APPENDIX J – Traffic Report

Hall & Foreman, Inc.
Engineering • Surveying • Planning • Landscape Architecture

TRAFFIC IMPACT ANALYSIS

Devil's Gate Reservoir Sediment Removal and Management Project

Los Angeles County, California

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UPDATED
DRAFT REPORT
October 18, 2013

Hall & Foreman, Inc.
Engineering ▪ Planning ▪ Surveying

October 18, 2013 Job No. VV.110264.0000

Paula Fell
Senior Environmental Planner
Chambers Group, Inc.
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Santa Ana, CA 92707

RE: TRAFFIC IMPACT ANALYSIS – DEVIL'S GATE RESERVOIR SEDIMENT REMOVAL AND MANAGEMENT PROJECT – LOS ANGELES COUNTY, CALIFORNIA

Dear Ms. Fell;

Hall & Foreman Inc. is pleased to submit this Traffic Impact Analysis report for the haul route alternatives for the Devil's Gate Reservoir Sediment Removal and Management Project. Devil's Gate Dam and Reservoir is located to the north east of the I-210 Freeway in the City of Pasadena. Devil's Gate Dam and Reservoir serves as a critical component of the Los Angeles County Flood Control District since it provides flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles. The sediment removal is proposed to be taken to eight potential disposal sites that have been identified by the County of Los Angeles.

The report examines the traffic impacts specifically along the project haul routes. The report also addresses the impacts of ambient growth within the area to assure that cumulative traffic mitigations can be addressed.

We are pleased to have been of assistance to you in processing and obtaining approval for the project. If you have any questions or comments, please feel free to contact me at 760-524-9115.

Respectfully submitted,

Hall & Foreman Inc.

REGISTERED PROFESSIONAL ENGINEER
ROBERT KILPATRICK
No. 1573
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STATE OF CALIFORNIA

Robert A. Kilpatrick, P.E., T.E.
Project Director/Associate

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1. INTRODUCTION

Project Description

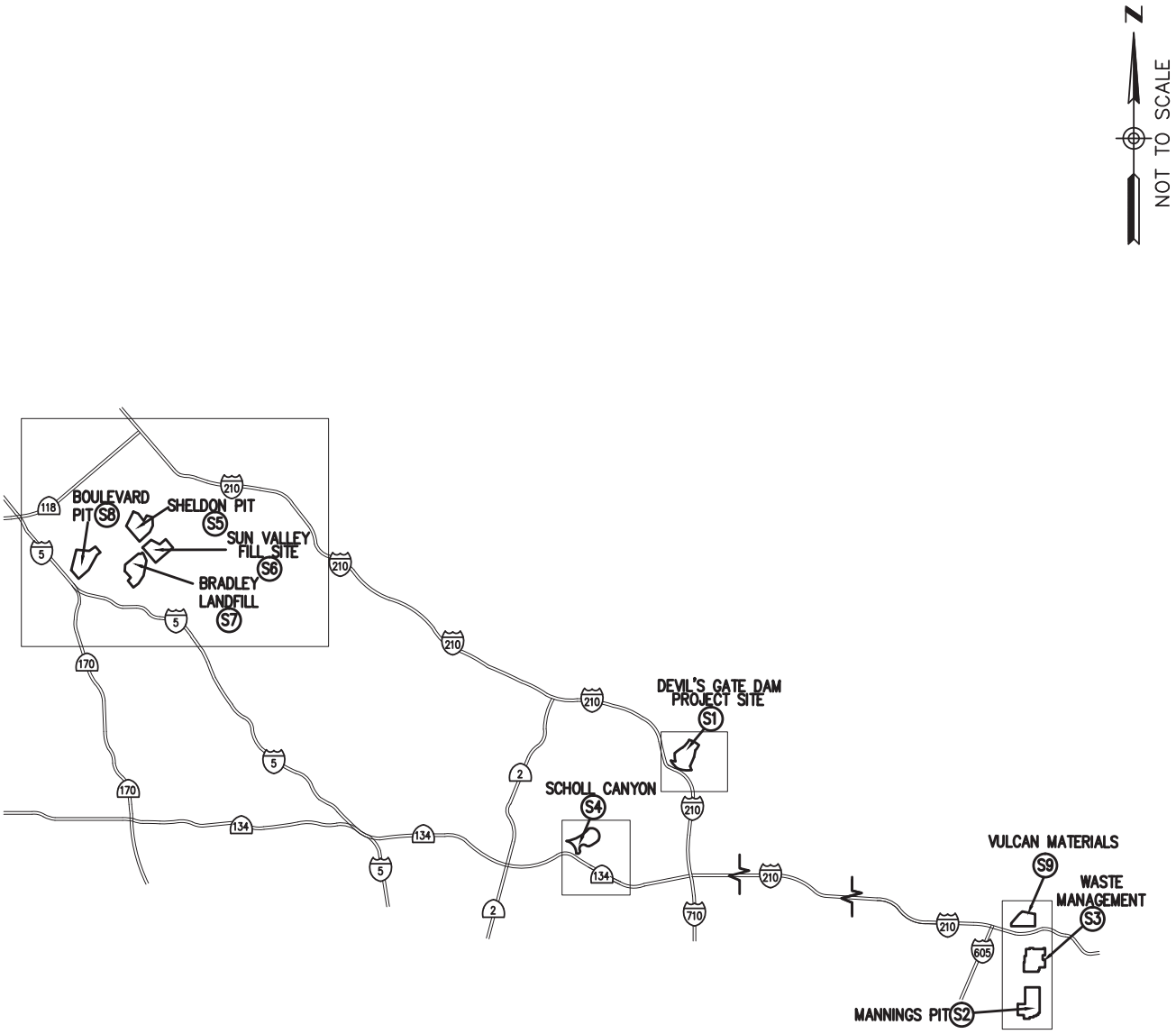
The County of Los Angeles has proposed a sediment removal project for the Devil's Gate Dam and Reservoir which is located to the northeast of the I-210 Freeway in the City of Pasadena, as illustrated in *Figure 1-1.* The project site is surrounded by residential communities to the south, and east of the site. Devil's Gate Dam and Reservoir serves as a critical component of the Los Angeles County Flood Control District since it provides flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles. The sediment removal is proposed to be taken to seven potential disposal sites that have been identified by the County of Los Angeles.

The Devil's Gate Dam and Reservoir site is located to the northeast of the I-210 Freeway on Oak Grove Drive between Berkshire Place and the Foothill Freeway Overpass. Access to the project site will be obtained from Oak Grove Drive. The sediment and organic materials removed from the dam is proposed to be transported to eight potential disposal sites within the county of Los Angeles. The sediment is proposed to be transported to potentially seven (7) disposal sites and one (1) green waste disposal site, as illustrated in *Figure 1-2.* The seven proposed disposal sites are the Manning's Pit, Waste Management, Vulcan Materials - Irwindale Site, Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and the Boulevard Pit. The Waste Management, Manning's Pit, and Vulcan Materials - Irwindale Site are to the east of the dam site in the cities of Azusa and Irwindale. The Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and the Boulevard Pit are to the northwest of the dam site in the City of Los Angeles, as illustrated in *Figure 1-3*. The proposed green waste disposal site is the Scholl Canyon Landfill, southwest of the dam in the Eagle Rock area within the City of Los Angeles.

The On-site excavation hours is proposed to occur between the hours of 7 AM to 6 PM Standard Time, 7 AM to 7 PM Daylight Savings Time, and Saturday 8 AM to 5 PM. The operational period is divided into three peak hour periods. The AM peak period consists of the hours 7 AM to 10 AM. The MIDDAY peak period consists of the hours 10 AM to 4 PM. The PM peak period consists of the hours 4 PM to 6 PM Standard Time, 4 PM to 7 PM Daylight Savings Time.

The proposed Haul Trucks are Double Dump Trucks estimated to haul 18 cubic yards of sediment. The trucks are anticipated to haul approximately 7.65 thousand cubic yards per day. A proposed 50 trucks per hour will be removing up to 4 million cubic yards of sediment and organic materials during the sediment removal phase of the project.

This traffic study analyzed the existing conditions, the existing conditions with project trips (existing + project conditions), and the Year 2014 project conditions for the identified study intersections, freeway segments, and ramps. Twenty-six (26) haul routes are proposed for the transportation of the removed sediment to the proposed disposal sites. Along the 26 haul routes 52 intersections were identified for analysis. Twenty-eight (28) freeway segments along the I-210 Freeway, SR-134 Freeway, SR-2 Freeway, I-5 Freeway, and SR-118 freeway and fifty-four (54) on and off-ramps within those freeway segments were also identified for analysis. The sediment removal project phase is expected to generate 50 truck trips per hour with destinations to the potential seven disposal sites. It is estimated that a total of 17 and 425 average daily trips for autos and trucks will travel to and from the project site, respectively. Truck trip distributions were based on the existing capacity of the haul routes and intersections along the haul routes.



LEGEND

S# – DISPOSAL SITE

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DEVIL'S GATE PROJECT MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-1

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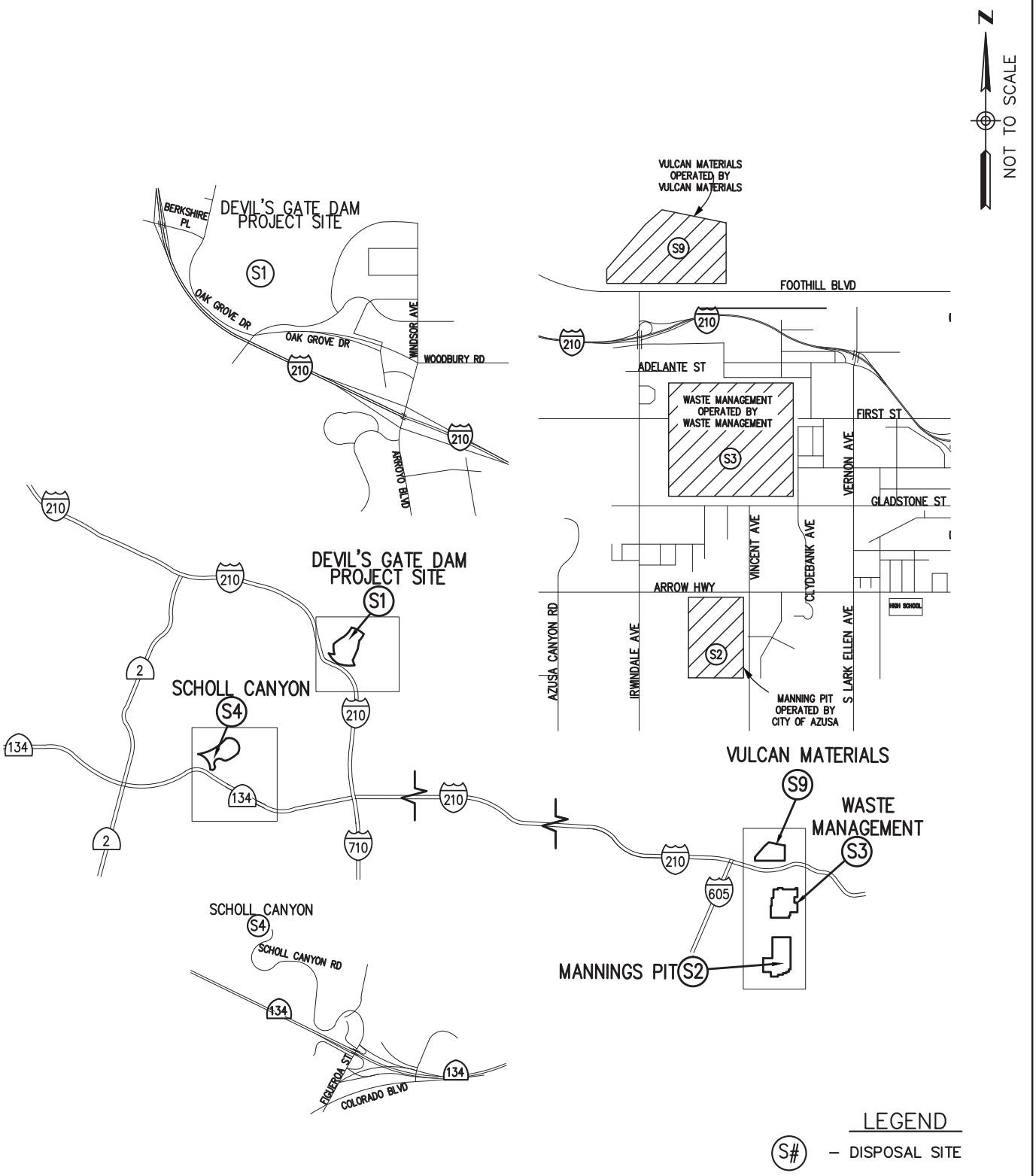

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DEVIL'S GATE, SCHOLL CANYON. WASTE MANAGEMENT, MANNINGS PIT, VULCAN MATERIALS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-2

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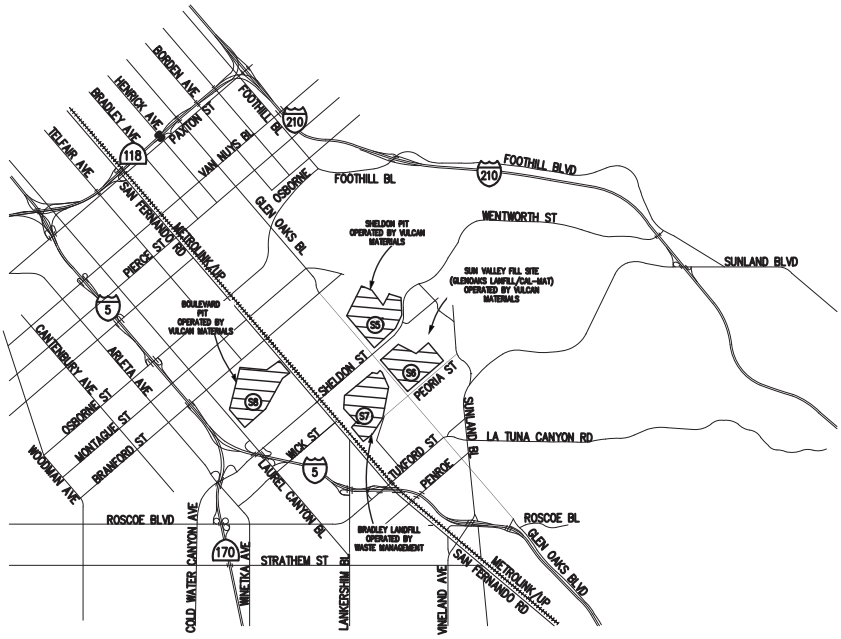

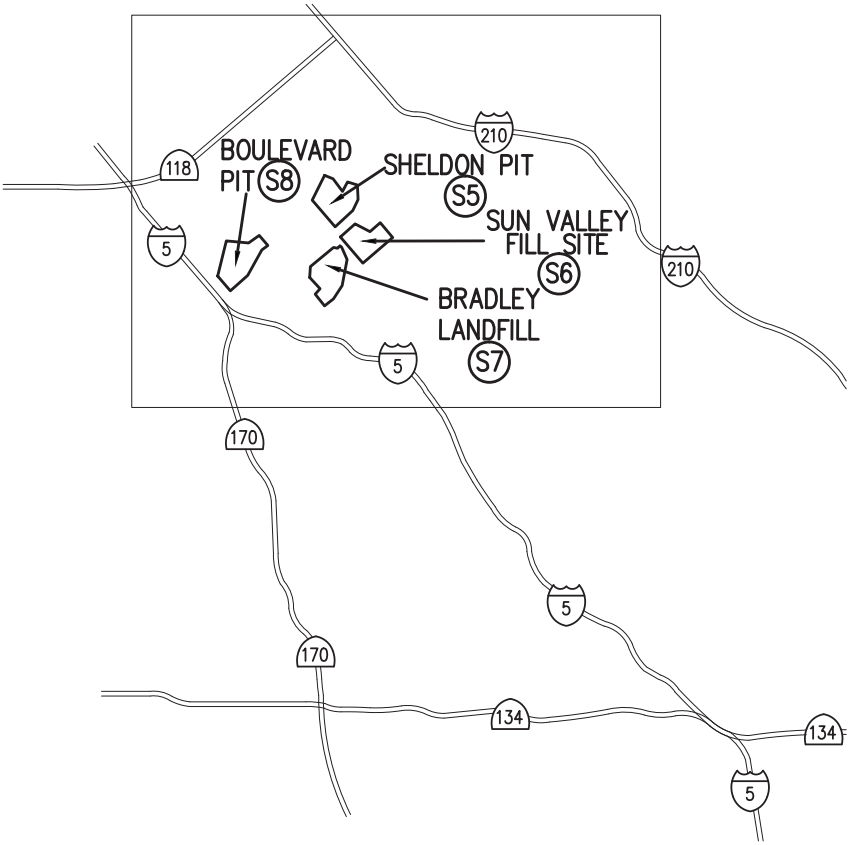

N

NOT TO SCALE

LEGEND

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SHELDON PIT, SUN VALLEY FILL SITE, BRADLEY LANDFILL, AND BOULEVARD PIT SITES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-3

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The Preferred Haul Routes

The preferred Haul Route to the east is the Haul Route 1D. The Haul Routes that utilize the Haul Route 1D are the Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4). The Manning's Pit preferred Haul Route is Haul Route 2A. The Waste Management preferred Haul Route is Haul Route 3. The Vulcan Materials - Irwindale Site preferred Haul Route is Haul Route 9. The Scholl Canyon Landfill preferred Haul Route is Haul Route 4A.

The preferred Haul Route to the west is the Haul Route 1H. The Haul Routes that utilize the Haul Route 1H are the Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The Sheldon Pit preferred Haul Route is Haul Route 5A. The Sun Valley Fill Site preferred Haul Route is Haul Route 6A. The Bradley Landfill preferred Haul Route is Haul Route 7A. The Boulevard Pit preferred Haul Route is Haul Route 8C.

Devil's Gate Dam Area (Site 1): Haul Route 1D

Haul Route 1D is the preferred route to Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4), disposal sites east of Devil's Gate Dam and Reservoir.

Preferred East Route – Devil's Gate Dam and Reservoir (Haul Route 1D) - Year 2014

Route1D		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	F	51.4	-	-	B	10.8	-	-	C	23.7	-	-	D	31.6	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.5	-	-	A	4.9	-	-	A	7.2	-	-	A	3.8	-	-
3	Oak Grove Drive and Berkshire Place	B	19.2	0.93	B	A	5.6	0.29	A	A	8.4	0.57	B	A	8	0.57	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	19.2	-	-	A	9.6	-	-	A	9.5	-	-	B	11.3	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.7	0.94	D	B	14.3	0.54	A	B	17.1	0.58	A	C	24.9	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	B	10.4	0.66	B	A	6	0.31	A	A	7.3	0.41	A	A	8.2	0.45	B

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 1D AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	-	D	-	E	YES	-	F	-	-	N/A
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	-	A	-	A	NO	-	A	-	-	N/A
3	Oak Grove Drive and Berkshire Place	0.50	A	0.67	A	NO	0.93	B	-	-	N/A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	-	B	-	C	NO	-	C	-	-	N/A
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	0.87	C	0.86	C	NO	0.94	C	-	-	N/A
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	0.53	A	0.57	A	NO	0.66	B	-	-	N/A

The Haul Route 1D is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir driveway does not require potential impact reduction measures.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the AM peak period.

Manning's Pit (Site 2): Haul Route 2A

Haul Route 2A is the preferred route for Manning's Pit, east of Devil's Gate Dam and Reservoir.

Preferred Route – Manning's Pit (Haul Route 2A) - Year 2014

Route 2A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Ave and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Ave and Gladstone Street	B	14.3	0.80	C	A	8.9	0.45	A	B	14.4	0.72	C
13	Vincent Ave and Arrow Hwy	B	17.6	0.90	D	A	9.8	0.45	A	B	15.4	0.93	D

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 2A AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Ave and I-210 Freeway Westbound Ramps	0.48	A	0.5	A	NO	0.56	A	-	-	N/A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.84	C	0.85	C	NO	0.93	C	-	-	N/A
10	Irwindale Ave and First Street	0.6	B	0.64	B	NO	0.63	B	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.81	C	0.87	C	NO	0.92	C	-	-	N/A
12	Vincent Ave and Gladstone Street	0.61	B	0.72	B	NO	0.8	B	-	-	N/A
13	Vincent Ave and Arrow Hwy	0.77	B	0.8	B	NO	0.9	B	-	-	N/A

The Haul Route 2A is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods without the need for potential impact reduction measures.

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Waste Management (Site 3): Haul Route 3

Haul Route 3 is the preferred route for Waste Management, east of Devil's Gate Dam and Reservoir.

Preferred Route – Waste Management (Haul Route 3) - Year 2014

Route 3		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Ave and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Ave and Gladstone Street	B	11.7	0.68	B	A	8.7	0.31	A	B	11.0	0.57	B

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

The Haul Route 3 is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods without the need for potential impact reduction measures. The Waste Management driveway is at the signalized study intersection of Vincent Avenue and Gladstone Street that does not require potential impact reduction measures.

Route 3 AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Ave and I-210 Freeway Westbound Ramps	0.48	A	0.5	A	NO	0.56	A	-	-	N/A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.84	C	0.85	C	NO	0.93	C	-	-	N/A
10	Irwindale Ave and First Street	0.6	B	0.64	B	NO	0.63	B	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.81	C	0.87	C	NO	0.92	C	-	-	N/A
12	Vincent Ave and Gladstone Street	0.61	B	0.65	B	NO	0.68	B	-	-	N/A

Vulcan Material (Site 9): Haul Route 9

Haul Route 9 is the preferred route for Vulcan Material – Irwindale Site, east of Devil's Gate Dam and Reservoir.

Preferred Route – Vulcan Material (Haul Route 9) - Year 2014

Route 9		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.2	0.57	A	A	7.5	0.54	A	A	7.5	0.58	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.90	C	C	22.5	0.80	C	C	26.6	0.88	D
53	Irwindale Ave and Foothill Boulevard	C	30.0	0.87	C	D	46.8	1.01	D	E	77.1	1.09	F*

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 9 PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Ave and I-210 Freeway Westbound Ramps	0.50	A	0.52	A	NO	0.58	A	-	-	N/A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.83	C	0.84	C	NO	0.88	C	-	-	N/A
53	Irwindale Ave and Foothill Boulevard	0.94	D	1.05	D	NO	1.09	E	-	-	N/A

The Haul Route 9 is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM, and MID-DAY peak periods without the need for potential impact reduction measures.

Irwindale Avenue (NS) and Foothill Boulevard (EW) (Vulcan Materials driveway): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Scholl Canyon Landfill Haul (Site 4): Route 4A

Haul Route 4A is the Scholl Canyon Landfill preferred route, east of Devil's Gate Dam and Reservoir.

Preferred Route – Scholl Canyon Landfill (Haul Route 4A) - Year 2014

Route 4A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	E	41.2	-	-	B	14.4	-	-	E	49.9	-	-
	With potential impact reduction measures (Lane Modification)	C	15.3	-	-	B	11.0	-	-	C	15.7	-	-
22	Figueroa St and Eagle Vista Drive	B	14.2	-	-	B	12.8	-	-	C	22.9	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	9.2	0.66	B	A	6.4	0.44	A	A	8.6	0.63	B

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 4A AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	-	D	-	E	YES	-	E	-	C	NO
22	Figueroa St and Eagle Vista Drive	-	B	-	B	NO	-	B	-	-	N/A
23	Figueroa St and SR-134 Freeway Eastbound Ramps	0.5	A	0.57	A	NO	0.66	A	-	-	N/A

Route 4A PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	-	D	-	D	NO	-	E	-	C	NO
22	Figueroa St and Eagle Vista Drive	-	C	-	C	NO	-	C	-	-	N/A
23	Figueroa St and SR-134 Freeway Eastbound Ramps	0.46	A	0.55	A	NO	0.63	A	-	-	N/A

The Haul Route 4A utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures. The following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

Devil's Gate Dam Area (Site 1): Haul Route 1H

Haul Route 1H is the preferred route for disposal sites Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8), east of Devil's Gate Dam and Reservoir.

Preferred East Route – Devil's Gate Dam and Reservoir (Haul Route 1H) - Year 2014

Route1H		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	10.4	-	-	A	4.6	-	-	A	6.6	-	-	A	3.5	-	-
3	Oak Grove Drive and Berkshire Place	B	19.2	0.93	B	A	5.6	0.29	A	A	8.4	0.57	B	A	8	0.57	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	19.2	-	-	A	9.6	-	-	A	9.5	-	-	B	11.3	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.7	0.94	D	B	14.3	0.54	A	B	17.1	0.58	A	C	24.9	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.7	0.61	B	A	5.7	0.37	A	A	6.4	0.37	A	A	7.8	0.44	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	28.6	0.57	A	B	16.1	0.39	A	B	17.4	0.42	A	C	26.8	0.63	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 1H AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	-	A	-	A	NO	-	B	-	-	N/A
3	Oak Grove Drive and Berkshire Place	0.50	A	0.67	A	NO	0.93	B	-	-	N/A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	-	B	-	C	NO	-	C	-	-	N/A
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	0.87	C	0.86	C	NO	0.94	C	-	-	N/A
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	0.53	A	0.55	A	NO	0.61	A	-	-	N/A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	0.49	C	0.53	C	NO	0.57	C	-	-	N/A

The Haul Route 1H is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir entrance and access to Oak Grove Drive Oak Grove Drive for Route 1H to access the Devil's Gate Dam and Reservoir does not require potential impact reduction measures.

Sheldon Pit (Site 5): Haul Route 5A

Haul Route 5A is the preferred route for Sheldon Pit, west of Devil's Gate Dam and Reservoir.

Preferred Route – Sheldon Pit (Haul Route 5A) – Year 2014

Route 5A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 5A AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.51	A	0.57	A	NO	0.30	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.60	A	0.63	A	NO	0.32	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.89	B	1.16	D	NO	0.78	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.99	E	1.13	F	YES	1.15	F	-	-	YES
28	Glenoaks Blvd and Montague Street	0.69	A	0.72	A	NO	0.79	B	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.77	B	0.81	B	NO	0.80	B	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.78	B	NO	0.86	B	-	-	N/A

Route 5A PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.46	A	0.50	A	NO	0.56	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.39	A	0.41	A	NO	0.44	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.73	B	0.91	B	NO	0.88	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.90	D	0.90	D	NO	0.95	E	-	-	YES
28	Glenoaks Blvd and Montague Street	0.55	A	0.58	A	NO	0.62	A	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.76	C	0.80	C	NO	0.91	C	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.95	B	NO	1.10	C	-	-	N/A

The Haul Route 5A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6A

Haul Route 6A is the preferred route for Sun Valley Fill Site, west of Devil's Gate Dam and Reservoir.

Preferred Route – Sun Valley Fill Site (Haul Route 6A) – Year 2014

Route 6A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 6A AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.51	A	0.57	A	NO	0.30	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.60	A	0.63	A	NO	0.32	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.89	B	1.16	D	NO	0.78	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.99	E	1.13	F	YES	1.15	F	-	-	YES
28	Glenoaks Blvd and Montague Street	0.69	A	0.72	A	NO	0.79	B	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.77	B	0.81	B	NO	0.80	B	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.78	B	NO	0.86	B	-	-	N/A

Route 6A PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.46	A	0.50	A	NO	0.56	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.39	A	0.41	A	NO	0.44	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.73	B	0.91	B	NO	0.88	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.90	D	0.90	D	NO	0.95	E	-	-	YES
28	Glenoaks Blvd and Montague Street	0.55	A	0.58	A	NO	0.62	A	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.76	C	0.80	C	NO	0.91	C	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.95	B	NO	1.10	C	-	-	N/A

The Haul Route 6A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Bradley Landfill (Site 7): Haul Route 7A

Haul Route 7A is the Bradley Landfill preferred route, west of Devil's Gate Dam and Reservoir.

Preferred Route – Bradley Landfill (Haul Route 7A) – Year 2014

Route 7A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	16.0	0.89	E	A	7.7	0.52	A	B	14.7	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.2	0.64	A	A	5.4	0.42	A	A	6.4	0.56	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 7A AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.51	A	0.57	A	NO	0.30	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.60	A	0.63	A	NO	0.32	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.89	B	1.16	D	NO	0.78	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.99	E	1.13	F	YES	1.15	F	-	-	YES
28	Glenoaks Blvd and Montague Street	0.69	A	0.72	A	NO	0.79	B	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.77	B	0.81	B	NO	0.80	B	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.79	B	NO	0.89	B	-	-	N/A
31	Glenoaks Blvd and Peoria Street	0.54	B	0.61	A	NO	0.64	A	-	-	N/A

Route 7A PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
24	Foothill Blvd and I-210 Westbound Ramps	0.46	A	0.50	A	NO	0.56	A	-	-	N/A
25	Foothill Blvd and I-210 Eastbound Ramps	0.39	A	0.41	A	NO	0.44	A	-	-	N/A
26	Foothill Blvd and Osborne Street	0.73	B	0.91	B	NO	0.88	C	-	-	N/A
27	Glenoaks Blvd and Osborne Street	0.90	D	0.90	D	NO	0.95	E	-	-	YES
28	Glenoaks Blvd and Montague Street	0.55	A	0.58	A	NO	0.62	A	-	-	N/A
29	Glenoaks Blvd and Branford Street	0.76	C	0.80	C	NO	0.91	C	-	-	N/A
30	Glenoaks Blvd and Sheldon Street	0.75	B	0.78	B	NO	0.86	B	-	-	N/A
31	Glenoaks Blvd and Peoria Street	0.52	B	0.55	A	NO	0.56	A	-	-	N/A

The Haul Route 7A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures. The Bradley Landfill driveway does not require potential impact reduction measures.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Boulevard Pit (Site 8): Haul Route 8C

Haul Route 8C is the Boulevard Pit preferred route west of Devil's Gate Dam and Reservoir.

Preferred Route – Boulevard Pit (Haul Route 8C) – Year 2014

Route 8C		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glen Oaks Blvd and Sheldon Street	B	14.7	0.87	D	A	7.6	0.50	A	B	13.7	0.86	D
31	Glen Oaks Blvd and Peoria Street	A	6.6	0.59	A	A	9.0	0.39	A	B	16.9	0.53	A
32	Glen Oaks Blvd and Tuxford Street	D	40.1	1.10	E	A	8.9	0.63	B	B	11.1	0.81	C
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramp	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A
48	Tuxford Street and San Fernando Road	D	40.1	0.80	C	C	34.7	0.80	B	C	34.8	0.75	C
49	Lankershim Blvd and San Fernando Road	A	8.6	0.57	A	A	7.8	0.47	A	A	9.6	0.55	A
50	Sheldon Street and San Fernando Road	C	34.8	0.80	C	C	24.3	0.54	A	E	58.1	1.03	E
51	Branford Street and San Fernando Road	D	38.0	0.89	B	C	30.7	0.51	A	F	84.0	0.99	D

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 8C PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
30	Glen Oaks Blvd and Sheldon Street	0.75	B	0.75	B	NO	0.86	B	-	-	N/A
31	Glen Oaks Blvd and Peoria Street	0.52	B	0.54	B	NO	0.53	B	-	-	N/A
32	Glen Oaks Blvd and Tuxford Street	0.54	A	0.65	A	NO	0.81	B	-	-	N/A
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	-	A	-	A	NO	-	A	-	-	N/A
45	Wheatland Ave and I-210 Freeway Westbound Ramp	-	A	-	A	NO	-	B	-	-	N/A
46	Wheatland Ave and Foothill Blvd	0.27	A	0.43	B	NO	0.47	B	-	-	N/A
47	Wentworth Street and Foothill Blvd	0.42	A	0.43	A	NO	0.48	A	-	-	N/A
48	Tuxford Street and San Fernando Road	0.73	C	0.71	D	NO	0.75	C	-	-	N/A
49	Lankershim Blvd and San Fernando Road	0.46	A	0.51	A	NO	0.55	A	-	-	N/A
50	Sheldon Street and San Fernando Road	0.94	D	0.94	D	NO	1.03	E	-	-	N/A
51	Branford Street and San Fernando Road	0.92	E	0.95	E	NO	0.99	F	-	-	N/A

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-DAY peak periods without the need for potential impact reduction measures.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Sheldon Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Branford Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the PM peak period.

The Alternate Haul Routes

The Alternate Haul Route to the east is the Haul Route 1B. The Haul Routes that utilize the Haul Route 1B to and from Devil's Gate Dam and Reservoir are the Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9). The Manning's Pit alternate Haul Route is Haul Route 2B. The Waste Management alternate Haul Route is Haul Route 3. The Vulcan Materials - Irwindale Site alternate Haul Route is Haul Route 9.

The Alternate Haul Route to the west is the Haul Route 1F. The Haul Routes that utilize the Haul Route 1F to and from Devil's Gate Dam and Reservoir are the Scholl Canyon Landfill (Site 4), Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The Scholl Canyon Landfill alternate Haul Route is Haul Route 4B.The Sheldon Pit alternate Haul Route is Haul Route 5C. The Sun Valley Fill Site alternate Haul Route is Haul Route 6C. The Bradley Landfill alternate Haul Route is Haul Route 7C. The Boulevard Pit alternate Haul Route is Haul Route 8B.

Devil's Gate Dam Area (Site 1): Haul Route 1B

Haul Route 1B is an alternative route to the disposal sites Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4), east of Devil's Gate Dam and Reservoir.

Alternative East Route – Devil's Gate Dam and Reservoir (Haul Route 1B)

Route1B		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	21.0	-	-	A	9.9	-	-	A	9.8	-	-	B	12.0	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.6	0.94	D	B	14.4	0.59	A	B	17.1	0.58	A	C	24.7	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	B	10.8	0.68	B	A	6.8	0.37	A	A	6.9	0.37	A	A	8.3	0.48	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	23.7	0.39	A	C	30.9	0.42	A	C	28.4	0.42	A	C	28.5	0.62	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 1B AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
4	Oak Grove Drive and Foothill Freeway Overpass (3)	-	B	-	C	NO	-	C	-	-	N/A
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	0.87	C	0.86	C	NO	0.94	C	-	-	N/A
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	0.53	A	0.60	A	NO	0.68	B	-	-	N/A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	0.49	C	0.53	C	NO	0.39	C	-	-	N/A

The use of Haul Route 1B requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena. The Haul Route 1B is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Manning's Pit (Site 2): Haul Route 2B

The Haul Route 2B is the alternate route for Manning's Pit, east of Devil's Gate Dam and Reservoir.

Preferred Route – Manning's Pit (Haul Route 2B) - Year 2014

Route 2B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.2	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	13.8	0.65	B	B	18.5	0.65	B	D	50.3	0.93	C
11	Irwindale Ave and Gladstone Street	C	31.9	0.91	D	B	15.2	0.67	B	C	27.6	0.95	D
12	Vincent Ave and Gladstone Street	B	12.6	0.74	B	A	8.7	0.38	A	B	14.2	0.72	C
13	Vincent Ave and Arrow Hwy	B	17.5	0.90	D	A	9.8	0.45	A	B	15.4	0.93	D
14	Arrow Hwy and Lark Ellen Ave	E	61.5	0.97	D	D	40.3	0.72	B	E	55.4	0.94	E
15	Arrow Hwy and Enid Ave	D	55.0	1.35	E	B	12.8	0.50	A	B	14.4	0.70	C
16	Azusa Ave and Arrow Hwy	E	63.8	1.15	D	E	55.4	0.96	D	E	58.4	1.04	E
17	Azusa Ave and Gladstone Street	E	61.5	1.01	D	D	38.3	0.91	C	D	38.0	0.87	D
18	Azusa Ave and I-210 Freeway Eastbound Ramps	B	12.1	0.71	A	B	11.7	0.75	A	B	10.3	0.65	A
19	Azusa Ave and First Street	D	46.2	0.87	D	B	16.3	0.57	A	B	18.9	0.69	B
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	E	69.2	1.40	E	B	11.6	0.63	B	B	17.1	0.87	C

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 2B AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.84	C	0.85	C	NO	0.93	C	-	-	N/A
10	Irwindale Ave and First Street	0.60	B	0.64	B	NO	0.65	B	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.81	C	0.88	C	NO	0.91	C	-	-	N/A
12	Vincent Ave and Gladstone Street	0.61	B	0.63	B	NO	0.74	B	-	-	N/A
13	Vincent Ave and Arrow Hwy	0.77	B	0.80	B	NO	0.90	B	-	-	N/A
14	Arrow Hwy and Lark Ellen Ave	0.88	D	0.88	D	NO	0.97	E	-	-	N/A
15	Arrow Hwy and Enid Ave	1.00	C	1.08	C	NO	1.35	D	-	-	N/A
16	Azusa Ave and Arrow Hwy	0.95	D	1.04	D	NO	1.15	E	-	-	N/A
17	Azusa Ave and Gladstone Street	0.89	D	0.93	D	NO	1.01	E	-	-	N/A
18	Azusa Ave and I-210 Freeway Eastbound Ramps	0.63	A	0.64	B	NO	0.71	B	-	-	N/A
19	Azusa Ave and First Street	0.82	C	0.84	D	NO	0.87	D	-	-	N/A
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	1.13	D	1.19	D	NO	1.40	E	-	-	N/A

Route 2B MIDDAY Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.71	B	0.72	B	NO	0.79	C	-	-	N/A
10	Irwindale Ave and First Street	0.60	B	0.60	B	NO	0.65	B	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.51	B	0.57	B	NO	0.67	B	-	-	N/A
12	Vincent Ave and Gladstone Street	0.30	A	0.31	A	NO	0.38	A	-	-	N/A
13	Vincent Ave and Arrow Hwy	0.36	A	0.40	A	NO	0.45	A	-	-	N/A
14	Arrow Hwy and Lark Ellen Ave	0.62	C	0.67	C	NO	0.72	D	-	-	N/A
15	Arrow Hwy and Enid Ave	0.43	B	0.48	B	NO	0.50	B	-	-	N/A
16	Azusa Ave and Arrow Hwy	0.91	D	0.95	D	NO	0.96	E	-	-	YES
17	Azusa Ave and Gladstone Street	0.75	C	0.79	C	NO	0.91	D	-	-	N/A
18	Azusa Ave and I-210 Freeway Eastbound Ramps	0.63	A	0.67	A	NO	0.75	B	-	-	N/A
19	Azusa Ave and First Street	0.53	B	0.53	B	NO	0.57	B	-	-	N/A
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	0.54	B	0.56	B	NO	0.63	B	-	-	N/A

Route 2B PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.83	C	0.84	C	NO	0.91	C	-	-	N/A
10	Irwindale Ave and First Street	0.69	B	0.69	C	NO	0.93	D	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.84	B	0.88	C	NO	0.95	C	-	-	N/A
12	Vincent Ave and Gladstone Street	0.57	B	0.60	B	NO	0.72	B	-	-	N/A
13	Vincent Ave and Arrow Hwy	0.73	B	0.77	B	NO	0.93	B	-	-	N/A
14	Arrow Hwy and Lark Ellen Ave	0.79	D	0.82	D	NO	0.94	E	-	-	N/A
15	Arrow Hwy and Enid Ave	0.64	B	0.68	B	NO	0.70	B	-	-	N/A
16	Azusa Ave and Arrow Hwy	0.94	D	0.96	D	NO	1.04	E	-	-	N/A
17	Azusa Ave and Gladstone Street	0.77	C	0.85	C	NO	0.87	D	-	-	N/A
18	Azusa Ave and I-210 Freeway Eastbound Ramps	0.58	A	0.59	A	NO	0.65	B	-	-	N/A
19	Azusa Ave and First Street	0.64	B	0.64	B	NO	0.69	B	-	-	N/A
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	0.78	B	0.82	B	NO	0.87	B	-	-	N/A

The Haul Route is anticipated to operate at an unacceptable LOS at Arrow Hwy and Lark Ellen Ave, Azusa Ave and Arrow Hwy, Azusa Ave and Gladstone Street, and First Street and Alameda Street/I-210 Freeway Westbound Ramps during the AM, MID-DAY, and PM peak periods.

Arrow Hwy (EW) and Lark Ellen Ave (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Azusa Ave (NS) and Arrow Hwy (EW): The Intersection is anticipated to operate at an unacceptable LOS throughout the day. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS throughout the day.

Azusa Ave (NS) and Gladstone Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

First Street (EW) and Alameda Street/I-210 Freeway Westbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Waste Management (Site 3): Haul Route 3

The Waste Management is provided with a single route as such does not have an alternate route other than Haul Route 3. The Haul Route 3 is the preferred route for Waste Management, east of Devil's Gate Dam and Reservoir.

Preferred Route – Waste Management (Haul Route 3) - Year 2014

Route 3		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Ave and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Ave and Gladstone Street	B	11.7	0.68	B	A	8.7	0.31	A	B	11.0	0.57	B

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 3 AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Ave and I-210 Freeway Westbound Ramps	0.48	A	0.5	A	NO	0.56	A	-	-	N/A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.84	C	0.85	C	NO	0.93	C	-	-	N/A
10	Irwindale Ave and First Street	0.6	B	0.64	B	NO	0.63	B	-	-	N/A
11	Irwindale Ave and Gladstone Street	0.81	C	0.87	C	NO	0.92	C	-	-	N/A
12	Vincent Ave and Gladstone Street	0.61	B	0.65	B	NO	0.68	B	-	-	N/A

The Haul Route 3 is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods without the need for potential impact reduction measures. The Waste Management driveway is at the signalized study intersection of Vincent Avenue and Gladstone Street that does not require potential impact reduction measures.

Vulcan Material (Site 9): Haul Route 9

The Vulcan Material – Irwindale Site is provided with a single route as such does not have an alternate route other than Haul Route 9. Haul Route 9 is the preferred route for Vulcan Material – Irwindale Site, east of Devil's Gate Dam and Reservoir.

Preferred Route – Vulcan Material (Haul Route 9) - Year 2014

Route 9		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.2	0.57	A	A	7.5	0.54	A	A	7.5	0.58	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.90	C	C	22.5	0.80	C	C	26.6	0.88	D
53	Irwindale Ave and Foothill Boulevard	C	30.0	0.87	C	D	46.8	1.01	D	E	77.1	1.09	F*

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 9 PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
8	Irwindale Ave and I-210 Freeway Westbound Ramps	0.50	A	0.52	A	NO	0.58	A	-	-	N/A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	0.83	C	0.84	C	NO	0.88	C	-	-	N/A
53	Irwindale Ave and Foothill Boulevard	0.94	D	1.05	D	NO	1.09	E	-	-	N/A

The Haul Route 9 is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM, and MID-DAY peak periods without the need for potential impact reduction measures.

Irwindale Avenue (NS) and Foothill Boulevard (EW) (Vulcan Materials driveway): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route, therefore, is anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Devil's Gate Dam Area (Site 1): Haul Route 1F

Haul Route 1F is the alternate route for disposal sites Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8), east of Devil's Gate Dam and Reservoir.

Alternative Route – Devil's Gate Dam and Reservoir (Haul Route 1F) – Year 2014

Route1F		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	21	-	-	A	9.9	-	-	A	9.8	-	-	B	12	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.6	0.94	D	B	14.4	0.59	A	B	17.1	0.58	A	C	24.7	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.9	0.62	B	A	5.5	0.31	A	A	5.6	0.27	A	A	7.9	0.47	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	28.6	0.57	A	B	16.1	0.39	A	B	17.4	0.42	A	C	26.8	0.63	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 1F AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without Potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
4	Oak Grove Drive and Foothill Freeway Overpass (3)	-	B	-	C	NO	-	C	-	-	N/A
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	0.87	C	0.86	C	NO	0.94	C	-	-	N/A
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	0.53	A	0.56	A	NO	0.62	A	-	-	N/A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	0.49	C	0.53	C	NO	0.57	C	-	-	N/A

The use of Haul Route 1F requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena. The Haul Route 1F is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Scholl Canyon Landfill Haul (Site 4): Route 4B

Haul Route 4B is the Scholl Canyon Landfill alternate route, west of Devil's Gate Dam and Reservoir.

Preferred Route – Scholl Canyon Landfill (Haul Route 4B) - Year 2014

Route 4B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	E	41.3	-	-	B	14.3	-	-	F	53.8	-	-
	With potential impact reduction measures (Lane Modification)	C	17.6	-	-	B	12.9	-	-	D	28.3	-	-
22	Figueroa St and Eagle Vista Drive	B	14.2	-	-	B	12.8	-	-	C	22.9	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	8.1	0.54	B	A	7.1	0.37	A	A	8	0.55	B

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 4B AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	-	D	-	D	NO	-	E	-	C	N/A
22	Figueroa St and Eagle Vista Drive	-	B	-	B	NO	-	B	-	-	N/A
23	Figueroa St and SR-134 Freeway Eastbound Ramps	0.50	A	0.52	A	NO	0.54	A	-	-	N/A

Route 4B PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and potential impact reduction measures		Difference with vs. without potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	-	D	-	E	YES	-	F	-	D	NO
22	Figueroa St and Eagle Vista Drive	-	C	-	C	NO	-	C	-	-	N/A
23	Figueroa St and SR-134 Freeway Eastbound Ramps	0.46	A	0.48	A	NO	0.55	A	-	-	N/A

The Haul Route 4B utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures. The following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

Sheldon Pit (Site 5): Haul Route 5C

Haul Route 5C is the alternate route for Sheldon Pit, west of Devil's Gate Dam and Reservoir.

Preferred Route – Sheldon Pit (Haul Route 5C) – Year 2014

Route 5C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
44	Wheatland Ave and I- 210 Freeway Eastbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10.0	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 5C AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential impact reduction measures		Difference with vs. without Potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	-	A	-	A	NO	-	A	-	-	N/A
45	Wheatland Ave and I-210 Freeway Westbound Ramp	-	A	-	B	NO	-	B	-	-	N/A
46	Wheatland Ave and Foothill Blvd	0.25	A	0.42	B	NO	0.46	B	-	-	N/A
47	Wentworth Street and Foothill Blvd	0.69	B	0.78	B	NO	0.88	C	-	-	N/A

The Haul Route 5C utilized intersections are anticipated to continue to operate at an LOS C or better throughout the day.

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6C

Haul Route 6C is the alternate route for Sun Valley Fill Site, west of Devil's Gate Dam and Reservoir.

Preferred Route – Sun Valley Fill Site (Haul Route 6C) – Year 2014

Route 6C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	17.4	0.92	E	A	8.0	0.54	A	B	15.9	0.89	D
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 6C AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential impact reduction measures		Difference with vs. without Potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
30	Glen Oaks Blvd and Sheldon Street	0.75	B	0.75	B	NO	0.92	B	-	-	N/A
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	-	A	-	A	NO	-	A	-	-	N/A
45	Wheatland Ave and I-210 Freeway Westbound Ramp	-	A	-	B	NO	-	B	-	-	N/A
46	Wheatland Ave and Foothill Blvd	0.25	A	0.42	B	NO	0.46	B	-	-	N/A
47	Wentworth Street and Foothill Blvd	0.69	B	0.78	B	NO	0.88	C	-	-	N/A

The Haul Route 6C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

Bradley Landfill (Site 7): Haul Route 7C

Haul Route 7C is the Bradley Landfill alternate route, west of Devil's Gate Dam and Reservoir.

Preferred Route – Bradley Landfill (Haul Route 7C) – Year 2014

Route 7C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	14.7	0.87	D	A	7.6	0.50	A	B	13.7	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.2	0.64	A	A	5.4	0.42	A	A	6.4	0.56	A
44	Wheatland Ave and I- 210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 7C AM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential impact reduction measures		Difference with vs. without Potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
30	Glen Oaks Blvd and Sheldon Street	0.75	B	0.78	B	NO	0.87	B	-	-	N/A
31	Glen Oaks Blvd and Peoria Street	0.54	B	0.61	A	NO	0.64	A	-	-	N/A
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	-	A	-	A	NO	-	A	-	-	N/A
45	Wheatland Ave and I-210 Freeway Westbound Ramp	-	A	-	B	NO	-	B	-	-	N/A
46	Wheatland Ave and Foothill Blvd	0.25	A	0.42	B	NO	0.46	B	-	-	N/A
47	Wentworth Street and Foothill Blvd	0.69	B	0.78	B	NO	0.88	C	-	-	N/A

The Haul Route 7C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day. The Bradley Landfill driveway does not require potential impact reduction measures.

Boulevard Pit (Site 8): Haul Route 8B

Haul Route 8B is the Boulevard Pit alternate route west of Devil's Gate Dam and Reservoir.

Preferred Route – Boulevard Pit (Haul Route 8B) – Year 2014

Route 8B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
40	Branford Street and Laurel Canyon Blvd	C	21.9	1.00	D	B	11.0	0.54	C	D	37.2	1.21	F*
41	Osborne Street and I-5 Freeway Southbound Ramps	B	13.7	0.83	D	C	20.9	0.93	B	D	37.0	1.00	E
42	Osborne Street and I-5 Freeway Northbound Ramps	B	14.7	0.75	B	B	12.1	0.70	B	B	19.3	0.89	D
43	Osborne Street and Laurel Canyon Blvd	D	42.3	0.98	E	C	25.2	0.80	D	E	66.3	1.03	F

(*) F*- ICU LOS Exceeds LOS F

Source: **Hall & Foreman Inc**

Route 8C PM Peak Hour		Existing Conditions		Existing Plus Project Conditions		Difference with vs. without project	Year 2014 with Project		Year 2014 with Project and Potential impact reduction measures		Difference with vs. without Potential impact reduction measures
Intersection # / Name		HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact	HCM V/C	HCM LOS	HCM V/C	HCM LOS	Significant Impact
40	Branford Street and Laurel Canyon Blvd	0.76	B	1.06	C	NO	1.21	D	-	-	N/A
41	Osborne Street and I-5 Freeway Southbound Ramps	0.91	C	0.91	C	NO	1.00	D	-	-	N/A
42	Osborne Street and I-5 Freeway Northbound Ramps	0.83	C	0.83	B	NO	0.89	B	-	-	N/A
43	Osborne Street and Laurel Canyon Blvd	1.01	D	0.98	D	NO	1.03	E	-	-	N/A

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-DAY peak periods without the need for potential impact reduction measures.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Osborne Street (EW) and Laurel Canyon Blvd (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

2. CAPACITY ANALYSIS METHODOLOGY

Level of Service Analysis Criteria for Local Intersections:

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the Cities of Pasadena, La Cañada Flintridge, Los Angeles, Azusa, Irwindale, and unincorporated areas in the County of Los Angeles. In order to maintain adequate traffic flow it is important to meet the lowest acceptable service level at each intersection along the truck haul routes. In order to verify the intersection capacity analysis impacts, present Level-of-Service (LOS) were conducted for the signalized and un-signalized study intersections. Based on the existing intersection geometrics and traffic volumes during the AM, Mid-day, and PM peak hours, the intersection capacity analyses for the signalized and un-signalized intersections were conducted using Trafficware Ltd Synchro version 8 which implements the methods of the 2010 Highway Capacity Manual (HCM) and 2003 Intersection Capacity Utilization (ICU) methods.

It is important to note that each city/jurisdiction has different criteria and thresholds to identify the lowest acceptable service levels. Each jurisdiction along the truck haul routes follows either the ICU, CMA, or HCM methodologies for signalized intersections. Synchro analysis was used to conduct the intersection capacity analyses for the signalized and un-signalized intersections since Synchro can provide the LOS per the HCM and ICU methodologies. To further understand the concepts and differences between the methodologies, used by the local jurisdictions, each methodology is described below.

Critical Movement Analysis (CMA)

The Critical Movement Analysis (CMA) methodology is a method developed by the Transportation Research Board (TRB) Circular 212. Under the CMA methodology the Level-of-Service (LOS) is determined by dividing the volume of vehicles that pass through the facility over the capacity of that facility. This ratio is known as the volume-to-capacity (V/C) ratio. A V/C ratio value of 1.00 or greater indicates that an intersection is at or exceeding capacity. The V/C ratio value is based upon volumes by lane, signal phasing, and approach lane configurations. The LOS values range from LOS A to LOS F where a LOS A indicates excellent operating conditions and a LOS F represents congested conditions with excessive vehicle delay. The threshold table for signalized intersections per the CMA methodology is shown below.

TABLE 2-1
Critical Movement Analysis (CMA) - LOS and V/C Threshold

Level of Service (LOS)	Volume/Capacity Ratio (V/C)	Definition
A	0.000 - 0.600	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601 - 0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 – 0.800	GOOD. Occasionally, drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 – 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 – 1.00	POOR. Represents the most vehicles that intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	Greater than 1.000	FAILURE. Backups from nearby intersections or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

Source: **TRB**

Intersection Capacity Utilization (ICU)

The Intersection Capacity Utilization (ICU) traffic analysis methodology is a method that is similar to the Critical Movement Analysis (CMA) methodology. Like the CMA method the ICU method uses volume-to-capacity (V/C) ratios to determine a LOS for an intersection. However, the ICU method compares the V/C ratios of conflicting turn movements at an intersection, sums these critical conflicting V/C ratios for each intersection approach, and determines the overall ICU. The resulting ICU is expressed in terms of LOS, where LOS A represents free-flow activity and LOS F represents overcapacity operation. The ICU thresholds are similar to the thresholds of the CMA methodology but can vary by local jurisdictions.

HCM Methodology

The Highway Capacity Manual (HCM) traffic analysis methodology is a method developed by the Transportation Research Board (TRB). Under the HCM methodology the LOS of an intersection is determined based on the delay of vehicles at the intersections. For signalized intersections the HCM measures the LOS based on control delay. Control delay is a portion of the total delay attributed to a signalized intersection and consists of initial acceleration delay, queue move-up time, stopped delay, and final acceleration delay. The HCM bases its delay on an adjusted flow using a mean control delay for the highest 15 minute period within the hour. The LOS for signalized intersections ranges from LOS A, which indicates excellent operating conditions and a LOS F, which represents congested conditions with excessive vehicle delay. The threshold table for signalized intersections per the HCM 2010 methodology is shown below.

TABLE 2-2
HCM 2010 - LOS Criteria for Signalized Intersections

LOS	Control Delay per Vehicle (s/veh)
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

Source: **HCM 2010 Exhibit 18-1**

For un-signalized intersections the HCM measures the LOS based on the computed or measured control delay for Two Way Stop Controlled intersections (TWSC) and control delay for All Way Stop Controlled (AWSC) intersections. For a TWSC the LOS is computed for each movement and the most critical LOS is the one that describes the effectiveness of that intersection, which is typically the stop controlled left turn movement from the minor street. The threshold table for TWSC intersections per the HCM 2010 methodology is shown below.

TABLE 2-3
HCM 2010 - LOS Criteria for TWSC Intersections

LOS	Control Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: **HCM 2010 Exhibit 19-1**

For an AWSC intersection the LOS defines the whole intersection. The threshold table for AWSC intersections per the HCM 2010 methodology is shown below.

TABLE 2-4
HCM 2010 - LOS Criteria for AWSC Intersections

LOS	Control Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: **HCM 2010 Exhibit 20-2**

Level of Service Analysis Criteria for Freeways and Ramps:

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the I-210, I-5, SR-2, SR-134, and SR-118 freeways from which 28 freeway segments and 54 ramps were identified for analysis. The LOS analysis done on the freeway and ramps will be per Caltrans requirements, which consists of the use of the HCM 2010 methodologies. To determine the LOS per the HCM 2010 methodology, Highway Capacity (HCS) 2010 software, which is developed by McTrans, was used for the freeway mainline analysis, ramp analysis, and weaving analysis.

Freeway Mainline HCM Methodology:

The freeway mainline LOS analysis was done with existing mainline volumes provided by Caltrans for each segment identified for analysis. The HCM methodology for determining the LOS of a basic freeway segment consists of inputting the existing geometric data, free flow speed (FFS), base free flow speed (BFFS), and mainline volumes to specific formulas described in Chapter 23 of the HCM. The procedure consists of adjusting the BFFS and mainline volume based on the existing conditions of the freeway. After the adjustments are made a speed-flow curve is used to determine the average passenger car speed in order to compute the density of the freeway segment to determine the LOS of that segment.

To determine the mainline LOS the mainline volumes and required criteria are inputted into the HCS 2010 software which calculates the freeway segment density value using the HCM methodology. The resulting density value is then matched to the corresponding LOS value as presented in Table 2-5 shown below. Caltrans District 7 has established that the densities in a freeway mainline should not exceed 35.0 pc/mi/ln which corresponds to a LOS D. Caltrans has determined that freeway segments that operate below LOS D should be identified and improved to an acceptable LOS.

TABLE 2-5
Caltrans Freeway Mainline HCM LOS Criteria

LOS	Basic Freeway Segment Density (pc/mi/ln)
A	0 - 11.0
B	11.0 - 18.0
C	18.0 - 26.0
D	26.0 - 35.0
E	35.0 - 45.0
F	> 45.0

Source: **HCM 2000, Exhibit 23-2**

Ramp HCM Methodology:

The freeway ramp LOS analysis was conducted with existing ramp volumes counted by Newport Traffic Studies. The HCM methodology for determining the LOS of a freeway ramps consists of inputting the existing geometric data, ramp free flow speed, and the existing ramp volumes to specific formulas described in Chapter 25 of the HCM. The volume (demand) is adjusted and then a demand flow rate is computed for a merging (entering) maneuver in an on-ramp or a diverging (exiting) maneuver in an off-ramp. Capacity is then computed and compared to the adjusted flow. After this the density for the ramp can be computed and the LOS of the ramp can be determined.

To determine the freeway ramp LOS a ramp merge and diverge analysis was carried out through the use of the freeway-to-arterial interchanges analysis in the HCS software. According to Chapter 13 of the HCM, the merge and diverge ramp areas focus on an influential area of 1,500 feet, which includes the acceleration or deceleration lane and adjacent freeway lanes. The HCM methodology has three major steps that need to be followed.

The first step is the determination of traffic entering the freeway lanes immediately upstream of the merge area for a merging maneuver or at the beginning of a deceleration lane of the diverge area for a diverging maneuver. The second step is to determine the capacity for the corresponding segment. The final step is the determination of the density of flow within the influence area and the LOS based on that density value.

The HCS software computes a density value for a freeway ramp using the same HCM procedure. That density value can then be matched to the corresponding LOS values as presented in Table 2-6 shown below. Caltrans District 7 has established that the densities in a freeway ramp should not exceed 35.0 pc/mi/ln which corresponds to a LOS D. Caltrans has determined that freeway ramps that operate below LOS D should be identified and improved to an acceptable LOS.

TABLE 2-6
Caltrans Freeway Ramp HCM LOS Criteria

LOS	Freeway Ramp Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0
F	Exceeds Capacity

Source: **HCM 2000, Exhibit 25-4**

Freeway Weaving HCM Methodology:

Freeway weaving is defined as the crossing of two streams of traffic traveling in the same direction along a significant length of highway without the aid of traffic control devices. Freeway weaving can become complicated when on and off-ramps are spaced close together, spaced less than 2,500 feet apart and do not allow proper merging or diverging maneuvers. Weaving maneuvers can adversely affect the traffic on the mainline which is why freeway weaving is being analyzed in this study.

The freeway weaving LOS analysis was done with existing freeway volumes provided by Caltrans. The HCM methodology for determining the LOS of a weaving segment consists of inputting the existing geometric data, the free flow speed of the before and after weaving segments, and the weaving and non-weaving volumes into to specific formulas described in Chapter 24 of the HCM. To determine the freeway weaving LOS the HCS software was used. The HCS software computes a density for the weaving area based on the parameters inputted into the software. The density value can then be matched to the corresponding LOS values as presented in Table 2-7 shown below.

TABLE 2-7
Caltrans Freeway Weaving HCM LOS Criteria

LOS	Freeway Weaving Segment Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0 and ≤ 43.0
F	> 43.0

Source: **HCM 2000, Exhibit 24-2**

3. EXISTING CONDITIONS

Land-Use Description & Haul Routes

The Project site and proposed disposal sites are located in areas surrounded by residential neighborhoods and industrial and office buildings. The descriptions of the sites are as follows.

Devil's Gate Dam (Site 1)
Land uses to the south, and east of the dam consist of residential housing. A local high school is located just north of the dam on Oak Grove Drive. Oak Grove Drive is the main road fronting the project site and provides access to the I-210 through Berkshire Place and Windsor Avenue.

Manning's Pit (Site 2)
Land uses around the Manning's Pit consist of industrial and office buildings to the north of the site. Residential housing surrounds the disposal site to the south, west, and east. Vincent Avenue is the main street fronting the project. The site is operated by the City of Azusa.

Waste Management (Site 3)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. Gladstone Street is the main street fronting the project. The site is operated by Waste Management.

Vulcan Materials - Irwindale Site (Site 9)
Land uses to the north, south, and east of the site consist of industrial and office buildings and vacant land to the west of the site. Foothill Boulevard is the main street fronting the site. The site is operated by Vulcan Materials.

Scholl Canyon Landfill (Site 4)
Land uses around the Scholl Canyon Landfill consist of residential housing to the west of the site and vacant mountainous terrain to the north, south, and east of the site. Scholl Canyon Road is the main road fronting the project site. The site is operated by Los Angeles County.

Sheldon Pit (Site 5)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. The Sun Valley Fill Site is located just south across Sheldon Street. Glenoaks Blvd is the major road fronting the project site to the west and allows access to the I-5 Freeway. Access to the Sheldon Pit is provided through Sheldon Street. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. The Sheldon Pit is located just north across Sheldon Street. Glenoaks Blvd is the major road fronting the project site to the west and allows access to the I-5 Freeway. Access to the Sheldon Pit is provided through Sheldon Street. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

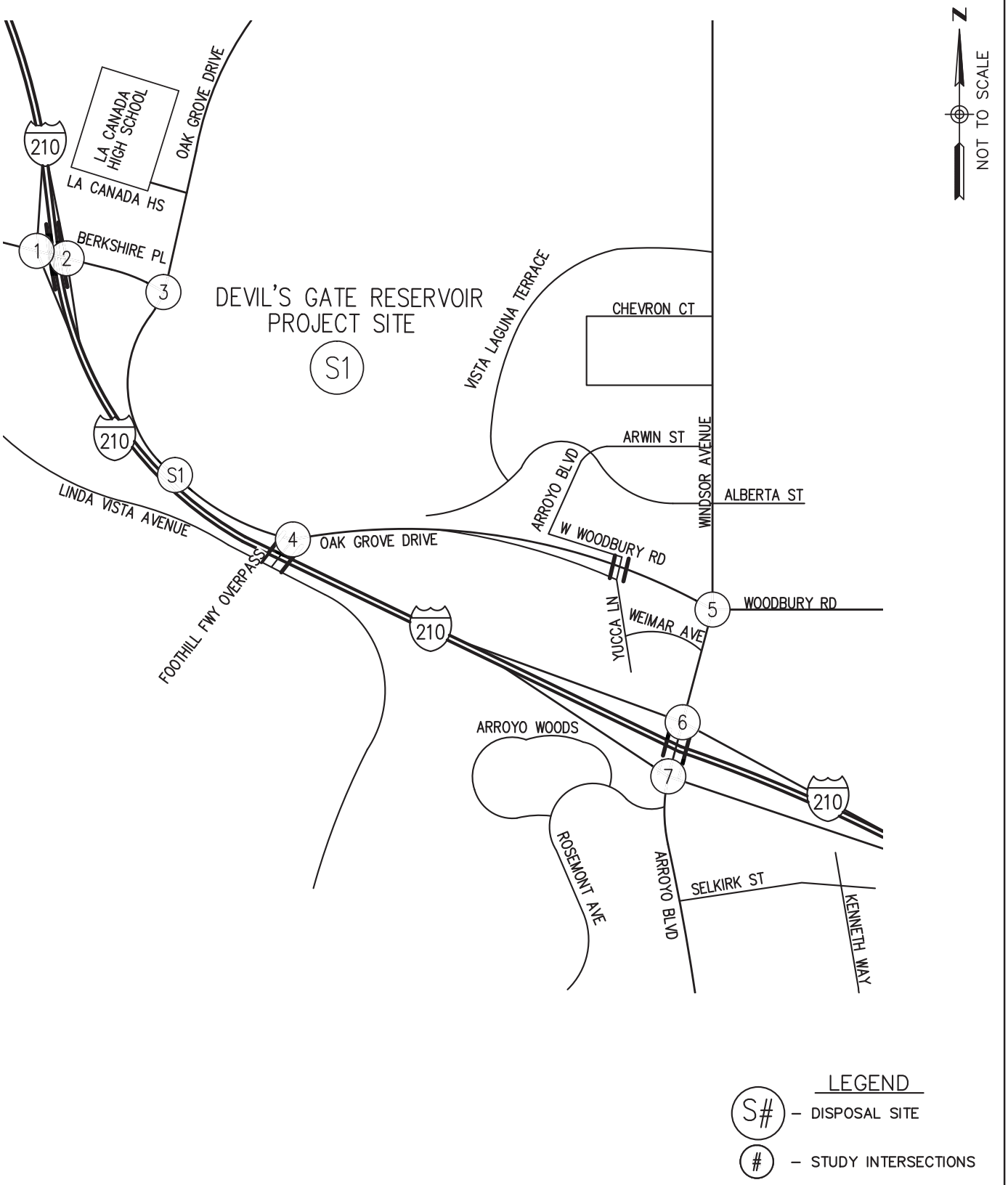
Bradley Landfill (Site 7)
Land uses to the north and south of the site consist of industrial and office buildings and residential housing to the west and east. The Sheldon Pit and Sun Valley Fill Site are located just to the east across Glenn Oaks Blvd. Access to the Bradley Landfill is found through Peoria Street. Glenoaks Blvd is the major road fronting the project site to the east and allows access to the I-5 Freeway. The site is operated by the Waste Management.

Boulevard Pit (Site 8)
Land uses to the north, south, and west of the site consist of residential housing and Industrial and office buildings to the east. The Bradley Landfill is located to the southeast of the disposal site. Access to the Boulevard Pit is found through Branford Street. Branford Street is the major road fronting the project site to the east and allows access to the I-5 Freeway. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

As identified, the sediment removed may be transported to the disposal sites through twenty-six (26) proposed haul routes. The proposed haul routes are outlined below:

Devil's Gate Dam & Reservoir Area

1.	Haul Route 1A	-Exit the WB I-210 Freeway at Berkshire Place. -Turn right onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the EB I-210 Freeway at Berkshire Place.
2.	Haul Route 1B	-Exit the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn right onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
3.	Haul Route 1C	-Exit the WB I-210 Freeway at Berkshire Place. -Turn right onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
4.	Haul Route 1D	-Exit the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn right onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the EB I-210 Freeway at Berkshire Place.
5.	Haul Route 1E	-Exit the EB I-210 Freeway at Berkshire Place. -Turn left onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the WB I-210 Freeway at Berkshire Place.
6.	Haul Route 1F	-Exit the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn left onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
7.	Haul Route 1G	-Exit the EB I-210 Freeway at Berkshire Place. -Turn left onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
8.	Haul Route 1H	-Exit the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn left onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the WB I-210 Freeway at Berkshire Place.



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DEVIL'S GATE RESERVOIR VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-1-1

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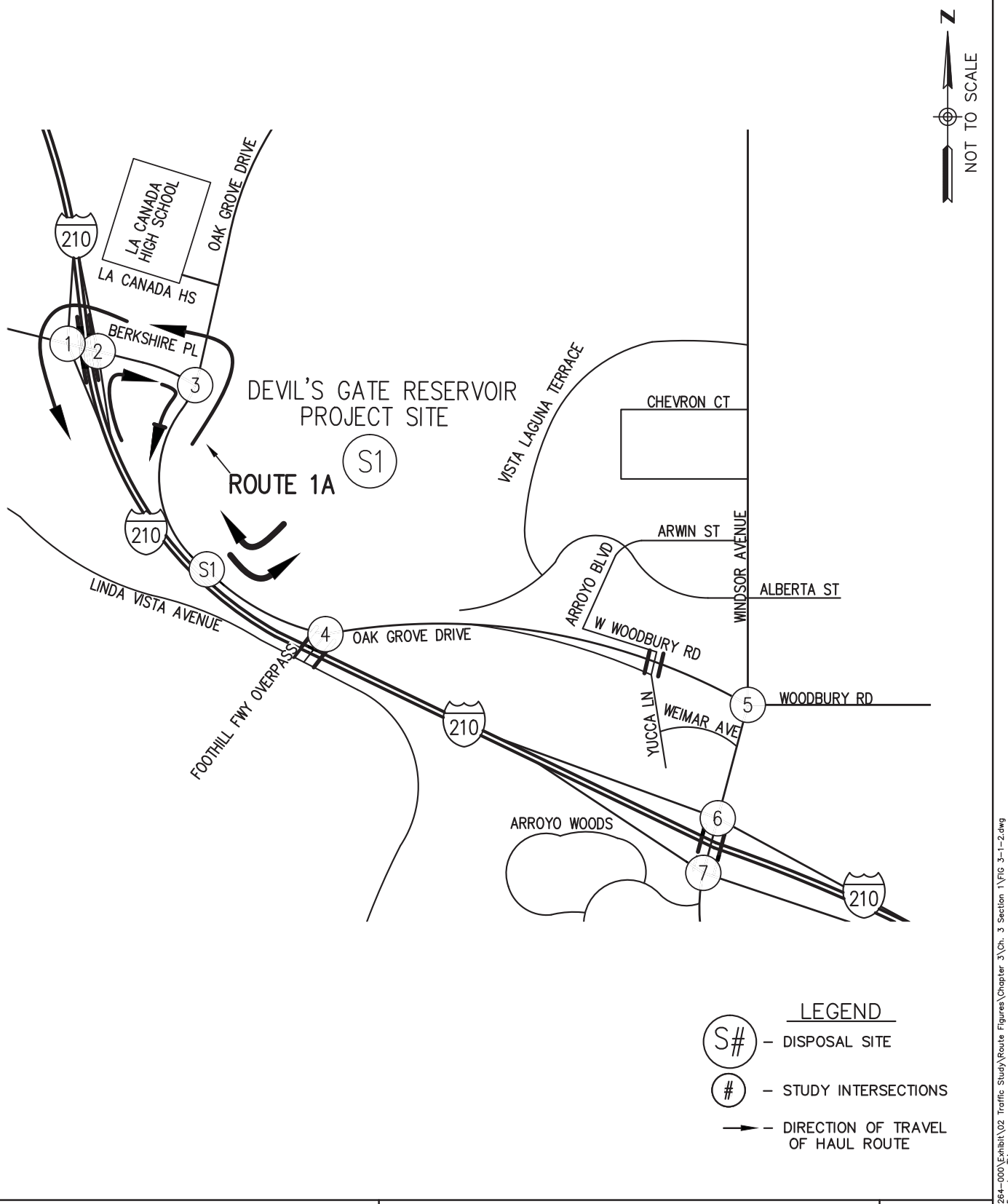

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HAUL ROUTE 1A

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-2

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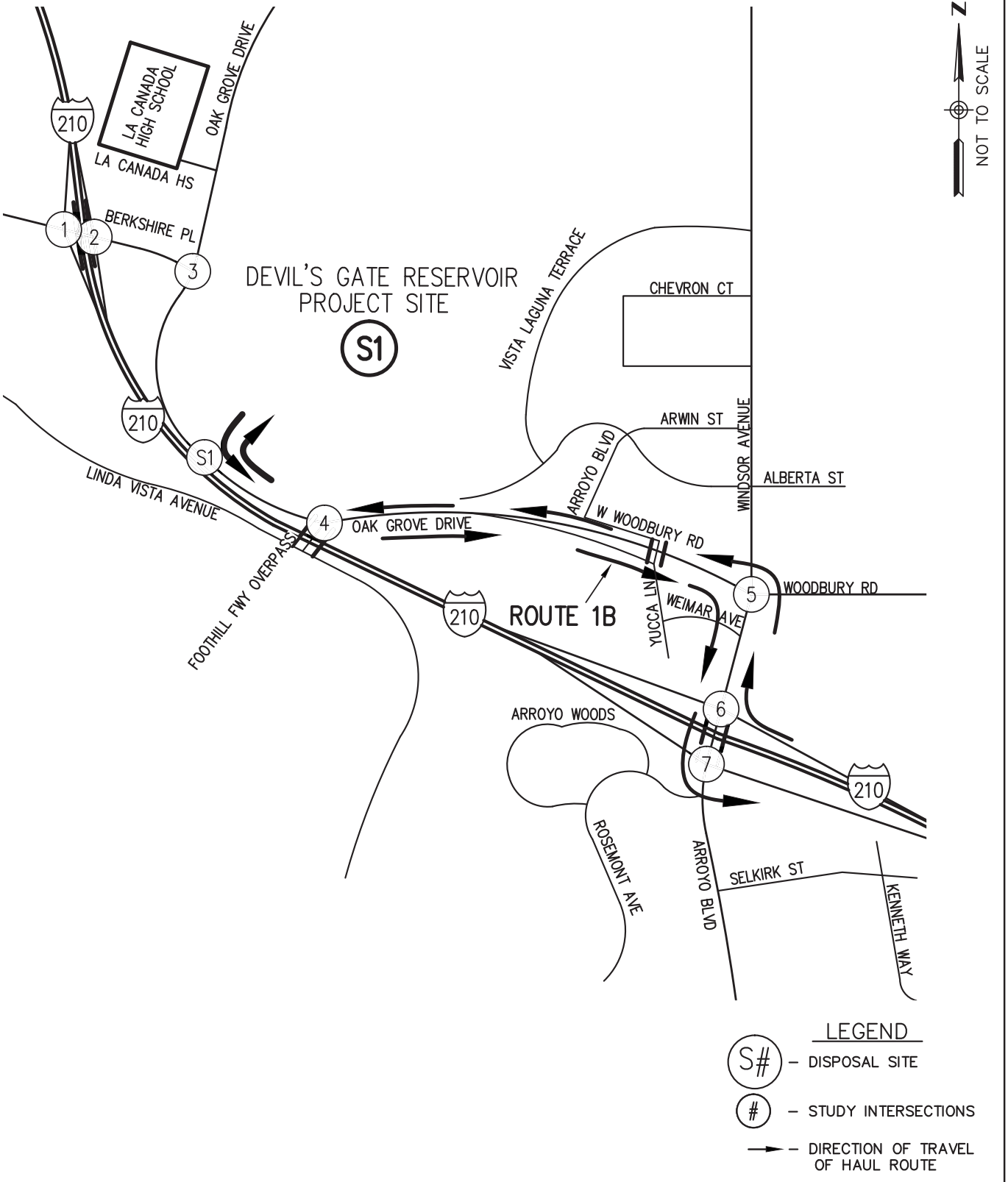

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HAUL ROUTE 1B

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-1-3

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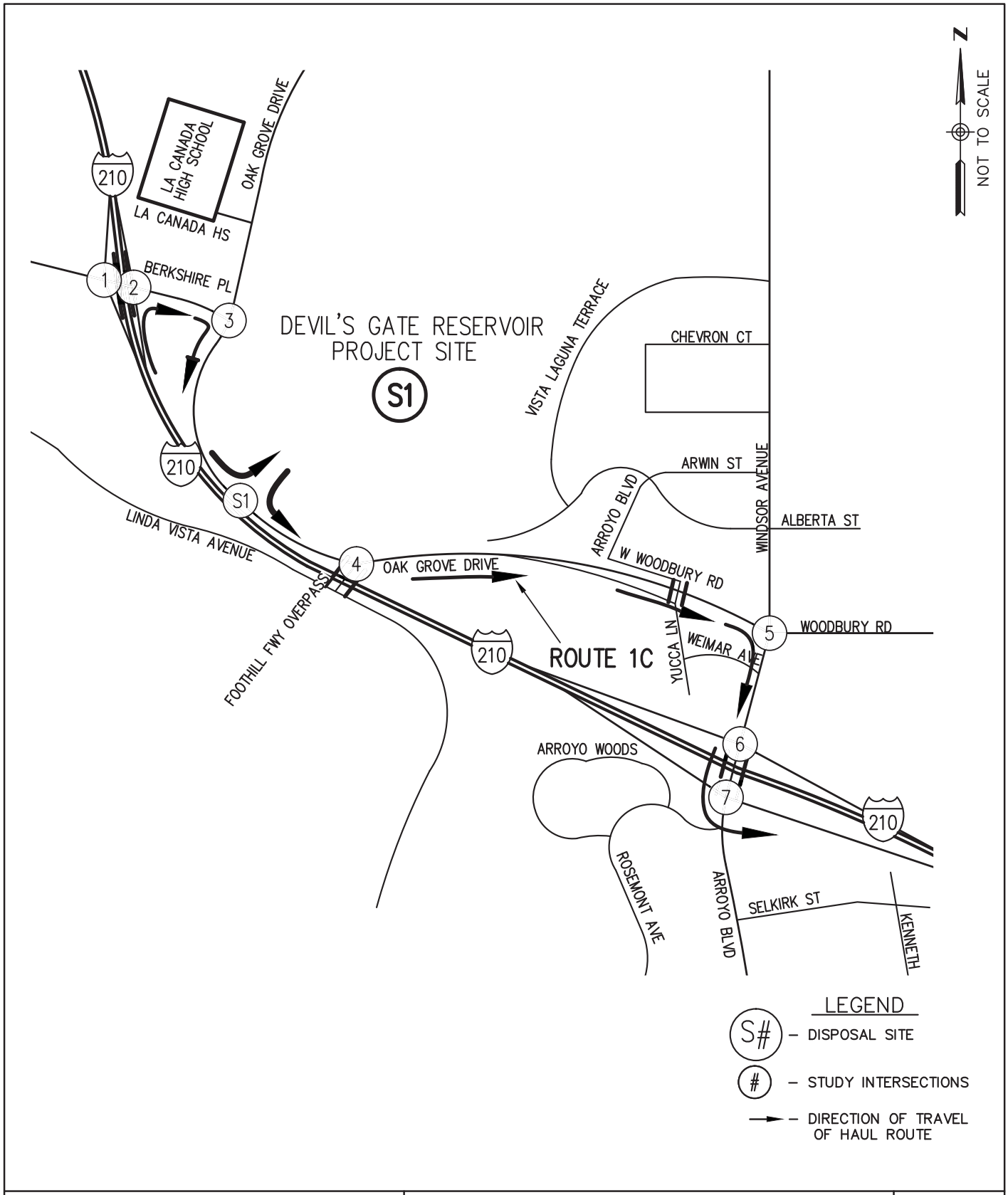

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HAUL ROUTE 1C

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-4

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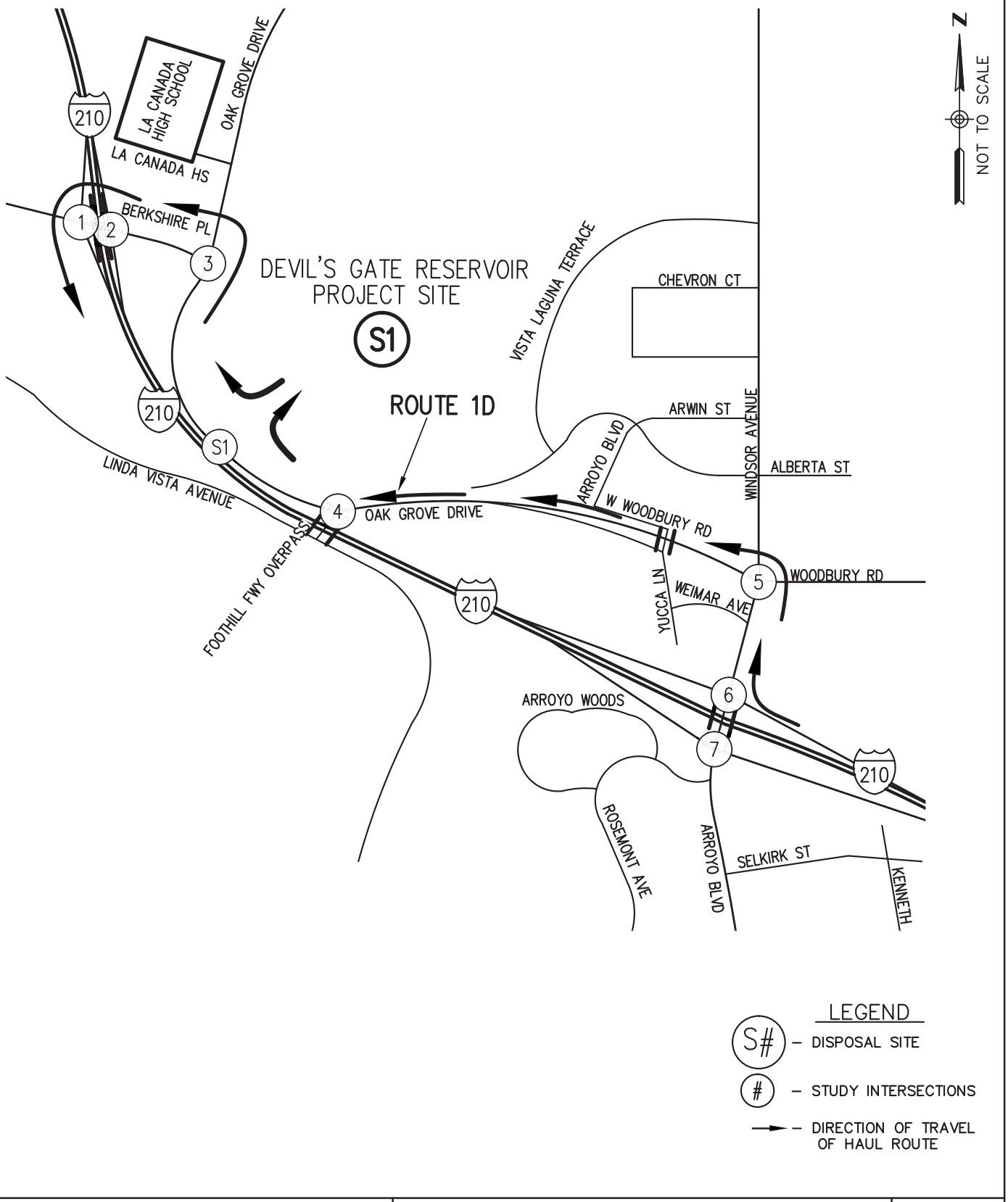

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HAUL ROUTE 1D

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-5

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-5.dwg
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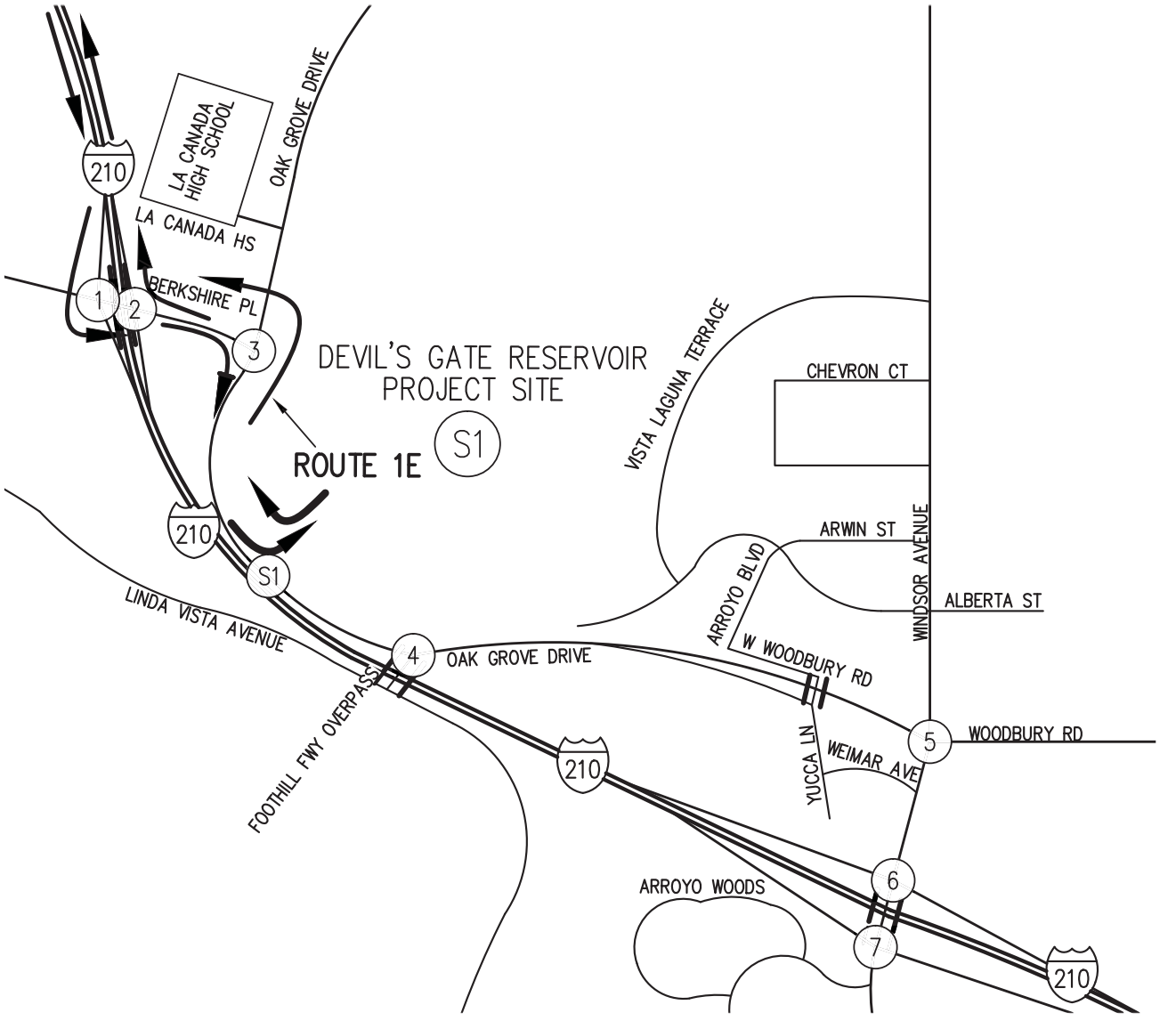

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

→ – DIRECTION OF TRAVEL OF HAUL ROUTE

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HAUL ROUTE 1E

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-6

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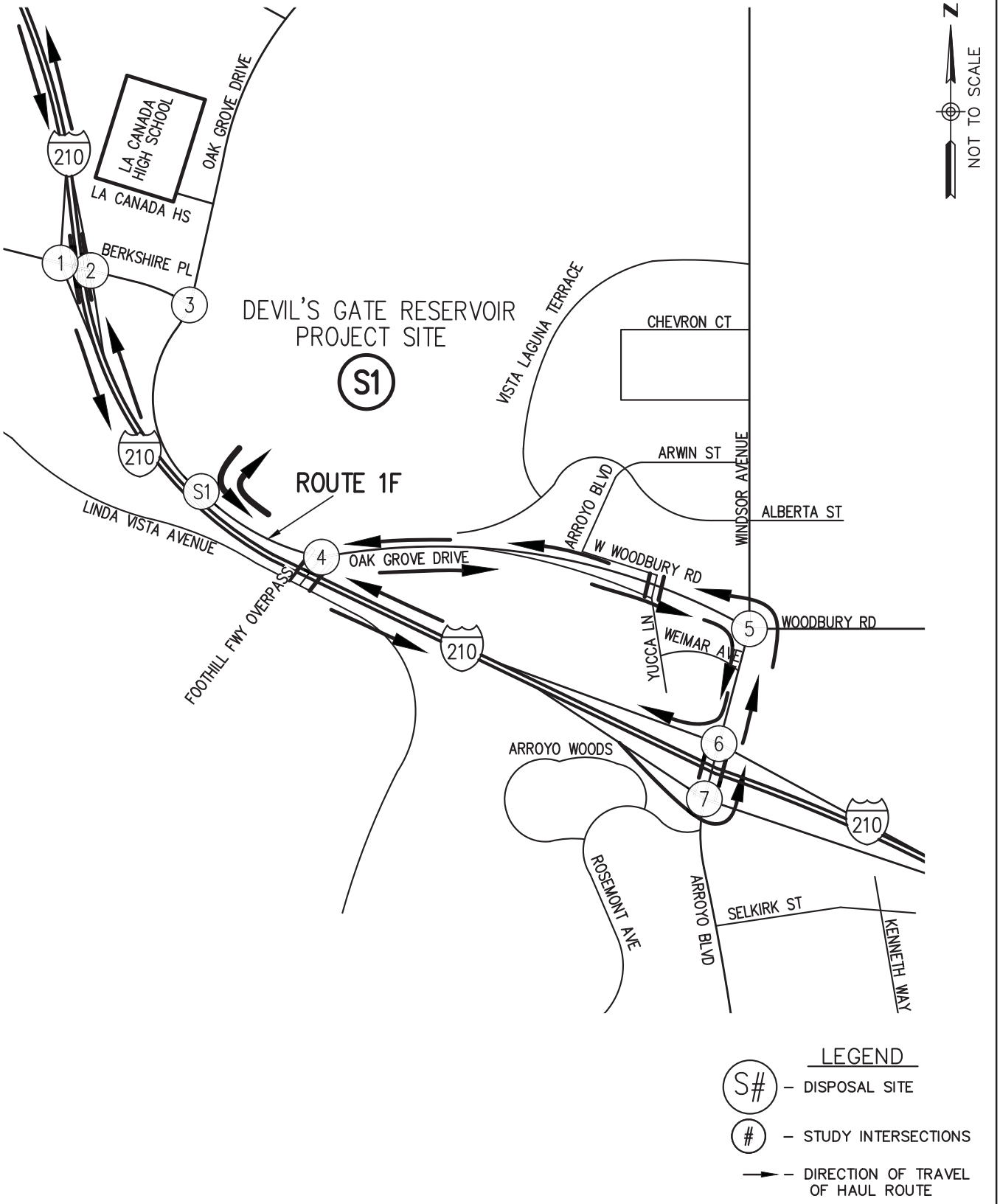

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HAUL ROUTE 1F

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-1-7

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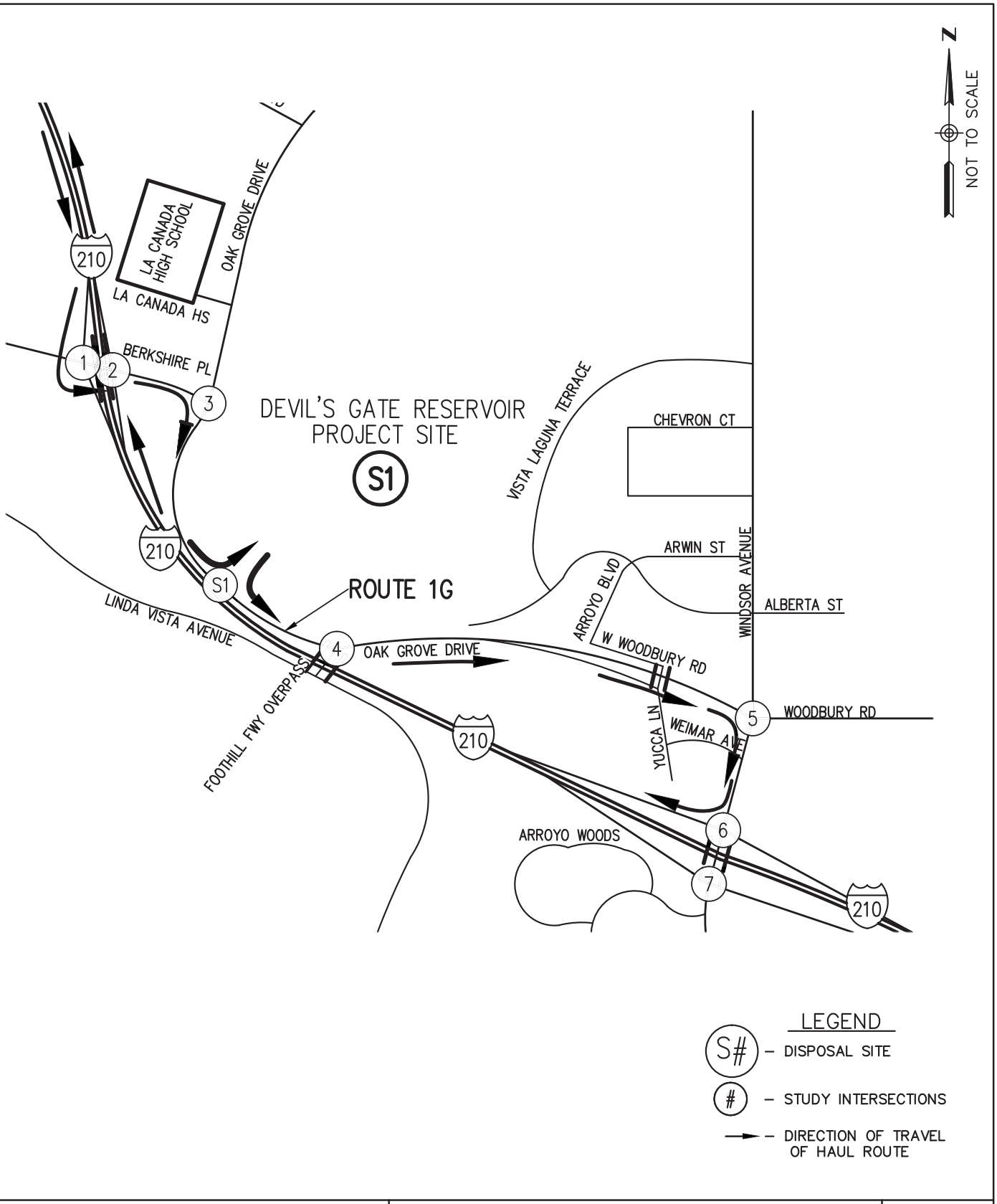

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HAUL ROUTE 1G

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-8

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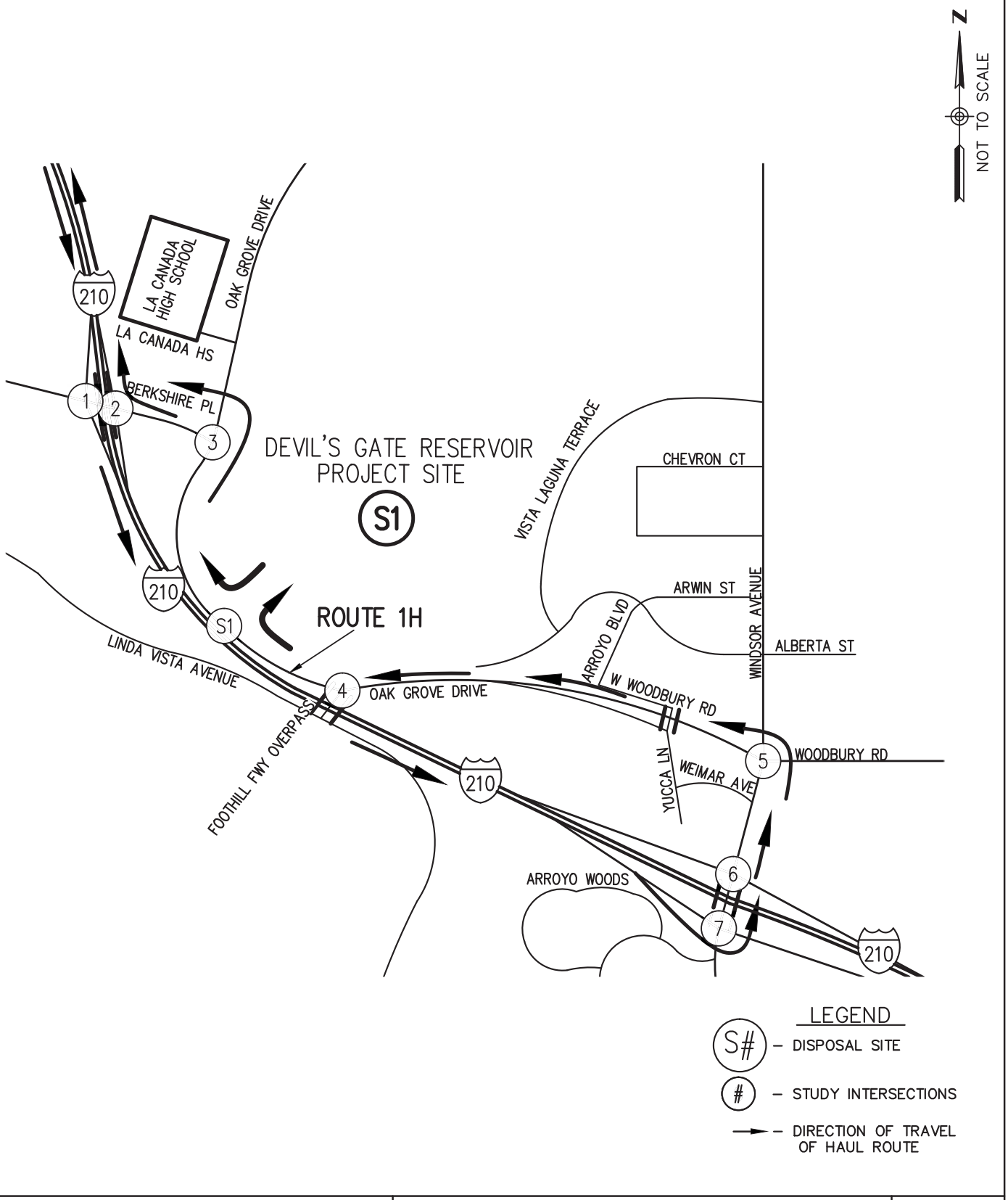

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HAUL ROUTE 1H

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-9

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-9.dwg
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Manning's Pit Area

9.	Haul Route 2A	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue. -Enter and exit the disposal site on Vincent Avenue. -Turn left onto NB Vincent Ave and then left onto WB Gladstone Street. -Turn right onto NB Irwindale Ave. -Enter the WB I-210 Freeway at Irwindale Avenue.
10.	Haul Route 2B	-Exit the EB I-210 Freeway at Irwindale Ave. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue. -Enter and exit the disposal site on Vincent Avenue. -Turn left onto NB Vincent Ave. -Turn right onto EB Arrow Hwy then left onto NB Azusa Avenue. -Turn right onto EB First Street. -Enter the WB I-210 Freeway at First Street.

Waste Management Area

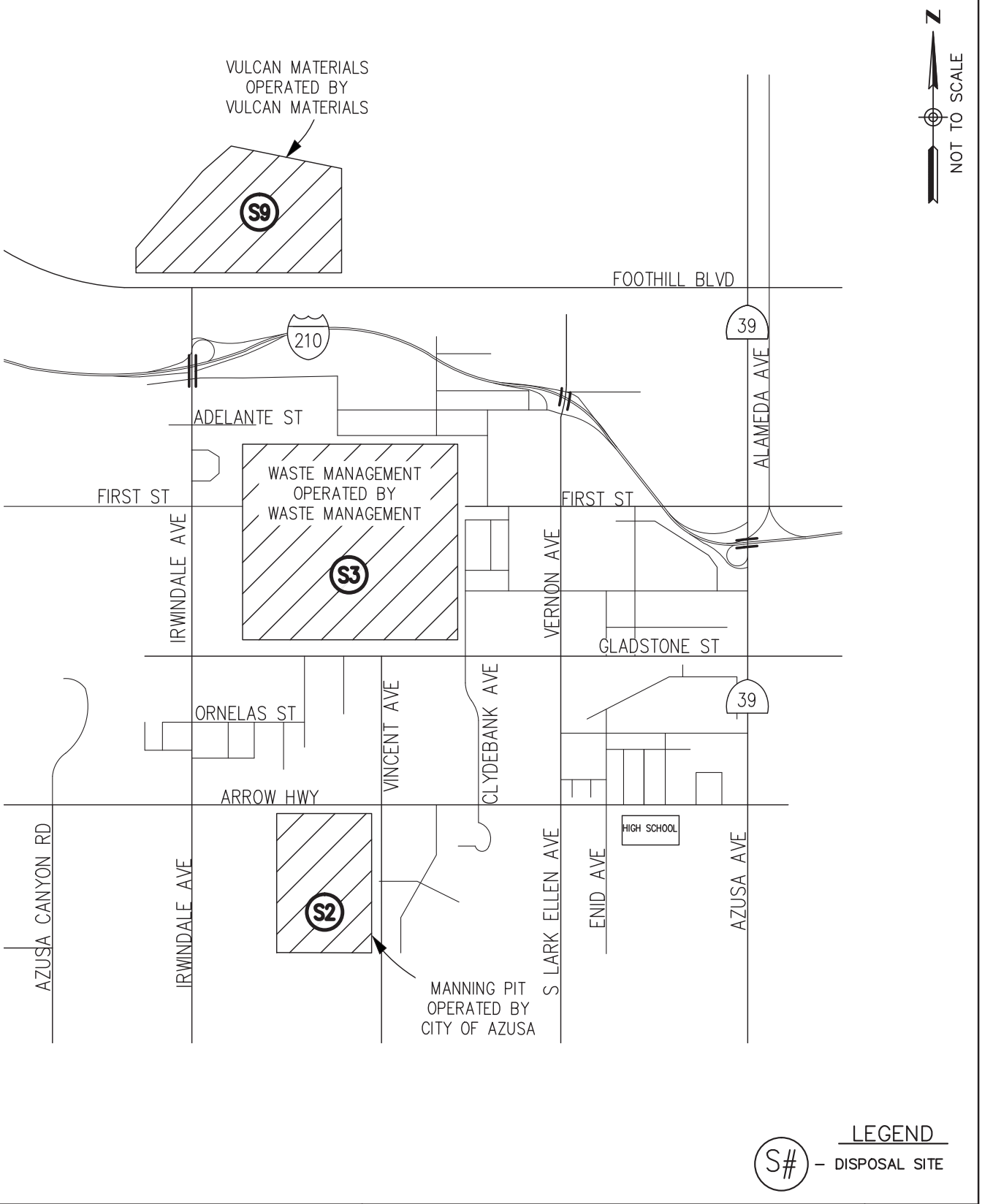
11.	Haul Route 3	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street. -Enter and exit the disposal site on Gladstone Street. -Turn right onto WB Gladstone Street. -Turn right onto NB Irwindale Ave. -Enter the WB I-210 Freeway at Irwindale Avenue.

Vulcan Materials - Irwindale Site Area

26.	Haul Route 9	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn left onto NB Irwindale Ave. -Enter and exit the disposal site at the intersection of Irwindale Ave and Foothill Blvd. -Enter the WB I-210 Freeway at Irwindale Avenue.

Scholl Canyon Landfill Area

12.	Haul Route 4A	-Exit the WB SR-134 Freeway at Figueroa Street. -Turn right onto NB Scholl Canyon Rd. -Enter and exit the disposal site on Scholl Canyon Road. -Turn right onto SB Scholl Canyon Rd. -Enter the EB SR-134 Freeway at Figueroa Street.
13.	Haul Route 4B	-Exit the EB SR-134 Freeway at Figueroa Street. -Turn right onto NB Figueroa Street. -Enter and exit the disposal site on Scholl Canyon Road. -Turn right onto SB Scholl Canyon Rd. -Enter the WB SR-134 Freeway at Figueroa Street.



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WASTE MANAGEMENT PIT, MANNING PIT, AND VULCAN MATERIALS PIT VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-2-1

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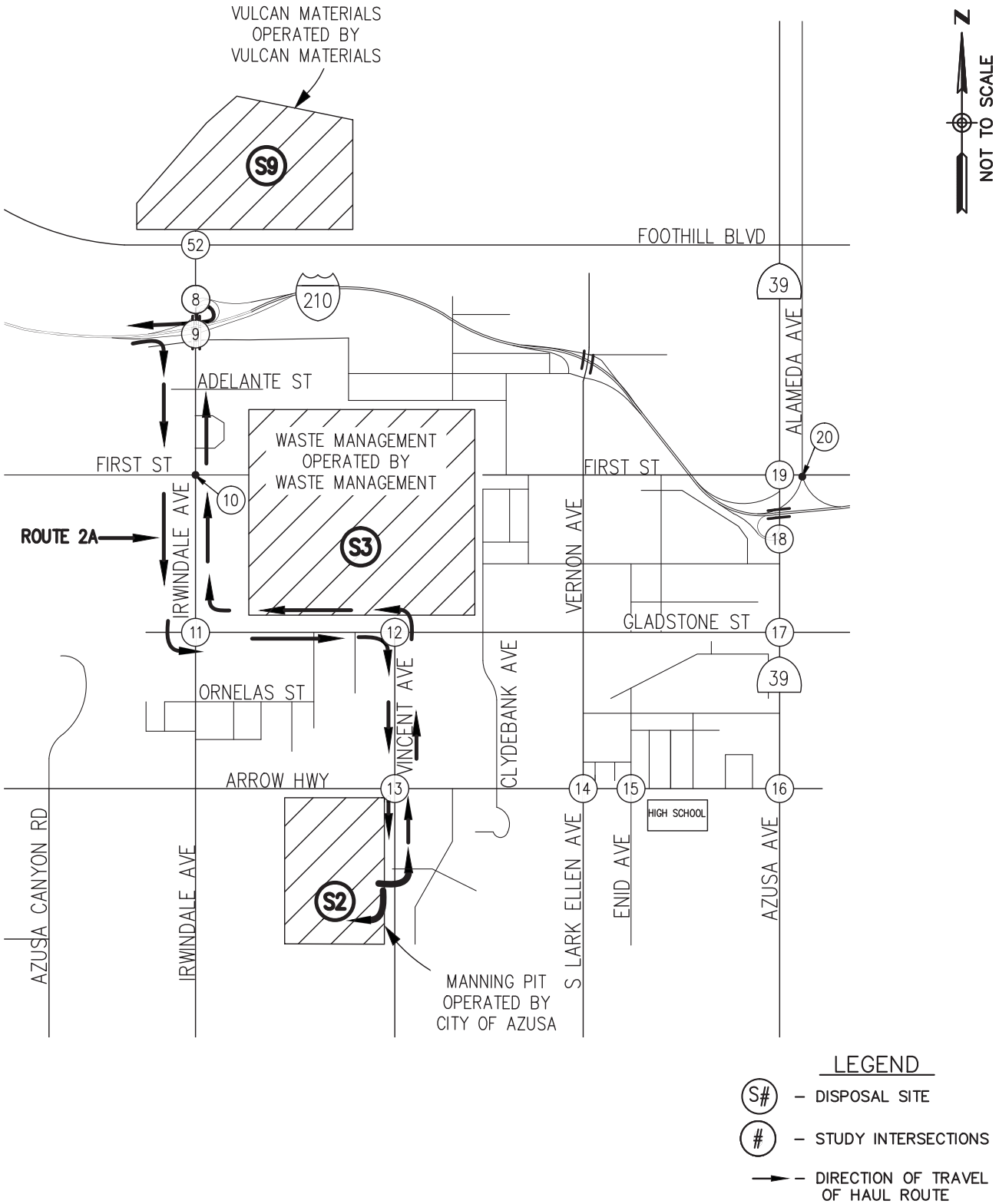

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HAUL ROUTE 2A

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-2-2

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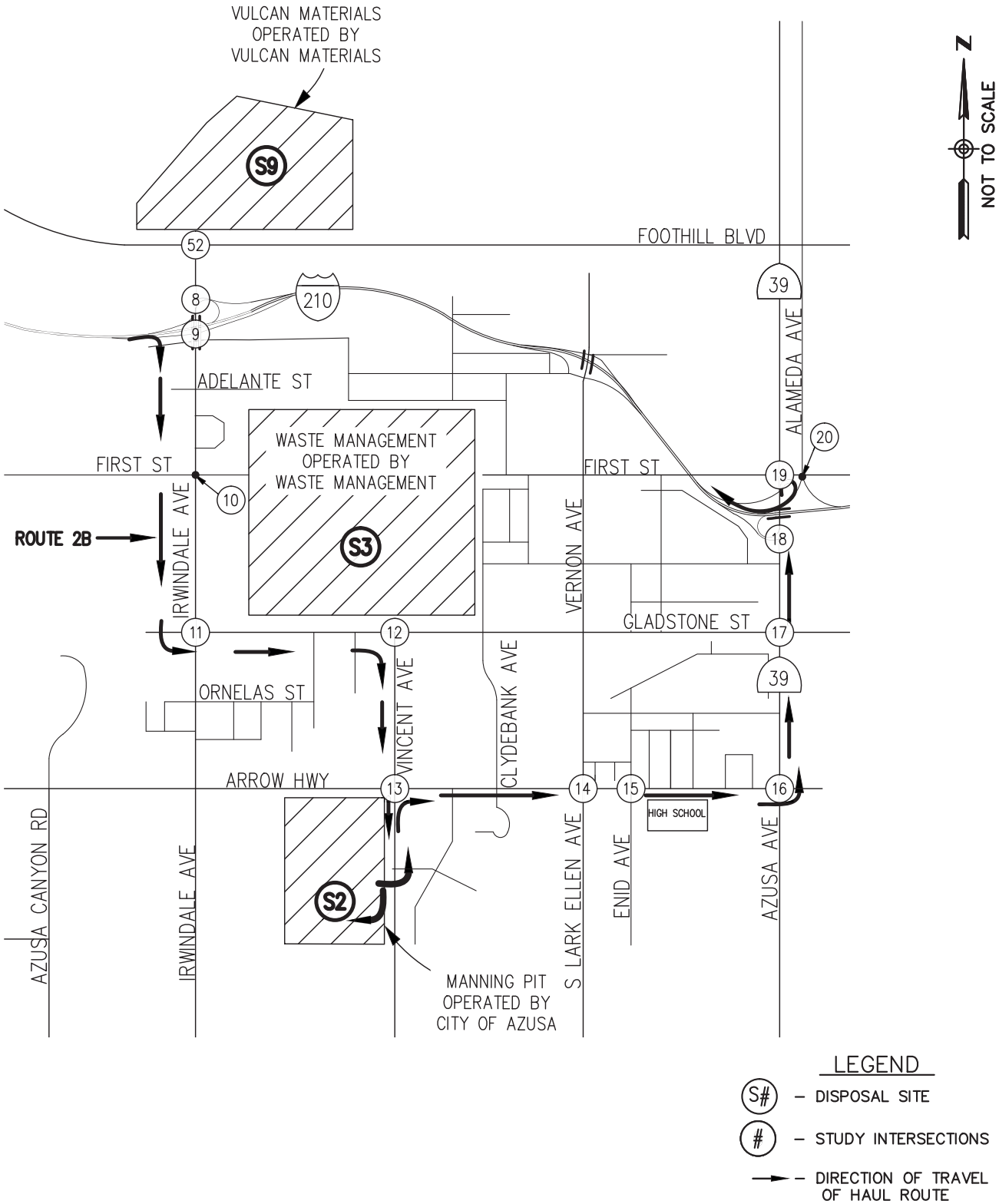

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HAUL ROUTE 2B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-2-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 2\FIG 3-2-3.dwg
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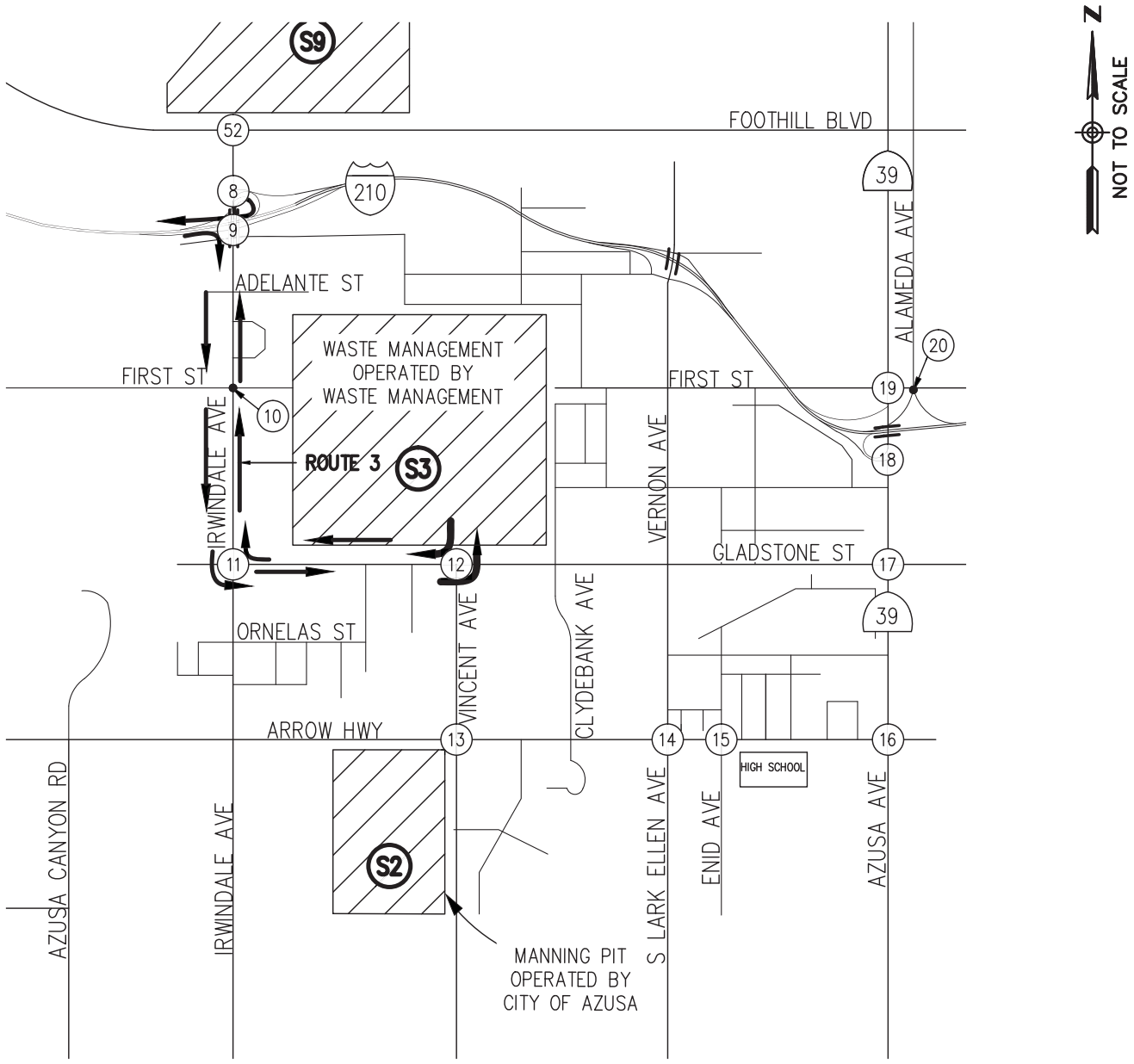

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

→ – DIRECTION OF TRAVEL OF HAUL ROUTE

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HAUL ROUTE 3

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-2-4

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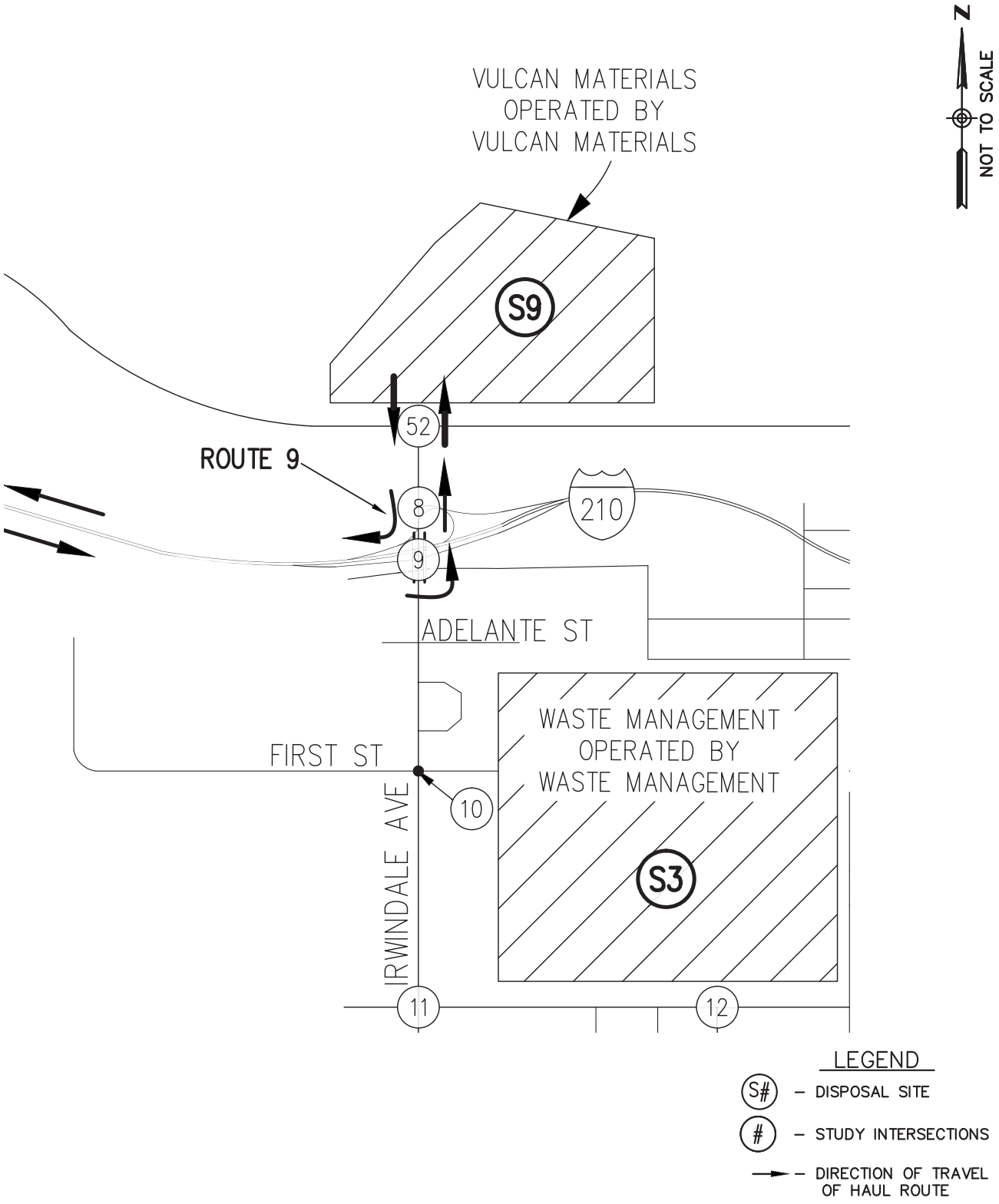

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HAUL ROUTE 9

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-2-5

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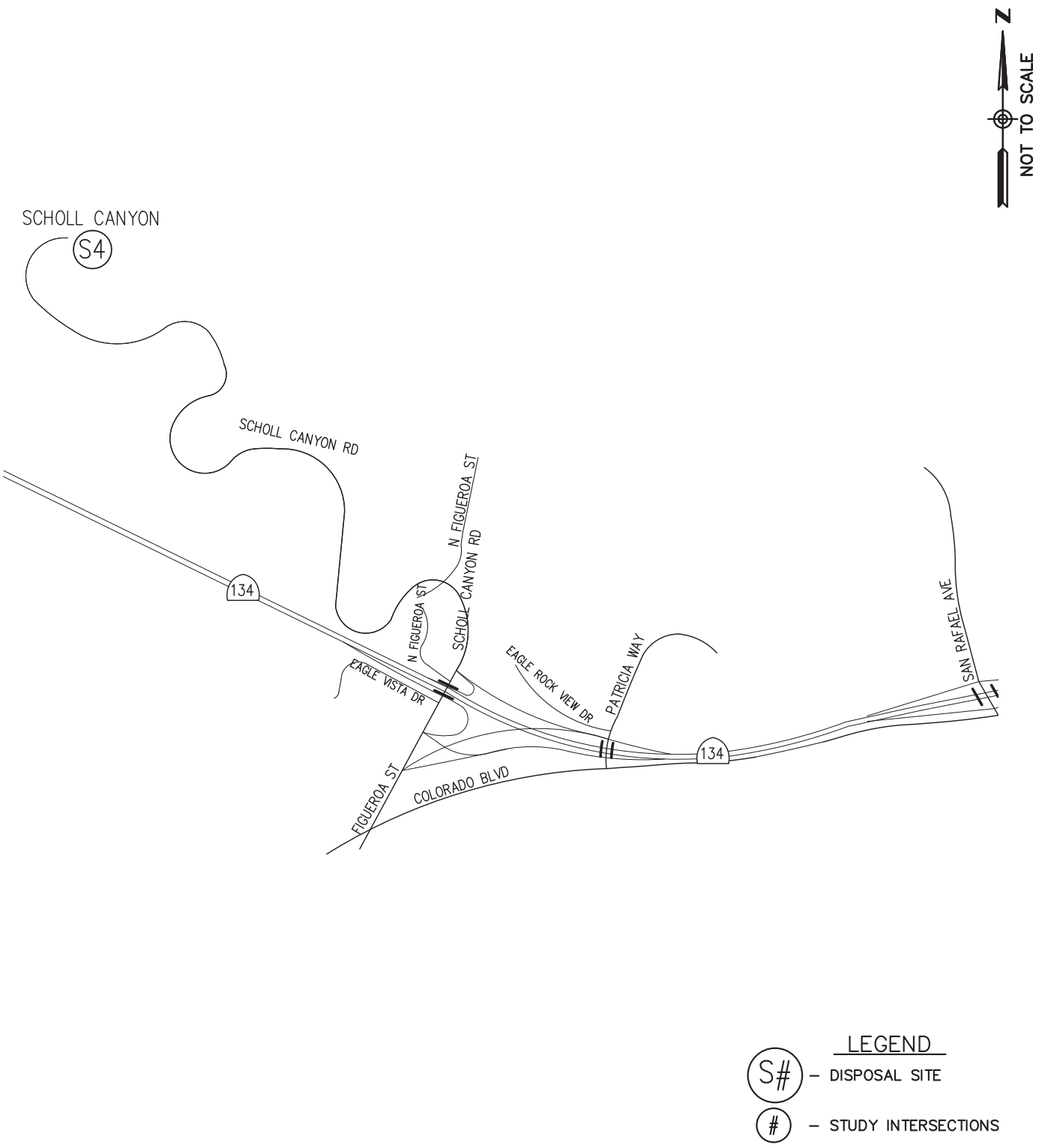

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SCHOLL CANYON PIT VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-3-1

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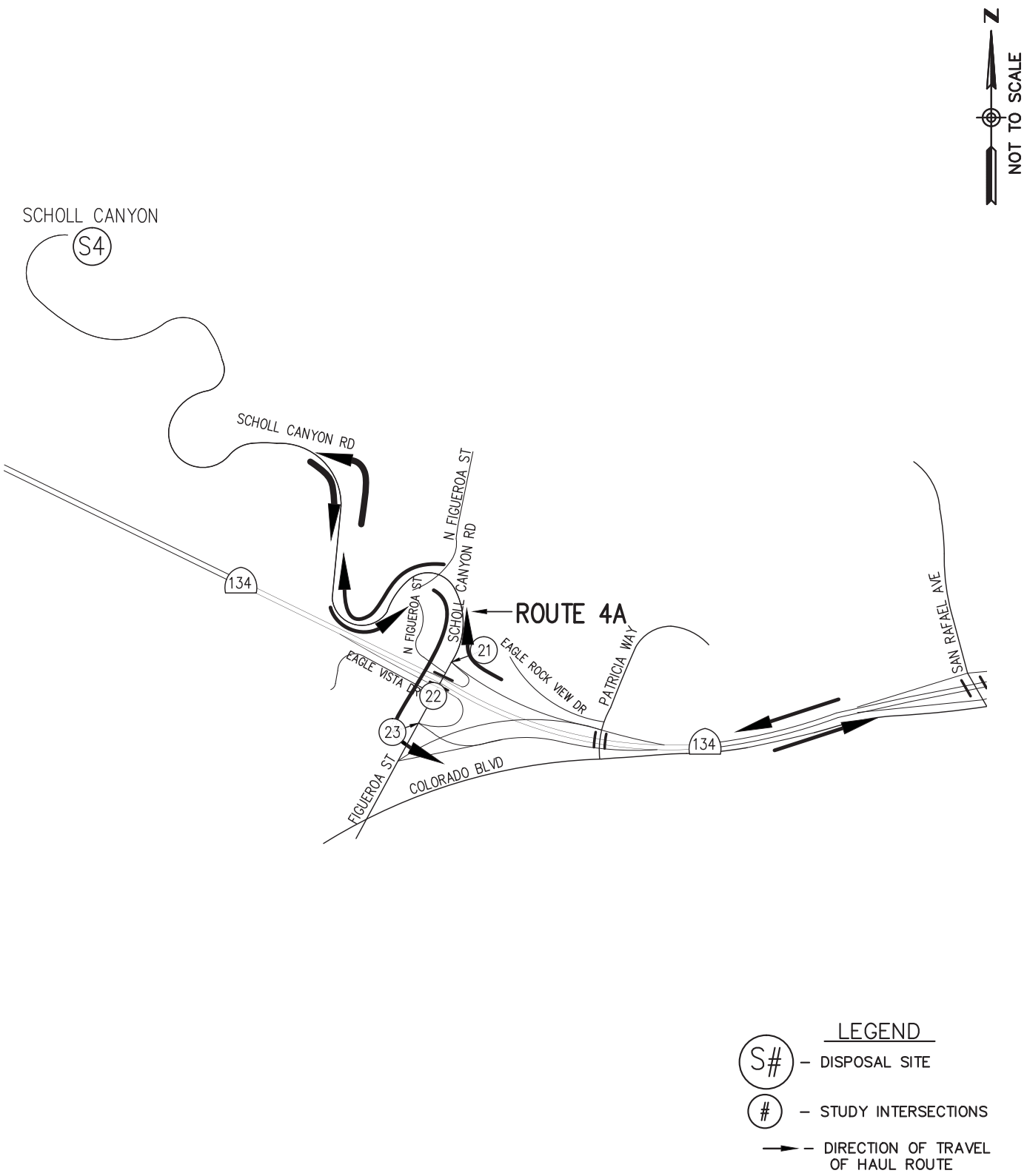

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HAUL ROUTE 4A

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-3-2

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 3\FIG 3-3-2.dwg
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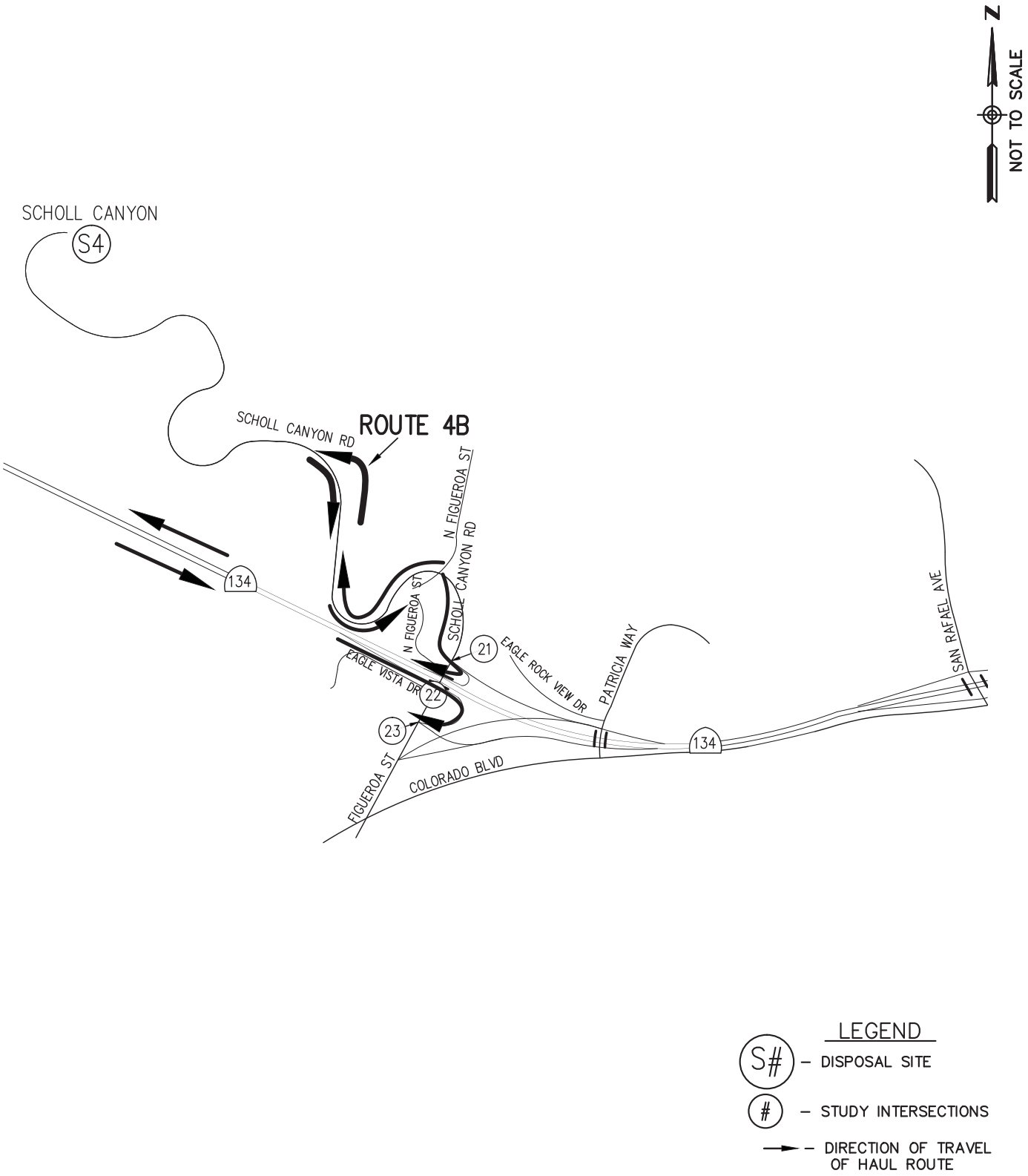

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HAUL ROUTE 4B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-3-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 3\FIG 3-3-3.dwg
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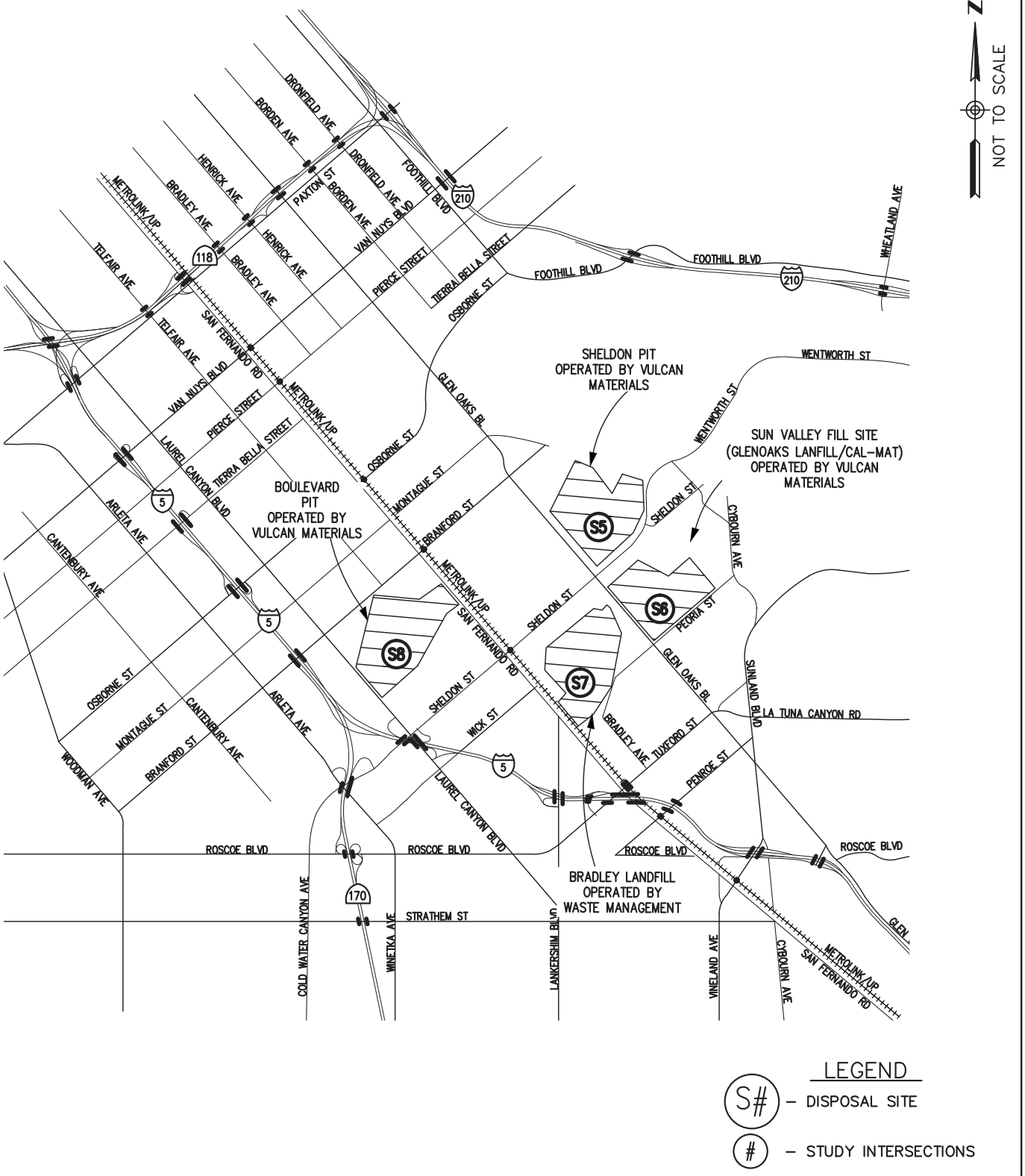
Sheldon Pit Area

14.	Haul Route 5A	-Exit the WB I-210 Freeway at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn left onto EB Sheldon Street. -Enter and exit the disposal site on Sheldon Street. -Turn right onto WB Sheldon Street. -Turn right onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Freeway at the Osborne Street/Foothill Blvd interchange.
15.	Haul Route 5B	-Exit the NB I-5 Freeway at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Enter and exit the disposal site on Sheldon Street. -Turn right onto WB Sheldon Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
16.	Haul Route 5C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Enter and exit the disposal site on Sheldon Street. -Turn left onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange.



LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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BOULEVARD, BRADLEY, SUN VALLEY, SHELDON PITS VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-1

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-1.dwg
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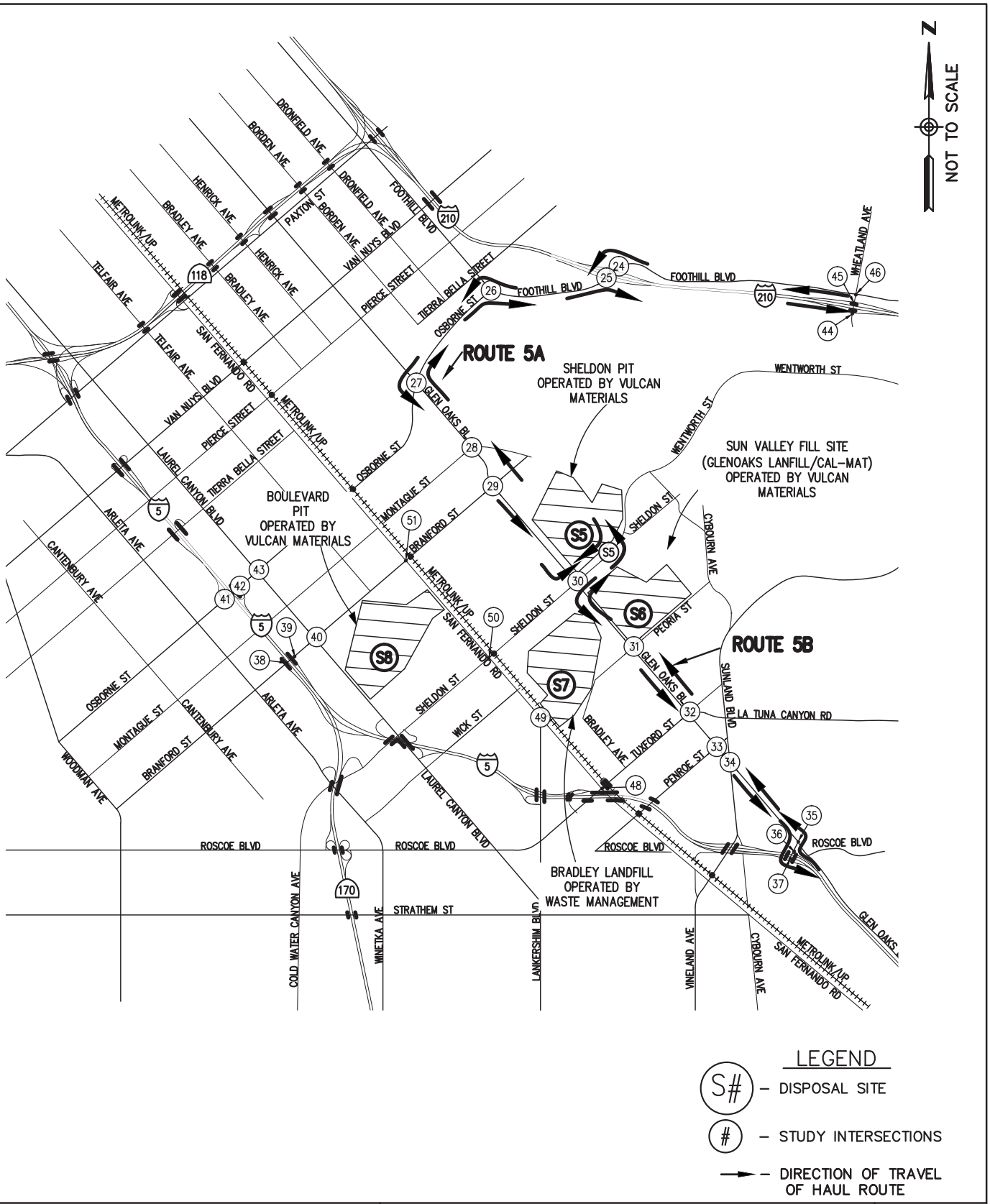

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HAUL ROUTE 5A/5B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-2

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-2.dwg
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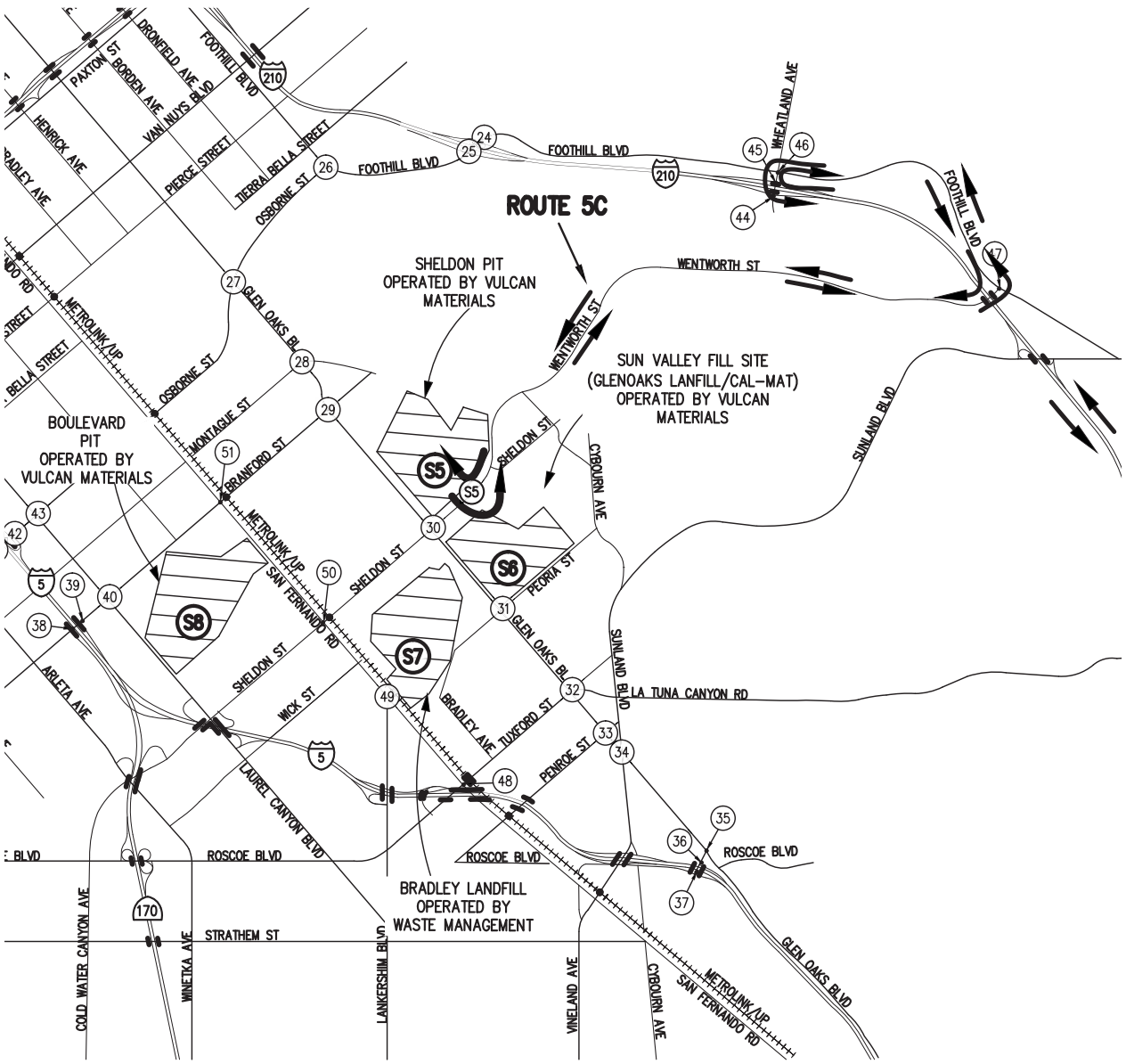

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

→ – DIRECTION OF TRAVEL OF HAUL ROUTE

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HAUL ROUTE 5C

DEVIL'S GATE DAM & RESERVOIR

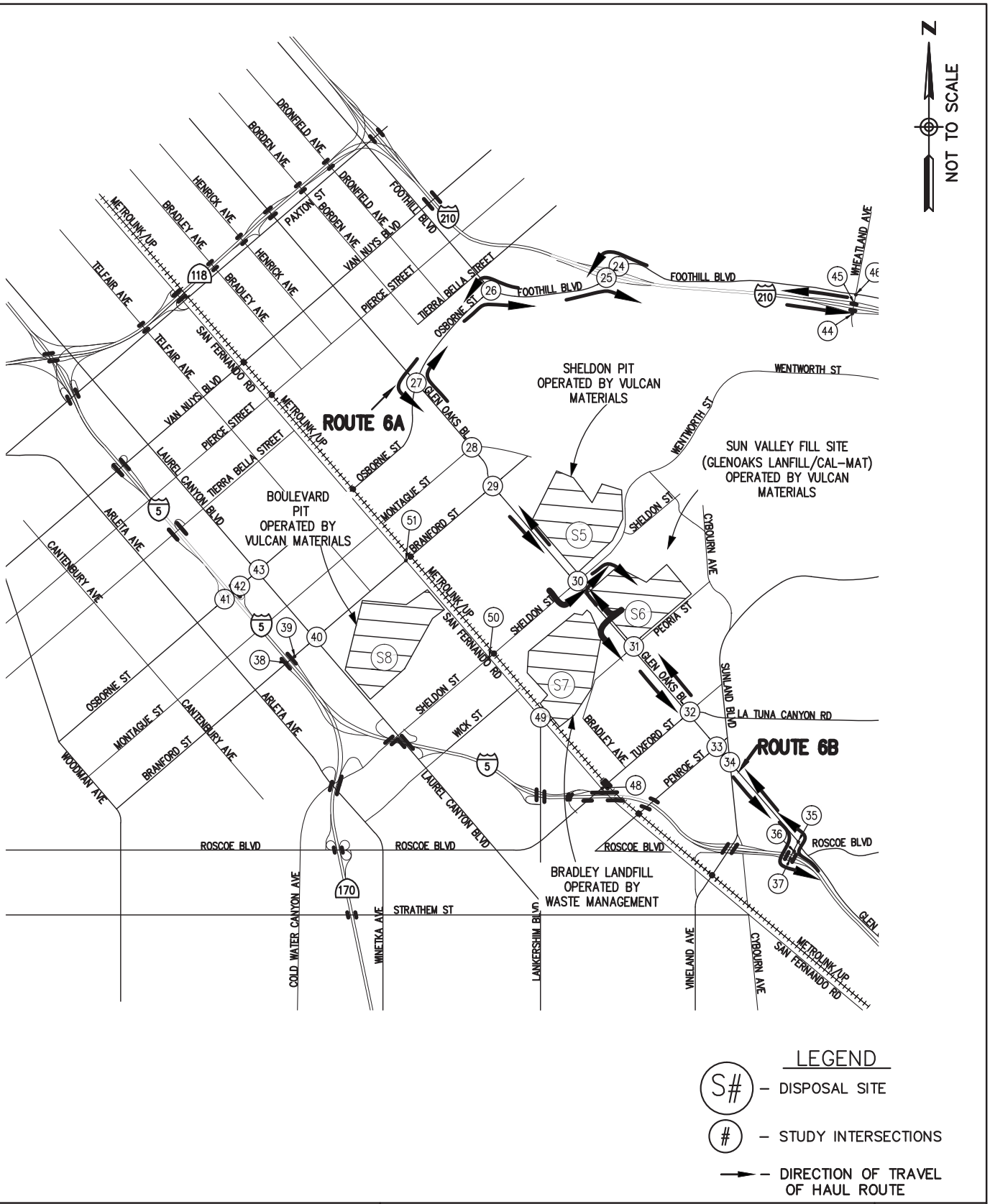
FIGURE

3-4-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-3.dwg
Last Opened: Oct 03, 2013 - 11:59am by: TMunoz

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) Area

17.	Haul Route 6A	-Exit the WB I-210 Fwy at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn left onto EB Sheldon Street. -Enter the disposal site on Sheldon Street. -Exit the disposal site on Glenoaks Blvd. -Turn right onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Fwy at the Osborne Street/Foothill Blvd interchange.
18.	Haul Route 6B	-Exit the NB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Enter the disposal site on Sheldon Street. -Exit the disposal site on Glenoaks Blvd. -Turn left onto SB Glenoaks Blvd -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
19.	Haul Route 6C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Enter the disposal site on Sheldon Street. -Exit the disposal site on Glenoaks Blvd. -Turn right onto NB Glenoaks Blvd -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange



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HAUL ROUTE 6A/6B

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-4

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-4.dwg
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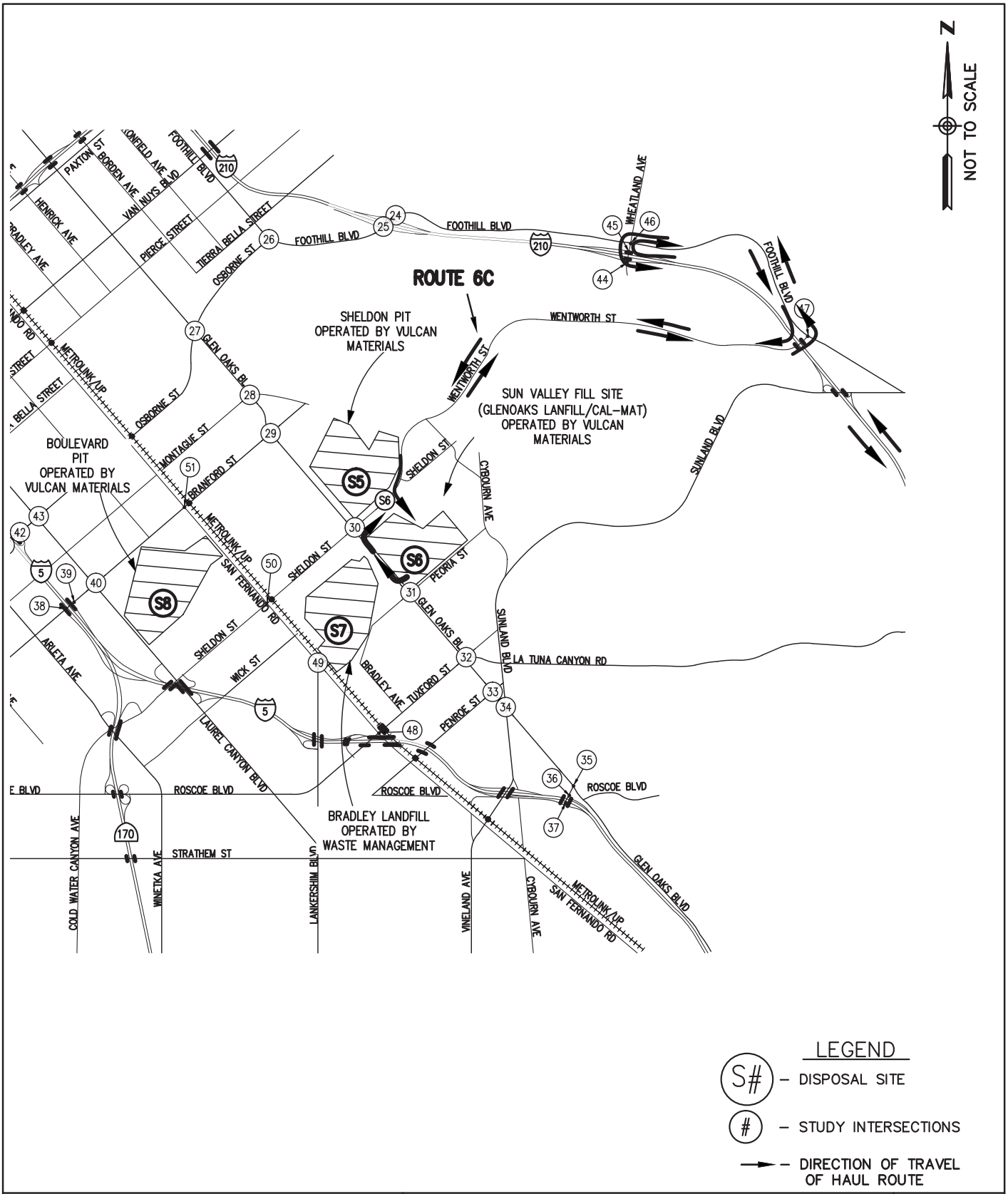

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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HAUL ROUTE 6C

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-5

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-5.dwg
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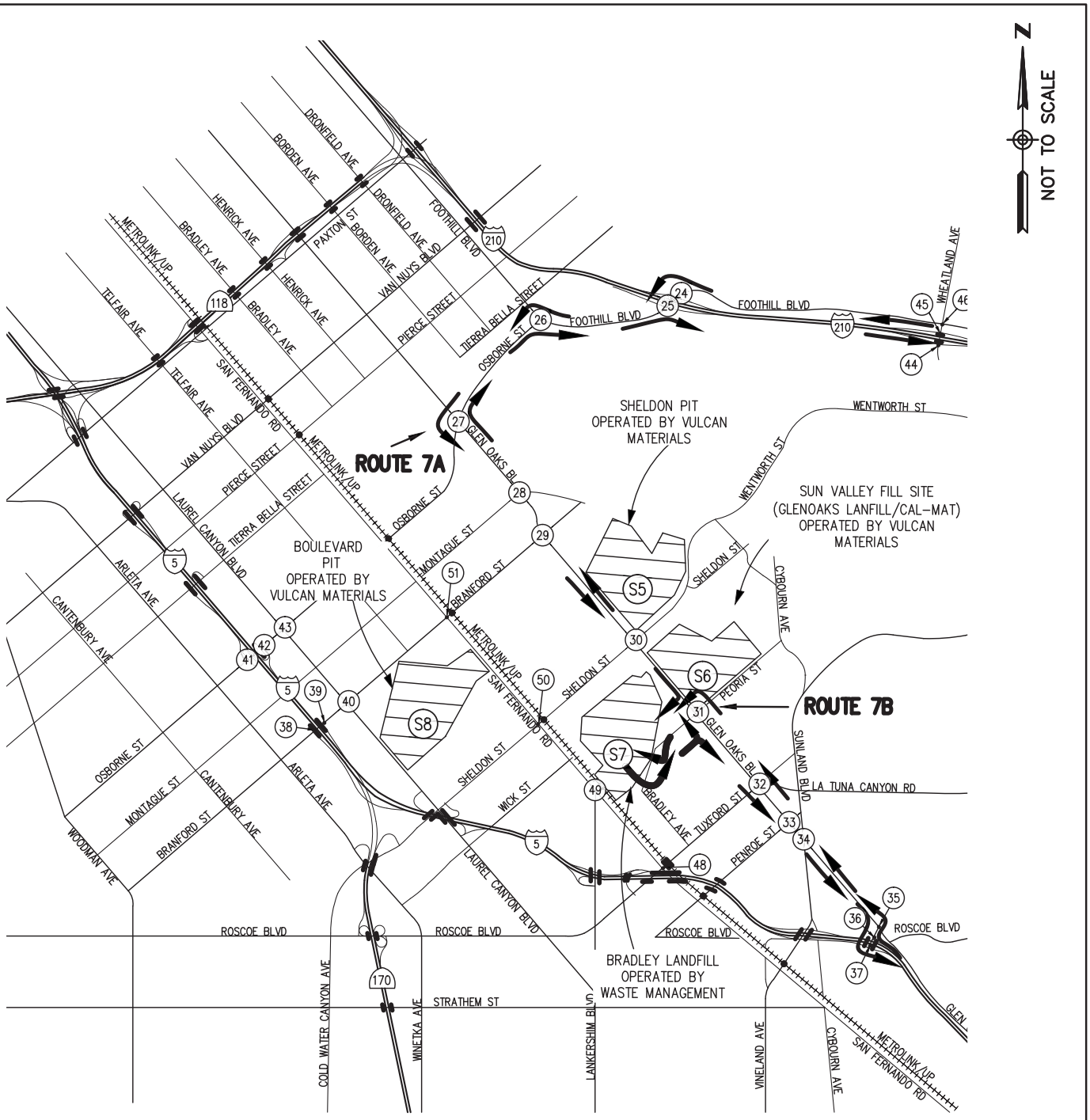
Bradley Landfill Area

20.	Haul Route 7A	-Exit the WB I-210 Fwy at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Fwy at the Osborne Street/Foothill Blvd interchange.
21.	Haul Route 7B	-Exit the NB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn left onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn right onto SB Glenoaks Blvd. -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
22.	Haul Route 7C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange



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HAUL ROUTE 7A/7B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-6

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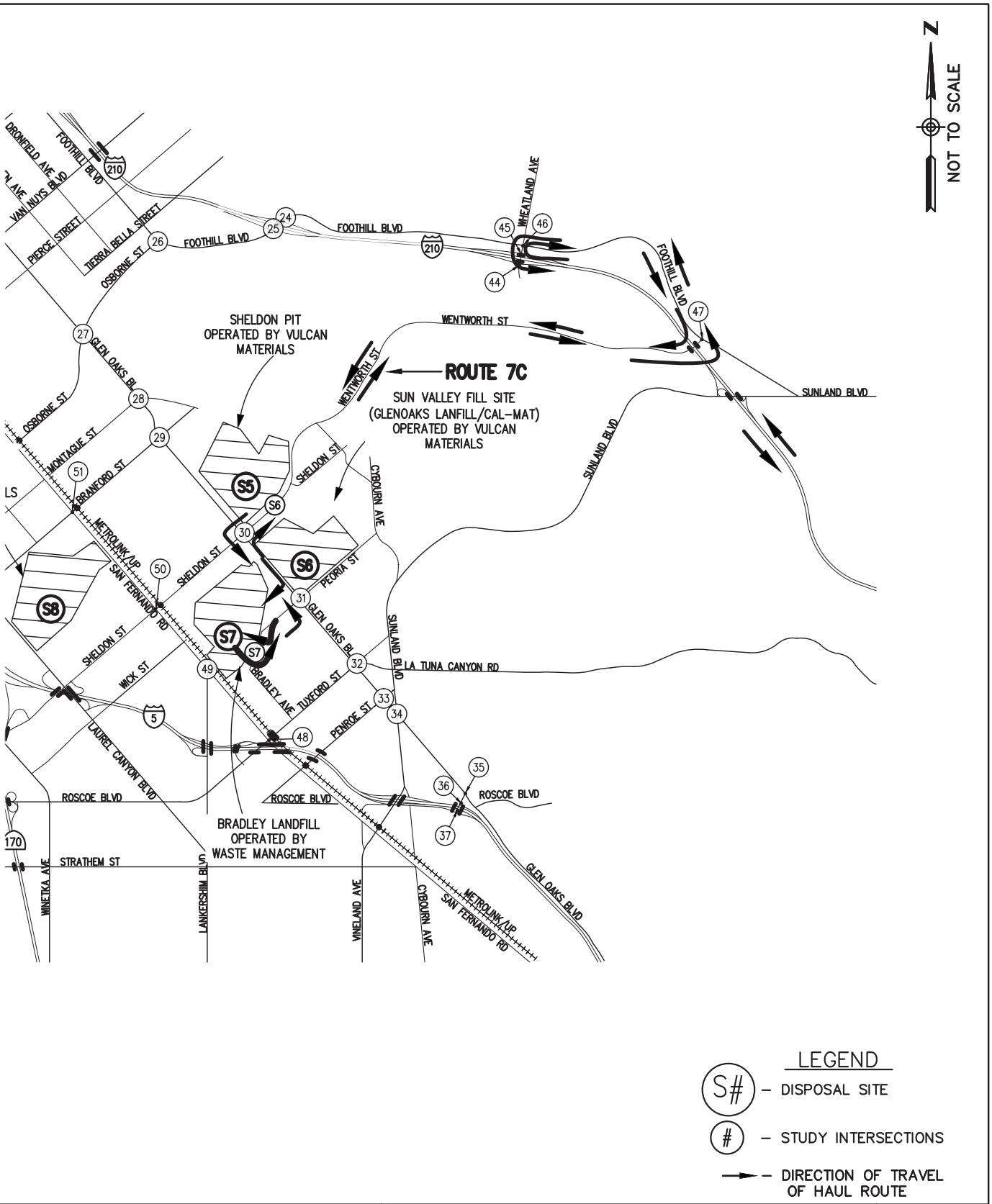

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

→ – DIRECTION OF TRAVEL OF HAUL ROUTE

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HAUL ROUTE 7C

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-4-7

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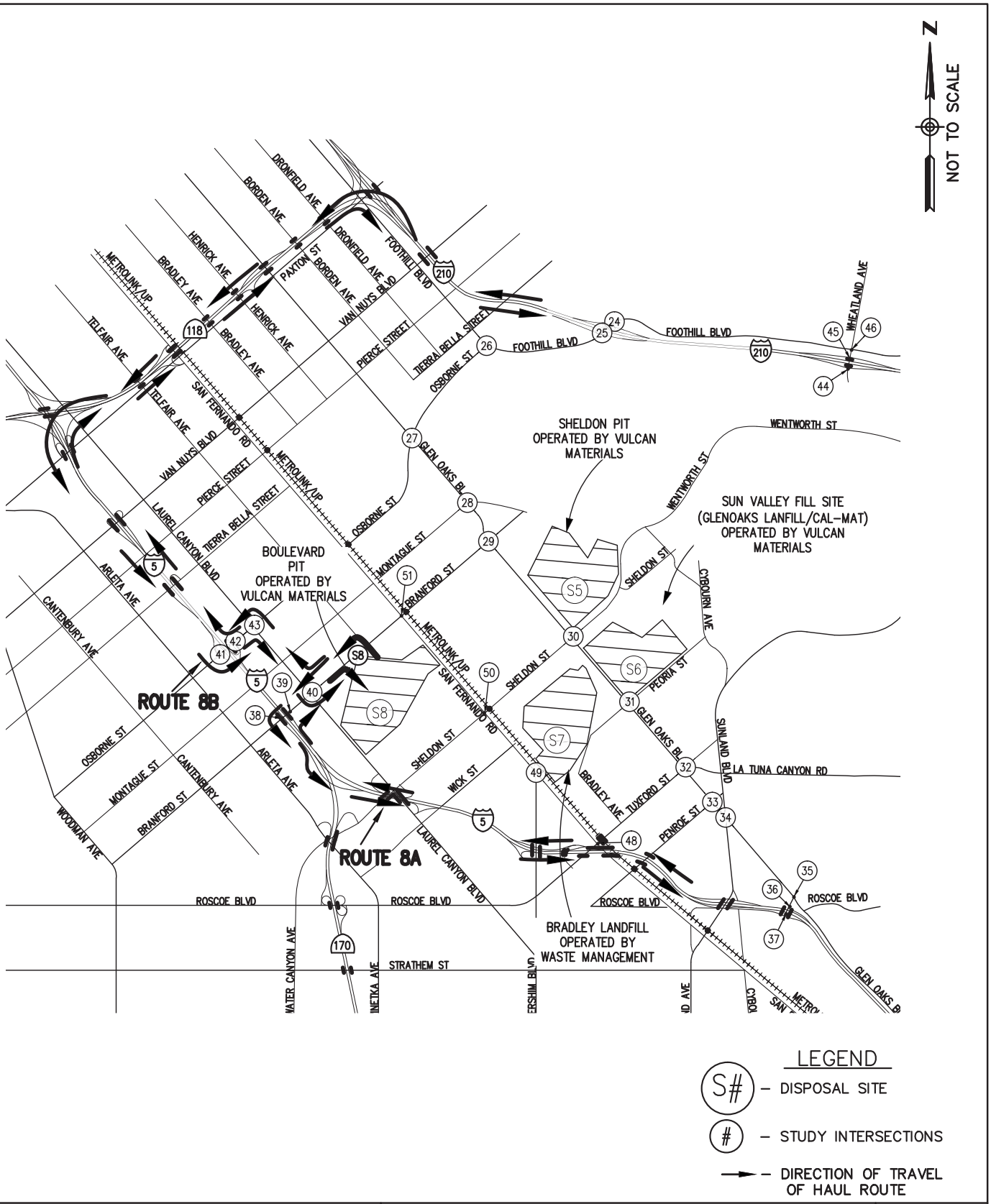
Boulevard Pit Area

23.	Haul Route 8A	-Exit the NB I-5 Fwy at Branford Street. -Turn right onto EB Branford Street. -Enter and exit the disposal site on Branford Street. -Turn left onto WB Branford Street. -Enter the SB I-5 Fwy at Branford Street.
24.	Haul Route 8B	-Exit the SB I-5 Fwy at Osborne Street. -Turn left onto EB Osborne Street. -Turn right onto SB Laurel Canyon Blvd. -Turn left onto EB Branford Street. -Enter and exit the disposal site on Branford Street. -Turn left onto WB Branford Street. -Turn right onto NB Laurel Canyon Blvd. -Turn left onto WB Osborne Street. -Enter the NB I-5 Fwy at Osborne Street.
25.	Haul Route 8C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave then right onto EB Foothill Blvd. -Turn right onto Wentworth Street. -Turn left onto Glenoaks Blvd. -Turn right onto Tuxford Street then right onto San Fernando Road. -Turn left onto Branford Street. -Enter and exit the disposal site on Branford Street. -Turn right onto EB Branford Street. -Turn right onto San Fernando Rd then left on to Tuxford Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd then left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange



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HAUL ROUTE 8A/8B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-8

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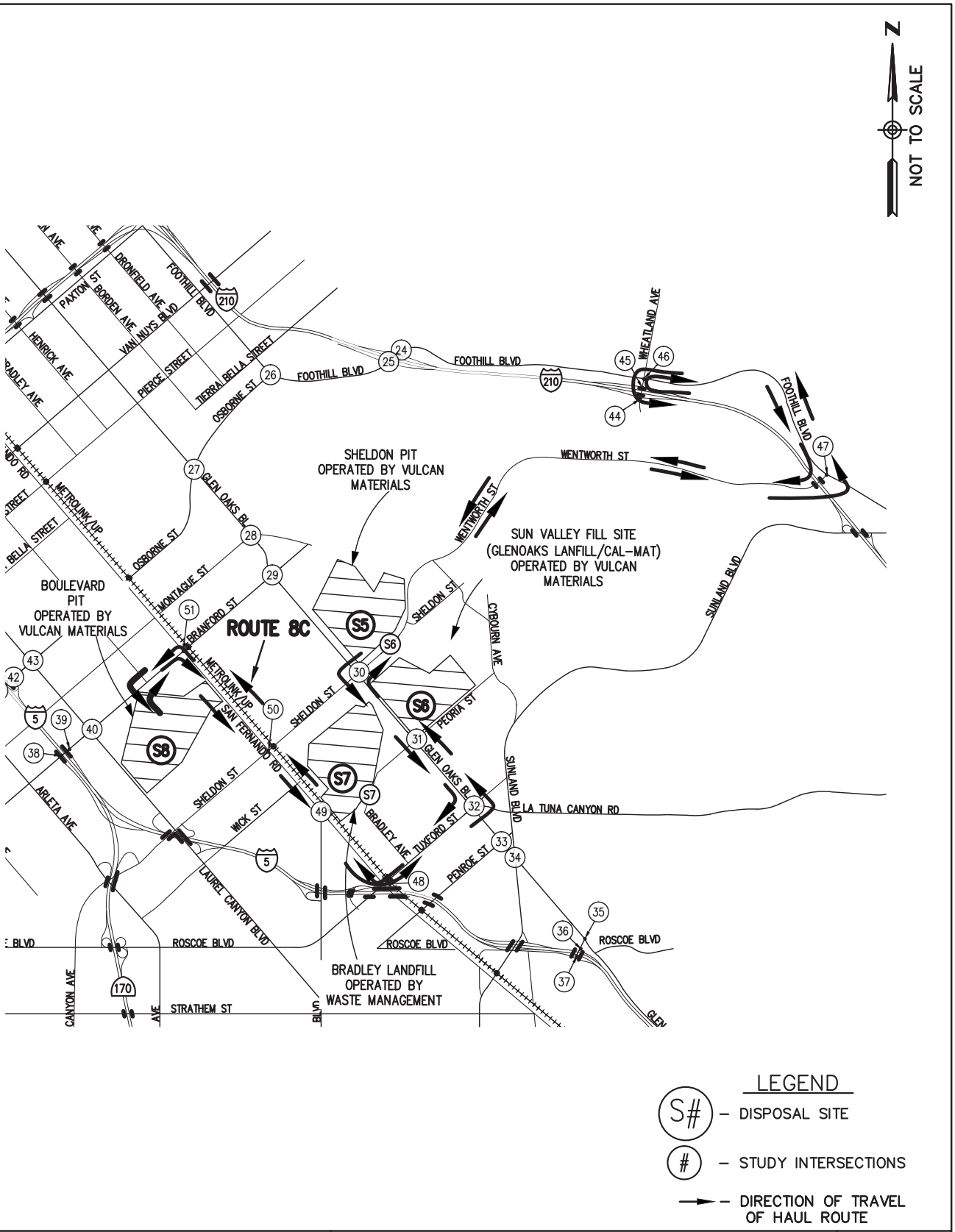

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HAUL ROUTE 8C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-9

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Last Opened: Oct 03, 2013 - 12:02pm by: TMunoz

The proposed haul routes consist of the following roadways:

Local and Major Roadways:

Devil's Gate Dam Area (Site 1)

Oak Grove Drive is a north-south four-lane arterial road with a striped median to the north of the Foothill Freeway Overpass and a raised median to the south. The roadway provides two travel lanes in each direction and a bike lane in each direction. Oak Grove Drive provides direct access to the project site and freeway access from the project site through the intersections of Berkshire Place and Windsor Avenue. On-street parking is not permitted along Oak Grove Drive. Pavement conditions range from fair to poor conditions.

Berkshire Place is a west-east four-lane collector road with two travel lanes in each direction, a bike lane in each direction, and a striped two way left turn lane median. The road provides access to the I-210 Freeway to the residential neighborhoods to the north and west of the project site. On-street parking is not permitted along Berkshire Place. Pavement conditions range from good to fair conditions.

Windsor Avenue is a north-south four lane arterial road with two travel lanes in each direction, one bike lane on the southbound side, and a striped two way left turn lane median. Windsor Avenue provides regional access within the City of Pasadena and access to the I-210 Freeway. On-street parking is not permitted along the west side and some street parking is allowed on the east side of the roadway. Pavement conditions range from good to fair conditions.

Waste Management (Site 2), Manning's Pit (Site 3), and Vulcan Material (Site 9)

Foothill Boulevard is an east-west four lane arterial road with two travel lanes in each direction, and a striped or raised median. Foothill Boulevard (Route 66) generally follows the alignment of the I-210 freeway. Pavement conditions range from good to fair conditions.

Irwindale Avenue is a north-south four lane arterial road with two travel lanes in each direction that has a raised median to the north of First Street and a striped two way left turn lane median between First Street and Gladstone Street. Irwindale Ave provides regional access within the City of Azusa and Irwindale and local access to the I-210 Freeway and I-10 Freeway. On-street parking is generally permitted on both sides of the roadway between First Street and Gladstone Street. Pavement conditions range from good to fair conditions.

Gladstone Street is a west-east four lane collector street with two travel lanes in each direction and a striped two way left turn lane median. Gladstone Street provides regional access within the City of Azusa and access to the I-210 Freeway. On-street parking is permitted along some segments of the roadway, but these areas are not adjacent. Pavement conditions range from good to fair conditions.

Vincent Avenue is a north-south four lane collector road with two travel lanes in each direction and a striped two way left turn lane median along certain sections of the roadway. Vincent Ave provides regional access within the City of Azusa and Irwindale. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side. Pavement conditions range from fair to poor conditions.

Arrow Highway is a west-east four lane arterial highway with two travel lanes in each direction and a striped two way left turn lane median. Arrow Highway serves as an alternative to the I-210 Freeway by providing access from the San Bernardino, Rancho Cucamonga, and San Dimas areas to the City of Azusa, Covina, and Irwindale. It also provides regional access within the City of Azusa, Covina, and Irwindale as well as access to the I-605 and SR-57 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

Azusa Avenue (SR-39) is a north-south divided four lane arterial highway with two travel lanes in each direction and a raised median. Azusa Avenue (SR-39) provides access from the City of Azusa and Covina to Orange County. It also provides regional access to the I-210 Freeway and I-10 Freeway. On-street parking is generally permitted along some segments of the roadway. Pavement conditions range from good to fair conditions.

First Street is a west-east four lane collector road with two travel lanes in each direction with a striped median. It provides regional access within the City of Azusa and access to the westbound I-210 Freeway. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Scholl Canyon Landfill Area (Site 4)

Figueroa Street is a north-south four lane arterial road with two travel lanes in each direction and a striped median. It provides access from the City of Los Angeles to the Eagle Rock area. It also provides regional access to the SR-134 Freeway. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side. Pavement conditions range from fair to poor conditions.

Scholl Canyon Road is a west-east two lane collector road with one travel lane in each direction and a striped median. Scholl Canyon Road provides access to the Scholl Canyon Landfill. On-street parking is generally permitted along both sides of the roadway. Pavement conditions are poor.

Boulevard, Bradley, Sun Valley Fill Site & Sheldon Pits/Landfill (Sites 5-8)

Foothill Blvd is a north-south four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a striped two way left turn lane median. It provides access from La Cañada Flintridge area to the San Fernando Valley area. It also provides regional access to the I-210 Freeway. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Osborne Street is a west-east four lane collector road with two travel lanes in each direction and a striped two way left turn lane median. Osborne Street provides local access to the I-210 Freeway and I-5 Freeway. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

Branford Street is a west-east collector road with four lanes in some sections and three lanes in other sections and a striped two way left turn lane median. Branford Street provides access to the I-5 Freeway. Pavement conditions range from good to fair conditions.

Glenoaks Blvd is a north-south four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles and Burbank. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from fair to poor conditions.

Sheldon Street is west-east four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a two way left turn lane. Sheldon Street provides local access to the I-5 Freeway and the Sun Valley Fill Site and Sheldon Pits. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Laurel Canyon Blvd is a north-south four lane arterial road with two travel lanes in each direction and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

San Fernando Road is a north-south four lane arterial road with two travel lanes in each direction and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles and Burbank. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side of the roadway. Pavement conditions range from good to fair conditions.

Wheatland Avenue is north-south two lane collector road with one travel lane in each direction and a striped median. Wheatland Avenue provides the Sunland community access to the I-210 Freeway. On-street parking is generally allowed along both sides of the roadway. Pavement conditions range from fair to poor conditions.

Wentworth Street is west-east four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a two way left turn lane. Wentworth Street provides local access to the Sunland area. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Tuxford Street is west-east four lane collector road with two travel lanes in each direction and a two way left turn lane. Tuxford Street provides local access to the I-5 Freeway. On-street parking is generally allowed along both sides of the roadway. Pavement conditions range from good to fair conditions.

Peoria Street is west-east two lane local road with one travel lanes in each direction. Peoria Street provides access Bradley Landfill. On-street parking is generally allowed along the both sides of the roadway. Pavement conditions range from fair to poor conditions.

Existing Intersections

Based on our review of the proposed truck trips and distribution of the truck trips, we recommended that fifty-two (52) intersections in the study area be analyzed:

1.) Berkshire Place and I-210 Freeway Eastbound Ramps (La Cañada Flintridge/Caltrans)
2.) Berkshire Place and I-210 Freeway Westbound Ramps (La Cañada Flintridge/Caltrans)
3.) Oak Grove Drive and Berkshire Place (Pasadena)
4.) Oak Grove Drive and Foothill Freeway Overpass (La Cañada Flintridge)
5.) Windsor Ave and Oak Grove Drive/Woodbury Rd (Altadena/Los Angeles County)
6.) Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps (Los Angeles County /Caltrans)
7.) Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps (Pasadena/Caltrans)
8.) Irwindale Ave and I-210 Freeway Westbound Ramps (Caltrans, Irwindale)
9.) Irwindale Ave and I-210 Freeway Eastbound Ramps (Caltrans, Irwindale)
10.) Irwindale Ave and First Street (Irwindale/Azusa)
11.) Irwindale Ave and Gladstone Street (Irwindale/Azusa)
12.) Vincent Ave and Gladstone Street (Azusa)
13.) Vincent Ave and Arrow Hwy (Irwindale/Azusa/Los Angeles County)
14.) Arrow Hwy and Lark Ellen Ave (County of Los Angeles)
15.) Arrow Hwy and Enid Ave (County of Los Angeles)
16.) Azusa Ave and Arrow Hwy (Azusa/Covina/Los Angeles County)
17.) Azusa Ave and Gladstone Street (Azusa/Los Angeles County)
18.) Azusa Ave and I-210 Freeway Eastbound Ramps (Caltrans/ Azusa)
19.) Azusa Ave and First Street (Azusa)
20.) First Street and Alameda Street/I-210 Freeway Westbound Ramps (Caltrans, Azusa)
21.) Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps (City of Los Angeles, Caltrans)
22.) Figueroa St and Eagle Vista Drive (City of Los Angeles)
23.) Figueroa St and SR-134 Freeway Eastbound Ramps (City of Los Angeles, Caltrans)
24.) Foothill Blvd and I-210 Westbound Ramps (City of Los Angeles, Caltrans)
25.) Foothill Blvd and I-210 Eastbound Ramps (City of Los Angeles, Caltrans)
26.) Foothill Blvd and Osborne Street (City of Los Angeles)
27.) Glenoaks Blvd and Osborne Street (City of Los Angeles)
28.) Glenoaks Blvd and Montague Street (City of Los Angeles)
29.) Glenoaks Blvd and Branford Street (City of Los Angeles)
30.) Glenoaks Blvd and Sheldon Street (City of Los Angeles)
31.) Glenoaks Blvd and Peoria Street (City of Los Angeles)
32.) Glenoaks Blvd and Tuxford Street (City of Los Angeles)
33.) Glenoaks Blvd and Penroe Street (City of Los Angeles)
34.) Glenoaks Blvd and Sunland Blvd (City of Los Angeles)
35.) Glenoaks Blvd and Roscoe Blvd (City of Los Angeles)
36.) Roscoe Blvd and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)
37.) Roscoe Blvd and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
38.) Branford Street and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
39.) Branford Street and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)
40.) Branford Street and Laurel Canyon Blvd (City of Los Angeles)
41.) Osborne Street and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
42.) Osborne Street and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)

43.) Osborne Street and Laurel Canyon Blvd (City of Los Angeles)
44.) Wheatland Ave and I-210 Freeway Eastbound Ramps (City of Los Angeles/Caltrans)
45.) Wheatland Ave and I-210 Freeway Westbound Ramps (City of Los Angeles/Caltrans)
46.) Wheatland Ave and Foothill Blvd (City of Los Angeles)
47.) Wentworth Street and Foothill Blvd (City of Los Angeles)
48.) Tuxford Street and San Fernando Road (City of Los Angeles)
49.) Lankershim Blvd and San Fernando Road (City of Los Angeles)
50.) Sheldon Street and San Fernando Road (City of Los Angeles)
51.) Branford Street and San Fernando Road (City of Los Angeles)
52.) Irwindale Avenue and Foothill Boulevard (City of Irwindale)

Freeway Facilities

Interstate 210 Freeway provides regional access within the study area and runs west to east to the east of the SR-134 Freeway interchange and runs north to south to the north of the SR-134 Freeway interchange. To the east of the SR-134 Freeway interchange the I-210 Freeway is an eight-lane freeway with four lanes in each direction and one car pool lane in each direction. To the north of the SR-134 Freeway interchange the I-210 Freeway becomes an eight-lane freeway with four lanes in each direction. This freeway is an interstate facility that provides travel between the San Bernardino, Rancho Cucamonga, and San Dimas areas to the Pasadena and San Fernando areas.

Interstate 5 Freeway provides regional access within the study area and runs north to south connecting Southern California to Northern California. The I-5 Freeway is an eight-lane freeway with four lanes in each direction. This freeway is an interstate facility that provides travel between Los Angeles to Orange and San Diego County and between Los Angeles to Bakersfield, Sacramento, and San Francisco.

State Route 134 Freeway provides regional access within the study area and runs west to east from the I-210 Freeway interchange to the US-101 and SR-170 Freeway interchange in Hollywood. The SR-134 Freeway is an eight-lane freeway with four lanes in each direction and one car pool lane in each direction. This freeway is a state facility that provides travel between the Ventura, Hollywood, and Burbank areas to the Pasadena, San Dimas, and San Bernardino areas.

State Route 2 Freeway provides regional access within the study area and runs north to south from south of the I-5 Freeway interchange in Los Angeles to the I-210 Freeway interchange in La Cañada Flintridge. The SR-2 Freeway is an eight-lane freeway with four lanes in each direction. This freeway is a state facility that provides travel between the La Cañada Flintridge and Glendale areas to the Los Angeles and Hollywood areas.

State Route 118 Freeway provides regional access within the study area and runs north to south from south of the I-5 Freeway interchange to the I-210 Freeway interchange within Los Angeles. The SR-118 Freeway is an eight-lane freeway with four lanes in each direction. This freeway is a state facility that provides travel with Los Angeles.

Existing Freeway and Ramps System

The proposed haul routes must utilize freeway segments along the I-210 Freeway, SR-134 Freeway, SR-2 Freeway, I-5 Freeway, and SR-118 freeway as well as several on and off-ramps. An increase in truck traffic along the freeway and ramps can impact the LOS of the freeway and ramps adversely. In order to ensure adequate freeway and ramp operations this study has identified 28 freeway segments and 54 on and off-ramps for analysis. The 28 freeway segments identified for analysis consist of the following:

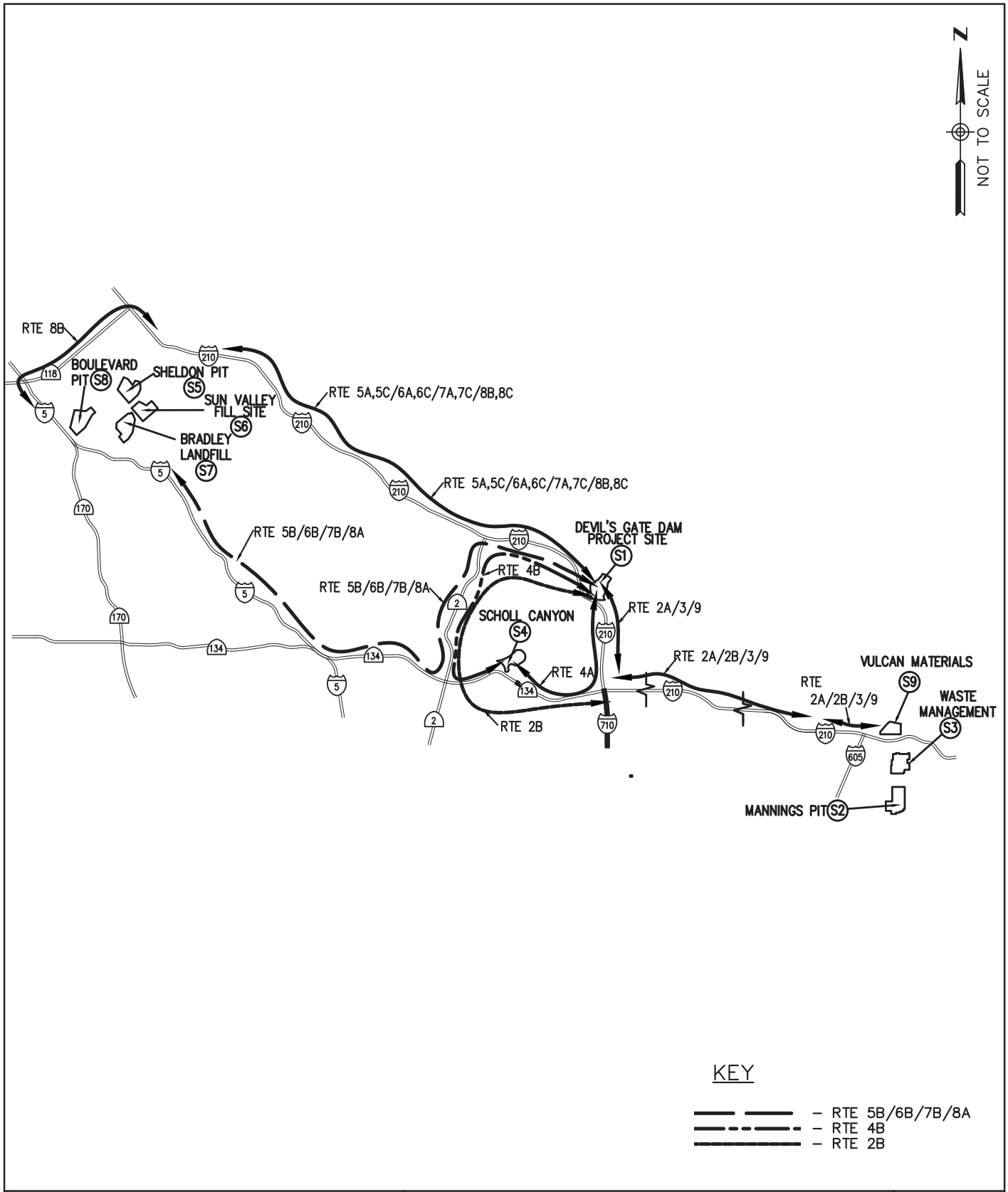
1.) I-210 Freeway between Windsor Ave/Arroyo Blvd and Berkshire Place.
2.) I-210 Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.
3.) I-210 Freeway between the SR-134 Freeway and Mountain Street.
4.) SR-134 Freeway between San Rafael Ave and Figueroa Street.
5.) SR-134 Freeway between the I-210 Freeway and San Rafael Ave.
6.) I-210 Freeway between the SR-134 Freeway and Lake Ave.
7.) I-210 Freeway between the I-605 Freeway and Irwindale Ave.
8.) I-210 Freeway between Irwindale Ave and Azusa Ave.
9.) I-210 Freeway between Berkshire Place and Foothill Blvd.
10.) I-210 Freeway between Angeles Crest Hwy and the SR-2 Freeway (Glendale Freeway)
11.) SR-2 Freeway between the I-210 Freeway and Mountain Street.
12.) SR-2 Freeway between Mountain Street and the SR-134 Freeway.
13.) SR-134 Freeway between the SR-2 Freeway and Figueroa Street.
14.) SR-134 Freeway between the SR-2 Freeway and Glendale Ave.
15.) SR-134 Freeway between the Pacific Ave and Concord Street.
16.) SR-134 Freeway between Concord Street and the I-5 Freeway.
17.) I-5 Freeway between the SR-134 Freeway and Western Ave.
18.) I-5 Freeway between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.
19.) I-5 Freeway between Sheldon Street/Laurel Canyon Blvd and the SR-170 Freeway.
20.) I-5 Freeway between the SR-170 Freeway and Branford Street.
21.) I-210 Freeway between the SR-2 Freeway and Montrose Ave.
22.) I-210 Freeway between Sunland Blvd and Wheatland Ave
23.) I-210 Freeway between Wheatland Ave and Foothill Blvd/Osborne Street.
24.) I-210 Freeway between Foothill Blvd/Osborne Street and the SR-118 Freeway.
25.) SR-118 Freeway between the I-210 Freeway and Glenoaks Blvd.
26.) SR-118 Freeway between San Fernando Rd and the I-5 Freeway.
27.) I-5 Freeway between the SR-118 Freeway and Van Nuys Blvd.
28.) I-5 Freeway between Tierra Bella Street and Osborne Street.

The 54 on and off-ramps on-ramps and off-ramps identified for analysis consists of the following:

1.) Berkshire Place and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
2.) Berkshire Place and the Westbound I-210 Freeway On-ramp.*(Merge Point)*
3.) Berkshire Place and the Eastbound I-210 Freeway On-ramp. *(Merge Point)*
4.) Berkshire Place and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*
5.) Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
6.) Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. *(Merge Point)*
7.) Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. *(Merge Point)*
8.) Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*

9.) Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline and Eastbound I-210 Freeway mainline. *(Diverge Point)*
10.) Westbound I-210 Freeway and Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Merge Point)*
11.) Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*
12.) Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*
13.) Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. *(Diverge Point)*
14.) Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. *(Merge Point)*
15.) Southbound I-210 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
16.) Westbound I-210 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*
17.) Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
18.) Irwindale Ave and the Westbound loop I-210 Freeway On-ramp. *(Merge Point)*
19.) First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*
20.) Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. *(Diverge Point)*
21.) Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
22.) Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. *(Merge Point)*
23.) Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Diverge Point)*
24.) Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*
25.) Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*
26.) Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*
27.) Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*
28.) Figueroa Street and the Eastbound SR-134 Freeway Off-ramp. *(Diverge Point)*
29.) Figueroa Street and the Westbound SR-134 Freeway On-ramp. *(Merge Point)*
30.) Southbound SR-2 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*
31.) Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*
32.) Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Diverge Point)*
33.) Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*
34.) Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Merge Point)*
35.) Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*

36.) Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
37.) Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*
38.) Branford Street and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*
39.) Branford Street and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
40.) Wheatland Ave and the Westbound I-210 Freeway mainline Off-ramp. *(Diverge Point)*
41.) Wheatland Avenue and the Eastbound I-210 Freeway mainline On-ramp. *(Merge Point)*
42.) Foothill Blvd/Osborne Street and the Westbound I-210 Freeway mainline Off-ramp. *(Diverge Point)*
43.) Foothill Blvd/Osborne Street and the Eastbound I-210 Freeway mainline On-ramp. *(Merge Point)*
44.) Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Diverge Point)*
45.) Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
46.) Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Merge Point)*
47.) Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Diverge Point)*
48.) Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. *(Diverge Point)*
49.) Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. *(Merge Point)*
50.) Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. *(Merge Point)*
51.) Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline *(Diverge Point)*
52.) Osborne Street and the Southbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
53.) Osborne Street and the Northbound I-5 Freeway mainline On-ramp. *(Merge Point)*
54.) Irwindale Ave and the Westbound I-210 Freeway On-ramp. *(Merge Point)*



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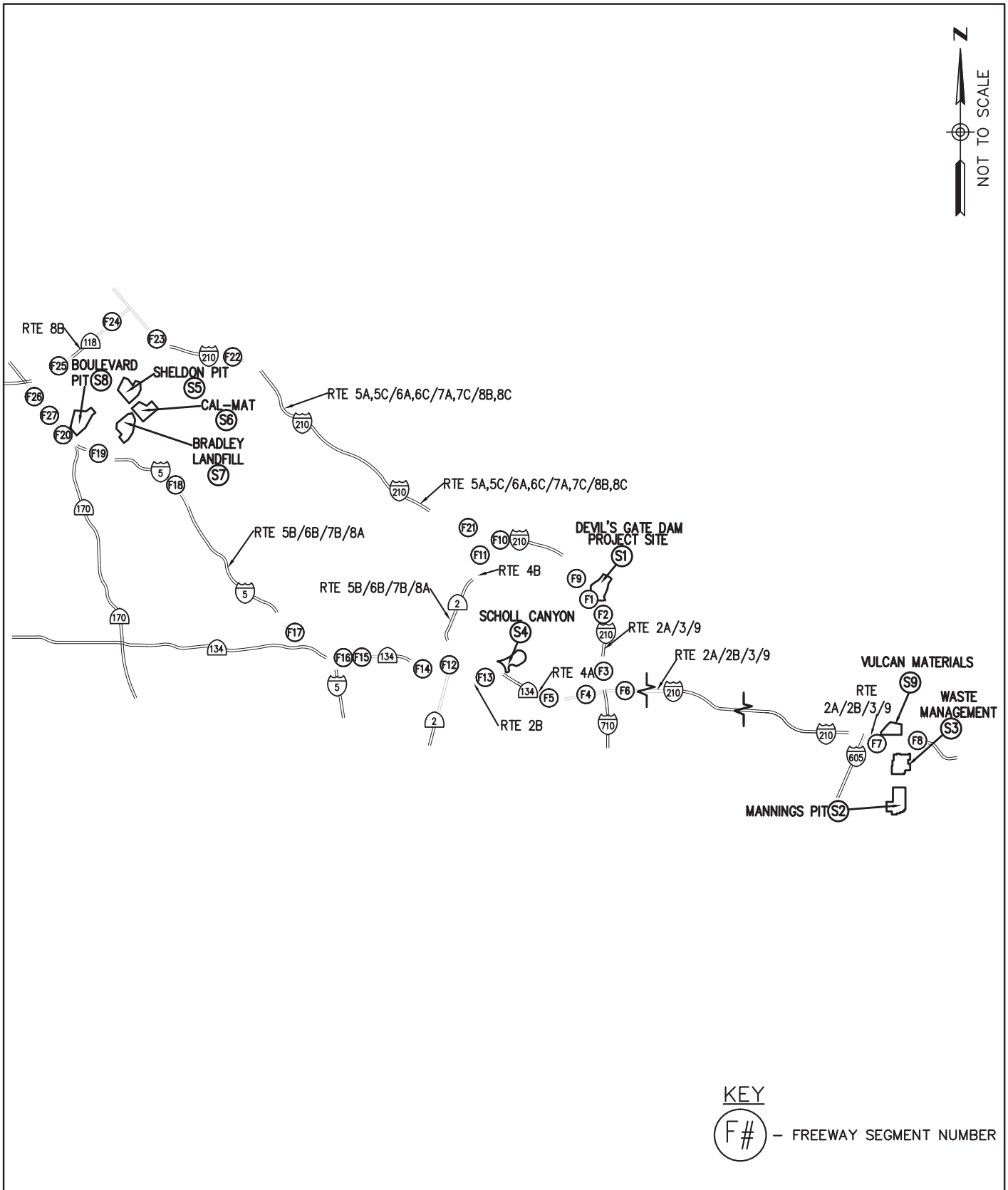
FREEWAY SYSTEM

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-5-1

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-1.dwg
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz



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LOCATION OF FREEWAY SEGMENTS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-2

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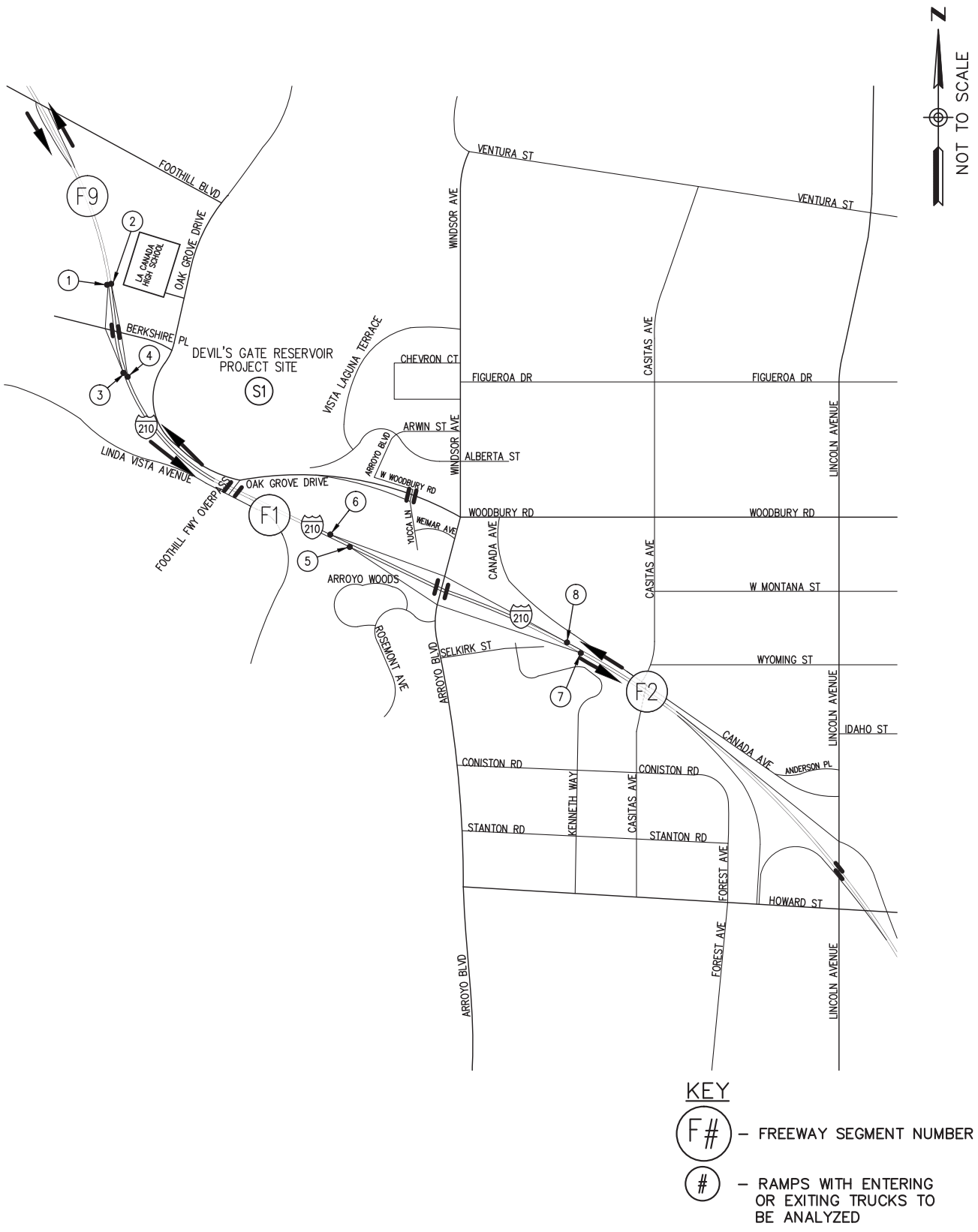
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz



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FREEWAY SEGMENTS 1, 2, AND 9

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-3

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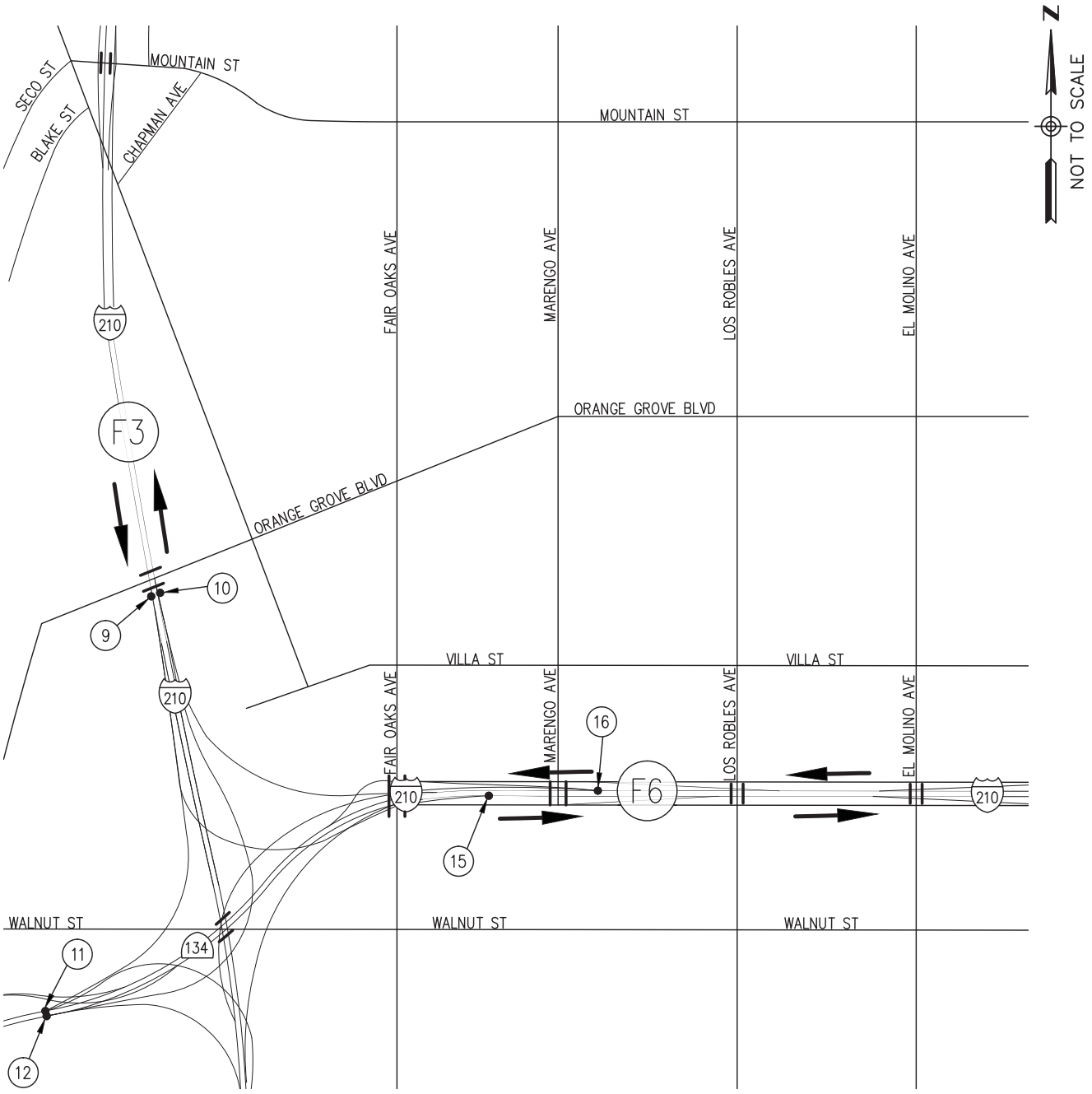

KEY

F# – FREEWAY SEGMENT NUMBER

– RAMPS WITH ENTERING OR EXITING TRUCKS TO BE ANALYZED

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FREEWAY SEGMENTS 3 AND 6

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-4

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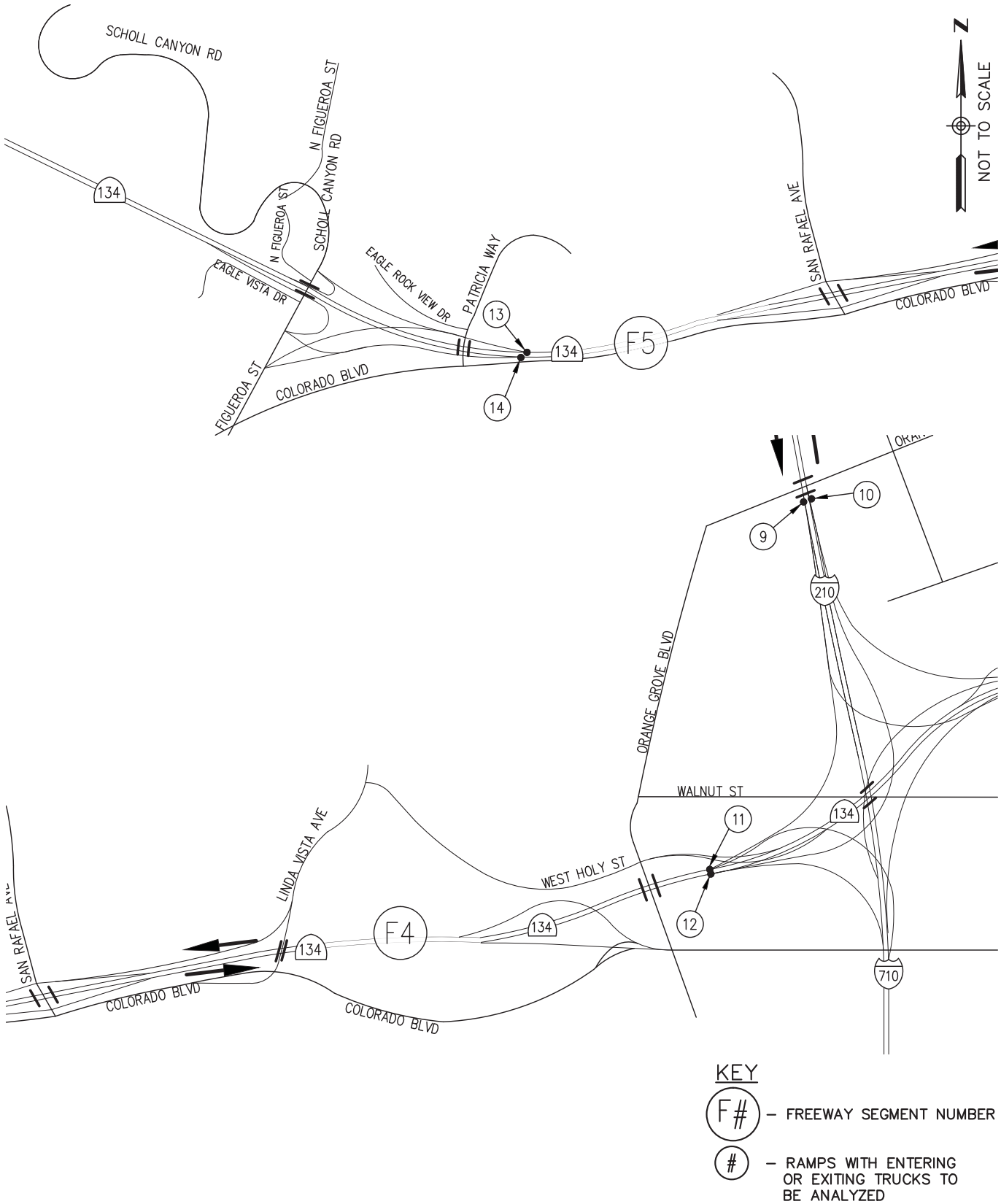
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz



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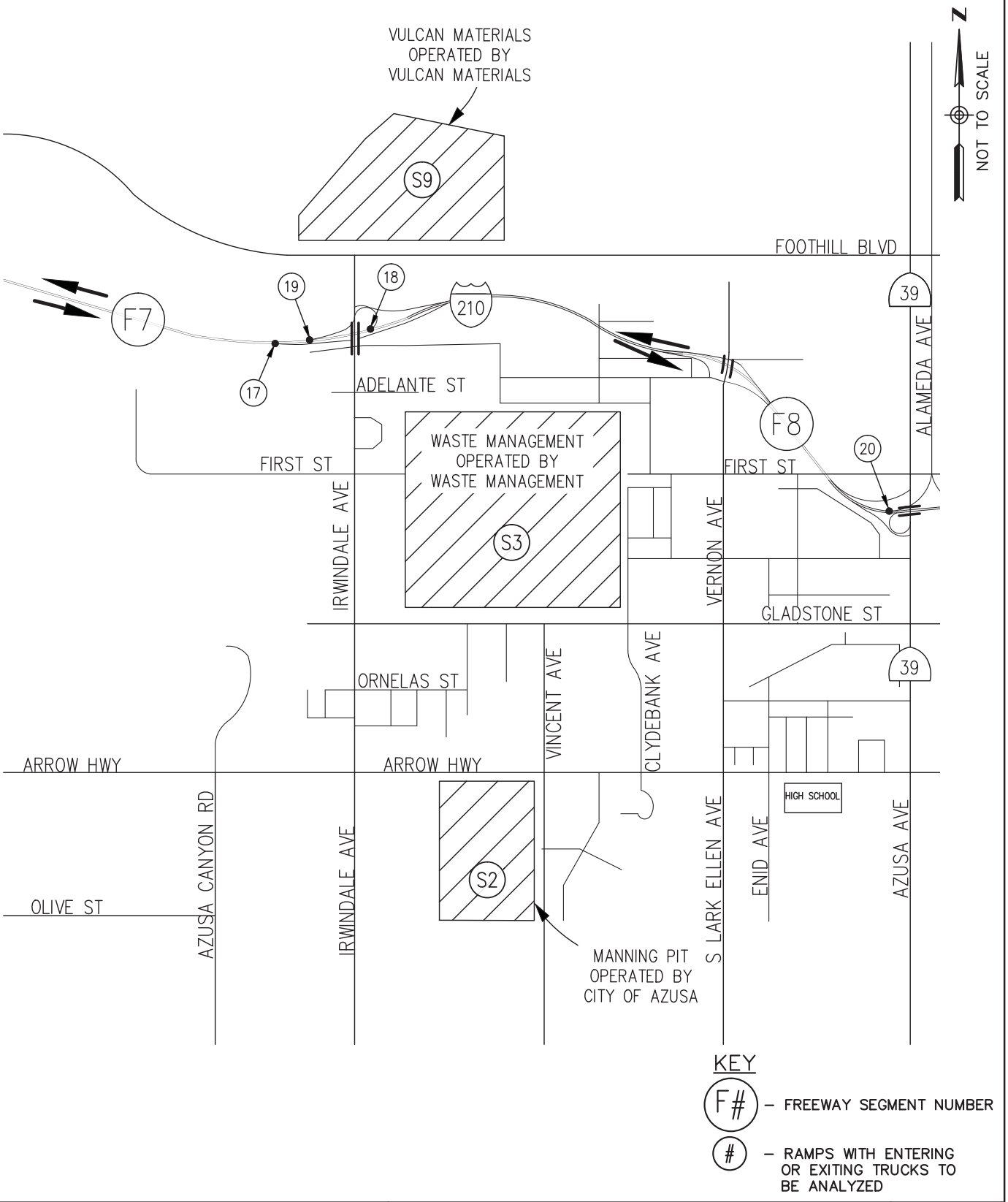
FREEWAY SEGMENTS 4 AND 5

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-5

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-5.dwg
Last Opened: Oct 03, 2013 – 12:03pm by: TMunoz



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FREEWAY SEGMENTS 7, AND 8

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-6

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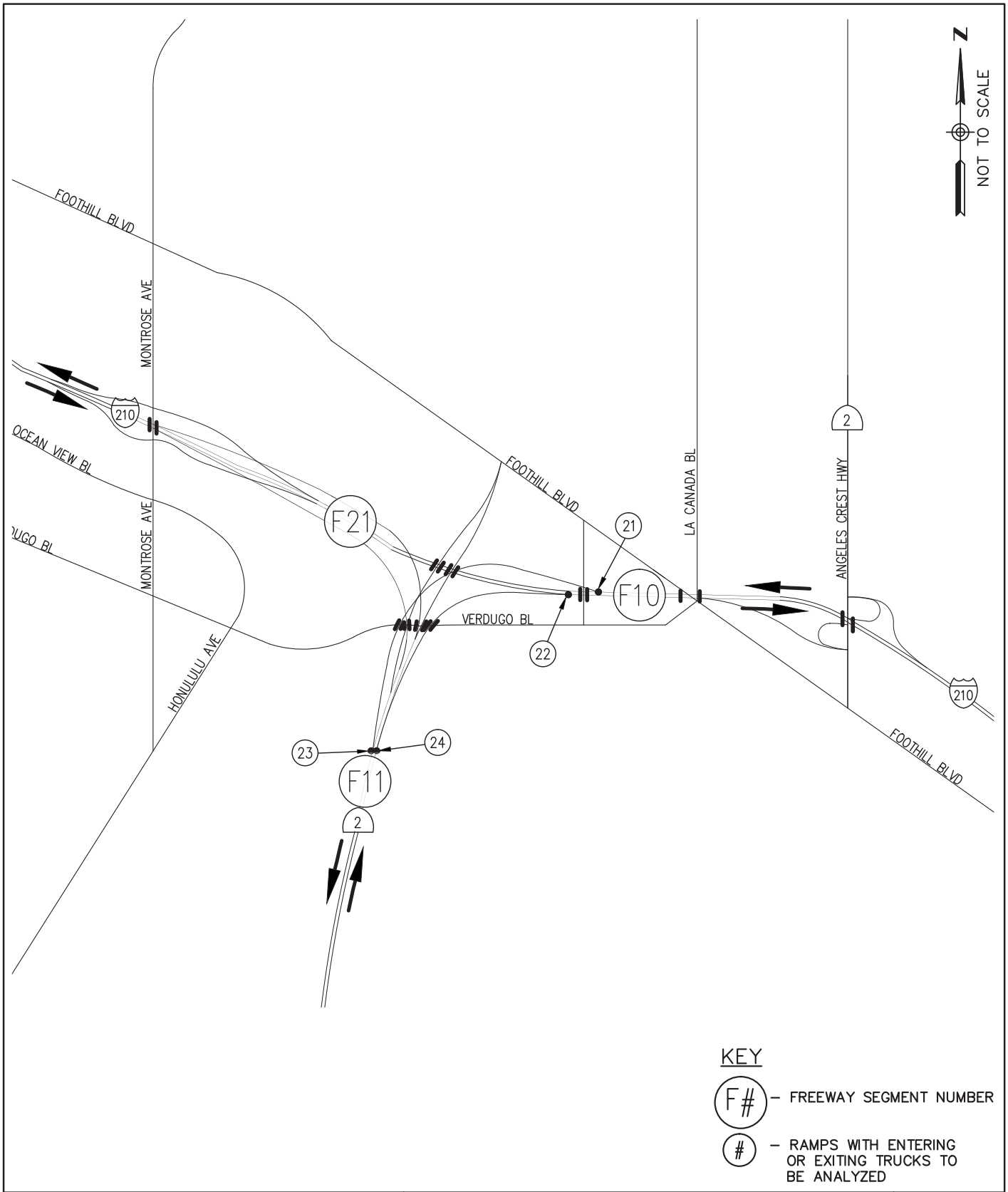
Last Opened: Oct 03, 2013 – 12:03pm by: TMunoz



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FREEWAY SEGMENTS 10, 11, AND 21

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-5-7

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-7.dwg
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KEY

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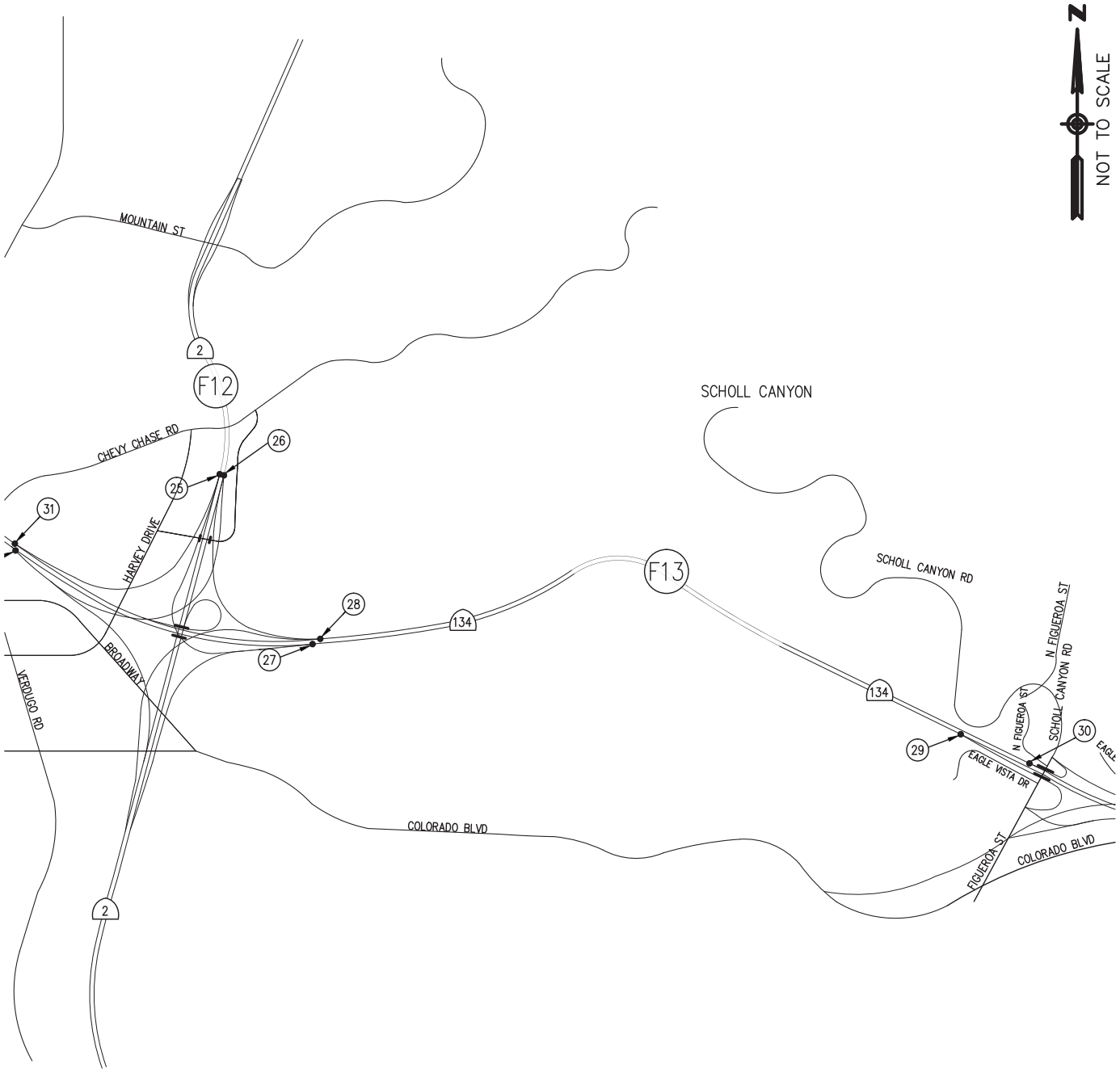
FREEWAY SEGMENTS 12 AND 14

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-8

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-8.dwg
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz



KEY

F# – FREEWAY SEGMENT NUMBER

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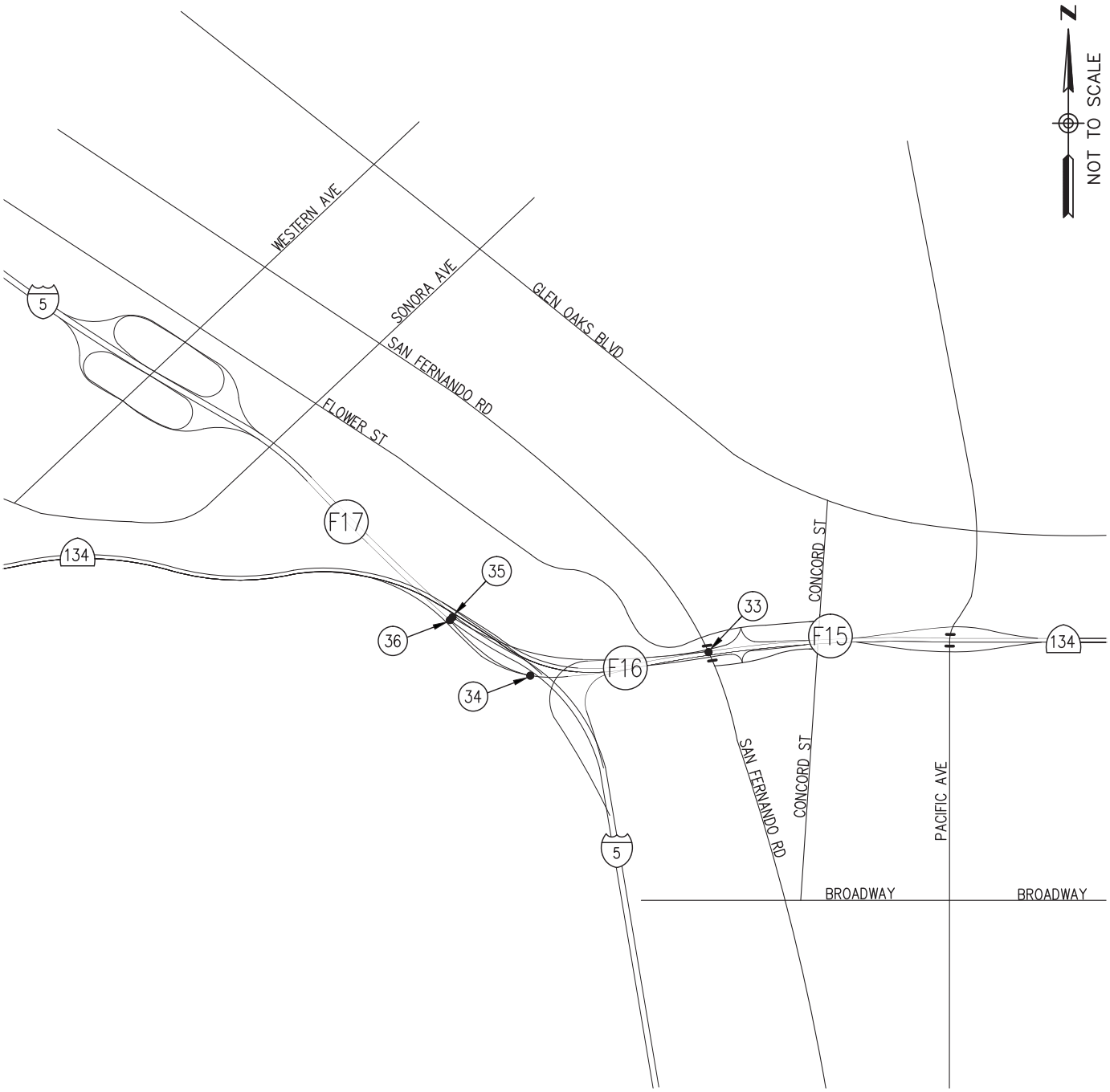
FREEWAY SEGMENTS 12 AND 13

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-9

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-9.dwg
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz



KEY

F# – FREEWAY SEGMENT NUMBER

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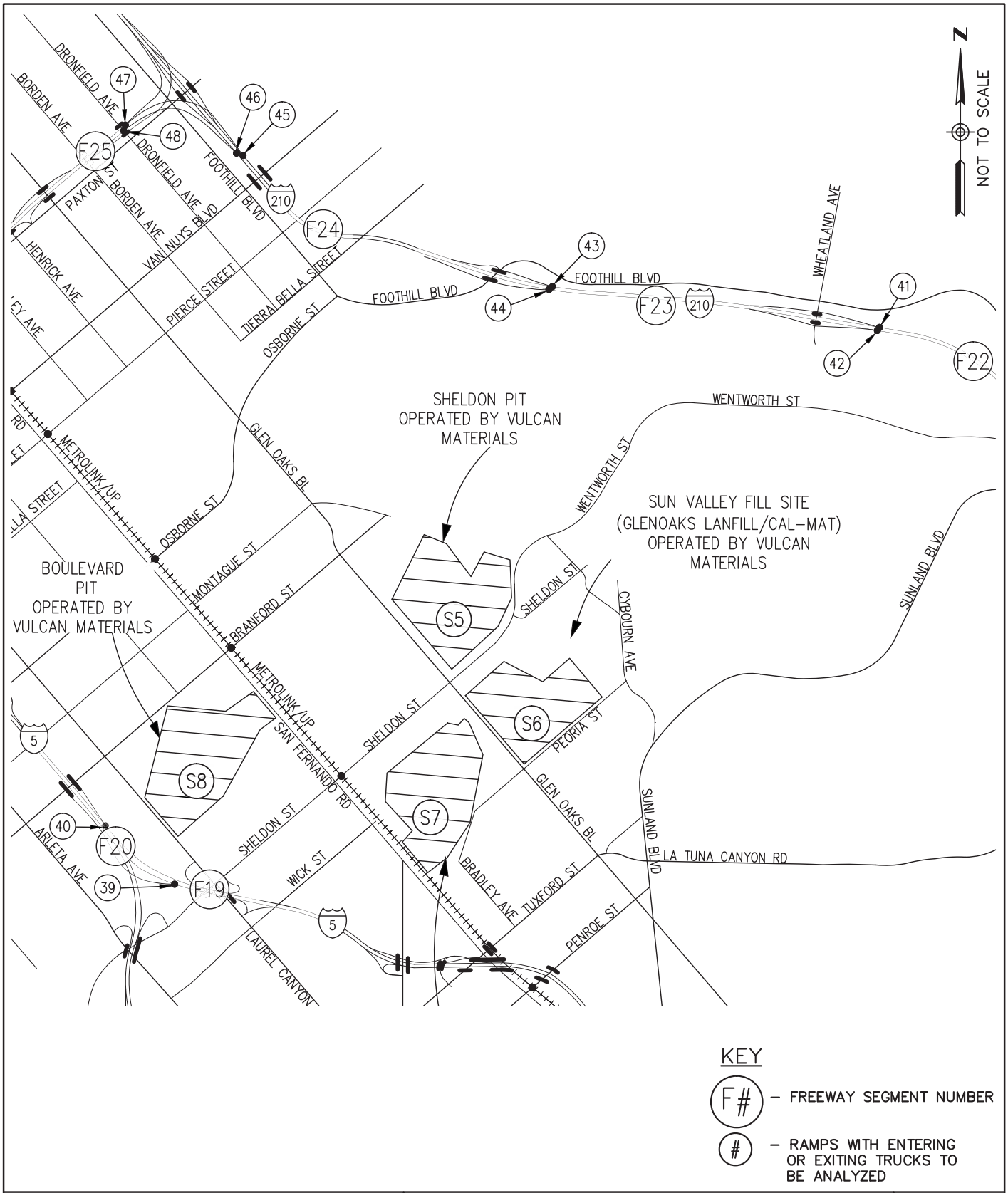
FREEWAY SEGMENTS 15, 16, AND 17

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-5-10

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-10.dwg
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz



KEY

(F#) – FREEWAY SEGMENT NUMBER

(#) – RAMPS WITH ENTERING OR EXITING TRUCKS TO BE ANALYZED

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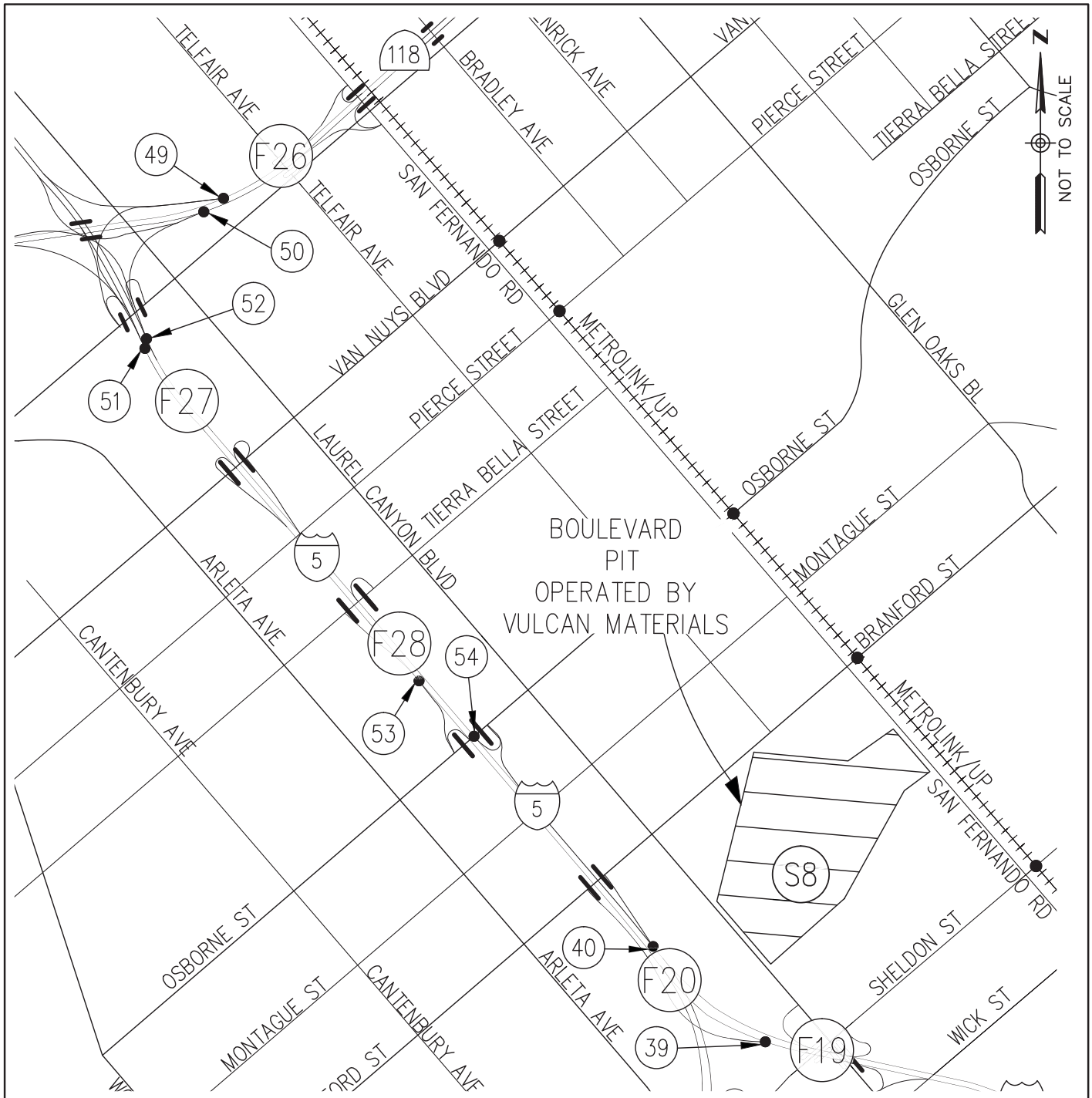
FREEWAY SEGMENTS 19, 20, 22, 23, 24, AND 25

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-11

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-11.dwg
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz



KEY

(F#) – FREEWAY SEGMENT NUMBER

(#) – RAMPS WITH ENTERING OR EXITING TRUCKS TO BE ANALYZED

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FREEWAY SEGMENTS 19, 20, 26, 27, AND 28

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-12

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-12.dwg
Last Opened: Oct 03, 2013 - 12:03pm by: TMunoz

Existing Traffic Analysis

Capacity analyses for the existing conditions were conducted utilizing the methods discussed in Chapter 2 for the twenty-five (25) proposed haul routes. Within those 25 haul routes 51 intersections, 28 freeway segments, and 53 on and off-ramps were analyzed.

Existing Intersection Level of Service
The intersection LOS is presented in Chapter 3 of Appendix A in the Tables 3-1-1 through 3-4-12, Sites 1 through Site 9. The LOS of both the HCM and ICU methods are presented. The capacity analysis worksheets are provided in Appendix B.

Existing Freeway Mainline HCM Analysis
The freeway mainline LOS is presented in Chapter 3 of Appendix A in the Table 3-5-1. The capacity analysis worksheets are provided in Appendix C.

Existing Freeway Ramp HCM Analysis
The freeway ramp LOS is presented in Chapter 3 of Appendix A in the Table 3-5-2. The capacity analysis worksheets are provided in Appendix D.

Existing plus Project Traffic Analysis

Capacity analyses for the existing plus project were conducted utilizing the methods discussed in Chapter 2 for the twenty-five (25) proposed haul routes.

Existing plus Project Intersection Level of Service
The intersection LOS is presented in Chapter 4 of Appendix A in the Tables 4-1-1 through 4-4-12. The capacity analysis worksheets are provided in Appendix B.

Existing plus Project Freeway Mainline HCM Analysis
The freeway mainline LOS is presented in Chapter 4 of Appendix A in the Table 4-5-1. The capacity analysis worksheets are provided in Appendix C.

Existing plus Project Freeway Ramp HCM Analysis
The freeway ramp LOS is presented in Chapter 4 of Appendix A in the Table 4-5-2. The capacity analysis worksheets are provided in Appendix D.

4. PROJECT CONDITIONS - YEAR 2014

Project Trip Generation

The sediment removal process is expected to generate 50 truck trips per hour. The expected increase of truck trips can result in an increase of traffic delay at the intersections along the truck haul routes. The intersections along the haul routes were analyzed to determine the impact the truck trips will have on the intersection operations. Employee trips to the site are also taken into account and are estimated.

Table 4 summarizes the estimated trucks trip generation for the project site during the AM and PM peak periods. It is recommended that *Table 4* be used as the trip generation for this project.

Table 4
Project Trip Generation
Traffic Scope – Devil's Gate Dam & Reservoir

			A.M. Peak Hour			Mid-Day Peak Hour			P.M. Peak Hour		
	Use	Daily	In	Out	Total	In	Out	Total	In	Out	Total
1	**Employees**										
		17	2	2	4	2	2	4	2	2	4
2	**Trucks**										
	Truck Trips	425	50	50	100	50	50	100	50	50	100
	PCE Adjustment		125	150	275	125	150	275	125	150	275
	Total	442	52	52	104	52	52	104	52	52	104
	Total Adjusted (w PCE)		127	152	279	127	152	279	127	152	279

Project Trip Growth

The Devil's Gate Dam and Reservoir Area included the cumulative projects in the cities of La Cañada Flintridge, Pasadena, Pacoima, and peak road. The NASA Jet Propulsion Laboratory (JPL) On-Site Parking Structure project was included for the study area within the City of La Cañada Flintridge. The Rose Bowl National Football League (NFL) Stadium designation project was included for the study area within the City of Pasadena.

The Manning's Pit and Waste Management deposit sites included cumulative projects in the cities of Azusa and Irwindale. The cumulative projects included for the study area within the cities of Azusa and Irwindale include the Azusa Material Recovery Facility and Waste Transfer Station project and the Gold Line Station project.

For the project conditions at the Year 2014, vehicular growth is expected to occur. An annual increase factor of 4.5% totaling 9% for 2 years is incorporated to the report to account for any construction improvements and cumulative projects expected to occur in the surrounding area up to Project Year 2014. The cumulative projects included in the growth factor are specific to deposit site. The report accounts for this growth and incorporated into the calculations. This helps to identify major problematic areas of improvements.

Project Traffic Analysis

Capacity analyses for the project conditions were conducted for the twenty-six (26) proposed haul routes. Within those 26 haul routes 52 intersections, 28 freeway segments, and 54 on and off-ramps were analyzed. The resulting LOS for the project conditions Year 2014 of each haul route analyzed are presented in Tables 4-1-1 thru 4-4-3. The intersection capacity analysis worksheets are provided in Appendix B. The freeway mainline capacity analysis worksheets are provided in Appendix C. The freeway ramp capacity analysis worksheets are provided in Appendix D.

TABLE 4-1-1: Haul Route 1A-Route 1H Year 2014: AM Peak Hour

	Intersections							Freeway Segments						Ramps								
	1	2	3	4	5	6	7	1	2	1	2	9		1	2	3	4	5	6	7	8	
	Berkshire Place & I-210 Freeway Eastbound Ramps	Berkshire Place & I-210 Freeway Westbound Ramps	Oak Grove Drive and Berkshire Place	Oak Grove Drive and Foothill Freeway Overpass	Windsor Ave and Oak Grove Drive/Woodbury Rd	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 WB between Berkshire Place and Foothill Blvd.	I-210 EB between Berkshire Place and Foothill Blvd.	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Westbound I-210 Freeway On-ramp.*(Merge Point)*	Berkshire Place and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Eastbound I-210 Freeway On-ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	**Route Total**
Route 1A	x	x	x					x	x							x	x					
HCM LOS	F	B	C					B	C							C	C					
HCM Delay	51.4	13.1	26.6					13.3	21.4							27.7	23.7					217
HCM V/C	-	-	0.97																			
ICU LOS	-	-	B																			
Length (ft)	360	640	1,110					3,800	4,030							960	1,120					13,770
Grade (%)								1.5	-1.5													
Route 1B				x	x	x	x			x	x									x	x	
HCM LOS				C	C	B	C			B	C									B	B	
HCM Delay				21.0	34.6	10.8	23.7			15.7	23.8									19.1	11.1	226
HCM V/C				-	0.94	0.68	0.39															
ICU LOS				-	D	B	A															
Length (ft)				940	2,300	520	340			2,550	2,540									1,270	1,335	15,555
Grade (%)										1.7	-1.7											
Route 1C		x	x	x	x	x	x	x			x					x				x		
HCM LOS		B	B	C	C	B	C	B			C					C				B		
HCM Delay		13.1	10.9	18.1	29	10.2	23.7	13.3			23.8					27.7				19.1		189
HCM V/C		-	0.68	-	0.95	0.65	0.39															
ICU LOS		-	A	-	D	B	A															
Length (ft)		640	1,110	940	2,300	520	340	3,800			2,540					960				1,270		14,420
Grade (%)								1.5			-1.7											
Route 1D	x	x	x	x	x	x			x	x							x				x	
HCM LOS	F	A	B	C	C	B			C	B							C				B	
HCM Delay	51.4	9.5	19.2	19.2	34.7	10.4			21.4	15.7							23.7				11.1	216
HCM V/C	-	-	0.93	-	0.94	0.66																
ICU LOS	-	-	B	-	D	B																
Length (ft)	360	640	1,110	940	2,300	520			4,030	2,550							1,120				1,335	14,905
Grade (%)									-1.5	1.7												
Route 1E	x	x	x									x	x	x	x							
HCM LOS	E	B	C									B	C	C	B							
HCM Delay	48.2	11.0	26.6									15.3	24.4	20.3	14.9							198
HCM V/C	-	-	0.97																			
ICU LOS	-	-	B																			
Length (ft)	360	640	1,110									2,250	1,680	1,500	960							10,250
Grade (%)												1.8	-1.8									
Route 1F				x	x	x	x	x	x									x	x			
HCM LOS				C	C	A	C	B	C									D	C			
HCM Delay				21	34.6	9.9	28.6	13.3	21.4									23.7	33.4			251
HCM V/C				-	0.94	0.62	0.57															
ICU LOS				-	D	B	A															
Length (ft)				940	2,300	520	340	3,650	3,930									1,140	2,000			18,580
Grade (%)								1.5	-1.5													
Route 1G	x	x	x	x	x	x		x					x	x					x			
HCM LOS	E	A	B	C	C	A		B					C	C					C			
HCM Delay	48.2	4.7	10.9	18.1	29	9.6		13.3					24.4	20.3					33.4			212
HCM V/C	-	-	0.68	-	0.95	0.61																
ICU LOS	-	-	A	-	D	B																
Length (ft)	360	640	1,110	940	2,300	520		3,650					1680	1500					2,000			14,700
Grade (%)								1.5					-1.8									
Route 1H		x	x	x	x	x	x		x			x			x			x				
HCM LOS		B	B	C	C	A	C		C			B			B			D				
HCM Delay		10.4	19.2	19.2	34.7	9.7	28.6		21.4			15			14.9			23.7				197
HCM V/C		-	0.93	-	0.94	0.61	0.57															
ICU LOS		-	B	-	D	B	A															
Length (ft)		640	1,110	940	2,300	520	340		3,930			2,250			960			1,140				14,130
Grade (%)									-1.5			1.8										

TABLE 4-1-2: Haul Route 1A-Route 1H Year 2014: MID-DAY (12-2) Peak Hour

	Intersections							Freeway Segments						Ramps								
	1	2	3	4	5	6	7	1	2	1	2	9		1	2	3	4	5	6	7	8	
	Berkshire Place & I-210 Freeway Eastbound Ramps	Berkshire Place & I-210 Freeway Westbound Ramps	Oak Grove Drive and Berkshire Place	Oak Grove Drive and Foothill Freeway Overpass	Windsor Ave and Oak Grove Drive/Woodbury Rd	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 WB between Berkshire Place and Foothill Blvd.	I-210 EB between Berkshire Place and Foothill Blvd.	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Westbound I-210 Freeway On-ramp.*(Merge Point)*	Berkshire Place and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Eastbound I-210 Freeway On-ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	**Route Total**
Route 1A	x	x	x					x	x							x	x					
HCM LOS	B	A	A					A	B							C	C					
HCM Delay	10.8	7.0	6.2					9.9	14.9							20.6	22.7					105
HCM V/C	-	-	0.30																			
ICU LOS	-	-	A																			
Length (ft)	360	640	1,110					3,800	4,030							960	1,120					13,770
Grade (%)								1.5	-1.5													
Route 1B				x	x	x	x			x	x									x	x	
HCM LOS				A	B	A	C			B	B									B	A	
HCM Delay				9.9	14.4	6.8	30.9			15.5	14.5									11.8	5.2	140
HCM V/C				-	0.59	0.37	0.42															
ICU LOS				-	A	A	A															
Length (ft)				940	2,300	520	340			2,550	2,540									1,270	1,335	15,555
Grade (%)										1.7	-1.7											
Route 1C		x	x	x	x	x	x	x			x					x				x		
HCM LOS		A	A	A	B	A	C	A			B					C				B		
HCM Delay		6.9	6.1	9.4	14.5	5.7	30.9	9.9			14.5					20.6				11.8		130
HCM V/C		-	0.22	-	0.53	0.33	0.42															
ICU LOS		-	A	-	A	A	A															
Length (ft)		640	1,110	940	2,300	520	340	3,800			2,540					960				1,270		14,420
Grade (%)								1.5			-1.7											
Route 1D	x	x	x	x	x	x			x	x							x				x	
HCM LOS	B	A	A	A	B	A			B	B							C				A	
HCM Delay	10.8	4.9	5.6	9.6	14.3	6			14.9	15.5							22.7				5.2	110
HCM V/C	-	-	0.29	-	0.54	0.31																
ICU LOS	-	-	A	-	A	A																
Length (ft)	360	640	1,110	940	2,300	520			4,030	2,550							1,120				1,335	14,905
Grade (%)									-1.5	1.7												
Route 1E	x	x	x									x	x	x	x							
HCM LOS	B	A	A									B	B	B	B							
HCM Delay	10.6	4.7	6.2									15.5	14.6	10.5	14.7							88
HCM V/C	-	-	0.30																			
ICU LOS	-	-	A																			
Length (ft)	360	640	1,110									2,250	1,680	1,500	960							10,250
Grade (%)												1.8	-1.8									
Route 1F				x	x	x	x	x	x									x	x			
HCM LOS				A	B	A	B	A	B									C	B			
HCM Delay				9.9	14.4	5.5	16.1	9.9	14.9									23.1	18.2			142
HCM V/C				-	0.59	0.31	0.39															
ICU LOS				-	A	A	A															
Length (ft)				940	2,300	520	340	3,650	3,930									1,140	2,000			18,580
Grade (%)								1.5	-1.5													
Route 1G	x	x	x	x	x	x		x					x	x					x			
HCM LOS	B	A	A	A	B	A		A					B	B					B			
HCM Delay	10.6	6.9	6.1	9.4	14.5	5.6		9.9					14.6	10.5					18.2			106
HCM V/C	-	-	0.22	-	0.53	0.31																
ICU LOS	-	-	A	-	A	A																
Length (ft)	360	640	1,110	940	2,300	520		3,650					1680	1500					2,000			14,700
Grade (%)								1.5					-1.8									
Route 1H		x	x	x	x	x	x		x			x			x			x				
HCM LOS		A	A	A	B	A	B		B			B			B			C				
HCM Delay		4.6	5.6	9.6	14.3	5.7	16.1		14.9			15.5			14.7			23.1				124
HCM V/C		-	0.29	-	0.54	0.37	0.39															
ICU LOS		-	A	-	A	A	A															
Length (ft)		640	1,110	940	2,300	520	340		3,930			2,250			960			1,140				14,130
Grade (%)									-1.5			1.8										

TABLE 4-1-3: Haul Route 1A-Route 1H Year 2014: MID-DAY (2-4) Peak Hour

	Intersections						
	1	2	3	4	5	6	7
	Berkshire Place & I-210 Freeway Eastbound Ramps	Berkshire Place & I-210 Freeway Westbound Ramps	Oak Grove Drive and Berkshire Place	Oak Grove Drive and Foothill Freeway Overpass	Windsor Ave and Oak Grove Drive/Woodbury Rd	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps
Route 1A	x	x	x				
HCM LOS	C	A	A				
HCM Delay	23.7	9.3	7.1				
HCM V/C	-	-	0.49				
ICU LOS	-	-	A				
Length (ft)	360	640	1,110				
Grade (%)							
Route 1B				x	x	x	x
HCM LOS				A	B	A	C
HCM Delay				9.8	17.1	6.9	28.4
HCM V/C				-	0.58	0.37	0.42
ICU LOS				-	A	A	A
Length (ft)				940	2,300	520	340
Grade (%)							
Route 1C		x	x	x	x	x	x
HCM LOS		A	A	A	B	A	C
HCM Delay		8.4	8.4	9.6	17.3	6.4	28.4
HCM V/C		-	0.59	-	0.55	0.4	0.42
ICU LOS		-	A	-	A	A	A
Length (ft)		640	1,110	940	2,300	520	340
Grade (%)							
Route 1D	x	x	x	x	x	x	
HCM LOS	C	A	A	A	B	A	
HCM Delay	23.7	7.2	8.4	9.5	17.1	7.3	
HCM V/C	-	-	0.57	-	0.58	0.41	
ICU LOS	-	-	B	-	A	A	
Length (ft)	360	640	1,110	940	2,300	520	
Grade (%)							
Route 1E	x	x	x				
HCM LOS	C	A	A				
HCM Delay	18.9	6.9	7.1				
HCM V/C	-	-	0.49				
ICU LOS	-	-	A				
Length (ft)	360	640	1,110				
Grade (%)							
Route 1F				x	x	x	x
HCM LOS				A	B	A	B
HCM Delay				9.8	17.1	5.6	17.4
HCM V/C				-	0.58	0.27	0.42
ICU LOS				-	A	A	A
Length (ft)				940	2,300	520	340
Grade (%)							
Route 1G	x	x	x	x	x	x	
HCM LOS	C	A	A	A	B	A	
HCM Delay	18.9	6.9	8.4	9.6	17.3	6.3	
HCM V/C	-	-	0.59	-	0.55	0.37	
ICU LOS	-	-	A	-	A	A	
Length (ft)	360	640	1,110	940	2,300	520	
Grade (%)							
Route 1H		x	x	x	x	x	x
HCM LOS		A	A	A	B	A	B
HCM Delay		6.6	8.4	9.5	17.1	6.4	17.4
HCM V/C		-	0.57	-	0.58	0.37	0.42
ICU LOS		-	B	-	A	A	A
Length (ft)		640	1,110	940	2,300	520	340
Grade (%)							

TABLE 4-1-4: Haul Route 1A-Route 1H Year 2014: PM Peak Hour

	Intersections							Freeway Segments						Ramps								
								1		2		9										
	1	2	3	4	5	6	7	1	2	3	4	17	18	1	2	3	4	5	6	7	8	
	Berkshire Place & I-210 Freeway Eastbound Ramps	Berkshire Place & I-210 Freeway Westbound Ramps	Oak Grove Drive and Berkshire Place	Oak Grove Drive and Foothill Freeway Overpass	Windsor Ave and Oak Grove Drive/Woodbury Rd	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 WB between Berkshire Place and Foothill Blvd.	I-210 EB between Berkshire Place and Foothill Blvd.	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Westbound I-210 Freeway On-ramp.*(Merge Point)*	Berkshire Place and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	Berkshire Place and the Eastbound I-210 Freeway On-ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. *(Merge Point)*	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*	**Route Total**
Route 1A	x	x	x					x	x							x	x					
HCM LOS	D	A	A					B	C							C	D					
HCM Delay	31.6	5.6	8.4					16.4	18.1							25.2	31.9					151
HCM V/C	-	-	0.57																			
ICU LOS	-	-	B																			
Length (ft)	360	640	1,110					3,800	4,030							960	1,120					13,770
Grade (%)								1.5	-1.5													
Route 1B				x	x	x	x			x	x									x	x	
HCM LOS				B	C	A	C			C	B									B	B	
HCM Delay				12.0	24.7	8.3	28.5			24.8	17.5									14.2	13.3	188
HCM V/C				-	0.76	0.48	0.62															
ICU LOS				-	C	B	A															
Length (ft)				940	2,300	520	340			2,550	2,540									1,270	1,335	15,555
Grade (%)										1.7	-1.7											
Route 1C		x	x	x	x	x	x	x			x					x				x		
HCM LOS		A	A	B	C	A	C	B			B					C				B		
HCM Delay		5.7	7.1	11.5	24.9	7.6	28.5	16.4			17.5					25.2				14.2		159
HCM V/C		-	0.54	-	0.69	0.45	0.62															
ICU LOS		-	B	-	C	B	A															
Length (ft)		640	1,110	940	2,300	520	340	3,800			2,540					960				1,270		14,420
Grade (%)								1.5			-1.7											
Route 1D	x	x	x	x	x	x			x	x							x				x	
HCM LOS	D	A	A	B	C	A			C	C							D				B	
HCM Delay	31.6	3.8	8	11.3	24.9	8.2			18.1	24.8							31.9				13.3	176
HCM V/C	-	-	0.57	-	0.76	0.45																
ICU LOS	-	-	B	-	C	B																
Length (ft)	360	640	1,110	940	2,300	520			4,030	2,550							1,120				1,335	14,905
Grade (%)									-1.5	1.7												
Route 1E	x	x	x									x	x	x	x							
HCM LOS	C	A	A									C	B	B	C							
HCM Delay	21.8	3.7	8.4									25.4	17.2	14.4	24.1							127
HCM V/C	-	-	0.57																			
ICU LOS	-	-	B																			
Length (ft)	360	640	1,110									2,250	1,680	1,500	960							10,250
Grade (%)												1.8	-1.8									
Route 1F				x	x	x	x	x	x									x	x			
HCM LOS				B	C	A	C	B	C									C	C			
HCM Delay				12	24.7	7.9	26.8	16.4	18.1									28	25.6			204
HCM V/C				-	0.76	0.47	0.63															
ICU LOS				-	C	B	A															
Length (ft)				940	2,300	520	340	3,650	3,930									1,140	2,000			18,580
Grade (%)								1.5	-1.5													
Route 1G	x	x	x	x	x	x		x					x	x					x			
HCM LOS	C	A	A	B	C	A		B					B	B					C			
HCM Delay	21.8	3.7	7.1	11.5	24.9	7.6		16.4					17.2	14.4					25.6			150
HCM V/C	-	-	0.54	-	0.69	0.45																
ICU LOS	-	-	B	-	C	B																
Length (ft)	360	640	1,110	940	2,300	520		3,650					1680	1500					2,000			14,700
Grade (%)								1.5					-1.8									
Route 1H		x	x	x	x	x	x		x			x			x			x				
HCM LOS		A	A	B	C	A	C		C			C			C			C				
HCM Delay		3.5	8	11.3	24.9	7.8	26.8		18.1			25.4			24.1			28				178
HCM V/C		-	0.57	-	0.76	0.44	0.63															
ICU LOS		-	B	-	C	B	A															
Length (ft)		640	1,110	940	2,300	520	340		3,930			2,250			960			1,140				14,130
Grade (%)									-1.5			1.8										

TABLE 4-2-1: Haul Routes 2A,2B,3,9 Year 2014: AM Peak Hour

Intersections

	8 Irwindale Ave and I-210 Freeway Westbound Ramps	9 Irwindale Ave and I-210 Freeway Eastbound Ramps	10 Irwindale Ave and First Street	11 Irwindale Ave and Gladstone Street	12 Vincent Ave and Gladstone Street	13 Vincent Ave and Arrow Hwy	14 Arrow Hwy and Lark Ellen Ave	15 Arrow Hwy and Enid Ave	16 Azusa Ave and Arrow Hwy	17 Azusa Ave and Gladstone Street	18 Azusa Ave and I-210 Freeway Eastbound Ramps	19 Azusa Ave and First Street	20 First Street and Alameda Street/I-210 Freeway Westbound Ramps	52 Irwindale Ave and Foothill Blvd.
Route 2A	x	x	x	x	x	x								
HCM LOS	A	C	B	C	B	B								
HCM Delay	7.1	27.9	10.6	29.9	14.3	17.6								
HCM V/C	0.56	0.93	0.63	0.92	0.80	0.90								
ICU LOS	A	C	B	D	C	D								
Length (ft)	420	2,840	2,650	2,660	2,670	370								
Grade (%)														
Route 2B		x	x	x	x	x	x	x	x	x	x	x	x	
HCM LOS		C	B	C	B	B	E	D	E	E	B	D	E	
HCM Delay		27.9	13.8	31.9	12.6	17.5	61.5	55.0	63.8	61.5	12.1	46.2	69.2	
HCM V/C		0.93	0.65	0.91	0.74	0.90	0.97	1.35	1.15	1.01	0.71	0.87	1.40	
ICU LOS		C	B	D	B	D	D	E	D	D	A	D	E	
Length (ft)		2,840	2,650	2,660	2,670	370	3000	730	2030	2750	1900	800	350	
Grade (%)														
Route 3	x	x	x	x	x									
HCM LOS	A	C	B	C	B									
HCM Delay	7.1	27.9	10.6	29.9	11.7									
HCM V/C	0.56	0.93	0.63	0.92	0.68									
ICU LOS	A	C	B	D	B									
Length (ft)	420	2,840	2,650	2,660	2,670									
Grade (%)														
Route 9	x	x												x
HCM LOS	A	C												C
HCM Delay	7.2	27.9												30
HCM V/C	0.57	0.9												0.87
ICU LOS	A	C												C
Length (ft)	420	2840												900
Grade (%)														

Freeway Segments

	1		2		3		4		5		6		7		8
	1 I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	2 I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	3 I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo	4 I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo	5 I-210 WB between the SR-134 Fwy and Mountain Street.	6 I-210 EB between the SR-134 Fwy and Mountain Street.	7 SR-134 WB between San Rafael Ave and Figueroa Street	8 SR-134 EB between San Rafael Ave and Figueroa Street	9 SR-134 WB between the I-210 Fwy and San Rafael Ave.	10 SR-134 EB between the I-210 Fwy and San Rafael Ave.	11 I-210 WB between the SR-134 Fwy and Lake Ave.	12 I-210 EB between the SR-134 Fwy and Lake Ave.	13 I-210 WB between the I-605 Fwy and Irwindale Avenue.	14 I-210 EB between the I-605 Fwy and Irwindale Avenue.	15 I-210 WB between Irwindale Avenue and Azusa Avenue.
Route 2A			x	x	x	x					x	x	x	x	
HCM LOS			B	C	B	C					E	E	C	B	
HCM Delay			15.7	23.8	15	23.3					39.8	36.3	23.9	17.5	
HCM V/C															
ICU LOS															
Length (ft)			3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540	
Grade (%)			0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7	
Route 2B	x						x	x	x	x	x	x	x	x	x
HCM LOS	B						D	C	D	C	E	E	C	B	C
HCM Delay	13.3						28.3	18.9	26.9	24.8	39.8	36.3	23.9	17.5	22.2
HCM V/C															
ICU LOS															
Length (ft)	5030						4800	4800	5200	5200	7,200	7,200	7,800	6,540	9100
Grade (%)	1.5						0.2	-0.2	-0.4	0.4	-0.5	0.5	-0.7	0.7	0
Route 3			x	x	x	x					x	x	x	x	
HCM LOS			B	C	B	C					E	E	C	B	
HCM Delay			15.7	23.8	15	23.3					39.8	36.3	23.9	17.5	
HCM V/C															
ICU LOS															
Length (ft)			3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540	
Grade (%)			0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7	
Route 9			x	x	x	x					x	x	x	x	
HCM LOS			B	C	B	C					E	E	C	B	
HCM Delay			15.7	23.8	15	23.3					39.8	36.3	23.9	17.5	
HCM V/C															
ICU LOS															
Length (ft)			3,800	3,800	4,600	0					7,200	7,200	7,800	6,540	
Grade (%)			0.4	-0.4	1.3	0.0					-0.5	0.5	-0.7	0.7	

Freeway Segments

	9		10		11		12		13	
	17 I-210 WB between Berkshire Place and Foothill Blvd.	18 I-210 EB between Berkshire Place and Foothill Blvd.	19 I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	20 I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	21 SR-2 NB between the I-210 Fwy and Mountain Street.	22 SR-2 SB between the I-210 Fwy and Mountain St	23 SR-2 NB between Mountain St and the SR-134 Fwy.	24 SR-2 SB between Mountain St and the SR-134 Fwy.	25 SR-134 WB between the SR-2 Fwy and Figueroa St.	26 SR-134 EB between the SR-2 Fwy and Figueroa St.
Route 2A										
HCM LOS										
HCM Delay										
HCM V/C										
ICU LOS										
Length (ft)										
Grade (%)										
Route 2B	x	x	x	x	x	x	x	x	x	x
HCM LOS	B	C	B	N/D*	A	D	N/D*	D	C	C
HCM Delay	15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	20.4	20.3
HCM V/C										
ICU LOS										
Length (ft)	3200	3200	5300		15500	15500		6600	13000	13000
Grade (%)	2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4
Route 3										
HCM LOS										
HCM Delay										
HCM V/C										
ICU LOS										
Length (ft)										
Grade (%)										
Route 9										
HCM LOS										
HCM Delay										
HCM V/C										
ICU LOS										
Length (ft)										
Grade (%)										

Ramps

	9 Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline and	10 Westbound I-210 Freeway and Eastbound SR-134 Freeway Transition Ramp to the Northbound	15 Southbound I-210 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	16 Westbound I-210 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. (Diverge Point)	17 Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	18 Irwindale Ave and the Westbound I-210 Freeway Loop On-ramp. *(Merge Point)*	19 Irwindale Ave and the Westbound I-210 Freeway Slip On-ramp. *(Merge Point)*	20 First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	21 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	22 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	23 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	24 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	25 Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	26 Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	27 Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	28 Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	**Route Total**
Route 2A	x	x	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	N/D*	A	C											
HCM Delay	N/D*	N/D*	N/D*	N/D*	0.6	20.5											424.1
HCM V/C																	
ICU LOS																	
Length (ft)					1450	740											70530
Grade (%)																	
Route 2B					x			x	x	x	x	x	x	x	x	x	
HCM LOS					A			C	A	C	A	B	N/D*	N/D*	N/D*	C	
HCM Delay					0.6			23.9	11	24.3	5.6	18.9	N/D*	N/D*	N/D*	26.7	997
HCM V/C																	
ICU LOS																	
Length (ft)					1450			1150	5700	4000	5700	4000				5000	187,920
Grade (%)																	
Route 3	x	x	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	N/D*	A	C											
HCM Delay	N/D*	N/D*	N/D*	N/D*	0.6	20.5											356
HCM V/C																	
ICU LOS																	
Length (ft)					1450	740											66,950
Grade (%)																	
Route 9	x	x	x	x	x		x										
HCM LOS	N/D*	N/D*	N/D*	N/D*	A		C										
HCM Delay	N/D*	N/D*	N/D*	N/D*	0.6		22.6										314
HCM V/C																	
ICU LOS																	
Length (ft)					1450		1300										48,750
Grade (%)																	

N/D*: No Data available from Caltrans

TABLE 4-2-2: Haul Routes 2A,2B,3,9 Year 2014: MID-DAY Peak Hour

Intersections

	8 Irwindale Ave and I-210 Freeway Westbound Ramps	9 Irwindale Ave and I-210 Freeway Eastbound Ramps	10 Irwindale Ave and First Street	11 Irwindale Ave and Gladstone Street	12 Vincent Ave and Gladstone Street	13 Vincent Ave and Arrow Hwy	14 Arrow Hwy and Lark Ellen Ave	15 Arrow Hwy and Enid Ave	16 Azusa Ave and Arrow Hwy	17 Azusa Ave and Gladstone Street	18 Azusa Ave and I-210 Freeway Eastbound Ramps	19 Azusa Ave and First Street	20 First Street and Alameda Street/I-210 Freeway Westbound Ramps	52 Irwindale Ave and Foothill Blvd.
Route 2A	x	x	x	x	x	x								
HCM LOS	A	C	B	B	A	A								
HCM Delay	7.4	22.0	14.2	16.0	8.9	9.8								
HCM V/C	0.53	0.79	0.65	0.72	0.45	0.45								
ICU LOS	A	C	B	B	A	A								
Length (ft)	420	2,840	2,650	2,660	2,670	370								
Grade (%)														
Route 2B		x	x	x	x	x	x	x	x	x	x	x	x	
HCM LOS		C	B	B	A	A	D	B	E	D	B	B	B	
HCM Delay		22.2	18.5	15.2	8.7	9.8	40.3	12.8	55.4	38.3	11.7	16.3	11.6	
HCM V/C		0.79	0.65	0.67	0.38	0.45	0.72	0.50	0.96	0.91	0.75	0.57	0.63	
ICU LOS		C	B	B	A	A	B	A	D	C	A	A	B	
Length (ft)		2,840	2,650	2,660	2,670	370	3000	730	2030	2750	1900	800	350	
Grade (%)														
Route 3	x	x	x	x	x									
HCM LOS	A	C	B	B	A									
HCM Delay	7.4	22.0	14.2	16.0	8.7									
HCM V/C	0.53	0.79	0.65	0.72	0.31									
ICU LOS	A	C	B	B	A									
Length (ft)	420	2,840	2,650	2,660	2,670									
Grade (%)														
Route 9	x	x												x
HCM LOS	A	C												D
HCM Delay	7.5	22.5												46.8
HCM V/C	0.54	0.8												1.01
ICU LOS	A	C												D
Length (ft)	420	2840												900
Grade (%)														

Freeway Segments

	1		2		3		4		5		6		7		8	
	1 I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	2 I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	3 I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	4 I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	5 I-210 WB between the SR-134 Fwy and Mountain Street.	6 I-210 EB between the SR 134 Fwy and Mountain Street.	7 SR-134 WB between San Rafael Ave and Figueroa Street	8 SR-134 EB between San Rafael Ave and Figueroa Street	9 SR-134 WB between the I-210 Fwy and San Rafael Ave.	10 SR-134 EB between the I 210 Fwy and San Rafael Ave.	11 I-210 WB between the SR-134 Fwy and Lake Ave.	12 I-210 EB between the SR 134 Fwy and Lake Ave.	13 I-210 WB between the I-605 Fwy and Irwindale Avenue.	14 I-210 EB between the I-605 Fwy and Irwindale Avenue.	15 I-210 WB between Irwindale Avenue and Azusa Avenue.	16 I-210 EB between Irwindale Avenue and Azusa Avenue.
Route 2A			x	x	x	x					x	x	x	x		
HCM LOS			B	B	B	B					E	E	C	B		
HCM Delay			15.5	14.5	12.8	14.4					39.8	36.3	23.9	17.5		
HCM V/C																
ICU LOS																
Length (ft)			3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)			0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		
Route 2B	x						x	x	x	x	x	x	x	x	x	
HCM LOS	A						C	B	B	C	D	E	C	B	C	
HCM Delay	9.9						18.1	17.6	17.2	21.4	26.3	38.1	22.8	16.6	21.8	
HCM V/C																
ICU LOS																
Length (ft)	5030						4800	4800	5200	5200	7,200	7,200	7,800	6,540	9100	
Grade (%)	1.5						0.2	-0.2	-0.4	0.4	-0.5	0.5	-0.7	0.7	0	
Route 3			x	x	x	x					x	x	x	x		
HCM LOS			B	B	B	B					D	E	C	B		
HCM Delay			15.5	14.5	12.8	14.4					26.3	38.1	22.8	16.6		
HCM V/C																
ICU LOS																
Length (ft)			3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)			0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		
Route 9			x	x	x	x					x	x	x	x		
HCM LOS			B	C	B	C					E	E	C	B		
HCM Delay			15.7	23.8	15	23.3					39.8	36.3	23.9	17.5		
HCM V/C																
ICU LOS																
Length (ft)			3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)			0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		

Freeway Segments

	9		10		11		12		13	
	17 I-210 WB between Berkshire Place and Foothill Blvd.	18 I-210 EB between Berkshire Place and Foothill Blvd.	19 I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	20 I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	21 SR-2 NB between the I-210 Fwy and Mountain Street.	22 SR-2 SB between the I-210 Fwy and Mountain St	23 SR-2 NB between Mountain St and the SR-134 Fwy.	24 SR-2 SB between Mountain St and the SR-134 Fwy.	25 SR-134 WB between the SR-2 Fwy and Figueroa St.	26 SR-134 EB between the SR-2 Fwy and Figueroa St.
Route 2A										
HCM LOS										
HCM Delay										
HCM V/C										
ICU LOS										
Length (ft)										
Grade (%)										
Route 2B	x	x	x	x	x	x	x	x	x	x
HCM LOS	B	B	B	N/D*	B	A	N/D*	A	B	C
HCM Delay	15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	15.9	21.2
HCM V/C										
ICU LOS										
Length (ft)	3200	3200	5300		15500	15500		6600	13000	13000
Grade (%)	2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4
Route 3										
HCM LOS										
HCM Delay										
HCM V/C										
ICU LOS										
Length (ft)										
Grade (%)										
Route 9										
HCM LOS										
HCM Delay										
HCM V/C										
ICU LOS										
Length (ft)										
Grade (%)										

Ramps

	9 Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline and	10 Westbound I-210 Freeway and Eastbound SR-134 Freeway Transition Ramp to the Northbound	15 Southbound I-210 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	16 Westbound I-210 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. (Diverge Point)	17 Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	18 Irwindale Ave and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	18 First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	19 First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	20 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	21 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	22 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	23 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	24 Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	25 Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	26 Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	27 Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	**Route Total**
Route 2A	x	x	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	N/D*	A	C											
HCM Delay	N/D*	N/D*	N/D*	N/D*	0.8	23.2											343.3
HCM V/C																	
ICU LOS																	
Length (ft)					1,450	740											70530
Grade (%)																	
Route 2B					x			x	x	x	x	x	x	x	x	x	
HCM LOS					A			B	A	C	A	B	N/D*	N/D*	N/D*	C	
HCM Delay					0.8			19.4	18.7	22.8	1.2	14.7	N/D*	N/D*	N/D*	22.4	688
HCM V/C																	
ICU LOS																	
Length (ft)					1450			1150	5700	4000	5700	4000				5,000	187,920
Grade (%)																	
Route 3	x	x	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	N/D*	A	C											
HCM Delay	N/D*	N/D*	N/D*	N/D*	0.8	23.2											288
HCM V/C																	
ICU LOS																	
Length (ft)					1,450	740											66,950
Grade (%)																	
Route 9	x	x	x	x	x		x										
HCM LOS	N/D*	N/D*	N/D*	N/D*	A		C										
HCM Delay	N/D*	N/D*	N/D*	N/D*	0.8		20.4										340
HCM V/C																	
ICU LOS																	
Length (ft)					1450		1300										53,350
Grade (%)																	

N/D*: No Data available from Caltrans

TABLE 4-2-3: Haul Routes 2A,2B,3,9 Year 2014: PM Peak Hour

Intersections

	8 Irwindale Ave and I-210 Freeway Westbound Ramps	9 Irwindale Ave and I-210 Freeway Eastbound Ramps	10 Irwindale Ave and First Street	11 Irwindale Ave and Gladstone Street	12 Vincent Ave and Gladstone Street	13 Vincent Ave and Arrow Hwy	14 Arrow Hwy and Lark Ellen Ave	15 Arrow Hwy and Enid Ave	16 Azusa Ave and Arrow Hwy	17 Azusa Ave and Gladstone Street	18 Azusa Ave and I-210 Freeway Eastbound Ramps	19 Azusa Ave and First Street	20 First Street and Alameda Street/I-210 Freeway Westbound Ramps	52 Irwindale Ave and Foothill Blvd.
Route 2A	x	x	x	x	x	x								
HCM LOS	A	C	C	C	B	B								
HCM Delay	7.3	26.9	23.2	30.2	14.4	15.4								
HCM V/C	0.56	0.91	0.86	0.95	0.72	0.93								
ICU LOS	A	D	C	D	C	D								
Length (ft)	420	2,840	2,650	2,660	2,670	370								
Grade (%)														
Route 2B		x	x	x	x	x	x	x	x	x	x	x	x	
HCM LOS		C	D	C	B	B	E	B	E	D	B	B	B	
HCM Delay		26.9	50.3	27.6	14.2	15.4	55.4	14.4	58.4	38.0	10.3	18.9	17.1	
HCM V/C		0.91	0.93	0.95	0.72	0.93	0.94	0.70	1.04	0.87	0.65	0.69	0.87	
ICU LOS		D	C	D	C	D	E	C	E	D	A	B	C	
Length (ft)		2,840	2,650	2,660	2,670	370	3000	730	2030	2750	1900	800	350	
Grade (%)														
Route 3	x	x	x	x	x									
HCM LOS	A	C	C	C	B									
HCM Delay	7.3	26.9	23.2	30.2	11.0									
HCM V/C	0.56	0.91	0.86	0.95	0.57									
ICU LOS	A	D	C	D	B									
Length (ft)	420	2,840	2,650	2,660	2,670									
Grade (%)														
Route 9	x	x												x
HCM LOS	A	C												E
HCM Delay	7.5	26.6												77.1
HCM V/C	0.58	0.88												1.09
ICU LOS	A	D												F*
Length (ft)	420	2840												900
Grade (%)														

Freeway Segments

	1 1 I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	1 2 I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	2 3 I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	2 4 I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo	3 5 I-210 WB between the SR-134 Fwy and Mountain Street.	3 6 I-210 EB between the SR-134 Fwy and Mountain Street.	4 7 SR-134 WB between San Rafael Ave and Figueroa Street	4 8 SR-134 EB between San Rafael Ave and Figueroa Street	5 9 SR-134 WB between the I-210 Fwy and San Rafael Ave.	5 10 SR-134 EB between the I-210 Fwy and San Rafael Ave.	6 11 I-210 WB between the SR-134 Fwy and Lake Ave.	6 12 I-210 EB between the SR-134 Fwy and Lake Ave.	7 13 I-210 WB between the I-605 Fwy and Irwindale Avenue.	7 14 I-210 EB between the I-605 Fwy and Irwindale Avenue.	8 15 I-210 WB between Irwindale Avenue and Azusa Avenue.	8 16 I-210 EB between Irwindale Avenue and Azusa Avenue.
Route 2A			x	x	x	x					x	x	x	x		
HCM LOS			C	B	C	B					D	E	D	C		
HCM Delay			24.8	17.5	18.2	16.6					33	41.1	26.4	18		
HCM V/C																
ICU LOS																
Length (ft)			3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)			0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		
Route 2B	x						x	x	x	x	x	x	x	x	x	
HCM LOS	B						C	C	C	D	D	E	D	C	D	
HCM Delay	16.4						25.4	21.8	25	28.2	33	41.1	26.4	18	31.3	
HCM V/C																
ICU LOS																
Length (ft)	5030						4800	4800	5200	5200	7,200	7,200	7,800	6,540	9100	
Grade (%)	1.5						0.2	-0.2	-0.4	0.4	-0.5	0.5	-0.7	0.7	0	
Route 3			x	x	x	x					x	x	x	x		
HCM LOS			C	B	C	B					D	E	D	C		
HCM Delay			24.8	17.5	18.2	16.6					33	41.1	26.4	18		
HCM V/C																
ICU LOS																
Length (ft)			3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)			0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		
Route 9			x	x	x	x					x	x	x	x		
HCM LOS			B	C	B	C					E	E	C	B		
HCM Delay			15.7	23.8	15	23.3					39.8	36.3	23.9	17.5		
HCM V/C																
ICU LOS																
Length (ft)			3,800	3,800	4,600	4,600					7,200	7,200	7,800	6,540		
Grade (%)			0.4	-0.4	1.3	-1.3					-0.5	0.5	-0.7	0.7		

Freeway Segments

	9 17 I-210 WB between Berkshire Place and Foothill Blvd.	9 18 I-210 EB between Berkshire Place and Foothill Blvd.	10 19 I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	10 20 I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	11 21 SR-2 NB between the I-210 Fwy and Mountain Street.	11 22 SR-2 SB between the I-210 Fwy and Mountain St	12 23 SR-2 NB between Mountain St and the SR-134 Fwy.	12 24 SR-2 SB between Mountain St and the SR-134 Fwy.	13 25 SR-134 WB between the SR-2 Fwy and Figueroa St.	13 26 SR-134 EB between the SR-2 Fwy and Figueroa St.
Route 2A										
HCM LOS										
HCM Delay										
HCM V/C										
ICU LOS										
Length (ft)										
Grade (%)										
Route 2B	x	x	x	x	x	x	x	x	x	x
HCM LOS	B	B	B	N/D*	B	A	N/D*	A	B	C
HCM Delay	15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	15.9	21.2
HCM V/C										
ICU LOS										
Length (ft)	3200	3200	5300		15500	15500		6600	13000	13000
Grade (%)	2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4
Route 3										
HCM LOS										
HCM Delay										
HCM V/C										
ICU LOS										
Length (ft)										
Grade (%)										
Route 9										
HCM LOS										
HCM Delay										
HCM V/C										
ICU LOS										
Length (ft)										
Grade (%)										

Ramps

	9 Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline and	10 Westbound I-210 Freeway and Eastbound SR-134 Freeway Transition Ramp to the Northbound	15 Southbound I-210 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	16 Westbound I-210 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. (Diverge Point)	17 Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*	18 Irwindale Ave and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	18 First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	19 First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*	20 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway	21 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	22 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	23 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	24 Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	25 Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	26 Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	27 Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	**Route Total**
Route 2A	x	x	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	N/D*	A	C											
HCM Delay	N/D*	N/D*	N/D*	N/D*	0.8	23.2											446.1
HCM V/C																	
ICU LOS																	
Length (ft)					1,450	740											70530
Grade (%)																	
Route 2B					x			x	x	x	x	x	x	x	x	x	
HCM LOS					A			B	A	C	A	B	N/D*	N/D*	N/D*	C	
HCM Delay					0.8			19.4	18.7	22.8	1.2	14.7	N/D*	N/D*	N/D*	22.4	881
HCM V/C																	
ICU LOS																	
Length (ft)					1450			1150	5700	4000	5700	4000				5,000	187,920
Grade (%)																	
Route 3	x	x	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	N/D*	A	C											
HCM Delay	N/D*	N/D*	N/D*	N/D*	0.8	23.2											382
HCM V/C																	
ICU LOS																	
Length (ft)					1,450	740											66,950
Grade (%)																	
Route 9	x	x	x	x	x		x										
HCM LOS	N/D*	N/D*	N/D*	N/D*	A		C										
HCM Delay	N/D*	N/D*	N/D*	N/D*	2		22.7										0
HCM V/C																	
ICU LOS																	
Length (ft)					1450		1300										0
Grade (%)																	

N/D*: No Data available from Caltrans

TABLE 4-3-1: Haul Route 4A-Route 4B Year 2014: AM Peak Hour

	Intersections			Freeway segment 1		2		3		4		5		9		10		11		12		13	
	21	22	23	1	2	3	4	5	6	7	8	9	10	17	18	19	20	21	22	23	24	25	26
	Figueroa St/Scholl Canyon Rd and SR-134 Freeway Westbound Ramps	Figueroa St and Eagle Vista Dr	Figueroa St and SR-134 Freeway Eastbound Ramps	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 WB between the SR-134 Fwy and Mountain St.	I-210 EB between the SR-134 Fwy and Mountain St.	SR-134 WB between San Rafael Ave and Figueroa St	SR-134 EB between San Rafael Ave and Figueroa St	SR-134 WB between the I-210 Fwy and San Rafael Ave.	SR-134 EB between the I-210 Fwy and San Rafael Ave.	I-210 WB between Berkshire Pl and Foothill Blvd.	I-210 EB between Berkshire Pl and Foothill Blvd.	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	SR-2 NB between the I-210 Fwy and Mountain St.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Figueroa St.	SR-134 EB between the SR-2 Fwy and Figueroa St.
Route 4A	x	x	x			x	x	x	x	x	x	x	x										
HCM LOS	E	B	A			B	C	B	C	D	C	D	C										
HCM Delay	41.2	14.2	9.2			15.7	23.8	15	23.3	28.3	18.9	26.9	24.8										
HCM V/C	-	-	0.66																				
ICU LOS	-	-	B																				
Length (ft)	9,700	600	300			3,800	3,800	4,600	4,600	2,900	3,500	5,200	5,200										
Grade (%)						0.4	-0.4	1.3	-1.3	0.2	-0.2	-0.4	0.4										
Route 4B	x	x	x	x										x	x	x	x	x	x	x	x	x	x
HCM LOS	E	B	A	B										B	C	B	N/D*	A	D	N/D*	D	C	C
HCM Delay	41.3	14.2	8.1	13.3										15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	20.4	20.3
HCM V/C	-	-	0.54																				
ICU LOS	-	-	B																				
Length (ft)	9700	600	300	4900										3200	3200	5300		15500	15500		6600	13000	13000
Grade (%)				1.3										2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4

	Ramps														
	11	12	13	14	20	21	22	23	24	25	26	27	28	29	
	Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	Figueroa Street and the Eastbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa Street and the Westbound SR-134 Freeway On-ramp. (Merge Point)	**Route Total**
Route 4A	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	D											
HCM Delay	N/D*	N/D*	N/D*	301											568
HCM V/C															
ICU LOS															
Length (ft)				1,430											51,530
Grade (%)															
Route 4B					x	x	x	x	x	x	x	x	x	x	
HCM LOS					A	C	A	B	N/D*	N/D*	N/D*	C	D	N/D*	
HCM Delay					11	24.3	5.6	18.9	N/D*	N/D*	N/D*	26.7	28.7	N/D*	381
HCM V/C															
ICU LOS															
Length (ft)					5700	4000	5700	4000				5,000	1300		121,300
Grade (%)															

N/D*: No Data available from Caltrans

TABLE 4-3-2: Haul Route 4A-Route 4B Year 2014: MID-DAY Peak Hour

	Intersections			Freeway segment 1		2		3				4		5		9		10		11		12		13	
	21	22	23	1	2	3	4	5	6	7	8	9	10	17	18	19	20	21	22	23	24	25	26
	Figueroa St/Scholl Canyon Rd and SR-134 Freeway Westbound Ramps	Figueroa St and Eagle Vista Dr	Figueroa St and SR-134 Freeway Eastbound Ramps	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 WB between the SR-134 Fwy and Mountain St.	I-210 EB between the SR-134 Fwy and Mountain St.	SR-134 WB between San Rafael Ave and Figueroa St	SR-134 EB between San Rafael Ave and Figueroa St	SR-134 WB between the I-210 Fwy and San Rafael Ave.	SR-134 EB between the I-210 Fwy and San Rafael Ave.	I-210 WB between Berkshire Pl and Foothill Blvd.	I-210 EB between Berkshire Pl and Foothill Blvd.	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	SR-2 NB between the I-210 Fwy and Mountain St.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Figueroa St.	SR-134 EB between the SR-2 Fwy and Figueroa St.
Route 4A	x	x	x			x	x	x	x	x	x	x	x												
HCM LOS	B	B	A			B	B	B	B	C	B	B	C												
HCM Delay	14.4	12.8	6.4			15.5	14.5	12.8	14.4	18.1	17.6	17.2	21.4												
HCM V/C	-	-	0.44																						
ICU LOS	-	-	A																						
Length (ft)	9,700	600	300			3,800	3,800	4,600	4,600	2,900	3,500	5,200	5,200												
Grade (%)						0.4	-0.4	1.3	-1.3	0.2	-0.2	-0.4	0.4												
Route 4B	x	x	x	x										x	x	x	x	x	x	x	x	x	x		
HCM LOS	B	B	A	A										B	B	B	N/D*	B	A	N/D*	A	B	C		
HCM Delay	14.3	12.8	7.1	9.9										15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	8.7	15.9	21.2		
HCM V/C	-	-	0.37																						
ICU LOS	-	-	A																						
Length (ft)	9700	600	300	4900										3200	3200	5300		15500	15500		6600	13000	13000		
Grade (%)				1.3										2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4		

	Ramps														
	11	12	13	14	20	21	22	23	24	25	26	27	28	29	
	Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	Figueroa Street and the Eastbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa Street and the Westbound SR-134 Freeway On-ramp. (Merge Point)	**Route Total**
Route 4A	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	D											
HCM Delay	N/D*	N/D*	N/D*	28.7											193
HCM V/C															
ICU LOS															
Length (ft)				1,430											51,530
Grade (%)															
Route 4B					x	x	x	x	x	x	x	x	x	x	
HCM LOS					A	C	A	B	N/D*	N/D*	N/D*	C	D	N/D*	
HCM Delay					18.7	22.8	1.2	14.7	N/D*	N/D*	N/D*	22.4	28.3	N/D*	272
HCM V/C															
ICU LOS															
Length (ft)					5700	4000	5700	4000				5,000	1300		121,300
Grade (%)															

N/D*: No Data available from Caltrans

TABLE 4-3-3: Haul Route 4A-Route 4B Year 2014: PM Peak Hour

	Intersections			Freeway segment																			
				1		2		3		4		5		9		10		11		12		13	
	21	22	23	1	2	3	4	5	6	7	8	9	10	17	18	19	20	21	22	23	24	25	26
	Figueroa St/Scholl Canyon Rd and SR-134 Freeway Westbound Ramps	Figueroa St and Eagle Vista Dr	Figueroa St and SR-134 Freeway Eastbound Ramps	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 WB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 EB Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.	I-210 WB between the SR-134 Fwy and Mountain St.	I-210 EB between the SR-134 Fwy and Mountain St.	SR-134 WB between San Rafael Ave and Figueroa St	SR-134 EB between San Rafael Ave and Figueroa St	SR-134 WB between the I-210 Fwy and San Rafael Ave.	SR-134 EB between the I-210 Fwy and San Rafael Ave.	I-210 WB between Berkshire Pl and Foothill Blvd.	I-210 EB between Berkshire Pl and Foothill Blvd.	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	SR-2 NB between the I-210 Fwy and Mountain St.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Figueroa St.	SR-134 EB between the SR-2 Fwy and Figueroa St.
Route 4A	x	x	x			x	x	x	x	x	x	x	x										
HCM LOS	E	C	A			C	B	C	B	C	C	C	D										
HCM Delay	49.9	22.9	8.6			24.8	17.5	18.2	16.6	25.4	21.8	25	28.2										
HCM V/C	-	-	0.63																				
ICU LOS	-	-	B																				
Length (ft)	9,700	600	300			3,800	3,800	4,600	4,600	2,900	3,500	5,200	5,200										
Grade (%)						0.4	-0.4	1.3	-1.3	0.2	-0.2	-0.4	0.4										
Route 4B	x	x	x	x										x	x	x	x	x	x	x	x	x	x
HCM LOS	F	C	A	B										C	B	C	N/D*	C	B	N/D*	B	C	C
HCM Delay	53.8	22.9	8	16.4										25.4	17.2	23.2	N/D*	18.6	11.5	N/D*	11.5	20.5	24.1
HCM V/C	-	-	0.55																				
ICU LOS	-	-	B																				
Length (ft)	9700	600	300	4900										3200	3200	5300		15500	15500		6600	13000	13000
Grade (%)				1.3										2.3	2.3	0.4		2.7	-2.7		-4	0.4	-0.4

	Ramps														
	11	12	13	14	20	21	22	23	24	25	26	27	28	29	
	Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Diverge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. (Merge Point)	Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. (Diverge Point)	Figueroa Street and the Eastbound SR-134 Freeway Off-ramp. (Diverge Point)	Figueroa Street and the Westbound SR-134 Freeway On-ramp. (Merge Point)	**Route Total**
Route 4A	x	x	x	x											
HCM LOS	N/D*	N/D*	N/D*	D											
HCM Delay	N/D*	N/D*	N/D*	32.5											317
HCM V/C															
ICU LOS															
Length (ft)				1,430											51,530
Grade (%)															
Route 4B					x	x	x	x	x	x	x	x	x	x	
HCM LOS					A	C	A	B	N/D*	N/D*	N/D*	C	D	N/D*	
HCM Delay					18.7	22.8	1.2	14.7	N/D*	N/D*	N/D*	22.4	28.3	N/D*	410
HCM V/C															
ICU LOS															
Length (ft)					5700	4000	5700	4000				5,000	1300		121,300
Grade (%)															

N/D*: No Data available from Caltrans

TABLE 4-4-1: Haul Route 5A-Route 8C Year 2014: AM Peak Hour

	Intersection																											
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
	Foothill Blvd and I-210 Westbound Ramps	Foothill Blvd and I-210 Eastbound Ramps	Foothill Blvd and Osborne Street	Glenoaks Blvd and Osborne Street	Glenoaks Blvd and Montague Street	Glenoaks Blvd and Branford Street	Glenoaks Blvd and Sheldon Street	Glenoaks Blvd and Peoria Street	Glenoaks Blvd and Tuxford Street	Glenoaks Blvd and Penrose Street	Glenoaks Blvd and Sunland Blvd	Glenoaks Blvd and Roscoe Blvd	Roscoe Blvd and I-5 Freeway Northbound Ramps	Roscoe Blvd and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Northbound Ramps	Branford Street and Laurel Canyon Blvd	Osborne Street and I-5 Freeway Southbound Ramps	Osborne Street and I-5 Freeway Northbound Ramps	Osborne Street and Laurel Canyon Blvd	Wheatland Ave and I-210 Freeway Eastbound RampS	Wheatland Ave and I-210 Freeway Westbound Ramps	Wheatland Ave and Foothill Blvd	Wentworth Street and Foothill Blvd	Tuxford Street and San Fernando Road	Lankershim Blvd and San Fernando Road	Sheldon Street and San Fernando Road	Branford Street and San Fernando Road
Route 5A	x	x	x	x	x	x	x																					
HCM LOS	A	A	C	F	B	B	B																					
HCM Delay	5.8	6.4	20.7	105.7	10.5	17.9	14.2																					
HCM V/C	0.30	0.32	0.78	1.15	0.79	0.80	0.86																					
ICU LOS	A	A	D	F	B	C	E																					
Length (ft)	400	3900	4200	2850	1480	4330	720																					
Grade (%)																												
Route 5B							x	x	x	x	x	x	x	x														
HCM LOS							B	A	B	A	C	A	B	A														
HCM Delay							13.5	6.6	15.7	6.6	22.9	6.7	12.0	0.0														
HCM V/C							0.85	0.59	0.89	0.58	0.88	0.41	-	-														
ICU LOS							D	A	D	A	C	A	-	-														
Length (ft)							720	2900	2900	1440	800	3520	230	290														
Grade (%)																												
Route 5C																					x	x	x	x				
HCM LOS																					A	B	B	C				
HCM Delay																					0.0	11.1	11.3	28.4				
HCM V/C																					-	-	0.46	0.88				
ICU LOS																					-	-	A	A				
Length (ft)																					320	280	8000	12500				
Grade (%)																												
Route 6A	x	x	x	x	x	x	x																					
HCM LOS	A	A	C	F	B	B	B																					
HCM Delay	5.8	6.4	20.7	105.7	10.5	17.9	14.2																					
HCM V/C	0.30	0.32	0.78	1.15	0.79	0.80	0.86																					
ICU LOS	A	A	D	F	B	C	E																					
Length (ft)	400	3900	4200	2850	1480	4330	1050																					
Grade (%)																												
Route 6B							x	x	x	x	x	x	x	x														
HCM LOS							B	A	B	A	C	A	B	A														
HCM Delay							13.3	6.6	15.7	6.6	22.9	6.7	12.0	0.0														
HCM V/C							0.85	0.59	0.89	0.58	0.88	0.41	-	-														
ICU LOS							D	A	D	A	C	A	-	-														
Length (ft)							1050	2900	2900	1440	800	3520	230	290														
Grade (%)																												
Route 6C							x														x	x	x	x				
HCM LOS							B														A	B	B	C				
HCM Delay							17.4														0	11.1	11.3	28.4				
HCM V/C							0.92														-	-	0.46	0.88				
ICU LOS							E														-	-	A	A				
Length (ft)							2080														320	280	8000	18900				
Grade (%)																												
Route 7A	x	x	x	x	x	x	x	x																				
HCM LOS	A	A	C	F	B	B	B	A																				
HCM Delay	5.8	6.4	20.7	105.7	10.5	17.9	16.0	6.2																				
HCM V/C	0.30	0.32	0.78	1.15	0.79	0.80	0.89	0.64																				
ICU LOS	A	A	D	F	B	C	E	A																				
Length (ft)	400	3900	4200	2850	1480	4330	1050	2100																				
Grade (%)																												
Route 7B								x	x	x	x	x	x	x														
HCM LOS								A	B	A	C	A	B	A														
HCM Delay								6.0	15.7	6.6	22.9	6.7	12.0	0.0														
HCM V/C								0.76	0.89	0.58	0.88	0.41	-	-														
ICU LOS								B	D	A	C	A	-	-														
Length (ft)								2100	2900	1440	800	3520	230	290														
Grade (%)																												
Route 7C							x	x													x	x	x	x				
HCM LOS							B	A													A	B	B	C				
HCM Delay							14.7	6.2													0	11.1	11.3	28.4				
HCM V/C							0.87	0.64													-	-	0.46	0.88				
ICU LOS							D	A													-	-	A	A				
Length (ft)							2900	2100													320	280	8000	12500				
Grade (%)																												
Route 8A															x	x	x											
HCM LOS															N/D*	N/D*	B											
HCM Delay															N/D*	N/D*	11.2											
HCM V/C															-	-	0.62											
ICU LOS															-	-	C											
Length (ft)																	2,480											
Grade (%)																												
Route 8B																	x	x	x	x								
HCM LOS																	C	B	B	D								
HCM Delay																	21.9	13.7	14.7	42.3								
HCM V/C																	1.00	0.83	0.75	0.98								
ICU LOS																	D	D	B	E								
Length (ft)																	2,400	510	1,030	2,900								
Grade (%)																												
Route 8C							x	x	x												x	x	x	x	x	x	x	x
HCM LOS							B	A	D												A	B	B	C	D	A	C	D
HCM Delay							14.7	6.6	40.1												0	11.1	11.3	28.4	40.1	8.6	34.8	38.0
HCM V/C							0.87	0.59	1.10												-	-	0.46	0.88	0.80	0.57	0.80	0.89
ICU LOS							D	A	E												-	-	A	A	C	A	C	B
Length (ft)							2,900	2,900	3,900												320	280	8,000	19,500	3,060	2,800	4,320	1,130
Grade (%)																												

- Value exceeds maximum calculated delay. N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-1: Haul Route 5A-Route 8C Year 2014: AM Peak Hour

Freeway Segments

	1		2		9			10		11		12		14		15		16		17		18		19		20		21			22			23		24		25		26		27		28	
	1	2	3	4	17	18	19	20	21	22	23	24	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56
	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	I-210 WB Freeway between Lincoln Ave and Windsor Ave	I-210 EB Freeway between Lincoln Ave and Windsor Ave	I-210 WB between Berkshire Pl and Foothill Blvd.	I-210 EB between Berkshire Pl and Foothill Blvd.	I-210 WB between Angeles Crest Hwy and the SR-2 Fwy	I-210 EB between Angeles Crest Hwy and the SR-2 Fwy	SR-2 NB between the I-210 Fwy and Mountain St.	SR-2 SB between the I-210 Fwy and Mountain St	SR-2 NB between Mountain St and the SR-134 Fwy.	SR-2 SB between Mountain St and the SR-134 Fwy.	SR-134 WB between the SR-2 Fwy and Glendale Ave.	SR-134 EB between the SR-2 Fwy and Glendale Ave.	SR-134 WB between the Pacific Ave and Concord St.	SR-134 EB between the Pacific Ave and Concord St.	SR-134 WB between San Fernando St and the I-5 Fwy.	SR-134 EB between San Fernando St and the I-5 Fwy.	I-5 SB between the SR-134 Fwy and Western Ave.	I-5 NB between the SR-134 Fwy and Western Ave.	I-5 NB between North Hollywood Way and Roscoe Blvd.	I-5 SB between North Hollywood Way and Roscoe Blvd.	I-5 SB between Sheldon St and the SR-170 Fwy.	I-5 NB between Sheldon St and the SR-170 Fwy.	I-5 SB between the SR-170 Fwy and Branford St.	I-5 NB between the SR-170 Fwy and Branford St.	I-210 Fwy between the SR-2 Fwy and Montrose Ave.	I-210EB between the SR-2 Fwy and Montrose Ave.	I-210 WB between Wheatland Ave and Sunland Blvd.	I-210 EB between Wheatland Ave and Sunland Blvd.	I-210 WB between Wheatland Blvd and Foothill Blvd.	I-210 EB between Wheatland Blvd and Foothill Blvd.	I-210 WB between Foothill Blvd and the SR-118 Fwy.	I-210 EB between Foothill Blvd and the SR-118 Fwy.	SR-118 WB between the I-210 Fwy and Glenoaks Blvd.	SR-118 EB between the I-210 Fwy and Glenoaks Blvd.	SR-118 WB between San Fernando Rd and the I-5 Fwy.	SR-118 EB between San Fernando Rd and the I-210 Fwy.	I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	I-5 NB between Tierra Bella Street and Osborne Street.	I-5 SB between Tierra Bella Street and Osborne Street.
Route 5A	x	x			x	x	x	x																			x	x	x	x														
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C														
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1														
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500																							8800														
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3														
Route 5B	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																						
HCM LOS	B	C			B	C	B	N/D*	A	D	N/D*	D	N/D*	C	D	E	D	N/D*	D	N/D*	C	D																						
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	N/D*	22.2	32	36.8	29.8	N/D*	30.1	N/D*	23	27.1																						
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650																						
Grade (%)	1.3	-1.5			2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5																						
Route 5C	x	x			x	x	x	x																			x	x	x	x														
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C														
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1														
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500																							8800														
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3														
Route 6A	x	x			x	x	x	x																			x	x	x	x														
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C														
HCM Delay																																												
HCM V/C																																												
ICU LOS	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1														
Length (ft)	4,900	4,030			3200	3200	2500																							8800														
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3														
Route 6B	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																						
HCM LOS	B	C			B	C	B	N/D*	A	D	N/D*	D	N/D*	C	D	E	D	N/D*	D	N/D*	C	D																						
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	N/D*	22.2	32	36.8	29.8	N/D*	30.1	N/D*	23	27.1																						
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650																						
Grade (%)	1.3	-1.5			2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5																						
Route 6C	x	x			x	x	x	x																			x	x	x	x														
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C														
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1														
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500																							8800														
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3														
Route 7A	x	x			x	x	x	x																			x	x	x	x														
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C														
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1														
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500																							8800														
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3														
Route 7B	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																						
HCM LOS	B	C			B	C	B	N/D*	A	D	N/D*	D	N/D*	C	D	E	D	N/D*	D	N/D*	C	D																						
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	N/D*	22.2	32	36.8	29.8	N/D*	30.1	N/D*	23	27.1																						
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650																						
Grade (%)	1.3	-1.5			2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5																						
Route 7C	x	x			x	x	x	x																			x	x	x	x														
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C														
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1														
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500																							8800														
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3														
Route 8A	x	x			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																		
HCM LOS	B	C			B	C	B	N/D*	A	D	N/D*	D	N/D*	C	D	E	D	N/D*	D	N/D*	C	D	N/D*	C	F	N/D*																		
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*	8.6	27.3	N/D*	30.6	N/D*	22.2	32	36.8	29.8	N/D*	30.1	N/D*	23	27.1	N/D*	21	-	N/D*																		
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650		1800																				
Grade (%)	1.3	-1.5			2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5		2.5																				
Route 8B	x	x			x	x	x	x																			x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C	B	C	B	N/D*	N/D*	N/D*	F	N/D*	E	D	F	N/D*
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1	16.2	18.2	16.7	N/D*	N/D*	N/D*	51.3	N/D*	42.4	27.2	47	N/D*
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500																							8800	8400	8400	9700				5100		4500	4500	1650	
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3	-0.4	-0.4	-0.8				1.5		0.2	-0.2	1	
Route 8C	x	x			x	x	x	x																			x	x	x	x														
HCM LOS	B	C			B	C	B	N/D*																			N/D*	N/D*	N/D*	C														
HCM Delay	13.3	21.4			15.3	24.4	13.8	N/D*																			N/D*	N/D*	N/D*	19.1														
HCM V/C																																												
ICU LOS																																												
Length (ft)	4,900	4,030			3200	3200	2500																							8800														
Grade (%)	1.3	-1.5			2.3	2.3	0.4																							2.3														

- Value exceeds maximum calculated delay.

N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-1: Haul Route 5A-Route 8C Year 2014: AM Peak Hour

	Ramps																																
	21 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	22 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	23 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	24 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	26 Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	31 Southbound SR-2 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	32 Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*	33 Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Diverge Point)*	34 Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*	35 Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Merge Point)*	36 Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*	37 Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Freeway mainline Off ramp. (Diverge Point)	38 Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	39 Brainford Street and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	40 Brainford Street and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	41 Wheatland Ave and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	42 Wheatland Avenue and the Eastbound I-210 Freeway mainline On-ramp. Merge Point)	43 Foothill Blvd/Osborne Street and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	44 Foothill Blvd/Osborne Street and the Eastbound I-210 Freeway mainline On-ramp. (Merge Point)	45 Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. (Diverge Point)	46 Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	47 Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Merge Point)*	48 Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	49 Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Diverge Point)	50 Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Merge Point)	51 Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Merge Point)	52 Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Diverge Point)	53 Osborne Street and the Southbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	54 Osborne Street and the Northbound I-5 Freeway mainline On-ramp. *(Merge Point)*	**Route Total**
Route 5A																			x	x													
HCM LOS																			D	C													
HCM Delay																			34.8	20.7													519
HCM V/C																																	
ICU LOS																																	
Length (ft)																			1050	885													63,925
Grade (%)																																	
Route 5B	x	x	x	x	x	x	x	x	x	x	x	x	x																				
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				595
HCM V/C																																	
ICU LOS																																	
Length (ft)	5700	4000	5700	4000			5600																										123,560
Grade (%)																																	
Route 5C																	x	x															
HCM LOS																	D	C															
HCM Delay																	32.4	25.5															267
HCM V/C																																	
ICU LOS																																	
Length (ft)																	1300	1060															70,870
Grade (%)																																	
Route 6A																			x	x													
HCM LOS																			D	C													
HCM Delay																			34.8	20.7													412
HCM V/C																																	
ICU LOS																																	
Length (ft)																			1050	885													64,585
Grade (%)																																	
Route 6B	x	x	x	x	x	x	x	x	x	x	x	x	x																				
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				595
HCM V/C																																	
ICU LOS																																	
Length (ft)	5700	4000	5700	4000			5600																										124,220
Grade (%)																																	
Route 6C																	x	x															
HCM LOS																	D	C															
HCM Delay																	32.4	25.5															238
HCM V/C																																	
ICU LOS																																	
Length (ft)																	1300	1060															83,670
Grade (%)																																	
Route 7A																			x	x													
HCM LOS																			D	C													
HCM Delay																			34.8	20.7													541
HCM V/C																																	
ICU LOS																																	
Length (ft)																			1050	885													69,185
Grade (%)																																	
Route 7B	x	x	x	x	x	x	x	x	x	x	x	x	x																				
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																				22,999
HCM V/C																																	
ICU LOS																																	
Length (ft)	5700	4000	5700	4000			5600																										98,480
Grade (%)																																	
Route 7C																	x	x															
HCM LOS																	D	C															
HCM Delay																	32.4	25.5															52,045
HCM V/C																																	
ICU LOS																																	
Length (ft)																	1300	1060															28,990
Grade (%)																																	
Route 8A	x	x	x	x	x	x	x	x	x	x	x			x	x																		
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*																		
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*																		2,916
HCM V/C																																	
ICU LOS																																	
Length (ft)	5700	4000	5700	4000			5600																										97,080
Grade (%)																																	
Route 8B																					x	x	x	x	x	x	x	x	x	x	x		
HCM LOS																					N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	C	D		
HCM Delay																					N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	24.4	34.9		13,556
HCM V/C																																	
ICU LOS																																	
Length (ft)																													770	830			70,480
Grade (%)																																	
Route 8C																	x	x															
HCM LOS																	D	C															
HCM Delay																	32.4	25.5															98,065
HCM V/C																																	
ICU LOS																																	
Length (ft)																	1300	1060															28,990
Grade (%)																																	

N/D*: No Data available from Caltrans

TABLE 4-4-2: Haul Route 5A-Route 8C Year 2014: MID-DAY Peak Hour

	Intersection																											
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
	Foothill Blvd and I-210 Westbound Ramps	Foothill Blvd and I-210 Eastbound Ramps	Foothill Blvd and Osborne Street	Glenoaks Blvd and Osborne Street	Glenoaks Blvd and Montague Street	Glenoaks Blvd and Branford Street	Glenoaks Blvd and Sheldon Street	Glenoaks Blvd and Peoria Street	Glenoaks Blvd and Tuxford Street	Glenoaks Blvd and Penrice Street	Glenoaks Blvd and Sunland Blvd	Glenoaks Blvd and Roscoe Blvd	Roscoe Blvd and I-5 Freeway Northbound Ramps	Roscoe Blvd and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Northbound Ramps	Branford Street and Laurel Canyon Blvd	Osborne Street and I-5 Freeway Southbound Ramps	Osborne Street and I-5 Freeway Northbound Ramps	Osborne Street and Laurel Canyon Blvd	Wheatland Ave and I-210 Freeway Eastbound RampS	Wheatland Ave and I-210 Freeway Westbound Ramps	Wheatland Ave and Foothill Blvd	Wentworth Street and Foothill Blvd	Tuxford Street and San Fernando Road	Lankershim Blvd and San Fernando Road	Sheldon Street and San Fernando Road	Branford Street and San Fernando Road
Route 5A	x	x	x	x	x	x	x																					
HCM LOS	A	A	B	D	A	B	A																					
HCM Delay	5.9	6.7	10.8	35.4	9.5	16.5	8.1																					
HCM V/C	0.31	0.33	0.56	0.88	0.41	0.65	0.56																					
ICU LOS	A	A	A	C	A	B	B																					
Length (ft)	400	3900	4200	2850	1480	4330	720																					
Grade (%)																												
Route 5B							x	x	x	x	x	x	x	x														
HCM LOS							A	A	A	A	B	A	B	A														
HCM Delay							7.5	9.0	7.8	6.0	16.3	7.1	11.8	0.0														
HCM V/C							0.48	0.39	0.49	0.36	0.67	0.42	-	-														
ICU LOS							A	A	A	A	B	A	-	-														
Length (ft)							720	2900	2900	1440	800	3520	230	290														
Grade (%)																												
Route 5C																					x	x	x	x				
HCM LOS																					A	A	B	B				
HCM Delay																					0.0	8.8	10.6	10.4				
HCM V/C																					-	-	0.39	0.45				
ICU LOS																					-	-	A	A				
Length (ft)																					320	280	8000	12500				
Grade (%)																												
Route 6A	x	x	x	x	x	x	x																					
HCM LOS	A	A	B	D	A	B	A																					
HCM Delay	5.9	6.7	10.8	35.4	9.5	16.5	8.1																					
HCM V/C	0.31	0.33	0.56	0.88	0.41	0.65	0.56																					
ICU LOS	A	A	A	C	A	B	B																					
Length (ft)	400	3900	4200	2850	1480	4330	1050																					
Grade (%)																												
Route 6B							x	x	x	x	x	x	x	x														
HCM LOS							A	A	A	A	B	A	B	A														
HCM Delay							7.4	9.0	7.8	6.0	16.3	7.1	11.8	0.0														
HCM V/C							0.48	0.39	0.49	0.36	0.67	0.42	-	-														
ICU LOS							A	A	A	A	B	A	-	-														
Length (ft)							1050	2900	2900	1440	800	3520	230	290														
Grade (%)																												
Route 6C							x														x	x	x	x				
HCM LOS							A														A	A	B	B				
HCM Delay							8.0														0	8.8	10.6	10.4				
HCM V/C							0.54														-	-	0.39	0.45				
ICU LOS							A														-	-	A	A				
Length (ft)							2080														320	280	8000	18900				
Grade (%)																												
Route 7A	x	x	x	x	x	x	x	x																				
HCM LOS	A	A	B	D	A	B	A	A																				
HCM Delay	5.9	6.7	10.8	35.4	9.5	16.5	7.7	5.4																				
HCM V/C	0.31	0.33	0.56	0.88	0.41	0.65	0.52	0.42																				
ICU LOS	A	A	A	C	A	B	A	A																				
Length (ft)	400	3900	4200	2850	1480	4330	1050	2100																				
Grade (%)																												
Route 7B								x	x	x	x	x	x	x														
HCM LOS								A	A	A	B	A	B	A														
HCM Delay								4.4	7.8	6.0	16.3	7.1	11.8	0.0														
HCM V/C								0.33	0.49	0.36	0.67	0.42	-	-														
ICU LOS								A	A	A	B	A	-	-														
Length (ft)								2100	2900	1440	800	3520	230	290														
Grade (%)																												
Route 7C							x	x													x	x	x	x				
HCM LOS							A	A													A	A	B	B				
HCM Delay							7.6	5.4													0	8.8	10.6	10.4				
HCM V/C							0.50	0.42													-	-	0.39	0.45				
ICU LOS							A	A													-	-	A	A				
Length (ft)							2900	2100													320	280	8000	12500				
Grade (%)																												
Route 8A															x	x	x											
HCM LOS															N/D*	N/D*	B											
HCM Delay															N/D*	N/D*	10.1											
HCM V/C															-	-	0.45											
ICU LOS															-	-	B											
Length (ft)																	2,400											
Grade (%)																												
Route 8B																	x	x	x	x								
HCM LOS																	B	C	B	C								
HCM Delay																	11.0	20.9	12.1	25.2								
HCM V/C																	0.54	0.93	0.70	0.80								
ICU LOS																	C	B	B	D								
Length (ft)																	2,400	510	1,030	2,900								
Grade (%)																												
Route 8C							x	x	x												x	x	x	x	x	x	x	x
HCM LOS							A	A	A												A	A	B	B	C	A	C	C
HCM Delay							7.6	9.0	8.9												0	8.8	10.6	10.4	34.7	7.8	24.3	30.7
HCM V/C							0.50	0.39	0.63												-	-	0.39	0.45	0.80	0.47	0.54	0.51
ICU LOS							A	A	B												-	-	A	A	B	A	A	A
Length (ft)							2,900	2,900	3,900												320	280	8,000	19,500	3,060	2,800	4,320	1,130
Grade (%)																												

- Value exceeds maximum calculated delay. N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-2: Haul Route 5A-Route 8C Year 2014: MID-DAY Peak Hour

Freeway Segments

	1	2	3	4	9	10	11	12	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28
	1 I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	2 I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	3 I-210 WB Freeway between Lincoln Ave and Windsor Ave	4 I-210 EB Freeway between Lincoln Ave and Windsor Ave	17 I-210 WB between Berkshire Pl and Foothill Blvd.	18 I-210 EB between Berkshire Pl and Foothill Blvd.	19 I-210 WB between Angeles Crest Hwy and the SR-2 Fwy	20 I-210 EB between Angeles Crest Hwy and the SR-2 Fwy	21 SR-2 NB between the I-210 Fwy and Mountain St.	22 SR-2 SB between the I-210 Fwy and Mountain St.	23 SR-2 NB between Mountain St and the SR-134 Fwy.	24 SR-2 SB between Mountain St and the SR-134 Fwy.	27 SR-134 WB between the SR-2 Fwy and Glendale Ave.	28 SR-134 EB between the SR-2 Fwy and Glendale Ave.	29 SR-134 WB between the Pacific Ave and Concord St.	30 SR-134 EB between the Pacific Ave and Concord St.	31 SR-134 WB between San Fernando St and the I-5 Fwy.	32 SR-134 EB between San Fernando St and the I-5 Fwy.	33 I-5 SB between the SR-134 Fwy and Western Ave.	34 I-5 NB between the SR-134 Fwy and Western Ave.	35 I-5 NB between North Hollywood Way and Roscoe Blvd.	36 I-5 SB between North Hollywood Way and Roscoe Blvd.	37 I-5 SB between Sheldon St and the SR-170 Fwy.	38 I-5 NB between Sheldon St and the SR-170 Fwy.	39 I-5 SB between the SR-170 Fwy and Branford St.	40 I-5 NB between the SR-170 Fwy and Branford St.	41 I-210 Fwy between the SR-2 Fwy and Montrose Ave.	42 I-210EB between the SR-2 Fwy and Montrose Ave.	43 I-210 WB between Wheatland Ave and Sunland Blvd.	44 I-210 EB between Wheatland Ave and Sunland Blvd.	45 I-210 WB between Wheatland Blvd and Foothill Blvd.	46 I-210 EB between Wheatland Blvd and Foothill Blvd.	47 I-210 WB between Foothill Blvd and the SR-118 Fwy.	48 I-210 EB between Foothill Blvd and the SR-118 Fwy.	49 SR-118 WB between the I-210 Fwy and Glenoaks Blvd.	50 SR-118 EB between the I-210 Fwy and Glenoaks Blvd.	51 SR-118 WB between San Fernando Rd and the I-5 Fwy.	52 SR-118 EB between San Fernando Rd and the I-210 Fwy.	53 I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	54 I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	55 I-5 NB between Tierra Bella Street and Osborne Street.	56 I-5 SB between Tierra Bella Street and Osborne Street.
Route 5A	x				x	x	x	x																				x	x	x	x													
HCM LOS	A				B	B	B	N/D*																				N/D*	N/D*	N/D*	B													
HCM Delay	9.9				15.5	14.6	13.6	N/D*																				N/D*	N/D*	N/D*	11.2													
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500																								8800													
Grade (%)	1.3				2.3	2.3	0.4																								2.3													
Route 5B	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																								
HCM LOS	A				B	B	B	N/D*	B	A	N/D*	A	N/D*	C	C	D	C	N/D*	E	N/D*	D	C																						
HCM Delay	9.9				15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	N/D*	25.4	20.4	34.7	21.2	N/D*	36.7	N/D*	26.2	21																						
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650																						
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5																						
Route 5C	x				x	x	x	x																				x	x	x	x													
HCM LOS	A				B	B	B	N/D*																				N/D*	N/D*	N/D*	B													
HCM Delay	9.9				15.5	14.6	13.6	N/D*																				N/D*	N/D*	N/D*	11.2													
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500																								8800													
Grade (%)	1.3				2.3	2.3	0.4																								2.3													
Route 6A	x				x	x	x	x																				x	x	x	x													
HCM LOS	A				B	B	B	N/D*																				N/D*	N/D*	N/D*	B													
HCM Delay	9.9				15.5	14.6	13.6	N/D*																				N/D*	N/D*	N/D*	11.2													
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500																								8800													
Grade (%)	1.3				2.3	2.3	0.4																								2.3													
Route 6B	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																						
HCM LOS	A				B	B	B	N/D*	B	A	N/D*	A	N/D*	C	C	D	C	N/D*	E	N/D*	D	C																						
HCM Delay	9.9				15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	N/D*	25.4	20.4	34.7	21.2	N/D*	36.7	N/D*	26.2	21																						
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650																						
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5																						
Route 6C	x				x	x	x	x																				x	x	x	x													
HCM LOS	A				B	B	B	N/D*																				N/D*	N/D*	N/D*	B													
HCM Delay	9.9				15.5	14.6	13.6	N/D*																				N/D*	N/D*	N/D*	11.2													
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500																								8800													
Grade (%)	1.3				2.3	2.3	0.4																								2.3													
Route 7A	x				x	x	x	x																				x	x	x	x													
HCM LOS	A				B	B	B	N/D*																				N/D*	N/D*	N/D*	B													
HCM Delay	9.9				15.5	14.6	13.6	N/D*																				N/D*	N/D*	N/D*	11.2													
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500																								8800													
Grade (%)	1.3				2.3	2.3	0.4																								2.3													
Route 7B	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																						
HCM LOS	A				B	B	B	N/D*	B	A	N/D*	A	N/D*	C	C	D	C	N/D*	E	N/D*	D	C																						
HCM Delay	9.9				15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	N/D*	25.4	20.4	34.7	21.2	N/D*	36.7	N/D*	26.2	21																						
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650																						
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5																						
Route 7C	x				x	x	x	x																				x	x	x	x													
HCM LOS	A				B	B	B	N/D*																				N/D*	N/D*	N/D*	B													
HCM Delay	9.9				15.5	14.6	13.6	N/D*																				N/D*	N/D*	N/D*	11.2													
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500																								8800													
Grade (%)	1.3				2.3	2.3	0.4																								2.3													
Route 8A	x				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x																				
HCM LOS	A				B	B	B	N/D*	B	A	N/D*	A	N/D*	C	C	D	C	N/D*	E	N/D*	D	C	N/D*	C	F	N/D*																		
HCM Delay	9.9				15.5	14.6	13.6	N/D*	17.1	8.7	N/D*	10.6	N/D*	25.4	20.4	34.7	21.2	N/D*	36.7	N/D*	26.2	21	N/D*	23.5	-	N/D*																		
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500		13400	13400		3450		5900	2100	2100	2300		5700		3650	3650		1800																				
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5		2.5																				
Route 8B	x				x	x	x	x																				x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	A				B	B	B	N/D*																				N/D*	N/D*	N/D*	B	B	B	B	N/D*	N/D*	N/D*	C	N/D*	F	C	F	N/D*
HCM Delay	9.9				15.5	14.6	13.6	N/D*																				N/D*	N/D*	N/D*	11.2	14.2	14.1	13.7	N/D*	N/D*	N/D*	19.9	N/D*	47.5	19.8	53.4	N/D*
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500																								8800	8400	8400	9700				5100		4500	4500	1650	
Grade (%)	1.3				2.3	2.3	0.4																								2.3	-0.4	-0.4	-0.8				1.5		0.2	-0.2	1	
Route 8C	x				x	x	x	x																				x	x	x	x													
HCM LOS	A				B	B	B	N/D*																				N/D*	N/D*	N/D*	B													
HCM Delay	9.9				15.5	14.6	13.6	N/D*																				N/D*	N/D*	N/D*	11.2													
HCM V/C																																											
ICU LOS																																											
Length (ft)	4,900				3200	3200	2500																								8800													
Grade (%)	1.3				2.3	2.3	0.4																								2.3													

- Value exceeds maximum calculated delay.

N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-2: Haul Route 5A-Route 8C Year 2014: MID-DAY Peak Hour

	Ramps																															
	21 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	22 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	23 Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	24 Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	26 Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	31 Southbound SR-2 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	32 Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*	33 Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Diverge Point)*	34 Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*	35 Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Merge Point)*	36 Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*	37 Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Freeway mainline Off ramp. (Diverge Point)	38 Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	39 Branford Street and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	40 Branford Street and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	41 Wheatland Ave and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	42 Wheatland Avenue and the Eastbound I-210 Freeway mainline On-ramp. Merge Point)	43 Foothill Blvd/Osborne Street and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	44 Foothill Blvd/Osborne Street and the Eastbound I-210 Freeway mainline On-ramp. (Merge Point)	45 Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. (Diverge Point)	46 Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	47 Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Merge Point)*	48 Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	49 Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Diverge Point)	50 Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Merge Point)	51 Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Merge Point)	52 Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Diverge Point)	53 Osborne Street and the Southbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	54 Osborne Street and the Northbound I-5 Freeway mainline On-ramp. *(Merge Point)*	**Route Total**
Route 5A																			x	x												
HCM LOS																			C	B												
HCM Delay																			21	16.8												283
HCM V/C																																
ICU LOS																																
Length (ft)																			1050	885												59,895
Grade (%)																																
Route 5B	x	x	x	x	x	x	x	x	x	x	x	x	x																			
HCM LOS	A	C	A	B	N/D*	N/D*	B	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																			
HCM Delay	18.7	22.8	1.2	14.7	N/D*	N/D*	14.9	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																			467
HCM V/C																																
ICU LOS																																
Length (ft)	5700	4000	5700	4000			5600																									119,530
Grade (%)																																
Route 5C																	x	x														
HCM LOS																	C	C														
HCM Delay																	20.9	20.1														165
HCM V/C																																
ICU LOS																																
Length (ft)																	1300	1060														66,840
Grade (%)																																
Route 6A																			x	x												
HCM LOS																			C	B												
HCM Delay																			21	16.8												283
HCM V/C																																
ICU LOS																																
Length (ft)																			1050	885												60,555
Grade (%)																																
Route 6B	x	x	x	x	x	x	x	x	x	x	x	x	x																			
HCM LOS	A	C	A	B	N/D*	N/D*	B	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																			
HCM Delay	18.7	22.8	1.2	14.7	N/D*	N/D*	14.9	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																			467
HCM V/C																																
ICU LOS																																
Length (ft)	5700	4000	5700	4000			5600																									120,190
Grade (%)																																
Route 6C																	x	x														
HCM LOS																	C	C														
HCM Delay																	20.9	20.1														155
HCM V/C																																
ICU LOS																																
Length (ft)																	1300	1060														79,640
Grade (%)																																
Route 7A																			x	x												
HCM LOS																			C	B												
HCM Delay																			21	16.8												298
HCM V/C																																
ICU LOS																																
Length (ft)																			1050	885												65,155
Grade (%)																																
Route 7B	x	x	x	x	x	x	x	x	x	x	x	x	x																			
HCM LOS	A	C	A	B	N/D*	N/D*	B	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																			
HCM Delay	18.7	22.8	1.2	14.7	N/D*	N/D*	14.9	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																			22,908
HCM V/C																																
ICU LOS																																
Length (ft)	5700	4000	5700	4000			5600																									94,450
Grade (%)																																
Route 7C																	x	x														
HCM LOS																	C	C														
HCM Delay																	20.9	20.1														51,986
HCM V/C																																
ICU LOS																																
Length (ft)																	1300	1060														24,960
Grade (%)																																
Route 8A	x	x	x	x	x	x	x	x	x	x	x			x	x																	
HCM LOS	A	C	A	B	N/D*	N/D*	B	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*																	
HCM Delay	18.7	22.8	1.2	14.7	N/D*	N/D*	14.9	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*																	2,757
HCM V/C																																
ICU LOS																																
Length (ft)	5700	4000	5700	4000			5600																									93,050
Grade (%)																																
Route 8B																					x	x	x	x	x	x	x	x	x	x		
HCM LOS																					N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	B	D		
HCM Delay																					N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	19.1	34.8		13,471
HCM V/C																																
ICU LOS																																
Length (ft)																													770	830		66,450
Grade (%)																																
Route 8C																	x	x														
HCM LOS																	C	C														
HCM Delay																	20.9	20.1														98,006
HCM V/C																																
ICU LOS																																
Length (ft)																	1300	1060														24,960
Grade (%)																																

- Value exceeds maximum calculated delay.

N/D*: No Data available from Caltrans

TABLE 4-4-3: Haul Route 5A-Route 8C Year 2014: PM Peak Hour

	Intersection																											
	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51
	Foothill Blvd and I-210 Westbound Ramps	Foothill Blvd and I-210 Eastbound Ramps	Foothill Blvd and Osborne Street	Glenoaks Blvd and Osborne Street	Glenoaks Blvd and Montague Street	Glenoaks Blvd and Branford Street	Glenoaks Blvd and Sheldon Street	Glenoaks Blvd and Peoria Street	Glenoaks Blvd and Tuxford Street	Glenoaks Blvd and Penrose Street	Glenoaks Blvd and Sunland Blvd	Glenoaks Blvd and Roscoe Blvd	Roscoe Blvd and I-5 Freeway Northbound Ramps	Roscoe Blvd and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Southbound Ramps	Branford Street and I-5 Freeway Northbound Ramps	Branford Street and Laurel Canyon Blvd	Osborne Street and I-5 Freeway Southbound Ramps	Osborne Street and I-5 Freeway Northbound Ramps	Osborne Street and Laurel Canyon Blvd	Wheatland Ave and I-210 Freeway Eastbound Ramps5	Wheatland Ave and I-210 Freeway Westbound Ramps	Wheatland Ave and Foothill Blvd	Wentworth Street and Foothill Blvd	Tuxford Street and San Fernando Road	Lankershim Blvd and San Fernando Road	Sheldon Street and San Fernando Road	Branford Street and San Fernando Road
Route 5A	x	x	x	x	x	x	x																					
HCM LOS	A	A	C	E	A	C	C																					
HCM Delay	8.5	7.9	21.1	55.4	10.0	21.9	21.8																					
HCM V/C	0.56	0.44	0.88	0.95	0.62	0.91	1.10																					
ICU LOS	A	A	D	E	C	D	D																					
Length (ft)	400	3900	4200	2850	1480	4330	720																					
Grade (%)																												
Route 5B							x	x	x	x	x	x	x	x														
HCM LOS							B	B	A	B	C	B	C	A														
HCM Delay							13.6	16.9	10.2	11.3	27.4	10.6	26.3	0.0														
HCM V/C							0.86	0.53	0.67	0.70	0.92	0.65	-	-														
ICU LOS							D	A	C	B	D	A	-	-														
Length (ft)							720	2900	2900	1440	800	3520	230	290														
Grade (%)																												
Route 5C																					x	x	x	x				
HCM LOS																					A	B	B	A				
HCM Delay																					0.0	10.2	10.0	9.7				
HCM V/C																					-	-	0.47	0.48				
ICU LOS																					-	-	A	A				
Length (ft)																					320	280	8000	12500				
Grade (%)																												
Route 6A	x	x	x	x	x	x	x																					
HCM LOS	A	A	C	E	A	C	C																					
HCM Delay	8.5	7.9	21.1	55.4	10.0	21.9	21.8																					
HCM V/C	0.56	0.44	0.88	0.95	0.62	0.91	1.10																					
ICU LOS	A	A	D	E	C	D	D																					
Length (ft)	400	3900	4200	2850	1480	4330	1050																					
Grade (%)																												
Route 6B							x	x	x	x	x	x	x	x														
HCM LOS							B	B	A	B	C	B	C	A														
HCM Delay							13.7	16.9	10.2	11.3	27.4	10.6	26.3	0.0														
HCM V/C							0.86	0.53	0.67	0.7	0.92	0.65	-	-														
ICU LOS							D	A	C	B	D	A	-	-														
Length (ft)							1050	2900	2900	1440	800	3520	230	290														
Grade (%)																												
Route 6C							x														x	x	x	x				
HCM LOS							B														A	B	B	A				
HCM Delay							15.9														0	10.2	10	9.7				
HCM V/C							0.89														-	-	0.47	0.48				
ICU LOS							D														-	-	A	A				
Length (ft)							2080														320	280	8000	18900				
Grade (%)																												
Route 7A	x	x	x	x	x	x	x	x																				
HCM LOS	A	A	C	E	A	C	B	A																				
HCM Delay	8.5	7.9	21.1	55.4	10.0	21.9	14.7	6.4																				
HCM V/C	0.56	0.44	0.88	0.95	0.62	0.91	0.86	0.56																				
ICU LOS	A	A	D	E	C	D	D	A																				
Length (ft)	400	3900	4200	2850	1480	4330	1050	2100																				
Grade (%)																												
Route 7B								x	x	x	x	x	x	x														
HCM LOS								A	A	B	C	B	C	A														
HCM Delay								5.3	10.2	11.3	27.4	10.6	26.3	0.0														
HCM V/C								0.48	0.67	0.7	0.92	0.65	-	-														
ICU LOS								A	C	B	D	A	-	-														
Length (ft)								2100	2900	1440	800	3520	230	290														
Grade (%)																												
Route 7C							x	x													x	x	x	x				
HCM LOS							B	A													A	B	B	A				
HCM Delay							13.7	6.4													0	10.2	10	9.7				
HCM V/C							0.86	0.56													-	-	0.47	0.48				
ICU LOS							D	A													-	-	A	A				
Length (ft)							2900	2100													320	280	8000	12500				
Grade (%)																												
Route 8A															x	x	x											
HCM LOS															N/D*	N/D*	B											
HCM Delay															N/D*	N/D*	17.6											
HCM V/C															-	-	0.88											
ICU LOS															-	-	E											
Length (ft)																	2,480											
Grade (%)																												
Route 8B																	x	x	x	x								
HCM LOS																	D	D	B	E								
HCM Delay																	37.2	37.0	19.3	66.3								
HCM V/C																	1.21	1.00	0.89	1.03								
ICU LOS																	F*	E	D	F								
Length (ft)																	2,400	510	1,030	2,900								
Grade (%)																												
Route 8C							x	x	x												x	x	x	x	x	x	x	x
HCM LOS							B	B	B												A	B	B	A	C	A	E	F
HCM Delay							13.7	16.9	11.1												0	10.2	10	9.7	34.8	9.6	58.1	84.0
HCM V/C							0.86	0.53	0.81												-	-	0.47	0.48	0.75	0.55	1.03	0.99
ICU LOS							D	A	C												-	-	A	A	C	A	E	D
Length (ft)							2,900	2,900	3,900												320	280	8,000	19,500	3,060	2,800	4,320	1,130
Grade (%)																												

- Value exceeds maximum calculated delay. N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-3: Haul Route 5A-Route 8C Year 2014: PM Peak Hour

Freeway Segments

	1 – 1: I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Pl	1 – 2: I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Pl	2 – 3: I-210 WB Freeway between Lincoln Ave and Windsor Ave	2 – 4: I-210 EB Freeway between Lincoln Ave and Windsor Ave	9 – 17: I-210 WB between Berkshire Pl and Foothill Blvd.	9 – 18: I-210 EB between Berkshire Pl and Foothill Blvd.	10 – 19: I-210 WB between Angeles Crest Hwy and the SR-2 Fwy	10 – 20: I-210 EB between Angeles Crest Hwy and the SR-2 Fwy	11 – 21: SR-2 NB between the I-210 Fwy and Mountain St.	11 – 22: SR-2 SB between the I-210 Fwy and Mountain St	12 – 23: SR-2 NB between Mountain St and the SR-134 Fwy.	12 – 24: SR-2 SB between Mountain St and the SR-134 Fwy.
Route 5A	x				x	x	x	x				
HCM LOS	B				C	B	C	N/D*				
HCM Delay	16.4				25.4	17.2	23.2	N/D*				
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500					
Grade (%)	1.3				2.3	2.3	0.4					
Route 5B	x				x	x	x	x	x	x	x	x
HCM LOS	B				C	B	C	N/D*	C	B	N/D*	B
HCM Delay	16.4				25.4	17.2	23.2	N/D*	18.6	11.5	N/D*	13.2
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500		13400	13400		3450
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4
Route 5C	x				x	x	x	x				
HCM LOS	B				C	B	C	N/D*				
HCM Delay	16.4				25.4	17.2	23.2	N/D*				
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500					
Grade (%)	1.3				2.3	2.3	0.4					
Route 6A	x				x	x	x	x				
HCM LOS	B				C	B	C	N/D*				
HCM Delay	16.4				25.4	17.2	23.2	N/D*				
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500					
Grade (%)	1.3				2.3	2.3	0.4					
Route 6B	x				x	x	x	x	x	x	x	x
HCM LOS	B				C	B	C	N/D*	C	B	N/D*	B
HCM Delay	16.4				25.4	17.2	23.2	N/D*	18.6	11.5	N/D*	13.2
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500		13400	13400		3450
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4
Route 6C	x				x	x	x	x				
HCM LOS	B				C	B	C	N/D*				
HCM Delay	16.4				25.4	17.2	23.2	N/D*				
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500					
Grade (%)	1.3				2.3	2.3	0.4					
Route 7A	x				x	x	x	x				
HCM LOS	B				C	B	C	N/D*				
HCM Delay	16.4				25.4	17.2	23.2	N/D*				
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500					
Grade (%)	1.3				2.3	2.3	0.4					
Route 7B	x				x	x	x	x	x	x	x	x
HCM LOS	B				C	B	C	N/D*	C	B	N/D*	B
HCM Delay	16.4				25.4	17.2	23.2	N/D*	18.6	11.5	N/D*	13.2
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500		13400	13400		3450
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4
Route 7C	x				x	x	x	x				
HCM LOS	B				C	B	C	N/D*				
HCM Delay	16.4				25.4	17.2	23.2	N/D*				
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500					
Grade (%)	1.3				2.3	2.3	0.4					
Route 8A	x				x	x	x	x	x	x	x	x
HCM LOS	B				C	B	C	N/D*	C	B	N/D*	B
HCM Delay	16.4				25.4	17.2	23.2	N/D*	18.6	11.5	N/D*	13.2
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500		13400	13400		3450
Grade (%)	1.3				2.3	2.3	0.4		2.7	-2.7		-4
Route 8B	x				x	x	x	x				
HCM LOS	B				C	B	C	N/D*				
HCM Delay	16.4				25.4	17.2	23.2	N/D*				
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500					
Grade (%)	1.3				2.3	2.3	0.4					
Route 8C	x				x	x	x	x				
HCM LOS	B				C	B	C	N/D*				
HCM Delay	16.4				25.4	17.2	23.2	N/D*				
HCM V/C												
ICU LOS												
Length (ft)	4,900				3200	3200	2500					
Grade (%)	1.3				2.3	2.3	0.4					

	14 – 27: SR-134 WB between the SR-2 Fwy and Glendale Ave.	14 – 28: SR-134 EB between the SR-2 Fwy and Glendale Ave.	15 – 29: SR-134 WB between the Pacific Ave and Concord St.	15 – 30: SR-134 EB between the Pacific Ave and Concord St.	16 – 31: SR-134 WB between San Fernando St and the I-5 Fwy.	16 – 32: SR-134 EB between San Fernando St and the I-5 Fwy.	17 – 33: I-5 SB between the SR-134 Fwy and Western Ave.	17 – 34: I-5 NB between the SR-134 Fwy and Western Ave.	18 – 35: I-5 NB between North Hollywood Way and Roscoe Blvd.	18 – 36: I-5 SB between North Hollywood Way and Roscoe Blvd.	19 – 37: I-5 SB between Sheldon St and the SR-170 Fwy.	19 – 38: I-5 NB between Sheldon St and the SR-170 Fwy.	20 – 39: I-5 SB between the SR-170 Fwy and Branford St.	20 – 40: I-5 NB between the SR-170 Fwy and Branford St.
Route 5A														
HCM LOS														
HCM Delay														
HCM V/C														
ICU LOS														
Length (ft)														
Grade (%)														
Route 5B	x	x	x	x	x	x	x	x	x	x				
HCM LOS	N/D*	D	C	E	F	N/D*	E	N/D*	D	C				
HCM Delay	N/D*	32.7	22.1	39.7	52.7	N/D*	35.3	N/D*	29.6	19.3				
HCM V/C														
ICU LOS														
Length (ft)		5900	2100	2100	2300		5700		3650	3650				
Grade (%)		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5				
Route 5C														
HCM LOS														
HCM Delay														
HCM V/C														
ICU LOS														
Length (ft)														
Grade (%)														
Route 6A														
HCM LOS														
HCM Delay														
HCM V/C														
ICU LOS														
Length (ft)														
Grade (%)														
Route 6B	x	x	x	x	x	x	x	x	x	x				
HCM LOS	N/D*	D	C	E	F	N/D*	E	N/D*	D	C				
HCM Delay	N/D*	32.7	22.1	39.7	52.7	N/D*	35.3	N/D*	29.6	19.3				
HCM V/C														
ICU LOS														
Length (ft)		5900	2100	2100	2300		5700		3650	3650				
Grade (%)		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5				
Route 6C														
HCM LOS														
HCM Delay														
HCM V/C														
ICU LOS														
Length (ft)														
Grade (%)														
Route 7A														
HCM LOS														
HCM Delay														
HCM V/C														
ICU LOS														
Length (ft)														
Grade (%)														
Route 7B	x	x	x	x	x	x	x	x	x	x				
HCM LOS	N/D*	D	C	E	F	N/D*	E	N/D*	D	C				
HCM Delay	N/D*	32.7	22.1	39.7	52.7	N/D*	35.3	N/D*	29.6	19.3				
HCM V/C														
ICU LOS														
Length (ft)		5900	2100	2100	2300		5700		3650	3650				
Grade (%)		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5				
Route 7C														
HCM LOS														
HCM Delay														
HCM V/C														
ICU LOS														
Length (ft)														
Grade (%)														
Route 8A	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	N/D*	D	C	E	F	N/D*	E	N/D*	D	C	N/D*	C	F	N/D*
HCM Delay	N/D*	32.7	22.1	39.7	52.7	N/D*	35.3	N/D*	29.6	19.3	N/D*	19.3	-	N/D*
HCM V/C														
ICU LOS														
Length (ft)		5900	2100	2100	2300		5700		3650	3650		1800		
Grade (%)		0.7	-1.4	1.4	-1.2		-1		0.5	-0.5		2.5		
Route 8B														
HCM LOS														
HCM Delay														
HCM V/C														
ICU LOS														
Length (ft)														
Grade (%)														
Route 8C														
HCM LOS														
HCM Delay														
HCM V/C														
ICU LOS														
Length (ft)														
Grade (%)														

	21 – 41: I-210 Fwy between the SR-2 Fwy and Montrose Ave.	21 – 42: I-210EB between the SR-2 Fwy and Montrose Ave.	22 – 43: I-210 WB between Wheatland Ave and Sunland Blvd.	22 – 44: I-210 EB between Wheatland Ave and Sunland Blvd.	23 – 45: I-210 WB between Wheatland Blvd and Foothill Blvd.	23 – 46: I-210 EB between Wheatland Blvd and Foothill Blvd.	24 – 47: I-210 WB between Foothill Blvd and the SR-118 Fwy.	24 – 48: I-210 EB between Foothill Blvd and the SR-118 Fwy.	25 – 49: SR-118 WB between the I-210 Fwy and Glenoaks Blvd.	25 – 50: SR-118 EB between the I-210 Fwy and Glenoaks Blvd.	26 – 51: SR-118 WB between San Fernando Rd and the I-5 Fwy.	26 – 52: SR-118 EB between San Fernando Rd and the I-210 Fwy.	27 – 53: I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	27 – 54: I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	28 – 55: I-5 NB between Tierra Bella Street and Osborne Street.	28 – 56: I-5 SB between Tierra Bella Street and Osborne Street.
Route 5A	x	x	x	x												
HCM LOS	N/D*	N/D*	N/D*	B												
HCM Delay	N/D*	N/D*	N/D*	15.5												
HCM V/C																
ICU LOS																
Length (ft)				8800												
Grade (%)				2.3												
Route 5B																
HCM LOS																
HCM Delay																
HCM V/C																
ICU LOS																
Length (ft)																
Grade (%)																
Route 5C	x	x	x	x												
HCM LOS	N/D*	N/D*	N/D*	B												
HCM Delay	N/D*	N/D*	N/D*	15.5												
HCM V/C																
ICU LOS																
Length (ft)				8800												
Grade (%)				2.3												
Route 6A	x	x	x	x												
HCM LOS	N/D*	N/D*	N/D*	B												
HCM Delay	N/D*	N/D*	N/D*	15.5												
HCM V/C																
ICU LOS																
Length (ft)				8800												
Grade (%)				2.3												
Route 6B																
HCM LOS																
HCM Delay																
HCM V/C																
ICU LOS																
Length (ft)																
Grade (%)																
Route 6C	x	x	x	x												
HCM LOS	N/D*	N/D*	N/D*	B												
HCM Delay	N/D*	N/D*	N/D*	15.5												
HCM V/C																
ICU LOS																
Length (ft)				8800												
Grade (%)				2.3												
Route 7A	x	x	x	x												
HCM LOS	N/D*	N/D*	N/D*	B												
HCM Delay	N/D*	N/D*	N/D*	15.5												
HCM V/C																
ICU LOS																
Length (ft)				8800												
Grade (%)				2.3												
Route 7B																
HCM LOS																
HCM Delay																
HCM V/C																
ICU LOS																
Length (ft)																
Grade (%)																
Route 7C	x	x	x	x												
HCM LOS	N/D*	N/D*	N/D*	B												
HCM Delay	N/D*	N/D*	N/D*	15.5												
HCM V/C																
ICU LOS																
Length (ft)				8800												
Grade (%)				2.3												
Route 8A																
HCM LOS																
HCM Delay																
HCM V/C																
ICU LOS																
Length (ft)																
Grade (%)																
Route 8B	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x
HCM LOS	N/D*	N/D*	N/D*	B	D	C	C	N/D*	N/D*	N/D*	E	N/D*	F	C	F	N/D*
HCM Delay	N/D*	N/D*	N/D*	15.5	30.5	20.8	25	N/D*	N/D*	N/D*	41.4	N/D*	50	22.3	54.2	N/D*
HCM V/C																
ICU LOS																
Length (ft)				8800	8400	8400	9700				5100		4500	4500	1650	
Grade (%)				2.3	-0.4	-0.4	-0.8				1.5		0.2	-0.2	1	
Route 8C	x	x	x	x												
HCM LOS	N/D*	N/D*	N/D*	B												
HCM Delay	N/D*	N/D*	N/D*	15.5												
HCM V/C																
ICU LOS																
Length (ft)				8800												
Grade (%)				2.3												

- Value exceeds maximum calculated delay.

N/D*: No Data available from Caltrans

-CONTINUED- TABLE 4-4-3: Haul Route 5A-Route 8C Year 2014: PM Peak Hour

	Ramps																																
	21	22	23	24	26	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	Route Total
	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Diverge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. (Merge Point)	Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*	Southbound SR-2 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*	Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*	Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Diverge Point)*	Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*	Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Merge Point)*	Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*	Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Freeway mainline Off-ramp. (Diverge Point)	Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	Branford Street and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*	Branford Street and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	Wheatland Ave and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	Wheatland Avenue and the Eastbound I-210 Freeway mainline On-ramp. Merge Point)	Foothill Blvd/Osborne Street and the Westbound I-210 Freeway mainline Off-ramp. (Diverge Point)	Foothill Blvd/Osborne Street and the Eastbound I-210 Freeway mainline On-ramp. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Diverge Point)*	Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Merge Point)	Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Merge Point)*	Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. (Diverge Point)	Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Diverge Point)	Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Merge Point)	Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. (Merge Point)	Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. (Diverge Point)	Osborne Street and the Southbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*	Osborne Street and the Northbound I-5 Freeway mainline On-ramp. *(Merge Point)*	
Route 5A																		x	x											
HCM LOS																		D	C											
HCM Delay																		34.8	20.7											438
HCM V/C																														
ICU LOS																														
Length (ft)																		1050	885											59,895
Grade (%)																														
Route 5B	x	x	x	x	x	x	x	x	x	x	x	x	x																	
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	647
HCM V/C																														
ICU LOS																														
Length (ft)	5700	4000	5700	4000			5600																							119,530
Grade (%)																														
Route 5C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													215
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													66,840
Grade (%)																														
Route 6A																		x	x											
HCM LOS																		D	C											
HCM Delay																		34.8	20.7											438
HCM V/C																														
ICU LOS																														
Length (ft)																		1050	885											60,555
Grade (%)																														
Route 6B	x	x	x	x	x	x	x	x	x	x	x	x	x																	
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	647
HCM V/C																														
ICU LOS																														
Length (ft)	5700	4000	5700	4000			5600																							120,190
Grade (%)																														
Route 6C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													206
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													79,640
Grade (%)																														
Route 7A																		x	x											
HCM LOS																		D	C											
HCM Delay																		34.8	20.7											445
HCM V/C																														
ICU LOS																														
Length (ft)																		1050	885											65,155
Grade (%)																														
Route 7B	x	x	x	x	x	x	x	x	x	x	x	x	x																	
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*																	23,001
HCM V/C																														
ICU LOS																														
Length (ft)	5700	4000	5700	4000			5600																							94,450
Grade (%)																														
Route 7C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													52,036
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													2,360
Grade (%)																														
Route 8A	x	x	x	x	x	x	x	x	x	x	x			x	x															
HCM LOS	A	C	A	B	N/D*	N/D*	C	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*															
HCM Delay	11	24.3	5.6	18.9	N/D*	N/D*	23.8	N/D*	N/D*	N/D*	N/D*			N/D*	N/D*															2,564
HCM V/C																														
ICU LOS	5700	4000	5700	4000			5600																							
Length (ft)																														0
Grade (%)																														
Route 8B																				x	x	x	x	x	x	x	x	x	x	
HCM LOS																				N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	C	D	
HCM Delay																				N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*	24.4	34.9	13,229
HCM V/C																														
ICU LOS																														
Length (ft)																												770	830	1,600
Grade (%)																														
Route 8C																x	x													
HCM LOS																D	C													
HCM Delay																32.4	25.5													97,958
HCM V/C																														
ICU LOS																														
Length (ft)																1300	1060													2,360
Grade (%)																														

- Value exceeds maximum calculated delay.

N/D*: No Data available from Caltrans

5. PROJECT IMPACTS, SUMMARY, AND MITIGATIONS AND POTENTIAL IMPACT REDUCTION MEASURES

This study has examined and identified regional impacts related to the Devil's Gate Reservoir Sediment Removal and Management Project, and identified traffic impacts due to the expected increase of truck traffic generated along proposed routes. Route recommendations considered access and traffic mitigation in the impacted intersections, freeway segments, and ramps.

The Devil's Gate Dam and Reservoir site is located to the north east of the I-210 Freeway on Oak Grove Drive between Berkshire Place and the Foothill Freeway Overpass. Access to the project site will be obtained from Oak Grove Drive. Due to the project site vicinity to residential communities north, south, and east of the site further attention to route designation was required. The sediment and organic materials removed from the dam is proposed to be transported to eight disposal sites within the county of Los Angeles.

Twenty-six (26) haul routes were proposed and evaluated for the transportation of the sediment and organic materials to the proposed disposal sites. Along the 26 haul routes 52 intersections were identified for analysis. Twenty-eight (28) freeway segments along the I-210 Freeway, I-5 Freeway, SR-2 Freeway, and SR-134 Freeway and fifty-four (54) on and off-ramps within those freeway segments were also identified for analysis.

The hours of operation are 7 AM to 7 PM Monday through Friday and 8 AM to 5 PM on Saturday. The operational period is divided into three peak hour periods. The AM peak period consists of the hours 7 AM to 10 AM. The MIDDAY peak period consists of the hours 10 AM to 4 PM. The PM peak period consists of the hours 4 PM to 7 PM. Removal of sediment and organic materials off-site is expected to take place between these hours.

The proposed Haul Trucks are Double Dump Trucks estimated to haul 18 cubic yards of sediment. The trucks are anticipated to haul approximately 7.65 thousand cubic yards per day. During the sediment removal phase of the project approximately up to 4 million cubic yards of sediment and organic materials will be removed by 50 trucks per hour.

This traffic study analyzed the existing conditions, the existing conditions with project trips (existing + project conditions), and the Year 2014 project conditions for the identified study intersections, freeway segments, and ramps. Based on the results of the traffic analysis recommendations to maintain acceptable operating conditions at the intersections, freeway segments, and ramps were made.

Analysis, Scope, and Methodology

This traffic study report consists of the following analysis, scope, and methodologies listed below:

- Peak hour Synchro Intersection analysis of the existing, existing plus project, and year 2014 project conditions of the study intersections per the Highway Capacity Manual (HCM) methodology.
- Peak hour HCM Freeway analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the freeway segments and ramps in the study areas.
- Peak hour HCM Merge and Diverge analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the study areas.

5.1 Intersection Impacts

This traffic study analyzed 52 intersections in order to determine the optimal truck haul routes which would provide the least traffic impacts. From the traffic analysis it was determined that the increase in truck trips does not significantly impact the study intersections.

This study verified that most of the intersections associated with the twenty six routes are expected to continue to operate at an acceptable level of service (LOS) D or better during the Mid-day peak hour. There are some intersections that would require traffic mitigations or impact reduction measures as a result of route and peak hour selection. The intersections with unacceptable LOS E or lower are provided here identifying the condition when the intersection fails to meet an acceptable level of service.

Existing Conditions

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project two existing condition intersections are at an unacceptable LOS E. These intersections are as follows:

Intersection Impacts – Existing Plus Project

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM	E
51.	Branford Street and San Fernando Road	8C	PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Existing Plus Project

The project conditions will impact two additional intersections. These intersections are Berkshire Place and I-210 Freeway Eastbound Ramps and Figueroa St and SR-134 WB Ramps. Intersections identified during existing conditions are anticipated to continue to operate at LOS E or lower. These intersections are provided below:

Intersection Impacts – Existing Plus Project

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1A/1D/1E/1G	AM	E
21.	Figueroa St and SR-134 WB Ramps	4A/4B	AM/PM	E
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM	F
51.	Branford Street and San Fernando Road	8C	PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

The Year 2014 project conditions will impact 6 additional intersections. The level of service issues are anticipated to occur predominately during the AM and PM peak hours. The exception to this is in route 2B for Site 2, Manning's Pit at the intersection of Arrow Hwy and Azusa Ave is anticipated operate and an unacceptable LOS E throughout the day. Intersections identified during existing conditions and project conditions are anticipated to continue to operate at LOS E or lower. These intersections are expected to be minimally impacted by the project. Two intersections are anticipated to be noticeably impacted. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps of Routes 1A and 1D is anticipated to lower to an LOS F during the AM peak hour. Also the intersection of Figueroa Street and SR-134 Westbound Ramps of route 4B is anticipated to lower to an LOS F during the PM peak hour. These intersections are provided below:

Intersection Impacts – Project Year 2014

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1A/1D	AM	F
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1E/1G	AM	E
14.	Arrow Hwy and Lark Ellen Ave	2B	AM and PM	E
16.	Azusa Ave and Arrow Hwy	2B	AM, Mid-day, PM	E
17.	Azusa Ave and Gladstone St	2B	AM	E
20.	First St and Alameda St/I-210 Fwy WB Ramps	2B	AM	E
21.	Figueroa St and SR-134 WB Ramps	4A	AM/PM	E
21.	Figueroa St and SR-134 WB Ramps	4B	AM/PM	E/F
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM/PM	F/E
43.	Osborne Street and Laurel Canyon Blvd	8B	PM	E
50.	Sheldon Street and San Fernando Road	8C	PM	E
51.	Branford Street and San Fernando Road	8C	PM	F
52	Irwindale Avenue and Foothill Boulevard	9	PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

5.2 Freeway Impacts

This traffic study analyzed 28 freeway segments to determine the mainline Level-of-Service (LOS). From the traffic analysis it was determined that the increase in truck trips do not cause any major traffic impacts at the identified freeway segments.

Existing Conditions and Existing Plus Project

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project five existing condition freeway segments are at an unacceptable LOS E, predominately during the AM and PM peak hours. The inclusion of the project provides no additional unacceptable freeway segments, as presented in the Appendix A: Existing Plus Project Freeway Segment Table. The freeway segments operating at an unacceptable LOS are as follows:

Freeway Segment Impacts – Existing Conditions

	Freeway Segment	Haul Route	Peak Hour	LOS
31	WB SR-134 between San Fernando Rd and the I-5 Fwy	5B, 6B, 7B, 8A	PM	E
39	SB I-5 between SR-170 and Branford St	8A	AM, PM	F
39	SB I-5 between SR-170 and Branford St	8A	Mid-day	E
51	WB SR-118 between San Fernando Rd and the I-210 Fwy	8B	AM	E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	Mid-day, PM	E
55	NB I-5 between Tierra Bella St and Osborne St	8B	AM, Mid-day, PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

Anticipated impact the freeway segments for Year 2014 are WB I-210 between the SR-134 Fwy and Lake Ave, EB I-210 between the SR-134 Fwy and Lake Ave, EB SR-134 between the Pacific Ave and Concord St, and SB I-5 between the SR-134 Fwy and Western Ave. Freeway segments identified in existing conditions are anticipated to continue to operate at LOS E or lower. Year 2014 freeway segments with an anticipated LOS E or lower are as follows:

Freeway Segment Impacts – Project Year 2014

	Freeway Segment	Haul Route	Peak Hour	LOS
11	WB I-210 between the SR-134 Fwy and Lake Ave	2A, 2B, 3, 9	AM	E
12	EB I-210 between the SR-134 Fwy and Lake Ave	2A, 2B, 3, 9	AM, Mid-day, PM	E
30	EB SR-134 between the Pacific Ave and Concord St	5B, 6B, 7B, 8A	AM, PM	E
31	WB SR-134 between San Fernando Rd and the I-5 Fwy	5B, 6B, 7B, 8A	PM	F
33	SB I-5 between the SR-134 Fwy and Western Ave	5B, 6B, 7B, 8A	Mid-day, PM	E
39	SB I-5 between SR-170 and Branford St	8A	AM, Mid-day, PM	F
51	WB SR-118 between San Fernando Rd and the I-210 Fwy	8B	AM/PM	F/E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	AM	E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	Mid-day, PM	F
55	NB I-5 between Tierra Bella St and Osborne St	8B	AM, Mid-day, PM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

5.3 Ramp Impacts

This traffic study analyzed 54 on and off-ramps to determine the Level-of-Service (LOS) of the utilized ramps with the study area. From the traffic analysis it was determined that the increase in truck trips does not cause any major traffic impacts to the identified ramps. The LOS of the ramps remained acceptable when the expected increase in truck trips were applied to the ramps being studied.

Existing Conditions and Existing Plus Project

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project one ramp is at an unacceptable LOS E during existing condition. The inclusion of the project does not noticeably impact the ramps, as presented in the Appendix A: Existing Plus Project Freeway Ramp Table. The project condition provides no additional unacceptable ramps. The ramp operating at an unacceptable LOS is as follows:

Freeway Ramp Impacts – Existing Conditions

	RAMP	HAUL ROUTE	PEAK HOUR	LOS (1)
52	Osborne St and the SB I-5 Fwy mainline off-ramp	8B	AM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

The Year 2014 project conditions will negatively impact one additional ramp. The ramp identified during existing conditions is anticipated to continue to operate at LOS F. The ramps anticipated to operate at an unacceptable level are provided below:

Freeway Ramp Impacts – Project Year 2014

	RAMP	HAUL ROUTE	PEAK HOUR	LOS (1)
22	WB I-210 Fwy Transition Ramp to the SB SR-2 Fwy mainline	5B, 6B, 7B, 8A	AM	F
52	Osborne St and the SB I-5 Fwy mainline off-ramp	8B	AM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

5.4 Route Summary and Mitigations/Potential Impact Reduction Measures

An index of the routes was developed and provided in the Summary Tables. These tables outline the Level of Service (LOS), delay, volume to capacity ratio (V/C), segment lengths, and grade of the utilized freeway segments. The optimal time of operation for the Trucks varies by Haul Route. During the AM, MID-DAY, and PM peak periods most of the routes, currently and through the life of the project, are anticipated to operate at an acceptable LOS.

The Haul Trucks are estimated to haul 18 cubic yards of sediment and organic materials. Utilizing the proposed haul route hours of operation and 50 trucks per hour an approximate thousand cubic yards of sediment and organic materials will be removed from the dam per day.

5.4.1 Devil's Gate Dam Area

The reservoir requires two preferred routes. A route will accommodate trucks outbound to the deposit sites south and east of the reservoir, Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), Scholl Canyon Landfill (Site 4). The other route will accommodate trucks outbound to the deposit sites west of the reservoir, Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8).

Devil's Gate Dam Area (Site 1): Haul Route 1A

Haul Route 1A is an optional route to the disposal sites south and east of Devil's Gate Dam and Reservoir. The sites east of Devil's Gate Dam and Reservoir are Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9). The site south of Devil's Gate Dam and Reservoir is Scholl Canyon Landfill (Site 4). The use of Haul Route 1A requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1A is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1B

Haul Route 1B is the alternative route to the disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4).

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1B is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1C

Haul Route 1C is an optional route for disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4). The use of Haul Route 1C requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1C is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1D

Haul Route 1D is the preferred route for disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4).

AM Mitigations and Potential Impact Reduction Measures

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1D is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir driveway does not require potential impact reduction measures.

Devil's Gate Dam Area (Site 1): Haul Route 1E

Haul Route 1E is an optional route for disposal sites west of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1E requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1E is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1F

Haul Route 1F is an alternative route for disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1F requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1F is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1G

Haul Route 1G is an optional route to the disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1G requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1G is anticipated to continue to operate at an LOS C or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1H

Haul Route 1H is the preferred route for disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8).

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1H is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir entrance and access to Oak Grove Drive Oak Grove Drive for Route 1H to access the Devil's Gate Dam and Reservoir does not require potential impact reduction measures.

5.4.2 Waste Management, Manning's Pit, and Vulcan Materials - Irwindale Site Area

The Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Material (Site 9) are the disposal sites east of Devil's Gate Dam and Reservoir.

Manning's Pit (Site 2): Haul Route 2A

Haul Route 2A is the preferred route for Manning's Pit, east of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 2A is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods:

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Manning's Pit (Site 2): Haul Route 2B

Haul Route 2B is the alternate route for Manning's Pit, a disposal site east of Devil's Gate Dam and Reservoir.

AM, MID-DAY, and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to operate at an unacceptable LOS at Arrow Hwy and Lark Ellen Ave, Azusa Ave and Arrow Hwy, Azusa Ave and Gladstone Street, and First Street and Alameda Street/I-210 Freeway Westbound Ramps during the AM and PM peak periods.

The Haul Route is anticipated to operate at an unacceptable LOS at Arrow Hwy and Lark Ellen Ave, Azusa Ave and Arrow Hwy, Azusa Ave and Gladstone Street, and First Street and Alameda Street/I-210 Freeway Westbound Ramps during the AM and PM peak periods.

Arrow Hwy (EW) and Lark Ellen Ave (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Azusa Ave (NS) and Arrow Hwy (EW): The Intersection is anticipated to operate at an unacceptable LOS throughout the day. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS throughout the day.

Azusa Ave (NS) and Gladstone Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

First Street (EW) and Alameda Street/I-210 Freeway Westbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Waste Management (Site 3): Haul Route 3

Haul Route 3 is the preferred route for Waste Management, east of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 3 is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods without the need for potential impact reduction measures. The Waste Management driveway is at the signalized study intersection of Vincent Avenue and Gladstone Street that does not require potential impact reduction measures.

Vulcan Materials (Site 9): Haul Route 9

Haul Route 9 is the preferred route for Vulcan Material – Irwindale Site, east of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 9 is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM, and MID-DAY peak periods without the need for potential impact reduction measures. The Vulcan Materials driveway is at the signalized study intersection of Irwindale Avenue and Foothill Boulevard that does not require potential impact reduction measures.

PM Mitigations and Potential Impact Reduction Measures

Irwindale Avenue (NS) and Foothill Boulevard (EW) (Vulcan Materials driveway): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

5.4.3 Scholl Canyon Landfill (Site 4)

The Scholl Canyon Landfill (Site 4) is the green waste disposal site east of Devil's Gate Dam and Reservoir.

Scholl Canyon Landfill Haul (Site 4): Route 4A

Haul Route 4A is the Scholl Canyon Landfill preferred route, east of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 4A utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures. The Scholl Canyon Landfill driveway does not require potential impact reduction measures during the MID-DAY peak period.

AM and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an acceptable LOS for all utilized intersections during the AM and PM peak periods with the following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

Scholl Canyon Landfill Haul (Site 4): Haul Route 4B

Haul Route 4B is an optional route for the green waste disposal site Scholl Canyon Landfill, east of Devil's Gate Dam and Reservoir. The Scholl Canyon Landfill driveway does not require potential impact reduction measures.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an acceptable LOS for all utilized intersections during the AM and PM peak periods with the following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

5.4.4 Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8)

The Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8) are the disposal site west of Devil's Gate Dam and Reservoir.
Sheldon Pit (Site 5): Haul Route 5A

Haul Route 5A is the preferred route for Sheldon Pit, west of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY peak period
An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

AM and PM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Sheldon Pit (Site 5): Haul Route 5B

Haul Route 5B is an optional route for Sheldon Pit, a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 5B is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods.

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sheldon Pit (Site 5): Haul Route 5C

Haul Route 5C is the alternate route for Sheldon Pit, a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 5C utilized intersections are anticipated to continue to operate at an LOS C or better throughout the day:

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6A

Haul Route 6A is the preferred route for Sun Valley Fill Site, west of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 6A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

The Sun Valley Fill Site driveway does not require potential impact reduction measures during the AM and PM peak periods.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6B

Haul Route 6B is an optional route for Sun Valley Fill Site, a disposal site west of Devil's Gate Dam and Reservoir. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

MID-DAY Mitigation and Potential Impact Reduction Measures

The Haul Route 6B utilized intersections are anticipated to continue to operate at an acceptable LOS during the MID-DAY peak period without the need for potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6C

Haul Route 6C is the alternate route for Sun Valley Fill Site, a disposal site west of Devil's Gate Dam and Reservoir. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 6C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day without the need for potential impact reduction measures.

Bradley Landfill (Site 7): Haul Route 7A

Haul Route 7A is the Bradley Landfill is the preferred route, west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require potential impact reduction measures.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 7A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Bradley Landfill (Site 7): Haul Route 7B

Haul Route 7B is an optional route for Bradley Landfill, a disposal site west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require mitigation.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 7B is anticipated to continue to operate at an LOS C or better throughout the day without the need for potential impact reduction measures.

Bradley Landfill (Site 7): Haul Route 7C

Haul Route 7C is the alternate route for Bradley Landfill, a disposal site west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 7C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day without the need for potential impact reduction measures.

Boulevard Pit (Site 8): Haul Route 8A

Haul Route 8A is an optional route for a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 8A is anticipated to continue to operate at an acceptable LOS for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Boulevard Pit (Site 8): Haul Route 8B

Haul Route 8B is an alternative route for a disposal site west of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 8B is anticipated to continue to operate at an acceptable LOS during the AM and MID-DAY peak periods

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

PM Mitigations and Potential Impact Reduction Measures

Osborne Street (EW) and Laurel Canyon Blvd (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Boulevard Pit (Site 8): Haul Route 8C

Haul Route 8C is the Boulevard Pit preferred route west of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-DAY peak periods

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

PM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Sheldon Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Branford Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

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APPENDIX A: TECHNICAL REPORT

Devil's Gate Reservoir Sediment Removal and Management Project

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October 17, 2013

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Executive Summary

Project Description

This traffic study has been prepared to examine and identify impacts related to the Devil's Gate Reservoir Sediment Removal and Management Project. This report identifies traffic impacts due to the expected increase of truck traffic generated by the sediment removal project and presents recommendations for access and traffic mitigation in the impacted intersections, freeway segments, and ramps.

Devil's Gate Dam and Reservoir is located to the northeast of the I-210 Freeway on Oak Grove Drive between Berkshire Place and the Foothill Freeway Overpass. Access to the project site is proposed to be obtained from Oak Grove Drive. The project site is surrounded by residential communities to the south, and east of the site. The debris removed from the dam is proposed to be transported to eight potential disposal sites located within the county of Los Angeles. The sediment is proposed to be transported to seven dirt waste disposal sites and the eighth being a green waste disposal site. The seven proposed dirt waste disposal sites are Waste Management, Manning's Pit, Vulcan Materials - Irwindale Site, Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and the Boulevard Pit. The proposed green waste disposal site is the Scholl Canyon Landfill, located southwest of the dam in the Eagle Rock area within the City of Los Angeles. The sediment removal project is expected to generate 50 truck trips per hour with destinations to the potential eight disposal sites. It is estimated that a total of 17 and 425 average daily trips for autos and trucks will travel to and from the project site, respectively. The proposed Haul Trucks are the Double dumps estimated to haul 18 cubic yards of sediment. The trucks are anticipated to haul approximately 7.65 thousand cubic yards per day. A proposed 50 trucks per hour will be removing up to 4 million cubic yards of sediment and organic materials during the sediment removal phase of the project.

The On-site excavation hours is proposed to occur between the hours of 7 AM to 6 PM Standard Time, 7 AM to 7 PM Daylight Savings Time, and Saturday 8 AM to 5 PM. The operational period is divided into three peak hour periods. The AM peak period consists of the hours 7 AM to 10 AM. The MIDDAY peak period consists of the hours 10 AM to 4 PM. The PM peak period consists of the hours 4 PM to 6 PM Standard Time, 4 PM to 7 PM Daylight Savings Time.

The sediment removal project consists of 26 proposed haul routes. Within those 26 haul routes 52 intersections were evaluated. Truck trip distributions were made based on the existing capacity of the haul routes and intersections along the haul routes. This traffic study also identified 28 freeway segments along the I-210 Freeway, SR-134 Freeway, SR-2 Freeway, I-5 Freeway, and SR-118 freeway and 54 on and off-ramps within those freeway segments for analysis.

This traffic study analyzed the existing conditions, the existing conditions with project trips (existing + project conditions), and the year 2014 project conditions for the identified study intersections, freeway segments, and ramps. Based on the results of the traffic analysis, recommendations were made to maintain acceptable operating conditions at the intersections, freeway segments, and ramps.

Analysis, Scope, and Methodology

This traffic study report consists of the following analysis, scope, and methodologies:

- Peak hour Synchro Intersection analysis of the existing, existing plus project, and year 2014 project conditions of the study intersections per the Highway Capacity Manual (HCM) methodology.

- Peak hour HCM Freeway Segment analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the freeway segments and ramps in the study areas.

- Peak hour HCM Freeway Ramp and Weaving analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the study areas.

Intersection Impacts

This traffic study analyzed 52 intersections in order to determine the best truck haul routes that will provide the least traffic impacts. From the traffic analysis it was determined that the increase in truck trips do not significantly impact most of the study intersections.

Freeway and Ramp Impacts

This traffic study analyzed 28 freeway segments to determine the mainline Level-of-Service (LOS) as well as 54 on and off-ramps. It was determined that the increase in truck trips do not significantly impact the identified freeway segments and ramps.

Recommendations

The Routes selected provided the least traffic impacts and maintained acceptable operating conditions at the intersections, freeway segments, and ramps. The recommended hours of operation will vary by disposal site to accommodate the anticipated 50 trips per hour totaling to 425 average daily trips while minimally impacting the existing roadway network.

- *Devils Gate Dam (Site 1):* The preferred route for sites 2, 3, 9, and 4 is 1D. The alternative route for sites 2, 3, 9, and 4 is 1B. The preferred route for sites 5, 6, 7, and 8 is 1H. The alternate route for sites 5, 6, 7, and 8 is 1F. Anticipated all intersections, most freeway segment and all ramps will operate at an acceptable LOS.

- *Manning's Pit (Site 2):* The preferred route for site 2 is route 2A. The site Anticipated all intersections, most freeway segment and all ramps will operate at an acceptable LOS. The alternative route for Manning's Pit is Haul Route 2B.

- *Waste Management (Site 3):* The preferred route for site 3 is route 3A. Anticipated all intersections, most freeway segment and all ramps will operate at an acceptable LOS. The Waste Management does not have an alternative route with lower impacts other than Haul Route 3.

- *Vulcan Materials - Irwindale Site (Site 9):* The preferred route for site 9 is route 9. Anticipated all intersections, most freeway segment and all ramps will operate at an acceptable LOS. The Vulcan Material – Irwindale Site does not have an alternative route with lower impacts other than Haul Route 9.

- *Scholl Canyon Landfill (Site 4):* The preferred route for site 4 is route 4A. Anticipated all intersections, most freeway segment and all ramps will operate at an acceptable LOS. The alternative route for Scholl Canyon Landfill is Haul Route 4B.

- *Sheldon Pit (Site 5):* The preferred route for site 5 is route 5A. Anticipated intersection, freeway segments, and ramps will operate at an LOS D or better. The alternative route for Sheldon Pit Haul Route 5C.

- *Sun Valley Fill Site (Site 6):* The preferred route for site 6 is route. Anticipated intersection, freeway segments, and ramps will operate at an LOS D or better. The alternative route for Sun Valley Fill Site Haul Route 6C.

- *Bradley Landfill (Site 7):* The preferred route for site 7 is route 7A. Anticipated intersection, freeway segment and ramp LOS D or better. The alternative route for Bradley Landfill Haul Route 7C.

- *Boulevard Pit (Site 8):* The preferred route for site 8 is route 8C. Anticipated intersection, freeway segments, and ramps will operate at an LOS D or better. The alternative route for Boulevard Pit is Haul Route 8B.

1. INTRODUCTION

Project Description

The County of Los Angeles has proposed a sediment removal project for the Devil's Gate Dam and Reservoir which is located to the north east of the I-210 Freeway in the City of Pasadena, as illustrated in *Figure 1-1.* The project site is surrounded by residential communities to the south, and east of the site. Devil's Gate Dam and Reservoir serves as a critical component of the Los Angeles County Flood Control District since it provides flood protection to the Cities of Pasadena, South Pasadena, and Los Angeles. The sediment removal is proposed to be taken to seven potential disposal sites that have been identified by the County of Los Angeles.

As presented, the Devil's Gate Dam and Reservoir site is located to the northeast of the I-210 Freeway on Oak Grove Drive between Berkshire Place and the Foothill Freeway Overpass. Access to the project site is proposed to be obtained from Oak Grove Drive. The sediment removed from the dam is proposed to be transported to eight disposal sites located within the county of Los Angeles. The sediment is proposed to be transported to seven dirt waste disposal sites and the eighth being a green waste disposal site. The seven dirt waste disposal sites are Waste Management, Manning's Pit, Vulcan Materials - Irwindale Site, Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and the Boulevard Pit. The Waste Management, Manning's Pit, and Vulcan Material are located to the east of the dam site in the cities of Azusa and Irwindale, as illustrated in *Figure 1-2*. The green waste disposal site is the Scholl Canyon Landfill, located southwest of the dam in the Eagle Rock area within the City of Los Angeles, as illustrated in *Figure 1-2*. The Sheldon Pit, Sun Valley Fill Site, Bradley Landfill, and the Boulevard Pit are located to the northwest of the dam site in the City of Los Angeles, as illustrated in *Figure 1-3*.

The trucks are anticipated to haul approximately 7.65 thousand cubic yards per day. A proposed 50 trucks per hour will be removing up to 4 million cubic yards of sediment and organic materials during the sediment removal phase of the project.

The sediment removal project consists of 26 proposed haul routes for the transportation of the removed sediment to the disposal sites. Along those 26 haul routes 52 intersections were identified for analysis. Twenty-eight (28) freeway segments along the I-210 Freeway, SR-134 Freeway, SR-2 Freeway, I-5 Freeway, and SR-118 freeway and fifty-four (54) on and off-ramps within those freeway segments were also identified for analysis. The sediment removal project is expected to generate 50 truck trips per hour with destinations to the potential seven disposal sites. It is estimated that a total of 17 and 425 average daily trips for autos and trucks will travel to and from the project site, respectively. Truck trip distributions were based on the existing capacity of the haul routes and intersections along the haul routes.

Traffic Study Objectives

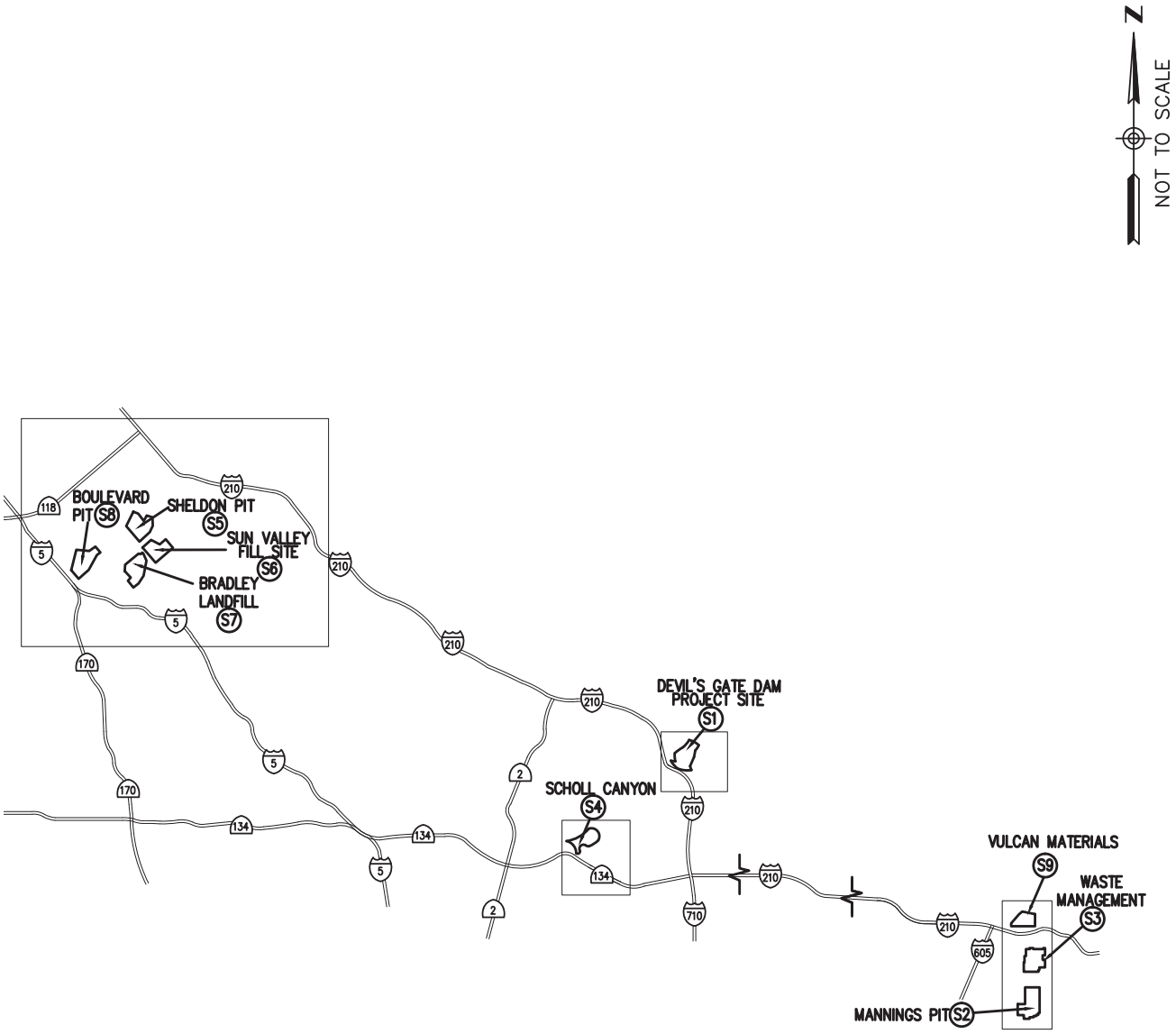
This traffic study has been prepared to examine and identify impacts related to the Devil's Gate Reservoir Sediment Removal and Management Project. This report identifies traffic impacts due to the expected increase of truck trips generated by the sediment removal project and presents recommendations for access and traffic mitigation in the impacted intersections, freeway segments, and ramps.

The traffic analysis along the 26 proposed haul routes consists of peak hour intersection capacity analysis, peak hour freeway mainline HCM 2010 analysis, peak hour ramp HCM 2010 capacity analysis, and peak hour freeway HCM 2010 weaving analysis. This study also addresses the impacts of ambient growth within the area since the sediment removal project is expected to last more than one year. Recommendations to maintain acceptable operating conditions at the intersections, freeway segments, and on and off-ramps were made based on the results of the analysis.

Report Organization

This report analyzes the existing conditions, existing plus project conditions, and project conditions. The report is organized as follows:

- Chapter 1: Introduction
- Chapter 2: Capacity Analysis Methodology
- Chapter 3: Existing Conditions
- Chapter 4: Existing + Plus Project Conditions
- Chapter 5: Year 2014 Project Conditions
- Chapter 6: Project Impacts, Mitigation and Summary



LEGEND

S# – DISPOSAL SITE

Hall & Foreman, Inc.
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DEVIL'S GATE PROJECT MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-1

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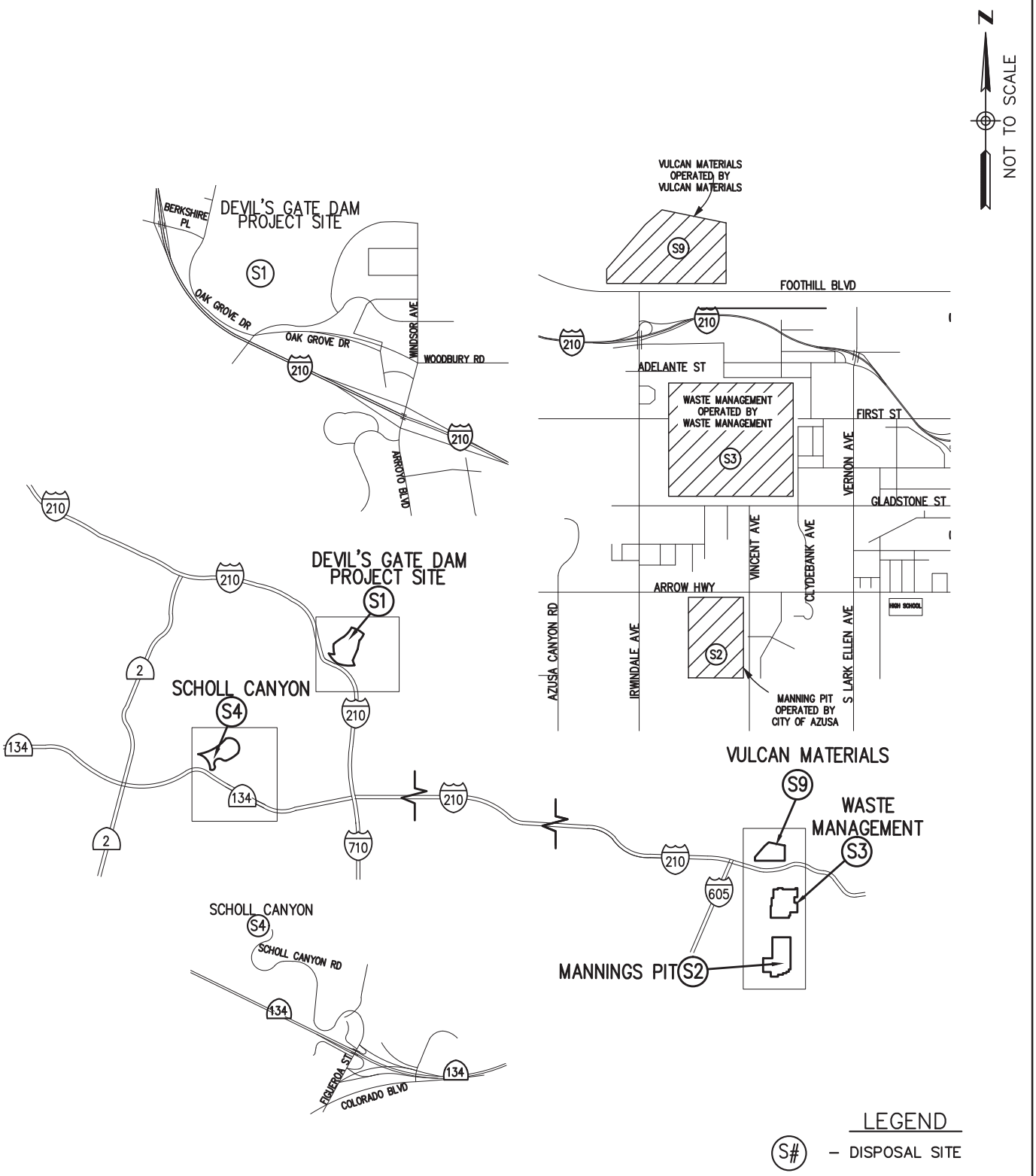

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DEVIL'S GATE, SCHOLL CANYON. WASTE MANAGEMENT, MANNINGS PIT, VULCAN MATERIALS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-2

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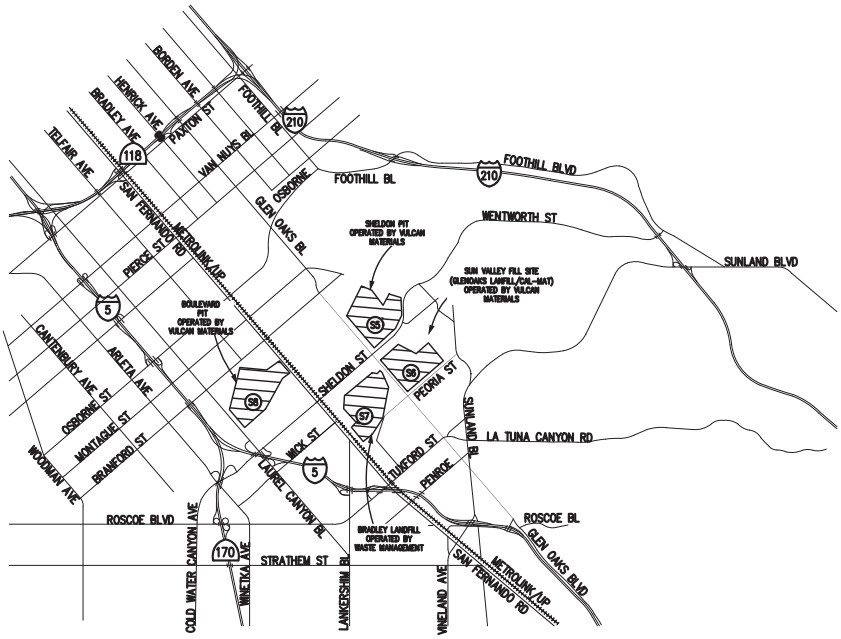

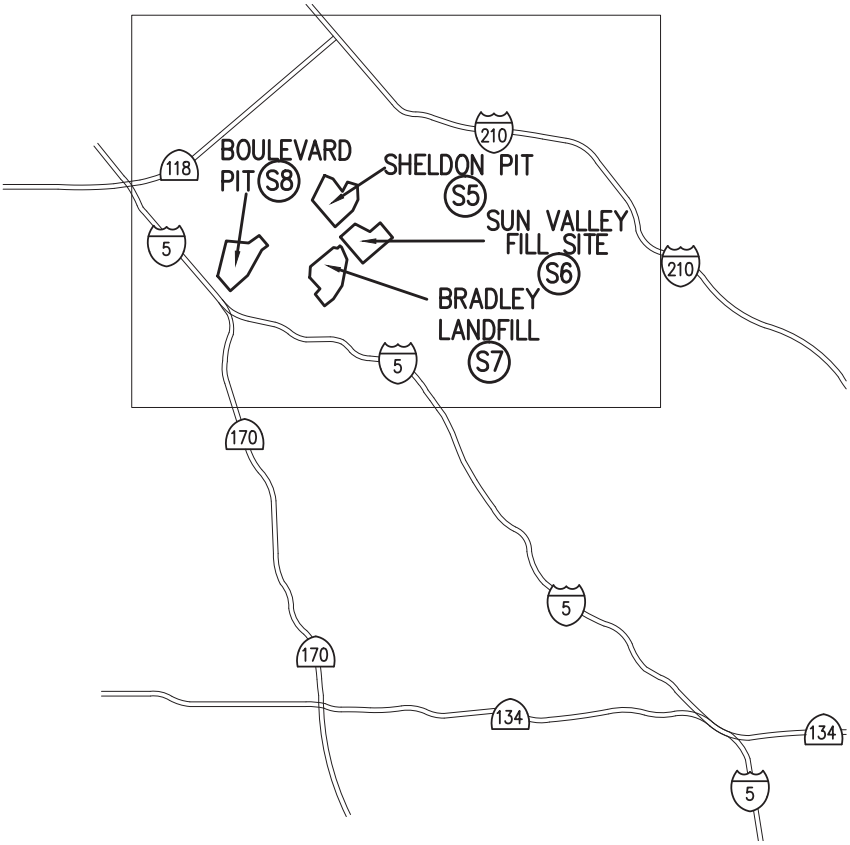

LEGEND

S# – DISPOSAL SITE

NOT TO SCALE

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SHELDON PIT, SUN VALLEY FILL SITE, BRADLEY LANDFILL, AND BOULEVARD PIT SITES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 1-3

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2. CAPACITY ANALYSIS METHODOLOGY

Level of Service Analysis Criteria For Local Intersections:

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the Cities of Pasadena, La Cañada Flintridge, Los Angeles, Azusa, Irwindale, and unincorporated areas in the County of Los Angeles. In order to maintain adequate traffic flow it is important to meet the lowest acceptable service level at each intersection along the truck haul routes. In order to verify the intersection capacity analysis impacts, present Level-of-Service (LOS) were conducted for the signalized and un-signalized study intersections. Based on the existing intersection geometrics and traffic volumes during the AM, Mid-day, and PM peak hours, the intersection capacity analyses for the signalized and un-signalized intersections were conducted using Trafficware Ltd Synchro version 8 which implements the methods of the 2010 Highway Capacity Manual (HCM) and 2003 Intersection Capacity Utilization (ICU) methods.

It is important to note that each city/jurisdiction has different criteria and thresholds to identify the lowest acceptable service levels. All jurisdictions along the truck haul routes either follow the ICU, CMA, or HCM methodologies for signalized intersections. In order to be consistent a Synchro analysis was done since Synchro can provide the LOS per the HCM and ICU methodologies. To further understand the concepts and differences between the methodologies each methodology used by the local jurisdictions is described below.

Critical Movement Analysis (CMA)

The Critical Movement Analysis (CMA) methodology is a method developed by the Transportation Research Board (TRB) Circular 212. Under the CMA methodology the Level-of-Service (LOS) is determined by dividing the volume of vehicles that pass through the facility over the capacity of that facility. This ratio is known as the volume-to-capacity (V/C) ratio. A V/C ratio value of 1.00 or greater indicates that an intersection is at or exceeding capacity. The V/C ratio value is based upon volumes by lane, signal phasing, and approach lane configurations. The LOS values range from LOS A to LOS F where a LOS A indicates excellent operating conditions and a LOS F represents congested conditions with excessive vehicle delay. The threshold table for signalized intersections per the CMA methodology is shown below.

Table 2-1
Critical Movement Analysis (CMA) - LOS and V/C Threshold

Level of Service (LOS)	Volume/Capacity Ratio (V/C)	Definition
A	0.000 - 0.600	EXCELLENT. No vehicle waits longer than one red light and no approach phase is fully used.
B	0.601 - 0.700	VERY GOOD. An occasional approach phase is fully utilized; many drivers begin to feel somewhat restricted within groups of vehicles.
C	0.701 – 0.800	GOOD. Occasionally, drivers may have to wait through more than one red light; backups may develop behind turning vehicles.
D	0.801 – 0.900	FAIR. Delays may be substantial during portions of the rush hours, but enough lower volume periods occur to permit clearing of developing lines, preventing excessive backups.
E	0.901 – 1.00	POOR. Represents the most vehicles that intersection approaches can accommodate; may be long lines of waiting vehicles through several signal cycles.
F	Greater than 1.000	FAILURE. Backups from nearby intersections or on cross streets may restrict or prevent movement of vehicles out of the intersection approaches. Tremendous delays with continuously increasing queue lengths.

Source: **TRB**

Intersection Capacity Utilization (ICU)

The Intersection Capacity Utilization (ICU) traffic analysis methodology is a method that is similar to the Critical Movement Analysis (CMA) methodology. Like the CMA method the ICU method uses volume-to-capacity (V/C) ratios to determine a LOS for an intersection. However, the ICU method compares the V/C ratios of conflicting turn movements at an intersection, sums these critical conflicting V/C ratios for each intersection approach, and determines the overall ICU. The resulting ICU is expressed in terms of LOS, where LOS A represents free-flow activity and LOS F represents overcapacity operation. The ICU thresholds are similar to the thresholds of the CMA methodology but can vary by local jurisdictions.

HCM Methodology

The Highway Capacity Manual (HCM) traffic analysis methodology is a method developed by the Transportation Research Board (TRB). Under the HCM methodology the LOS of an intersection is determined based on the delay of vehicles at the intersections. For signalized intersections the HCM measures the LOS based on control delay. Control delay is a portion of the total delay attributed to a signalized intersection and consists of initial acceleration delay, queue move-up time, stopped delay, and final acceleration delay. The HCM bases its delay on an adjusted flow using a mean control delay for the highest 15 minute period within the hour. The LOS for signalized intersections ranges from LOS A, which indicates excellent operating conditions and a LOS F, which represents congested conditions with excessive vehicle delay. The threshold table for signalized intersections per the HCM 2010 methodology is shown below.

Table 2-2
HCM 2010 - LOS Criteria for Signalized Intersections

LOS	Control Delay per Vehicle (s/veh)
A	≤ 10
B	> 10-20
C	> 20-35
D	> 35-55
E	> 55-80
F	> 80

Source: **HCM 2010 Exhibit 18-1**

For un-signalized intersections the HCM measures the LOS based on the computed or measured control delay for Two Way Stop Controlled intersections (TWSC) and control delay for All Way Stop Controlled (AWSC) intersections. For a TWSC the LOS is computed for each movement and the most critical LOS is the one that describes the effectiveness of that intersection, which is typically the stop controlled left turn movement from the minor street. The threshold table for TWSC intersections per the HCM 2010 methodology is shown below.

Table 2-3
HCM 2010 - LOS Criteria for TWSC Intersections

LOS	Control Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: **HCM 2010 Exhibit 19-1**

For an AWSC intersection the LOS defines the whole intersection. The threshold table for AWSC intersections per the HCM 2010 methodology is shown below.

Table 2-4
HCM 2010 - LOS Criteria for AWSC Intersections

LOS	Control Delay per Vehicle (s/veh)
A	0-10
B	> 10-15
C	> 15-25
D	> 25-35
E	> 35-50
F	> 50

Source: **HCM 2010 Exhibit 20-2**

Level of Service Analysis Criteria for Freeways and Ramps:

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the I-210, I-5, SR-2, and SR-134 freeways from which 28 freeway segments and 54 ramps were identified for analysis. The LOS analysis done on the freeway and ramps will be per Caltrans requirements, which consists of the use of the HCM 2010 methodologies. To determine the LOS per the HCM 2010 methodology, Highway Capacity (HCS) 2010 software, which is developed by McTrans, was used for the freeway mainline analysis, ramp analysis, and weaving analysis.

Freeway Mainline HCM Analysis:

The freeway mainline LOS analysis was done with existing mainline volumes provided by Caltrans for each segment identified for analysis. The HCM methodology for determining the LOS of a basic freeway segment consists of inputting the existing geometric data, free flow speed (FFS), base free flow speed (BFFS), and mainline volumes to specific formulas described in Chapter 23 of the HCM. The procedure consists of adjusting the BFFS and mainline volume based on the existing conditions of the freeway. After the adjustments are made a speed-flow curve is used to determine the average passenger car speed in order to compute the density of the freeway segment to determine the LOS of that segment.

To determine the mainline LOS the mainline volumes and required criteria are inputted into the HCS 2010 software which calculates the freeway segment density value using the HCM methodology. The resulting density value is then matched to the corresponding LOS value as presented in *Table 2-5* shown below. Caltrans District 7 has established that the densities in a freeway mainline should not exceed 35.0 pc/mi/ln which corresponds to a LOS D. Caltrans has determined that freeway segments that operate below LOS D should be identified and improved to an acceptable LOS.

Table 2-5
Caltrans Freeway Mainline HCM LOS Criteria

LOS	Basic Freeway Segment Density (pc/mi/ln)
A	0 - 11.0
B	11.0 - 18.0
C	18.0 - 26.0
D	26.0 - 35.0
E	35.0 - 45.0
F	> 45.0

Source: **HCM 2000, Exhibit 23-2**

Ramp HCM Analysis

The freeway ramp LOS analysis was conducted with existing ramp volumes counted by Newport Traffic Studies. The HCM methodology for determining the LOS of a freeway ramps consists of inputting the existing geometric data, ramp free flow speed, and the existing ramp volumes to specific formulas described in Chapter 25 of the HCM. The volume (demand) is adjusted and then a demand flow rate is computed for a merging maneuver in an on-ramp or a diverging maneuver in an off-ramp. Capacity is then computed and compared to the adjusted flow. After this the density for the ramp can be computed and the LOS of the ramp can be determined.

To determine the freeway ramp LOS a ramp merge and diverge analysis was carried out through the use of the freeway-to-arterial interchanges analysis in the HCS software. According to HCM methodology, the merge and diverge ramp areas focus on an influential area of 1,500 feet, which includes the acceleration or deceleration lane and adjacent freeway lanes. The HCM methodology has three major steps that need to be followed. The first step is the determination of traffic entering the freeway lanes immediately upstream of the merge area for a merging maneuver or at the beginning of a deceleration lane of the diverge area for a diverging maneuver. The second step is to determine the capacity for the corresponding segment. The final step is the determination of the density of flow within the influence area and the LOS based on that density value.

The HCS software computes a density value for a freeway ramp using the same HCM procedure. That density value can then be matched to the corresponding LOS values as presented in *Table 2-6* shown below. Caltrans District 7 has established that the densities in a freeway ramp should not exceed 35.0 pc/mi/ln which corresponds to a LOS D. Caltrans has determined that freeway ramps that operate below LOS D should be identified and improved to an acceptable LOS.

Table 2-6
Caltrans Freeway Ramp HCM LOS Criteria

LOS	Freeway Ramp Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0
F	Exceeds Capacity

Source: **HCM 2000, Exhibit 25-4**

Freeway Weaving HCM Analysis:

Freeway weaving is defined as the crossing of two streams of traffic traveling in the same direction along a significant length of highway without the aid of traffic control devices. Freeway weaving can become complicated when on and off-ramps are spaced close together and do not allow proper merging or diverging maneuvers. Weaving maneuvers can adversely affect the traffic on the mainline which is why freeway weaving is being analyzed in this study.

The freeway weaving LOS analysis was done with existing freeway volumes provided by Caltrans. The HCM methodology for determining the LOS of a freeway ramps consists of inputting the existing geometric data, the free flow speed of the before and after weaving segments, and the weaving and non-weaving volumes into specific formulas described in Chapter 24 of the HCM. To determine the freeway weaving LOS the HCS software was used. The HCS software computes a density for the weaving area based on the parameters inputted into the software. The density value can then be matched to the corresponding LOS values as presented in *Table 2-7* shown below.

Table 2-7
Caltrans Freeway Weaving HCM LOS Criteria

LOS	Freeway Weaving Segment Density (pc/mi/ln)
A	≤ 10.0
B	> 10.0 and ≤ 20.0
C	> 20.0 and ≤ 28.0
D	> 28.0 and ≤ 35.0
E	> 35.0 and ≤ 43.0
F	> 43.0

Source: **HCM 2000, Exhibit 24-2**

3. EXISTING CONDITIONS

Land-Use Description & Haul Routes

The Project site and proposed disposal sites are located in areas surrounded by residential neighborhoods and industrial and office buildings. The descriptions of the sites are as follows.

Devils Gate Dam (Site 1)
Land uses to the south, and east of the dam consist of residential housing. A local high school is located just north of the dam on Oak Grove Drive. Oak Grove Drive is the main road fronting the project site and provides access to the I-210 through Berkshire Place and Windsor Avenue.

Manning's Pit (Site 2)
Land uses around the Manning's Pit consist of industrial and office buildings to the north of the site. Residential housing surrounds the disposal site to the south, west, and east. Vincent Avenue is the main street fronting the project. The site is operated by the City of Azusa.

Waste Management (Site 3)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. Gladstone Street is the main street fronting the project. The site is operated by Waste Management.

Vulcan Materials - Irwindale Site (Site 9)
Land uses to the north, south, and east of the site consist of industrial and office buildings and vacant land to the west of the site. Foothill Boulevard is the main street fronting the site. The site is operated by Vulcan Materials.

Scholl Canyon Landfill (Site 4)
Land uses around the Scholl Canyon Landfill consist of residential housing to the west of the site and vacant mountainous terrain to the north, south, and east of the site. Scholl Canyon Road is the main road fronting the project site. The site is operated by Los Angeles County.

Sheldon Pit (Site 5)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. The Sun Valley Fill Site is located just south across Sheldon Street. Glenoaks Blvd is the major road fronting the project site to the west and allows access to the I-5 Freeway. Access to the Sheldon Pit is provided through Sheldon Street. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6)
Land uses to the north, south, and west of the site consist of industrial and office buildings and residential housing to the east of the site. The Sheldon Pit is located just north across Sheldon Street. Glenoaks Blvd is the major road fronting the project site to the west and allows access to the I-5 Freeway. Access to the Sheldon Pit is provided through Sheldon Street. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

Bradley Landfill (Site 7)
Land uses to the north and south of the site consist of industrial and office buildings and residential housing to the west and east. The Sheldon Pit and Sun Valley Fill Site are located just to the east across Glenn Oaks Blvd. Access to the Bradley Landfill is found through Peoria Street. Glenoaks Blvd is the major road fronting the project site to the east and allows access to the I-5 Freeway. The site is operated by the Waste Management.

Boulevard Pit (Site 8)
Land uses to the north, south, and west of the site consist of residential housing and Industrial and office buildings to the east. The Bradley Landfill is located to the southeast of the disposal site. Access to the Boulevard Pit is found through Branford Street. Branford Street is the major road fronting the project site to the east and allows access to the I-5 Freeway. The site is operated by the Vulcan Materials. The Hours of Operation are between 6AM to 8PM Monday to Saturday.

As identified, the sediment removed may be transported to the disposal sites through twenty-six (26) proposed haul routes. The proposed haul routes are outlined below:

Devil's Gate Dam & Reservoir Area

1.	Haul Route 1A	-Exit the WB I-210 Freeway at Berkshire Place. -Turn right onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the EB I-210 Freeway at Berkshire Place.
2.	Haul Route 1B	-Exit the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn right onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
3.	Haul Route 1C	-Exit the WB I-210 Freeway at Berkshire Place. -Turn right onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
4.	Haul Route 1D	-Exit the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn right onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the EB I-210 Freeway at Berkshire Place.
5.	Haul Route 1E	-Exit the EB I-210 Freeway at Berkshire Place. -Turn left onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the WB I-210 Freeway at Berkshire Place.
6.	Haul Route 1F	-Exit the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn left onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
7.	Haul Route 1G	-Exit the EB I-210 Freeway at Berkshire Place. -Turn left onto EB Berkshire Place and then right onto SB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn left onto SB Oak Grove Drive and then right onto WB Windsor Ave. -Enter the WB I-210 Freeway at Windsor Avenue/Arroyo Blvd.
8.	Haul Route 1H	-Exit the EB I-210 Freeway at Windsor Avenue/Arroyo Blvd. -Turn left onto EB Windsor Ave and then left onto NB Oak Grove Drive. -Enter and exit the project site on Oak Grove Drive. -Turn right onto NB Oak Grove Drive and then left onto WB Berkshire Place. -Enter the WB I-210 Freeway at Berkshire Place.

Manning's Pit Area

9.	Haul Route 2A	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue. -Enter and exit the disposal sites on Vincent Avenue. -Turn left onto NB Vincent Ave and then left onto WB Gladstone Street. -Turn right onto NB Irwindale Ave. -Enter the WB I-210 Freeway at Irwindale Avenue.
10.	Haul Route 2B	-Exit the EB I-210 Freeway at Irwindale Ave. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street and then right onto SB Vincent Avenue. -Enter and exit the disposal site on Vincent Avenue. -Turn left onto NB Vincent Ave. -Turn right onto EB Arrow Hwy then left onto NB Azusa Avenue. -Turn right onto EB First Street. -Enter the WB I-210 Freeway at First Street.

Waste Management Area

11.	Haul Route 3	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn right onto SB Irwindale Ave. -Turn left onto EB Gladstone Street. -Enter and exit the disposal site on Gladstone Street. -Turn right onto WB Gladstone Street. -Turn right onto NB Irwindale Ave. -Enter the WB I-210 Freeway at Irwindale Avenue.

Vulcan Materials - Irwindale Site Area

26.	Haul Route 9	-Exit the EB I-210 Freeway at Irwindale Avenue. -Turn left onto NB Irwindale Ave. -Enter and exit the disposal site at the intersection of Irwindale Ave and Foothill Blvd. -Enter the WB I-210 Freeway at Irwindale Avenue.

Scholl Canyon Landfill Area

12.	Haul Route 4A	-Exit the WB SR-134 Freeway at Figueroa Street. -Turn right onto NB Scholl Canyon Rd. -Enter and exit the disposal site on Scholl Canyon Road. -Turn right onto SB Scholl Canyon Rd. -Enter the EB SR-134 Freeway at Figueroa Street.
13.	Haul Route 4B	-Exit the EB SR-134 Freeway at Figueroa Street. -Turn right onto NB Figueroa Street. -Enter and exit the disposal site on Scholl Canyon Road. -Turn right onto SB Scholl Canyon Rd. -Enter the WB SR-134 Freeway at Figueroa Street.

Sheldon Pit Area

14.	Haul Route 5A	-Exit the WB I-210 Freeway at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn left onto EB Sheldon Street. -Enter and exit the disposal site on Sheldon Street. -Turn right onto WB Sheldon Street. -Turn right onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Freeway at the Osborne Street/Foothill Blvd interchange.
15.	Haul Route 5B	-Exit the NB I-5 Freeway at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Enter and exit the disposal site on Sheldon Street. -Turn right onto WB Sheldon Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
16.	Haul Route 5C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Enter and exit the disposal site on Sheldon Street. -Turn left onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) Area

17.	Haul Route 6A	-Exit the WB I-210 Fwy at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn left onto EB Sheldon Street. -Enter the disposal site on Sheldon Street. -Exit the dump site on Glenoaks Blvd. -Turn right onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Fwy at the Osborne Street/Foothill Blvd interchange.
18.	Haul Route 6B	-Exit the NB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Enter the disposal site on Sheldon Street. -Exit the dump site on Glenoaks Blvd. -Turn left onto SB Glenoaks Blvd -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
19.	Haul Route 6C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Enter the disposal site on Sheldon Street. -Exit the dump site on Glenoaks Blvd. -Turn right onto NB Glenoaks Blvd -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange.

Bradley Landfill Area

20.	Haul Route 7A	-Exit the WB I-210 Fwy at the Osborne Street/Foothill Blvd interchange. -Turn left onto WB Foothill Blvd and then left onto WB Osborne Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Osborne Street and then right onto EB Foothill Blvd. -Enter the EB I-210 Fwy at the Osborne Street/Foothill Blvd interchange.
21.	Haul Route 7B	-Exit the NB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange. -Turn right onto EB Roscoe Blvd. -Turn left onto NB Glenoaks Blvd. -Turn left onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn right onto SB Glenoaks Blvd. -Turn right onto WB Roscoe Blvd. -Enter the SB I-5 Fwy at the Glenoaks Blvd/Roscoe Blvd interchange.
22.	Haul Route 7C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave. -Turn right onto EB Foothill Blvd. -Turn right onto WB Wentworth Street. -Turn left onto SB Glenoaks Blvd. -Turn right onto WB Peoria Street. -Enter and exit the disposal site on Peoria Street. -Turn left onto EB Peoria Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd. -Turn left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange.

Boulevard Pit Area

23.	Haul Route 8A	-Exit the NB I-5 Fwy at Branford Street. -Turn right onto EB Branford Street. -Enter and exit the disposal site on Branford Street. -Turn left onto WB Branford Street. -Enter the SB I-5 Fwy at Branford Street.
24.	Haul Route 8B	-Exit the SB I-5 Fwy at Osborne Street. -Turn left onto EB Osborne Street. -Turn right onto SB Laurel Canyon Blvd. -Turn left onto EB Branford Street. -Enter and exit the disposal site on Branford Street. -Turn left onto WB Branford Street. -Turn right onto NB Laurel Canyon Blvd. -Turn left onto WB Osborne Street. -Enter the NB I-5 Fwy at Osborne Street.
25.	Haul Route 8C	-Exit the WB I-210 Fwy at the Wheatland Ave interchange. -Turn right onto NB Wheatland Ave then right onto EB Foothill Blvd. -Turn right onto Wentworth Street. -Turn left onto Glenoaks Blvd. -Turn right onto Tuxford Street then right onto San Fernando Road. -Turn left onto Branford Street. -Enter and exit the disposal site on Branford Street. -Turn right onto EB Branford Street. -Turn right onto San Fernando Rd then left on to Tuxford Street. -Turn left onto NB Glenoaks Blvd. -Turn right onto EB Sheldon Street. -Turn left onto WB Foothill Blvd then left onto SB Wheatland Ave. -Enter the EB I-210 Fwy at the Wheatland Ave interchange

The haul routes listed above consist of the following roadways:

Local and Major Roadways:

Devils Gate Dam Area (Site 1)

Oak Grove Drive is a north-south four-lane arterial road with a striped median to the north of the Foothill Freeway Overpass and a raised median to the south. The roadway provides two travel lanes in each direction and a bike lane in each direction. Oak Grove Drive provides direct access to the project site and freeway access from the project site through the intersections of Berkshire Place and Windsor Avenue. On-street parking is not permitted along Oak Grove Drive. Pavement conditions range from fair to poor conditions.

Berkshire Place is a west-east four-lane collector road with two travel lanes in each direction, a bike lane in each direction, and a striped two way left turn lane median. The road provides access to the I-210 Freeway to the residential neighborhoods to the north and west of the project site. On-street parking is not permitted along Berkshire Place. Pavement conditions range from good to fair conditions.

Windsor Avenue is a north-south four lane arterial road with two travel lanes in each direction, one bike lane on the southbound side, and a striped two way left turn lane median. Windsor Avenue provides regional access within the City of Pasadena and access to the I-210 Freeway. On-street parking is not permitted along the west side and some street parking is allowed on the east side of the roadway. Pavement conditions range from good to fair conditions.

Waste Management (Site 2), Manning's Pit (Site 3), and Vulcan Material (Site 9) Area

Foothill Boulevard is an east-west four lane arterial road with two travel lanes in each direction, and a striped or raised median. Foothill Boulevard (Route 66) generally follows the alignment of the I-210 freeway. Pavement conditions range from good to fair conditions.

Irwindale Avenue is a north-south four lane arterial road with two travel lanes in each direction that has a raised median to the north of First Street and a striped two way left turn lane median between First Street and Gladstone Street. Irwindale Ave provides regional access within the City of Azusa and Irwindale and local access to the I-210 Freeway and I-10 Freeway. On-street parking is generally permitted on both sides of the roadway between First Street and Gladstone Street. Pavement conditions range from good to fair conditions.

Gladstone Street is a west-east four lane collector street with two travel lanes in each direction and a striped two way left turn lane median. Gladstone Street provides regional access within the City of Azusa and access to the I-210 Freeway. On-street parking is permitted along some segments of the roadway, but these areas are not adjacent. Pavement conditions range from good to fair conditions.

Vincent Avenue is a north-south four lane collector road with two travel lanes in each direction and a striped two way left turn lane median along certain sections of the roadway. Vincent Ave provides regional access within the City of Azusa and Irwindale. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side. Pavement conditions range from fair to poor conditions.

Arrow Highway is a west-east four lane arterial highway with two travel lanes in each direction and a striped two way left turn lane median. Arrow Highway serves as an alternative to the I-210 Freeway by providing access from the San Bernardino, Rancho Cucamonga, and San Dimas areas to the City of Azusa, Covina, and Irwindale. It also provides regional access within the City of Azusa, Covina, and Irwindale as well as access to the I-605 and SR-57 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

Azusa Avenue (SR-39) is a north-south divided four lane arterial highway with two travel lanes in each direction and a raised median. Azusa Avenue (SR-39) provides access from the City of Azusa and Covina to Orange County. It also provides regional access to the I-210 Freeway and I-10 Freeway. On-street parking is generally permitted along some segments of the roadway. Pavement conditions range from good to fair conditions.

First Street is a west-east four lane collector road with two travel lanes in each direction with a striped median. It provides regional access within the City of Azusa and access to the westbound I-210 Freeway. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Scholl Canyon Landfill Area (Site 4)

Figueroa Street is a north-south four lane arterial road with two travel lanes in each direction and a striped median. It provides access from the City of Los Angeles to the Eagle Rock area. It also provides regional access to the SR-134 Freeway. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side. Pavement conditions range from fair to poor conditions.

Scholl Canyon Road is a west-east two lane collector road with one travel lane in each direction and a striped median. Scholl Canyon Road provides access to the Scholl Canyon Landfill. On-street parking is generally permitted along both sides of the roadway. Pavement conditions are poor.

Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Sites 8)

Foothill Blvd is a north-south four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a striped two way left turn lane median. It provides access from La Cañada Flintridge area to the San Fernando Valley area. It also provides regional access to the I-210 Freeway. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Osborne Street is a west-east four lane collector road with two travel lanes in each direction and a striped two way left turn lane median. Osborne Street provides local access to the I-210 Freeway and I-5 Freeway. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

Branford Street is a west-east collector road with four lanes in some sections and three lanes in other sections and a striped two way left turn lane median. Branford Street provides access to the I-5 Freeway. Pavement conditions range from good to fair conditions.

Glenoaks Blvd is a north-south four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles and Burbank. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from fair to poor conditions.

Sheldon Street is west-east four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a two way left turn lane. Sheldon Street provides local access to the I-5 Freeway and the Sun Valley and Sheldon Pits. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Laurel Canyon Blvd is a north-south four lane arterial road with two travel lanes in each direction and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along both sides of the roadway. Pavement conditions range from good to fair conditions.

San Fernando Road is a north-south four lane arterial road with two travel lanes in each direction and a striped two way left turn lane median. It provides access from the City of San Fernando to the City of Los Angeles and Burbank. It also provides regional access to the SR-118 and I-5 Freeways. On-street parking is generally permitted along the west side of the roadway and prohibited on the east side of the roadway. Pavement conditions range from good to fair conditions.

Wheatland Avenue is north-south two lane collector road with one travel lane in each direction and a striped median. Wheatland Avenue provides the Sunland community access to the I-210 Freeway. On-street parking is generally allowed along both sides of the roadway. Pavement conditions range from fair to poor conditions.

Wentworth Street is west-east four lane arterial road with two travel lanes in each direction, a striped bike lane in each direction, and a two way left turn lane. Wentworth Street provides local access to the Sunland area. On-street parking is generally prohibited along both sides of the roadway. Pavement conditions range from good to fair conditions.

Tuxford Street is west-east four lane collector road with two travel lanes in each direction and a two way left turn lane. Tuxford Street provides local access to the I-5 Freeway. On-street parking is generally allowed along both sides of the roadway. Pavement conditions range from good to fair conditions.

Peoria Street is west-east two lane local road with one travel lanes in each direction. Peoria Street provides access Bradley Landfill. On-street parking is generally allowed along the both sides of the roadway. Pavement conditions range from fair to poor conditions.

Existing Intersections

Based on our review of the proposed truck trips and distribution of the truck trips, we recommended that fifty-two (52) intersections in the study area be analyzed:

1.) Berkshire Place and I-210 Freeway Eastbound Ramps (La Cañada Flintridge/Caltrans)
2.) Berkshire Place and I-210 Freeway Westbound Ramps (La Cañada Flintridge/Caltrans)
3.) Oak Grove Drive and Berkshire Place (Pasadena)
4.) Oak Grove Drive and Foothill Freeway Overpass (La Cañada Flintridge)
5.) Windsor Ave and Oak Grove Drive/Woodbury Rd (Altadena/Los Angeles County)
6.) Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps (Los Angeles County /Caltrans)
7.) Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps (Pasadena/Caltrans)
8.) Irwindale Ave and I-210 Freeway Westbound Ramps (Caltrans, Irwindale)
9.) Irwindale Ave and I-210 Freeway Eastbound Ramps (Caltrans, Irwindale)
10.) Irwindale Ave and First Street (Irwindale/Azusa)
11.) Irwindale Ave and Gladstone Street (Irwindale/Azusa)
12.) Vincent Ave and Gladstone Street (Azusa)
13.) Vincent Ave and Arrow Hwy (Irwindale/Azusa/Los Angeles County)
14.) Arrow Hwy and Lark Ellen Ave (County of Los Angeles)
15.) Arrow Hwy and Enid Ave (County of Los Angeles)
16.) Azusa Ave and Arrow Hwy (Azusa/Covina/Los Angeles County)
17.) Azusa Ave and Gladstone Street (Azusa/Los Angeles County)

18.) Azusa Ave and I-210 Freeway Eastbound Ramps (Caltrans/ Azusa)
19.) Azusa Ave and First Street (Azusa)
20.) First Street and Alameda Street/I-210 Freeway Westbound Ramps (Caltrans, Azusa)
21.) Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps (City of Los Angeles, Caltrans)
22.) Figueroa St and Eagle Vista Drive (City of Los Angeles)
23.) Figueroa St and SR-134 Freeway Eastbound Ramps (City of Los Angeles, Caltrans)
24.) Foothill Blvd and I-210 Westbound Ramps (City of Los Angeles, Caltrans)
25.) Foothill Blvd and I-210 Eastbound Ramps (City of Los Angeles, Caltrans)
26.) Foothill Blvd and Osborne Street (City of Los Angeles)
27.) Glenoaks Blvd and Osborne Street (City of Los Angeles)
28.) Glenoaks Blvd and Montague Street (City of Los Angeles)
29.) Glenoaks Blvd and Branford Street (City of Los Angeles)
30.) Glenoaks Blvd and Sheldon Street (City of Los Angeles)
31.) Glenoaks Blvd and Peoria Street (City of Los Angeles)
32.) Glenoaks Blvd and Tuxford Street (City of Los Angeles)
33.) Glenoaks Blvd and Penroe Street (City of Los Angeles)
34.) Glenoaks Blvd and Sunland Blvd (City of Los Angeles)
35.) Glenoaks Blvd and Roscoe Blvd (City of Los Angeles)
36.) Roscoe Blvd and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)
37.) Roscoe Blvd and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
38.) Branford Street and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
39.) Branford Street and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)
40.) Branford Street and Laurel Canyon Blvd (City of Los Angeles)
41.) Osborne Street and I-5 Freeway Southbound Ramps (City of Los Angeles/Caltrans)
42.) Osborne Street and I-5 Freeway Northbound Ramps (City of Los Angeles/Caltrans)
43.) Osborne Street and Laurel Canyon Blvd (City of Los Angeles)
44.) Wheatland Ave and I-210 Freeway Eastbound Ramps (City of Los Angeles/Caltrans)
45.) Wheatland Ave and I-210 Freeway Westbound Ramps (City of Los Angeles/Caltrans)
46.) Wheatland Ave and Foothill Blvd (City of Los Angeles)
47.) Wentworth Street and Foothill Blvd (City of Los Angeles)
48.) Tuxford Street and San Fernando Road (City of Los Angeles)
49.) Lankershim Blvd and San Fernando Road (City of Los Angeles)
50.) Sheldon Street and San Fernando Road (City of Los Angeles)
51.) Branford Street and San Fernando Road (City of Los Angeles)
52.) Irwindale Avenue and Foothill Boulevard (City of Irwindale)

Freeway Facilities

Interstate 210 Freeway provides regional access within the study area and runs west to east to the east of the SR-134 Freeway interchange and runs north to south to the north of the SR-134 Freeway interchange. To the east of the SR-134 Freeway interchange the I-210 Freeway is an eight-lane freeway with four lanes in each direction and one car pool lane in each direction. To the north of the SR-134 Freeway interchange the I-210 Freeway becomes an eight-lane freeway with four lanes in each direction. This freeway is an interstate facility that provides travel between the San Bernardino, Rancho Cucamonga, and San Dimas areas to the Pasadena and San Fernando areas.

Interstate 5 Freeway provides regional access within the study area and runs north to south connecting Southern California to Northern California. The I-5 Freeway is an eight-lane freeway with four lanes in each direction. This freeway is an interstate facility that provides travel between Los Angeles to Orange and San Diego County and between Los Angeles to Bakersfield, Sacramento, and San Francisco.

State Route 134 Freeway provides regional access within the study area and runs west to east from the I-210 Freeway interchange to the US-101 and SR-170 Freeway interchange in Hollywood. The SR-134 Freeway is an eight-lane freeway with four lanes in each direction and one car pool lane in each direction. This freeway is a state facility that provides travel between the Ventura, Hollywood, and Burbank areas to the Pasadena, San Dimas, and San Bernardino areas.

State Route 2 Freeway provides regional access within the study area and runs north to south from south of the I-5 Freeway interchange in Los Angeles to the I-210 Freeway interchange in La Cañada Flintridge. The SR-2 Freeway is an eight-lane freeway with four lanes in each direction. This freeway is a state facility that provides travel between the La Cañada Flintridge and Glendale areas to the Los Angeles and Hollywood areas.

Existing Freeway and Ramps System

The proposed haul routes must utilize segments of the I-210 and SR-134 freeways as well as several on and off-ramps. An increase in truck traffic along the freeway and ramps can impact the LOS of the freeway and ramps adversely. In order to ensure adequate freeway and ramp operations this study has identified 28 freeway segments and 54 on and off-ramps for analysis. The 28 freeway segments identified for analysis consist of the following:

1.) I-210 Freeway between Windsor Ave/Arroyo Blvd and Berkshire Place.
2.) I-210 Freeway between Lincoln Ave and Windsor Ave/Arroyo Blvd.
3.) I-210 Freeway between the SR-134 Freeway and Mountain Street.
4.) SR-134 Freeway between San Rafael Ave and Figueroa Street.
5.) SR-134 Freeway between the I-210 Freeway and San Rafael Ave.
6.) I-210 Freeway between the SR-134 Freeway and Lake Ave.
7.) I-210 Freeway between the I-605 Freeway and Irwindale Ave.
8.) I-210 Freeway between Irwindale Ave and Azusa Ave.
9.) I-210 Freeway between Berkshire Place and Foothill Blvd.
10.) I-210 Freeway between Angeles Crest Hwy and the SR-2 Freeway (Glendale Freeway)
11.) SR-2 Freeway between the I-210 Freeway and Mountain Street.
12.) SR-2 Freeway between Mountain Street and the SR-134 Freeway.
13.) SR-134 Freeway between the SR-2 Freeway and Figueroa Street.
14.) SR-134 Freeway between the SR-2 Freeway and Glendale Ave.
15.) SR-134 Freeway between the Pacific Ave and Concord Street.
16.) SR-134 Freeway between Concord Street and the I-5 Freeway.
17.) I-5 Freeway between the SR-134 Freeway and Western Ave.
18.) I-5 Freeway between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.
19.) I-5 Freeway between Sheldon Street/Laurel Canyon Blvd and the SR-170 Freeway.
20.) I-5 Freeway between the SR-170 Freeway and Branford Street.
21.) I-210 Freeway between the SR-2 Freeway and Montrose Ave.
22.) I-210 Freeway between Sunland Blvd and Wheatland Ave
23.) I-210 Freeway between Wheatland Ave and Foothill Blvd/Osborne Street.

24.) I-210 Freeway between Foothill Blvd/Osborne Street and the SR-118 Freeway.
25.) SR-118 Freeway between the I-210 Freeway and Glenoaks Blvd.
26.) SR-118 Freeway between San Fernando Rd and the I-5 Freeway.
27.) I-5 Freeway between the SR-118 Freeway and Van Nuys Blvd.
28.) I-5 Freeway between Tierra Bella Street and Osborne Street.

The 54 on and off-ramps on-ramps and off-ramps identified for analysis consists of the following:

1.) Berkshire Place and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
2.) Berkshire Place and the Westbound I-210 Freeway On-ramp.*(Merge Point)*
3.) Berkshire Place and the Eastbound I-210 Freeway On-ramp. *(Merge Point)*
4.) Berkshire Place and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*
5.) Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
6.) Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. *(Merge Point)*
7.) Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. *(Merge Point)*
8.) Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. *(Diverge Point)*
9.) Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline and Eastbound I-210 Freeway mainline. *(Diverge Point)*
10.) Westbound I-210 Freeway and Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Merge Point)*
11.) Southbound I-210 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*
12.) Eastbound SR-134 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*
13.) Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. *(Diverge Point)*
14.) Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. *(Merge Point)*
15.) Southbound I-210 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
16.) Westbound I-210 Freeway Transition Ramp to the Northbound I-210 Freeway mainline. *(Diverge Point)*
17.) Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. *(Diverge Point)*
18.) Irwindale Ave and the Westbound loop I-210 Freeway On-ramp. *(Merge Point)*
19.) Irwindale Ave and the Westbound slip I-210 Freeway On-ramp. *(Merge Point)*
20.) First Street/Alameda Street and the Westbound I-210 Freeway On-ramp. *(Merge Point)*
21.) Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. *(Diverge Point)*
22.) Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
23.) Westbound I-210 Freeway Transition Ramp to the Southbound SR-2 Freeway mainline. *(Merge Point)*
24.) Northbound SR-2 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Diverge Point)*
25.) Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*
26.) Westbound and Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Merge Point)*
27.) Southbound SR-2 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*

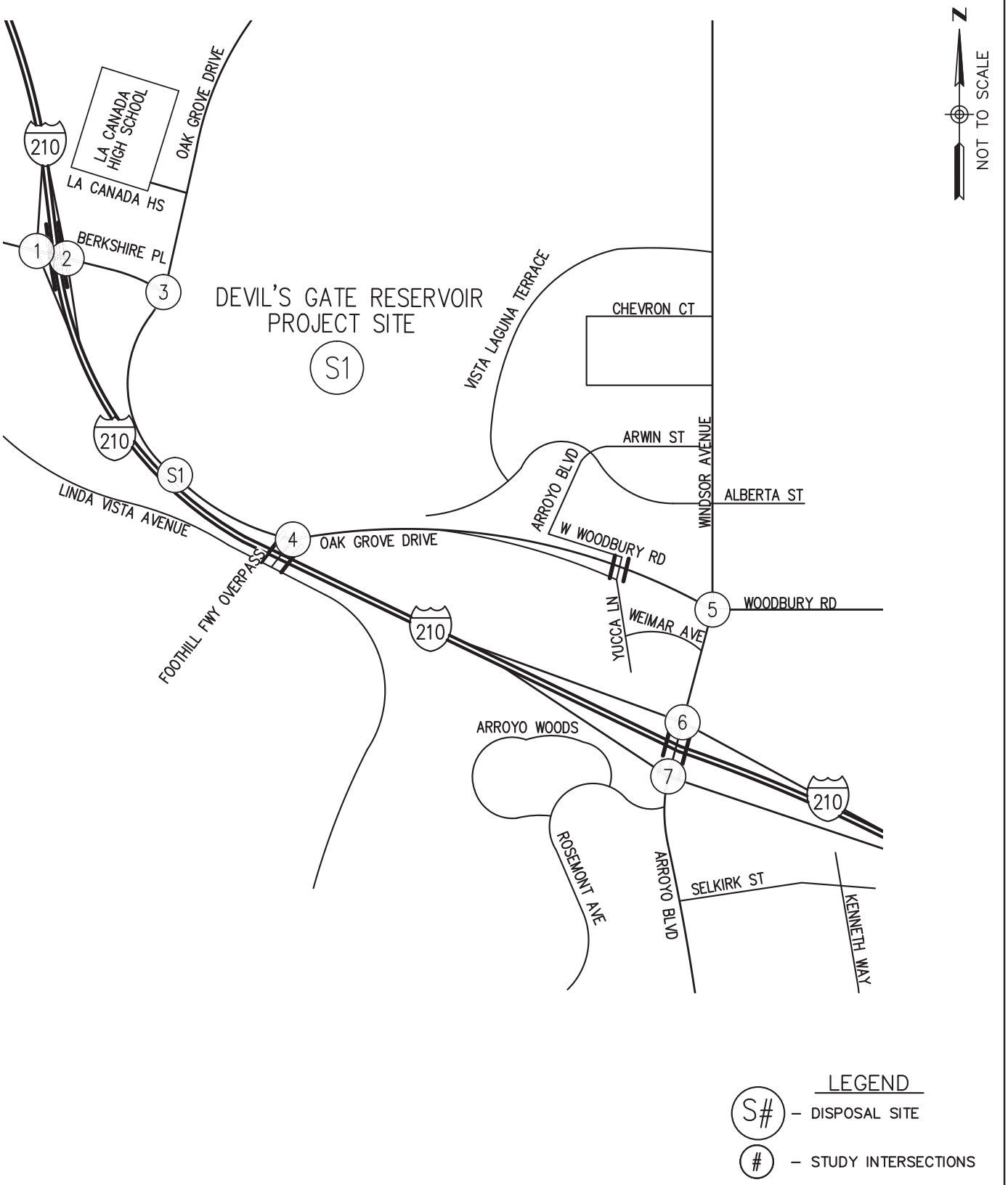
28.) Westbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*
29.) Figueroa Street and the Eastbound SR-134 Freeway Off-ramp. *(Diverge Point)*
30.) Figueroa Street and the Westbound SR-134 Freeway On-ramp. *(Merge Point)*
31.) Southbound SR-2 Freeway Transition Ramp to the Westbound SR-134 Freeway mainline. *(Merge Point)*
32.) Eastbound SR-134 Freeway Transition Ramp to the Northbound SR-2 Freeway mainline. *(Diverge Point)*
33.) Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Diverge Point)*
34.) Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Merge Point)*
35.) Westbound SR-134 Freeway Transition Ramp to the Northbound I-5 Freeway mainline. *(Merge Point)*
36.) Southbound I-5 Freeway Transition Ramp to the Eastbound SR-134 Freeway mainline. *(Diverge Point)*
37.) Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
38.) Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*
39.) Branford Street and the Southbound I-5 Freeway mainline On-ramp. *(Merge Point)*
40.) Branford Street and the Northbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
41.) Wheatland Ave and the Westbound I-210 Freeway mainline Off-ramp. *(Diverge Point)*
42.) Wheatland Avenue and the Eastbound I-210 Freeway mainline On-ramp. *(Merge Point)*
43.) Foothill Blvd/Osborne Street and the Westbound I-210 Freeway mainline Off-ramp. *(Diverge Point)*
44.) Foothill Blvd/Osborne Street and the Eastbound I-210 Freeway mainline On-ramp. *(Merge Point)*
45.) Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Diverge Point)*
46.) Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Merge Point)*
47.) Westbound I-210 Freeway Transition Ramp to the Westbound SR-118 Freeway mainline. *(Merge Point)*
48.) Eastbound SR-118 Freeway Transition Ramp to the Eastbound I-210 Freeway mainline. *(Diverge Point)*
49.) Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. *(Diverge Point)*
50.) Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline. *(Merge Point)*
51.) Westbound SR-118 Freeway Transition Ramp to the Southbound I-5 Freeway mainline. *(Merge Point)*
52.) Northbound I-5 Freeway Transition Ramp to the Eastbound SR-118 Freeway mainline *(Diverge Point)*
53.) Osborne Street and the Southbound I-5 Freeway mainline Off-ramp. *(Diverge Point)*
54.) Osborne Street and the Northbound I-5 Freeway mainline On-ramp. *(Merge Point)*

Existing Intersection Level of Service

Intersection capacity analyses were conducted for the fifty-two (52) existing study intersections utilizing the methods as discussed previously. The resulting LOS for the existing conditions of each intersection analyzed is presented in *Table 3-1-1* through *Table 3-4-12*, Sites 1 through Site 9. The LOS of both the HCM and ICU methods are presented.

Section 1: Devil's Gate Dam and Reservoir (Site 1)

The Devil's Gate Dam and Reservoir site consists of eight (8) proposed Haul Routes labeled 1A-1H. These routes will provide access from the Devil's Gate Dam and Reservoir to the proposed Disposal Sites. The Devil's Gate Dam and Reservoir site is illustrated in *Figure 3-1-1*, providing study intersections utilized. Proposed Haul Routes 1A through 1H are is illustrated in *Figure 3-1-2 through Figure 3-1-9.* The previously outlined intersection utilization is provided in the Route figures, outlining the Haul Truck turn movements for individual proposed routes. Existing AM (7-9), MID-DAY (12-2), MID-DAY (2-4), and PM (4-6) turn movement volumes, for proposed Haul Routes 1A through 1H, are provided in *Figure 3-1-10.* The existing geometrics are illustrated in *Figure 3-1-11.*



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DEVIL'S GATE RESERVOIR VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-1-1

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-1.dwg
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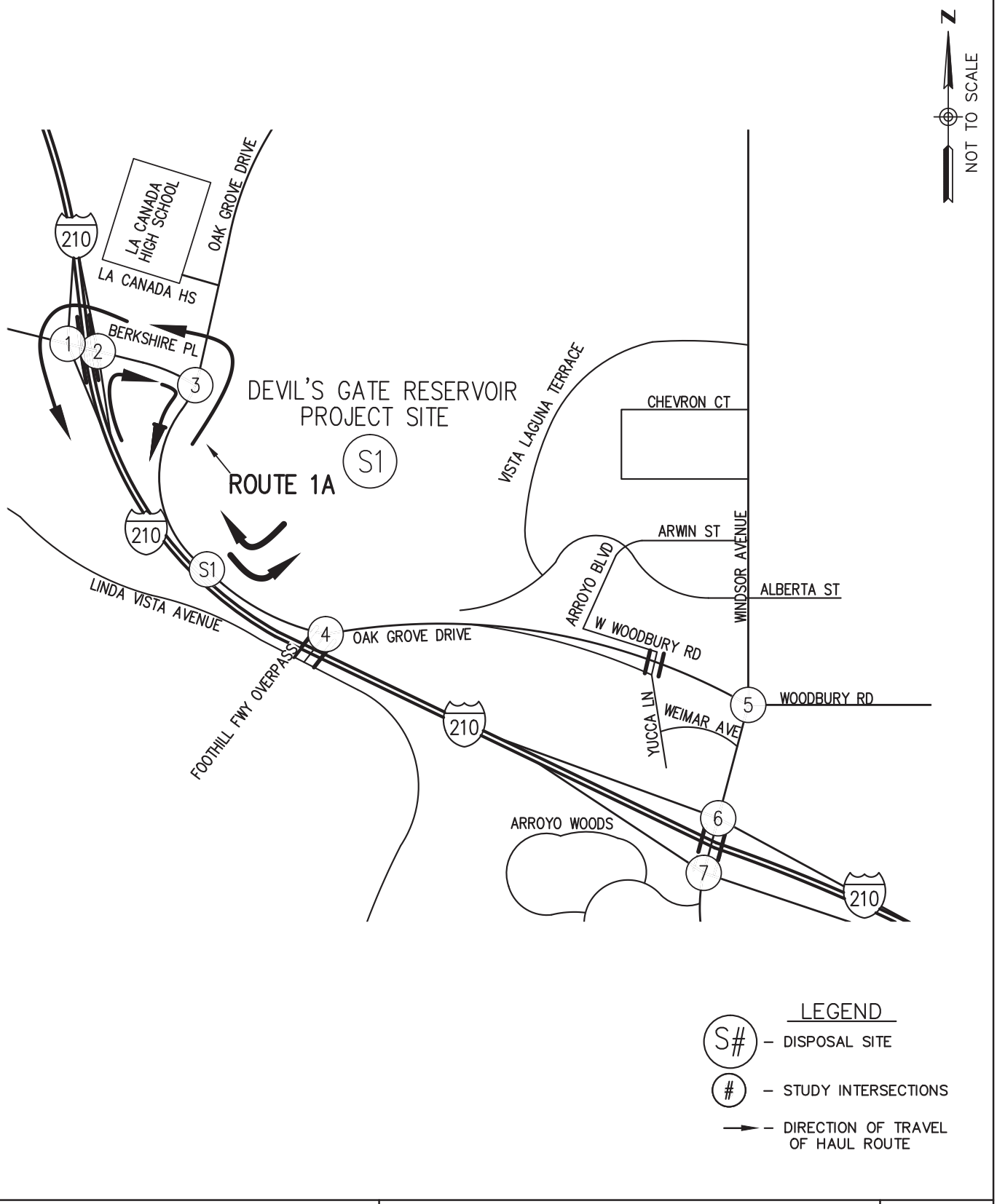

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HAUL ROUTE 1A

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-1-2

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-2.dwg
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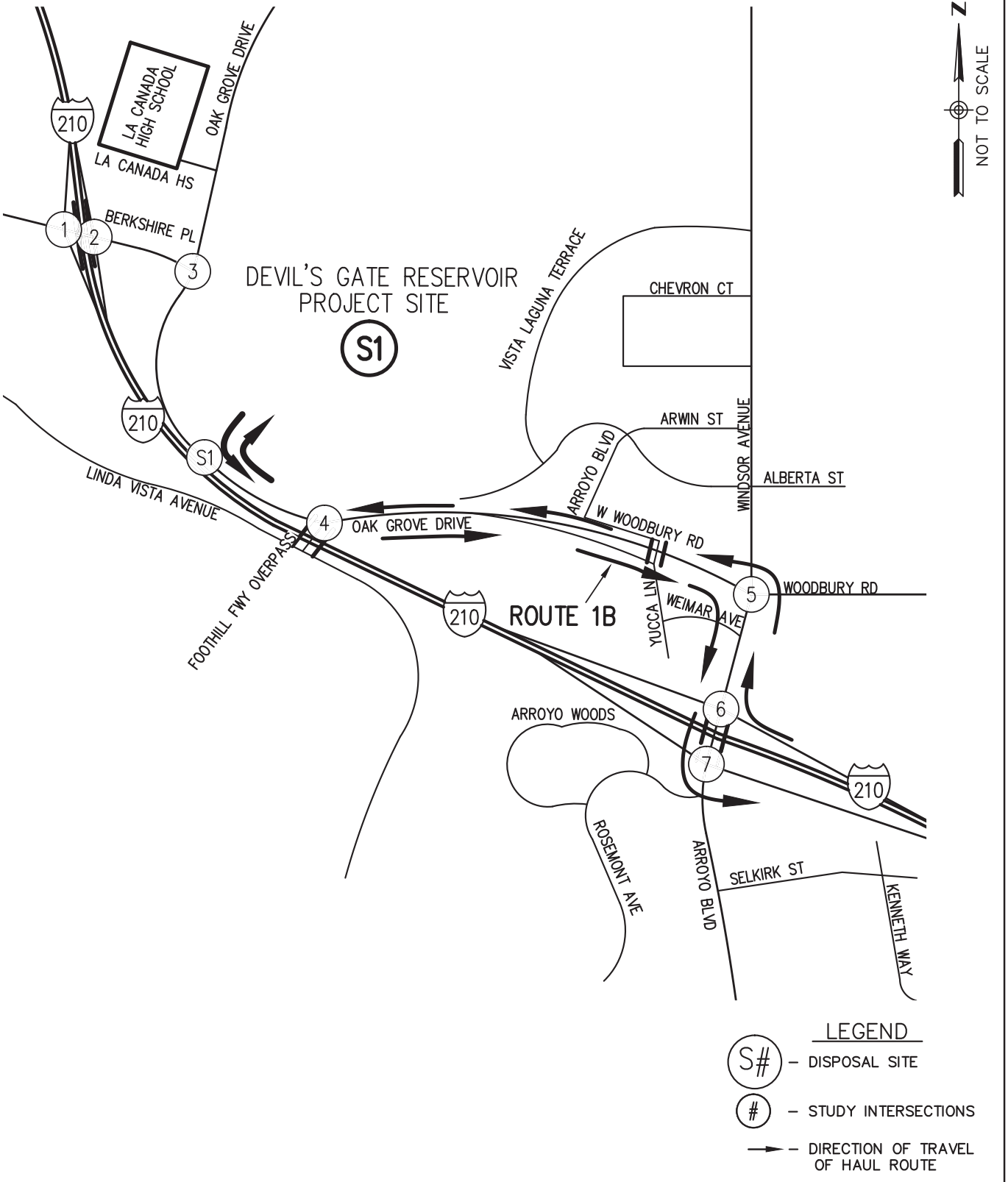

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HAUL ROUTE 1B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-3.dwg
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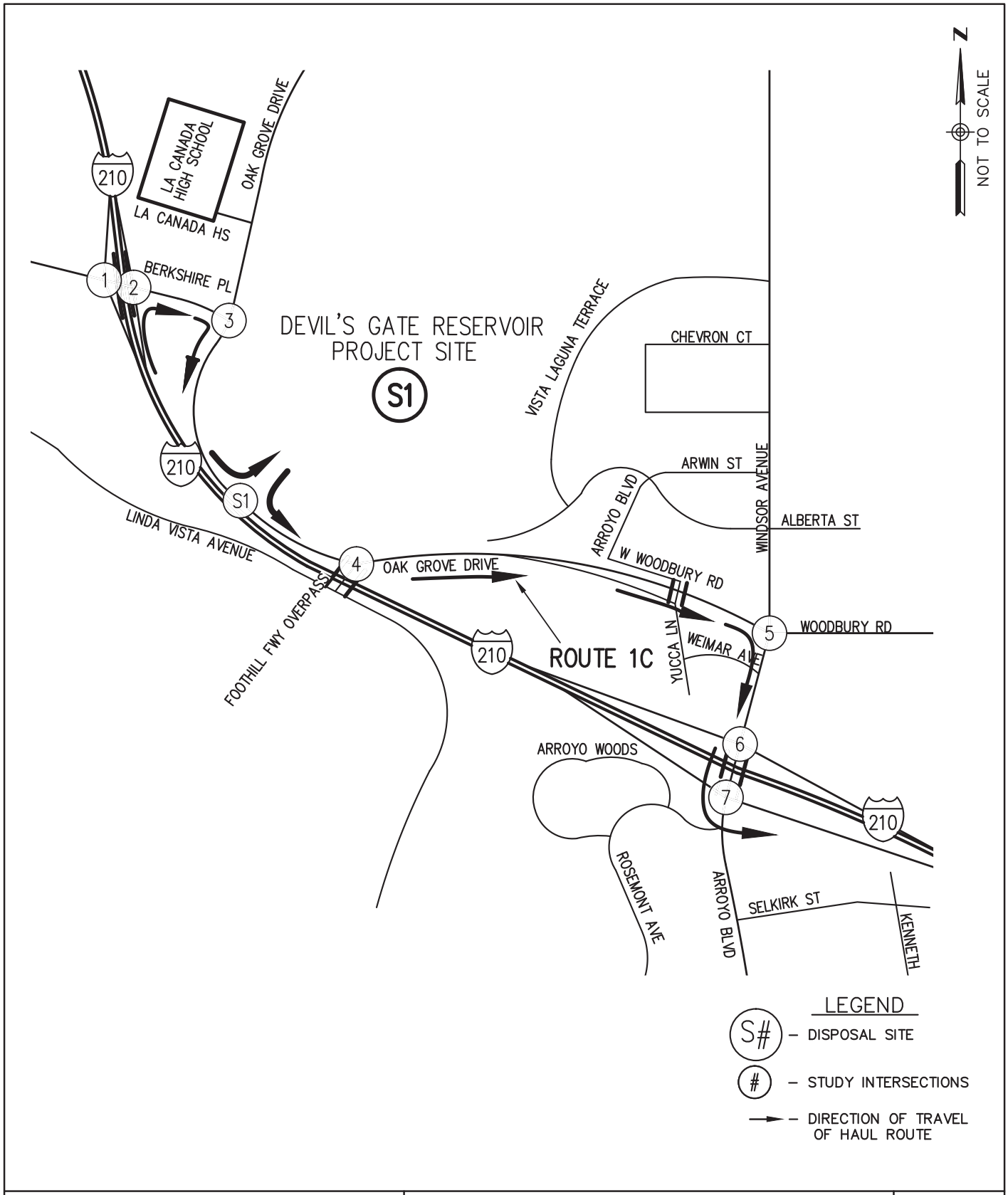

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HAUL ROUTE 1C

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-4

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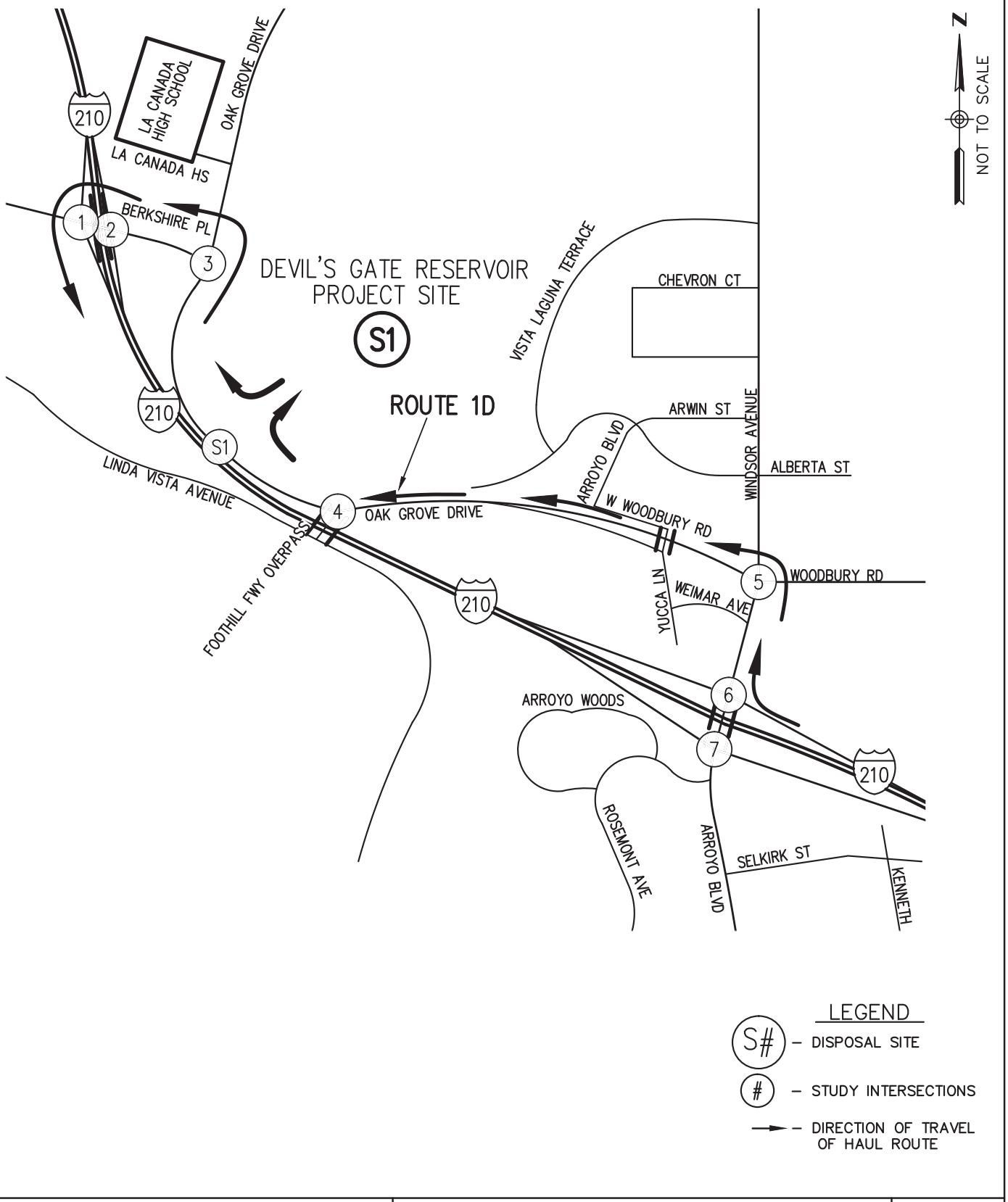

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HAUL ROUTE 1D

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-5

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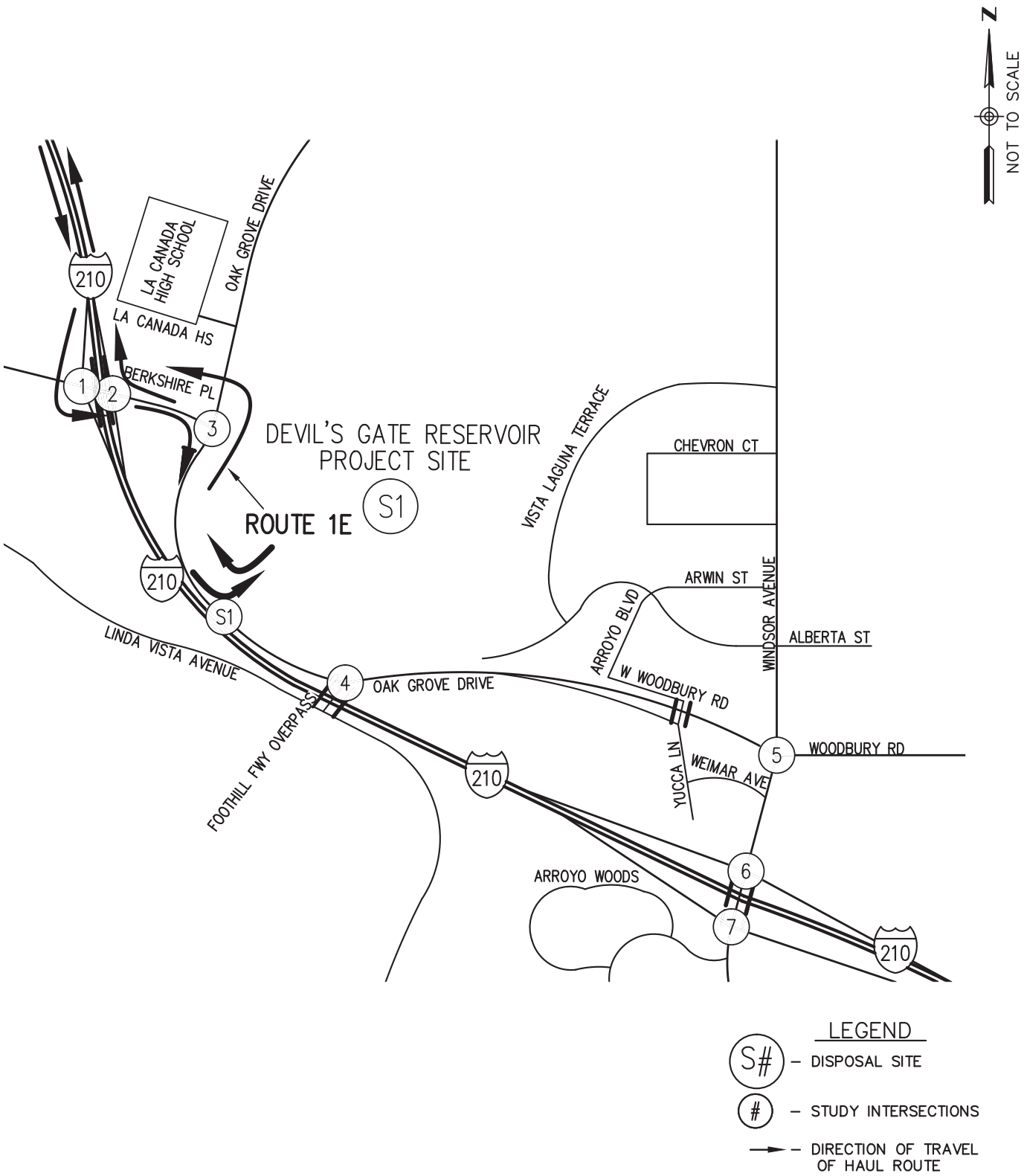

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HAUL ROUTE 1E

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-6

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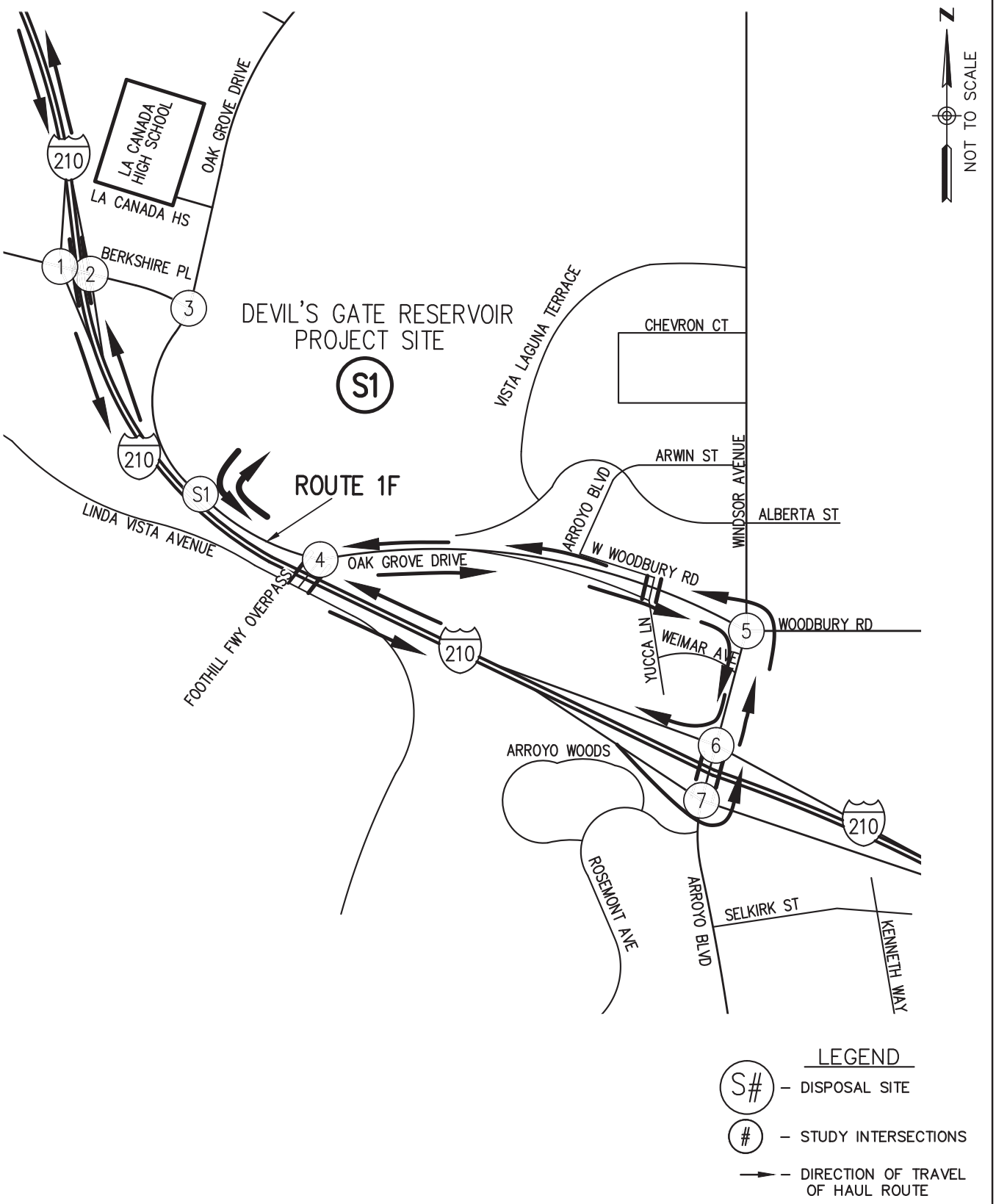

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HAUL ROUTE 1F

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-1-7

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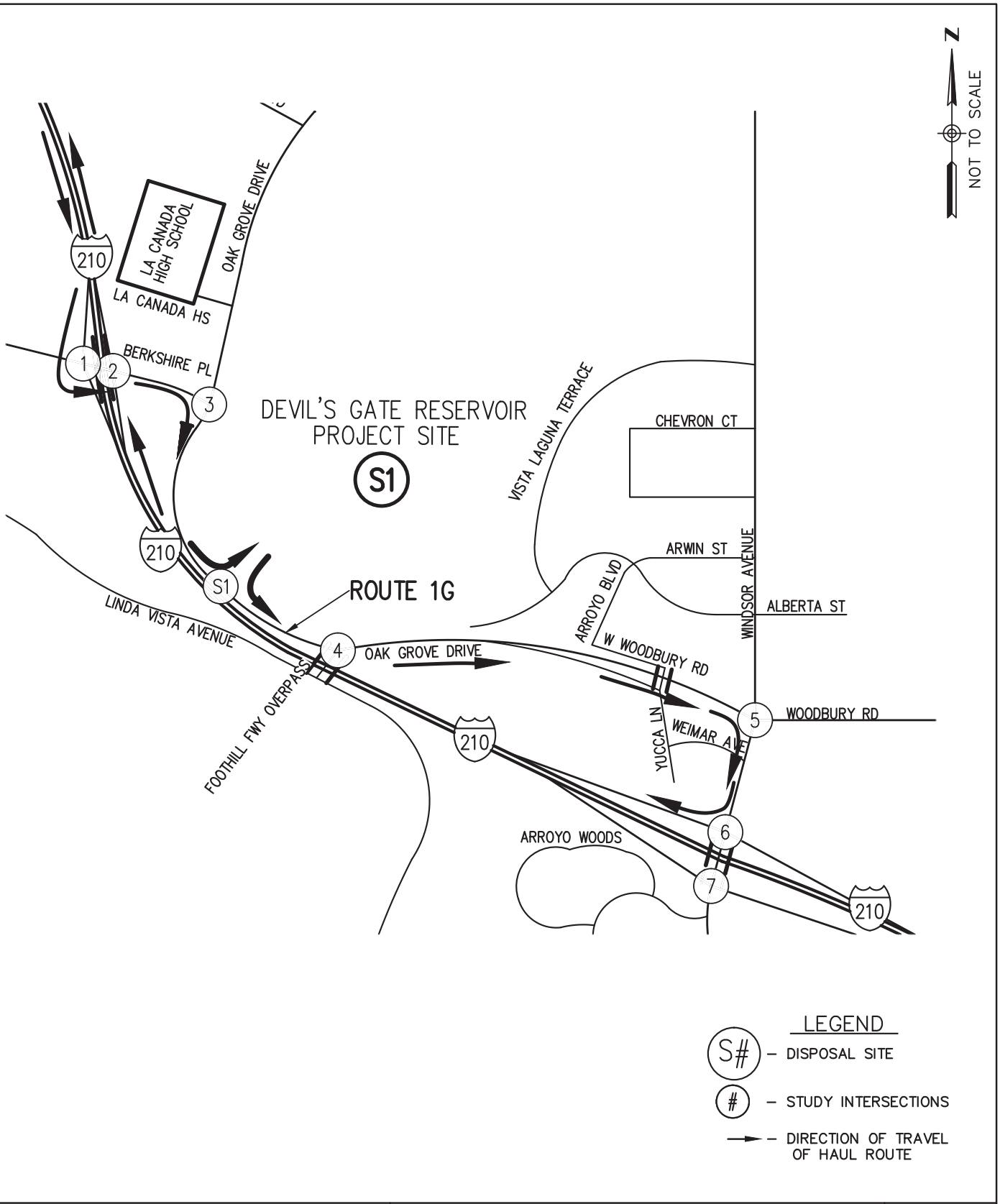

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HAUL ROUTE 1G

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-8

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-8.dwg
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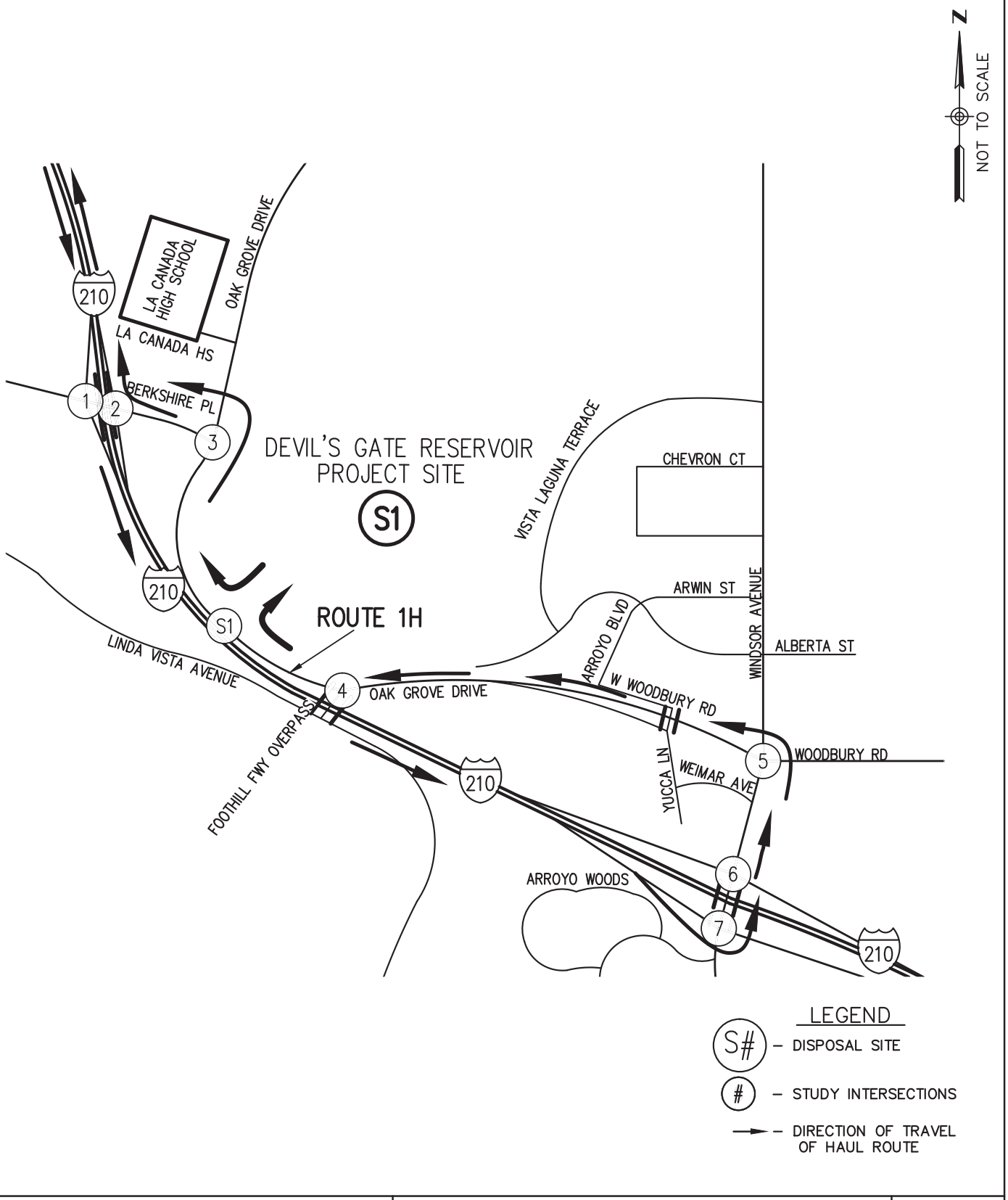

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HAUL ROUTE 1H

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-1-9

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N/S STREET					1			E/W STREET			
I-210 FWY EB RAMPS								BERKSHIRE PLACE			
					85	5	325				
					45	5	105				
					60	5	205				
					90	5	165				
0	0	0	0						0	0	0	0
250	100	125	80		TS				120	110	165	160
125	55	80	70						140	80	205	335
					0	0	0				
					0	0	0				
					0	0	0				
					0	0	0				

N/S STREET					2			E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
					0	0	0				
					0	0	0				
					0	0	0				
					0	0	0				
95	50	50	65						255	170	170	410
285	175	175	180		TS				190	110	110	405
0	0	0	0						0	0	0	0
					60	5	275				
					55	5	70				
					65	5	115				
					95	5	80				

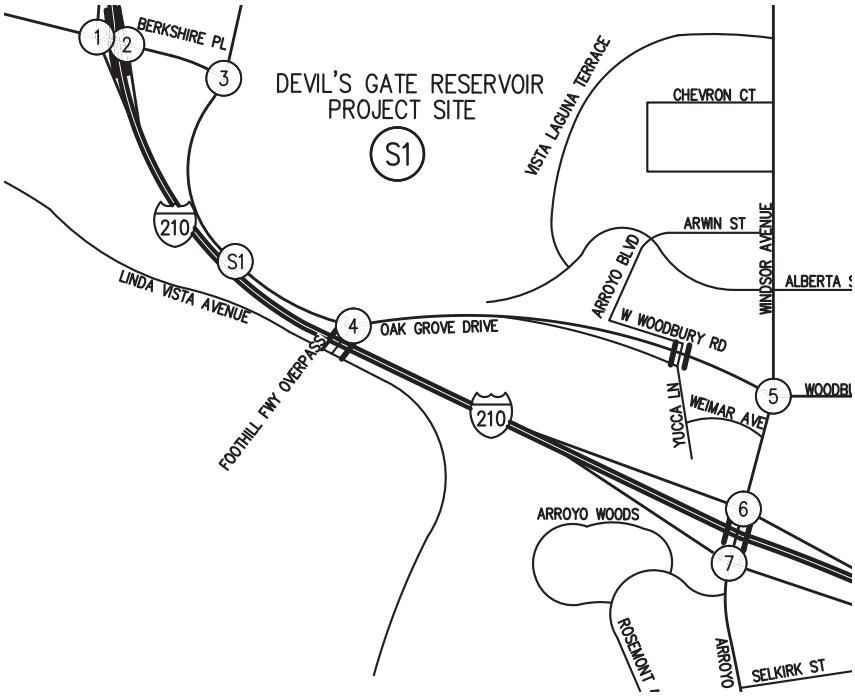
N/S STREET					3			E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
					360	70	0				
					215	100	0				
					745	140	0				
					750	245	0				
510	150	330	185						0	0	0	0
0	0	0	0		TS				0	0	0	0
70	60	45	85						0	0	0	0
					140	450	0				
					65	135	0				
					75	95	0				
					65	150	0				

N/S STREET					4			E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
					0	0	0				
					0	0	0				
					0	0	0				
					0	0	0				
0	0	0	0						0	0	0	0
115	105	140	265						465	170	125	130
50	65	60	80						180	60	40	60
					125	0	95				
					55	0	60				
					60	0	65				
					70	0	60				

N/S STREET					5			E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
					35	590	55				
					10	300	40				
					20	340	40				
					5	525	60				
20	25	20	40						45	35	30	50
105	140	140	240		TS				425	160	110	155
40	15	30	25						555	300	350	440
					70	605	455				
					30	290	365				
					20	355	435				
					25	495	570				

N/S STREET					6			E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
					530	585	0				
					280	370	0				
					275	435	0				
					445	550	0				
0	0	0	0						570	275	335	405
0	0	0	0		TS				5	5	5	5
0	0	0	0						5	20	20	25
					40	555	0				
					45	420	0				
					45	500	0				
					100	690	0				

N/S STREET					7			E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
					0	190	415				
					0	100	295				
					0	160	280				
					0	165	415				
550	320	370	595						0	0	0	0
5	5	5	5		TS				0	0	0	0
105	55	50	105						0	0	0	0
					0	130	20				
					0	145	15				
					0	160	15				
					0	195	15				



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N/S STREET					#			E/W STREET			
					7AM-9AM						
					12PM-2PM						
					2PM-4PM						
					4PM-6PM						
7AM - 9AM	12 PM - 2 PM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	12 PM - 2 PM	2PM - 4PM	4PM - 6PM
					7AM-9AM						
					12PM-2PM						
					2PM-4PM						
					4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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DEVILS GATE RESERVOIR AREA EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-1-10

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3-1-10.dwg
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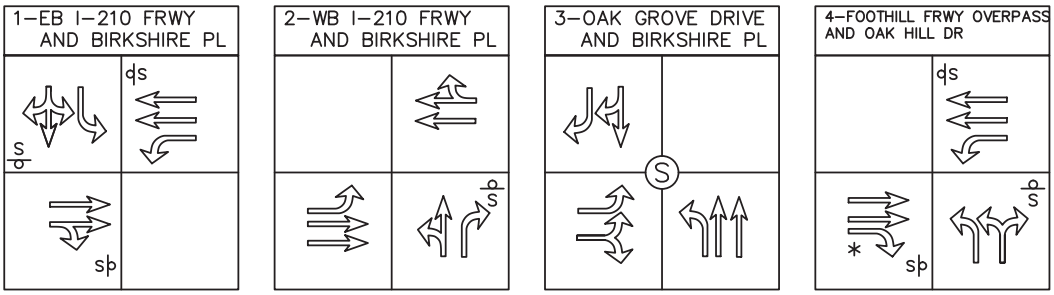

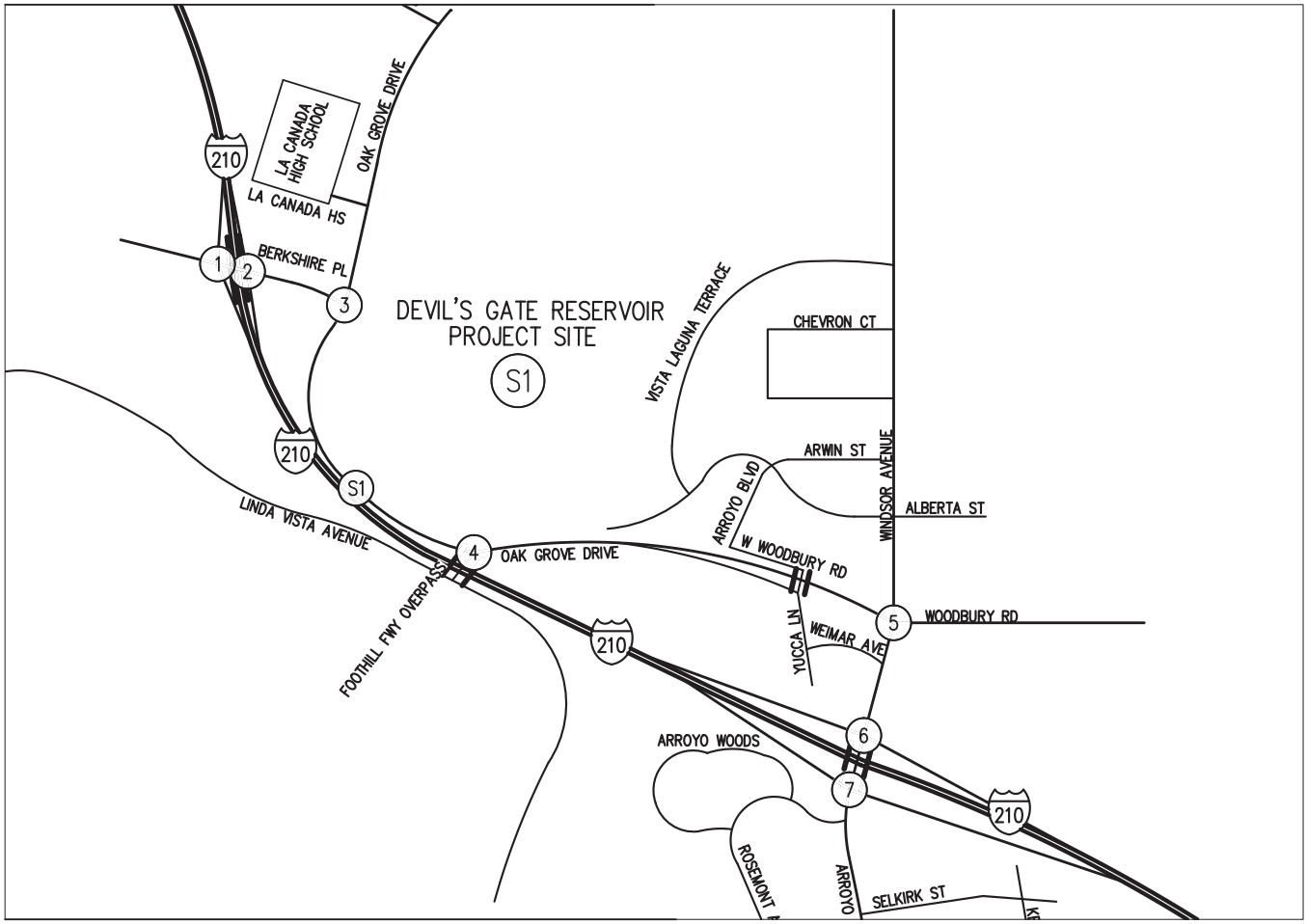

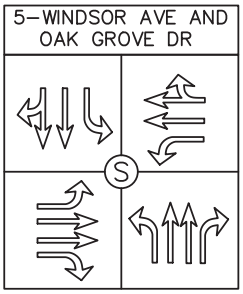

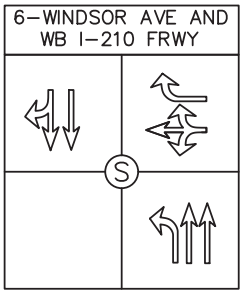

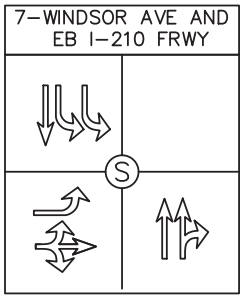

LEGEND

- # – STUDY INTERSECTIONS
- S – SIGNALIZED INTERSECTION
- p/s – UNSIGNALIZED INTERSECTION
- * – FREE RIGHT TURN
- ⇐ – EXISTING GEOMETRIC

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DEVILS GATE RESERVOIR AREA EXISTING GEOMETRICS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–1–11

Drawing Name: V:\110264\Eng\110264–000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 1\FIG 3–1–11.dwg
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Table 3-1-1
Intersection Capacity Analysis – Existing Conditions (Route 1A)

Route1A		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	D	27.9	-	-	A	9.5	-	-	B	14.6	-	-	C	16.3	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	4.5	-	-	A	6.3	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	8.3	0.50	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A

Table 3-1-2
Intersection Capacity Analysis – Existing Conditions (Route 1B)

Route1B		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.50	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	20.8	0.49	A	B	15.5	0.34	A	B	14.9	0.35	A	C	20.9	0.53	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5) ICU – Intersection Capacity Utilization

Source: **Hall & Foreman, Inc.**

Table 3-1-3
Intersection Capacity Analysis – Existing Conditions (Route 1C)

Route1C		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	8.8	-	-	A	4.5	-	-	A	6	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	8.3	0.5	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.5	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	20.8	0.49	A	B	15.5	0.34	A	B	14.9	0.35	A	C	20.9	0.53	A

Table 3-1-4
Intersection Capacity Analysis – Existing Conditions (Route 1D)

Route1D		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	D	27.9	-	-	A	9.5	-	-	B	14.6	-	-	C	16.3	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	4.5	-	-	A	6.3	-	-	A	1.9	-	-
3	Oak Grove Drive and Berkshire Place	A	8.3	0.50	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.5	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5) ICU – Intersection Capacity Utilization

Source: **Hall & Foreman, Inc.**

Table 3-1-5
Intersection Capacity Analysis – Existing Conditions (Route 1E)

Route1E		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	D	27.9	-	-	A	9.5	-	-	B	14.6	-	-	C	16.3	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps	A	9.7	-	-	A	4.5	-	-	A	6.3	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place (3)	A	8.3	0.50	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A

Table 3-1-6
Intersection Capacity Analysis – Existing Conditions (Route 1F)

Route1F		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.5	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	20.8	0.49	A	B	15.5	0.34	A	B	14.9	0.35	A	C	20.9	0.53	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5) ICU – Intersection Capacity Utilization

Source: **Hall & Foreman, Inc.**

Table 3-1-7
Intersection Capacity Analysis – Existing Conditions (Route 1G)

Route1G		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	D	27.9	-	-	A	9.5	-	-	B	14.6	-	-	C	16.3	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	4.5	-	-	A	6.3	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	8.3	0.50	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.50	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A

Table 3-1-8
Intersection Capacity Analysis – Existing Conditions (Route 1H)

Route1H		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	4.5	-	-	A	6.3	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	8.3	0.50	A	A	5.4	0.18	A	A	7.2	0.45	A	A	6.2	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	B	14.8	-	-	A	8.9	-	-	A	8.8	-	-	B	10.2	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	26.5	0.87	C	B	12.8	0.49	A	B	13.9	0.5	A	B	19.7	0.66	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.4	0.53	A	A	5.5	0.27	A	A	5.9	0.31	A	A	6.9	0.37	A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	20.8	0.49	A	B	15.5	0.34	A	B	14.9	0.35	A	C	20.9	0.53	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

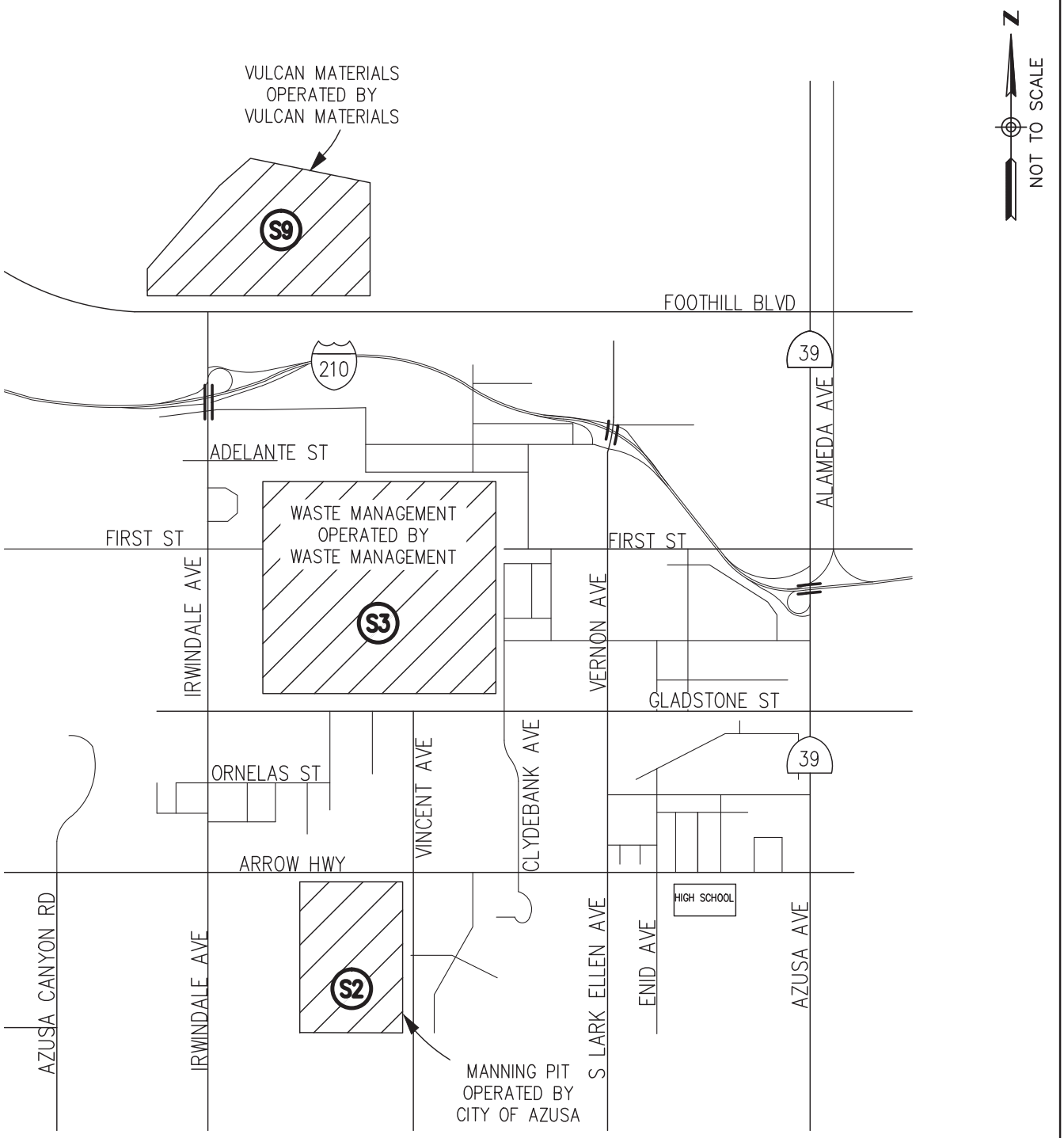
Source: **Hall & Foreman, Inc.**

Devil's Gate Dam and Reservoir (Site 1) Analysis

As presented in *Table 3-1-1* thru *Table 3-1-8*, under the existing conditions for Site 1 (Routes 1A - 1H) all intersections are operating at an acceptable HCM LOS of D or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. Since all intersections operate with an acceptable HCM LOS no mitigation is required to improve the HCM LOS under existing conditions.

Section 2: Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9)

The Manning's Pit consists of two (2) proposed Haul Routes labeled 2A-2B. The Waste Management consists of a proposed Haul Route labeled 3. The Vulcan Materials - Irwindale Site consists of a proposed Haul Route labeled 9. The Manning's Pit, Waste Management, and Vulcan Materials - Irwindale Site are illustrated in *Figure 3-2-1*. Proposed Haul Routes 2A, 2B, 3, and 9 are illustrated in *Figure 3-2-2 through Figure 3-2-5*, providing study intersections utilized. The previously outlined intersection utilization is provided in the Route figures, outlining the Haul Truck turn movements for individual proposed routes. Existing AM (7-9), MID-DAY (12-2), and PM (4-6) turn movement volumes, for proposed Haul Routes 2A, 2B, 3, and 9, are provided in *Figure 3-2-6A and Figure 3-2-6B.* The existing geometrics are illustrated in *Figure 3-2-7.*



LEGEND

S# – DISPOSAL SITE

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WASTE MANAGEMENT PIT, MANNING PIT, AND VULCAN MATERIALS PIT VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-2-1

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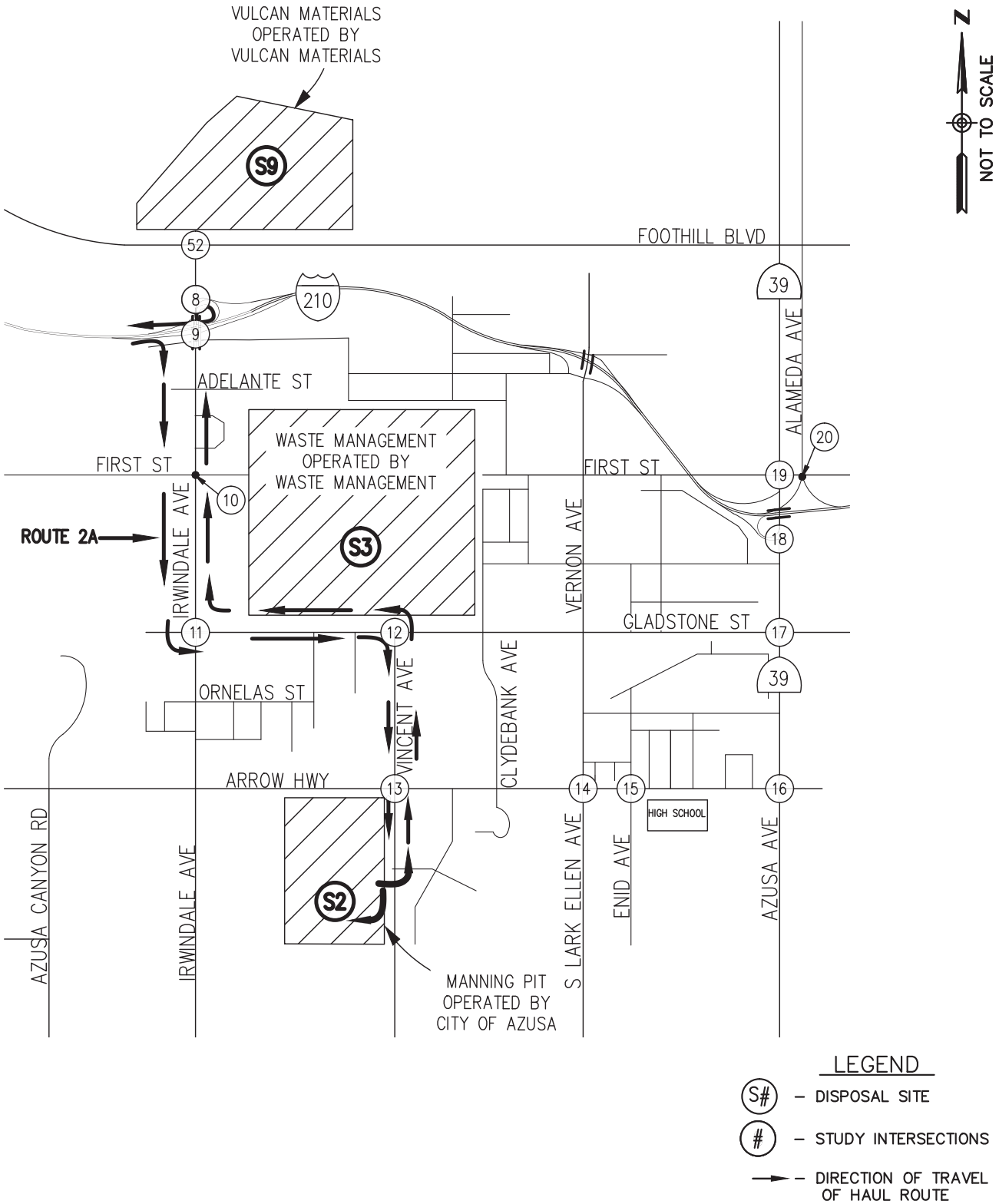

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HAUL ROUTE 2A

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-2-2

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 2\FIG 3-2-2.dwg
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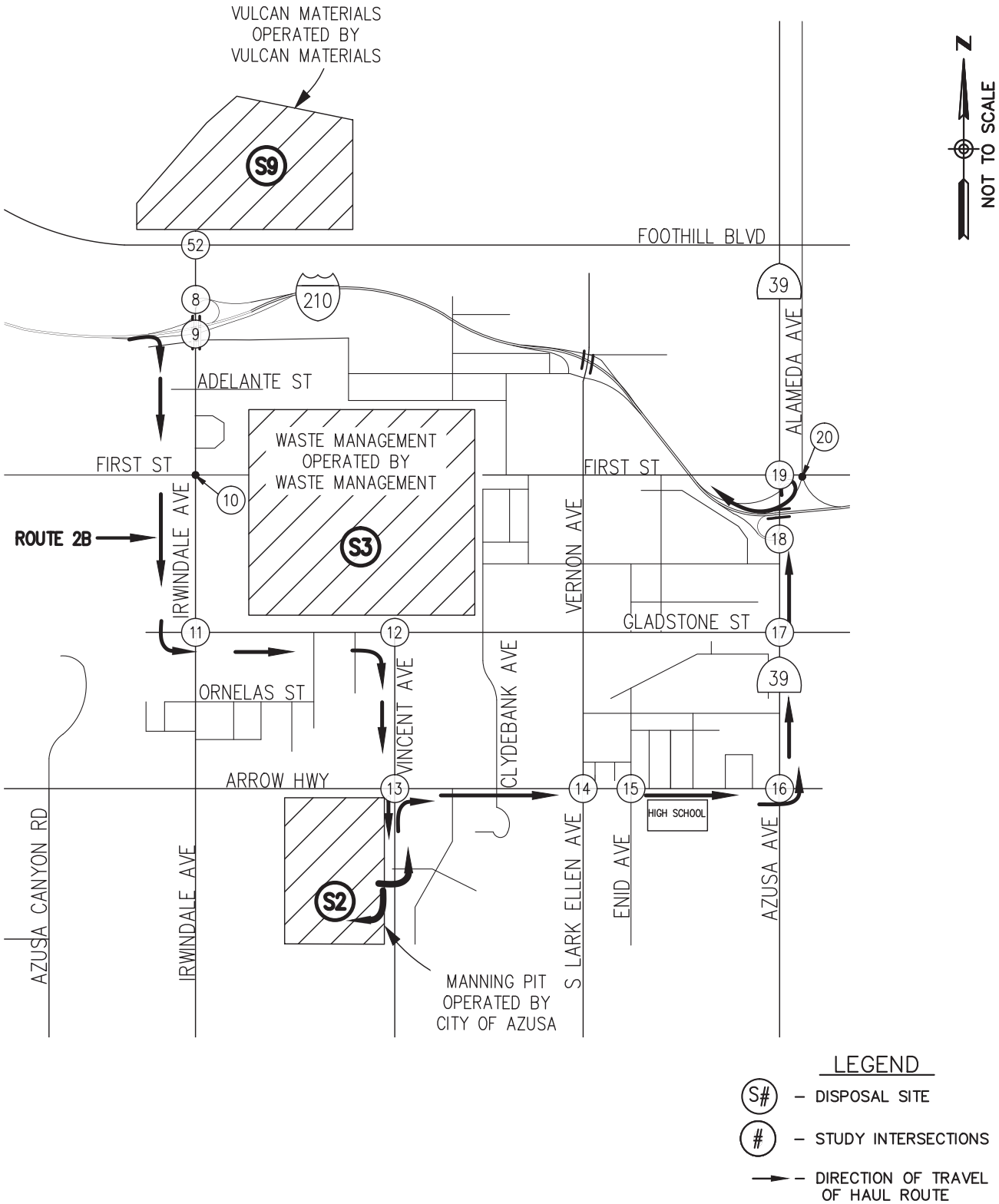

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HAUL ROUTE 2B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-2-3

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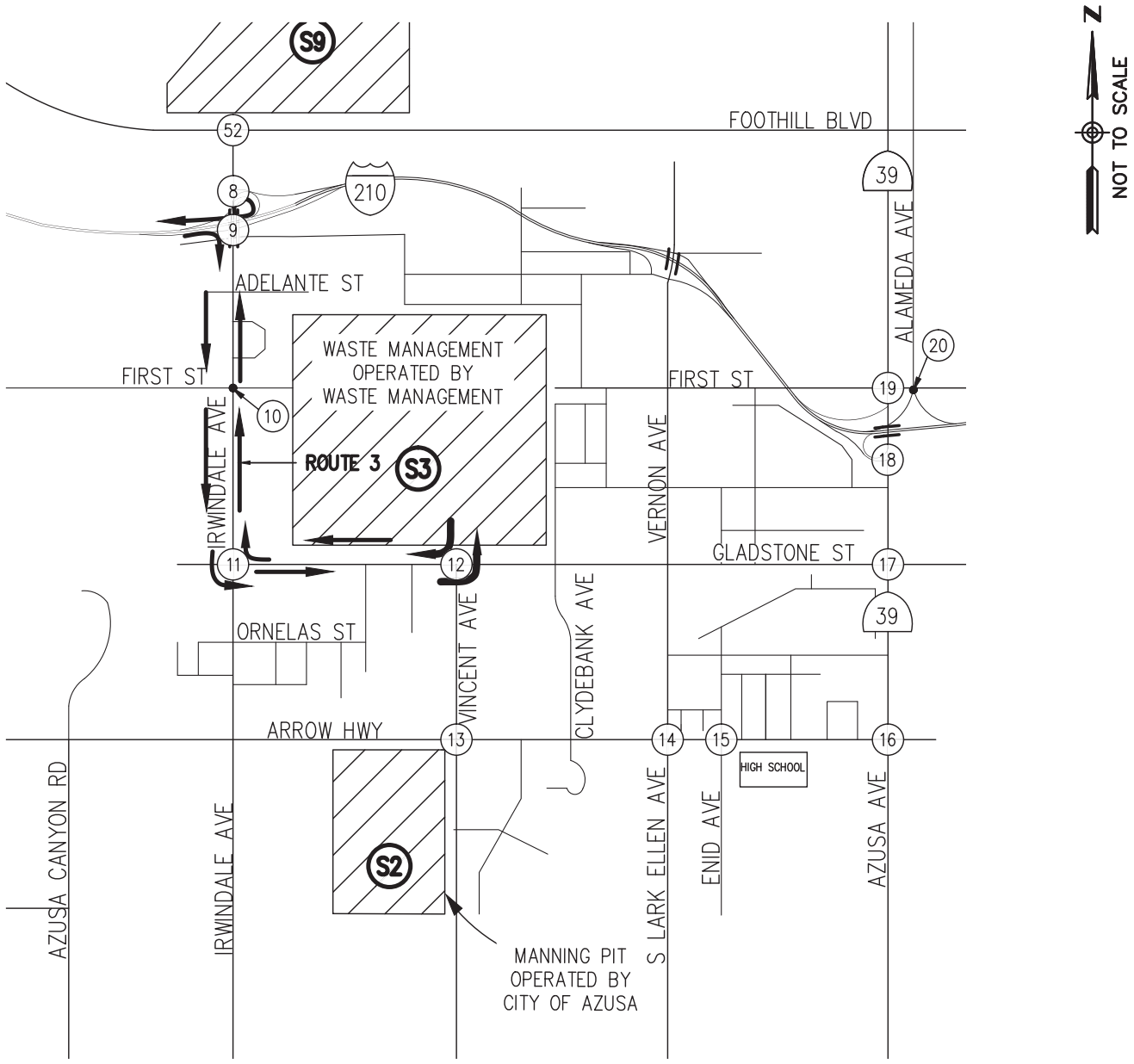

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

→ – DIRECTION OF TRAVEL OF HAUL ROUTE

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HAUL ROUTE 3

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-2-4

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 2\FIG 3-2-4.dwg
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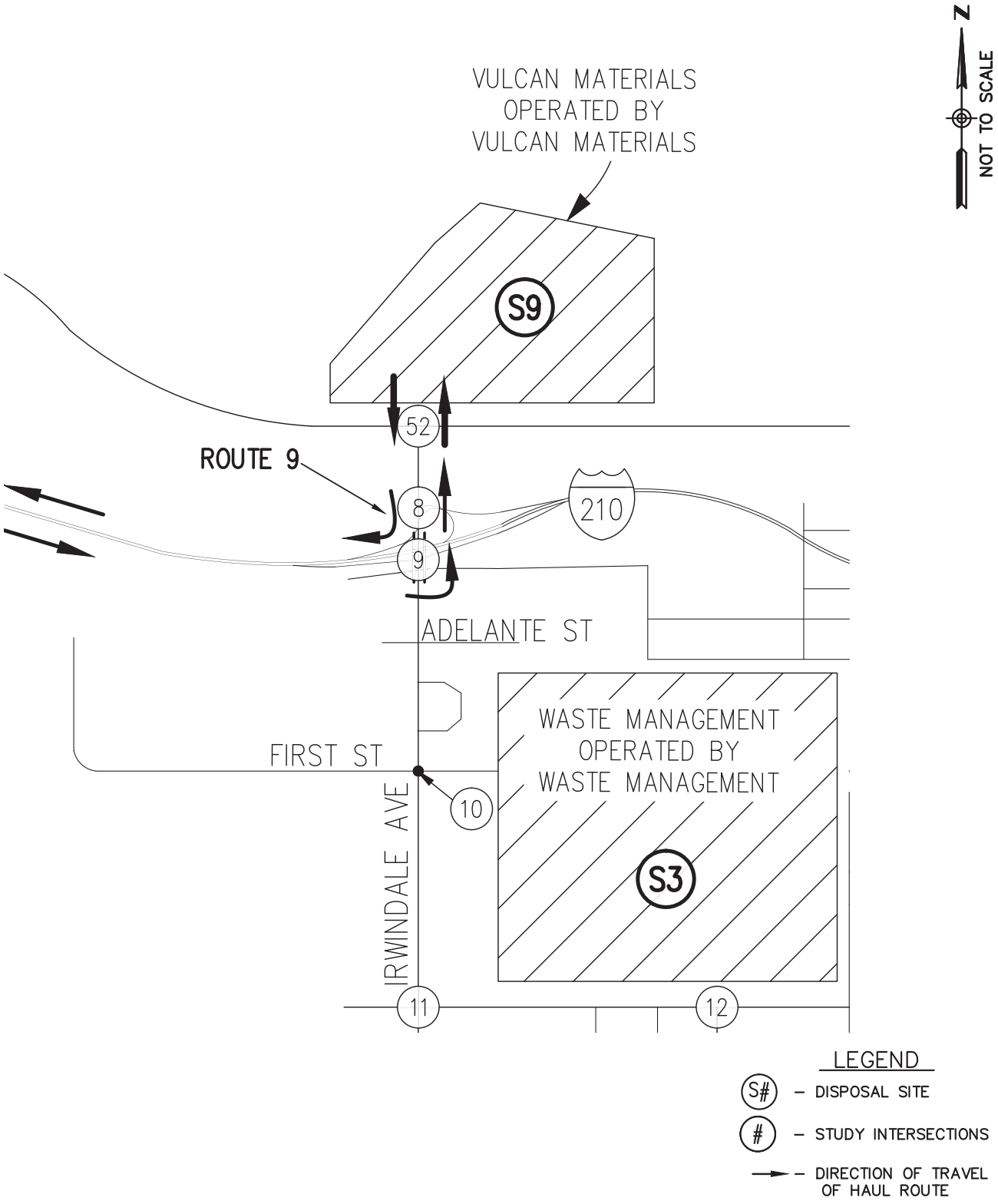

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HAUL ROUTE 9

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-2-5

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 2\FIG 3-2-5.dwg
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N/S STREET					8			E/W STREET		
IRWINDALE AVE								I-210 FWY WB RAMPS		
				610	470	0				
				545	595	0				
				475	895	0				
0	0	0						100	110	145
0	0	0		TS				0	0	0
0	0	0						175	255	145
				0	845	585				
				0	865	420				
				0	755	475				

N/S STREET					9			E/W STREET		
IRWINDALE AVE								I-210 FWY EB RAMPS		
				0	545	175				
				0	670	200				
				0	740	300				
470	590	375						0	0	0
5	5	5		TS				0	0	0
645	365	385						0	0	0
				0	895	195				
				0	690	240				
				0	960	385				

N/S STREET					10			E/W STREET		
IRWINDALE AVE								FIRST STREET		
				125	1055	5				
				170	750	20				
				40	970	15				
80	135	190						10	15	15
5	10	5		TS				5	5	5
20	95	35						5	15	15
				45	1000	5				
				90	975	25				
				30	1305	15				

N/S STREET					11			E/W STREET		
IRWINDALE AVE								GLADSTONE STREET		
				5	780	185				
				5	750	165				
				5	700	310				
5	5	5						580	200	175
10	25	70		TS				65	20	10
10	35	30						495	130	130
				10	515	55				
				15	770	90				
				10	1170	330				

N/S STREET					12			E/W STREET		
VINCENT AVE								GLADSTONE STREET		
				20	15	5				
				10	5	10				
				5	5	5				
15	10	5						5	5	5
105	170	585		TS				760	195	240
115	105	150						250	115	150
				310	10	165				
				140	5	170				
				90	5	355				

N/S STREET					13			E/W STREET		
VINCENT AVE								ARROW HWY		
				70	265	30				
				60	155	25				
				55	205	45				
55	80	135						90	45	75
530	655	1395		TS				1215	575	525
80	90	210						120	100	110
				170	315	85				
				75	175	115				
				40	235	105				

N/S STREET					14			E/W STREET		
LARK ELLEN AVE								ARROW HWY		
				70	330	110				
				25	210	70				
				55	330	100				
75	75	115						30	30	35
515	675	1345		TS				1205	540	595
90	60	115						115	110	85
				165	330	170				
				65	190	110				
				75	325	115				

N/S STREET					15			E/W STREET		
ENID AVE								ARROW HWY		
				60	145	30				
				25	20	25				
				30	35	25				
15	25	85						20	25	30
640	810	1425		TS				1300	635	630
110	20	60						170	45	50
				95	110	155				
				25	20	55				
				35	40	55				

N/S STREET					16			E/W STREET		
AZUSA AVE								ARROW HWY		
				205	490	95				
				100	760	125				
				85	635	260				
150	145	215						105	115	95
510	495	1130		TS				895	395	460
80	120	135						70	190	125
				225	520	45				
				200	670	135				
				160	465	230				

LEGEND

EXISTING VOLUMES

N/S STREET					#			E/W STREET		
					7AM-9AM					
					12PM-2PM					
					4PM-6PM					
7AM - 9AM	12 PM - 2 PM	4PM - 6PM			TS				7AM - 9AM	12 PM - 2 PM	4PM - 6PM
					7AM-9AM					
					12PM-2PM					
					4PM-6PM					

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WASTE MANAGEMENT, MANNINGS PIT, AND VULCAN MATERIALS AREA EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-2-6A

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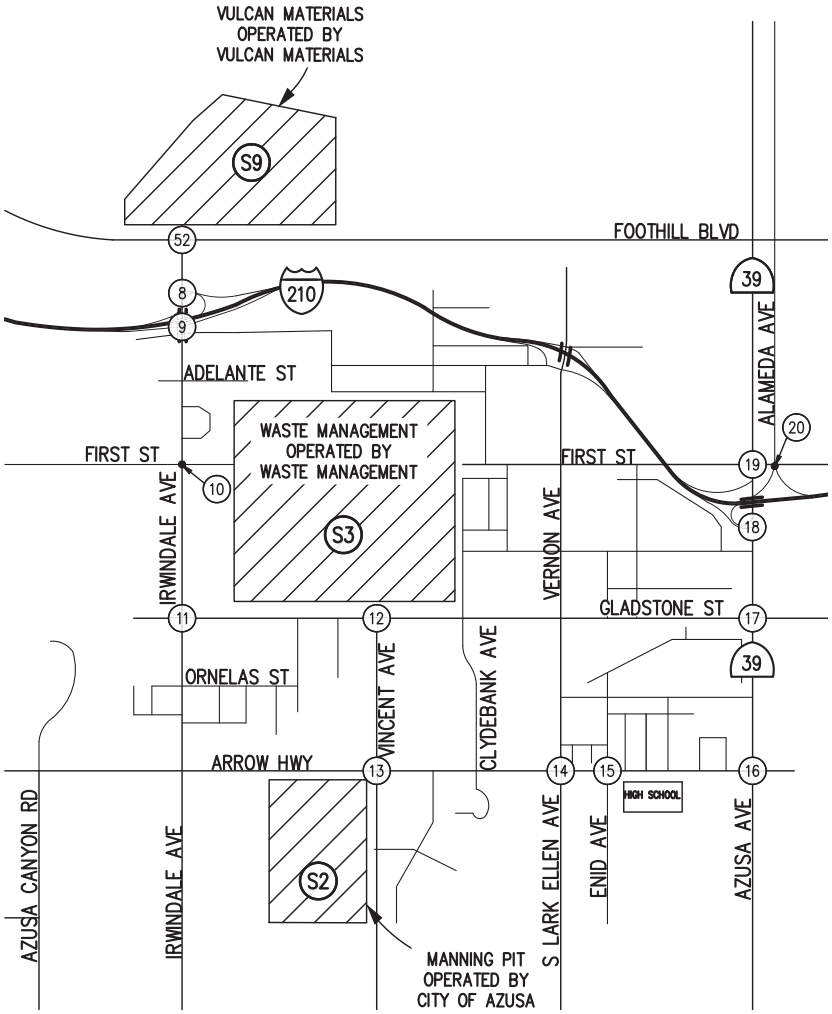
N/S STREET				17		E/W STREET				
AZUSA AVE						GLADSTONE STREET				
				120	630	160				
				115	765	175				
				65	825	180				
145	150	180	↱	↲	↑	↳	↳	60	85	55
160	195	670	←	TS			←	825	180	255
25	35	55	↰	↰	↑	↱	↱	155	200	130
				110	660	40				
				100	740	95				
				55	685	75				

N/S STREET				18		E/W STREET				
AZUSA AVE						I-210 FWY EB RAMPS				
				210	740	0				
				170	720	0				
				190	800	0				
250	280	225	↱	↲	↑	↳	↳	0	0	0
0	0	0	←	TS			←	0	0	0
235	260	215	↰	↰	↑	↱	↱	0	0	0
				0	660	195				
				0	815	215				
				0	640	245				

N/S STREET				19		E/W STREET				
AZUSA AVE						FIRST STREET				
				170	365	160				
				10	645	80				
				20	800	120				
120	45	90	↱	↲	↑	↳	↳	320	155	220
305	85	185	←	TS			←	500	130	205
125	30	35	↰	↰	↑	↱	↱	485	270	255
				160	375	375				
				70	655	325				
				50	430	330				

N/S STREET				20		E/W STREET				
ALAMEDA ST/WB I-210 FWY						FIRST STREET				
				80	35	45				
				65	25	30				
				65	35	50				
15	25	20	↱	↲	↑	↳	↳	40	25	35
320	210	395	←	TS			←	640	220	240
420	215	215	↰	↰	↑	↱	↱	410	120	150
				310	50	15				
				350	55	45				
				445	75	70				



NOT TO SCALE

LEGEND

EXISTING VOLUMES

N/S STREET				#		E/W STREET				
				7AM-9AM						
				12PM-2PM						
				4PM-6PM						
7AM - 9AM	12 PM - 2 PM	4PM - 6PM	↱	↲	↑	↳	↳	7AM - 9AM	12 PM - 2 PM	4PM - 6PM
			←	TS			←			
			↰	↰	↑	↱	↱			
				7AM-9AM						
				12PM-2PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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WASTE MANAGEMENT, MANNINGS PIT, AND VULCAN MATERIALS AREA EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-2-6B

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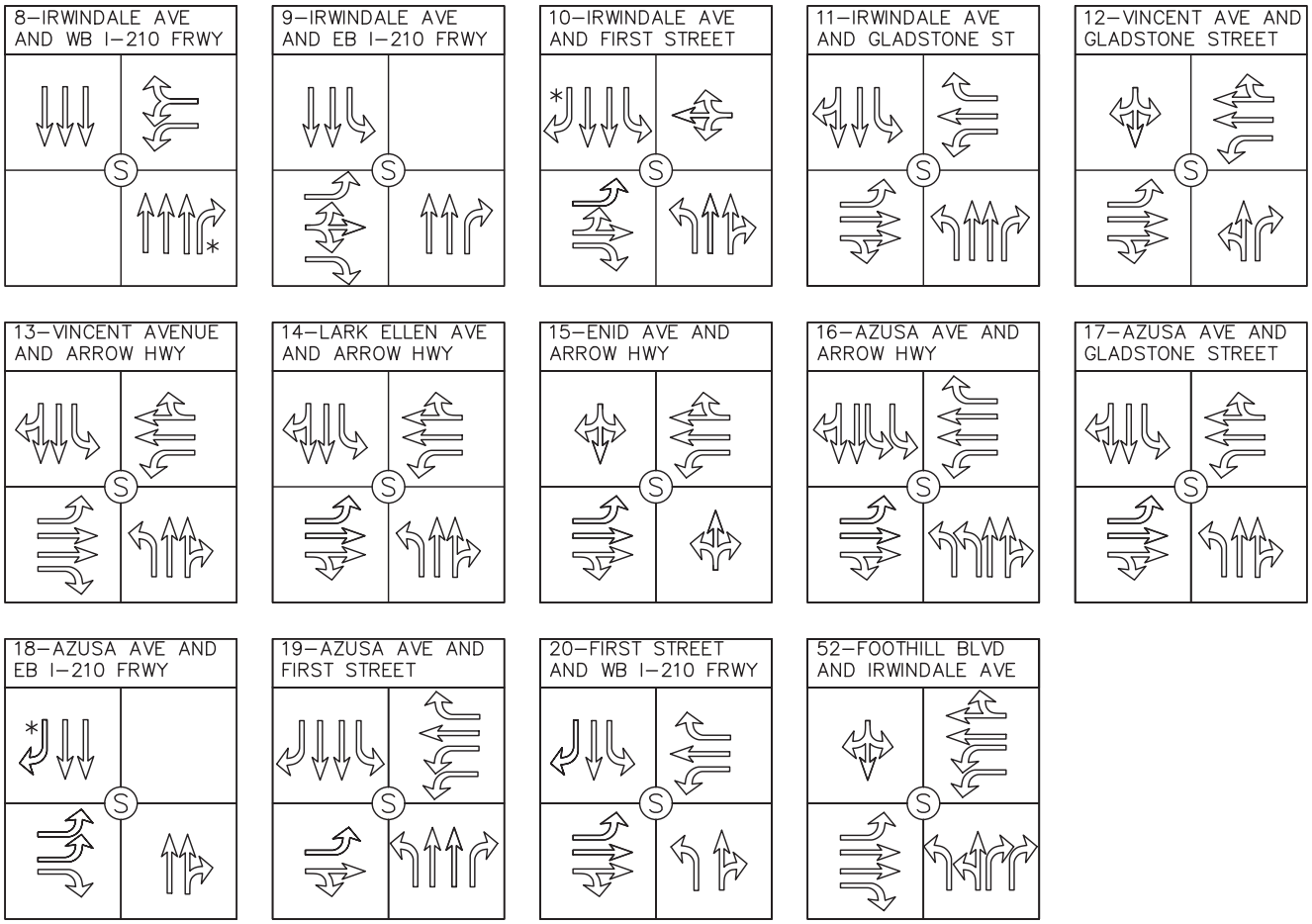

LEGEND

- (S) – SIGNALIZED INTERSECTION
- S – UNSIGNALIZED INTERSECTION
- * – FREE RIGHT TURN
- ⟸ – EXISTING GEOMETRIC

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WASTE MANAGEMENT, MANNINGS PIT, AND VULCAN MATERIALS AREA EXISTING GEOMETRICS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–2–7

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Table 3-2-1

Intersection Capacity Analysis – Existing Conditions (Route 2A)

Route2A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.3	0.48	A	A	6.7	0.46	A	A	6.4	0.50	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	21.6	0.84	C	B	18.2	0.71	B	C	21.0	0.83	C
10	Irwindale Ave and First Street	B	12.0	0.60	A	B	16.8	0.60	B	B	19.8	0.69	B
11	Irwindale Ave and Gladstone Street	C	30.3	0.81	C	B	11.0	0.51	A	B	18.8	0.84	D
12	Vincent Ave and Gladstone Street	B	10.8	0.61	B	A	8.6	0.30	A	B	11.2	0.57	B
13	Vincent Ave and Arrow Hwy	B	13.8	0.77	C	A	9.2	0.36	A	B	12.2	0.73	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: Hall & Foreman, Inc.

Table 3-2-2

Intersection Capacity Analysis – Existing Conditions (Route 2B)

Route2B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	21.6	0.84	C	B	18.2	0.71	B	C	21.0	0.83	C
10	Irwindale Ave and First Street	B	12.0	0.60	A	B	16.8	0.60	B	B	19.8	0.69	B
11	Irwindale Ave and Gladstone Street	C	30.3	0.81	C	B	11.0	0.51	A	B	18.8	0.84	D
12	Vincent Ave and Gladstone Street	B	10.8	0.61	B	A	8.6	0.30	A	B	11.2	0.57	B
13	Vincent Ave and Arrow Hwy	B	13.8	0.77	C	A	9.2	0.36	A	B	12.2	0.73	C
14	Arrow Hwy and Lark Ellen Ave	D	45.9	0.88	C	C	30.1	0.62	A	D	35.2	0.79	D
15	Arrow Hwy and Enid Ave	C	26.9	1.00	D	B	11.0	0.43	A	B	11.7	0.64	C
16	Azusa Ave and Arrow Hwy	D	37.2	0.95	D	D	36.6	0.91	C	D	42.6	0.94	E
17	Azusa Ave and Gladstone Street	D	43.4	0.89	D	C	30.8	0.75	B	C	31.2	0.77	C
18	Azusa Ave and I-210 Freeway Eastbound Ramps	A	9.8	0.63	A	A	9.5	0.63	A	A	8.6	0.58	A
19	Azusa Ave and First Street	C	32.9	0.82	C	B	16.6	0.53	A	B	17.5	0.64	B
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	D	42.2	1.13	D	B	10.5	0.54	B	B	14.4	0.78	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio
Source: **Hall & Foreman, Inc.**

Manning's Pit (Site 2) Analysis

As presented in *Tables 3-2-1* and *3-2-2*, under the existing conditions all intersections are operating at an acceptable HCM LOS of D or better throughout the day, thus mitigation is not required.

Table 3-2-3
Intersection Capacity Analysis – Existing Conditions (Route 3)

Route 3		AM				MID-DAY				PM			
Intersection # / Name		**HCM LOS**	**HCM Delay**	**HCM V/C**	**ICU LOS**	**HCM LOS**	**HCM Delay**	**HCM V/C**	**ICU LOS**	**HCM LOS**	**HCM Delay**	**HCM V/C**	**ICU LOS**
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.3	0.48	A	A	6.7	0.46	A	A	6.4	0.50	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	21.6	0.84	C	B	18.2	0.71	B	C	21.0	0.83	C
10	Irwindale Ave and First Street	B	12.0	0.60	A	B	16.8	0.60	B	B	19.8	0.69	B
11	Irwindale Ave and Gladstone Street	C	30.3	0.81	C	B	11.0	0.51	A	B	18.8	0.84	D
12	Vincent Ave and Gladstone Street	B	10.8	0.61	B	A	8.6	0.30	A	B	11.2	0.57	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Waste Management (Site 3) Analysis

As presented in *Table 3-2-3*, under the existing conditions all intersections are operating at an acceptable HCM LOS of C or better throughout the day, thus mitigation is not required.

Table 3-2-4
Intersection Capacity Analysis – Existing Conditions (Route 9)

Route 9		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.3	0.48	A	A	6.7	0.46	A	A	6.4	0.50	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	21.6	0.84	C	B	18.2	0.71	B	C	21.0	0.83	C
52	Irwindale Ave and Foothill Boulevard	C	21.7	0.79	B	C	28.5	0.79	C	D	45.5	0.94	F

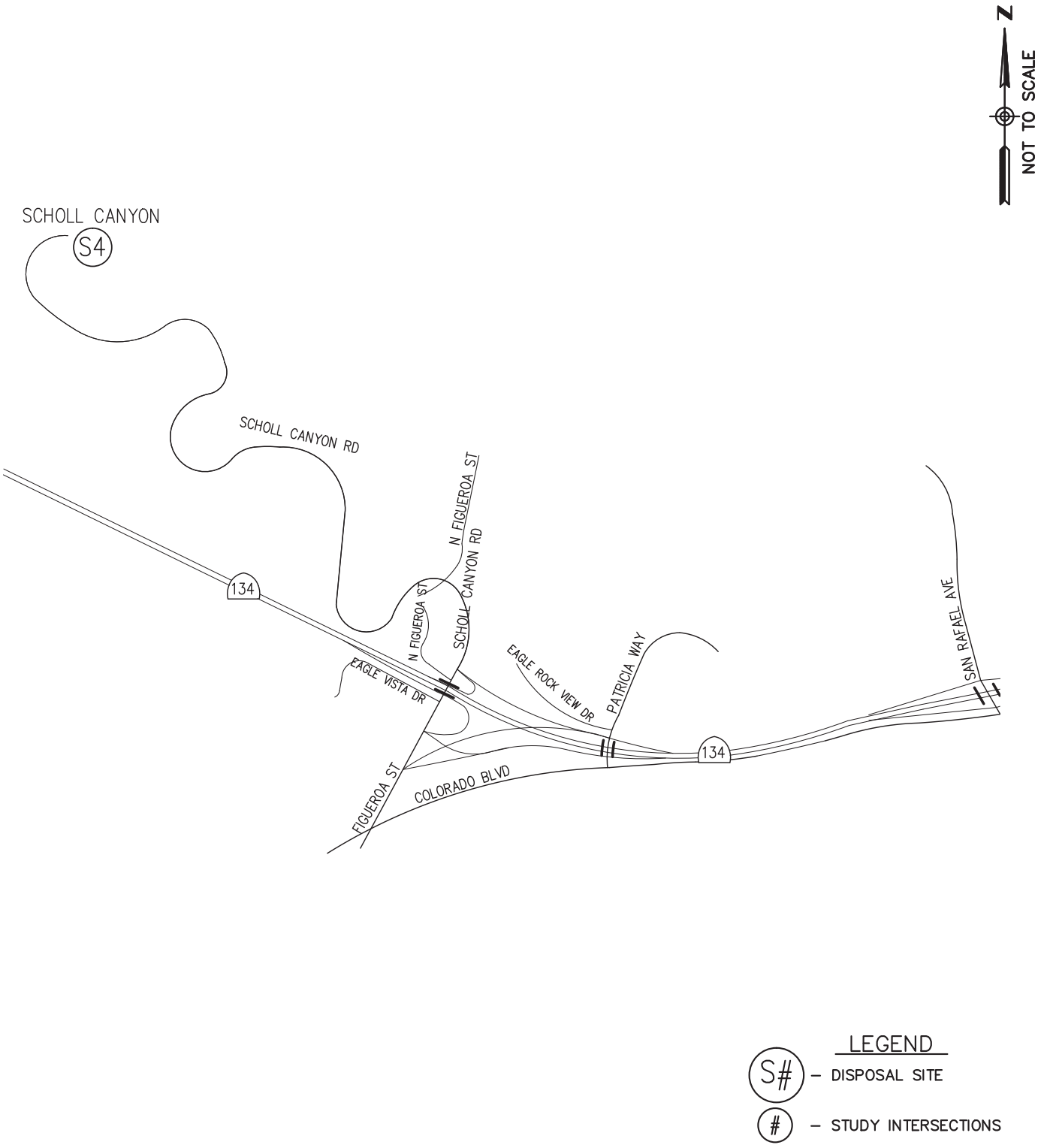
(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: Hall & Foreman, Inc.

Vulcan Material (Site 9) Analysis

As presented in *Table 3-2-4*, under the existing conditions all intersections are operating at an acceptable HCM LOS of D or better throughout the day, thus mitigation is not required.

Section 3: Scholl Canyon Landfill (Site 4)

The Scholl Canyon Landfill consists of two (2) proposed Haul Routes labeled 4A-4B. The Scholl Canyon Landfill is illustrated in *Figure 3-3-1*. Proposed Haul Routes 4A and 4B are illustrated in *Figure 3-3-2 and Figure 3-3-3 respectively.* The previously outlined intersection utilization is provided in the Route figures, outlining the Haul Truck turn movements for individual proposed routes. Existing AM (7-9), MID-DAY (12-2), and PM (4-6) turn movement volumes, for proposed Haul Routes 4A and 4B, are provided in *Figure 3-3-4.* The existing geometrics are illustrated in *Figure 3-3-5.*



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SCHOLL CANYON PIT VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-3-1

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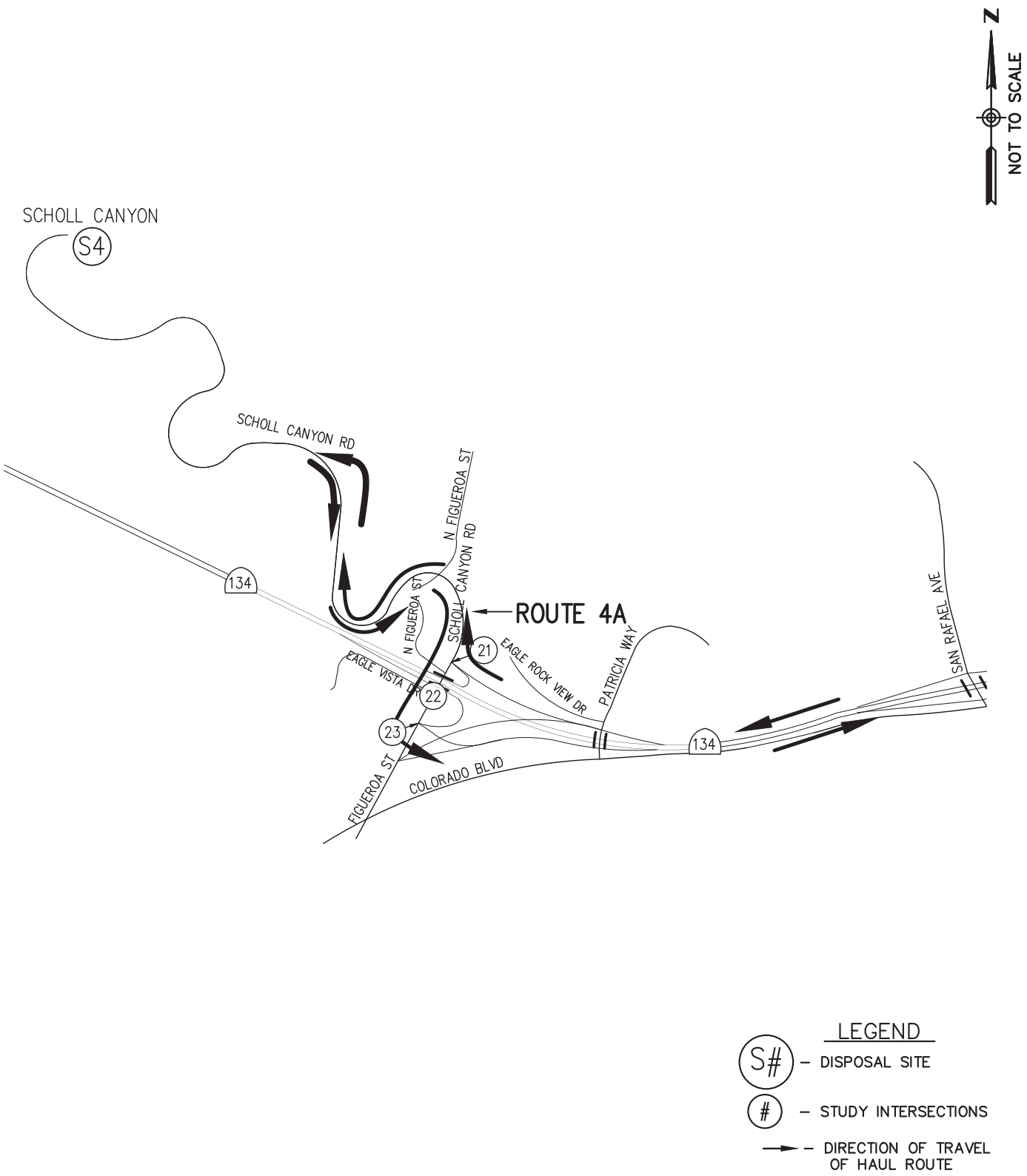

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HAUL ROUTE 4A

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-3-2

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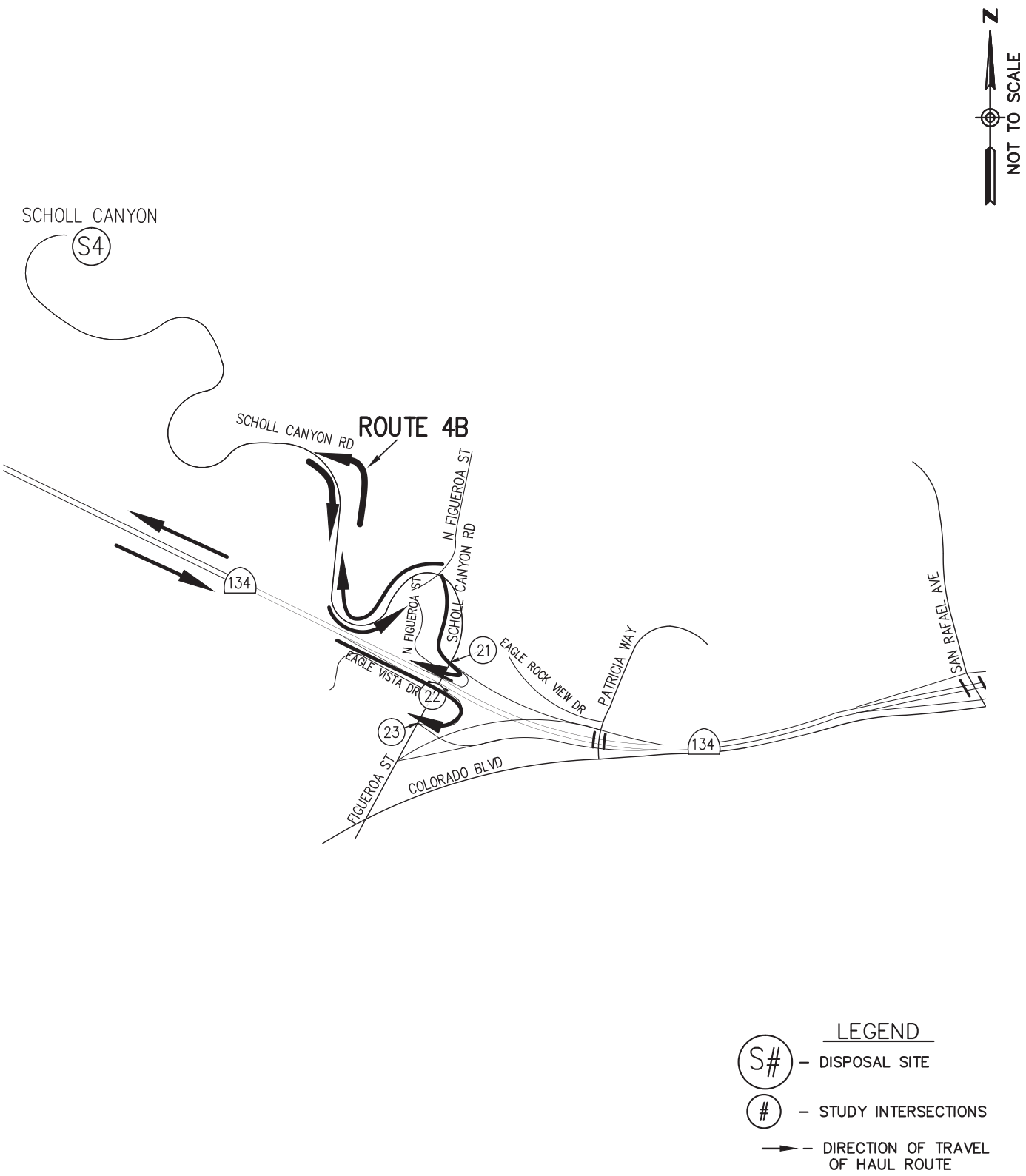

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HAUL ROUTE 4B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-3-3

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 3\FIG 3-3-3.dwg
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N/S STREET				21	E/W STREET					
SCHOLL CANYON RD					WB 134 FWY					
				0	10	5				
				0	45	15				
				0	35	15				
0	0	0	↳	↲	↑	↳	↳	15	35	10
0	0	0	←				←	0	0	0
0	0	0	↰	↰	↑	↱	↱	210	260	430
				0	20	635				
				0	35	310				
				0	10	460				

N/S STREET				22	E/W STREET					
FIGUEROA ST					EAGLE VISTA DRIVE					
				10	220	0				
				15	275	0				
				25	435	0				
45	30	40	↳	↲	↑	↳	↳	0	0	0
0	0	0	←				←	0	0	0
60	50	70	↰	↰	↑	↱	↱	0	0	0
				25	625	0				
				40	325	0				
				105	430	0				

N/S STREET				23	E/W STREET					
FIGUEROA ST					EB 134 FWY					
				0	210	50				
				0	280	65				
				0	445	55				
0	0	0	↳	↲	↑	↳	↳	40	75	55
0	0	0	←	TS			←	0	0	0
0	0	0	↰	↰	↑	↱	↱	365	235	455
				0	615	285				
				0	260	225				
				0	480	265				

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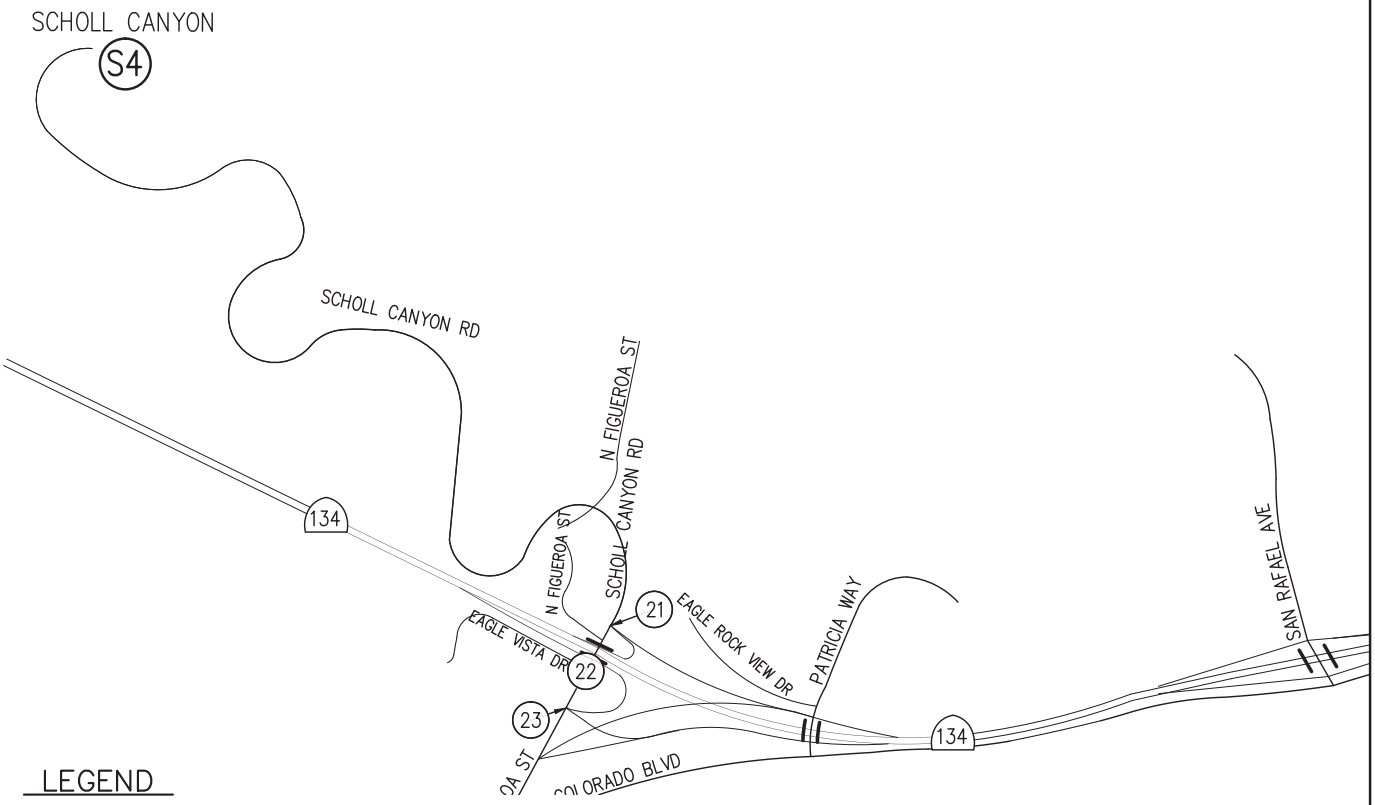
NOT TO SCALE



LEGEND

EXISTING VOLUMES

N/S STREET				S#	E/W STREET			
				7AM-9AM				
				12PM-2PM				
				4PM-6PM				
7AM - 9AM	12 PM - 2 PM	4PM - 6PM	↳	↲ ↑ ↳	↳	7AM - 9AM	12 PM - 2 PM	4PM - 6PM
			←	TS	←			
			↰	↰ ↑ ↱	↱			
				7AM-9AM				
				12PM-2PM				
				4PM-6PM				

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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SCHOLL CANYON AREA EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-3-4

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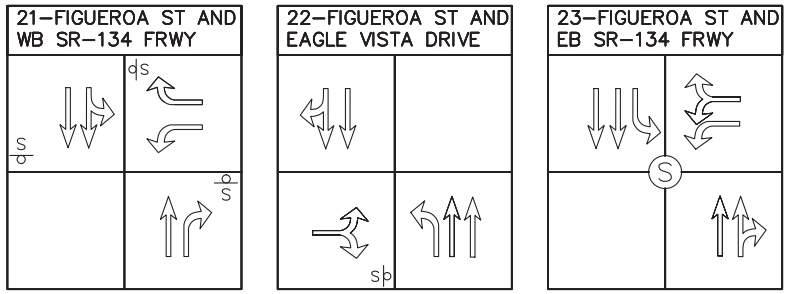

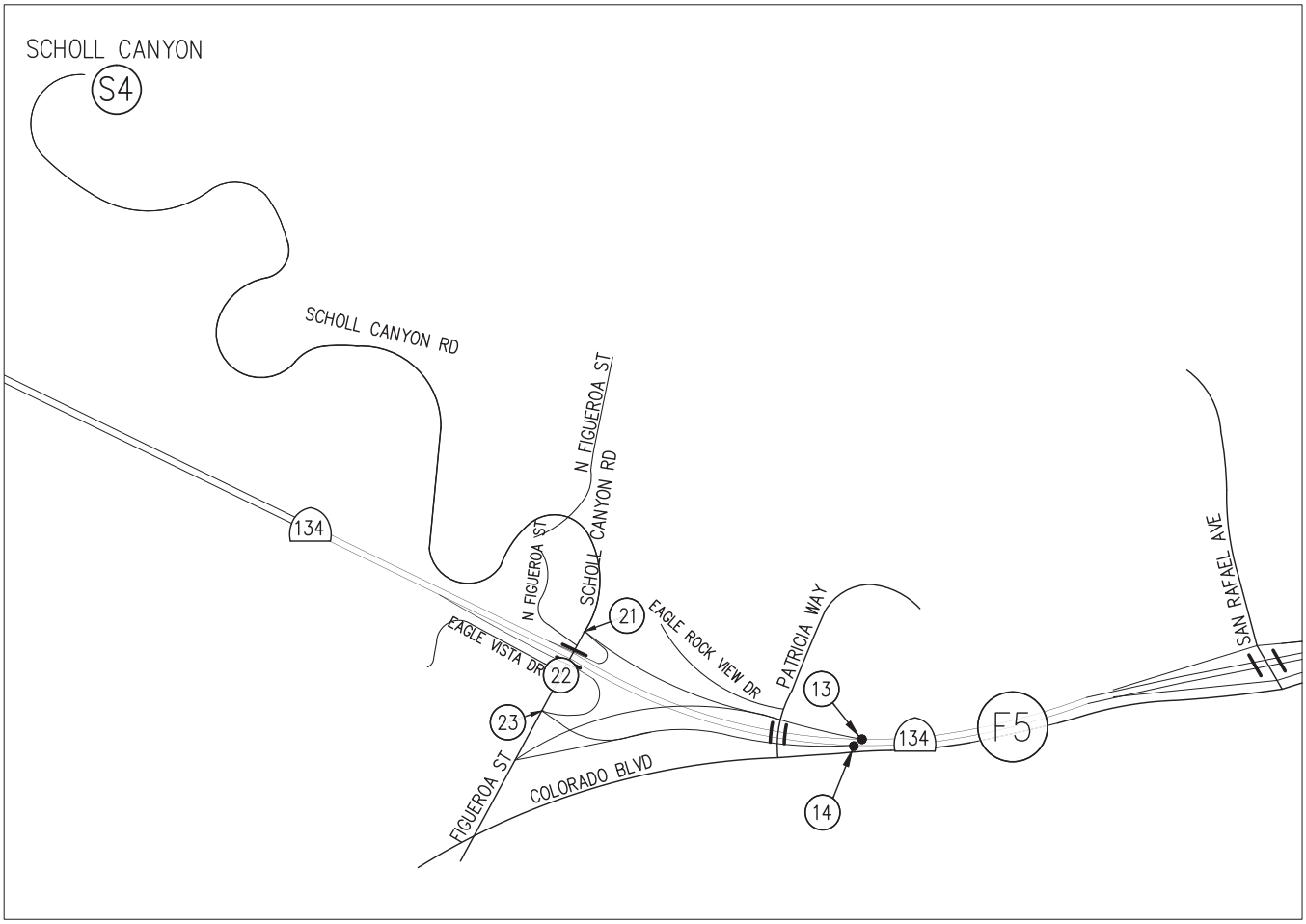

LEGEND

- (#) – STUDY INTERSECTIONS
- (S) – SIGNALIZED INTERSECTION
- p/s – UNSIGNALIZED INTERSECTION
- * – FREE RIGHT TURN
- ⟸ – EXISTING GEOMETRIC

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SCHOLL CANYON AREA EXISTING GEOMETRICS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–3–5

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Table 3-3-1
Intersection Capacity Analysis – Existing Conditions (Route 4A)

Route 4A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	D	30.8	-	-	B	12.3	-	-	D	31.4	-	-
22	Figueroa St and Eagle Vista Drive	B	12.6	-	-	B	11.5	-	-	C	17.6	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	7.1	0.5	A	A	6.4	0.27	A	A	7.1	0.46	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-3-2
Intersection Capacity Analysis – Existing Conditions (Route 4B)

Route 4B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	D	30.8	-	-	B	12.3	-	-	D	31.4	-	-
22	Figueroa St and Eagle Vista Drive	B	12.6	-	-	B	11.5	-	-	C	17.6	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	7.1	0.5	A	A	6.4	0.27	A	A	7.1	0.46	A

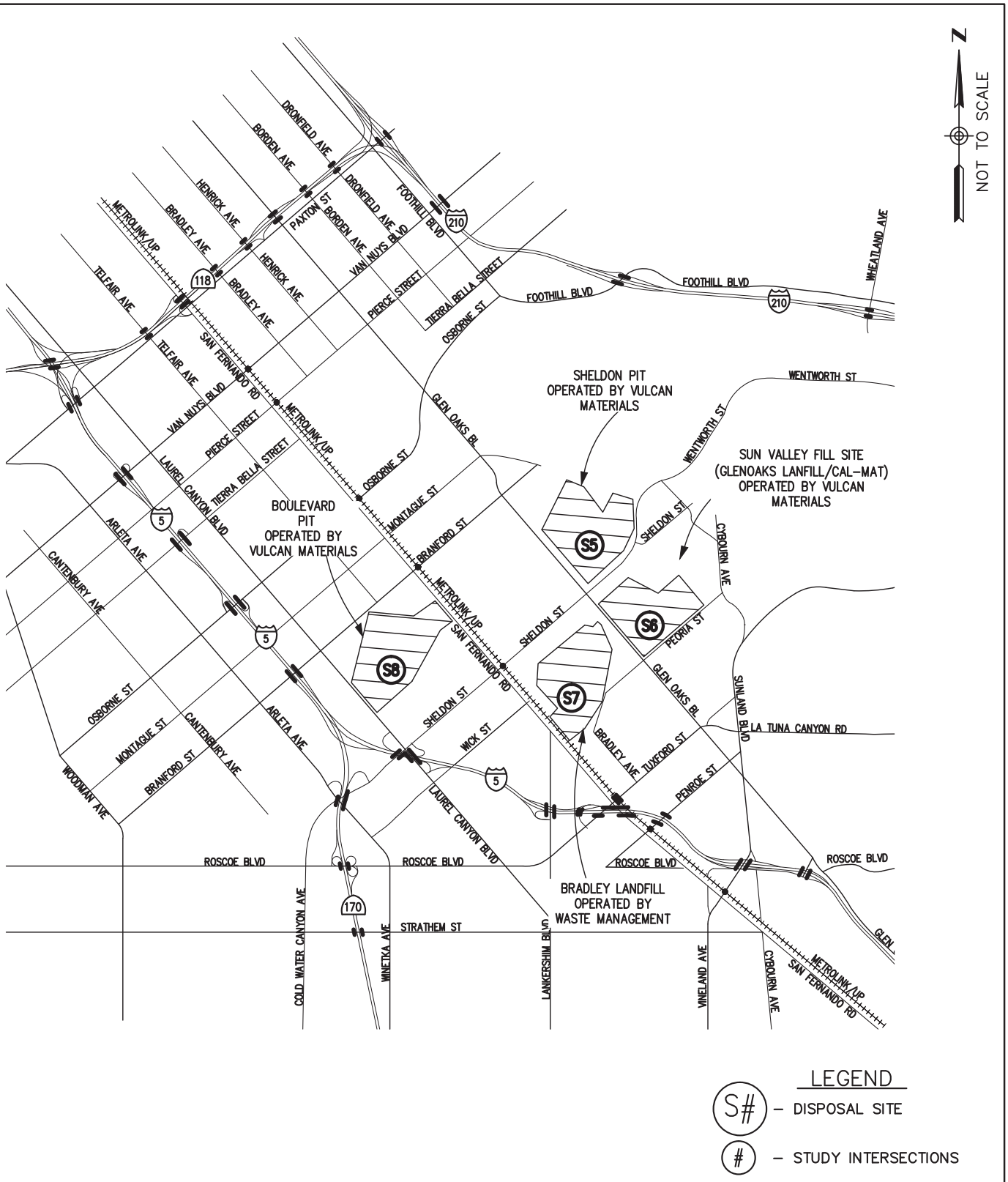
(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Scholl Canyon Landfill (Site 4) Analysis

As presented in *Table 3-3-1* and *Table 3-3-2*, under the existing conditions for Site 4 (Route 4A-4B) the study intersections are operating at an acceptable HCM LOS D or better, for the AM, Mid-day and PM peak hours. All intersections are operating with an acceptable HCM LOS and thus mitigation is not required to improve the HCM LOS under existing conditions.

Section 4: Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8)

The Bradley Landfill, Boulevard Pit, Sun Valley Fill Site, and Sheldon Pit each consists of three (2) proposed Haul Routes labeled 5A-8C. The Bradley Landfill, Boulevard Pit, Sun Valley Fill Site, and Sheldon Pit are illustrated in *Figure 3-4-1*. Proposed Haul Routes 5A through 8C are illustrated in *Figure 3-4-2 and Figure 3-4-9.* The previously outlined intersection utilization is provided in the Route figures, outlining the Haul Truck turn movements for individual proposed routes. Existing AM (7-9), MID-DAY (12-2), and PM (4-6) turn movement volumes, for proposed Haul Routes 5A through 8C, are provided in *Figure 3-4-10A* through *Figure 3-4-10D.* The existing geometrics are illustrated in *Figure 3-4-11A* and *Figure 3-4-11B.*



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S# – DISPOSAL SITE

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BOULEVARD, BRADLEY, SUN VALLEY, SHELDON PITS VICINITY MAP

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-1

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-1.dwg
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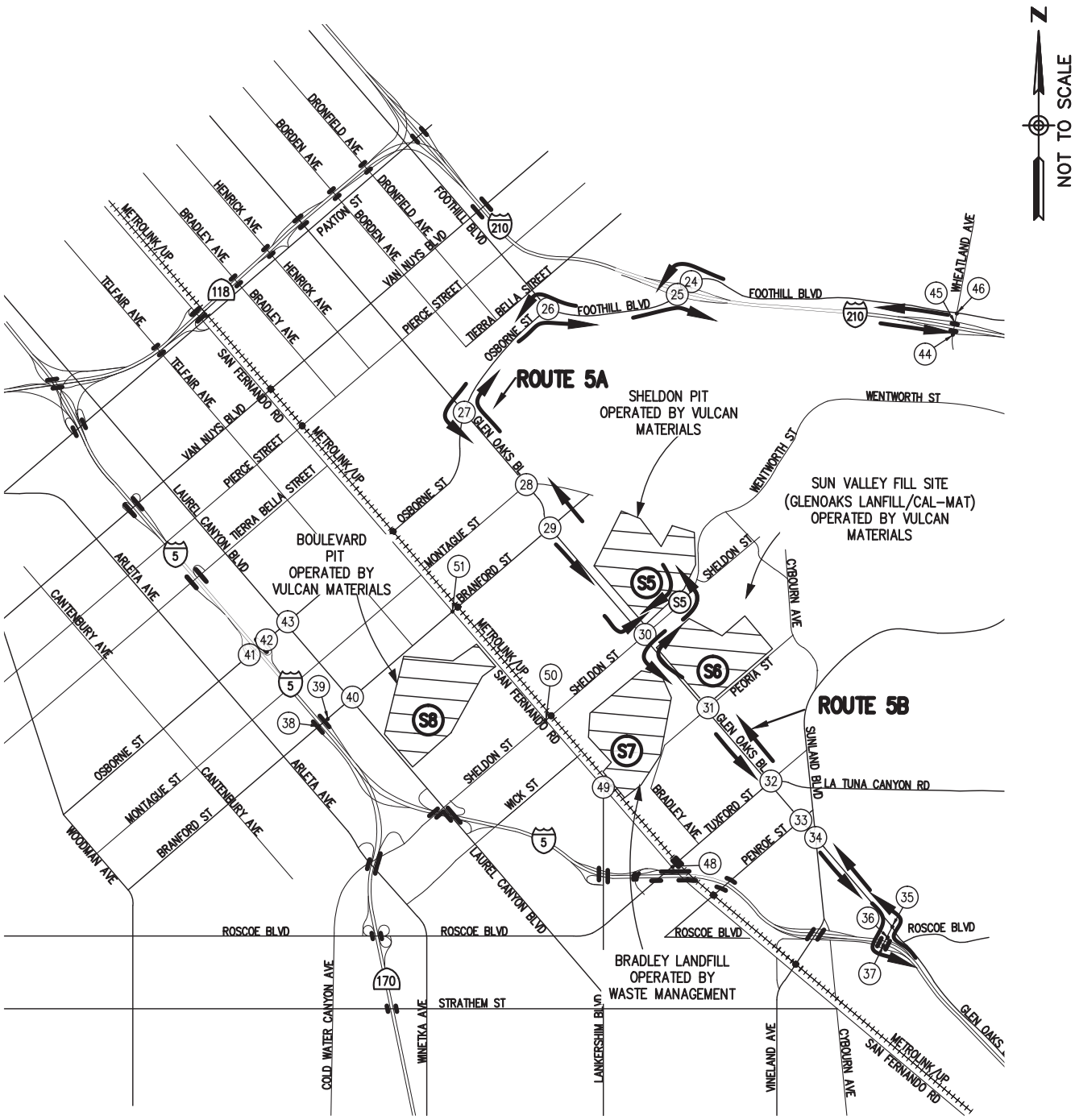

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HAUL ROUTE 5A/5B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-2

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-2.dwg
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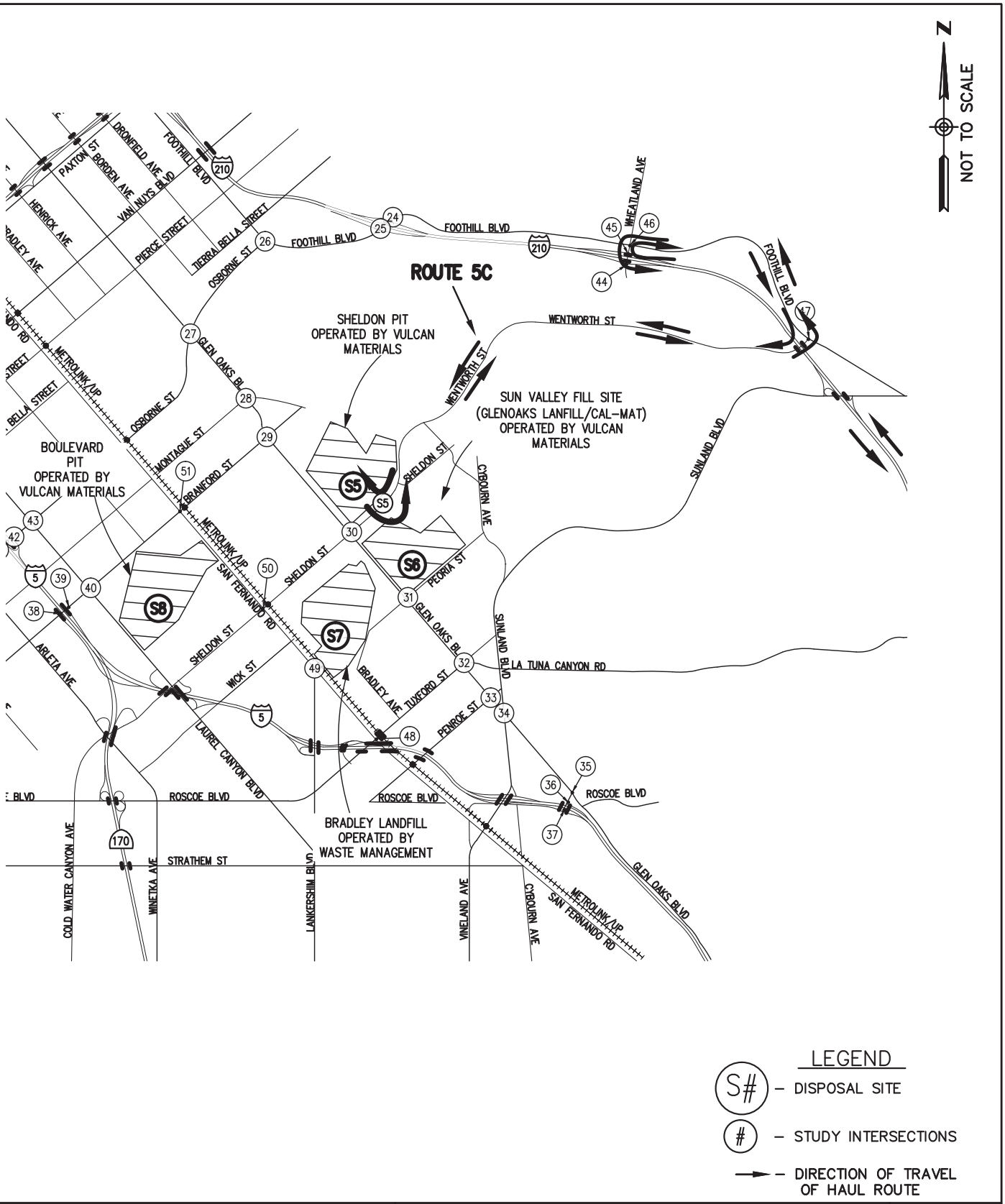

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HAUL ROUTE 5C

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-3

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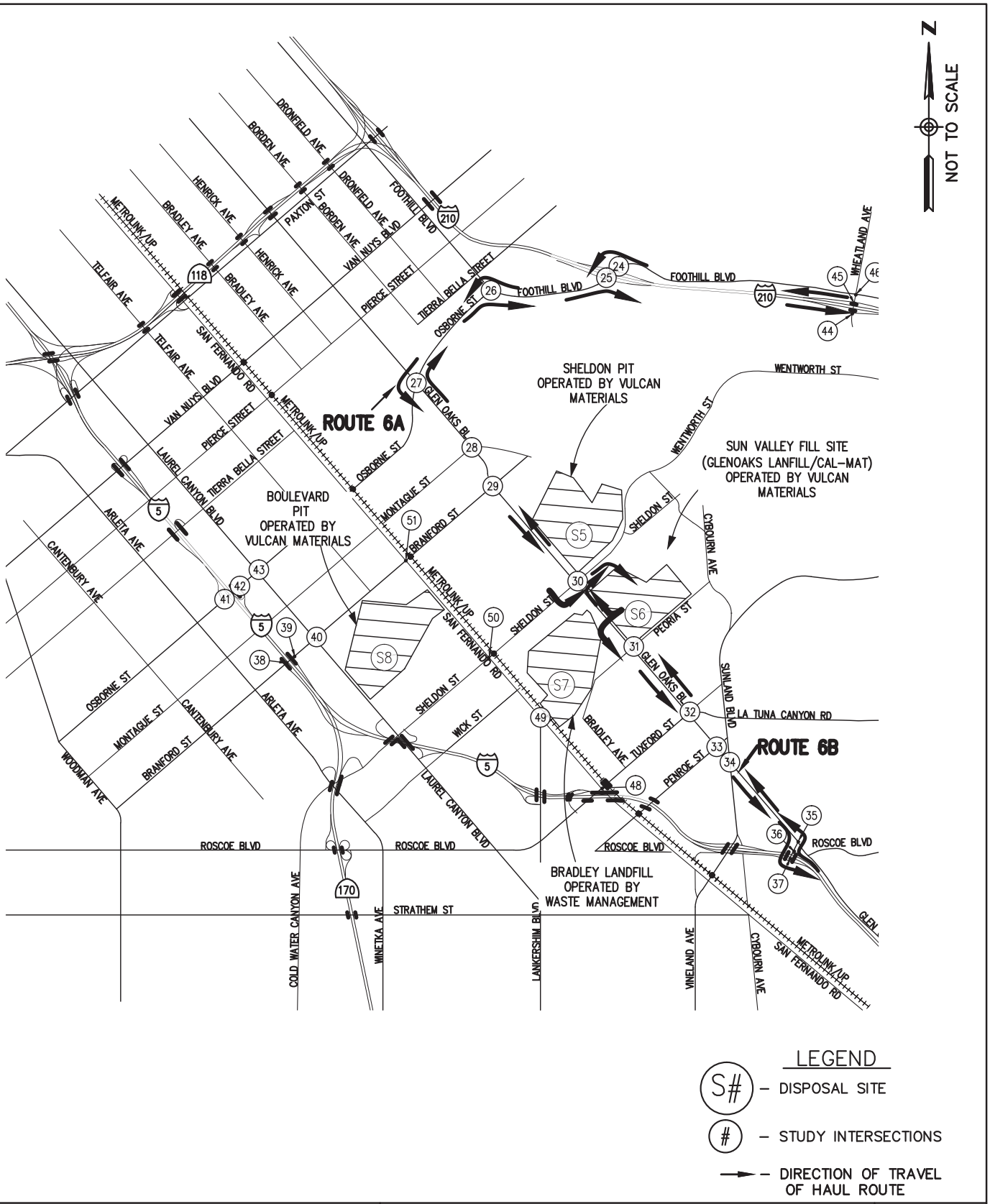

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HAUL ROUTE 6A/6B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-4

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-4.dwg
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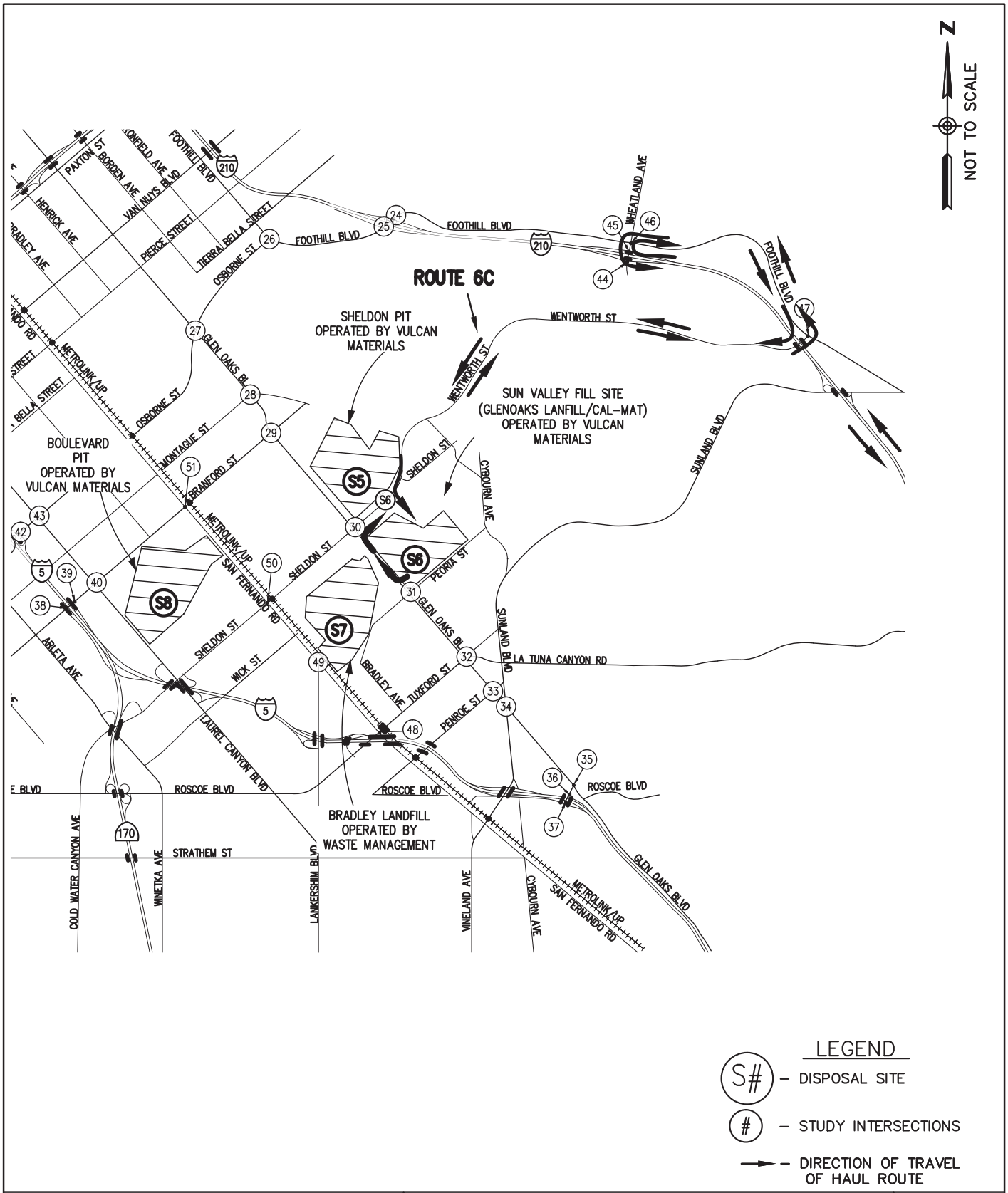

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HAUL ROUTE 6C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-5

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-5.dwg
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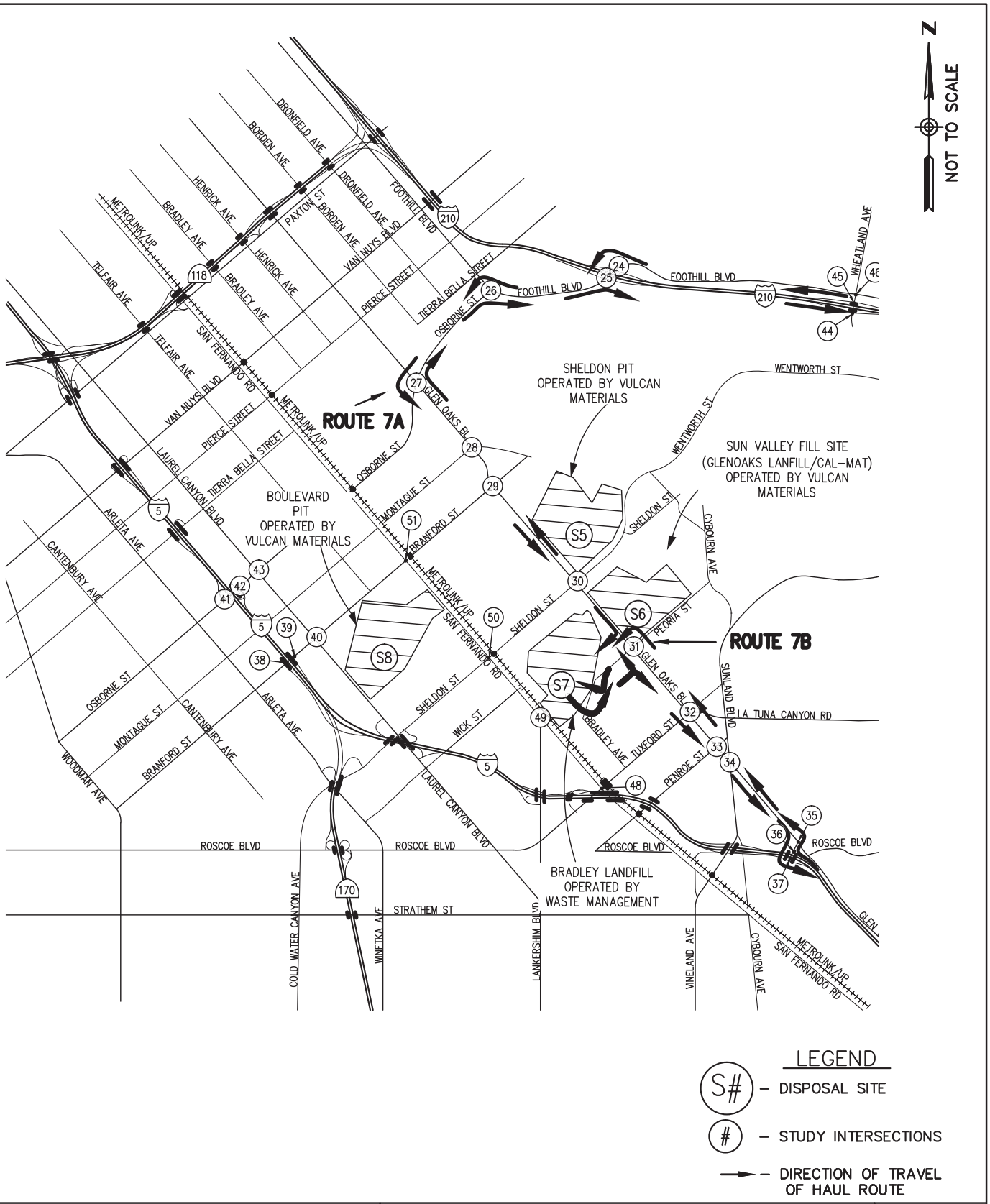

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HAUL ROUTE 7A/7B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-6

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-6.dwg
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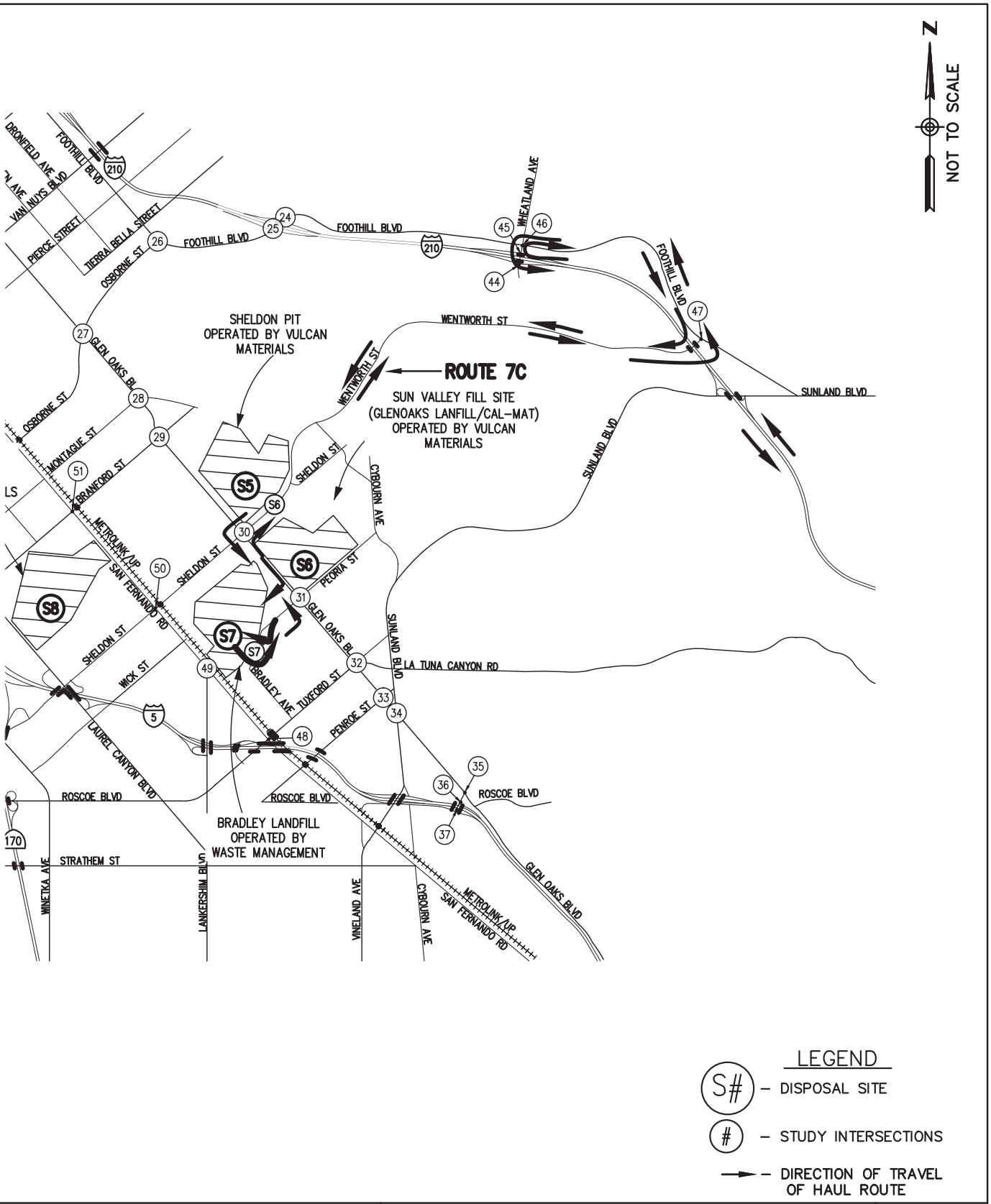

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HAUL ROUTE 7C

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-7

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-7.dwg
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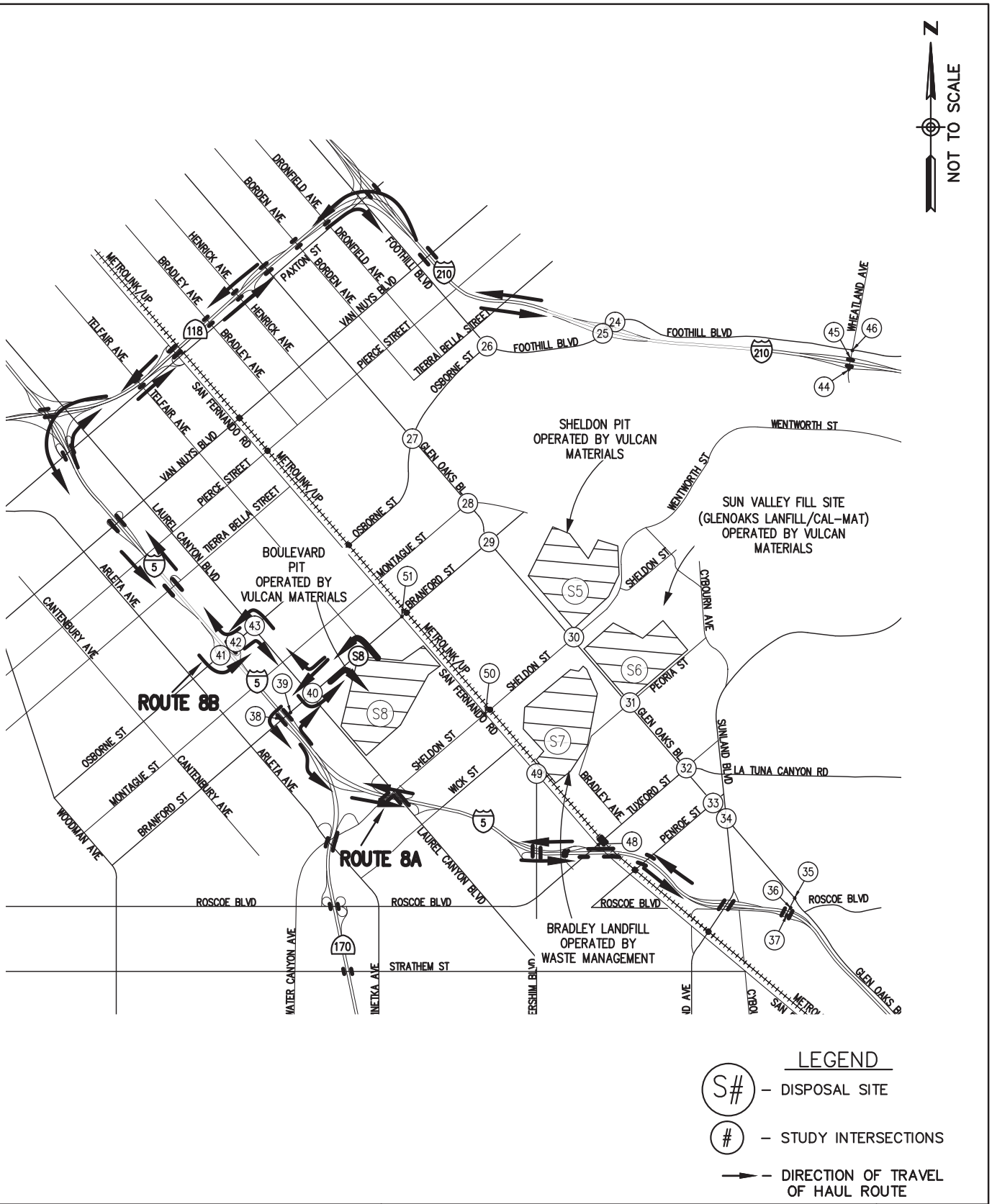

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HAUL ROUTE 8A/8B

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-4-8

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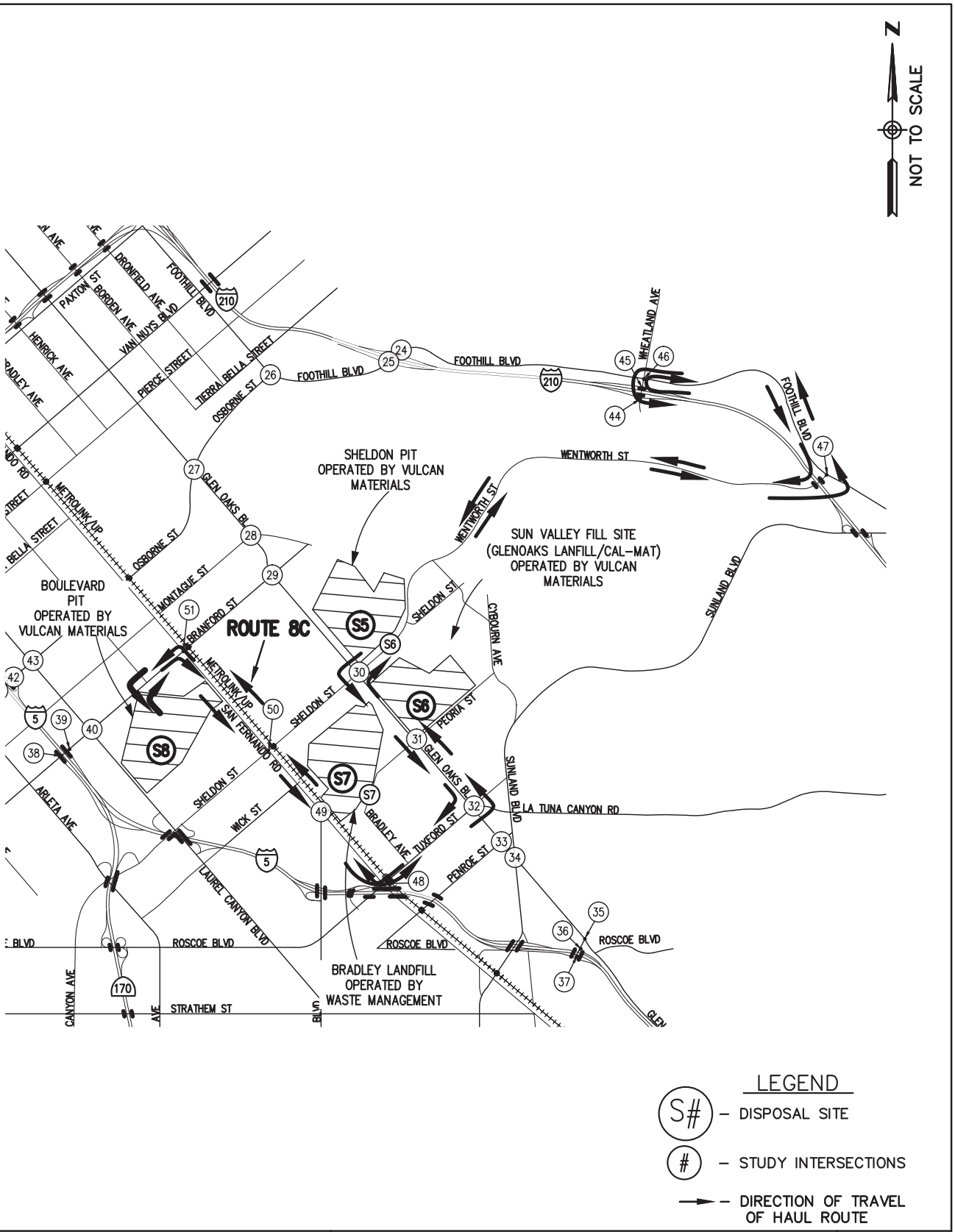

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HAUL ROUTE 8C

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-4-9

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N/S STREET				24		E/W STREET			
FOOTHILL BLVD						WB I-210 FWY RAMPS			
				490	390	0			
				205	255	0			
				225	260	0			
0	0	0						60	35	65
0	0	0		TS				0	0	0
0	0	0						170	115	255
				130	570	0			
				105	445	0			
				210	510	0			

N/S STREET				25		E/W STREET			
FOOTHILL BLVD						EB I-210 FWY RAMPS			
				0	355	195			
				0	305	75			
				0	460	55			
355	260	335						0	0	0
0	0	0		TS				0	0	0
100	40	80						0	0	0
				0	350	290			
				0	265	160			
				0	390	240			

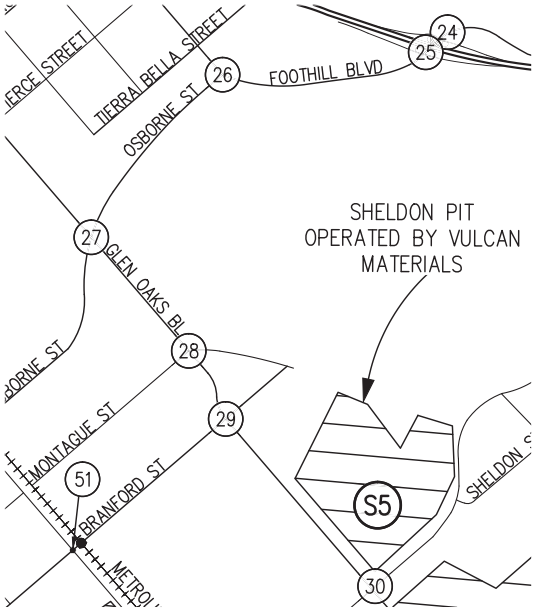
N/S STREET				26		E/W STREET			
OSBORNE STREET						FOOTHILL BLVD			
				5	5	5			
				15	5	5			
				15	5	5			
5	20	15						5	5	5
320	225	315		TS				245	200	305
520	25	265						260	165	205
				335	10	250			
				230	5	210			
				680	5	395			

N/S STREET				27		E/W STREET			
GLEN OAKS BLVD						OSBORNE STREET			
				170	1070	45			
				130	425	80			
				205	575	135			
300	170	240						70	70	100
535	425	690		TS				630	500	535
70	90	90						425	175	255
				50	520	135			
				80	635	150			
				120	875	340			

N/S STREET				28		E/W STREET			
GLEN OAKS BLVD						MONTAGUE STREET			
				55	####	15			
				35	525	35			
				25	855	15			
10	40	55						10	30	30
5	5	5		TS				5	5	5
30	45	60						5	35	10
				55	640	5			
				60	560	15			
				50	118 0	15			

N/S STREET				29		E/W STREET			
GLEN OAKS BLVD						BRANFORD STREET			
				175	1360	15			
				80	520	70			
				80	740	115			
130	150	220						10	85	100
15	85	110		TS				5	90	190
95	90	155						10	70	90
				95	595	10			
				90	565	70			
				115	945	105			

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				160	1235	85			
				95	490	50			
				145	730	90			
115	130	300						40	50	60
405	240	325		TS				595	285	325
45	80	65						90	45	40
				80	480	45			
				80	535	50			
				120	820	70			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

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BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, AND BRADLEY PIT EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-4-10A

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N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				40	1250	30			
				15	530	10			
				15	745	35			
15	25	40	⌟	⌜	↑	⌞	⌝	10	15	55
5	5	10	←	TS			←	5	5	5
5	30	20	⌝	⌜	↑	⌜	⌜	15	20	30
				15	525	25			
				25	525	15			
				25	975	25			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				125	1015	90			
				100	355	90			
				90	590	130			
115	110	140	⌟	⌜	↑	⌞	⌝	75	45	80
470	390	505	←	TS			←	565	425	345
45	60	95	⌝	⌜	↑	⌜	⌜	30	25	60
				95	395	20			
				110	435	30			
				120	800	60			

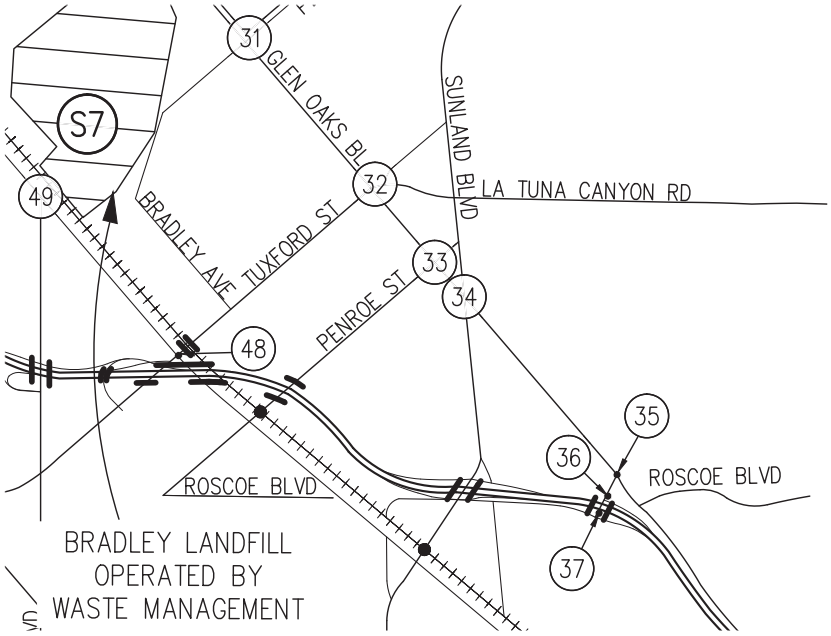
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				95	920	35			
				35	440	25			
				110	520	45			
120	90	185	⌟	⌜	↑	⌞	⌝	35	35	75
125	130	200	←	TS			←	70	85	140
20	50	55	⌝	⌜	↑	⌜	⌜	5	20	45
				25	365	5			
				45	465	25			
				75	700	40			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				205	640	10			
				170	305	35			
				50	510	50			
70	165	165	⌟	⌜	↑	⌞	⌝	20	15	5
670	430	650	←	TS			←	750	355	395
30	20	55	⌝	⌜	↑	⌜	⌜	205	320	360
				10	310	80			
				25	350	245			
				20	640	385			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				420	520	0			
				305	355	0			
				420	530	0			
175	240	545	⌟	⌜	↑	⌞	⌝	0	0	0
0	0	0	←	TS			←	0	0	0
75	90	120	⌝	⌜	↑	⌜	⌜	0	0	0
				70	275	0			
				75	370	0			
				65	540	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0	⌟	⌜	↑	⌞	⌝	0	0	0
90	120	110	←	TS			←	490	375	490
0	0	0	⌝	⌜	↑	⌜	⌜	0	0	0
				70	0	215			
				60	0	235			
				65	0	565			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	35	90			
				0	40	120			
				0	30	110			
0	0	0	⌟	⌜	↑	⌞	⌝	25	45	100
0	0	0	←	TS			←	0	0	0
0	0	0	⌝	⌜	↑	⌜	⌜	565	330	375
				0	0	0			
				0	0	0			
				0	0	0			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	⌟	⌜	↑	⌞	⌝	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			⌝	⌜	↑	⌜	⌜			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, AND BRADLEY PIT EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-4-10B

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N/S STREET	38	E/W STREET
SB I-5 FREEWAY RAMPS		BRANFORD STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	39	E/W STREET
NB I-5 FREEWAY RAMPS		BRANFORD STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	40	E/W STREET
LAUREL CANYON BLVD		BRANFORD STREET

				150	365	130				
				95	585	65				
				135	445	60				
150	115	190						110	85	125
145	170	380		TS				205	160	365
65	210	185						85	90	100
				90	585	140				
				85	460	85				
				115	1120	120				

N/S STREET	41	E/W STREET
SB I-5 FREEWAY RAMPS		OSBORNE STREET

				190	20	145				
				360	20	380				
				610	20	455				
0	0	0						515	220	225
795	595	895		TS				1155	910	1220
685	165	275						60	35	35
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	42	E/W STREET
NB I-5 FREEWAY RAMPS		OSBORNE STREET

				5	0	5				
				5	0	5				
				5	0	0				
5	5	5						25	15	30
955	955	1340		TS				1500	820	1075
0	0	0						0	0	0
				230	0	180				
				305	0	220				
				410	0	205				

N/S STREET	43	E/W STREET
LAUREL CANYON BLVD		OSBORNE STREET

				50	335	110				
				90	515	75				
				75	460	75				
120	90	95						170	110	110
840	995	1315		TS				1375	690	850
80	80	65						110	80	120
				85	605	105				
				80	460	90				
				160	1130	120				

N

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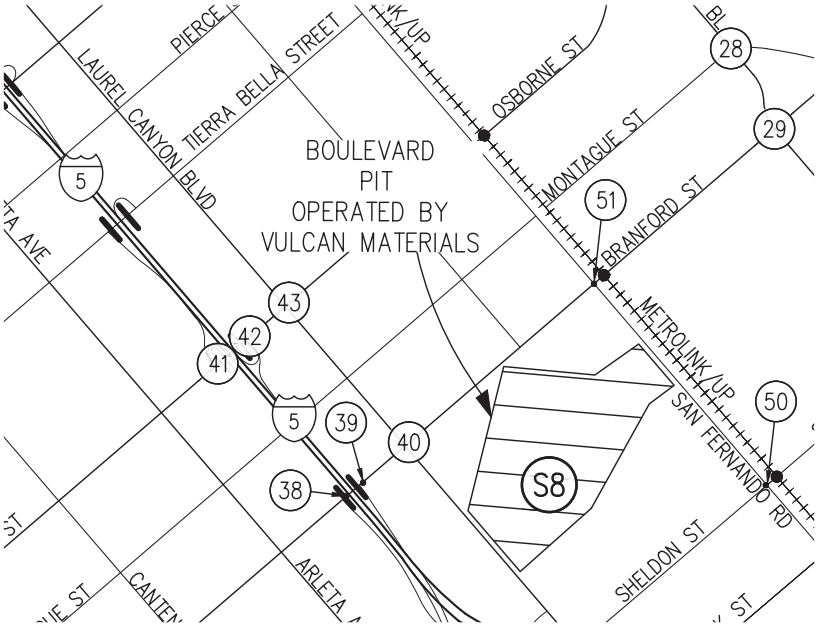

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N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

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BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, AND BRADLEY PIT EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-4-10C

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N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
				0	0	120			
				0	0	60			
				0	0	85			
105	75	100						0	0	0
5	5	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0			
				0	0	0			
				0	0	0			

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
				65	110	0			
				55	60	0			
				105	80	0			
0	0	0					100	40	120
0	0	0		TS			0	5	0
0	0	0					5	5	5
				5	100	0			
				5	55	0			
				5	95	0			

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
				5	15	15			
				15	20	5			
				5	20	10			
5	10	0					5	20	15
195	135	170		TS			220	130	215
90	35	80					80	65	95
				70	10	110			
				40	25	50			
				90	25	100			

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0					0	0	0
200	165	200		TS			175	155	295
165	95	125					440	215	215
				100	0	225			
				100	0	185			
				160	0	420			

N/S STREET				48		E/W STREET			
SAN FERNANDO ROAD						TUXFORD STREET			
				70	325	125			
				70	220	60			
				40	275	90			
65	80	30					105	100	130
515	380	570		TS			650	355	430
110	185	145					115	175	80
				250	210	60			
				315	185	135			
				330	580	65			

N/S STREET				49		E/W STREET			
SAN FERNANDO ROAD						LANKERSHIM BLVD			
				470	445	0			
				280	305	0			
				360	310	0			
225	275	550					0	0	0
0	0	0		TS			0	0	0
35	60	55					0	0	0
				50	260	0			
				55	285	0			
				80	620	0			

N/S STREET				50		E/W STREET			
SAN FERNANDO ROAD						SHELDON STREET			
				85	610	65			
				45	335	65			
				30	595	75			
60	60	125					55	55	100
355	320	560		TS			635	320	405
75	40	65					220	125	165
				35	290	80			
				50	375	95			
				115	975	160			

N/S STREET				51		E/W STREET			
SAN FERNANDO ROAD						BRANFORD STREET			
				70	635	40			
				55	330	65			
				115	530	100			
35	35	90					20	45	105
300	180	385		TS			145	150	285
105	45	105					55	70	125
				50	240	90			
				50	345	70			
				170	820	130			

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

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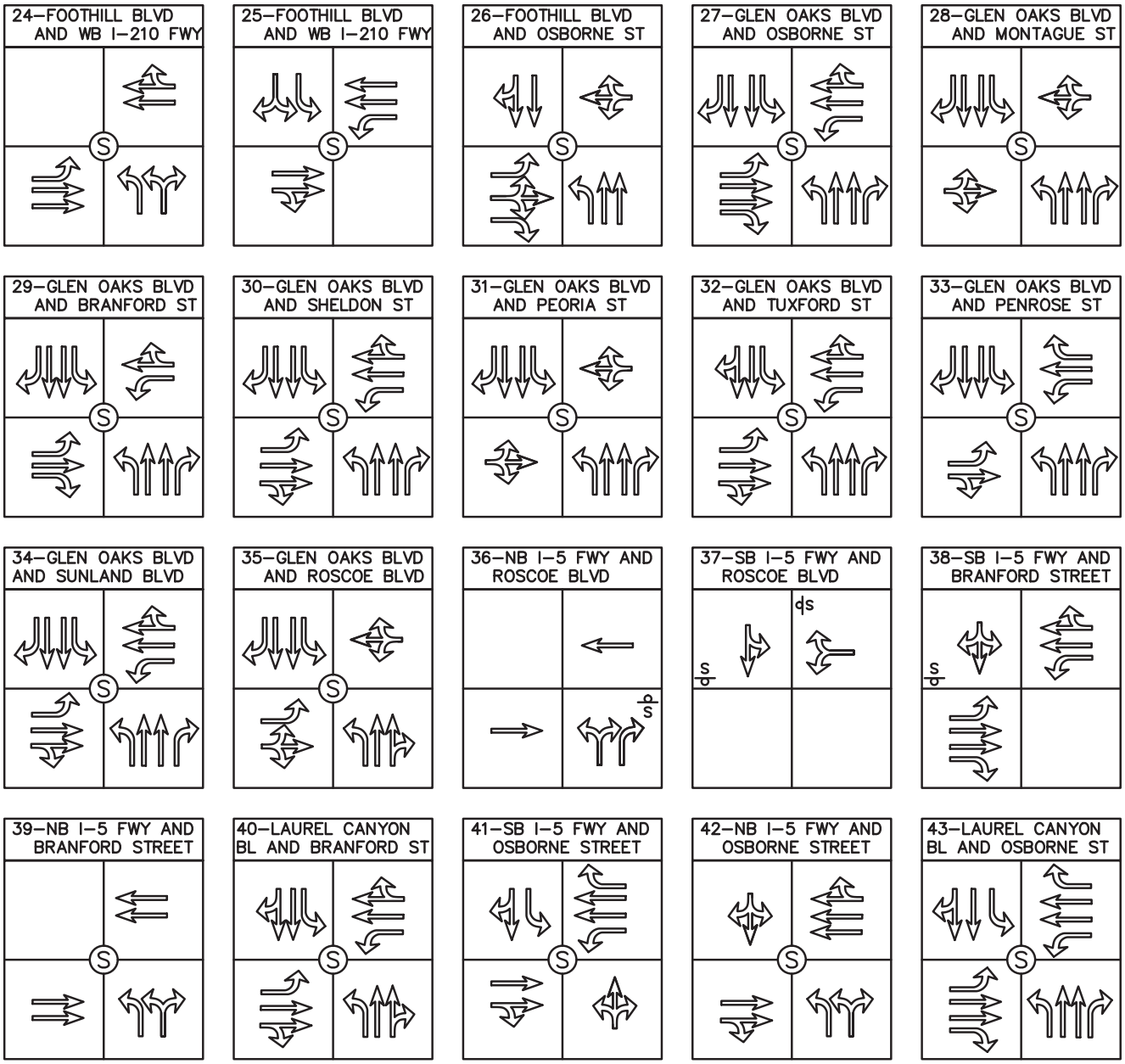
BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, BRADLEY PIT EXISTING VOLUMES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-4-10D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3-4-10D.dwg
Last Opened: Oct 04, 2013 - 9:47am by: TMunoz



LEGEND

(#) – STUDY INTERSECTIONS

(S) – SIGNALIZED INTERSECTION

p/s – UNSIGNALIZED INTERSECTION

* – FREE RIGHT TURN

⟸ – EXISTING GEOMETRIC

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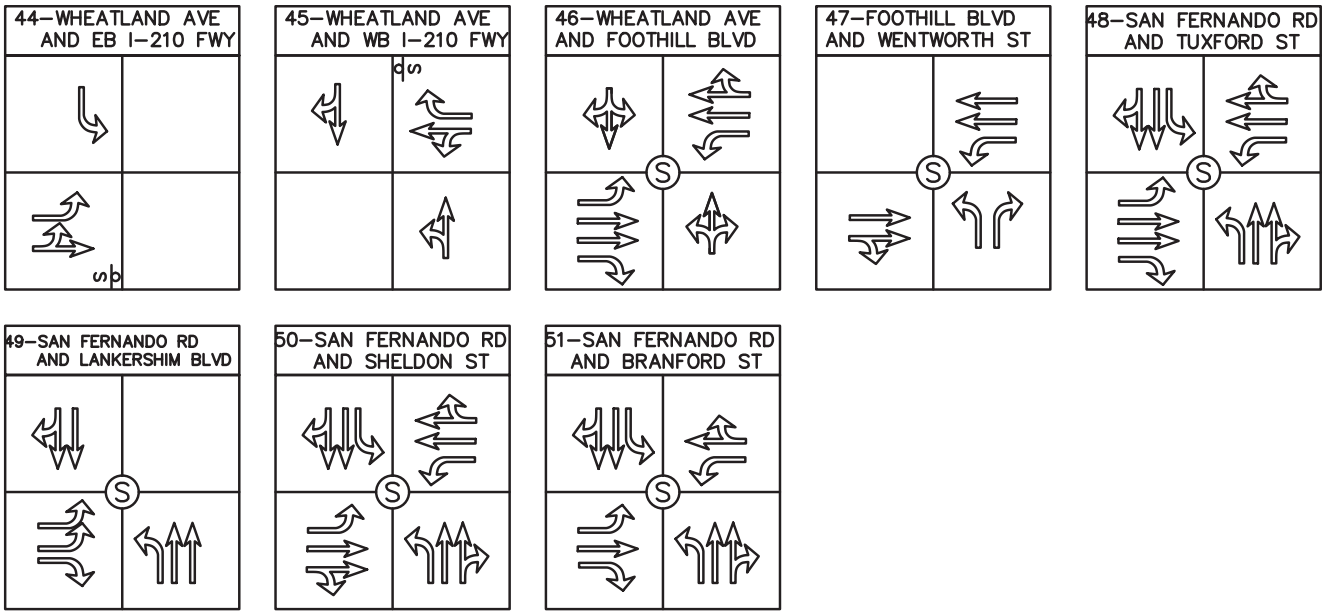
BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, AND BRADLEY PIT EXISTING GEOMETRICS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3–4–11A

Drawing Name: V:\110264\Eng\110264–000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3–4–11A.dwg
Last Opened: Oct 04, 2013 – 9:47am by: TMunoz



LEGEND

(#) – STUDY INTERSECTIONS

(S) – SIGNALIZED INTERSECTION

p/s – UNSIGNALIZED INTERSECTION

* – FREE RIGHT TURN

⇐ – EXISTING GEOMETRIC

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BOULEVARD PIT, SUN VALLEY FILL, SHELDON PIT, AND BRADLEY PIT EXISTING GEOMETRICS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3–4–11B

Drawing Name: V:\110264\Eng\110264–000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 4\FIG 3–4–11B.dwg
Last Opened: Oct 04, 2013 – 9:47am by: TMunoz

Table 3-4-1
Intersection Capacity Analysis – Existing Conditions (Route 5A)

Route 5A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	6.7	0.51	A	A	4.5	0.24	A	A	6.9	0.46	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.7	0.60	A	A	6.5	0.28	A	A	7.1	0.39	A
26	Foothill Blvd and Osborne Street	B	19.3	0.89	C	A	8.2	0.42	A	B	13.2	0.73	C
27	Glenoaks Blvd and Osborne Street	E	74.4	0.99	E	C	31.3	0.74	B	D	40.7	0.90	D
28	Glenoaks Blvd and Montague Street	A	8.7	0.69	B	B	14.6	0.34	A	A	9.5	0.55	B
29	Glenoaks Blvd and Branford Street	B	14.6	0.77	C	B	12.0	0.58	A	C	21.9	0.76	D
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-2
Intersection Capacity Analysis – Existing Conditions (Route 5B)

Route 5B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.7	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
31	Glenoaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A
32	Glenoaks Blvd and Tuxford Street	B	12.0	0.77	D	A	7.2	0.42	A	A	8.7	0.54	B
33	Glenoaks Blvd and Penrose Street	A	6.2	0.52	A	A	5.8	0.32	A	A	9.0	0.63	A
34	Glenoaks Blvd and Sunland Blvd	C	25.1	0.83	B	B	14.8	0.60	B	C	22.6	0.83	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.1	0.36	A	A	6.6	0.36	A	A	9.1	0.58	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.1	-	-	B	11.0	-	-	C	17.7	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-3
Intersection Capacity Analysis – Existing Conditions (Route 5C)

Route 5C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	A	9.2	-	-	A	6.6	-	-	A	9.0	-	-
46	Wheatland Ave and Foothill Blvd	A	9.6	0.25	A	A	9.3	0.19	A	A	9.4	0.27	A
47	Wentworth Street and Foothill Blvd	B	17.6	0.69	A	B	12.1	0.35	A	A	9.0	0.42	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Sheldon Pit (Site 5) Analysis

As presented in *Table 3-4-1* thru *Table 3-4-3*, under the existing conditions for Site 5 (Route 5A-5C) most of the study intersections are operating at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street included in Haul Route 5A, currently operates at a HCM LOS E during the AM peak hour. Under existing conditions, mitigation is recommended for Glenoaks Blvd and Osborne Street to improve the intersection to an acceptable level-of-service. All other intersections are operating with an acceptable HCM LOS and thus mitigation is not required under existing conditions for those intersections.

Table 3-4-4
Intersection Capacity Analysis – Existing Conditions (Route 6A)

Route 6A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	6.7	0.51	A	A	4.5	0.24	A	A	6.9	0.46	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.7	0.60	A	A	6.5	0.28	A	A	7.1	0.39	A
26	Foothill Blvd and Osborne Street	B	19.3	0.89	C	A	8.2	0.42	A	B	13.2	0.73	C
27	Glenoaks Blvd and Osborne Street	E	74.4	0.99	E	C	31.3	0.74	B	D	40.7	0.90	D
28	Glenoaks Blvd and Montague Street	A	8.7	0.69	B	B	14.6	0.34	A	A	9.5	0.55	B
29	Glenoaks Blvd and Branford Street	B	14.6	0.77	C	B	12.0	0.58	A	C	21.9	0.76	D
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc**

Table 3-4-5
Intersection Capacity Analysis – Existing Conditions (Route 6B)

Route 6B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
31	Glenoaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A
32	Glenoaks Blvd and Tuxford Street	B	12.0	0.77	D	A	7.2	0.42	A	A	8.7	0.54	B
33	Glenoaks Blvd and Penrose Street	A	6.2	0.52	A	A	5.8	0.32	A	A	9.0	0.63	A
34	Glenoaks Blvd and Sunland Blvd	C	25.1	0.83	B	B	14.8	0.60	B	C	22.6	0.83	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.1	0.36	A	A	6.6	0.36	A	A	9.1	0.58	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.1	-	-	B	11.0	-	-	C	17.7	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-6
Intersection Capacity Analysis – Existing Conditions (Route 6C)

Route 6C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	A	9.2	-	-	A	6.6	-	-	A	9	-	-
46	Wheatland Ave and Foothill Blvd	A	9.6	0.25	A	A	9.3	0.19	A	A	9.4	0.27	A
47	Wentworth Street and Foothill Blvd	B	17.6	0.69	A	B	12.1	0.35	A	A	9	0.42	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Sun Valley Fill Site (Site 6) Analysis

As presented in *Table 3-4-4* thru *Table 3-4-6*, under the existing conditions for Site 6 (Route 6A-6C) most of the study intersections are operating at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street included in Haul Route 6A, currently operates at a HCM LOS E during the AM peak hour. Under existing conditions, mitigation is recommended for Glenoaks Blvd and Osborne Street to improve the intersection to an acceptable level-of-service. All other intersections are operating with an acceptable HCM LOS and thus mitigation is not required under existing conditions for those intersections.

Table 3-4-7
Intersection Capacity Analysis – Existing Conditions (Route 7A)

Route 7A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	6.7	0.51	A	A	4.5	0.24	A	A	6.9	0.46	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.7	0.60	A	A	6.5	0.28	A	A	7.1	0.39	A
26	Foothill Blvd and Osborne Street	B	19.3	0.89	C	A	8.2	0.42	A	B	13.2	0.73	C
27	Glenoaks Blvd and Osborne Street	E	74.4	0.99	E	C	31.3	0.74	B	D	40.7	0.90	D
28	Glenoaks Blvd and Montague Street	A	8.7	0.69	B	B	14.6	0.34	A	A	9.5	0.55	B
29	Glenoaks Blvd and Branford Street	B	14.6	0.77	C	B	12.0	0.58	A	C	21.9	0.76	D
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
31	Glenoaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-8
Intersection Capacity Analysis – Existing Conditions (Route 7B)

Route 7B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
31	Glenoaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A
32	Glenoaks Blvd and Tuxford Street	B	12.0	0.77	D	A	7.2	0.42	A	A	8.7	0.54	B
33	Glenoaks Blvd and Penrose Street	A	6.2	0.52	A	A	5.8	0.32	A	A	9.0	0.63	A
34	Glenoaks Blvd and Sunland Blvd	C	25.1	0.83	B	B	14.8	0.60	B	C	22.6	0.83	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.1	0.36	A	A	6.6	0.36	A	A	9.1	0.58	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.1	-	-	B	11.0	-	-	C	17.7	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-9
Intersection Capacity Analysis – Existing Conditions (Route 7C)

Route 7C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
31	Glenoaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	A	9.2	-	-	A	6.6	-	-	A	9	-	-
46	Wheatland Ave and Foothill Blvd	A	9.6	0.25	A	A	9.3	0.19	A	A	9.4	0.27	A
47	Wentworth Street and Foothill Blvd	B	17.6	0.69	A	B	12.1	0.35	A	A	9	0.42	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Bradley Landfill (Site 7) Analysis

As presented in *Table 3-4-7* thru *Table 3-4-9*, under the existing conditions for Site 7 (Route 7A-7C) all intersections are operating at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street included in Haul Route 7A, currently operates at a HCM LOS E during the AM peak hour. Under existing conditions, mitigation is recommended for Glenoaks Blvd and Osborne Street to improve the intersection to an acceptable level-of-service. All other intersections are operating with an acceptable HCM LOS and thus mitigation is not required under existing conditions for those intersections.

Table 3-4-10
Intersection Capacity Analysis – Existing Conditions (Route 8A)

Route 8A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
38	Branford Street and I-5 Freeway Southbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
39	Branford Street and I-5 Freeway Northbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
40	Branford Street and Laurel Canyon Blvd	B	10.2	0.51	B	A	9.5	0.98	A	B	13.4	0.76	D

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-11

Intersection Capacity Analysis – Existing Conditions (Route 8B)

Route 8B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
40	Branford Street and Laurel Canyon Blvd	B	10.2	0.51	B	A	9.5	0.98	A	B	13.4	0.76	D
41	Osborne Street and I-5 Freeway Southbound Ramps	B	11.2	0.66	C	B	12.7	0.76	B	C	23.5	0.91	D
42	Osborne Street and I-5 Freeway Northbound Ramps	B	13.3	0.69	A	B	10.8	0.62	A	C	14.6	0.83	C
43	Osborne Street and Laurel Canyon Blvd	C	30.9	0.90	D	C	20.4	0.70	C	D	44.9	1.01	F

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 3-4-12

Intersection Capacity Analysis – Existing Conditions (Route 8C)

Route 8C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glen Oaks Blvd and Sheldon Street	B	11.2	0.75	D	A	7.2	0.44	A	B	11.2	0.75	C
31	Glen Oaks Blvd and Peoria Street	B	10.3	0.54	A	B	11.4	0.34	A	B	13.4	0.52	A
32	Glen Oaks Blvd and Tuxford Street	B	12.0	0.77	D	A	7.2	0.42	A	A	8.7	0.54	B
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramp	A	9.2	-	-	A	6.6	-	-	A	9	-	-
46	Wheatland Ave and Foothill Blvd	A	9.6	0.25	A	A	9.3	0.19	A	A	9.4	0.27	A
47	Wentworth Street and Foothill Blvd	B	17.6	0.69	A	B	12.1	0.35	A	A	9	0.42	A
48	Tuxford Street and San Fernando Road	C	30.0	0.67	B	C	34.0	0.69	B	C	33.2	0.73	B
49	Lankershim Blvd and San Fernando Road	A	6.6	0.46	A	A	6.8	0.36	A	A	8.5	0.46	A
50	Sheldon Street and San Fernando Road	C	30.9	0.74	B	C	23.7	0.46	A	D	40.5	0.94	D
51	Branford Street and San Fernando Road	C	26.3	0.81	B	C	20.3	0.44	A	E	62.7	0.92	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Boulevard Pit (Site 8) Analysis

As presented in *Table 3-4-10* thru *Table 3-4-12*, under the existing conditions for Site 8 (Routes 8A-8C) all intersections are operating at an acceptable HCM LOS of D or better for the AM, Mid-day, and PM peak hours with the exception of intersection of Branford Street and San Fernando Road. The Intersection of Branford Street and San Fernando Road is included in Haul Route 8C and is operating at a HCM LOS E during the PM peak hour. Under existing conditions, mitigation is recommended at Branford Street and San Fernando Road to improve the intersection to an acceptable level-of-service. All other intersections are operating with an acceptable HCM LOS and thus mitigation is not required under existing conditions for those intersections.

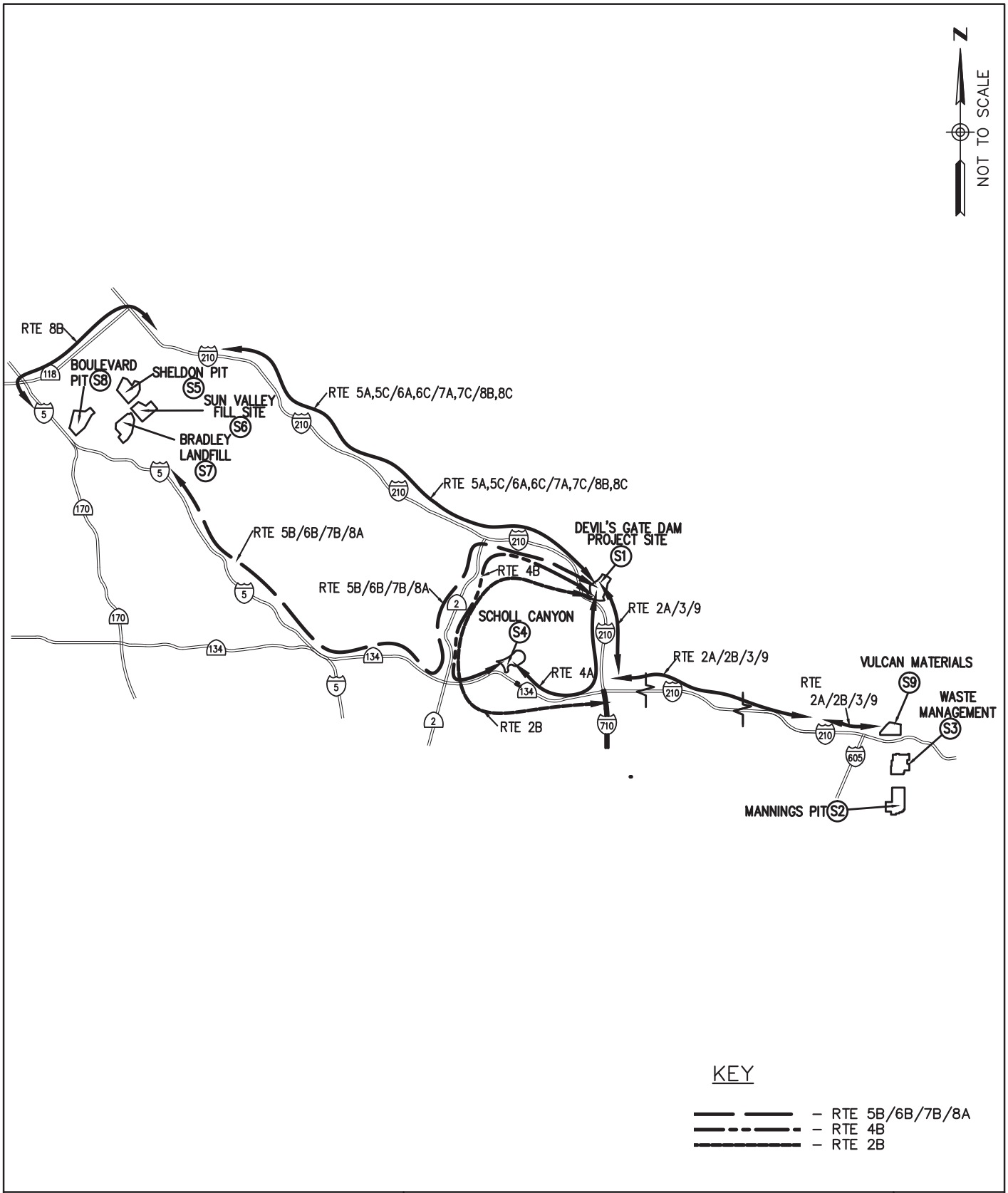
Existing Intersection Capacity Analysis

In Summary, most of the intersections associated with the twenty five routes are operating at an acceptable level of service with the exception of two intersections that mitigation is recommended to improve the level of service, during the AM or PM peak hours, prior to the introduction of the project trips. The Intersections include Glenoaks Blvd and Osborne Street (Haul Routes 5A, 6A, 7A) with an AM peak hour LOS E, and Branford Street and San Fernando Road (Haul Route 8C) with a PM peak hour LOS E.

Section E: (Caltrans)

The proposed haul routes for the Devil's Gate Reservoir Sediment Removal and Management Project will require the expected truck trips to travel through the I-210, I-5, SR-2, and SR-134 freeways from which 28 freeway segments and 54 ramps were identified for analysis. The HCM LOS analysis done on the freeway and ramps will be per Caltrans requirements, which consists of the use of the HCM 2010 methodologies. To determine the HCM LOS per the HCM 2010 methodology, Highway Capacity (HCS) 2010 software, which is developed by McTrans, was used for the freeway mainline analysis, ramp analysis, and weaving analysis.

The freeway system proposed to be utilized by the haul routes is illustrated in *Figure 3-5-1*, providing study haul route utilization. The 28 freeway segments identified for analysis are illustrated in *Figure 3-5-2*. *Figure 3-5-3* through *Figure 3-5-12* provide the identified 28 freeway segments and 53 ramps by segment. Existing AM (7-9), MID-DAY (12-2), and PM (4-6) freeway segment volumes are provided in *Figure 3-5-13* and *Figure 3-5-14.* Existing AM (7-9), MID-DAY (12-2), and PM (4-6) ramp volumes are provided in *Figure 3-5-15* and *Figure 3-5-16.*



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FREEWAY SYSTEM

DEVIL'S GATE DAM & RESERVOIR

FIGURE
3-5-1

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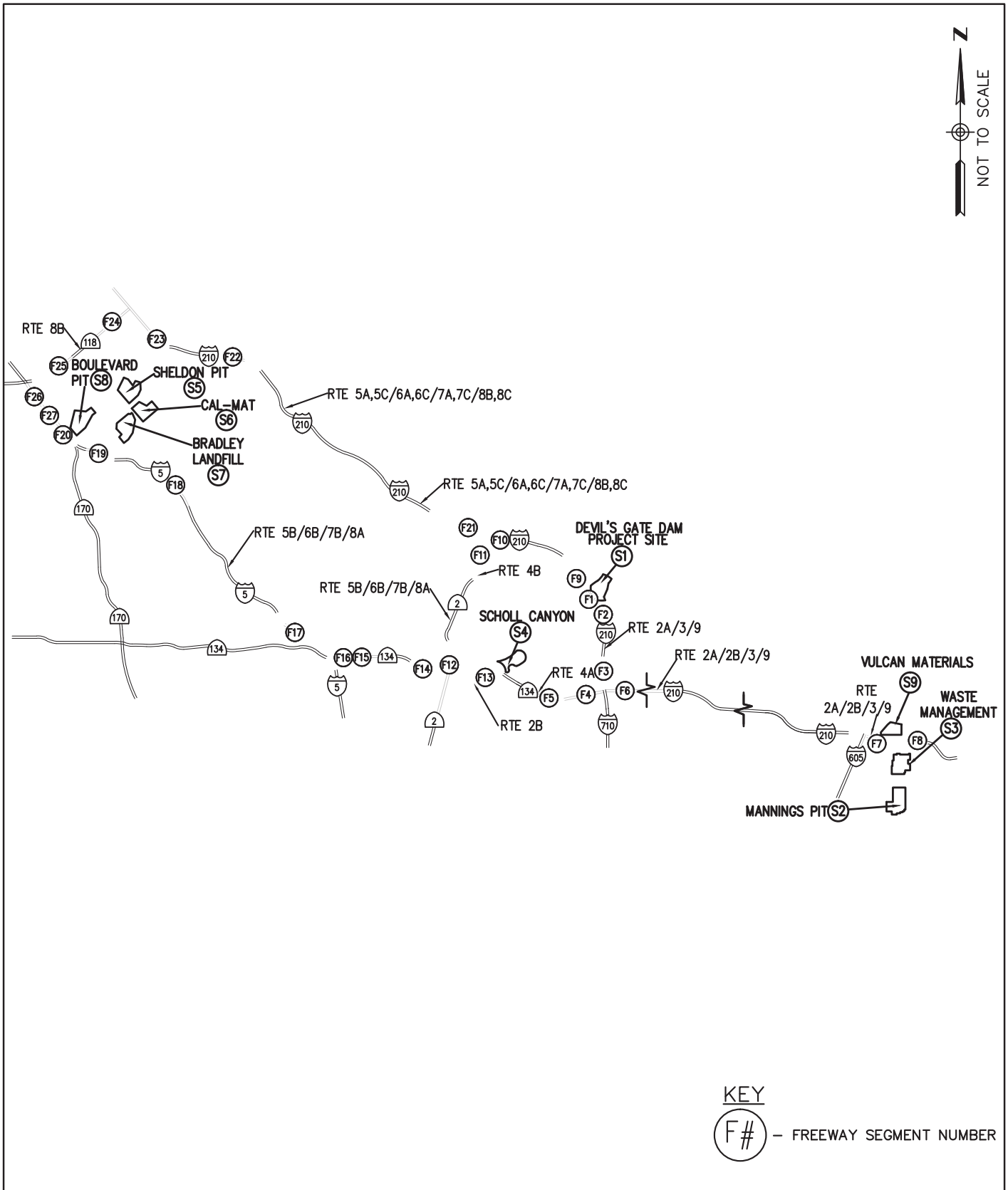

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LOCATION OF FREEWAY SEGMENTS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-2

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KEY

F# – FREEWAY SEGMENT NUMBER

– RAMPS WITH ENTERING OR EXITING TRUCKS TO BE ANALYZED

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FREEWAY SEGMENTS 1, 2, AND 9

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-3

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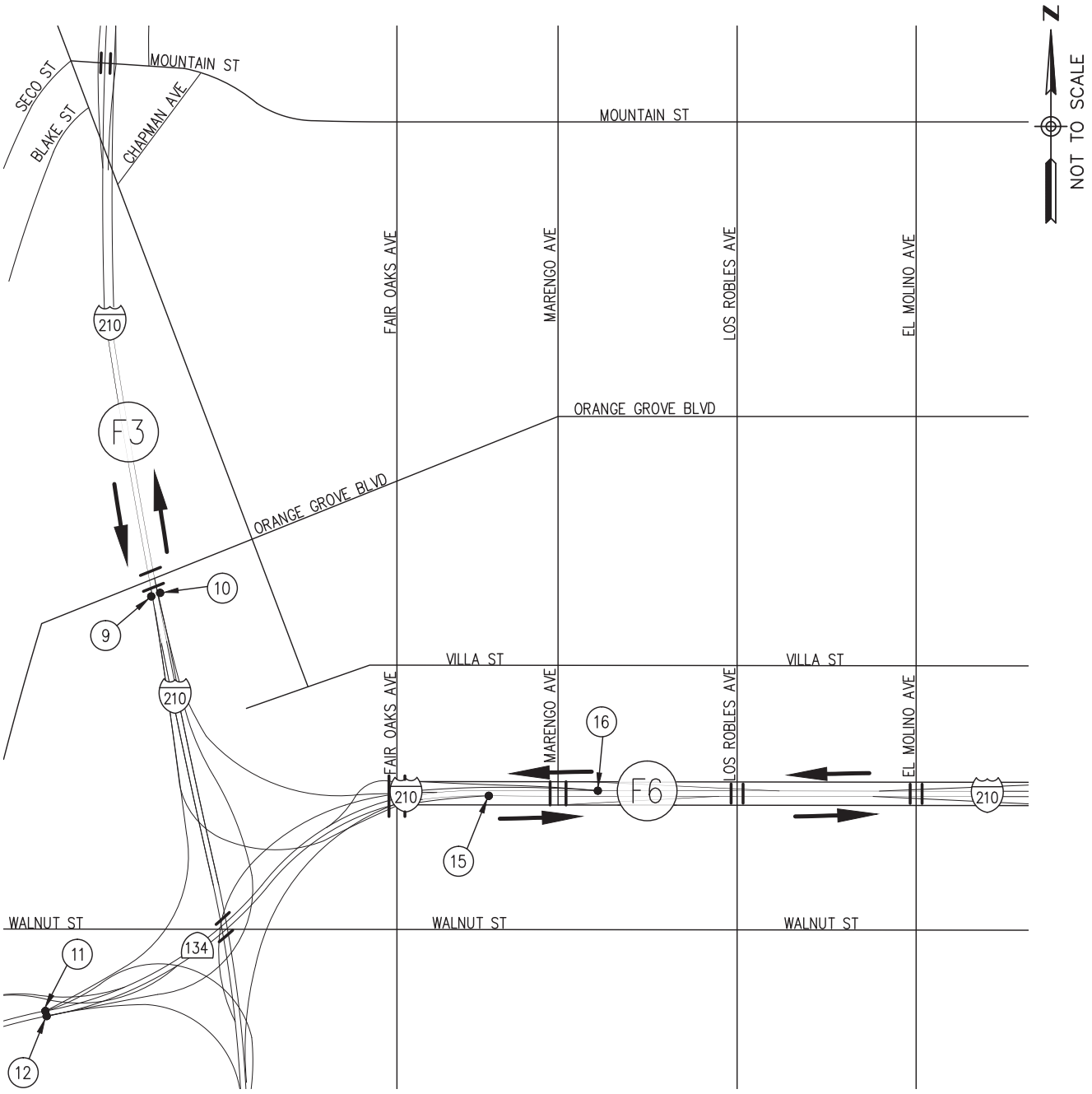

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FREEWAY SEGMENTS 3 AND 6

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-4

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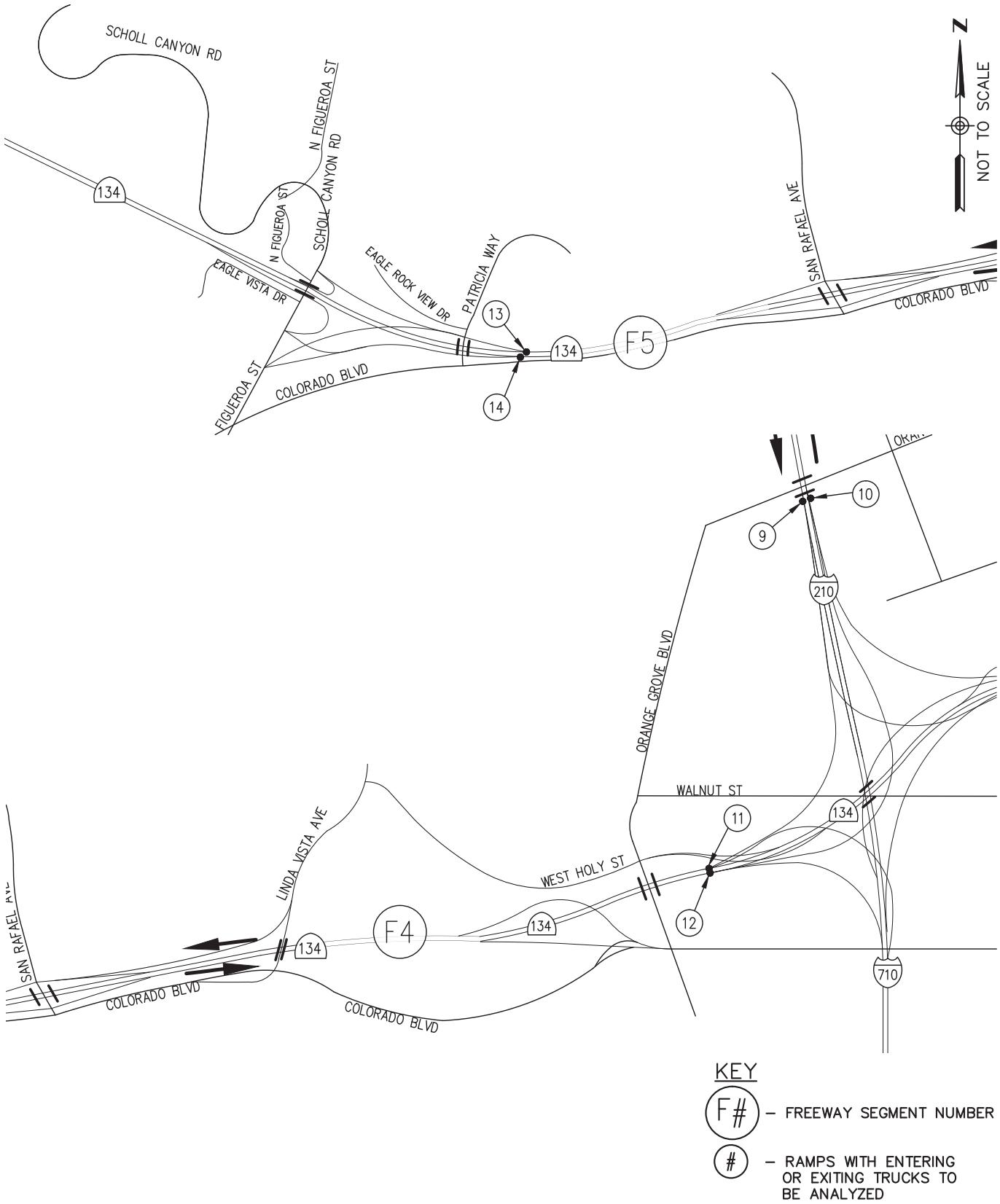

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FREEWAY SEGMENTS 4 AND 5

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-5

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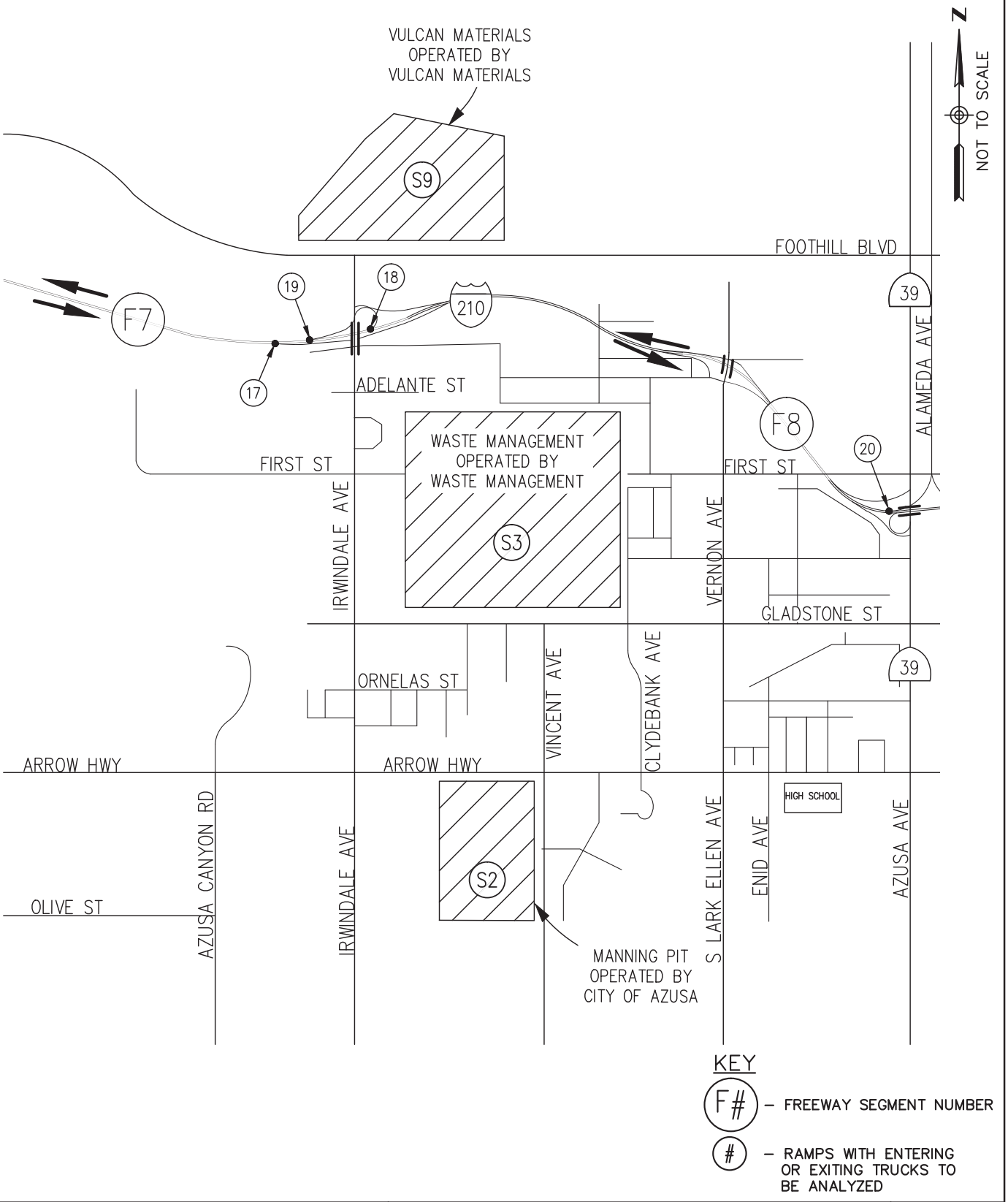

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FREEWAY SEGMENTS 7, AND 8

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-6

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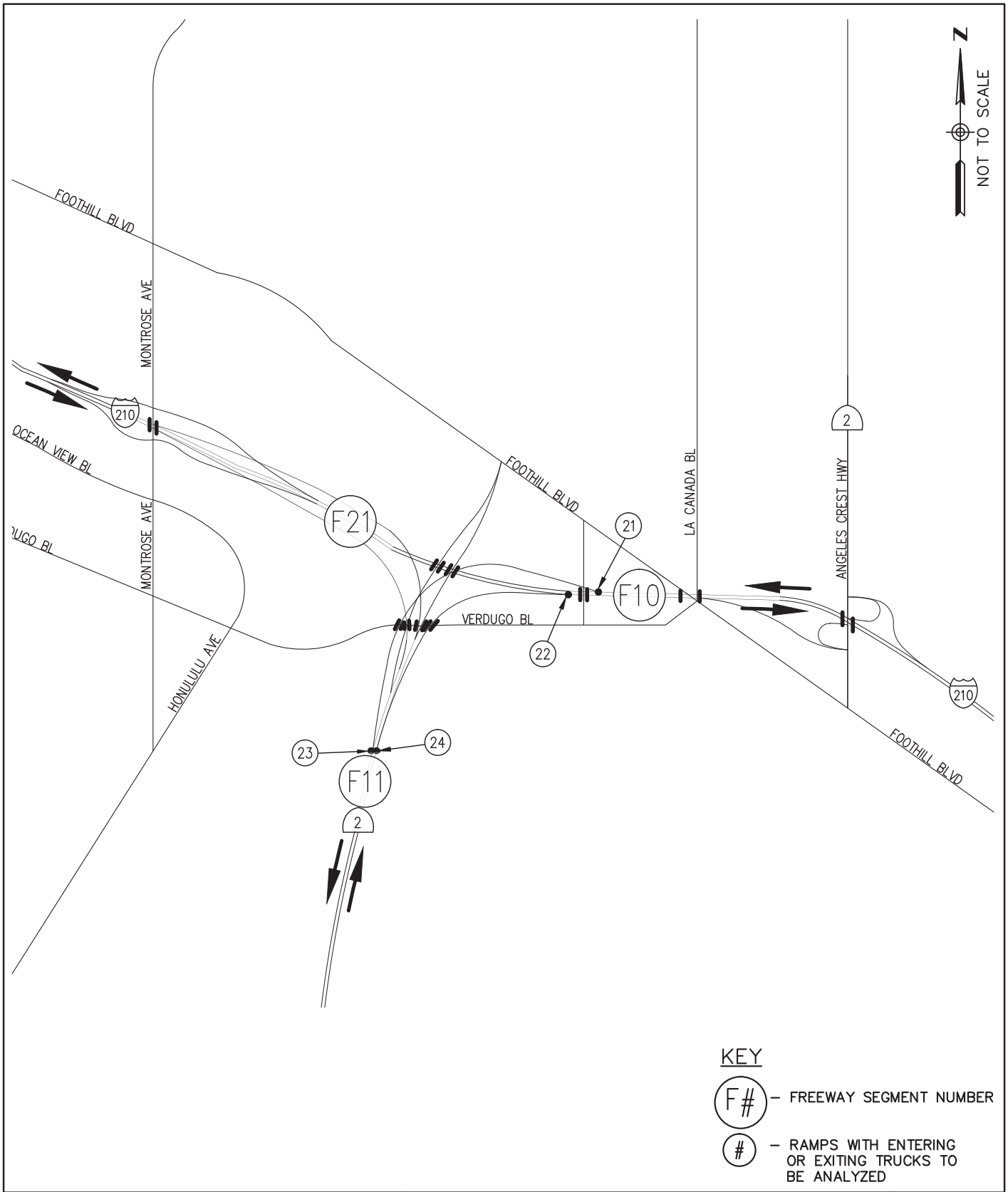

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FREEWAY SEGMENTS 10, 11, AND 21

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-7

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FREEWAY SEGMENTS 12 AND 14

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-5-8

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 3\Ch. 3 Section 5\FIG 3-5-8.dwg
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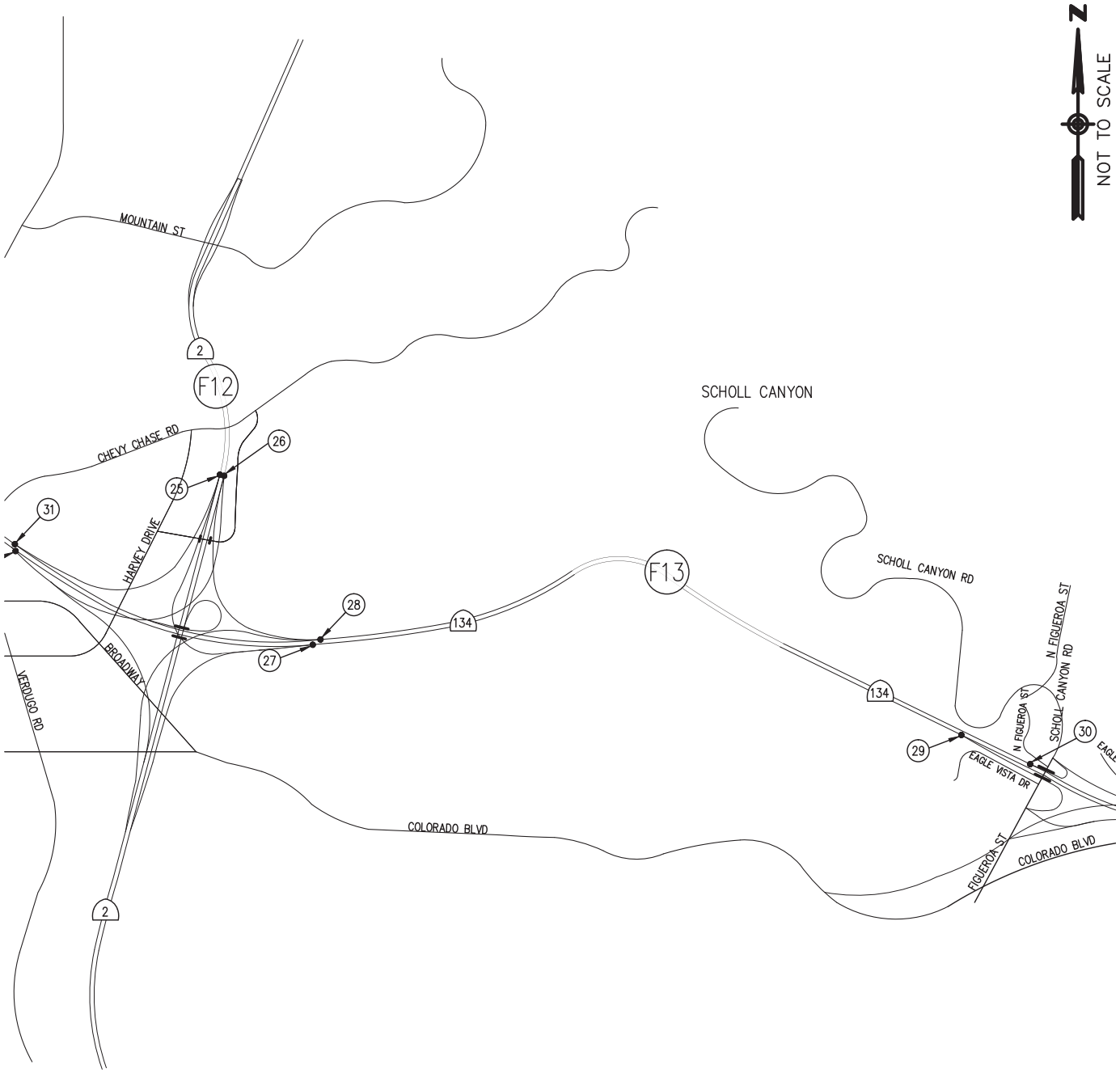

KEY

(F#) – FREEWAY SEGMENT NUMBER

(#) – RAMPS WITH ENTERING OR EXITING TRUCKS TO BE ANALYZED

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FREEWAY SEGMENTS 12 AND 13

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-9

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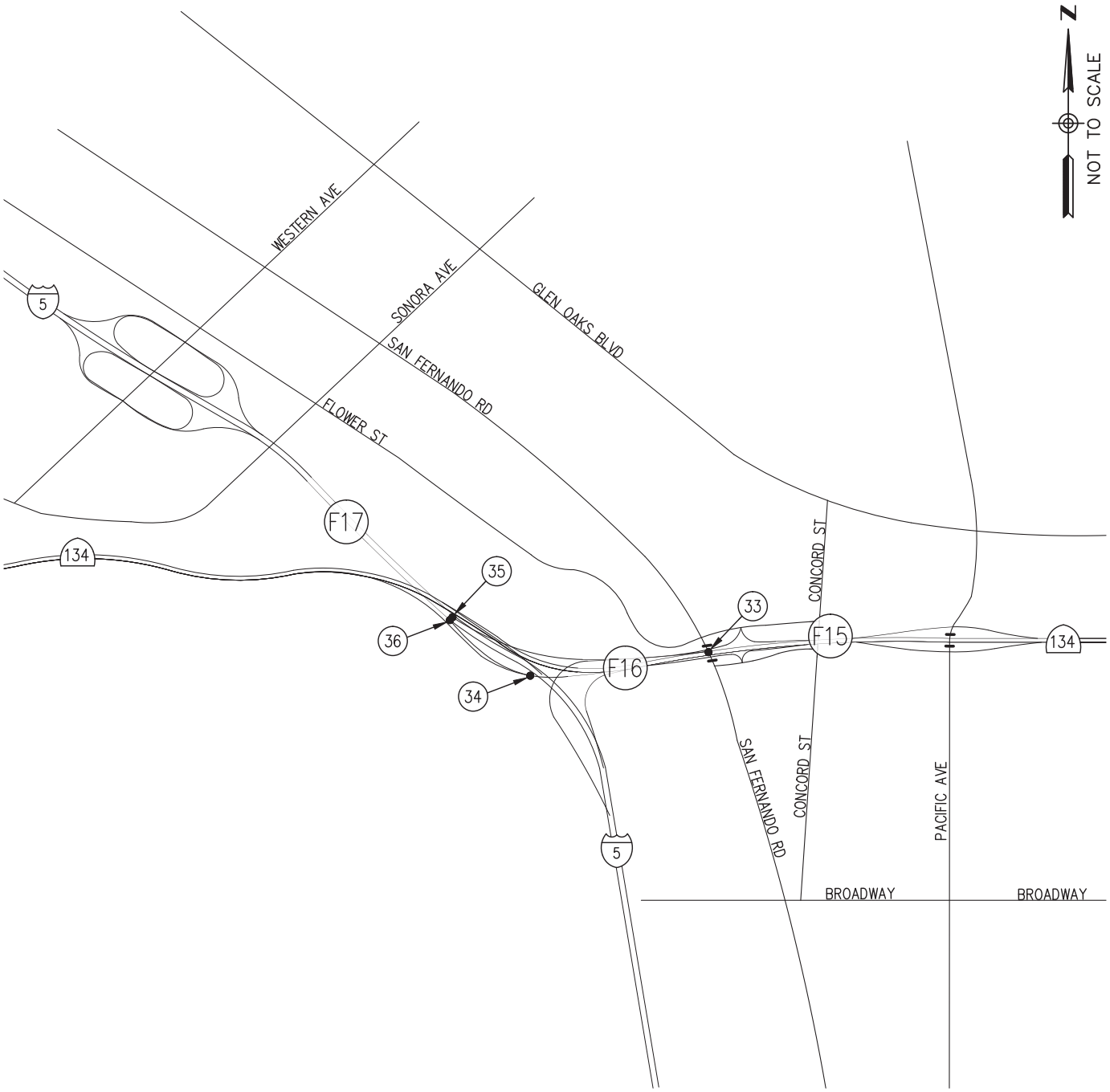

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FREEWAY SEGMENTS 15, 16, AND 17

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-5-10

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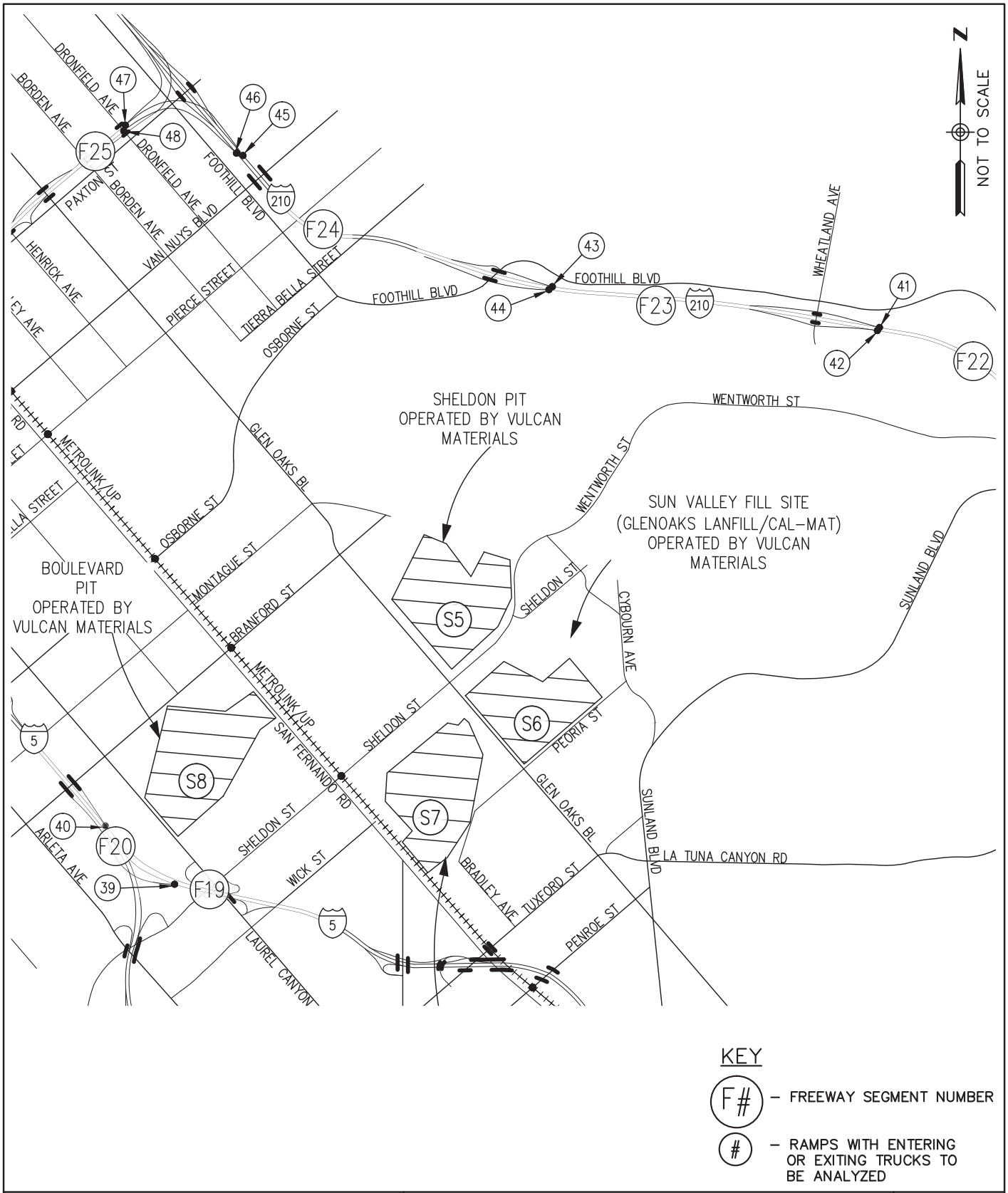

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FREEWAY SEGMENTS 19, 20, 22, 23, 24, AND 25

DEVIL'S GATE DAM & RESERVOIR

FIGURE

3-5-11

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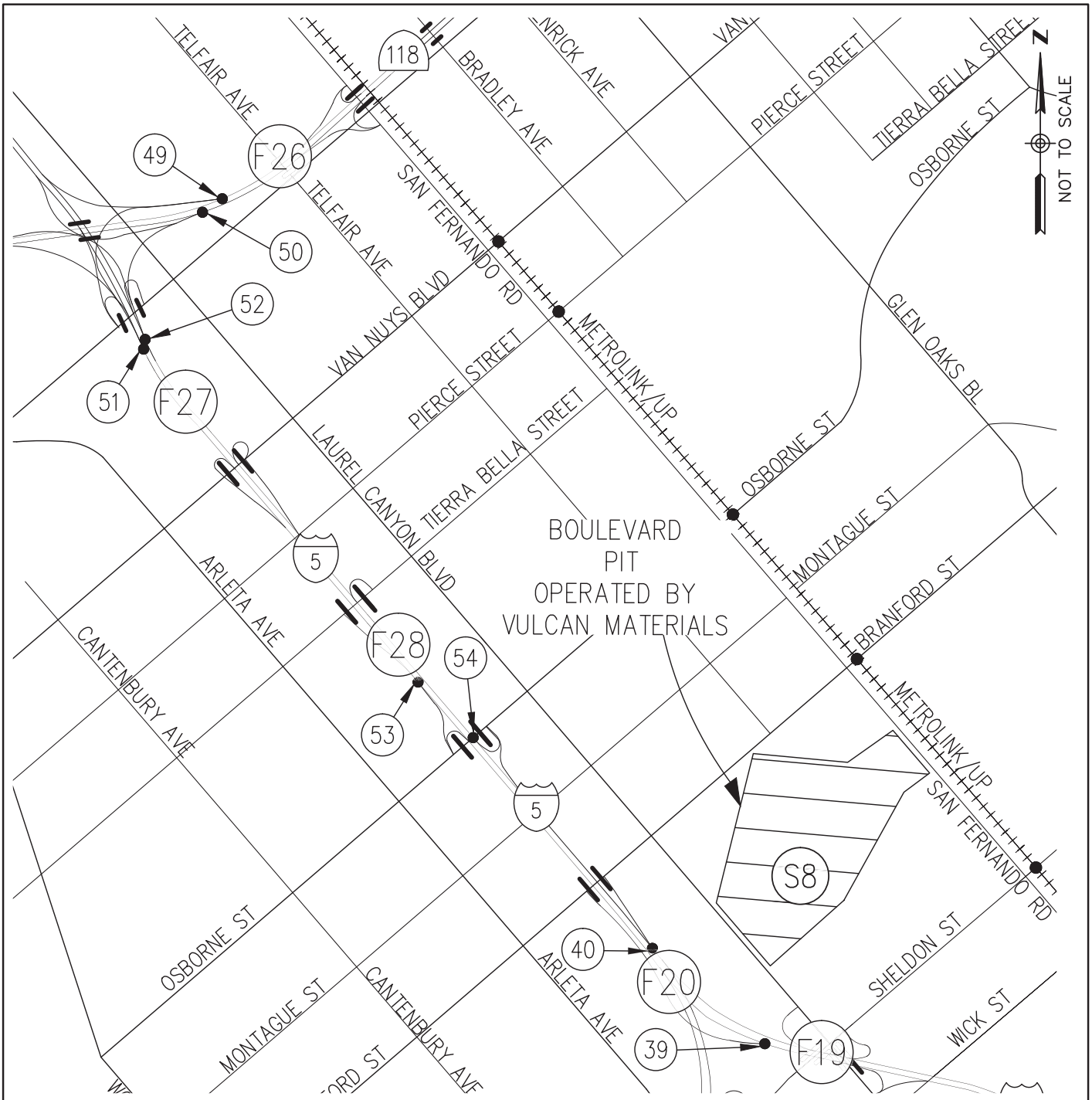

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FREEWAY SEGMENTS 19, 20, 26, 27, AND 28

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-12

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S1–EB I–210 FWY		S1–WB I–210 FWY	
SEGMENT BETWEEN BERKSHIRE PLACE AND WINDSOR AVE.		SEGMENT BETWEEN WINDSOR AVE AND BERKSHIRE PLACE .	
AM	5570→	AM	←3365
MID–DAY	3510→	MID–DAY	←2460
PM	4335→	PM	←4060

S2–EB I–210 FWY		S2–WB I–210 FWY	
SEGMENT BETWEEN WINDSOR AVE AND LINCOLN AVE.		SEGMENT BETWEEN LINCOLN AVE AND WINDSOR AVE.	
AM	5715→	AM	←3780
MID–DAY	3650→	MID–DAY	←3635
PM	4400→	PM	←5610

S3–EB I–210 FWY		S3–WB I–210 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND SR–134/1–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/1–210 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	5520→	AM	←4775
MID–DAY	3495→	MID–DAY	←3905
PM	4100→	PM	←5615

S4–EB SR–134 FWY		S4–WB SR–134 FWY	
SEGMENT BETWEEN FIGUEROA ST AND SAN RAFAEL AVE.		SEGMENT BETWEEN SAN RAFAEL AVE AND FIGUEROA ST.	
AM	5970→	AM	←7980
MID–DAY	5610→	MID–DAY	←5610
PM	6725→	PM	←7375

S5–EB SR–134 FWY		S5–WB SR–134 FWY	
SEGMENT BETWEEN SAN RAFAEL AVE AND SR–134/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/I–210 FWY INTERCHANGE AND SAN RAFAEL AVENUE.	
AM	7415→	AM	←7470*
MID–DAY	6630→	MID–DAY	←5215*
PM	8085→	PM	←7100*

S6–EB I–210 FWY		S6–WB I–210 FWY	
SEGMENT BETWEEN WB SR–134/EB I–210 FWY INTERCHANGE AND LAKE AVE.		SEGMENT BETWEEN LAKE AVE AND EB SR–134/WB I–210 FWY INTERCHANGE.	
AM	5115→	AM	←9710
MID–DAY	4140→	MID–DAY	←7420
PM	4325→	PM	←8400

S7–EB I–210 FWY		S7–WB I–210 FWY	
SEGMENT BETWEEN I–605 FREEWAY AND IRWINDALE AVE.		SEGMENT BETWEEN IRWINDALE AVE AND I–605 FREEWAY.	
AM	5515→	AM	←7070
MID–DAY	5200→	MID–DAY	←6825
PM	5615→	PM	←7520

S8–EB I–210 FWY		S8–WB I–210 FWY	
SEGMENT BETWEEN IRWINDALE AVE AND AZUSA AVE.		SEGMENT BETWEEN AZUSA AVE AND IRWINDALE AVE.	
AM	6225→	AM	←6715
MID–DAY	6660→	MID–DAY	←6630
PM	6265→	PM	←8500

S9–EB I–210 FWY		S9–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND BERKSHIRE PLACE.		SEGMENT BETWEEN BERKSHIRE PLACE AND FOOTHILL BLVD	
AM	5570*→	AM	←3705
MID–DAY	3560*→	MID–DAY	←3645
PM	4175*→	PM	←5765

S10–EB I–210 FWY		S10–WB I–210 FWY	
SEGMENT BETWEEN SR–2 FWY AND ANGELES CREST HWY.		SEGMENT BETWEEN ANGELES CREST HWY AND SR–2 FWY.	
AM	N/D→	AM	←3450
MID–DAY	N/D→	MID–DAY	←3305
PM	N/D→	PM	←5495

S11–NB SR–2 FWY		S11–SB SR–2 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND I–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN I–210/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	2590→	AM	←6015
MID–DAY	5200→	MID–DAY	←2095
PM	5610→	PM	←2790

S12–NB SR–2 FWY		S12–SB SR–2 FWY	
SEGMENT BETWEEN SR–134/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.		SEGMENT BETWEEN MOUNTAIN ST AND SR–134/SR–2 FWY INTERCHANGE.	
AM	N/D→	AM	←6475
MID–DAY	N/D→	MID–DAY	←2580
PM	N/D→	PM	←3235

S13–EB SR–134 FWY		S13–WB SR–134 FWY	
SEGMENT BETWEEN SR–2 FWY AND FIGUEROA ST.		SEGMENT BETWEEN FIGUEROA ST AND SR–2 FWY.	
AM	6030*→	AM	←6300
MID–DAY	6245*→	MID–DAY	←5040
PM	6905*→	PM	←6325

S14–EB SR–134 FWY		S14–WB SR–134 FWY	
SEGMENT BETWEEN GLENDALE AVE AND SR–2 FWY.		SEGMENT BETWEEN SR–2 FWY AND GLENDALE AVE.	
AM	6490→	AM	←N/D
MID–DAY	7175→	MID–DAY	←N/D
PM	8430→	PM	←N/D

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

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EXISTING VOLUMES ON FREEWAY SEGMENTS 1–14

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–5–13

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S15–EB SR–134 FWY		S15–WB SR–134 FWY	
SEGMENT BETWEEN SAN FERNANDO ST AND PACIFIC AVE.		SEGMENT BETWEEN PACIFIC AVE AND SAN FERNANDO ST.	
AM	7185→	AM	←8330
MID-DAY	6960→	MID-DAY	←6055
PM	7455→	PM	←6470

S16–EB SR–134 FWY		S16–WB SR–134 FWY	
SEGMENT BETWEEN SR–134/I–5 FWY INTERCHANGE AND SAN FERNANDO ST.		SEGMENT BETWEEN SAN FERNANDO ST. AND SR–134/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6370
MID-DAY	N/D→	MID-DAY	←5000
PM	N/D→	PM	←8385

S17–SB I–5 FWY		S17–NB I–5 FWY	
SEGMENT BETWEEN WESTERN AVE AND I–5/SR–134 FWY INTERCHANGE.		SEGMENT BETWEEN I–5/SR–134 FWY INTERCHANGE AND WESTERN AVE.	
AM	6450→	AM	←N/D
MID-DAY	7095→	MID-DAY	←N/D
PM	6995→	PM	←N/D

S18–SB I–5 FWY		S18–NB I–5 FWY	
SEGMENT BETWEEN ROSCOE BLVD/GLEN OAKS BLVD AND N. HOLLYWOOD WAY.		SEGMENT BETWEEN N. HOLLYWOOD WAY AND ROSCOE BLVD/GLEN OAKS BLVD.	
AM	5990→	AM	←5490
MID-DAY	4960→	MID-DAY	←6030
PM	4625→	PM	←6570

S19–SB I–5 FWY		S19–NB I–5 FWY	
SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND SHELDON ST.		SEGMENT BETWEEN SHELDON ST AND I–5/SR–170 FWY INTERCHANGE.	
AM	N/D→	AM	←4950
MID-DAY	N/D→	MID-DAY	←5445
PM	N/D→	PM	←4755

S20–SB I–5 FWY		S20–NB I–5 FWY	
SEGMENT BETWEEN BRANFORD ST. AND I–5/SR–170 FWY INTERCHANGE		SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND BRANFORD ST.	
AM	12595→	AM	←N/D
MID-DAY	8420→	MID-DAY	←N/D
PM	9245→	PM	←N/D

S21–EB I–210 FWY		S21–WB I–210 FWY	
SEGMENT BETWEEN MONTROSE AVE AND EB–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN EB–210/SR–2 FWY INTERCHANGE AND MONTROSE AVE.	
AM	N/D→	AM	←N/D
MID-DAY	N/D→	MID-DAY	←N/D
PM	N/D→	PM	←N/D

S22–EB I–210 FWY		S22–WB I–210 FWY	
SEGMENT BETWEEN WHEATLAND AVE AND SUNLAND AVE.		SEGMENT BETWEEN SUNLAND AVE AVE WHEATLAND AVE.	
AM	4735→	AM	←N/D
MID-DAY	2670→	MID-DAY	←N/D
PM	3650→	PM	←N/D

S23–EB I–210 FWY		S23–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND WHEATLAND AVE.		SEGMENT BETWEEN WHEATLAND AVE AND FOOTHILL BLVD.	
AM	4405→	AM	←4080
MID-DAY	3430→	MID-DAY	←3480
PM	4850→	PM	←6690

S24–EB I–210 FWY		S24–WB I–210 FWY	
SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND FOOTHILL BLVD		SEGMENT BETWEEN FOOTHILL BLVD AND SR–118/I–210 FWY INTERCHANGE.	
AM	N/D→	AM	←4030
MID-DAY	N/D→	MID-DAY	←3330
PM	N/D→	PM	←5640

S25–EB SR–118 FWY		S25–WB SR–118 FWY	
SEGMENT BETWEEN GLEN OAKS BLVD AND SR–118/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND GLEN OAKS BLVD.	
AM	N/D→	AM	←N/D
MID-DAY	N/D→	MID-DAY	←N/D
PM	N/D→	PM	←N/D

S26–EB SR–118 FWY		S26–WB SR–118 FWY	
SEGMENT BETWEEN SR–118/I–5 FWY INTERCHANGE AND SAN FERNANDO RD.		SEGMENT BETWEEN SAN FERNANDO RD AND SR–118/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6215
MID-DAY	N/D→	MID-DAY	←3550
PM	N/D→	PM	←5690

S27–SB I–5 FWY		S27–NB I–5 FWY	
SEGMENT BETWEEN I–5/ SR–118 FWY INTERCHANGE AND VAN NUYS BLVD.		SEGMENT BETWEEN VAN NUYS BLVD AND I–5/ SR–118 FWY INTERCHANGE.	
AM	9070→	AM	←7985
MID-DAY	7105→	MID-DAY	←8340
PM	7810→	PM	←8505

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

S28–SB I–5 FWY		S28–NB I–5 FWY	
SEGMENT BETWEEN VAN NUYS BLVD AND OSBORNE ST.		SEGMENT BETWEEN OSBORNE ST AND VAN NUYS BLVD.	
AM	7985→	AM	←10985
MID-DAY	8340→	MID-DAY	←7600
PM	8505→	PM	←8435

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EXISTING VOLUMES ON FREEWAY SEGMENTS 15–28

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3-5-14

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R1–EB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	415
MID–DAY	155
PM	260

R2–WB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	350
MID–DAY	220
PM	475

R3–EB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	265
MID–DAY	135
PM	405

R4–WB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	340
MID–DAY	130
PM	180

R5–EB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	660
MID–DAY	380
PM	705

R6–WB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	575
MID–DAY	330
PM	550

R7–EB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	435
MID–DAY	310
PM	430

R8–WB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	580
MID–DAY	200
PM	435

R9–EB 210 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY AND WB SR–134 FREEWAY TRANSITION/OFF–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R10–WB 210 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R11–WB 134 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R12–EB 134 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R13–WB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD OFF–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R14–EB 210 FREEWAY	
MERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD ON–RAMP	
AM	335
MID–DAY	290
PM	320

R15–EB 210 FREEWAY	
MERGE POINT	
EB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R16–WB 210 FREEWAY	
DIVERGE POINT	
WB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R17–EB 210 FREEWAY	
DIVERGE POINT	
IRWINDALE AVENUE OFF–RAMP	
AM	1120
MID–DAY	960
PM	765

R18–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE ON–RAMP	
AM	585
MID–DAY	420
PM	475

R19–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE SLIP ON–RAMP	
AM	610
MID–DAY	545
PM	475

R20–WB 210 FREEWAY	
MERGE POINT	
AZUSA AVENUE/FIRST STREET ON–RAMP	
AM	865
MID–DAY	360
PM	400

R21–WB 210 FREEWAY	
DIVERGE POINT	
SB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	1485
MID–DAY	660
PM	870

R22–EB 210 FREEWAY	
MERGE POINT	
NB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	525
MID–DAY	560
PM	785

R23–SB 2 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	1485
MID–DAY	660
PM	870

R24–NB 2 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	525
MID–DAY	560
PM	785

R25–SB 2 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R26–NB 2 FREEWAY	
MERGE POINT	
WB AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	1220
MID–DAY	1610
PM	2370

R27–EB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R28–WB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	1070
MID–DAY	740
PM	1180

R29–EB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD OFF–RAMP	
AM	405
MID–DAY	310
PM	510

LEGEND

XXX → EXISTING VOLUMES
N/D → NO DATA AVAILABLE
* → CALCULATED VOLUME

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EXISTING VOLUMES RAMPS 1–29

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–5–15

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R30–WB 134 FREEWAY	
MERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R31–WB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R32–EB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	2000 ►
MID–DAY	2260 ►
PM	3180 ►

R33–WB 134 FREEWAY	
DIVERGE POINT	
NB I–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ 2880
MID–DAY	◄ 2625
PM	◄ 2755

R34–EB 134 FREEWAY	
MERGE POINT	
SB I–5 FREEWAY TRANSITION/ ON–RAMP	
AM	2870 ►
MID–DAY	2630 ►
PM	2985 ►

R35–NB 5 FREEWAY	
MERGE POINT	
WB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	◄ 2900
MID–DAY	◄ 2490
PM	◄ 2755

R36–SB 5 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R37–NB 5 FREEWAY	
DIVERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD OFF–RAMP	
AM	◄ 285
MID–DAY	◄ 295
PM	◄ 630

R38–SB 5 FREEWAY	
MERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD ON–RAMP	
AM	600 ►
MID–DAY	370 ►
PM	405 ►

R39–SB 5 FREEWAY	
MERGE POINT	
BRANFORD STREET ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R40–NB 5 FREEWAY	
DIVERGE POINT	
BRANFORD STREET OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R41–WB 210 FREEWAY	
DIVERGE POINT	
WHEATLAND AVE OFF–RAMP	
AM	◄ 70
MID–DAY	◄ 65
PM	◄ 110

R42–EB 210 FREEWAY	
MERGE POINT	
WHEATLAND AVE ON–RAMP	
AM	125 ►
MID–DAY	65 ►
PM	90 ►

R43–WB 210 FREEWAY	
DIVERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET OFF–RAMP	
AM	◄ 230
MID–DAY	◄ 150
PM	◄ 320

R44–EB 210 FREEWAY	
MERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET ON–RAMP	
AM	485 ►
MID–DAY	235 ►
PM	295 ►

R45–WB 210 FREEWAY	
DIVERGE POINT	
WB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R46–EB 210 FREEWAY	
MERGE POINT	
EB SR–118 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R47–WB 118 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R48–EB 118 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R49–WB 118 FREEWAY	
DIVERGE POINT	
SB 1–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R50–EB 118 FREEWAY	
MERGE POINT	
NB I–5 FREEWAY TRANSITION/ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R51–SB 5 FREEWAY	
MERGE POINT	
WB SR–118 FREEWAY TRANSITION/ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R52–NB 5 FREEWAY	
DIVERGE POINT	
EB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R53–SB 5 FREEWAY	
MERGE POINT	
OSBORNE STREET ON–RAMP	
AM	355 ►
MID–DAY	760 ►
PM	1085 ►

R54–NB 5 FREEWAY	
DIVERGE POINT	
OSBORNE STREET OFF–RAMP	
AM	◄ 410
MID–DAY	◄ 525
PM	◄ 615

LEGEND

XXX ► EXISTING VOLUMES
N/D ► NO DATA AVAILABLE
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EXISTING VOLUMES RAMPS 30–54

DEVIL'S GATE DAM & RESERVOIR

FIGURE 3–5–16

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Existing Freeway Mainline HCM Analysis

Freeway mainline capacity analyses were conducted for the 28 freeway segments identified utilizing the methods as discussed in section 2 and the existing geometrics for the freeway Mainlines. *Table 3-5-1* presents the resulting HCM LOS of the freeway segments analyzed.

Table 3-5-1
Freeway Mainline Capacity Analysis – Existing Conditions
Traffic Impact Analysis

Segment/Freeway Name		AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
1	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	11.9	B	8.9	A	14.6	B
2	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	21.1	C	12.7	B	16.2	B
3	I-210 WB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	13.4	B	14.0	B	21.8	C
4	I-210 EB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	21.0	C	13.0	B	15.7	B
5	I-210 WB between the SR-134 Fwy and Mountain Street.	13.5	B	11.6	B	16.4	B
6	I-210 EB between the SR-134 Fwy and Mountain Street.	20.6	C	12.9	B	14.9	B
7	SR-134 WB between San Rafael Ave and Figueroa Street	24.5	C	16.2	B	21.7	C
8	SR-134 EB between San Rafael Ave and Figueroa Street	16.9	B	15.8	B	19.4	C
9	SR-134 WB between the I-210 Fwy and San Rafael Ave.	N/D*	N/D*	15.4	B	22.0	C
10	SR-134 EB between the I-210 Fwy and San Rafael Ave.	21.8	C	19.1	C	19.4	C
11	I-210 WB between the SR-134 Fwy and Lake Ave.	33.4	D	23.0	C	28.2	D
12	I-210 EB between the SR-134 Fwy and Lake Ave.	30.5	D	31.8	D	34.0	D
13	I-210 WB between the I-605 Fwy and Irwindale Avenue.	21.2	C	20.2	C	23.1	C
14	I-210 EB between the I-605 Fwy and Irwindale Avenue.	15.7	B	14.9	B	16.2	B
15	I-210 WB between Irwindale Avenue and Azusa Avenue.	19.8	C	19.5	C	27.1	D
16	I-210 EB between Irwindale Avenue and Azusa Avenue.	18.1	C	19.6	C	18.6	C
17	I-210 WB between Berkshire Place and Foothill Blvd.	13.7	B	13.9	B	22.3	C
18	I-210 EB between Berkshire Place and Foothill Blvd.	21.4	C	13.1	B	15.4	B
19	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	12.4	B	12.2	B	20.5	C
20	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
21	SR-2 NB between the I-210 Fwy and Mountain Street.	7.6	A	15.4	B	16.7	B
22	SR-2 SB between the I-210 Fwy and Mountain Street.	23.7	C	7.7	A	10.3	A
23	SR-2 NB between Mountain Street and the SR-134 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
24	SR-2 SB between Mountain Street and the SR-134 Fwy.	23.3	D	9.5	A	11.9	B

Table 3-5-1 -Continued-
Freeway Mainline Capacity Analysis – Existing Conditions
Traffic Impact Analysis

	Segment/Freeway Name	AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
25	SR-134 WB between the SR-2 Fwy and Figueroa Street.	18.2	C	14.3	B	18.3	C
26	SR-134 EB between the SR-2 Fwy and Figueroa Street.	18.1	C	18.8	C	21.2	C
27	SR-134 WB between the SR-2 Fwy and Glendale Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
28	SR-134 EB between the SR-2 Fwy and Glendale Avenue.	19.7	C	22.3	C	28.0	D
29	SR-134 WB between San Fernando Street and Pacific Ave.	27.4	D	18.1	C	19.6	C
30	SR-134 EB between San Fernando Street and Pacific Ave.	30.9	D	29.3	D	32.9	D
31	SR-134 WB between San Fernando Street and the I-5 Freeway.	25.7	C	18.8	C	41.5	E
32	SR-134 EB between San Fernando Street and the I-5 Freeway.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
33	I-5 SB between the SR-134 Fwy and Western Avenue.	25.9	C	30.7	D	30.0	D
34	I-5 NB between the SR-134 Fwy and Western Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	I-5 NB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	20.3	C	22.9	C	25.5	C
36	I-5 SB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	23.6	C	18.7	C	17.2	B
37	I-5 SB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	I-5 NB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy.	18.6	C	20.7	C	17.2	B
39	I-5 SB between the SR-170 Fwy and Branford Street.	256.1	F	39.8	E	48.3	F
40	I-5 NB between the SR-170 Fwy and Branford Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
41	I-210WB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
42	I-210EB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
43	I-210 WB between Wheatland Ave and Sunland Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
44	I-210 EB between Wheatland Ave and Sunland Blvd.	17.0	B	10.0	A	13.2	B
45	I-210 WB between Wheatland Ave and Foothill Blvd/Osborne Street.	14.6	B	12.8	B	26.2	D
46	I-210 EB between Wheatland Ave and Foothill Blvd/Osborne Street.	16.3	B	12.7	B	18.5	C
47	I-210 WB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	15.0	B	12.3	B	21.9	C
48	I-210 EB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	SR-118WB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	SR-118EB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 3-5-1 -Continued-
Freeway Mainline Capacity Analysis – Existing Conditions
Traffic Impact Analysis

Segment/Freeway Name		AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
51	SR-118 WB between San Fernando Rd and the I-210 Fwy.	40.5	E	17.7	B	34.0	D
52	SR-118 EB between San Fernando Rd and the I-210 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
53	I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	34.8	D	38.2	E	39.8	E
54	I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	23.9	C	17.7	B	19.7	C
55	I-5 NB between Tierra Bella Street and Osborne Street.	38.2	E	42.3	E	42.9	E
56	I-5 SB between Tierra Bella Street and Osborne Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

(1) Density – Highway Capacity Manual (pc/mi/ln)
(2) HCM LOS - Highway Capacity Manual Level of Service
(*) N/D*- No Available Data from Caltrans
Source: **Hall & Foreman Inc**

As presented in *Table 3-5-1*, under the existing conditions most of the identified freeway segments are operating at an acceptable HCM LOS during the AM, Mid-day, and PM peak hours. The following five segments are operating at an unacceptable HCM LOS. The freeway segment SR-134 Westbound between San Fernando road and the I-5 Freeway (Haul Routes 5B, 6B, 7B, 8A) with an HCM LOS E for the PM peak hour. The freeway segment I-5 Southbound between SR-170 and Branford (Haul Route 8A) with an HCM LOS F for the AM and PM peak hours and HCM LOS E for the MIDDAY peak hour. The freeway segment SR-118 Westbound Freeway between San Fernando road and the I-210 Freeway (Haul Route 8B) with an HCM LOS E for the AM peak hours. The freeway segment I-5 Northbound between the SR-118 Westbound Freeway and Van Nuys Blvd (Haul Route 8B) with an HCM LOS E MID-DAY and P.M. peak hours. The freeway segment I-5 Northbound between Tierra Bella Street and Osborne Street (Haul Route 8B) with an HCM LOS E AM, MID-DAY and P.M. peak hours. Mitigation is recommended to improve the HCM LOS for these five freeway segments.

Existing Freeway Ramp HCM Analysis

A freeway ramp analysis was conducted for the 54 on and off-ramps identified utilizing the methods as discussed previously and using the existing geometrics. The resulting HCM LOS for the existing conditions of each ramp analyzed is presented in *Table 3-5-2*.

Table 3-5-2
Freeway Ramp Analysis – Existing Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
1	1E, 1G	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	17.3	B	8.4	A	11.9	B
2	1E, 1H	Berkshire Place and the Westbound I-210 Freeway On-ramp.(Merge Point)	12.8	B	12.6	B	21.2	C
3	1A, 1C	Berkshire Place and the Eastbound I-210 Freeway On-ramp. (Merge Point)	25.1	C	18.6	B	22.9	C
4	1A, 1D	Berkshire Place and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	21.4	C	20.5	C	29.0	D
5	1F, 1H	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	30.0	D	20.8	C	25.4	C
6	1F, 1G	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. (Merge Point)	21.0	C	16.3	B	23.2	C
7	1B, 1C	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. (Merge Point)	16.4	B	9.7	A	12.0	B
8	1B, 1D	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	8.9	A	3.5	A	11.0	B
9	4A	Southbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline and Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
10	2A, 2B,3	Westbound I-210 Fwy and Eastbound SR-134 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
11	2B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
12	2B	Eastbound SR-134 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
13	4A	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
14	4A	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	22.7	C	21.6	C	23.6	C
15	2A, 3	Eastbound I-210 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline.(Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
16	2A, 3	Westbound I-210 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
17	2A, 2B, 3,9	Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	2.2	A	-3.1	A	-2.8	A
18	2A,3	Irwindale Ave and the Westbound loop I-210 Freeway On-ramp. (Merge Point)	17.8	B	16.2	B	18.0	B
19	9	Irwindale Ave and the Westbound slip I-210 Freeway On-ramp. (Merge Point)	19.4	B	17.9	B	19.0	B
20	2B	First Street/Azusa Avenue and the Westbound I-210 Freeway On-ramp. (Merge Point)	21.4	C	17.3	B	22.1	C

Table 3-5-2 -Continued-
Freeway Ramp Analysis – Existing Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
21	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Diverge Point)	14.8	A	20.6	A	13.2	A
22	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	22.1	C	21.1	C	22.4	C
23	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Merge Point)	21.0	C	-0.9	A	3.2	A
24	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	18.2	B	12.4	B	16.2	B
25	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
26	2B, 4B,5B, 6B, 7B, 8A	Westbound and Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
27	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
28	2B,4B	Westbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	25.0	C	20.5	C	25.8	C
29	4B	Figueroa Street and the Eastbound SR-134 Fwy Off-ramp. (Diverge Point)	27.4	C	25.7	C	29.2	D
30	4B	Figueroa Street and the Westbound SR-134 Fwy On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
31	5B, 6B, 7B,8A	Southbound SR-2 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
32	5B, 6B, 7B,8A	Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	9.0	A	11.5	B	19.7	B
33	5B, 6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
34	5B,6B, 7B,8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	5B,6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
36	5B, 6B, 7B, 8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
37	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
39	8A	Branford Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 3-5-2 -Continued-
Freeway Ramp Analysis – Existing Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
40	8A	Branford Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
41	5C,6C, 7C,8C	Wheatland Avenue and the Westbound I-210 Fwy mainline Off-Ramp. (Diverge Point)	21.0	C	19.0	B	31.6	D
42	5C,6C, 7C, 8C	Wheatland Avenue and the Eastbound I-210 Fwy mainline On-Ramp. (Merge Point)	22.8	C	15.2	B	18.8	B
43	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Westbound I-210 Fwy mainline Off-ramp. (Diverge Point)	23.0	C	18.1	B	23.1	C
44	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Eastbound I-210 Fwy mainline On-ramp. (Merge Point)	22.2	C	18.9	B	29.4	D
45	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
46	8B	Eastbound SR-118 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
47	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
48	8B	Eastbound SR-118 Fwy Transition Ramp to the -Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
51	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
52	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
53	8B	Osborne Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	24.4	F	15.9	B	20.2	C
54	8B	Osborne Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	29.3	D	31.6	D	31.7	D

(1) Density – Highway Capacity Manual (pc/mi/ln)
(2) LOS - Highway Capacity Manual Level of Service
(N/D*)- No Data

Source: **Hall & Foreman Inc**

As presented in *Table 3-5-2*, under the existing conditions most of the freeway ramps are operating at an acceptable HCM LOS of D or better throughout the day, with the exception of the Southbound I-5 Freeway on-ramp at Osborne Street. The Southbound I-5 Freeway on-ramp at Osborne Street (Haul Route 8B) is currently operating at HCM LOS F during the AM peak hour. Mitigations are recommended for the ramp under the existing conditions.

4. EXISTING PLUS PROJECT CONDITIONS

Project Trip Generation

The sediment removal process is expected to generate 50 truck trips per hour. The expected increase of truck trips can result in an increase of traffic delay at the intersections along the truck haul routes. The intersections along the haul routes were analyzed to determine the impact the truck trips will have on the intersection operations. Employee trips to the site are also taken into account and are estimated. As presented in *Table 4-1*, the site is broken down to employee trips, truck trips. It is estimated that a total of 17 and 425 average non adjusted daily trips, for Autos and Trucks will travel to and from the project site, respectively.

Table 4-1 summarizes the estimated trucks trip generation for the project site during the AM and PM peak periods. It is recommended that *Table 4-1* be used as the trip generation for this project.

Table 4-1
Project Trip Generation
Traffic Scope – Devil's Gate Dam & Reservoir

			A.M. Peak Hour			Mid-Day Peak Hour			P.M. Peak Hour		
	Use	Daily	In	Out	Total	In	Out	Total	In	Out	Total
1	**Employees**										
		17	2	2	4	2	2	4	2	2	4
2	**Trucks**										
	Truck Trips	425	50	50	100	50	50	100	50	50	100
	PCE Adjustment		125	150	275	125	150	275	125	150	275
	Total	442	52	52	104	52	52	104	52	52	104
	Total Adjusted (w PCE)		127	152	279	127	152	279	127	152	279

Project Trip Distribution

The trucks trips will be distributed based on the capacity that the proposed haul routes have. The haul routes with the most capacity will have more truck trips assigned to it. It is anticipated that the majority of the truck trips will be to and from the dam site to the disposal sites in the City of Los Angeles. It is expected that the disposal sites in the City of Los Angeles will be assigned most of the truck trips due to the closer proximity to the dam site and more haul route options. It should also be noted that the Employees will only affect Site 1 of the project as the remainder of the travel will be the Truck Trips.

Project Traffic Analysis

Intersection capacity analyses for the existing plus project conditions were conducted for the 52 study intersections utilizing the methods as discussed in section 2 and using the existing intersection geometrics. The resulting HCM LOS for the existing plus project conditions of each intersection analyzed are presented in *Table 4-1-1* thru *Table 4-4-12*. The LOS of both the HCM and ICU methods are presented.

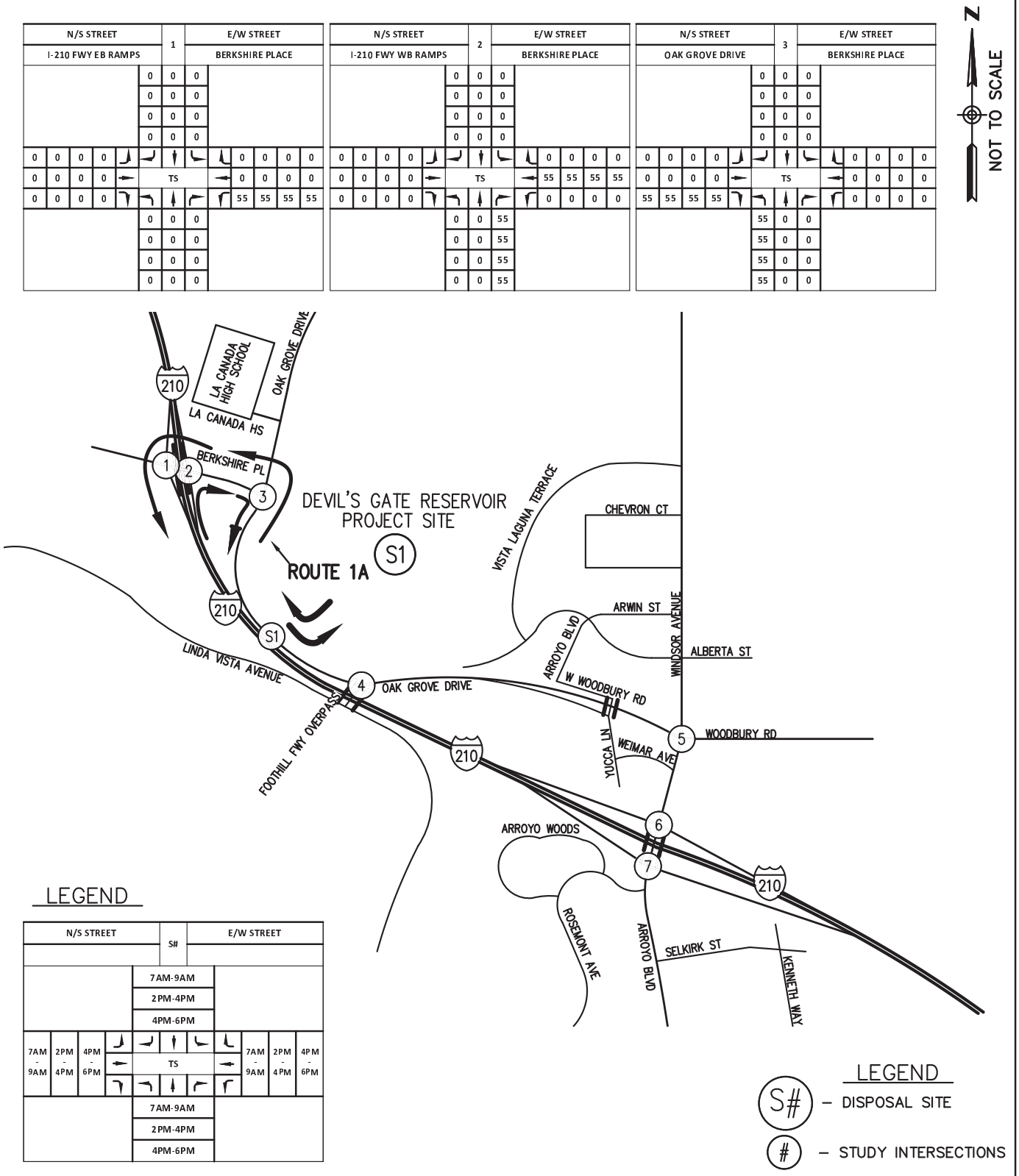
Section 1: Devil's Gate Dam and Reservoir (Site 1)

Haul Route 1A

The Haul Route 1A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-1A* through *Figure 4-1-1C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-1D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-1E.*

Haul Route 1B

The Haul Route 1B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-2A* through *Figure 4-1-2C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-2D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-2E.*



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ROUTE 1A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-1A.dwg
Last Opened: Oct 04, 2013 - 10:14am by: TMunoz

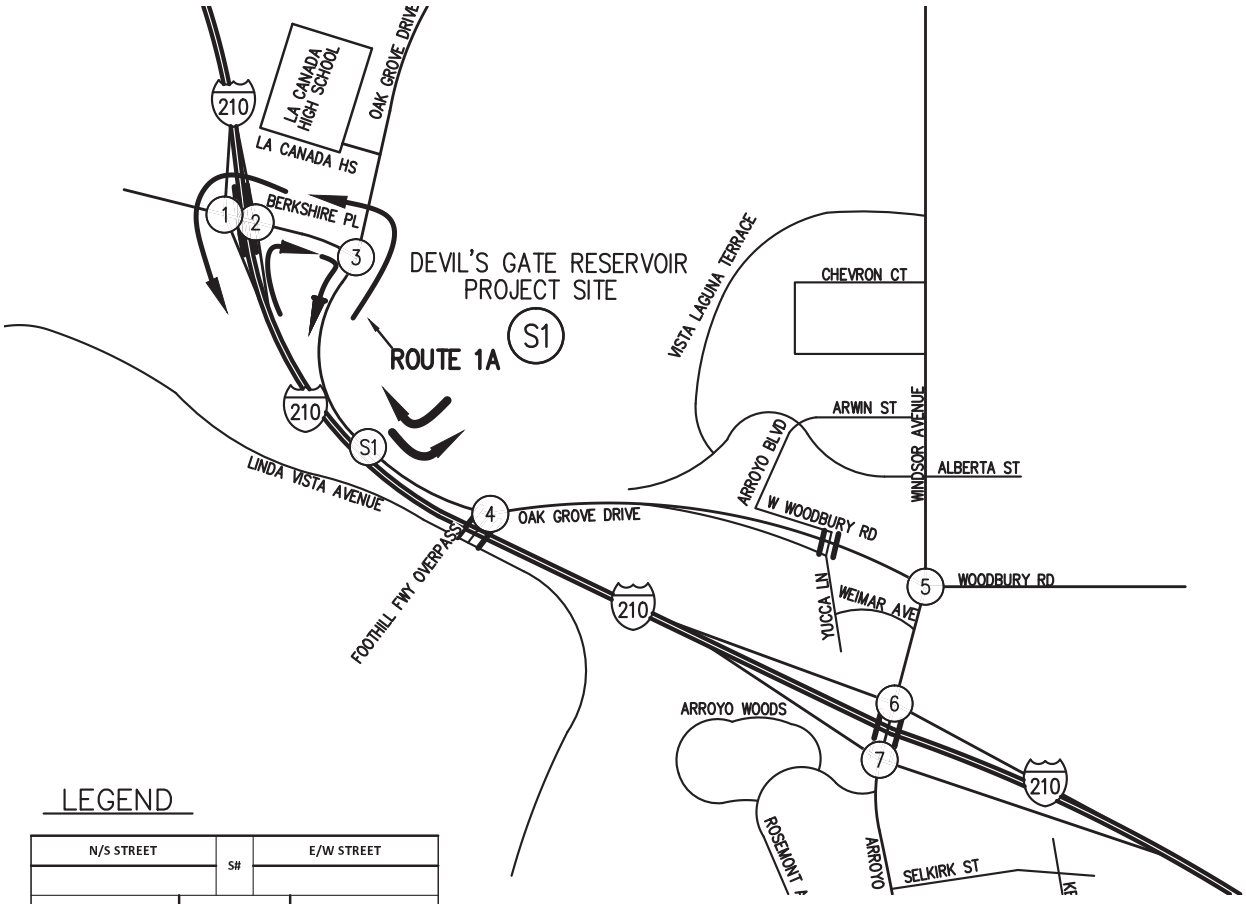
N/S STREET				1				E/W STREET			
I-210 FWY EB RAMPS								BERKSHIRE PLACE			
				5%	5%	5%					
				5%	0%	5%					
				5%	0%	5%					
				5%	5%	5%					
0%	0%	0%	0%						0%	0%	0%	0%
5%	5%	5%	5%		TS				5%	5%	5%	5%
5%	5%	5%	5%						30%	42%	22%	17%
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					

N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
5%	5%	5%	5%						5%	5%	5%	5%
5%	5%	5%	5%		TS				25%	5%	5%	5%
0%	0%	0%	0%						0%	0%	0%	0%
				5%	5%	20%					
				5%	5%	5%					
				5%	5%	5%					
				5%	5%	5%					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				5%	10%	0%					
				5%	10%	0%					
				5%	10%	0%					
				5%	10%	0%					
0%	5%	5%	5%						0%	0%	0%	0%
0%	0%	0%	0%		TS				0%	0%	0%	0%
42%	5%	5%	37%						0%	0%	0%	0%
				30%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
				43%	5%	0%					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

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ROUTE 1A TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-1B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-1B.dwg
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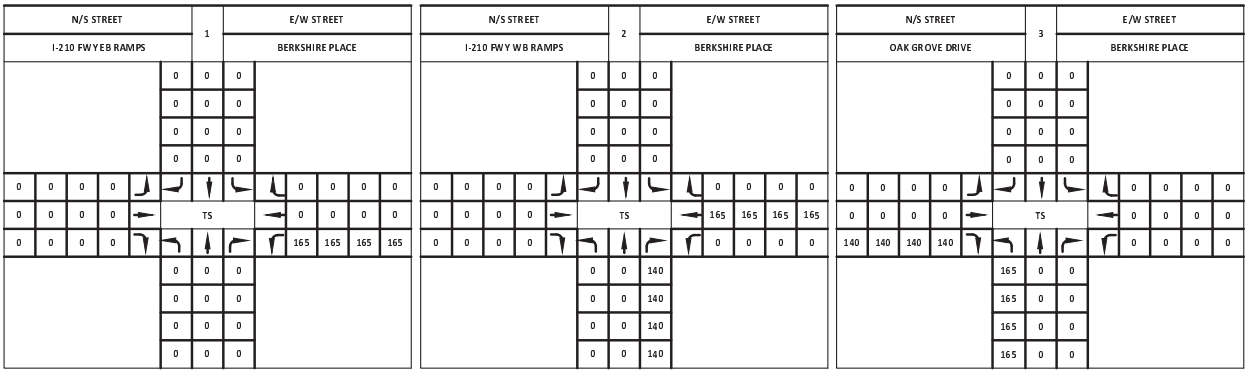

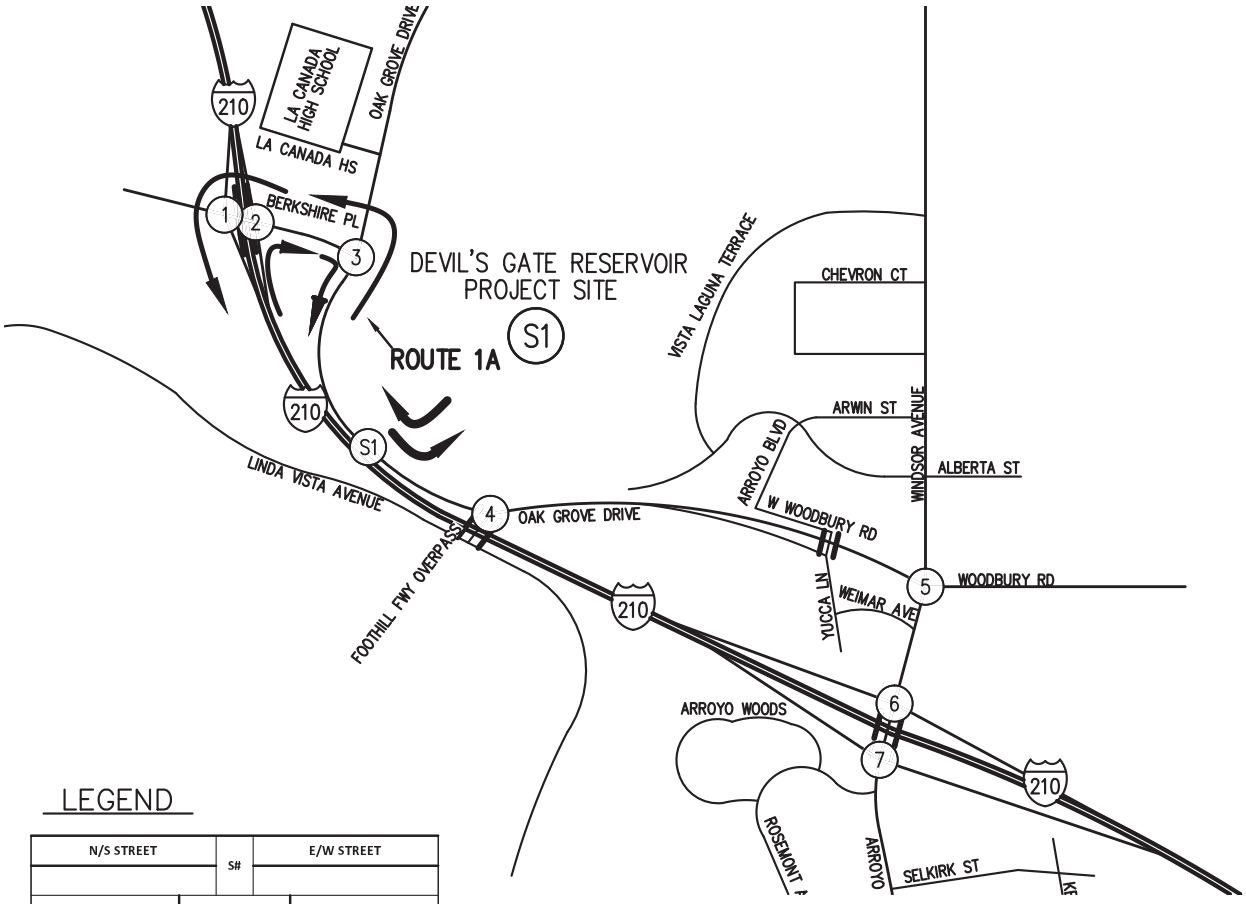

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

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ROUTE 1A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-1C

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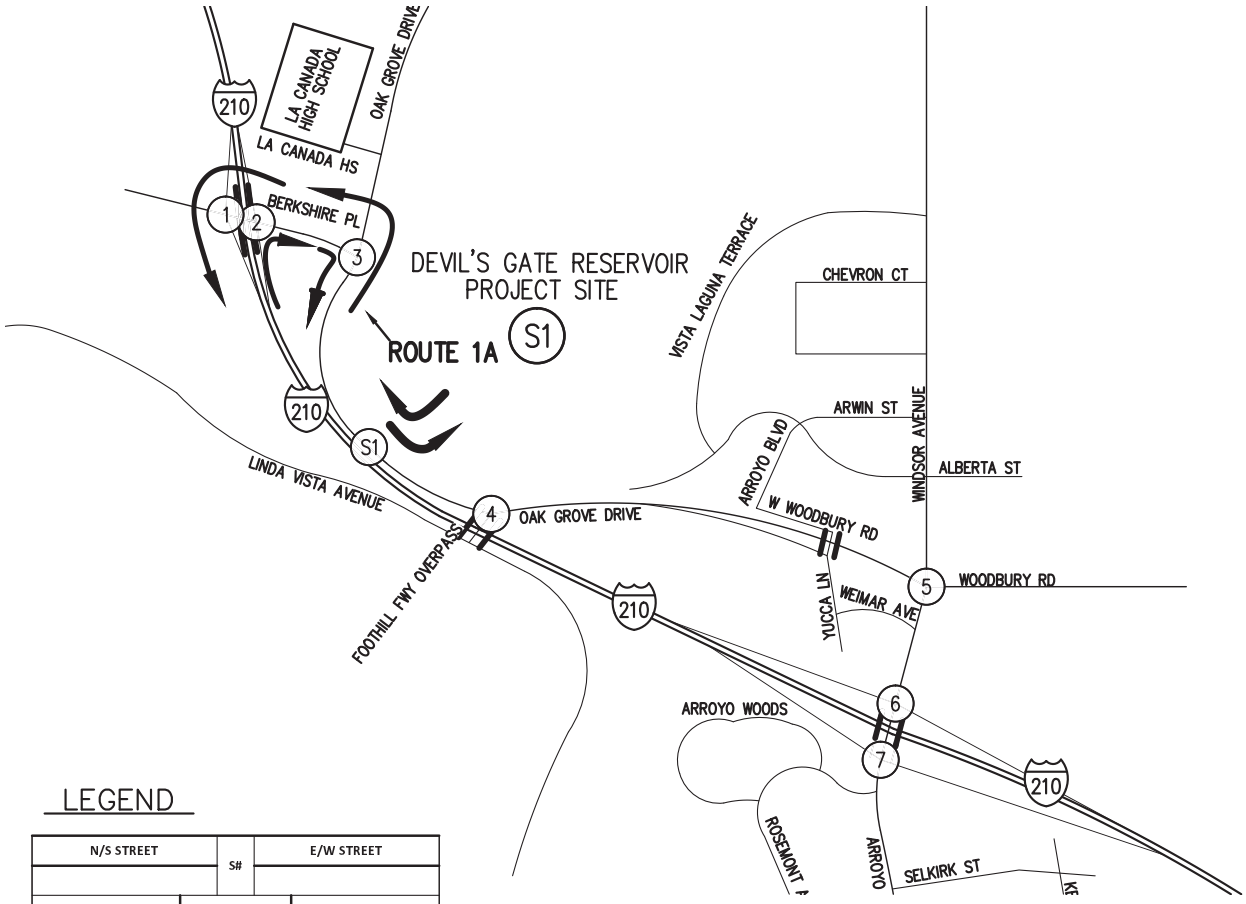
N/S STREET				1				E/W STREET			
I-210 FWY EB RAMPS								BERKSHIRE PLACE			
				85	5	325					
				45	5	105					
				60	5	205					
				90	5	165					
0	0	0	0					0	0	0	0
250	100	125	80		TS			120	110	165	160
125	55	80	70					195	135	260	390
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
95	50	50	65					255	170	170	410
285	175	175	180		TS			245	165	165	460
0	0	0	0					0	0	0	0
				60	5	330					
				55	5	125					
				65	5	170					
				95	5	135					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				360	70	0					
				215	100	0					
				745	140	0					
				750	245	0					
510	150	330	185					0	0	0	0
0	0	0	0		TS			0	0	0	0
125	115	100	140					0	0	0	0
				195	450	0					
				120	135	0					
				130	95	0					
				120	150	0					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET		
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 1A
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-1D

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N/S STREET				1				E/W STREET			
I-210 FWY EB RAMPS								BERKSHIRE PLACE			
				90	5	335					
				50	5	115					
				70	5	235					
				90	5	165					
0	0	0	0					0	0	0	0
250	105	145	85	TS				125	115	190	160
130	60	90	70					310	255	400	500
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
95	55	75	65					270	170	580	410
295	185	315	180	TS				365	285	500	575
0	0	0	0					0	0	0	0
				60	5	425					
				60	5	210					
				75	0	275					
				95	5	225					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				365	85	0					
				225	115	0					
				855	180	0					
				755	250	0					
520	160	380	200					0	0	0	0
0	0	0	0	TS				0	0	0	0
210	205	190	225					0	0	0	0
				310	455	0					
				230	140	0					
				250	110	0					
				230	160	0					

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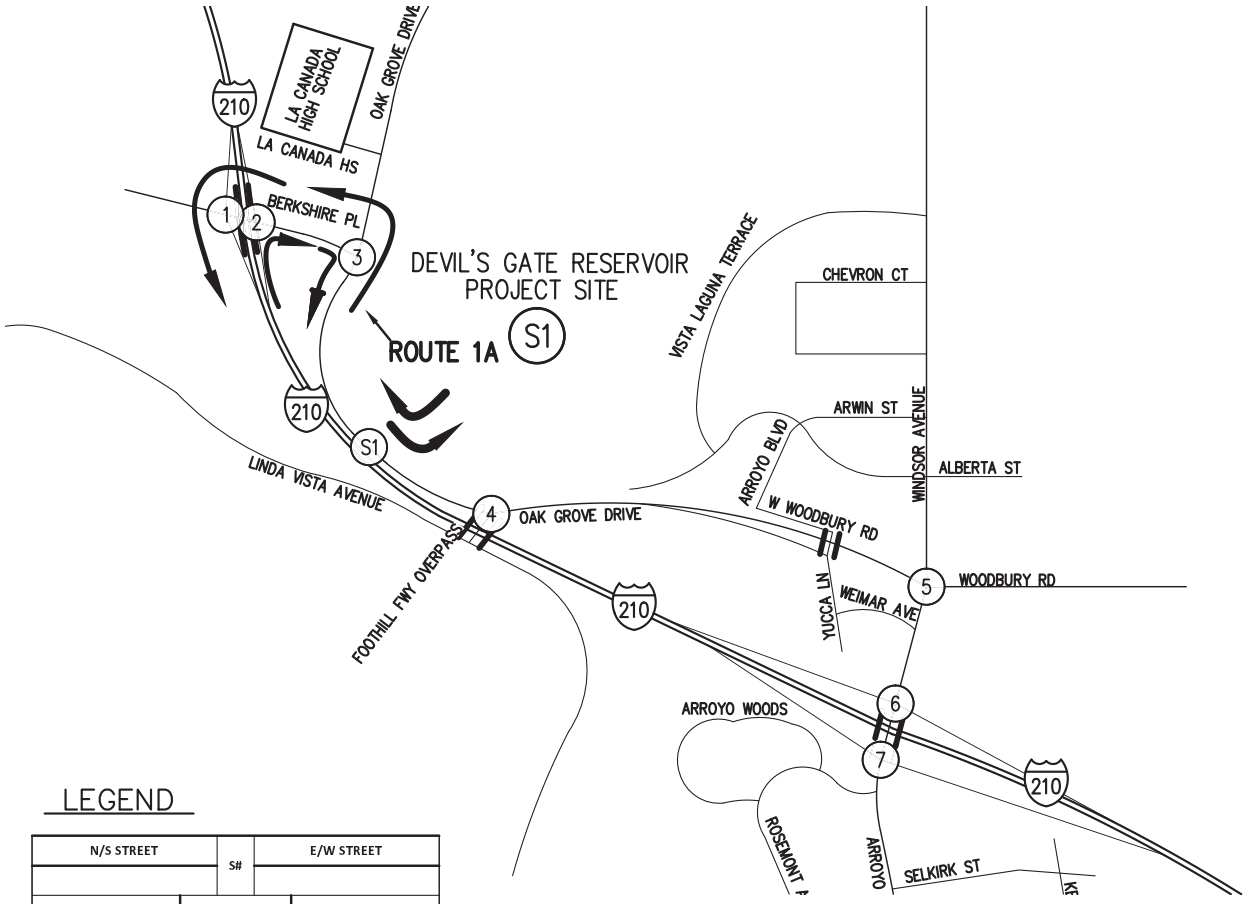
NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET		
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 1A
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-1E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-1E.dwg
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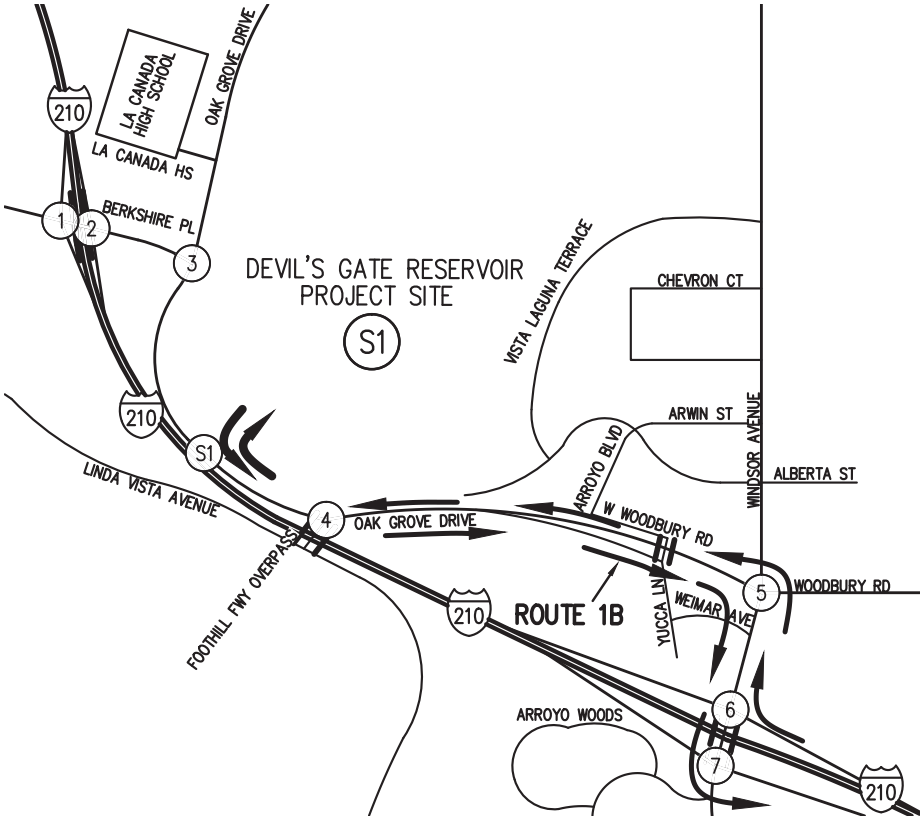
N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS



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LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM 2PM-4PM 4PM-6PM	

7AM - 9AM	2PM - 4PM	4PM - 6PM	TS	7AM - 9AM	2PM - 4PM	4PM - 6PM

LEGEND

S# – DISPOSAL SITE

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ROUTE 1B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-2A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-2A.dwg
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N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
0%	0%	0%	0%						0%	0%	0%	0%
5%	10%	5%	5%		TS				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
				5%	0%	5%					
				5%	0%	5%					
				5%	0%	5%					
				5%	0%	5%					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				5%	5%	5%					
				10%	5%	5%					
				10%	5%	5%					
				5%	5%	5%					
5%	5%	5%	5%						10%	15%	15%	5%
5%	5%	5%	5%		TS				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
				5%	5%	5%					
				5%	5%	5%					
				5%	5%	5%					
				5%	5%	5%					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
0%	0%	0%	0%						5%	5%	5%	5%
0%	0%	0%	0%		TS				5%	5%	5%	5%
0%	0%	0%	0%						5%	5%	5%	5%
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0%	5%	5%					
				0%	5%	5%					
				0%	5%	5%					
				0%	5%	5%					
5%	5%	5%	5%						0%	0%	0%	0%
5%	5%	5%	5%		TS				0%	0%	0%	0%
5%	5%	5%	5%						0%	0%	0%	0%
				0%	5%	5%					
				0%	5%	5%					
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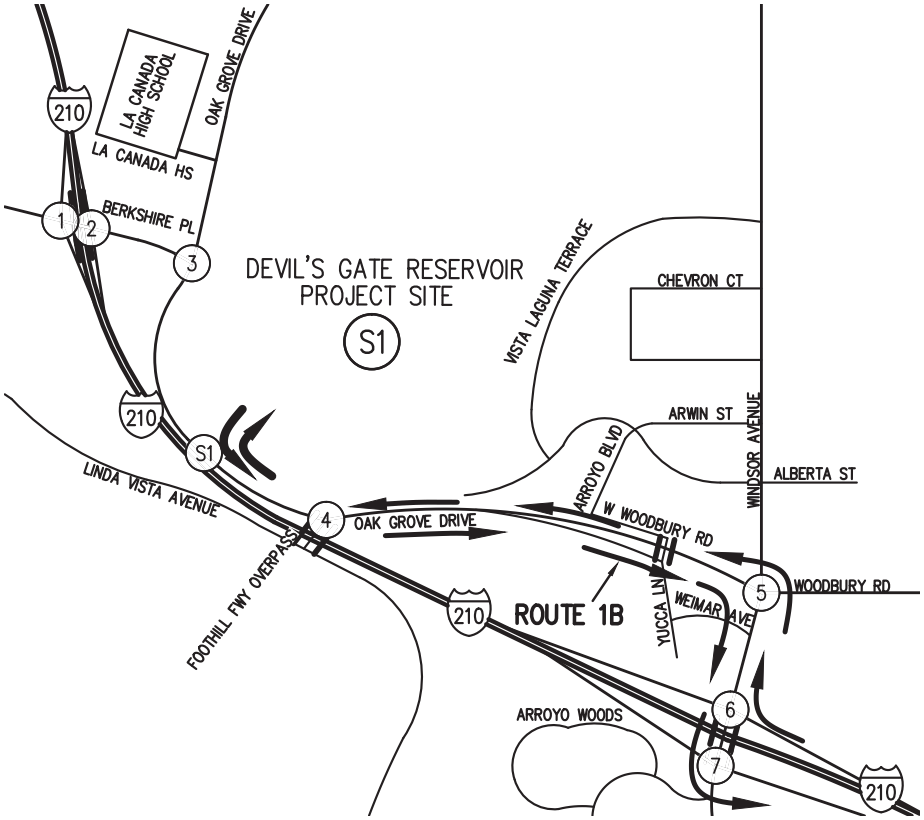
				0%	5%	5%					



NOT TO SCALE

LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 1B TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-2B

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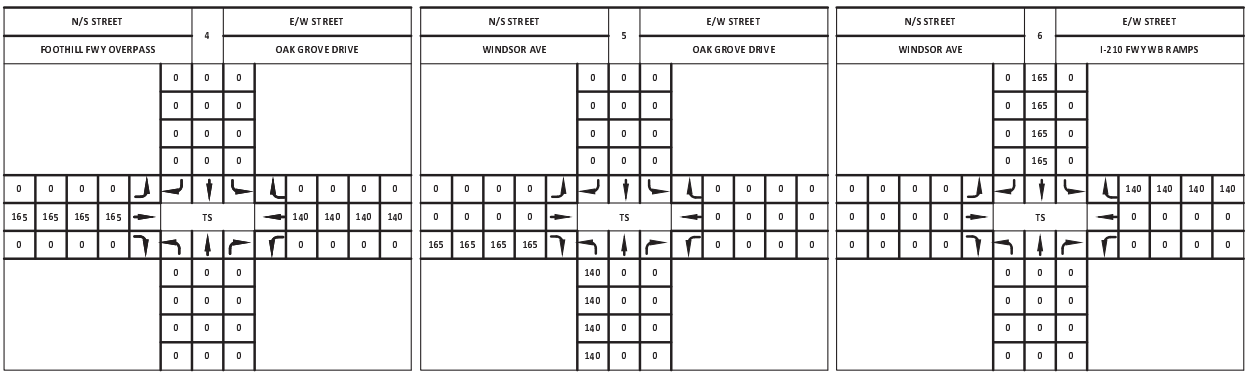

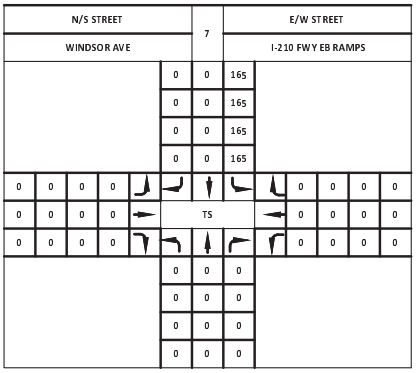

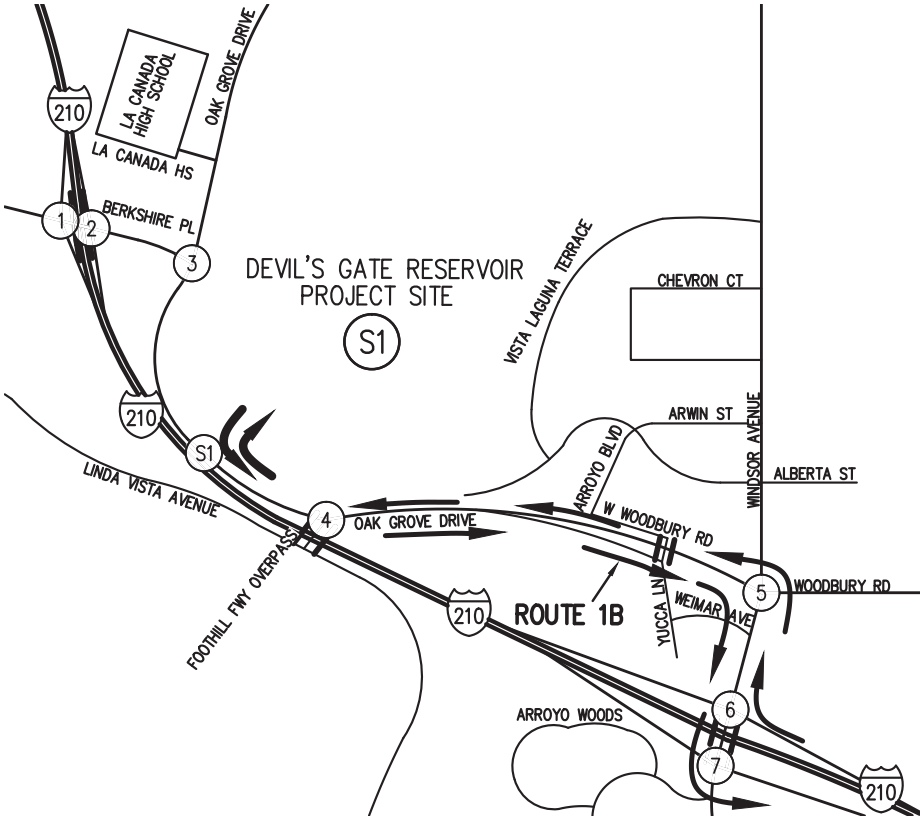

NOT TO SCALE

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1B PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-2C

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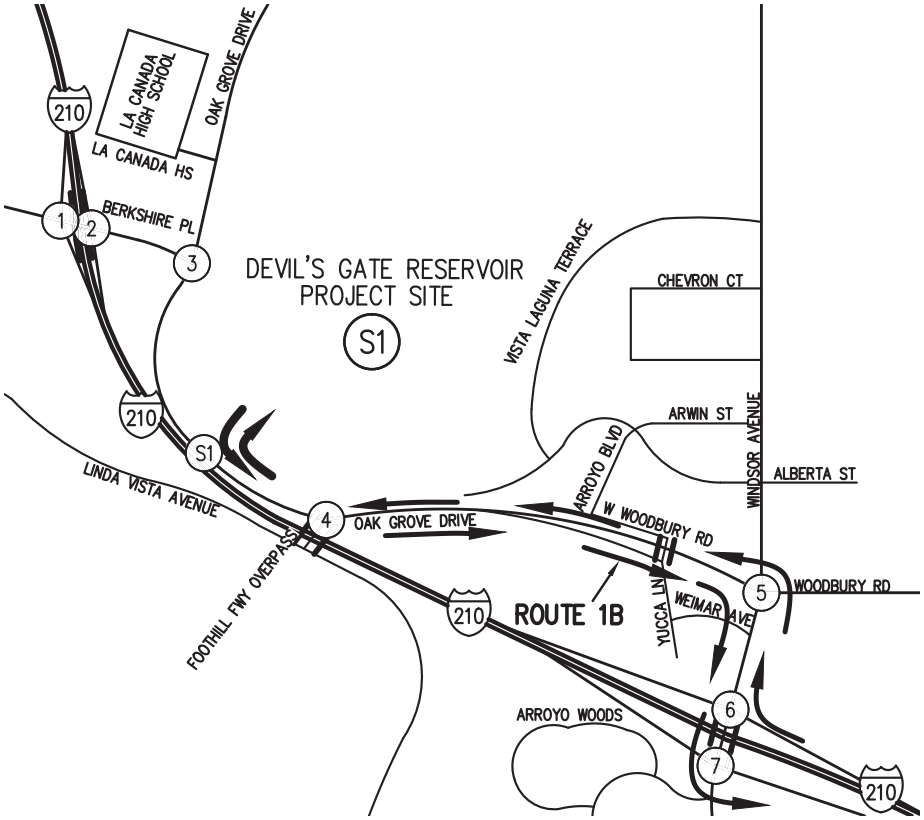
Last Opened: Oct 04, 2013 - 10:14am by: TMunoz

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0						0	0	0	0
170	160	195	320						520	225	180	185
50	65	60	80						180	60	40	60
				125	0	95					
				55	0	60					
				60	0	65					
				70	0	60					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	590	55					
				10	300	40					
				20	340	40					
				5	525	60					
20	25	20	40						45	35	30	50
105	140	140	240						425	160	110	155
95	70	85	80						555	300	350	440
				125	605	455					
				85	290	365					
				75	355	435					
				80	495	570					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				530	640	0					
				280	425	0					
				275	490	0					
				445	605	0					
0	0	0	0						625	330	390	460
0	0	0	0						5	5	5	5
0	0	0	0						5	20	20	25
				40	555	0					
				45	420	0					
				45	500	0					
				100	690	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	190	470					
				0	100	350					
				0	160	335					
				0	165	470					
550	320	370	595						0	0	0	0
5	5	5	5						0	0	0	0
105	55	50	105						0	0	0	0
				0	130	20					
				0	145	15					
				0	160	15					
				0	195	15					



NOT TO SCALE

LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 1B
EXISTING + PROJECT TRAFFIC

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-2D

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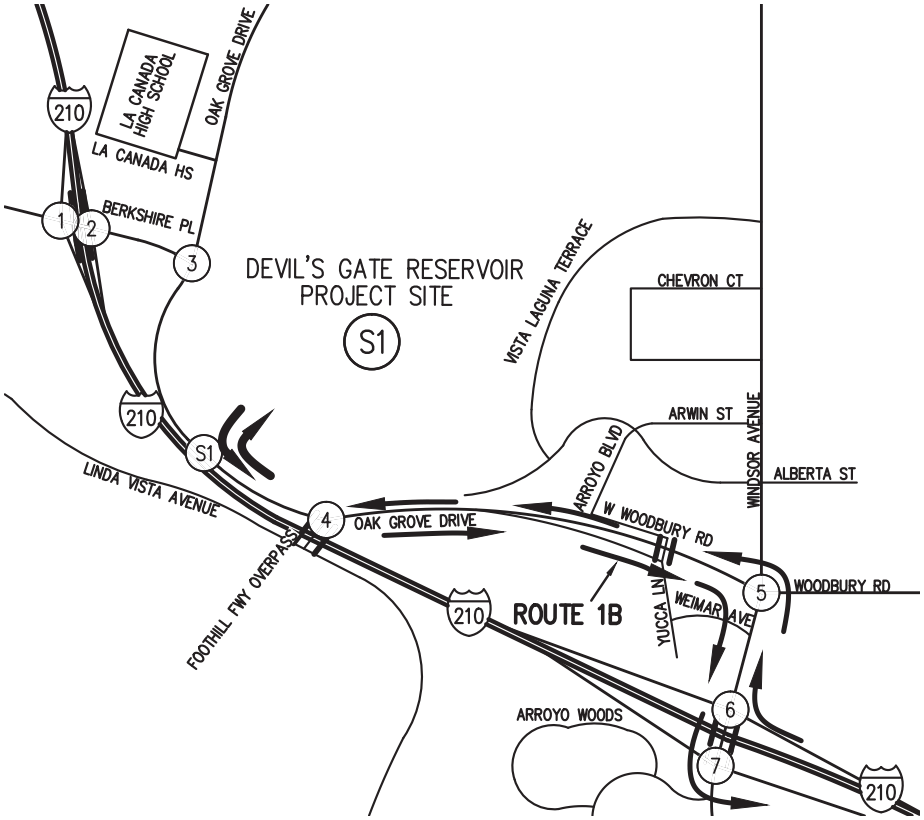
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0						0	0	0	0
300	290	325	435						620	325	285	280
55	65	70	80						190	65	45	60
				130	0	100					
				60	0	65					
				70	0	75					
				70	0	60					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	600	55					
				15	310	40					
				25	390	40					
				0	525	60					
20	25	20	40						55	45	45	50
115	150	160	250						440	165	125	175
210	180	200	190						575	330	405	445
				215	610	495					
				170	305	380					
				165	410	500					
				165	495	575					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				535	760	0					
				300	545	0					
				315	665	0					
				455	715	0					
0	0	0	0						720	420	525	550
0	0	0	0						0	0	5	5
0	0	0	0						5	20	20	25
				40	580	0					
				45	425	0					
				50	575	0					
				100	690	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	200	585					
				0	105	465					
				0	185	485					
				0	165	580					
550	320	370	595						0	0	0	0
5	5	5	5						0	0	0	0
105	55	50	105						0	0	0	0
				0	130	20					
				0	150	20					
				0	185	15					
				0	195	15					



NOT TO SCALE

LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 1B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-2E

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Table 4-1-1
Intersection Capacity Analysis – Existing + Project Conditions (Route 1A)
Traffic Impact Analysis - Site 1

Route1A		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	35.5	-	-	B	10.4	-	-	C	18.7	-	-	C	23.2	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	11.8	-	-	A	6.8	-	-	A	8.8	-	-	A	5.5	-	-
3	Oak Grove Drive and Berkshire Place	B	10.4	0.71	A	A	6.0	0.27	A	A	9.4	0.67	A	A	7.1	0.49	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Table 4-1-2
Intersection Capacity Analysis – Existing + Project Conditions (Route 1B)
Traffic Impact Analysis - Site 1

Route1B		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	17.5	-	-	A	9.6	-	-	A	9.5	-	-	B	11.4	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	28.4	0.86	C	B	13.5	0.53	A	B	15.0	0.52	A	B	18.9	0.74	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.5	0.60	A	A	5.9	0.31	A	A	6.8	0.37	A	A	7.5	0.41	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	24.9	0.53	A	C	23.7	0.39	A	C	21.6	0.39	A	C	23.6	0.57	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

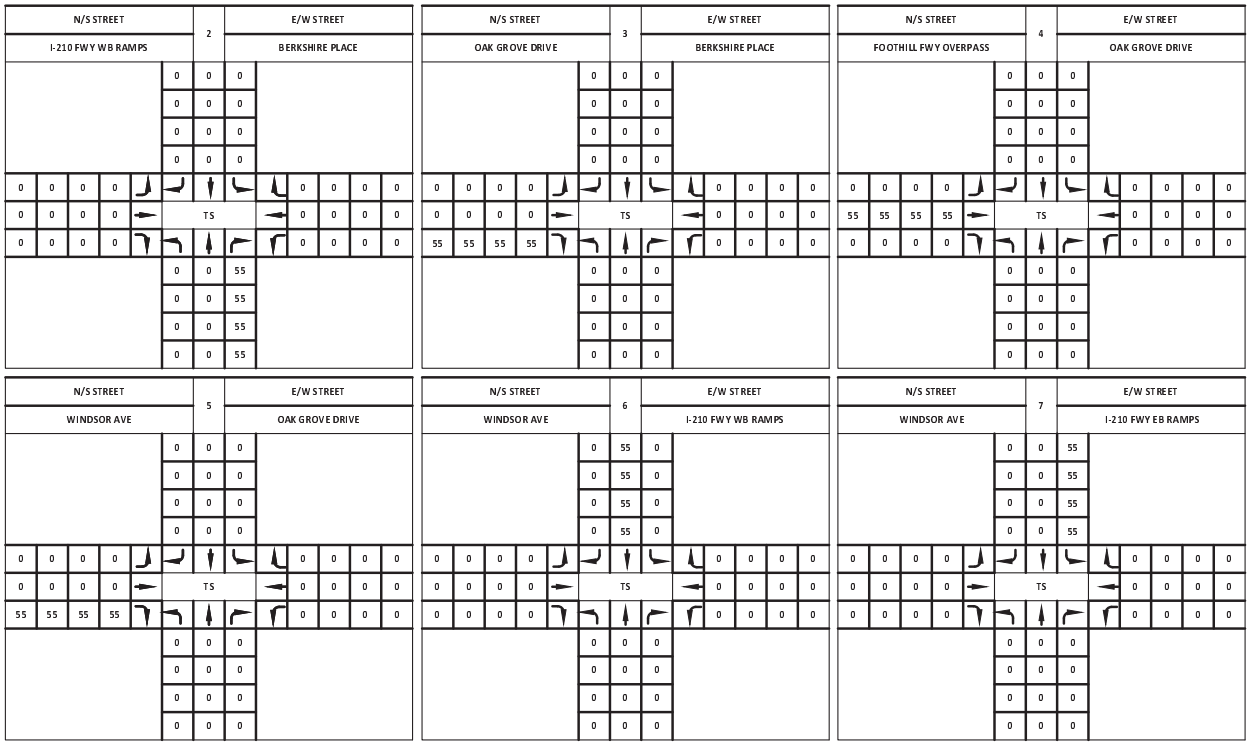
Source: **Hall & Foreman, Inc.**

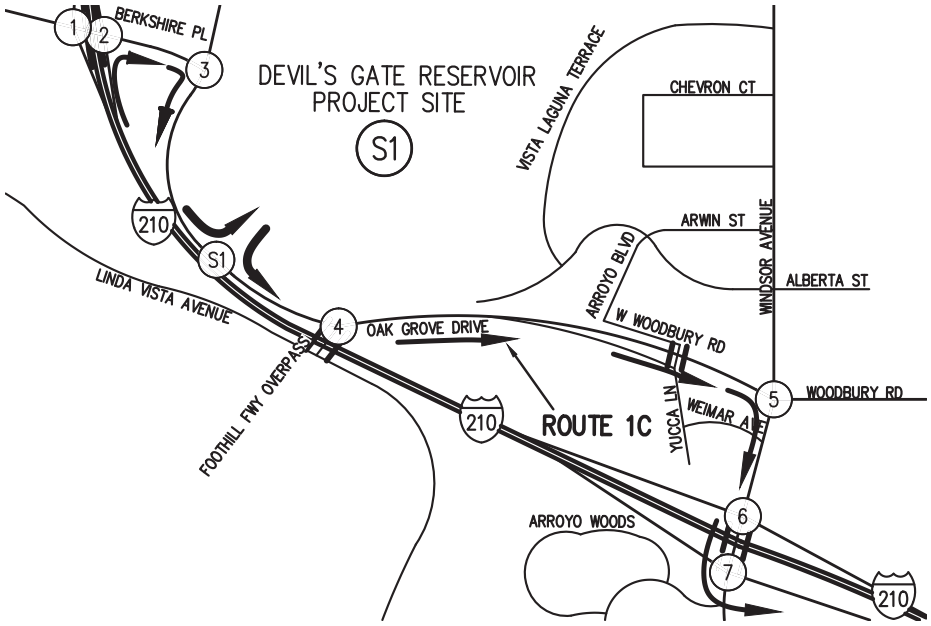
Haul Routes 1A and 1B Analysis

As presented in *Table 4-1-1* and *Table 4-1-2*, under the existing plus project conditions for Site 1 (Routes 1A-1B) most of the study intersections are anticipated to continue to operate at acceptable HCM LOS of C or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps is anticipated to operate at HCM LOS E during the AM peak period, mitigation is recommended.

Haul Route 1C

The Haul Route 1C project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-3A* through *Figure 4-1-3C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-3D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-3E.*





LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-3A

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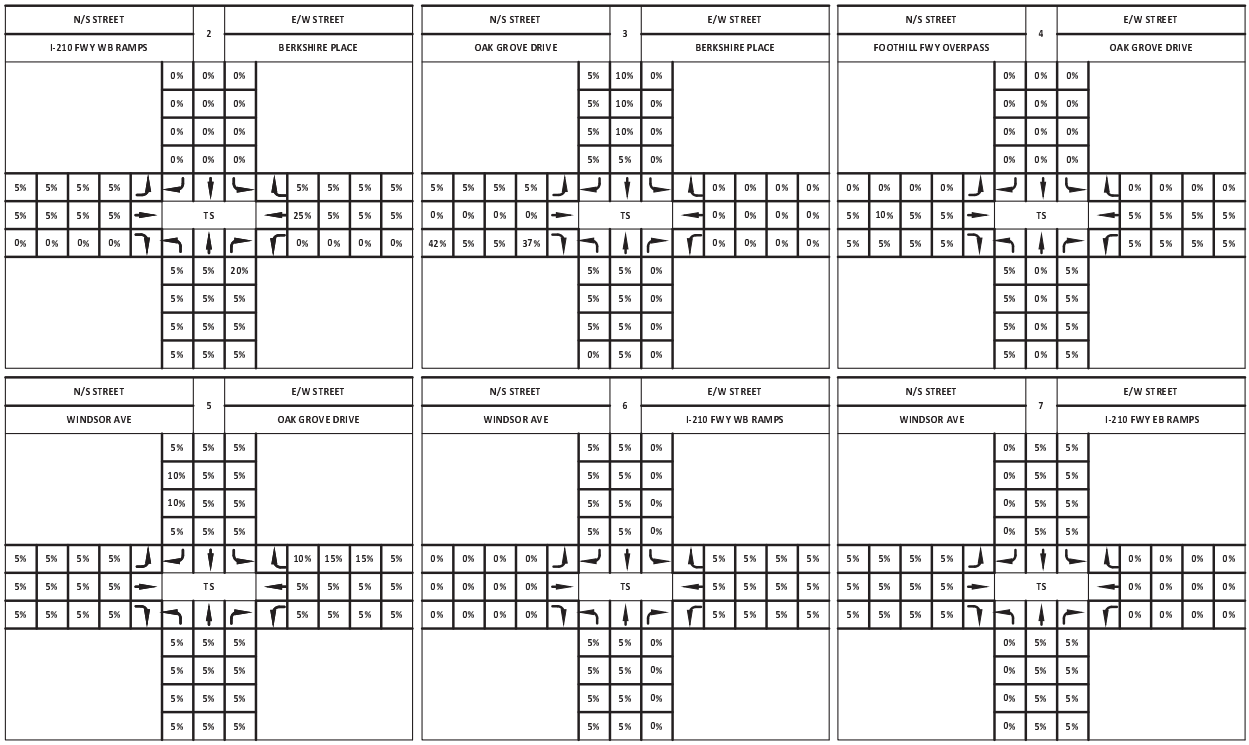

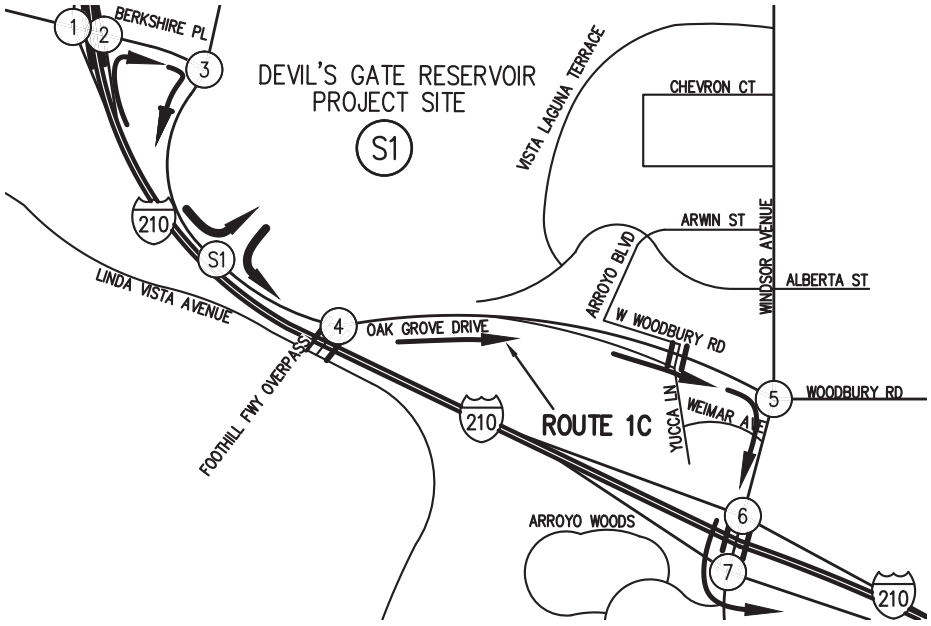

NOT TO SCALE

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1C TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-3B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-3B.dwg
Last Opened: Oct 04, 2013 - 10:18am by: TMunoz

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
					0	0	140					
					0	0	140					
					0	0	140					
					0	0	140					

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
140	140	140	140						0	0	0	0
					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
165	165	165	165		TS				0	0	0	0
0	0	0	0						0	0	0	0
					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
165	165	165	165						0	0	0	0
					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

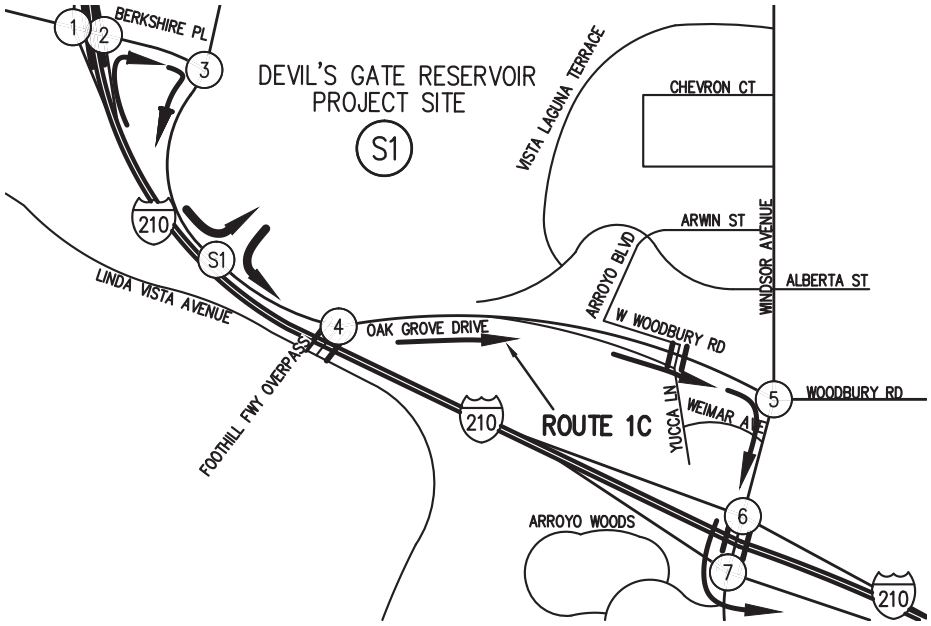
					0	165	0					
					0	165	0					
					0	165	0					
					0	165	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

					0	0	165					
					0	0	165					
					0	0	165					
					0	0	165					
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

					7AM-9AM							
					2PM-4PM							
					4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS							
					7AM-9AM							
					2PM-4PM							
					4PM-6PM							

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

Hall & Foreman, Inc.
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14297 Cajon St., Suite 101 Victorville, CA., 92392-2335
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ROUTE 1C
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-3C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-3C.dwg
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N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
95	50	50	65					255	170	170	410
285	175	175	180		TS			190	110	110	405
0	0	0	0					0	0	0	0
				60	5	330					
				55	5	125					
				65	5	170					
				95	5	135					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				360	70	0					
				215	100	0					
				745	140	0					
				750	245	0					
510	150	330	185					0	0	0	0
0	0	0	0		TS			0	0	0	0
125	115	100	140					0	0	0	0
				140	450	0					
				65	135	0					
				75	95	0					
				65	150	0					

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
170	160	195	320					465	170	125	130
50	65	60	80					180	60	40	60
				125	0	95					
				55	0	60					
				60	0	65					
				70	0	60					

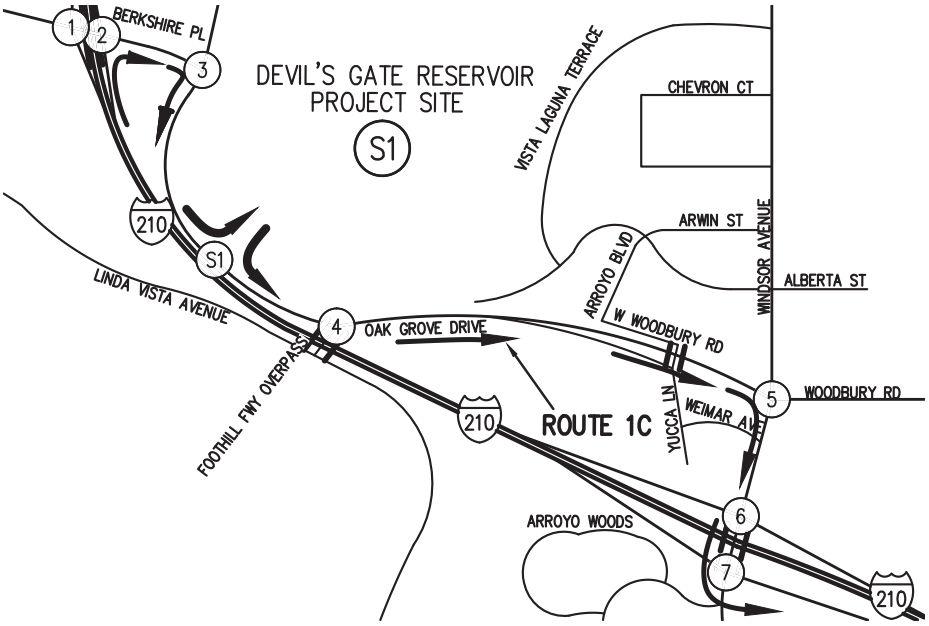
N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	590	55					
				10	300	40					
				20	340	40					
				5	525	60					
20	25	20	40					45	35	30	50
105	140	140	240		TS			425	160	110	155
95	70	85	80					555	300	350	440
				70	605	455					
				30	290	365					
				20	355	435					
				25	495	570					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				530	640	0					
				280	425	0					
				275	490	0					
				445	605	0					
0	0	0	0					570	275	335	405
0	0	0	0		TS			5	5	5	5
0	0	0	0					5	20	20	25
				40	555	0					
				45	420	0					
				45	500	0					
				100	690	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	190	470					
				0	100	350					
				0	160	335					
				0	165	470					
550	320	370	595					0	0	0	0
5	5	5	5		TS			0	0	0	0
105	55	50	105					0	0	0	0
				0	130	20					
				0	145	15					
				0	160	15					
				0	195	15					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 1C
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-3D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-3D.dwg
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N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
95	55	75	65					270	170	580	410
295	185	315	180		TS			200	120	335	410
0	0	0	0					0	0	0	0
				60	5	425					
				60	5	210					
				75	5	275					
				95	5	225					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				365	85	0					
				225	115	0					
				855	180	0					
				755	250	0					
520	160	380	200					0	0	0	0
0	0	0	0		TS			0	0	0	0
210	205	190	225					0	0	0	0
				145	455	0					
				65	140	0					
				85	110	0					
				65	160	0					

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
300	290	325	435					480	185	145	140
55	65	70	80					190	65	45	60
				130	0	100					
				60	0	65					
				70	0	75					
				70	0	60					

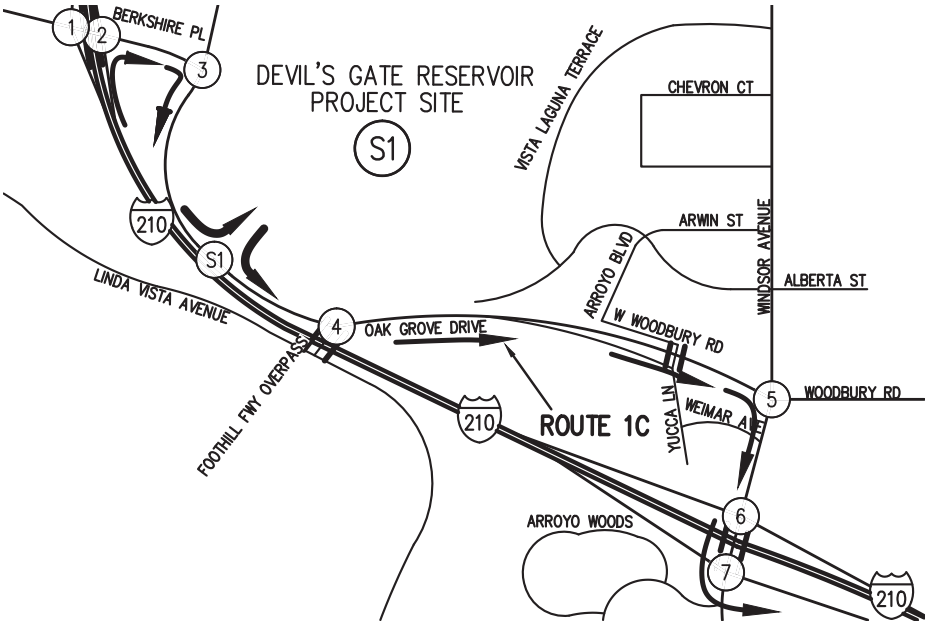
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
300	290	325	435					480	185	145	140
55	65	70	80					190	65	45	60
				130	0	100					
				60	0	65					
				70	0	75					
				70	0	60					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				535	760	0					
				300	545	0					
				315	665	0					
				455	715	0					
0	0	0	0					580	280	385	410
0	0	0	0		TS			5	5	5	5
0	0	0	0					5	20	20	25
				40	580	0					
				45	425	0					
				50	575	0					
				100	690	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	200	585					
				0	105	465					
				0	185	485					
				0	165	580					
550	320	370	595					0	0	0	0
5	5	5	5		TS			0	0	0	0
105	55	50	105					0	0	0	0
				0	130	20					
				0	150	20					
				0	185	15					
				0	195	15					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 1C
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-3E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-3E.dwg
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Table 4-1-3
Intersection Capacity Analysis – Existing + Project Conditions (Route 1C)
Traffic Impact Analysis - Site 1

Route1C		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	11.8	-	-	A	6.8	-	-	A	8	-	-	A	5.7	-	-
3	Oak Grove Drive and Berkshire Place	B	10	0.6	A	A	5.9	0.2	A	A	7.7	0.52	A	A	6.6	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	15.8	-	-	A	9.2	-	-	A	9.2	-	-	B	10.9	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	23.9	0.84	C	B	16.9	0.48	A	B	16.8	0.55	A	B	13.2	0.59	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.7	0.57	A	A	5.5	0.31	A	A	6	0.35	A	A	7	0.41	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	24.9	0.53	A	C	23.7	0.39	A	C	21.6	0.39	A	C	23.6	0.57	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

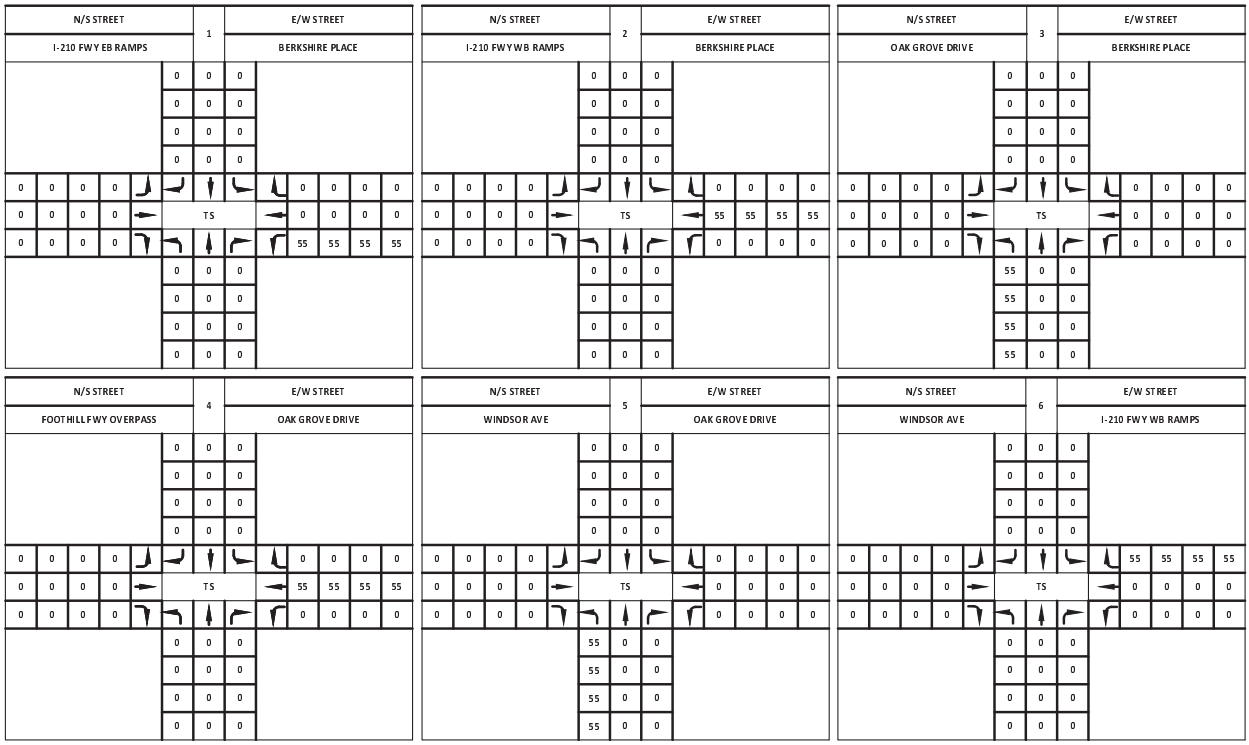
Source: **Hall & Foreman, Inc.**

Haul Route 1C Analysis

As presented in *Table 4-1-3*, under the existing plus project conditions for Site 1 (Routes 1C) all intersections are anticipated to continue to operate at acceptable HCM LOS of C or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours.

Haul Route 1D

The Haul Route 1D project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-4A* through *Figure 4-1-4C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-4D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-4E.*



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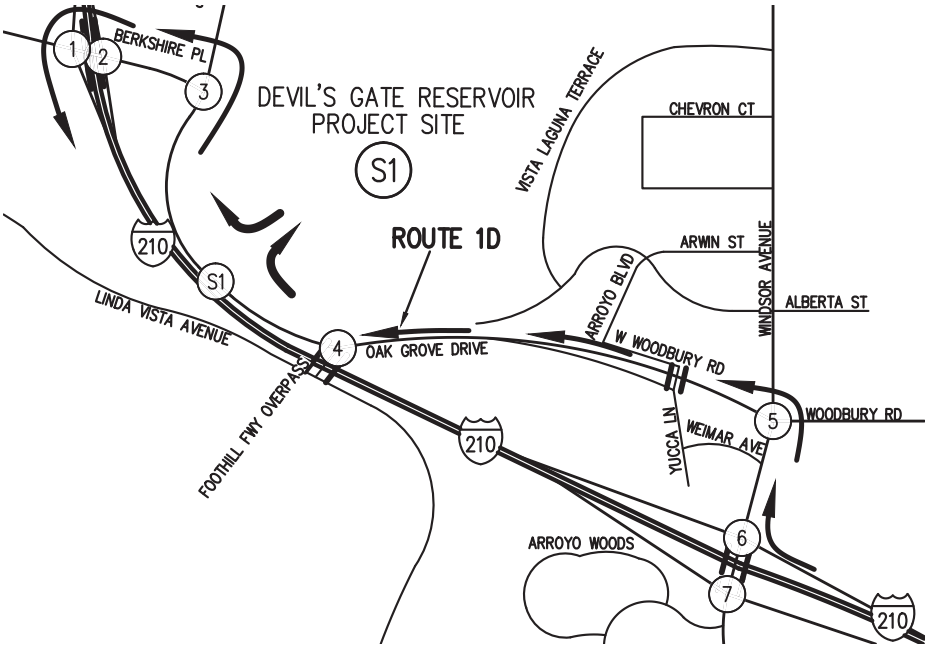

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1D PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-4A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-4A.dwg
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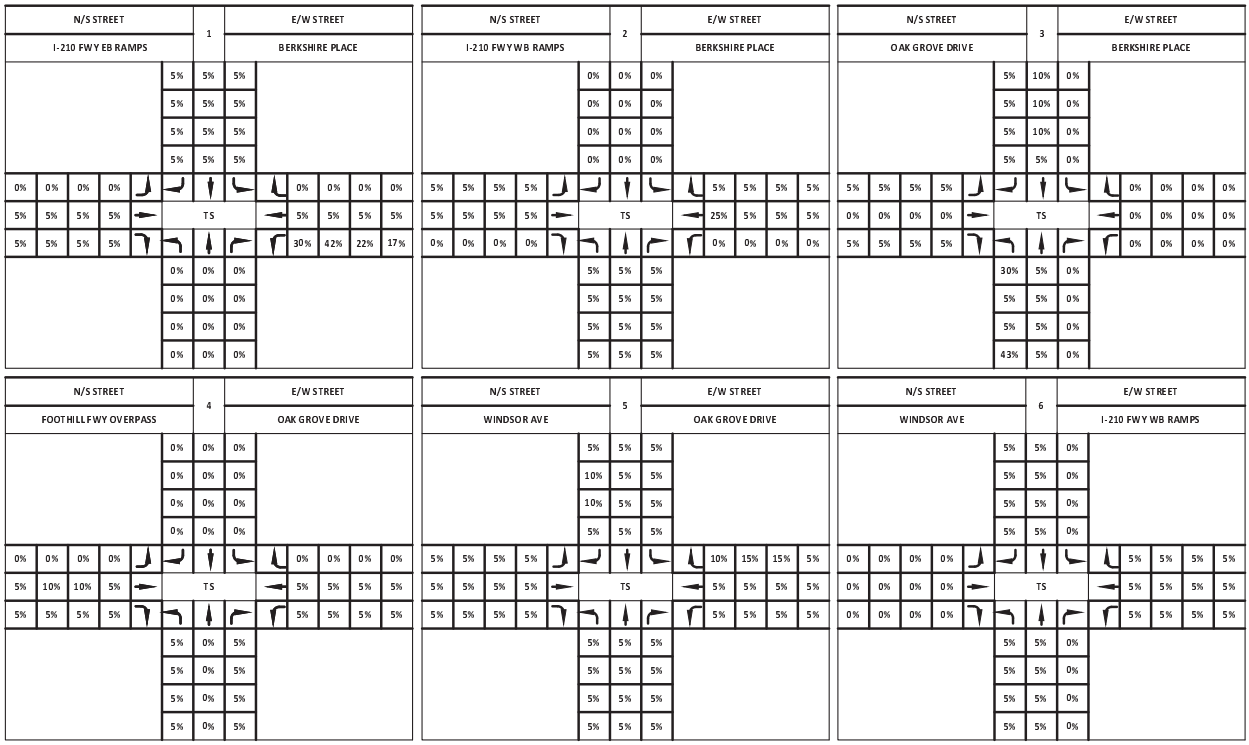

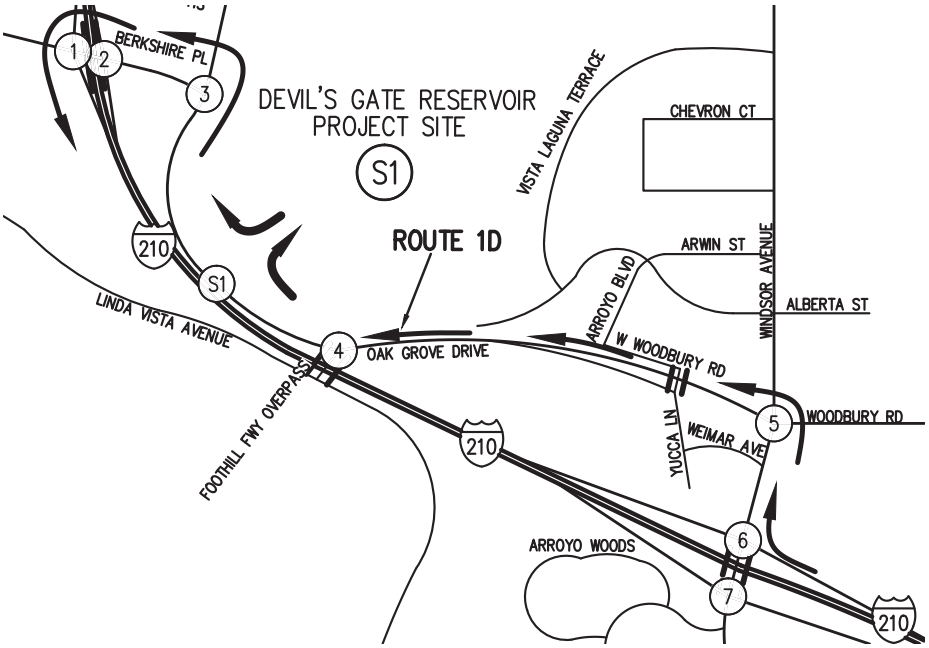

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1D TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-4B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-4B.dwg
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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						165	165	165	165
					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				165	165	165	165
0	0	0	0						0	0	0	0
					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
					165	0	0					
					165	0	0					
					165	0	0					
					165	0	0					

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				140	140	140	140
0	0	0	0						0	0	0	0
					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
					140	0	0					
					140	0	0					
					140	0	0					
					140	0	0					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						140	140	140	140
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					

N

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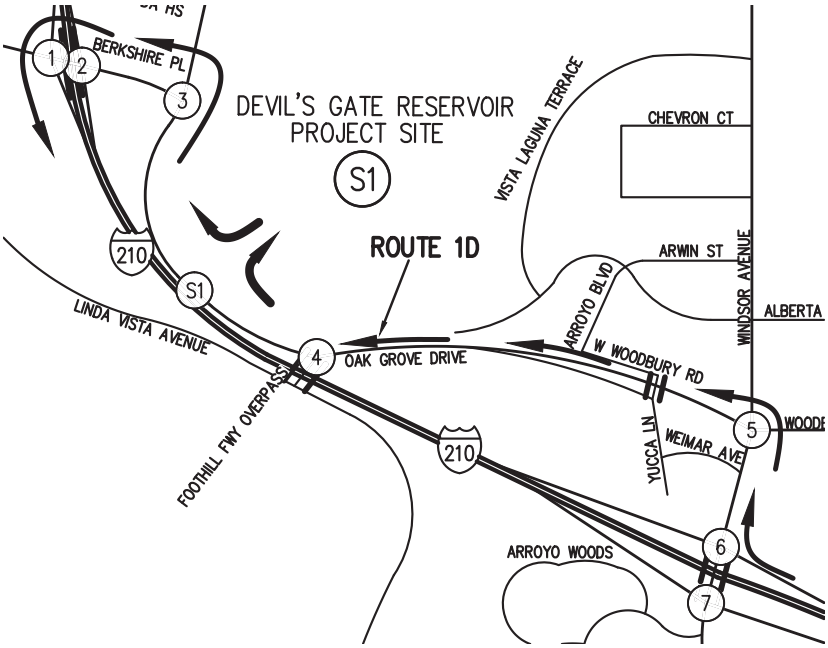

LEGEND

N/S STREET	S#	E/W STREET

					7AM-9AM							
					2PM-4PM							
					4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS							
					7AM-9AM							
					2PM-4PM							
					4PM-6PM							

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 1D
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-4C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-4C.dwg
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N/S STREET				1			E/W STREET			
I-210 FWY EB RAMPS							BERKSHIRE PLACE			
				85	5	325				
				45	5	105				
				60	5	205				
				90	5	165				
0	0	0	0					0	0	0	0
250	100	125	80		TS			120	110	165	160
125	55	80	70					195	135	260	390
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2			E/W STREET			
I-210 FWY WB RAMPS							BERKSHIRE PLACE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
95	50	50	65					255	170	170	410
285	175	175	180		TS			245	165	165	460
0	0	0	0					0	0	0	0
				60	5	275				
				55	5	70				
				65	5	115				
				95	5	80				

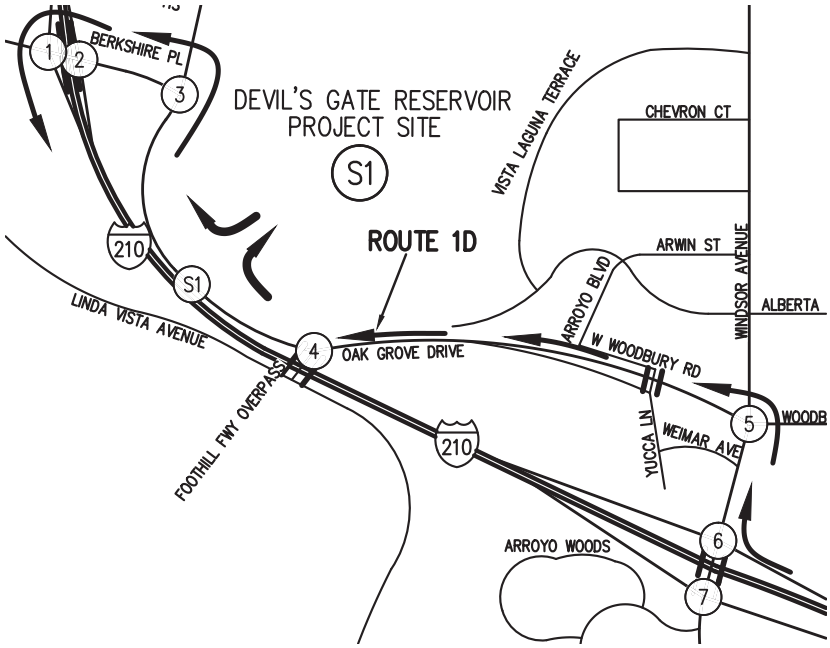
N/S STREET				3			E/W STREET			
OAK GROVE DRIVE							BERKSHIRE PLACE			
				360	70	0				
				215	100	0				
				745	140	0				
				750	245	0				
510	150	330	185					0	0	0	0
0	0	0	0		TS			0	0	0	0
70	60	45	85					0	0	0	0
				195	450	0				
				120	135	0				
				130	95	0				
				120	150	0				

N/S STREET				4			E/W STREET			
FOOTHILL FWY OVERPASS							OAK GROVE DRIVE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	0					0	0	0	0
115	105	140	265					520	225	180	185
50	65	60	80					180	60	40	60
				125	0	95				
				55	0	60				
				60	0	65				
				70	0	60				

N/S STREET				5			E/W STREET			
WINDSOR AVE							OAK GROVE DRIVE			
				35	590	55				
				10	300	40				
				20	340	40				
				5	525	60				
20	25	40	40					45	35	30	50
105	140	240	240		TS			425	160	110	155
40	15	25	25					555	300	350	440
				125	605	455				
				85	290	365				
				75	355	435				
				80	495	570				

N/S STREET				6			E/W STREET			
WINDSOR AVE							I-210 FWY WB RAMPS			
				530	585	0				
				280	370	0				
				275	435	0				
				445	550	0				
0	0	0	0					625	330	390	460
0	0	0	0		TS			5	5	5	5
0	0	0	0					5	20	20	25
				40	555	0				
				45	420	0				
				45	500	0				
				100	690	0				

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 1D
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-4D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-4D.dwg
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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE
	90 5 335	
	50 5 115	
	70 5 235	
	90 5 165	
0 0 0 0		0 0 0 0
250 105 145 85	TS	125 115 190 160
130 60 90 70		310 255 400 500
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
95 55 65 65		270 170 580 410
295 185 180 180	TS	365 285 500 575
0 0 0 0		0 0 0 0
	60 5 285	
	60 5 70	
	75 0 135	
	95 5 85	

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	365 85 0	
	225 115 0	
	855 180 0	
	755 250 0	
520 160 380 200		0 0 0 0
0 0 0 0	TS	0 0 0 0
70 65 50 85		0 0 0 0
	310 455 0	
	230 140 0	
	250 110 0	
	230 160 0	

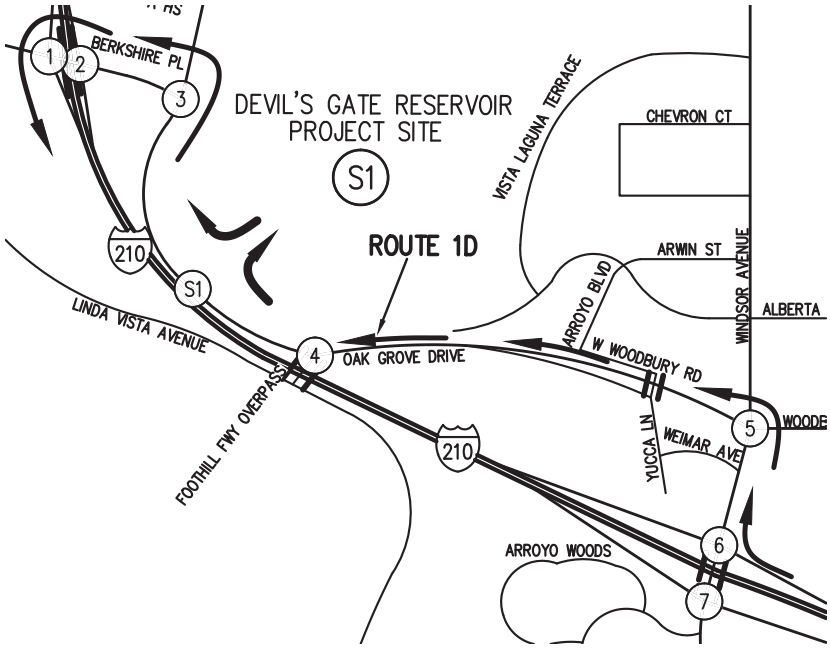
N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE
	0 0 0	
	0 0 0	
	0 0 0	
	0 0 0	
0 0 0 0		0 0 0 0
135 125 270 270		620 325 285 280
55 65 80 80		190 65 45 60
	130 0 100	
	60 0 65	
	70 0 75	
	70 0 60	

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE
	35 600 55	
	15 310 40	
	25 390 40	
	5 525 60	
20 25 40 40		55 45 45 50
115 150 250 250	TS	440 165 125 175
45 15 25 25		575 330 405 445
	215 610 495	
	170 305 380	
	165 410 500	
	165 495 575	

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS
	535 595 0	
	300 380 0	
	315 500 0	
	455 550 0	
0 0 0 0		720 420 525 550
0 0 0 0	TS	5 5 5 5
0 0 0 0		5 20 20 25
	40 580 0	
	45 425 0	
	50 575 0	
	100 690 0	

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 1D
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-4E

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Table 4-1-4
Intersection Capacity Analysis – Existing + Project Conditions (Route 1D)
Traffic Impact Analysis - Site 1

Route1D		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	35.5	-	-	B	10.4	-	-	C	18.7	-	-	C	23.2	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	5.1	-	-	A	6.3	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	9.6	0.67	A	A	5.4	0.25	A	A	8.8	0.57	A	A	6.8	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	16.3	-	-	A	9.3	-	-	A	9.2	-	-	B	10.7	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	28.4	0.86	C	B	13.6	0.49	A	B	14.9	0.53	A	B	19	0.74	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9	0.57	A	A	5.9	0.28	A	A	6.7	0.33	A	A	7.6	0.39	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1D Analysis

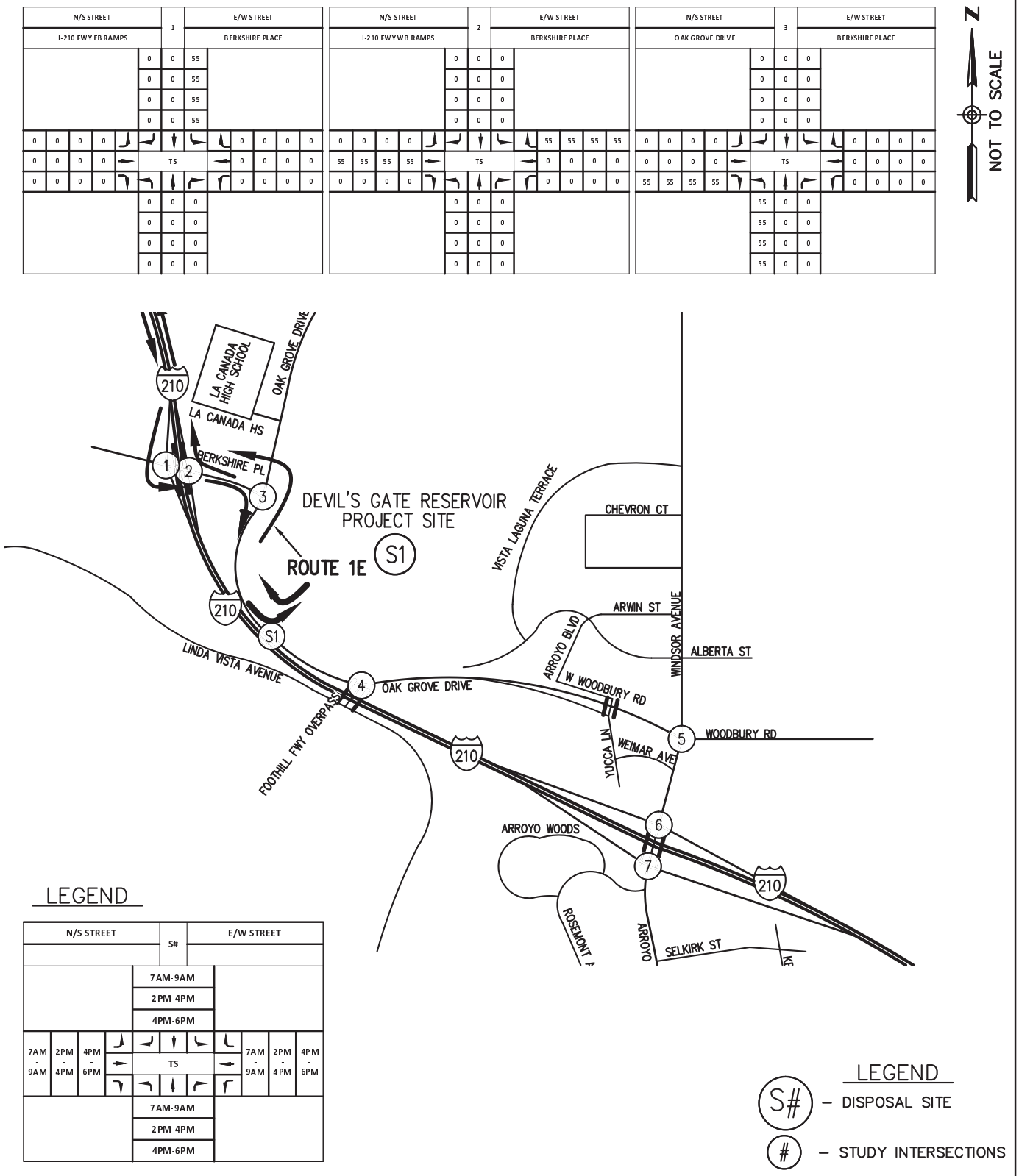
As presented in *Table 4-1-4*, under the existing plus project conditions for Site 1 (Routes 1D) most of the study intersections are anticipated to continue to operate at acceptable HCM LOS of D or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps is anticipated to operate at HCM LOS E during the AM peak period, mitigation is recommended.

Haul Route 1E

The Haul Route 1E project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-5A* through *Figure 4-1-5C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-5D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-5E.*

Haul Route 1F

The Haul Route 1F project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-6A* through *Figure 4-1-6C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-6D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-6E.*



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ROUTE 1E PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-5A

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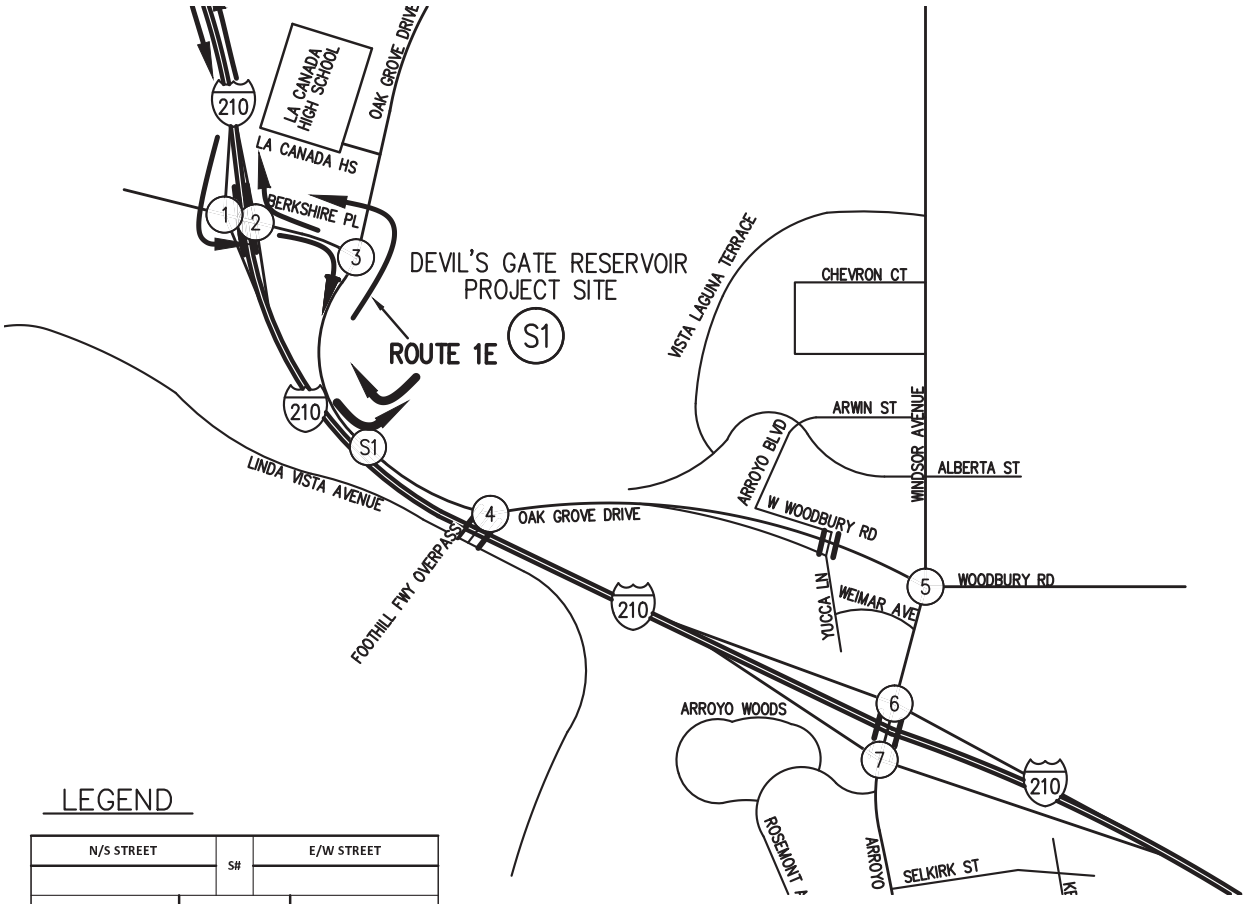
N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE
	5% 5% 18%	
	5% 5% 36%	
	5% 5% 23%	
	5% 5% 23%	
0% 0% 0% 0%		0% 0% 0% 0%
5% 5% 5% 5%	TR	5% 5% 5% 5%
5% 5% 5% 5%		5% 5% 5% 5%
	0% 0% 0%	
	0% 0% 0%	
	0% 0% 0%	
	0% 0% 0%	

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE
	0% 0% 0%	
	0% 0% 0%	
	0% 0% 0%	
	0% 0% 0%	
5% 5% 5% 5%		21% 5% 5% 5%
19% 5% 5% 5%	TS	5% 5% 5% 5%
0% 0% 0% 0%		0% 0% 0% 0%
	5% 5% 5%	
	5% 5% 5%	
	5% 5% 5%	
	5% 5% 5%	

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE
	5% 10% 0%	
	5% 10% 0%	
	5% 10% 0%	
	5% 10% 0%	
5% 5% 5% 5%		0% 0% 0% 0%
0% 0% 0% 0%	TS	0% 0% 0% 0%
42% 5% 5% 37%		0% 0% 0% 0%
	30% 5% 0%	
	5% 5% 0%	
	5% 5% 0%	
	43% 5% 0%	

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

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ROUTE 1E TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-5B

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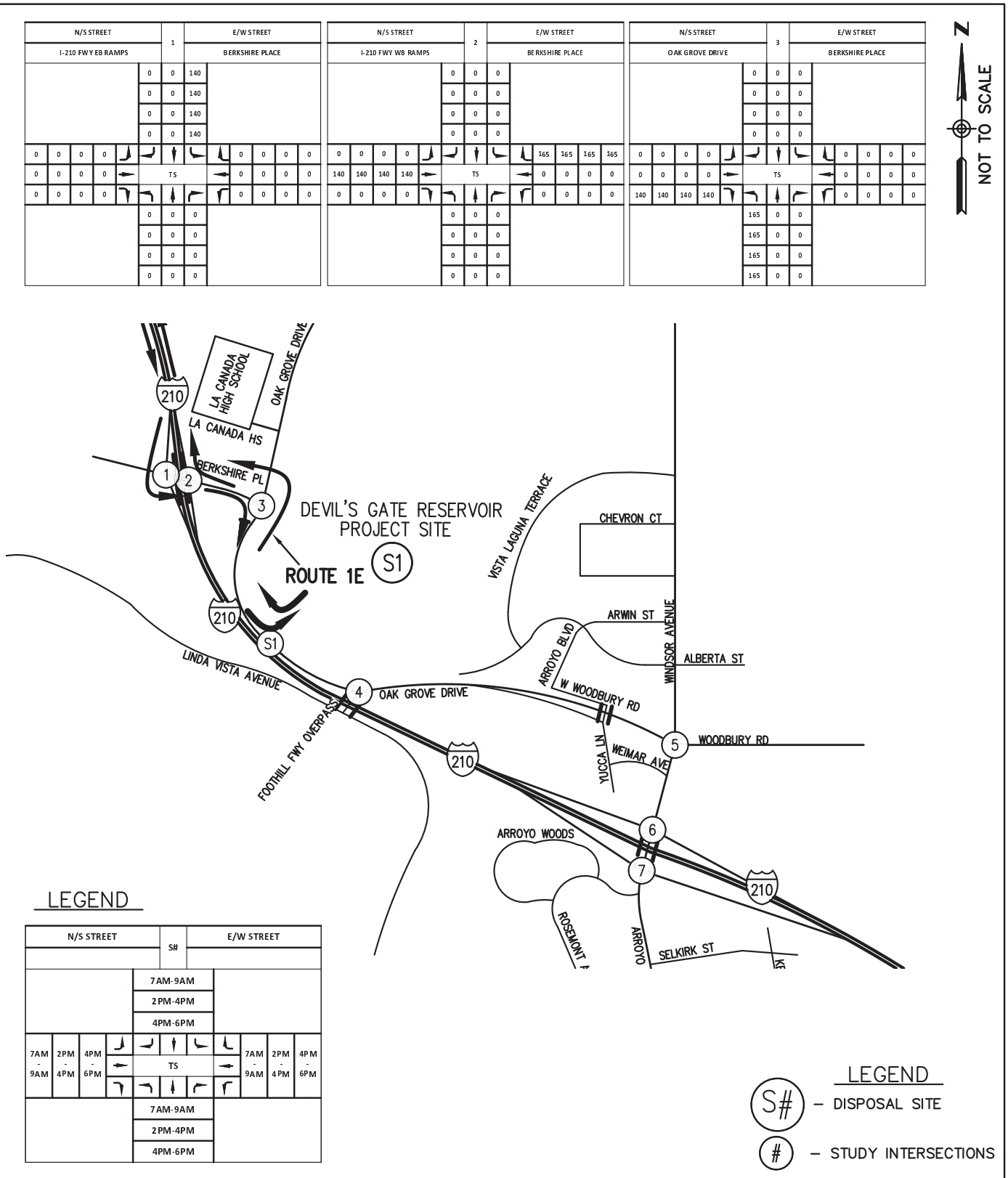

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ROUTE 1E
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-5C

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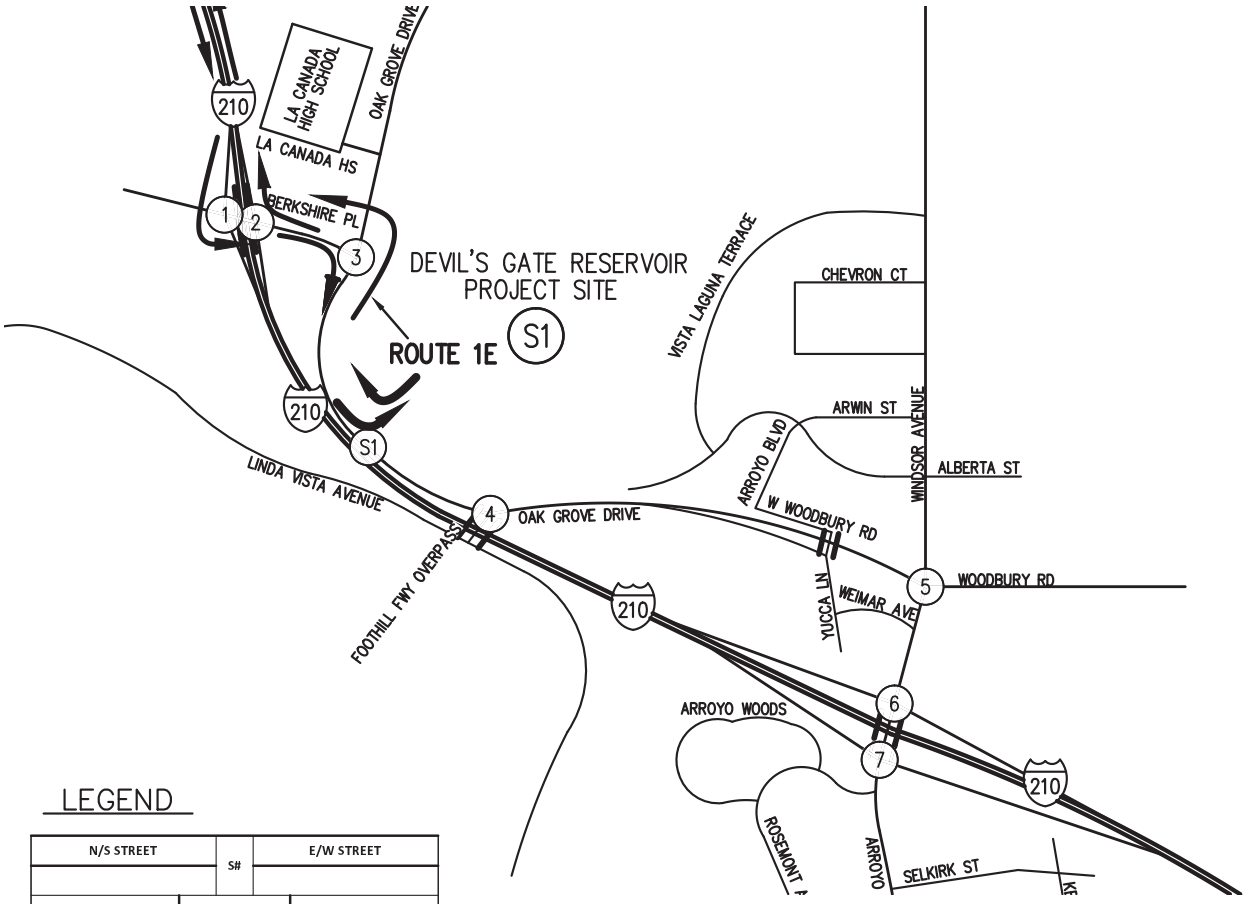
N/S STREET				1			E/W STREET			
I-210 FWY EB RAMPS							BERKSHIRE PLACE			
				85	5	380				
				45	5	160				
				60	5	205				
				90	5	220				
0	0	0	0					0	0	0	0
250	100	125	80	TS				120	110	165	160
125	55	80	70					140	80	260	335
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2			E/W STREET			
I-210 FWY WB RAMPS							BERKSHIRE PLACE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
95	50	50	65					310	225	225	465
340	230	230	235	TS				190	110	110	405
0	0	0	0					0	0	0	0
				60	5	275				
				55	5	70				
				65	5	115				
				95	5	80				

N/S STREET				3			E/W STREET			
OAK GROVE DRIVE							BERKSHIRE PLACE			
				360	70	0				
				215	100	0				
				745	140	0				
				750	245	0				
510	150	330	185					0	0	0	0
0	0	0	0	TS				0	0	0	0
125	115	100	140					0	0	0	0
				195	450	0				
				120	135	0				
				130	95	0				
				120	150	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 1E
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-5D

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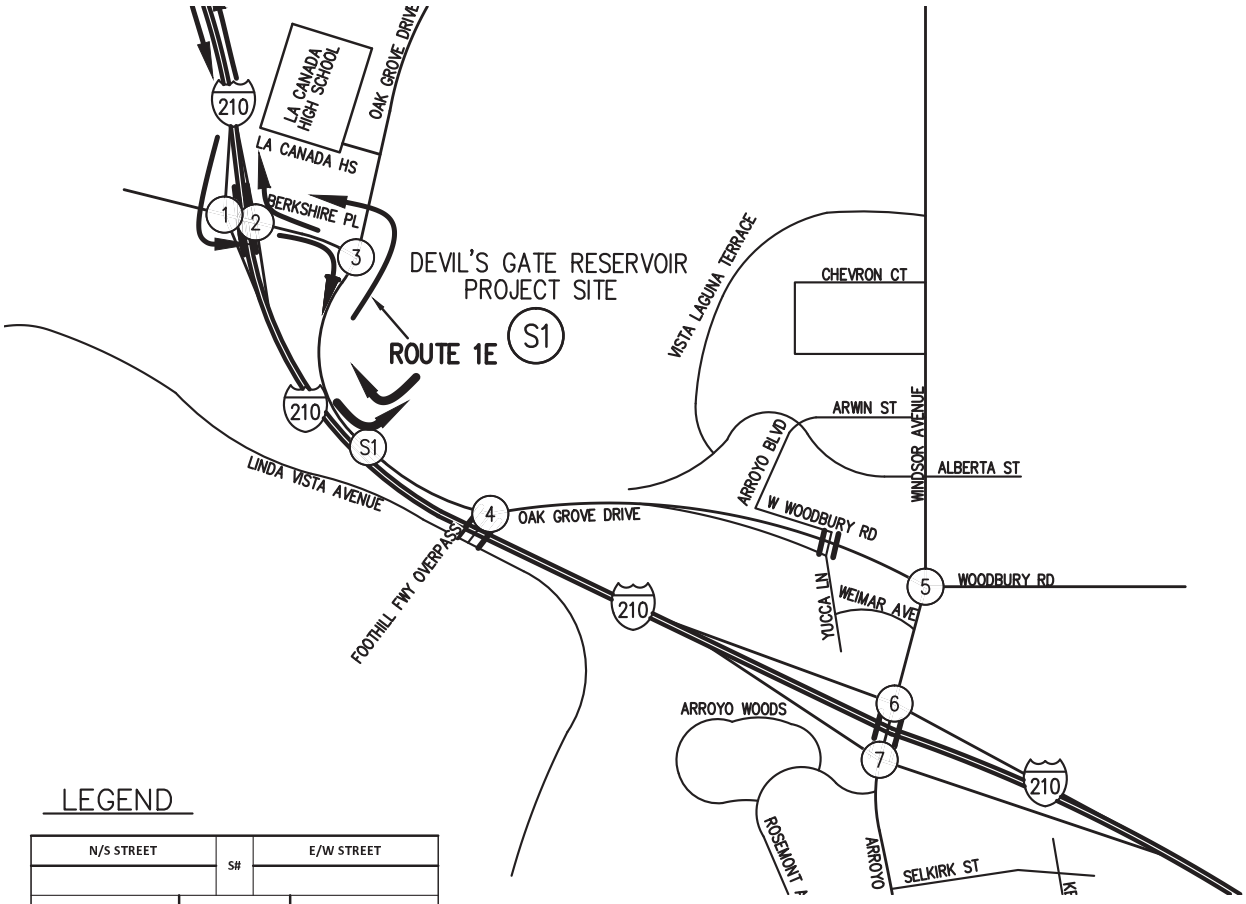
N/S STREET				1			E/W STREET			
I-210 FWY EB RAMPS							BERKSHIRE PLACE			
				90	5	475				
				50	5	255				
				70	5	235				
				90	5	305				
0	0	0	0					0	0	0	0
250	105	145	85		TS			125	115	190	160
130	60	90	70					145	90	400	335
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2			E/W STREET			
I-210 FWY WB RAMPS							BERKSHIRE PLACE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
95	55	75	65					435	335	745	575
435	325	455	320		TS			200	120	335	410
0	0	0	0					0	0	0	0
				60	5	285				
				60	5	70				
				75	5	135				
				95	5	85				

N/S STREET				3			E/W STREET			
OAK GROVE DRIVE							BERKSHIRE PLACE			
				365	85	0				
				225	115	0				
				855	180	0				
				755	250	0				
520	160	380	200					0	0	0	0
0	0	0	0		TS			0	0	0	0
210	205	190	225					0	0	0	0
				310	455	0				
				230	140	0				
				250	110	0				
				230	160	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
					TS					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 1E
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-5E

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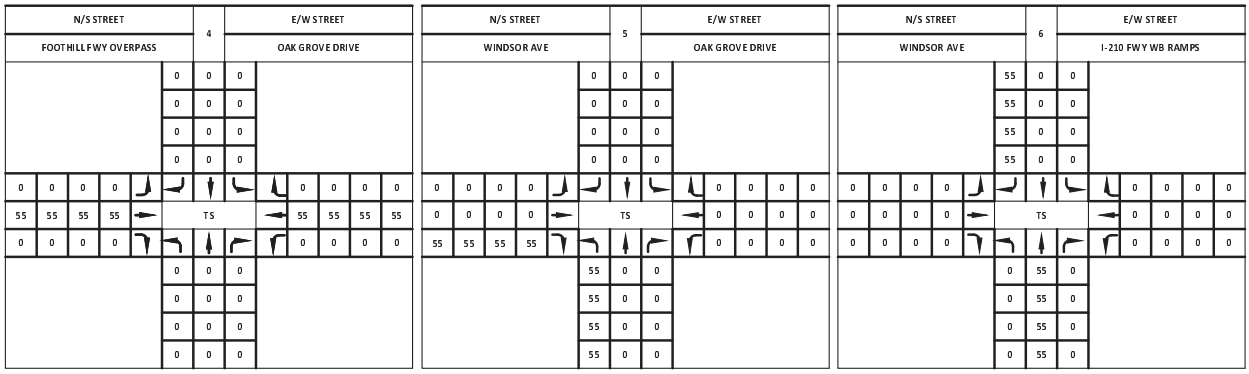

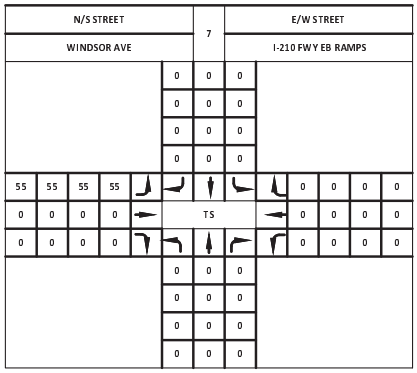

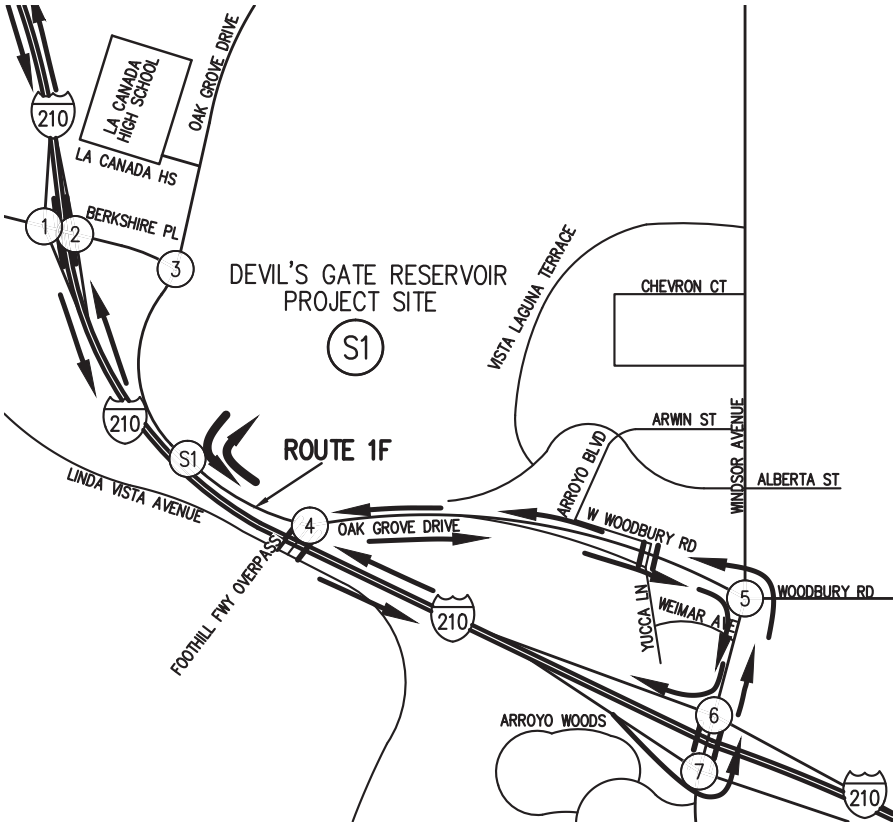

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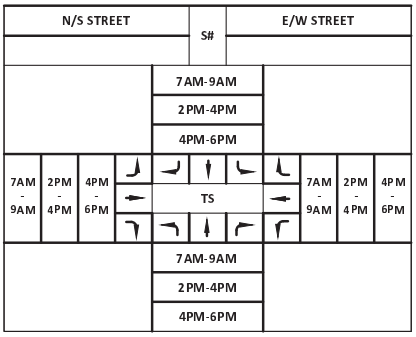

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ROUTE 1F PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-6A

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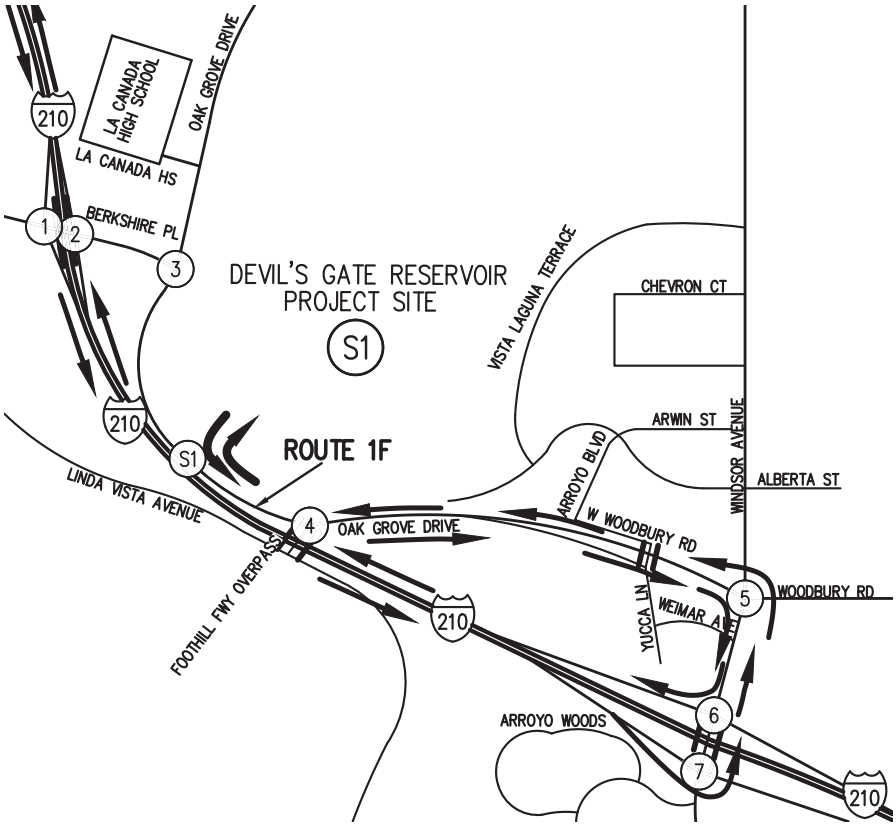
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
				0%	0%	0%					
0%	0%	0%	0%						0%	0%	0%	0%
5%	10%	5%	5%		TS				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
				5%	0%	5%					
				5%	0%	5%					
				5%	0%	5%					
				5%	0%	5%					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				5%	5%	5%					
				10%	5%	5%					
				10%	5%	5%					
				5%	5%	5%					
5%	5%	5%	5%						10%	15%	15%	5%
5%	5%	5%	5%		TS				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
				5%	5%	5%					
				5%	5%	5%					
				5%	5%	5%					
				5%	5%	5%					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
0%	0%	0%	0%						5%	5%	5%	5%
0%	0%	0%	0%		TS				5%	5%	5%	5%
0%	0%	0%	0%						5%	5%	5%	5%
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					
				5%	5%	0%					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0%	5%	5%					
				0%	5%	5%					
				0%	5%	5%					
				0%	5%	5%					
5%	5%	12%	5%						0%	0%	0%	0%
5%	5%	5%	5%		TS				0%	0%	0%	0%
5%	5%	5%	5%						0%	0%	0%	0%
				0%	5%	5%					
				0%	5%	5%					
				0%	5%	5%					
				0%	5%	5%					

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 1F TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-6B

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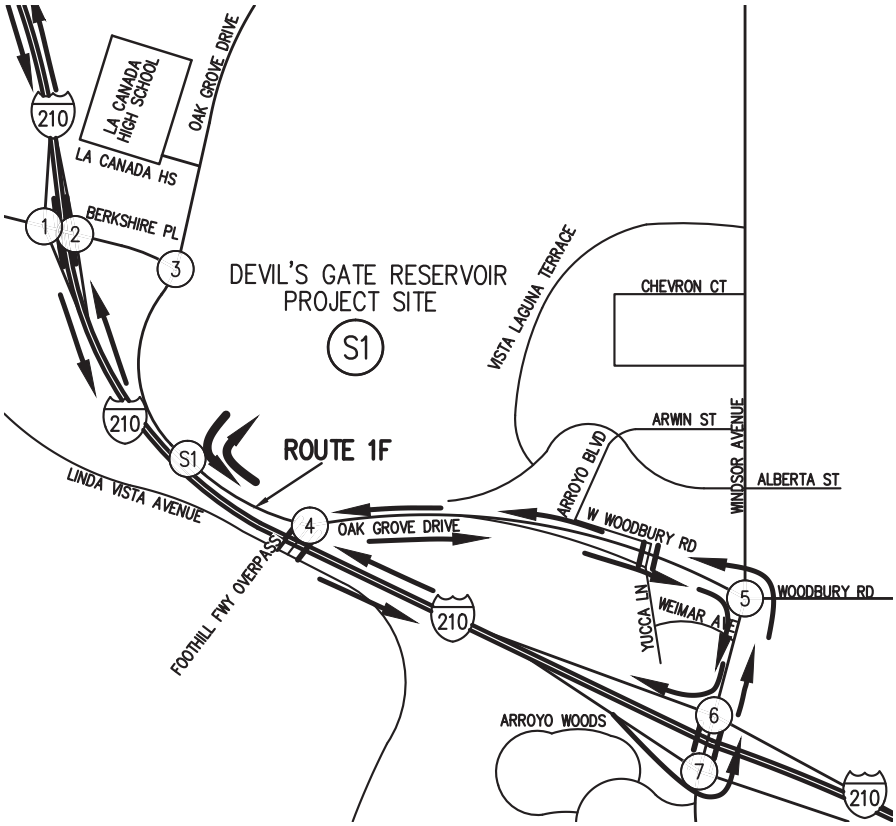
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0						0	0	0	0
165	165	165	165		TS				140	140	140	140
0	0	0	0						0	0	0	0
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
165	165	165	165						0	0	0	0
				140	0	0					
				140	0	0					
				140	0	0					
				140	0	0					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				165	0	0					
				165	0	0					
				165	0	0					
				165	0	0					
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
				0	140	0					
				0	140	0					
				0	140	0					
				0	140	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
140	140	140	140						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					



NOT TO SCALE

LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 1F PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-6C

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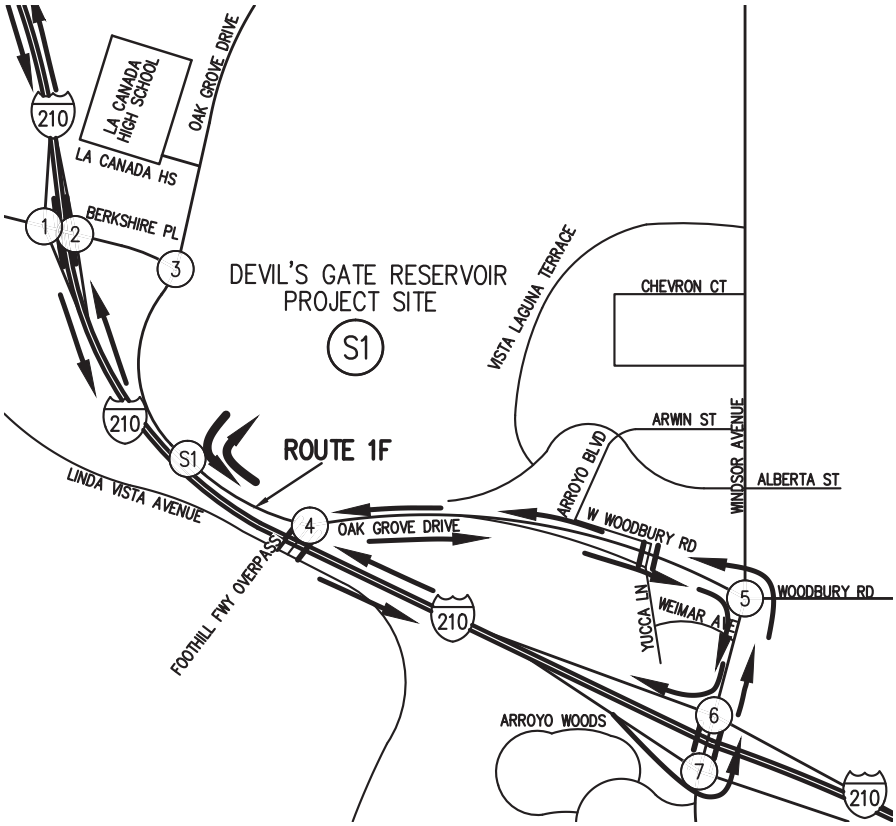
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0						0	0	0	0
170	160	195	320			TS			520	225	180	185
50	65	60	80						180	60	40	60
				125	0	95					
				55	0	60					
				60	0	65					
				70	0	60					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	590	55					
				10	300	40					
				20	340	40					
				5	525	60					
20	25	20	40						45	35	30	50
105	140	140	240			TS			425	160	110	155
95	70	85	80						555	300	350	440
				125	605	455					
				85	290	365					
				75	355	435					
				80	495	570					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				585	585	0					
				335	370	0					
				330	435	0					
				500	550	0					
0	0	0	0						570	275	335	405
0	0	0	0			TS			5	5	5	5
0	0	0	0						5	20	20	25
				40	610	0					
				45	475	0					
				45	555	0					
				100	745	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	190	415					
				0	100	295					
				0	160	280					
				0	165	415					
605	375	425	650						0	0	0	0
5	5	5	5			TS			0	0	0	0
105	55	50	105						0	0	0	0
				0	130	20					
				0	145	15					
				0	160	15					
				0	195	15					



N

NOT TO SCALE

LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

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ROUTE 1F EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-6D

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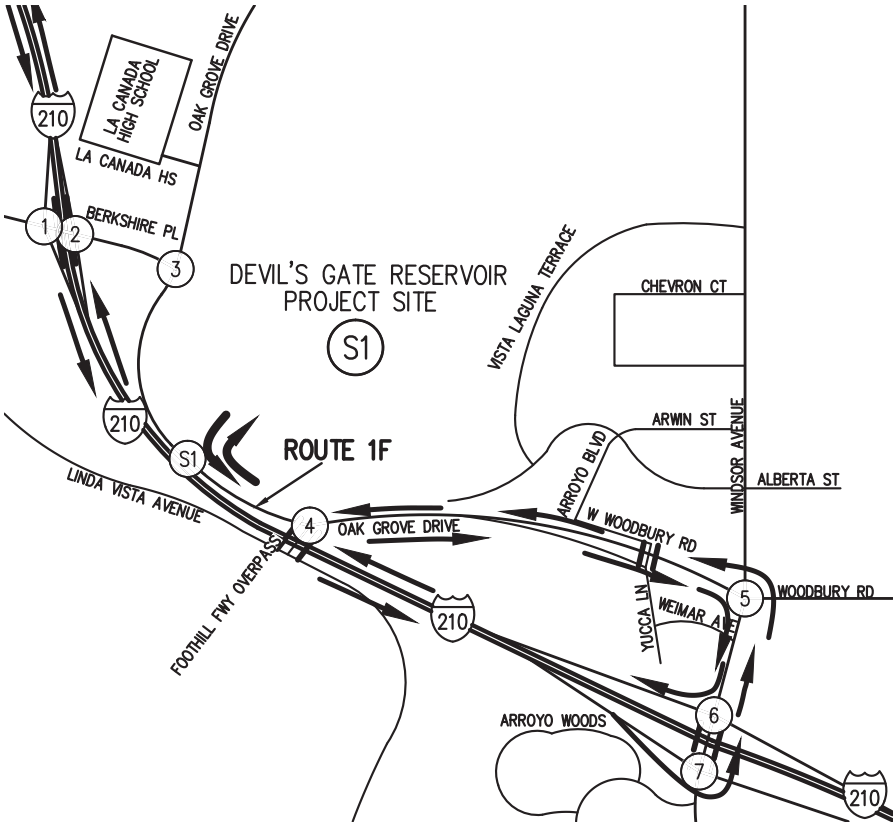
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0						0	0	0	0
300	290	325	435						620	325	285	280
55	65	70	80						190	65	45	60
				130	0	100					
				60	0	65					
				70	0	75					
				70	0	60					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	600	55					
				15	310	40					
				25	390	40					
				5	525	60					
20	25	20	40						55	45	45	50
115	150	160	250						440	165	125	175
210	180	200	190						575	330	405	445
				215	610	495					
				170	305	380					
				165	410	500					
				165	495	575					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				700	595	0					
				465	380	0					
				480	500	0					
				620	550	0					
0	0	0	0						580	280	385	410
0	0	0	0						5	5	5	5
0	0	0	0						5	20	20	25
				40	720	0					
				45	565	0					
				50	715	0					
				100	830	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	200	420					
				0	105	300					
				0	185	320					
				0	165	415					
690	460	510	735						0	0	0	0
5	5	5	5						0	0	0	0
105	55	50	105						0	0	0	0
				0	130	20					
				0	150	20					
				0	185	15					
				0	195	15					



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

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ROUTE 1F
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-6E

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Table 4-1-5
Intersection Capacity Analysis – Existing + Project Conditions (Route 1E)
Traffic Impact Analysis - Site 1

Route1E		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	37.0	-	-	B	10.2	-	-	C	16.3	-	-	C	17.9	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps	B	10.2	-	-	A	4.6	-	-	A	7.2	-	-	A	4.4	-	-
3	Oak Grove Drive and Berkshire Place (3)	B	10.4	0.71	A	A	6.0	0.27	A	A	9.4	0.67	A	A	7.1	0.49	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Table 4-1-6
Intersection Capacity Analysis – Existing + Project Conditions (Route 1F)
Traffic Impact Analysis - Site 1

Route1F		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	17.5	-	-	A	9.6	-	-	A	9.5	-	-	B	11.4	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	28.4	0.86	C	B	13.5	0.53	A	B	15	0.52	A	B	18.9	0.74	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.8	0.56	A	A	5.5	0.28	A	A	6	0.34	A	A	7.1	0.4	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	24.5	0.53	A	B	16.5	0.39	A	B	16.1	0.39	A	C	23.9	0.57	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

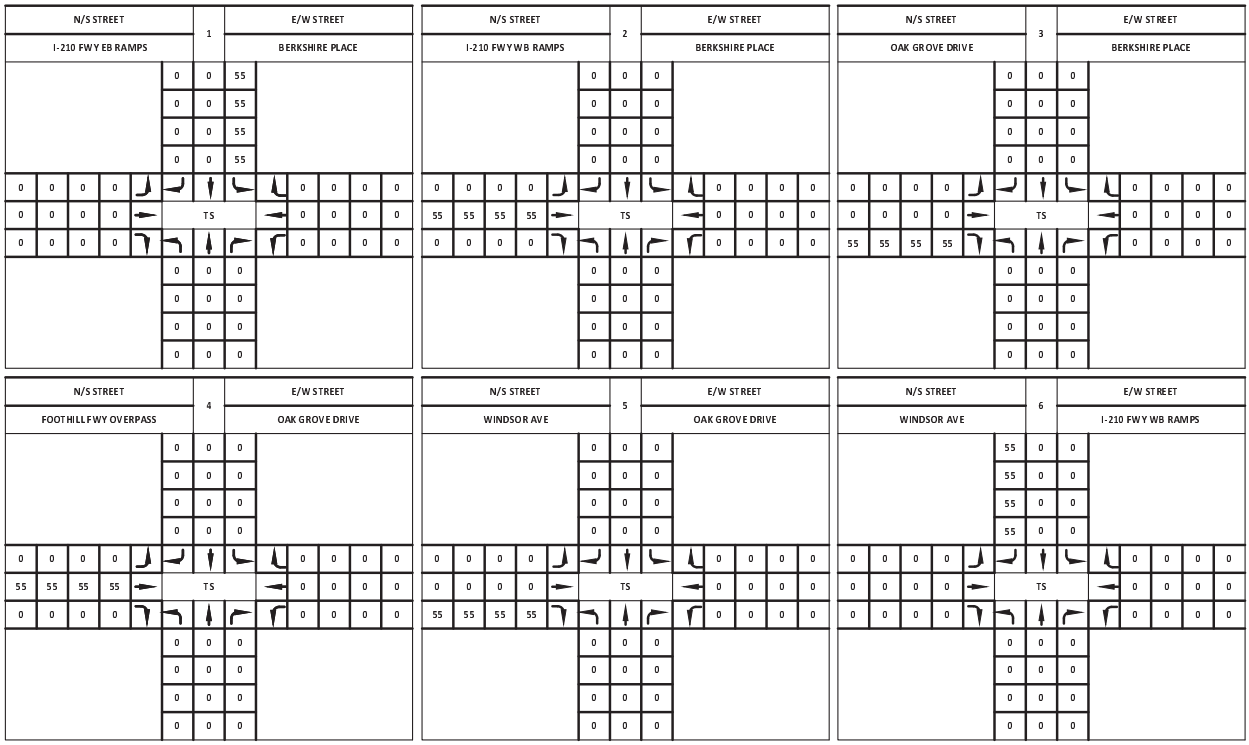
Source: **Hall & Foreman, Inc.**

Haul Routes 1E and 1F Analysis

As presented in *Table 4-1-5* and *Table 4-1-6*, under the existing plus project conditions for Site 1 (Routes 1E-1F) most of the study intersections are anticipated to continue to operate at acceptable HCM LOS of C or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps is anticipated to operate at HCM LOS E during the AM peak period, mitigation is recommended.

Haul Route 1G

The Haul Route 1G project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-7A* through *Figure 4-1-7C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-7D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-7E.*



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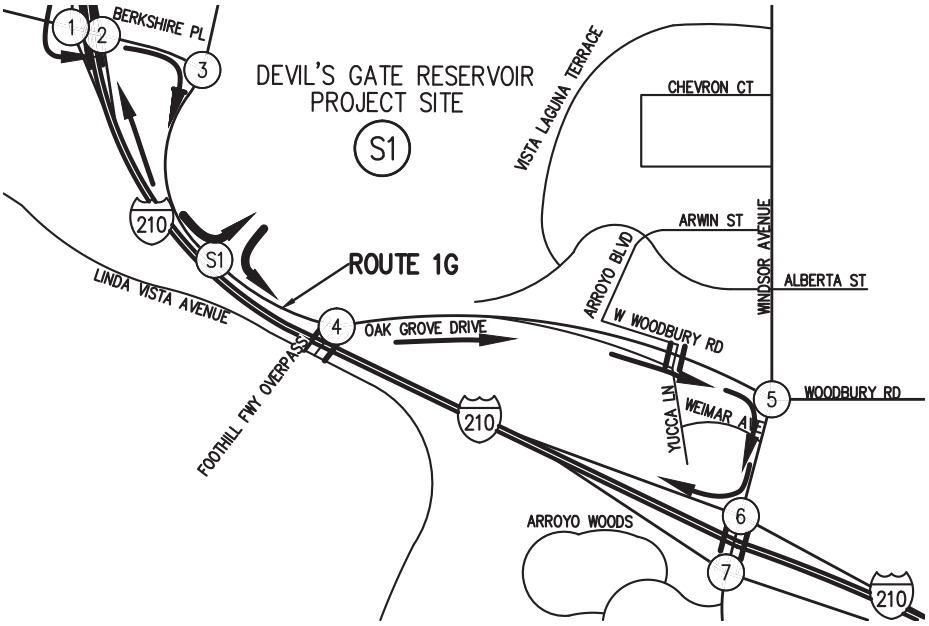

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

S# – DISPOSAL SITE

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ROUTE 1G PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-7A

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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

					5%	5%	18%					
					5%	5%	36%					
					5%	5%	23%					
					5%	5%	23%					
0%	0%	0%	0%						0%	0%	0%	0%
5%	5%	5%	5%		TR				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
					0%	0%	0%					
					0%	0%	0%					
					0%	0%	0%					
					0%	0%	0%					

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

					0%	0%	0%					
					0%	0%	0%					
					0%	0%	0%					
					0%	0%	0%					
5%	5%	5%	5%						5%	5%	5%	5%
19%	5%	20%	5%		TS				5%	5%	5%	5%
0%	0%	0%	0%						0%	0%	0%	0%
					5%	5%	5%					
					5%	5%	5%					
					5%	5%	5%					
					5%	5%	5%					

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

					5%	10%	0%					
					5%	10%	0%					
					5%	10%	0%					
					5%	5%	0%					
5%	5%	5%	5%						0%	0%	0%	0%
0%	0%	0%	0%		TS				0%	0%	0%	0%
42%	5%	5%	37%						0%	0%	0%	0%
					5%	5%	0%					
					5%	5%	0%					
					5%	5%	0%					
					5%	5%	0%					

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

					0%	0%	0%					
					0%	0%	0%					
					0%	0%	0%					
					0%	0%	0%					
0%	0%	0%	0%						0%	0%	0%	0%
5%	10%	5%	5%		TS				5%	5%	0%	5%
5%	5%	5%	5%						5%	5%	5%	5%
					5%	0%	5%					
					5%	0%	5%					
					5%	0%	5%					
					5%	0%	5%					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

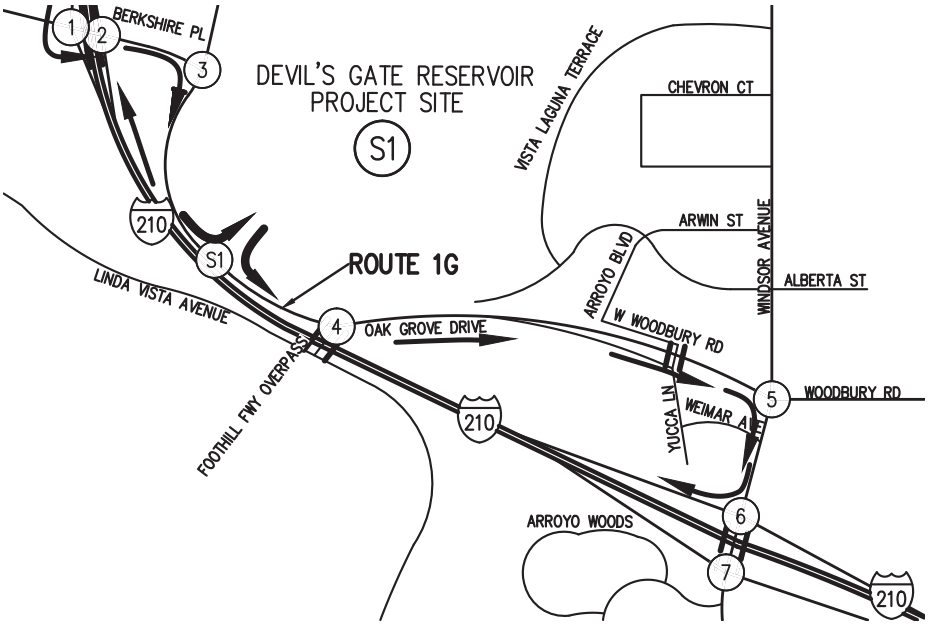
					5%	5%	5%					
					10%	5%	5%					
					10%	5%	5%					
					5%	5%	5%					
5%	5%	5%	5%						10%	15%	15%	5%
5%	5%	5%	5%		TS				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
					5%	5%	5%					
					5%	5%	5%					
					5%	5%	5%					
					5%	5%	5%					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

					5%	5%	0%					
					5%	5%	0%					
					5%	5%	0%					
					5%	5%	0%					
0%	0%	0%	0%						5%	5%	5%	5%
0%	0%	0%	0%		TS				5%	5%	5%	5%
0%	0%	0%	0%						5%	5%	5%	5%
					5%	5%	0%					
					5%	5%	0%					
					5%	5%	0%					
					5%	5%	0%					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

					7AM-9AM							
					2PM-4PM							
					4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS				7AM - 9AM	2PM - 4PM	4PM - 6PM	
					7AM-9AM							
					2PM-4PM							
					4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 1G TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-7B

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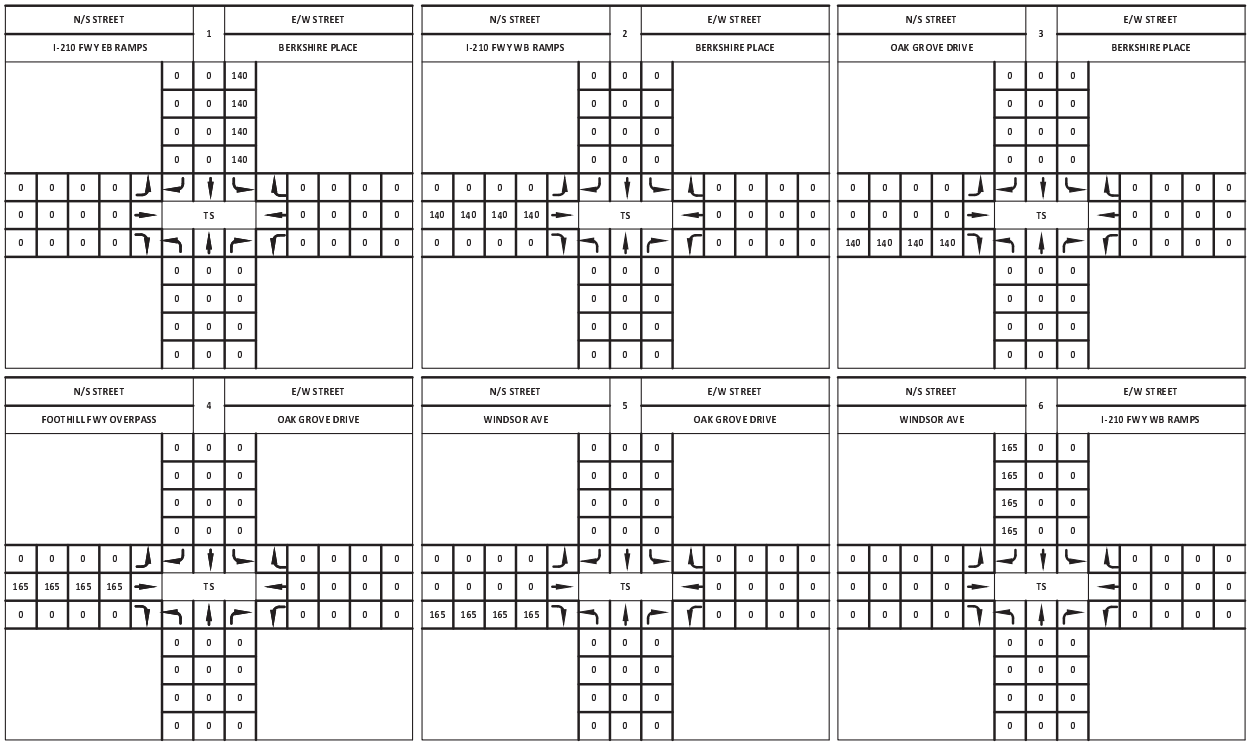

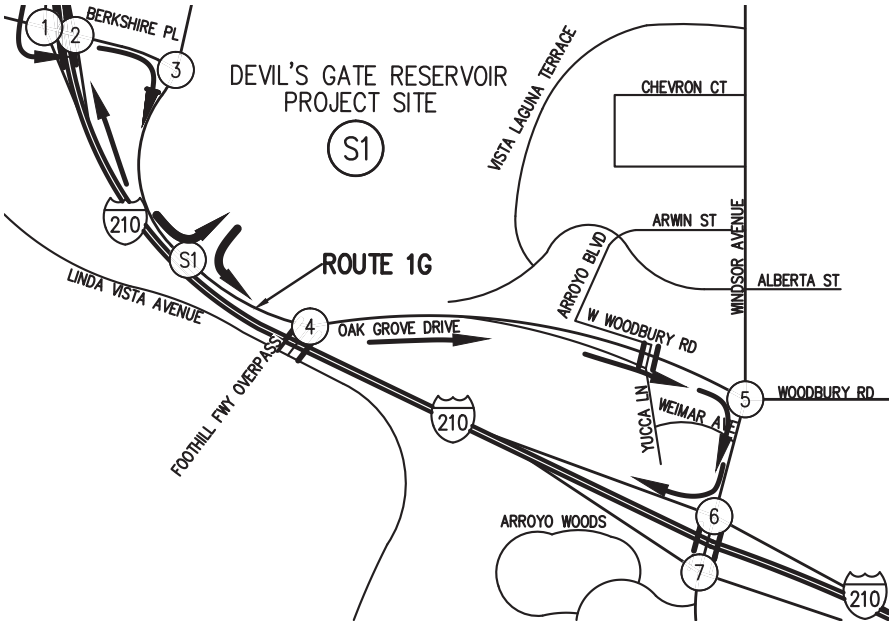

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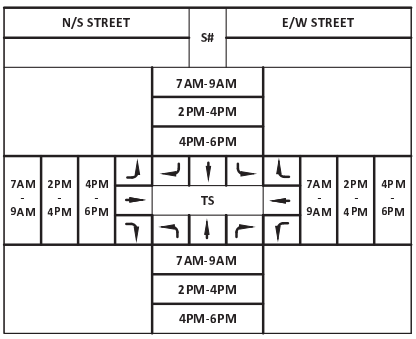

LEGEND

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ROUTE 1G
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-7C

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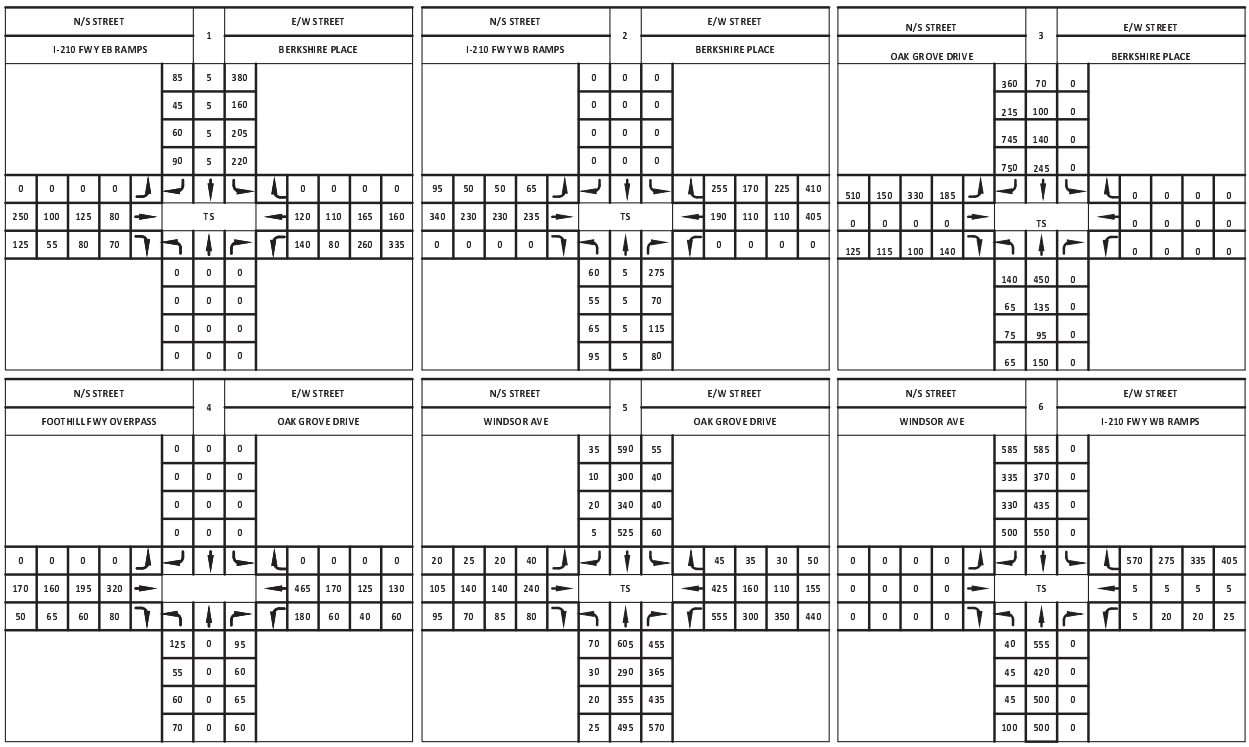

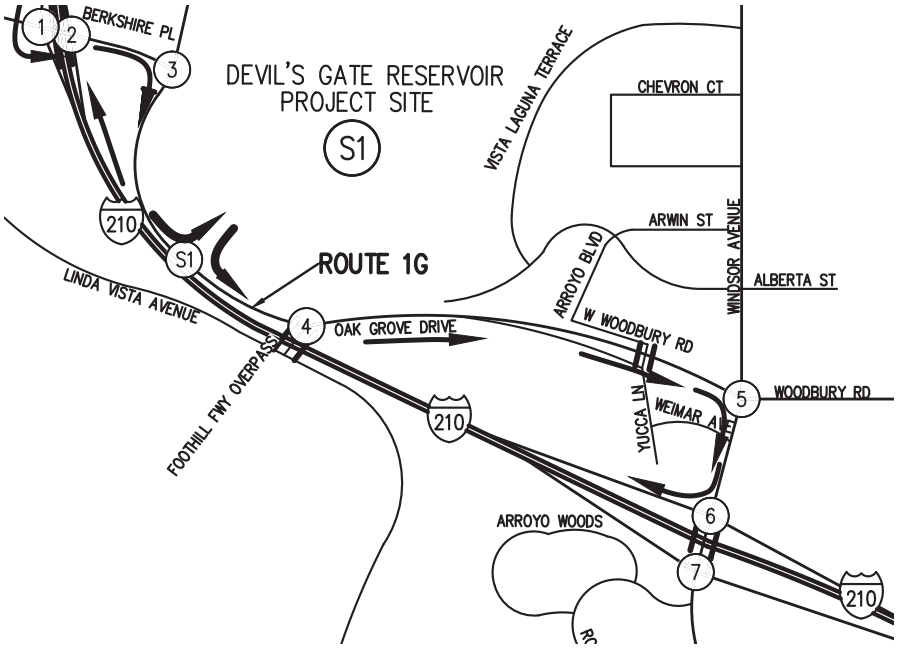

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

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ROUTE 1G
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-7D

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N/S STREET				1				E/W STREET			
I-210 FWY EB RAMPS								BERKSHIRE PLACE			
				90	5	475					
				50	5	255					
				70	5	235					
				90	5	305					
0	0	0	0					0	0	0	0
250	105	145	85		TS			125	115	190	160
130	60	90	70					145	90	400	335
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					

N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
95	55	75	65					270	170	745	410
435	325	455	320		TS			200	120	335	410
0	0	0	0					0	0	0	0
				60	5	285					
				60	5	70					
				75	5	135					
				95	5	85					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				365	85	0					
				225	115	0					
				855	180	0					
				755	250	0					
520	160	380	200					0	0	0	0
0	0	0	0		TS			0	0	0	0
210	205	190	225					0	0	0	0
				145	455	0					
				65	140	0					
				85	110	0					
				65	160	0					

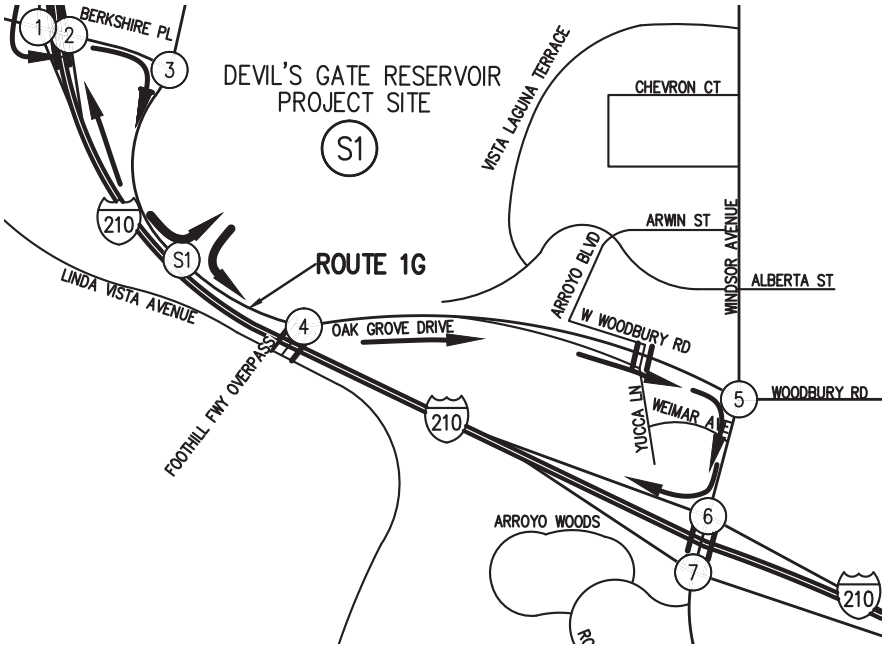
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
300	290	325	435					480	185	145	140
55	65	70	80					190	65	45	60
				130	0	100					
				60	0	65					
				70	0	75					
				70	0	60					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	600	55					
				15	310	40					
				25	390	40					
				5	525	60					
20	25	20	40					55	45	45	50
115	150	160	250		TS			440	165	125	175
210	180	200	190					575	330	405	445
				75	610	495					
				30	305	380					
				25	410	500					
				25	495	575					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				700	595	0					
				465	380	0					
				480	500	0					
				620	550	0					
0	0	0	0					580	280	385	410
0	0	0	0		TS			5	5	5	5
0	0	0	0					5	20	20	25
				40	580	0					
				45	425	0					
				50	575	0					
				100	690	0					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

Hall & Foreman, Inc.
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14297 Cajon St., Suite 101 Victorville, CA., 92392-2335
Phn. 760-524-9100 Fax. 760-524-9101

ROUTE 1G
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-7E

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Table 4-1-7
Intersection Capacity Analysis – Existing + Project Conditions (Route 1G)
Traffic Impact Analysis - Site 1

Route1G		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	37	-	-	B	10.2	-	-	C	16.3	-	-	C	17.9	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	10.2	-	-	A	4.6	-	-	A	6.7	-	-	A	3.7	-	-
3	Oak Grove Drive and Berkshire Place	B	10	0.60	A	A	5.9	0.20	A	A	7.7	0.52	A	A	6.6	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	15.8	-	-	A	9.2	-	-	A	9.2	-	-	B	10.9	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	23.9	0.84	C	B	16.9	0.48	A	B	16.8	0.55	A	B	13.2	0.59	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.6	0.56	A	A	5.5	0.30	A	A	5.9	0.34	A	A	7	0.40	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

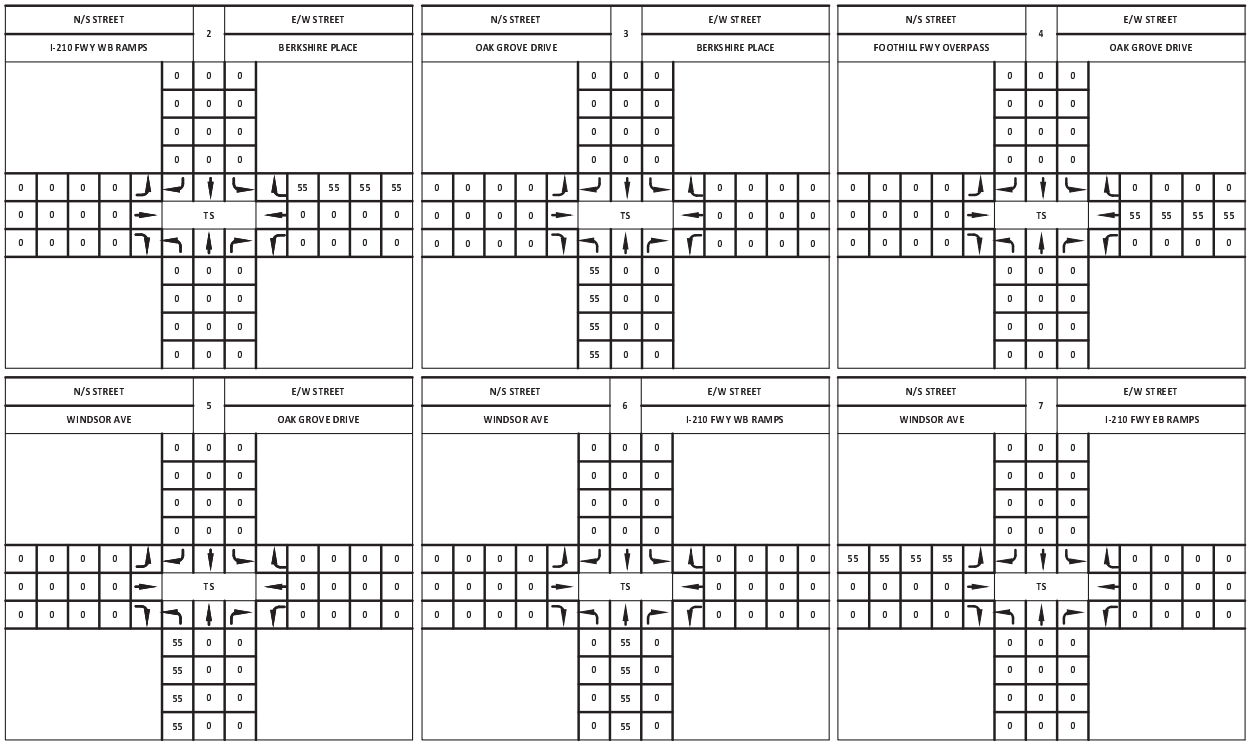
Source: **Hall & Foreman, Inc.**

Haul Route 1G Analysis

As presented in *Table 4-1-7*, under the existing plus project conditions for Site 1 (Routes 1G) most of the study intersections are anticipated to continue to operate at acceptable HCM LOS of C or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps is anticipated to operate at HCM LOS E during the AM peak period, mitigation is recommended.

Haul Route 1H

The Haul Route 1H project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-1-8A* through *Figure 4-1-8C.* The existing plus project AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 4-1-8D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-1-8E.*



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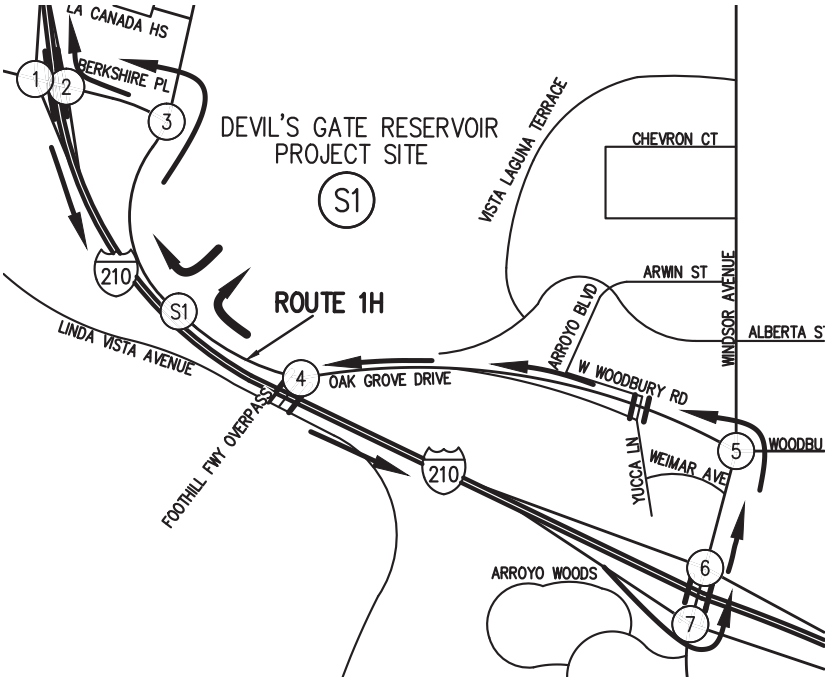
NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM, 2PM - 4PM, 4PM - 6PM	TS	7AM - 9AM, 2PM - 4PM, 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

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ROUTE 1H PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-8A

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N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
5%	5%	5%	5%						21%	5%	14%	5%
5%	5%	5%	5%		TS				5%	5%	5%	5%
0%	0%	0%	0%						0%	0%	0%	0%
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				5%	10%	0%						
				5%	10%	0%						
				5%	10%	0%						
				5%	5%	0%						
5%	5%	5%	5%						0%	0%	0%	0%
0%	0%	0%	0%		TS				0%	0%	0%	0%
5%	5%	5%	5%						0%	0%	0%	0%
				30%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				43%	5%	0%						

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
				0%	0%	0%						
0%	0%	0%	0%						0%	0%	0%	0%
5%	10%	10%	5%		TS				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
				5%	0%	5%						
				5%	0%	5%						
				5%	0%	5%						
				5%	0%	5%						

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

				5%	5%	5%						
				10%	5%	5%						
				10%	5%	5%						
				5%	5%	5%						
5%	5%	5%	5%						10%	15%	15%	5%
5%	5%	5%	5%		TS				5%	5%	5%	5%
5%	5%	5%	5%						5%	5%	5%	5%
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						
				5%	5%	5%						

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

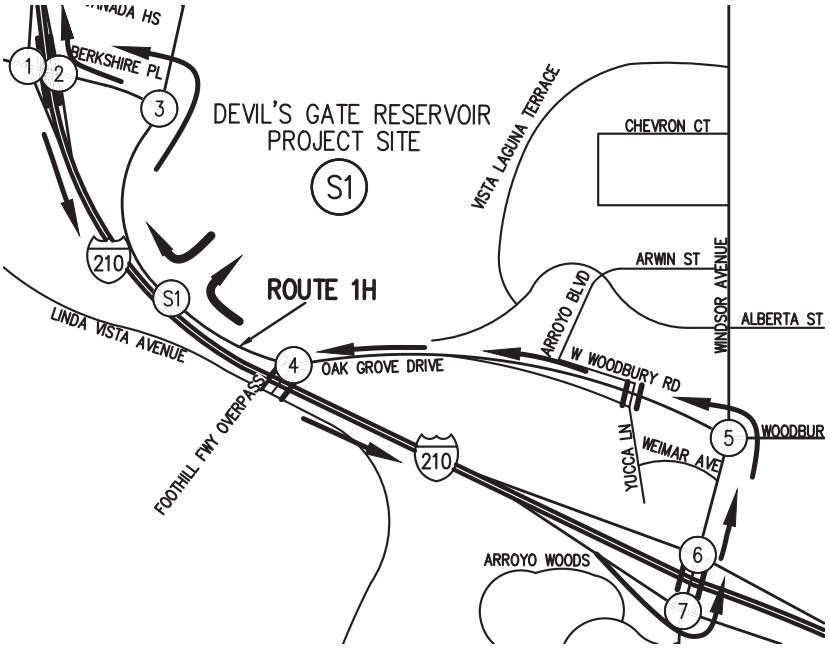
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
0%	0%	0%	0%						5%	5%	5%	5%
0%	0%	0%	0%		TS				5%	5%	5%	5%
0%	0%	0%	0%						5%	5%	5%	5%
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						
				5%	5%	0%						

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
5%	5%	12%	5%						0%	0%	0%	0%
5%	5%	5%	5%		TS				0%	0%	0%	0%
5%	5%	5%	5%						0%	0%	0%	0%
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						
				0%	5%	5%						

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM								
				2PM-4PM								
				4PM-6PM								
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS							
				7AM-9AM								
				2PM-4PM								
				4PM-6PM								

LEGEND

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ROUTE 1H TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-1-8B

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N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						
0	0	0	0						165	165	165	165
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
				165	0	0						
				165	0	0						
				165	0	0						
				165	0	0						

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						
0	0	0	0						0	0	0	0
0	0	0	0		TS				140	140	140	140
0	0	0	0						0	0	0	0
				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
				140	0	0						
				140	0	0						
				140	0	0						
				140	0	0						

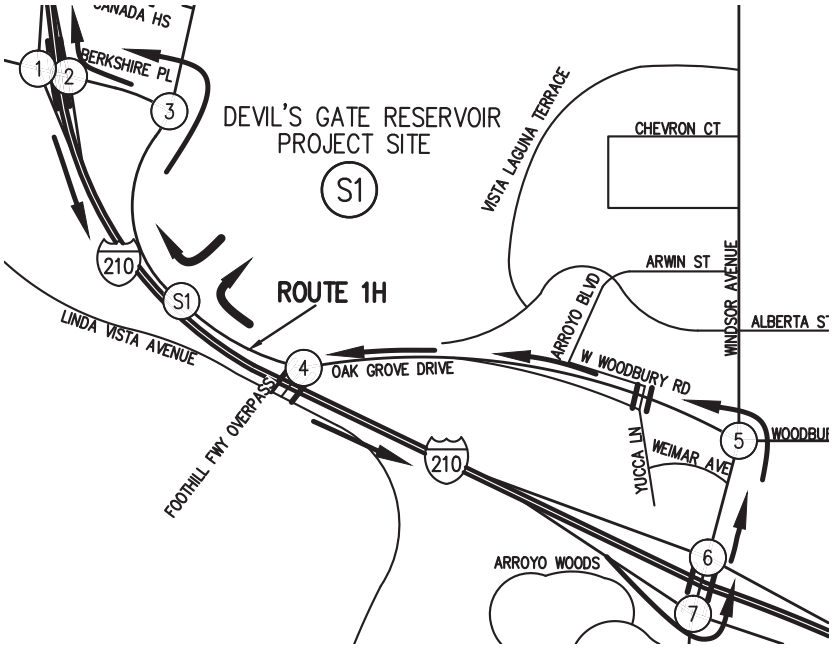
N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						
0	0	0	0						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
				0	140	0						
				0	140	0						
				0	140	0						
				0	140	0						

N/S STREET	7	E/W STREET
WINDSOR AVE		I-210 FWY EB RAMPS

				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						
140	140	140	140						0	0	0	0
0	0	0	0		TS				0	0	0	0
0	0	0	0						0	0	0	0
				0	0	0						
				0	0	0						
				0	0	0						
				0	0	0						

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM								
				2PM-4PM								
				4PM-6PM								
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS							
				7AM-9AM								
				2PM-4PM								
				4PM-6PM								

LEGEND

S# – DISPOSAL SITE

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ROUTE 1H
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-8C

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N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
95	50	50	65					310	225	225	465
285	175	175	180	←	TS			190	110	110	405
0	0	0	0					0	0	0	0
				60	5	275					
				55	5	70					
				65	5	115					
				95	5	80					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				360	70	0					
				215	100	0					
				745	140	0					
				750	245	0					
510	150	330	185					0	0	0	0
0	0	0	0	←	TS			0	0	0	0
70	60	45	85					0	0	0	0
				195	450	0					
				120	135	0					
				130	95	0					
				120	150	0					

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
115	105	140	265	←				520	225	180	185
50	65	60	80					180	60	40	60
				125	0	95					
				55	0	60					
				60	0	65					
				70	0	60					

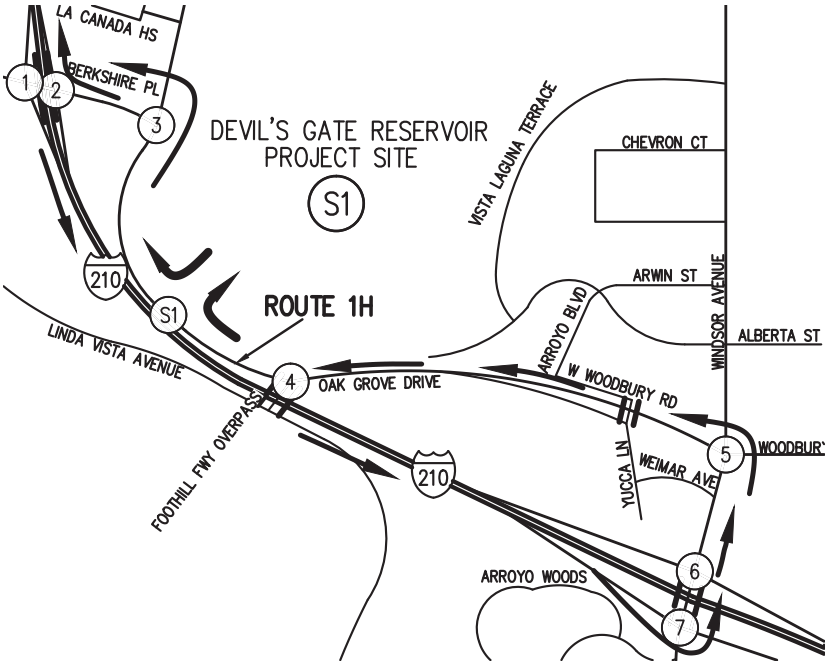
N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	590	55					
				10	300	40					
				20	340	40					
				5	525	60					
20	25	40	40					45	35	30	50
105	140	240	240	←	TS			425	160	110	155
40	15	25	25					555	300	350	440
				125	605	455					
				85	290	365					
				75	355	435					
				80	495	570					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				530	585	0					
				280	370	0					
				275	435	0					
				445	550	0					
0	0	0	0					570	275	335	405
0	0	0	0	←	TS			5	5	5	5
0	0	0	0					5	20	20	25
				40	610	0					
				45	475	0					
				45	555	0					
				100	745	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	190	415					
				0	100	295					
				0	160	280					
				0	165	415					
605	375	425	650					0	0	0	0
5	5	5	5	←	TS			0	0	0	0
105	55	50	105					0	0	0	0
				0	130	20					
				0	145	15					
				0	160	15					
				0	195	15					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
			←	TS			←				
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 1H
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-1-8D

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N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
95	55	75	65					435	335	745	575
295	185	315	180		TS			200	120	335	410
0	0	0	0					0	0	0	0
				60	5	285					
				60	5	70					
				75	5	135					
				95	5	85					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				365	85	0					
				225	115	0					
				855	180	0					
				755	250	0					
520	160	380	200					0	0	0	0
0	0	0	0		TS			0	0	0	0
70	65	50	85					0	0	0	0
				310	455	0					
				230	140	0					
				250	110	0					
				230	160	0					

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
135	125	270	270					620	325	285	280
55	65	80	80					190	65	45	60
				130	0	100					
				60	0	65					
				70	0	75					
				70	0	60					

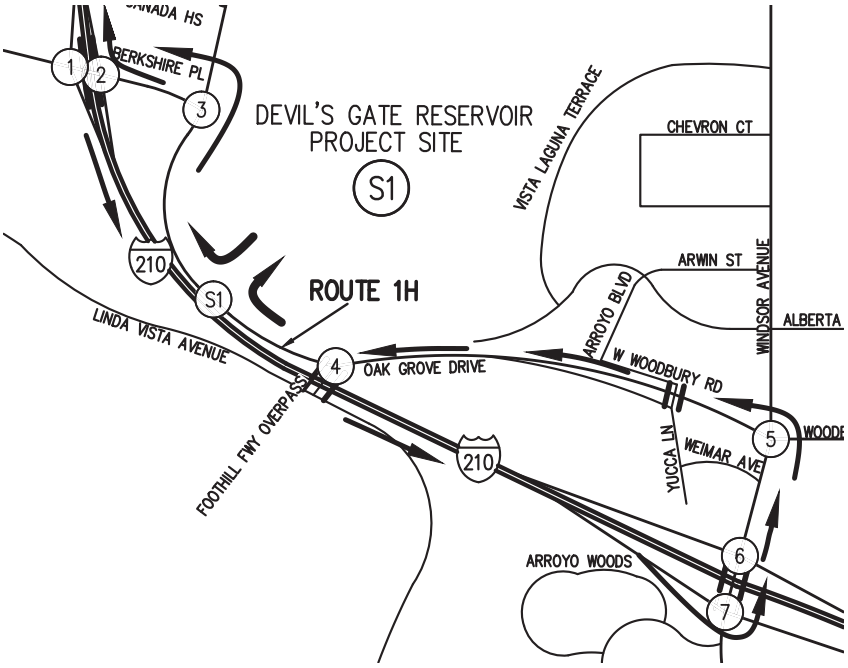
N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				35	600	55					
				15	310	40					
				25	390	40					
				5	525	60					
20	25	40	40					55	45	45	50
115	150	250	250		TS			440	165	125	175
45	15	25	25					575	330	405	445
				215	610	495					
				170	305	380					
				165	410	500					
				165	495	575					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				535	595	0					
				300	380	0					
				315	500	0					
				455	550	0					
0	0	0	0					580	280	385	410
0	0	0	0		TS			5	5	5	5
0	0	0	0					5	20	20	25
				40	720	0					
				45	565	0					
				50	715	0					
				100	830	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	200	420					
				0	105	300					
				0	185	320					
				0	165	415					
690	460	510	735					0	0	0	0
5	5	5	5		TS			0	0	0	0
105	55	50	105					0	0	0	0
				0	130	20					
				0	150	20					
				0	185	15					
				0	195	15					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 1H
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-1-8E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 1\FIG 4-1-8E.dwg
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Table 4-1-8
Intersection Capacity Analysis – Existing + Project Conditions (Route 1H)
Traffic Impact Analysis - Site 1

Route1H		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.7	-	-	A	4.5	-	-	A	6	-	-	A	3.6	-	-
3	Oak Grove Drive and Berkshire Place	A	9.6	0.67	A	A	5.4	0.25	A	A	8.8	0.57	A	A	6.8	0.49	A
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	16.3	-	-	A	9.3	-	-	A	9.2	-	-	B	10.7	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	28.4	0.86	C	B	13.6	0.49	A	B	14.9	0.53	A	B	19	0.74	B
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	8.7	0.55	A	A	5.5	0.27	A	A	6	0.32	A	A	7.1	0.38	A
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	24.5	0.53	A	B	16.5	0.39	A	B	16.1	0.39	A	C	23.9	0.57	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1H Analysis

As presented in *Table 4-1-8*, under the existing plus project conditions for Site 1 (Routes 1H) all intersections are anticipated to continue to operate at acceptable HCM LOS of C or better for the AM, Mid-day (12-2 PM), Mid-day (2-4 PM), and PM peak hours. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Section 2: Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9)

Haul Route 2A

The Haul Route 2A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-2-1A* through *Figure 4-2-1C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-2-1D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-2-1E.*

N/S STREET	8	E/W STREET
IRWINDALE AVE		I-210 FWY WB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

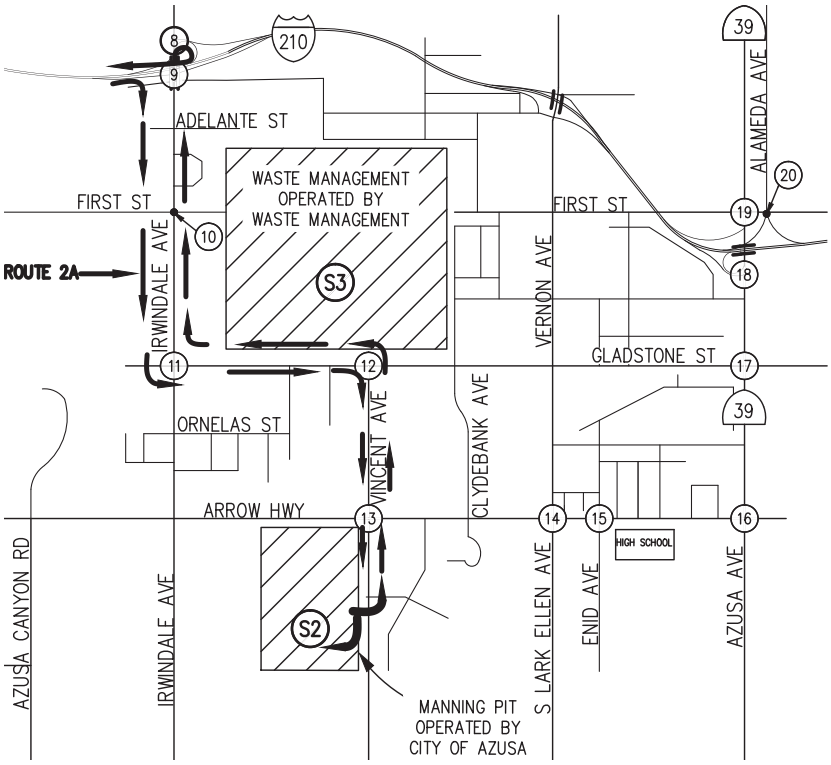
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 2A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-1A.dwg
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N/S STREET	8	E/W STREET
IRWINDALE AVE		I-210 FWY WB RAMPS

				10%	10%	0%				
				5%	5%	0%				
				5%	5%	0%				
0%	0%	0%						10%	5%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						5%	10%	5%
				0%	10%	10%				
				0%	10%	10%				
				0%	10%	5%				

N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

				0%	10%	10%				
				0%	10%	5%				
				0%	5%	5%				
10%	10%	5%						0%	0%	0%
5%	5%	5%		TS				0%	0%	0%
5%	10%	5%						0%	0%	0%
				0%	5%	5%				
				0%	5%	10%				
				0%	5%	5%				

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

				20%	10%	25%				
				35%	15%	5%				
				40%	5%	10%				
40%	30%	10%						10%	20%	15%
5%	5%	5%		TS				5%	5%	5%
35%	20%	15%						5%	5%	5%
				5%	10%	40%				
				15%	10%	5%				
				5%	5%	40%				

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

				5%	5%	25%				
				5%	10%	30%				
				30%	5%	10%				
5%	5%	5%						10%	20%	5%
35%	20%	5%		TS				5%	10%	10%
25%	5%	5%						5%	5%	5%
				20%	10%	10%				
				5%	10%	5%				
				40%	5%	10%				

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

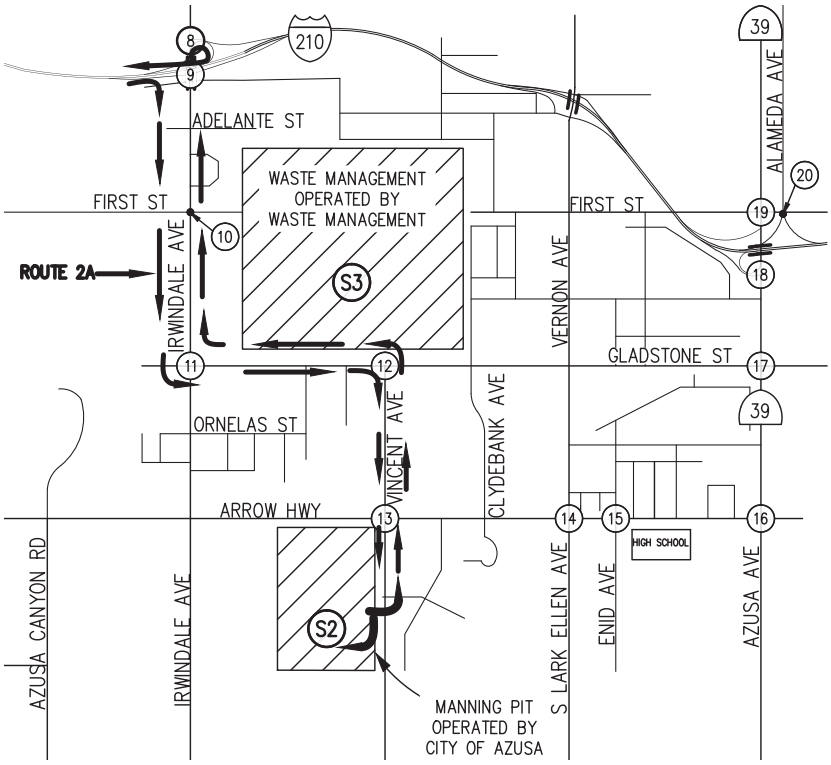
				70%	15%	5%				
				65%	5%	20%				
				35%	5%	5%				
75%	70%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
25%	49%	33%						5%	5%	5%
				5%	90%	5%				
				37%	100%	5%				
				56%	5%	5%				

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

				10%	10%	5%				
				5%	20%	5%				
				5%	5%	5%				
5%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	10%	5%						5%	5%	5%
				5%	5%	5%				
				10%	15%	5%				
				5%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 2A TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-1B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-1B.dwg
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N/S STREET	8	E/W STREET
IRWINDALE AVE		I-210 FWY WB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

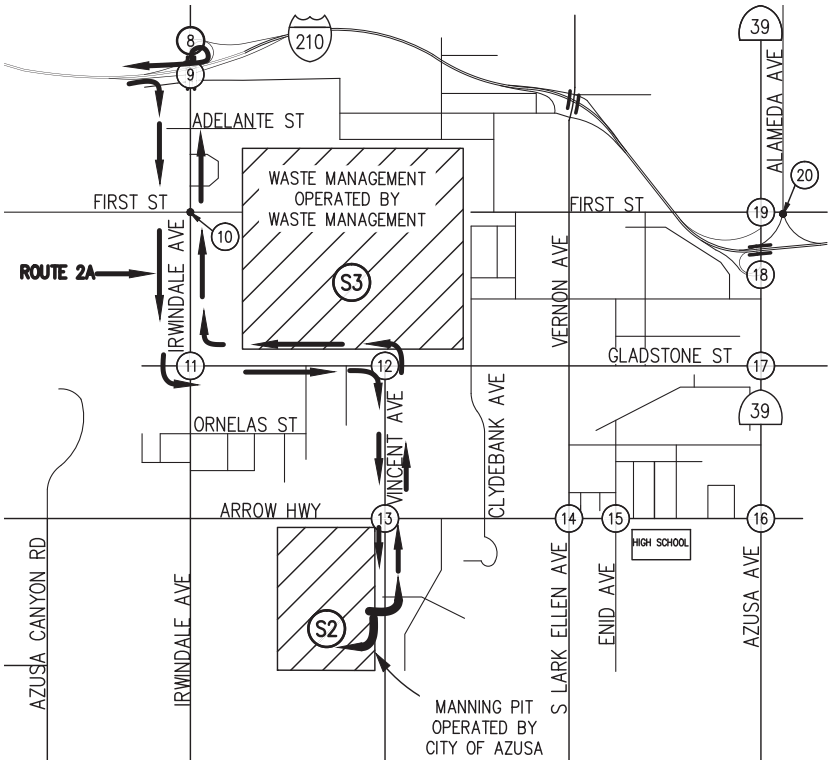
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				150	0	0				
				150	0	0				
				150	0	0				

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 2A PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-1C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-1C.dwg
Last Opened: Oct 04, 2013 - 10:44am by: TMunoz

N/S STREET				8		E/W STREET				
IRWINDALE AVE						I-210 FWY WB RAMPS				
				610	470	0				
				545	595	0				
				475	895	0				
0	0	0	↱	↰	↑	↳	↲	100	110	145
0	0	0	←	TS			←	0	0	0
0	0	0	↲	↰	↑	↳	↱	175	255	145
				0	845	635				
				0	865	470				
				0	755	525				

N/S STREET				9		E/W STREET				
IRWINDALE AVE						I-210 FWY EB RAMPS				
				0	545	175				
				0	670	200				
				0	740	300				
470	590	375	↱	↰	↑	↳	↲	0	0	0
5	5	5	←	TS			←	0	0	0
695	415	435	↲	↰	↑	↳	↱	0	0	0
				0	945	195				
				0	740	240				
				0	1010	385				

N/S STREET				10		E/W STREET				
IRWINDALE AVE						FIRST STREET				
				125	1105	5				
				170	800	20				
				40	1020	15				
80	135	190	↱	↰	↑	↳	↲	10	15	15
5	10	5	←	TS			←	5	5	5
20	95	35	↲	↰	↑	↳	↱	5	15	15
				45	1050	5				
				90	1025	25				
				30	1355	15				

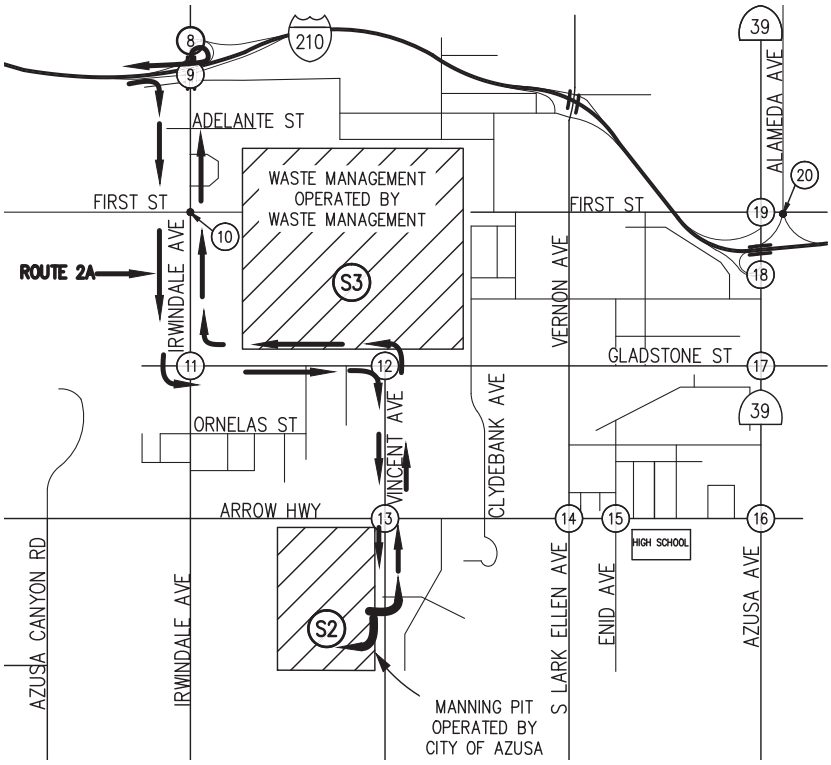
N/S STREET				11		E/W STREET				
IRWINDALE AVE						GLADSTONE STREET				
				5	780	235				
				5	750	215				
				5	700	360				
5	5	5	↱	↰	↑	↳	↲	630	250	225
10	25	70	←	TS			←	65	20	10
10	35	30	↲	↰	↑	↳	↱	495	130	130
				10	515	55				
				15	770	90				
				10	1170	330				

N/S STREET				12		E/W STREET				
VINCENT AVE						GLADSTONE STREET				
				20	15	5				
				10	5	10				
				5	5	5				
15	10	5	↱	↰	↑	↳	↲	5	5	5
105	170	585	←	TS			←	760	195	240
165	155	200	↲	↰	↑	↳	↱	250	115	150
				360	10	165				
				190	5	170				
				140	5	355				

N/S STREET				13		E/W STREET				
VINCENT AVE						ARROW HWY				
				70	315	30				
				60	205	25				
				55	255	45				
55	80	135	↱	↰	↑	↳	↲	90	45	75
530	655	1395	←	TS			←	1215	575	525
80	90	210	↲	↰	↑	↳	↱	120	100	110
				170	365	85				
				75	225	115				
				40	285	105				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↲	↰	↑	↳	↱			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 2A
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-1D

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N/S STREET				8		E/W STREET			
IRWINDALE AVE						I-210 FWY WB RAMPS			
				725	550	0			
				620	645	0			
				495	910	0			
0	0	0	↳	↰	↑	↱	↳	125	120	155
0	0	0	←	TS			←	0	0	0
0	0	0	↲	↰	↑	↱	↰	195	315	165
				0	975	830			
				0	950	670			
				0	780	660			

N/S STREET				9		E/W STREET			
IRWINDALE AVE						I-210 FWY EB RAMPS			
				0	660	220			
				0	810	210			
				0	780	315			
540	695	385	↳	↰	↑	↱	↳	0	0	0
5	5	5	←	TS			←	0	0	0
890	595	540	↲	↰	↑	↱	↰	0	0	0
				0	1115	215			
				0	925	290			
				0	1135	395			

N/S STREET				10		E/W STREET			
IRWINDALE AVE						FIRST STREET			
				170	1365	5			
				280	1090	25			
				75	1225	20			
140	225	235	↳	↰	↑	↱	↳	10	20	20
5	10	5	←	TS			←	5	5	5
30	130	45	↲	↰	↑	↱	↰	5	15	15
				50	1360	10			
				120	1330	25			
				35	1540	25			

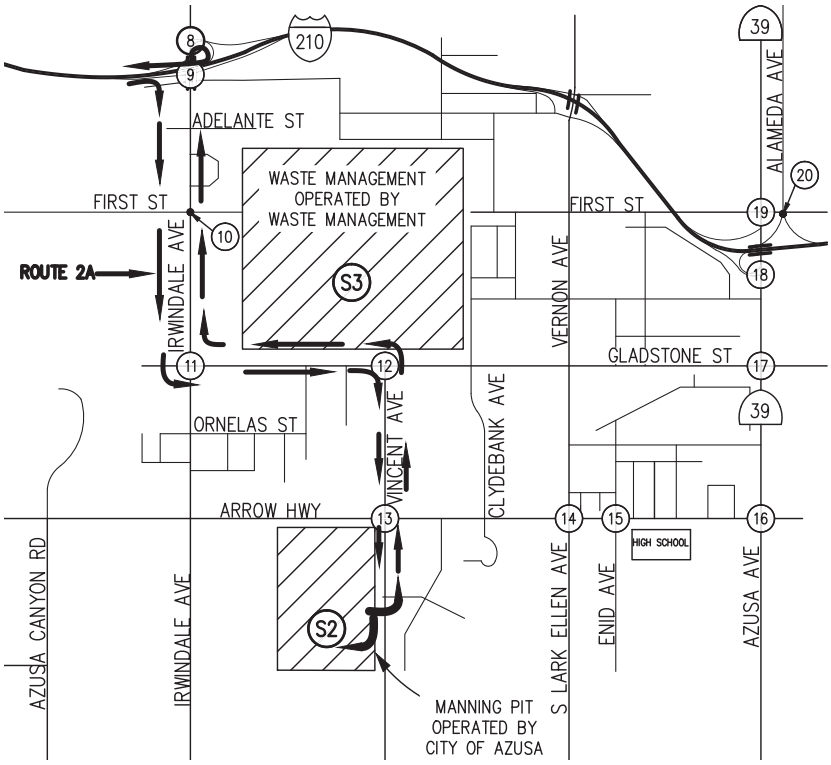
N/S STREET				11		E/W STREET			
IRWINDALE AVE						GLADSTONE STREET			
				5	850	435			
				5	875	415			
				10	785	510			
5	5	5	↳	↰	↑	↱	↳	850	440	345
15	35	70	←	TS			←	70	25	10
20	35	35	↲	↰	↑	↱	↰	535	145	145
				15	595	65			
				20	890	100			
				15	1250	405			

N/S STREET				12		E/W STREET			
VINCENT AVE						GLADSTONE STREET			
				50	20	5			
				20	5	15			
				5	5	5			
35	25	5	↳	↰	↑	↱	↳	5	5	5
115	180	585	←	TS			←	765	205	245
325	300	335	↲	↰	↑	↱	↰	255	115	150
				465	20	190			
				330	5	175			
				240	5	360			

N/S STREET				13		E/W STREET			
VINCENT AVE						ARROW HWY			
				85	460	30			
				65	355	25			
				55	355	45			
60	90	135	↳	↰	↑	↱	↳	90	45	75
540	670	1405	←	TS			←	1235	585	530
85	105	210	↲	↰	↑	↱	↰	125	100	110
				175	500	85			
				95	380	115			
				40	395	110			

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	↳	↰	↑	↱	↳	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↲	↰	↑	↱	↰			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 2A
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-1E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-1E.dwg
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Table 4-2-1
Intersection Capacity Analysis – Existing + Project Conditions (Route 2A)
Traffic Impact Analysis - Site 2

Route2A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.5	0.50	A	A	6.8	0.48	A	A	6.5	0.50	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	22.3	0.85	C	B	19.0	0.72	B	C	21.5	0.84	C
10	Irwindale Ave and First Street	B	12.6	0.64	A	B	17.4	0.63	B	D	39.1	0.88	B
11	Irwindale Ave and Gladstone Street	C	29.4	0.87	C	B	12.7	0.60	B	C	21.7	0.87	D
12	Vincent Ave and Gladstone Street	B	12.4	0.72	B	A	8.8	0.41	A	B	12.0	0.60	B
13	Vincent Ave and Arrow Hwy	B	14.4	0.80	D	A	9.2	0.40	A	B	12.7	0.77	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

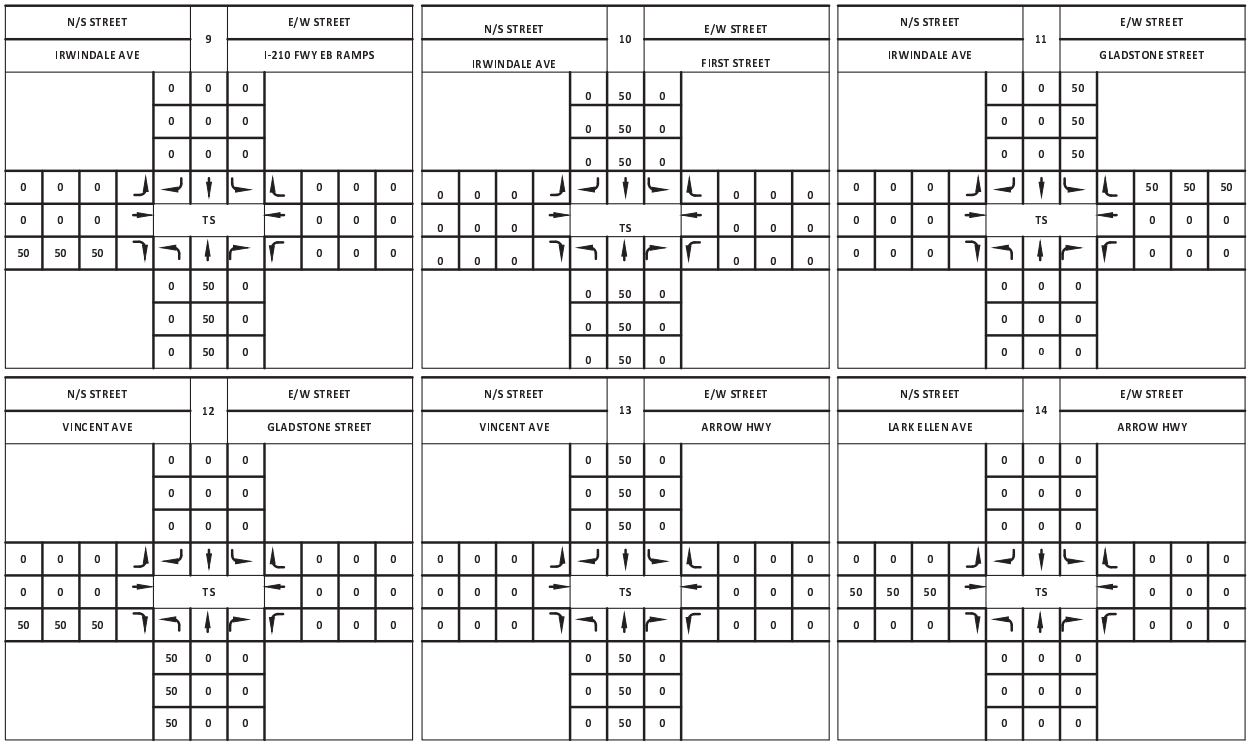
Source: **Hall & Foreman, Inc.**

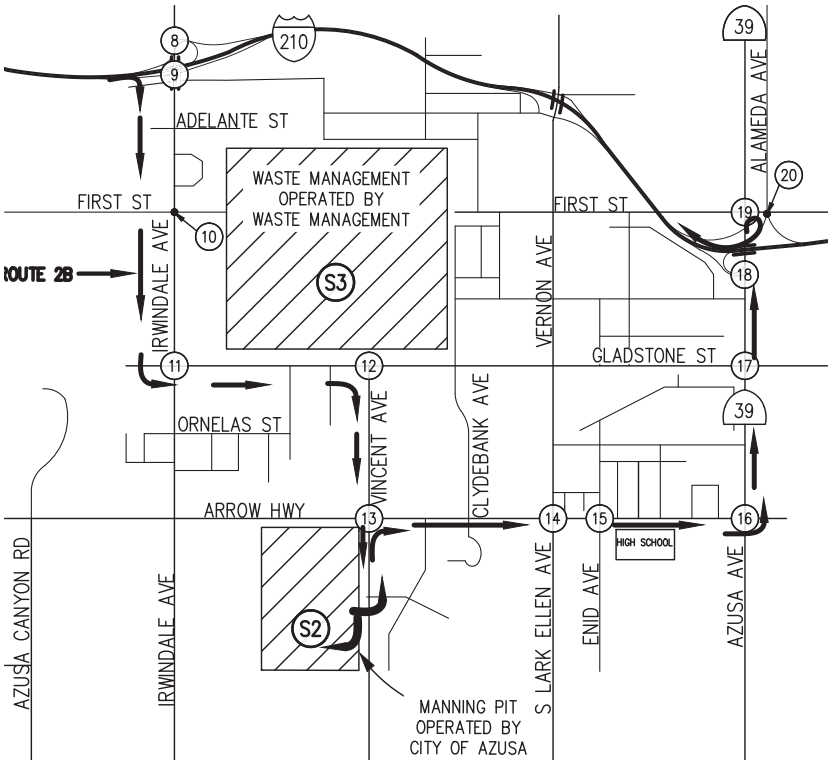
Haul Route 2A Analysis

As presented in *Table 4-2-1*, under the existing plus project conditions for Site 2 (Routes 2A) all intersections are anticipated to continue to operating at acceptable HCM LOS of D or better for the AM, Mid-day and PM peak hours. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Haul Route 2B

The Haul Route 2B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-2-2A* through *Figure 4-2-2F.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-2-2G* and *Figure 4-2-2H.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-2-2I* and *Figure 4-2-2J.*





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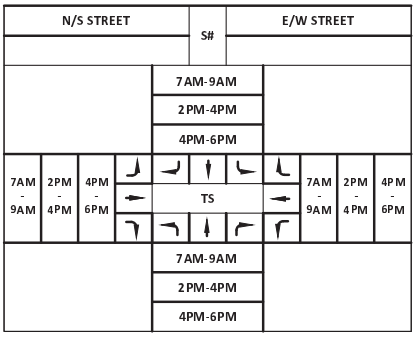

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 2B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-2A

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N/S STREET	15	E/W STREET
ENID AVE		ARROW HWY

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
50	50	50			TS			0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	16	E/W STREET
AZUSA AVE		ARROW HWY

				0	0	0				
				0	0	0				
				0	0	0				
50	50	50						0	0	0
0	0	0			TS			0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	17	E/W STREET
AZUSA AVE		GLADSTONE STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0			TS			0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	18	E/W STREET
AZUSA AVE		I-210 FWY EB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0			TS			0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	19	E/W STREET
AZUSA AVE		FIRST STREET

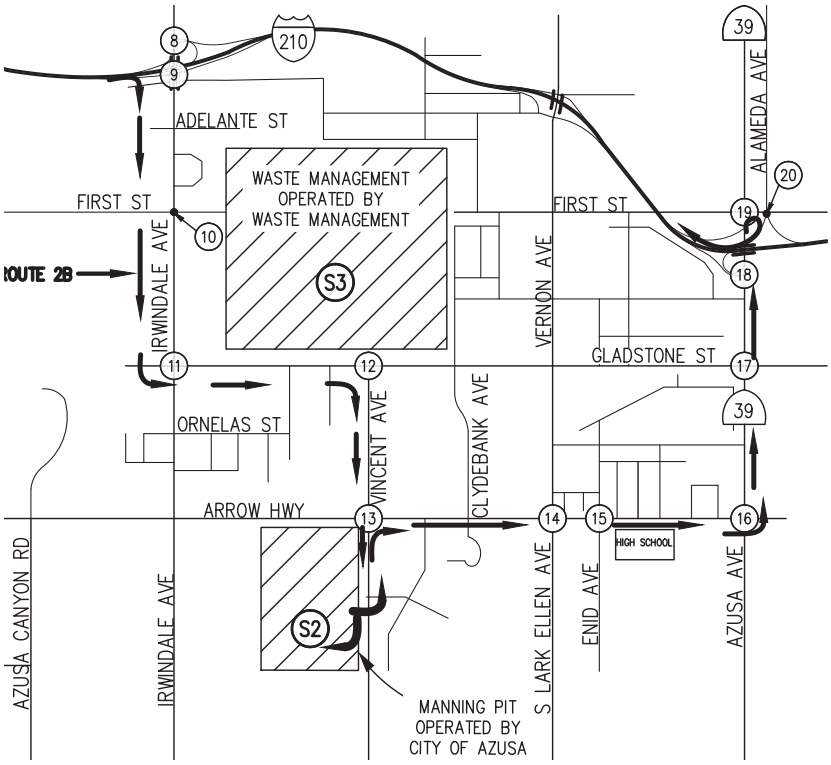
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0			TS			0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	20	E/W STREET
ALAMEDA ST/WB I-210 FWY		FIRST STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0			TS			0	0	0
50	50	50						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 2B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-2B

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Last Opened: Oct 04, 2013 – 10:47am by: TMunoz

N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

				0%	10%	10%				
				0%	10%	5%				
				0%	5%	5%				
10%	10%	5%						0%	0%	0%
5%	5%	5%		TS				0%	0%	0%
5%	10%	5%						0%	0%	0%
				0%	5%	5%				
				0%	5%	10%				
				0%	5%	5%				

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

				20%	10%	25%				
				35%	15%	5%				
				40%	5%	10%				
40%	30%	10%						10%	20%	15%
5%	5%	5%		TS				5%	5%	5%
35%	20%	15%						5%	5%	5%
				5%	10%	40%				
				15%	10%	5%				
				5%	5%	40%				

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

				5%	5%	25%				
				5%	10%	30%				
				30%	5%	10%				
5%	5%	5%						10%	20%	5%
35%	20%	5%		TS				5%	10%	10%
25%	5%	5%						5%	5%	5%
				20%	10%	10%				
				5%	10%	5%				
				40%	5%	10%				

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

				70%	15%	5%				
				65%	5%	20%				
				35%	5%	5%				
75%	70%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
25%	49%	33%						5%	5%	5%
				5%	90%	5%				
				37%	100%	5%				
				56%	5%	5%				

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

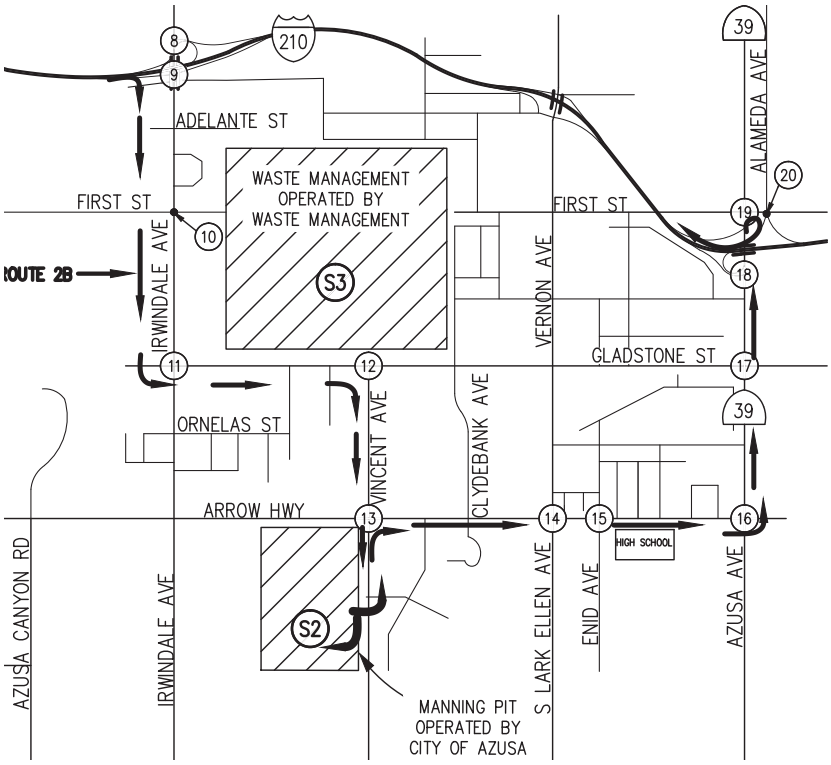
				10%	10%	5%				
				5%	20%	5%				
				5%	5%	5%				
5%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	10%	5%						5%	5%	5%
				5%	5%	5%				
				10%	15%	5%				
				5%	5%	5%				

N/S STREET	14	E/W STREET
LARK ELLEN AVE		ARROW HWY

				5%	5%	5%				
				15%	5%	5%				
				5%	5%	5%				
5%	10%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						5%	5%	5%
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 2B TRUCK PERCENTAGE

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-2C

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N/S STREET	15	E/W STREET
ENID AVE		ARROW HWY

				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						5%	5%	5%
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				

N/S STREET	16	E/W STREET
AZUSA AVE		ARROW HWY

				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	5%	5%
10%	5%	5%		TS				5%	5%	5%
5%	5%	5%						5%	10%	5%
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				

N/S STREET	17	E/W STREET
AZUSA AVE		GLADSTONE STREET

				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
10%	10%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
10%	10%	5%						5%	5%	5%
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				

N/S STREET	18	E/W STREET
AZUSA AVE		I-210 FWY EB RAMPS

				10%	5%	0%				
				10%	5%	0%				
				5%	5%	0%				
5%	5%	5%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
5%	5%	5%						0%	0%	0%
				0%	5%	10%				
				0%	5%	5%				
				0%	5%	5%				

N/S STREET	19	E/W STREET
AZUSA AVE		FIRST STREET

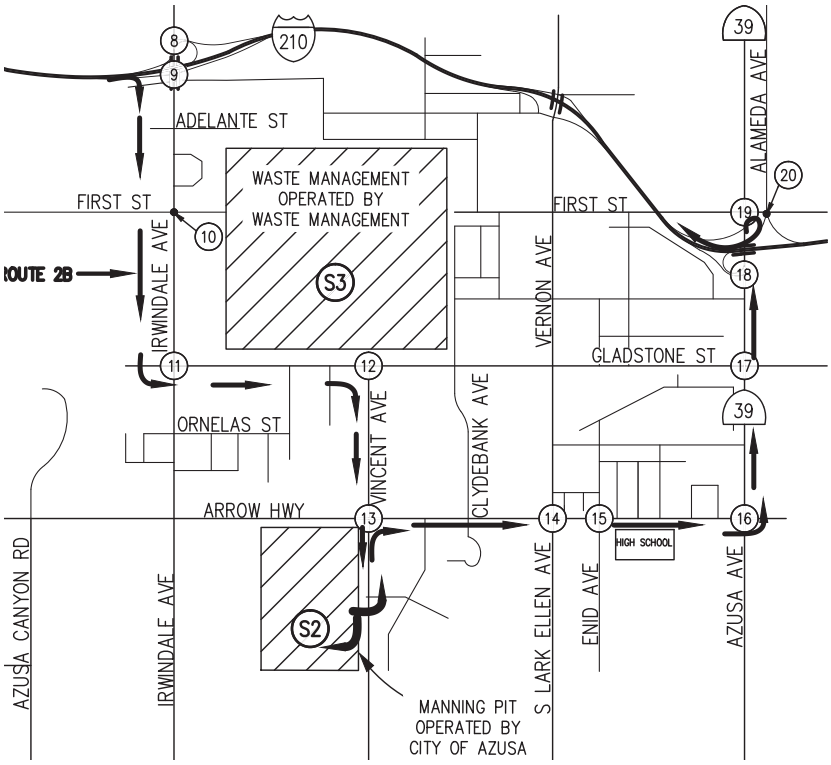
				10%	15%	5%				
				10%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	15%	5%						5%	5%	5%
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				

N/S STREET	20	E/W STREET
ALAMEDA ST/WB I-210 FWY		FIRST STREET

				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	30%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						5%	5%	5%
				5%	5%	5%				
				10%	5%	5%				
				5%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 2B TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-2D

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N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

				0	0	0				
				150	0	0				
				150	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	14	E/W STREET
LARK ELLEN AVE		ARROW HWY

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
150	150	150		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

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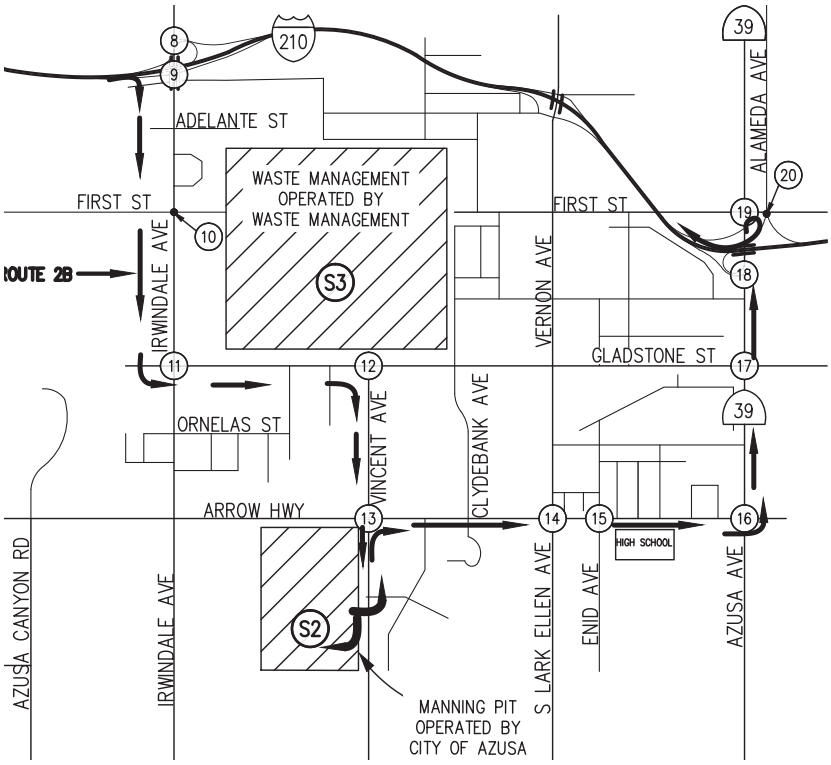

LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 2B
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-2E

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Last Opened: Oct 04, 2013 - 10:47am by: TMunoz

N/S STREET	15	E/W STREET
ENID AVE		ARROW HWY

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
150	150	150			TS			0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	16	E/W STREET
AZUSA AVE		ARROW HWY

				0	0	0				
				0	0	0				
				0	0	0				
150	150	150						0	0	0
0	0	0			TS			0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	17	E/W STREET
AZUSA AVE		GLADSTONE STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0			TS			0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	18	E/W STREET
AZUSA AVE		I-210 FWY EB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0			TS			0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	19	E/W STREET
AZUSA AVE		FIRST STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0			TS			0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	20	E/W STREET
ALAMEDA ST/WB I-210 FWY		FIRST STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0			TS			0	0	0
150	150	150						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N

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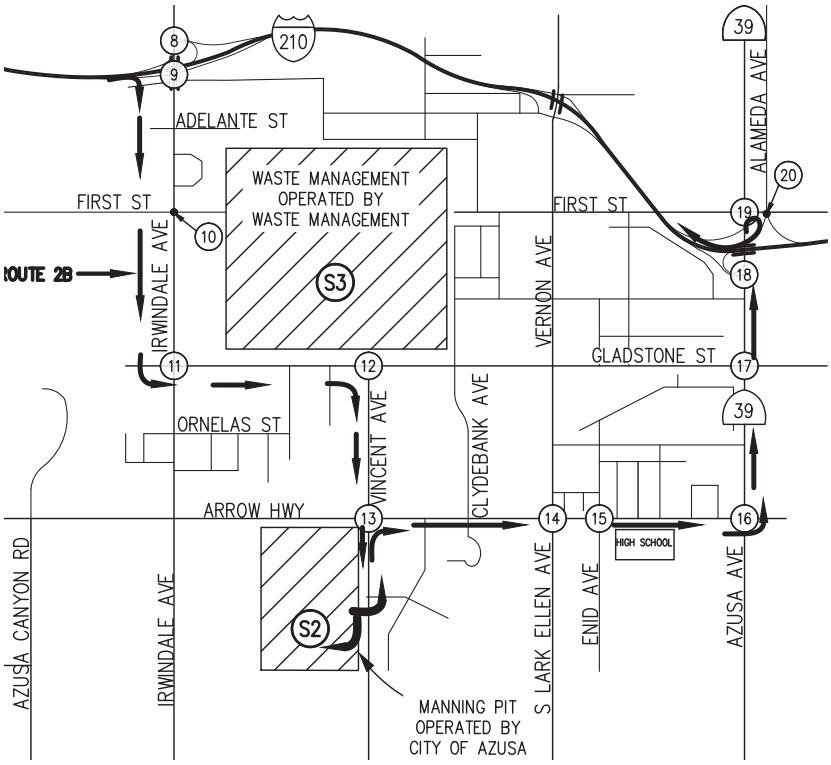

LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 2B PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-2F

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N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

				0	545	175				
				0	670	200				
				0	740	300				
470	590	375						0	0	0
5	5	5		TS				0	0	0
695	415	435						0	0	0
				0	945	195				
				0	740	240				
				0	1010	385				

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

				125	1105	5				
				170	800	20				
				40	1020	15				
80	135	190						10	15	15
5	10	5		TS				5	5	5
20	95	35						5	15	15
				45	1050	5				
				90	1025	25				
				30	1355	15				

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

				5	780	235				
				5	750	215				
				5	700	360				
5	5	5						630	250	225
10	25	70		TS				65	20	10
10	35	30						495	130	130
				10	515	55				
				15	770	90				
				10	1170	330				

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

				20	15	5				
				10	5	10				
				5	5	5				
15	10	5						5	5	5
105	170	585		TS				760	195	240
165	155	200						250	115	150
				360	10	165				
				190	5	170				
				140	5	355				

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

				70	315	30				
				60	205	25				
				55	255	45				
55	80	135						90	45	75
530	655	1395		TS				1215	575	525
80	90	210						120	100	110
				170	365	85				
				75	225	115				
				40	285	105				

N/S STREET	14	E/W STREET
LARK ELLEN AVE		ARROW HWY

				70	330	110				
				25	210	70				
				55	330	100				
75	75	115						30	30	35
565	725	1395		TS				1205	540	595
90	60	115						115	110	85
				165	330	170				
				65	190	110				
				75	325	115				

N

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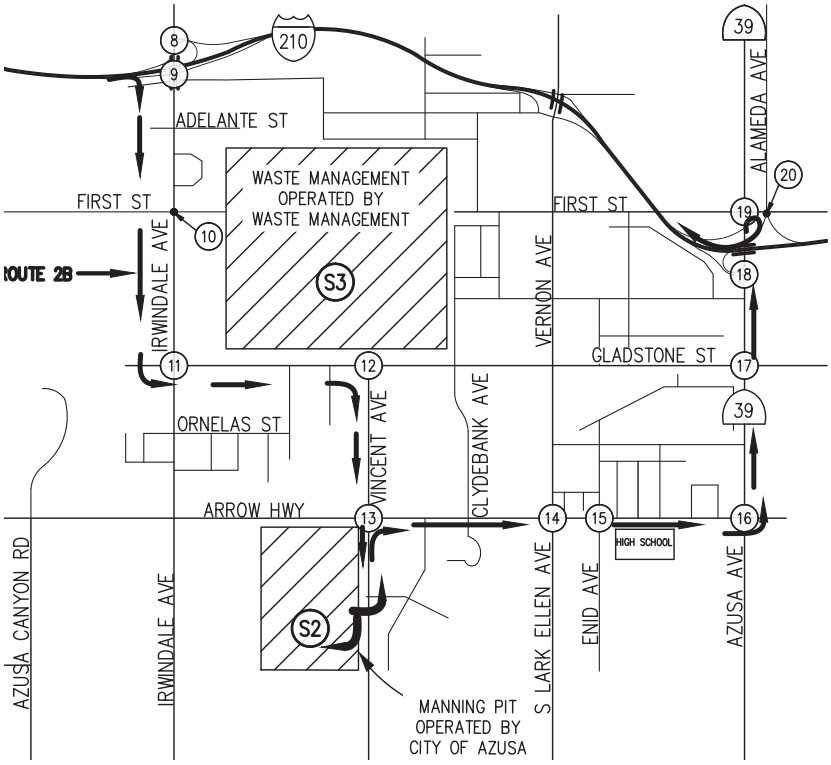

LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 2B EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-2G

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N/S STREET				15		E/W STREET			
ENID AVE						ARROW HWY			
				60	145	30			
				25	20	25			
				30	35	25			
15	25	85	↱	↰	↑	↳	↲	20	25	30
690	860	1475	←	TS			←	1300	635	630
110	20	60	↰	↰	↑	↳	↱	170	45	50
				95	110	155			
				25	20	55			
				35	40	55			

N/S STREET				16		E/W STREET			
AZUSA AVE						ARROW HWY			
				205	490	95			
				100	760	125			
				85	635	260			
200	195	265	↱	↰	↑	↳	↲	105	115	95
510	495	1130	←	TS			←	895	395	460
80	120	135	↰	↰	↑	↳	↱	70	190	125
				225	520	45			
				200	670	135			
				160	465	230			

N/S STREET				17		E/W STREET			
AZUSA AVE						GLADSTONE STREET			
				120	630	160			
				115	765	175			
				65	825	180			
145	150	180	↱	↰	↑	↳	↲	60	85	55
160	195	670	←	TS			←	825	180	255
25	35	55	↰	↰	↑	↳	↱	155	200	130
				110	710	40			
				100	790	95			
				55	735	75			

N/S STREET				18		E/W STREET			
AZUSA AVE						I-210 FWY EB RAMPS			
				210	740	0			
				170	720	0			
				190	800	0			
250	280	225	↱	↰	↑	↳	↲	0	0	0
0	0	0	←	TS			←	0	0	0
235	260	215	↰	↰	↑	↳	↱	0	0	0
				0	710	195			
				0	865	215			
				0	690	245			

N/S STREET				19		E/W STREET			
AZUSA AVE						FIRST STREET			
				170	365	160			
				10	645	80			
				20	800	120			
120	45	90	↱	↰	↑	↳	↲	320	155	220
305	85	185	←	TS			←	500	130	205
125	30	35	↰	↰	↑	↳	↱	485	270	255
				160	375	425			
				70	655	375			
				50	430	380			

N/S STREET				20		E/W STREET			
ALAMEDA ST/WB I-210 FWY						FIRST STREET			
				80	35	45			
				65	25	30			
				65	35	50			
15	25	20	↱	↰	↑	↳	↲	40	25	35
320	210	395	←	TS			←	640	220	240
470	265	265	↰	↰	↑	↳	↱	410	120	150
				310	50	15			
				350	55	45			
				445	75	70			

N

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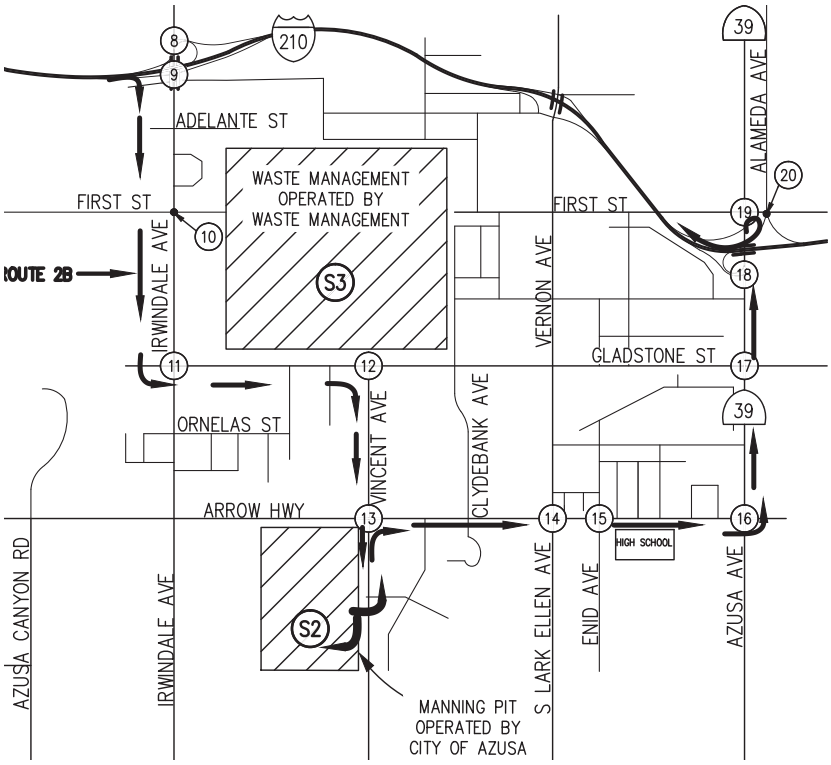

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↰	↰	↑	↳	↱			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 2B
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-2H

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N/S STREET				9		E/W STREET			
IRWINDALE AVE						I-210 FWY EB RAMPS			
				0	660	220			
				0	810	210			
				0	780	315			
540	695	385					0	0	0
5	5	5		TS			0	0	0
890	595	540					0	0	0
				0	965	215			
				0	775	290			
				0	985	395			

N/S STREET				10		E/W STREET			
IRWINDALE AVE						FIRST STREET			
				170	1365	5			
				280	1090	25			
				75	1225	20			
140	225	235					10	20	20
5	10	5		TS			5	5	5
30	130	45					5	15	15
				50	1210	10			
				120	1180	25			
				35	1390	25			

N/S STREET				11		E/W STREET			
IRWINDALE AVE						GLADSTONE STREET			
				5	850	435			
				5	875	415			
				10	785	510			
5	5	5					700	290	195
15	35	70		TS			70	25	10
20	35	35					535	145	145
				15	595	65			
				20	890	100			
				15	1250	405			

N/S STREET				12		E/W STREET			
VINCENT AVE						GLADSTONE STREET			
				50	20	5			
				20	5	15			
				5	5	5			
35	25	5					5	5	5
115	180	585		TS			765	205	245
325	300	335					255	115	150
				315	20	190			
				180	5	175			
				90	5	360			

N/S STREET				13		E/W STREET			
VINCENT AVE						ARROW HWY			
				85	460	30			
				65	355	25			
				55	355	45			
60	90	135					90	45	75
540	670	1405		TS			1235	585	530
85	105	210					125	100	110
				175	350	235			
				95	230	265			
				40	245	260			

N/S STREET				14		E/W STREET			
LARK ELLEN AVE						ARROW HWY			
				75	340	115			
				30	220	75			
				55	330	100			
80	85	120					30	30	35
730	910	1535		TS			1295	615	610
100	65	115					115	110	85
				170	345	175			
				70	215	110			
				80	325	115			

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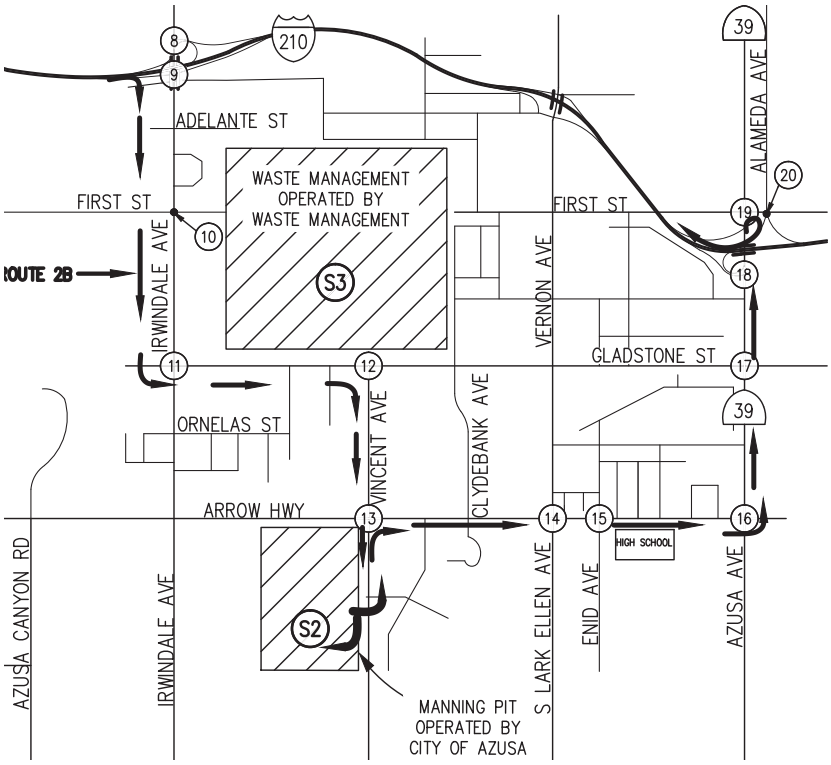

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 2B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-21

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N/S STREET				15			E/W STREET			
ENID AVE							ARROW HWY			
				60	145	30				
				25	20	25				
				35	35	25				
15	30	85						20	30	35
875	1075	1620		TS				1385	695	645
110	20	60						175	45	50
				95	115	160				
				25	20	55				
				35	40	55				

N/S STREET				16			E/W STREET			
AZUSA AVE							ARROW HWY			
				215	520	95				
				100	785	130				
				85	655	270				
305	305	370						110	120	95
595	520	1145		TS				940	420	475
80	130	140						70	230	130
				240	555	45				
				210	700	145				
				160	475	235				

N/S STREET				17			E/W STREET			
AZUSA AVE							GLADSTONE STREET			
				135	695	180				
				125	825	185				
				75	855	190				
180	180	195						65	90	55
180	225	695		TS				850	205	265
30	45	55						160	210	130
				120	850	45				
				110	940	100				
				60	860	80				

N/S STREET				18			E/W STREET			
AZUSA AVE							I-210 FWY EB RAMPS			
				240	815	0				
				205	780	0				
				205	845	0				
265	310	245						0	0	0
0	0	0		TS				0	0	0
255	280	245						0	0	0
				0	890	225				
				0	1020	240				
				0	825	270				

N/S STREET				19			E/W STREET			
AZUSA AVE							FIRST STREET			
				210	475	175				
				10	735	80				
				20	825	125				
120	45	95						330	170	225
305	95	190		TS				505	135	215
125	40	35						505	295	270
				165	425	555				
				70	710	495				
				50	455	490				

N/S STREET				20			E/W STREET			
ALAMEDA ST/WB I-210 FWY							FIRST STREET			
				80	40	45				
				65	25	30				
				65	40	50				
15	25	20						40	35	35
345	215	405		TS				665	230	245
590	385	375						425	125	155
				350	55	15				
				415	60	45				
				475	75	70				

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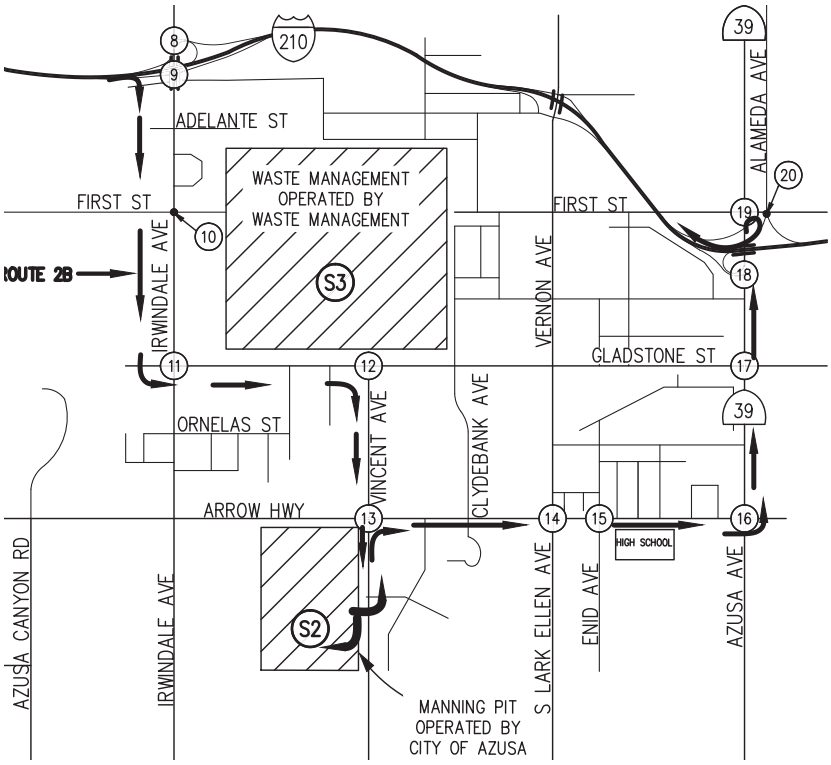

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 2B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-2J

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Table 4-2-2
Intersection Capacity Analysis – Existing + Project Conditions (Route 2B)
Traffic Impact Analysis - Site 2

Route2B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	22.3	0.85	C	B	19.0	0.72	B	C	21.5	0.84	C
10	Irwindale Ave and First Street	B	12.4	0.64	A	B	17.1	0.60	B	C	20.1	0.69	B
11	Irwindale Ave and Gladstone Street	C	28.0	0.88	C	B	12.0	0.57	B	C	21.4	0.88	D
12	Vincent Ave and Gladstone Street	B	10.9	0.63	B	A	8.6	0.31	A	B	11.8	0.60	B
13	Vincent Ave and Arrow Hwy	B	14.3	0.80	D	A	9.2	0.40	A	B	12.7	0.77	C
14	Arrow Hwy and Lark Ellen Ave	D	46.0	0.88	C	C	33.5	0.67	A	D	39.7	0.82	D
15	Arrow Hwy and Enid Ave	C	29.0	1.08	D	B	12.1	0.48	A	B	13.2	0.68	C
16	Azusa Ave and Arrow Hwy	D	52.2	1.04	D	D	42.0	0.95	C	D	43.7	0.96	E
17	Azusa Ave and Gladstone Street	D	46.8	0.93	D	C	32.0	0.79	B	C	32.0	0.85	C
18	Azusa Ave and I-210 Freeway Eastbound Ramps	B	10.1	0.64	A	A	10.0	0.67	A	A	9.0	0.59	A
19	Azusa Ave and First Street	D	38.1	0.84	C	B	16.6	0.53	A	B	17.6	0.64	B
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	D	46.8	1.19	D	B	10.8	0.56	B	B	15.7	0.82	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 2B Analysis

As presented in *Table 4-2-2*, under the existing plus project conditions for Site 2 (Routes 2B) all intersections are anticipated to continue to operating at acceptable HCM LOS of D or better for the AM, Mid-day and PM peak hours. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Haul Route 3

The Haul Route 3 project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-2-3A* through *Figure 4-2-3C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-2-3D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-2-3E.*

Haul Route 9

The Haul Route 9 project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-2-4A* through *Figure 4-2-4C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-2-4D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-2-4E.*

N/S STREET	8	E/W STREET
IRWINDALE AVE		I-210 FWY WB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	↳	↰	↑	↱	↳	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	↲	↰	↑	↱	↲	0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	↳	↰	↑	↱	↳	0	0	0
0	0	0	←	TS			←	0	0	0
50	50	50	↲	↰	↑	↱	↲	0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0	↳	↰	↑	↱	↳	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	↲	↰	↑	↱	↲	0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

				0	0	50				
				0	0	50				
				0	0	50				
0	0	0	↳	↰	↑	↱	↳	50	50	50
0	0	0	←	TS			←	0	0	0
0	0	0	↲	↰	↑	↱	↲	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

				50	0	0				
				50	0	0				
				50	0	0				
50	50	50	↳	↰	↑	↱	↳	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	↲	↰	↑	↱	↲	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

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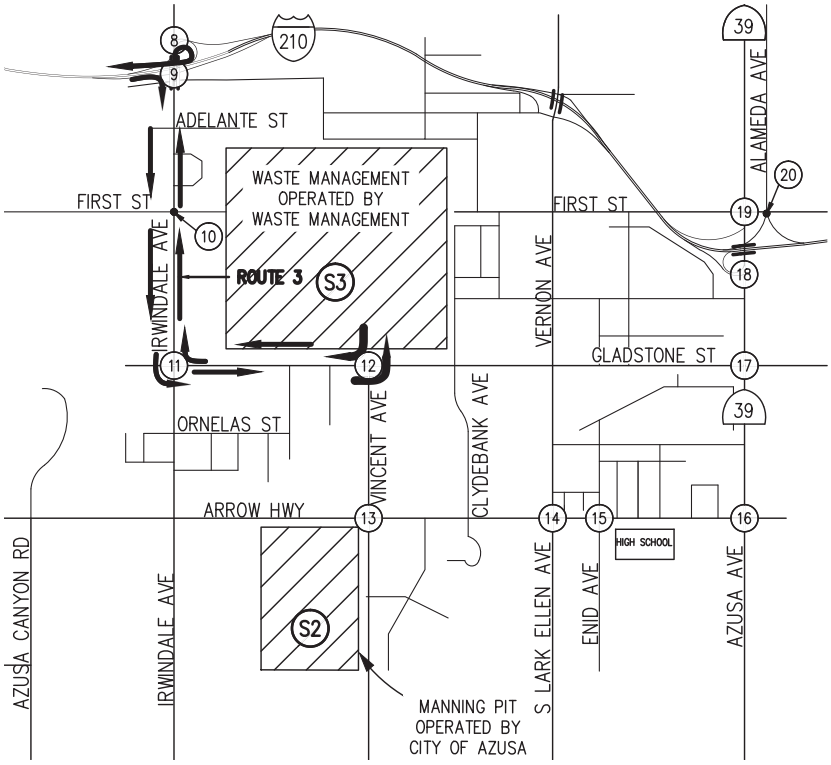
NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↳	↰	↑	↱	↳	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↲	↰	↑	↱	↲			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 3 PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-3A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-3A.dwg
Last Opened: Oct 04, 2013 – 10:53am by: TMunoz

N/S STREET				8			E/W STREET			
IRWINDALE AVE							I-210 FWY WB RAMPS			
				10%	10%	0%				
				5%	5%	0%				
				5%	5%	0%				
0%	0%	0%						10%	5%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						5%	10%	5%
				0%	10%	10%				
				0%	10%	10%				
				0%	10%	5%				

N/S STREET				9			E/W STREET			
IRWINDALE AVE							I-210 FWY EB RAMPS			
				0%	10%	10%				
				0%	10%	5%				
				0%	5%	5%				
10%	10%	5%						0%	0%	0%
5%	5%	5%		TS				0%	0%	0%
5%	10%	5%						0%	0%	0%
				0%	5%	5%				
				0%	5%	10%				
				0%	5%	5%				

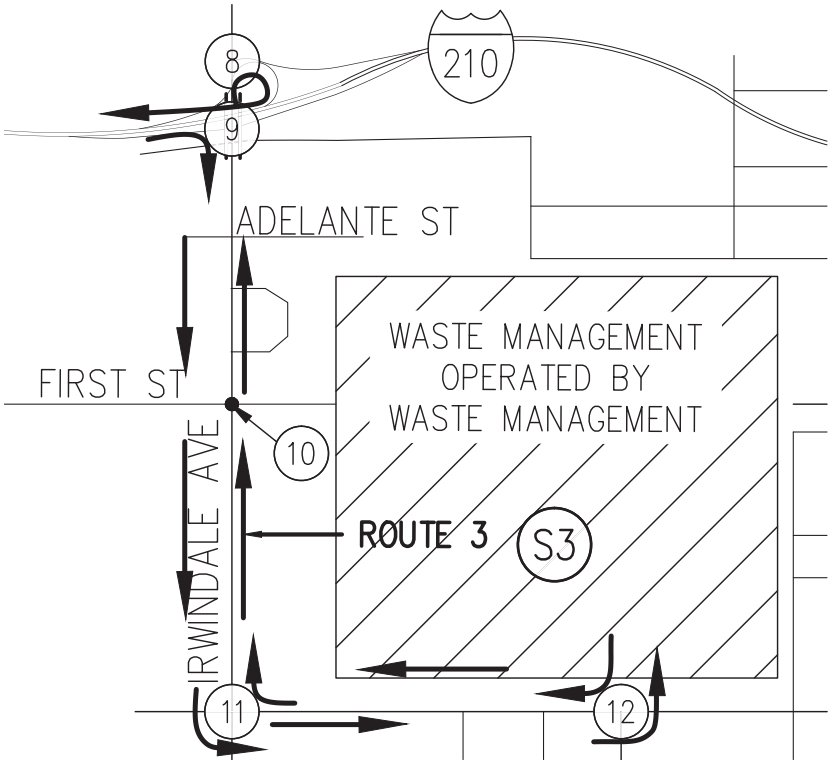
N/S STREET				10			E/W STREET			
IRWINDALE AVE							FIRST STREET			
				20%	10%	25%				
				35%	15%	5%				
				40%	5%	10%				
40%	30%	10%						10%	20%	15%
5%	5%	5%		TS				5%	5%	5%
35%	20%	15%						5%	5%	5%
				5%	10%	40%				
				15%	10%	5%				
				5%	5%	40%				

N/S STREET				11			E/W STREET			
IRWINDALE AVE							GLADSTONE STREET			
				5%	5%	25%				
				5%	10%	30%				
				30%	5%	10%				
5%	5%	5%						10%	20%	5%
35%	20%	5%		TS				5%	10%	10%
25%	5%	5%						5%	5%	5%
				20%	10%	10%				
				5%	10%	5%				
				40%	5%	10%				

N/S STREET				12			E/W STREET			
VINCENT AVE							GLADSTONE STREET			
				70%	15%	5%				
				94%	5%	20%				
				94%	5%	5%				
75%	95%	100%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
25%	25%	10%						5%	5%	5%
				5%	90%	5%				
				15%	100%	5%				
				5%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 3 TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-3B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-3B.dwg
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N/S STREET				8		E/W STREET			
IRWINDALE AVE						I-210 FWY WB RAMPS			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150			
				0	0	150			
				0	0	150			

N/S STREET				9		E/W STREET			
IRWINDALE AVE						I-210 FWY EB RAMPS			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				0	150	0			
				0	150	0			
				0	150	0			

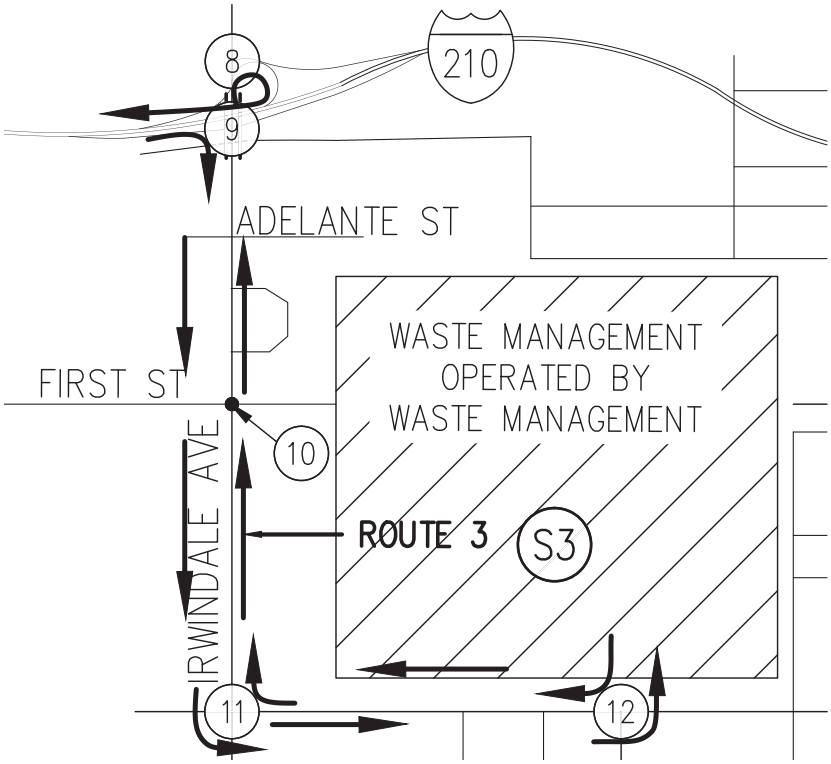
N/S STREET				10		E/W STREET			
IRWINDALE AVE						FIRST STREET			
				0	150	0			
				0	150	0			
				0	150	0			
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0			
				0	150	0			
				0	150	0			

N/S STREET				11		E/W STREET			
IRWINDALE AVE						GLADSTONE STREET			
				0	0	150			
				0	0	150			
				0	0	150			
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0			
				0	0	0			
				0	0	0			

N/S STREET				12		E/W STREET			
VINCENT AVE						GLADSTONE STREET			
				150	0	0			
				150	0	0			
				150	0	0			
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0			
				0	0	0			
				0	0	0			

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 3
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-3C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-3C.dwg
Last Opened: Oct 04, 2013 – 10:53am by: TMunoz

N/S STREET				8		E/W STREET				
IRWINDALE AVE						I-210 FWY WB RAMPS				
				610	470	0				
				545	595	0				
				475	895	0				
0	0	0						100	110	145
0	0	0		TS				0	0	0
0	0	0						175	255	145
				0	845	635				
				0	865	470				
				0	755	525				

N/S STREET				9		E/W STREET				
IRWINDALE AVE						I-210 FWY EB RAMPS				
				0	545	175				
				0	670	200				
				0	740	300				
470	590	375						0	0	0
5	5	5		TS				0	0	0
695	415	435						0	0	0
				0	945	195				
				0	740	240				
				0	1010	385				

N/S STREET				10		E/W STREET				
IRWINDALE AVE						FIRST STREET				
				125	1105	5				
				170	800	20				
				40	1020	15				
80	135	190						10	15	15
5	10	5		TS				5	5	5
20	95	35						5	15	15
				45	1050	5				
				90	1025	25				
				30	1355	15				

N/S STREET				11		E/W STREET				
IRWINDALE AVE						GLADSTONE STREET				
				5	780	235				
				5	750	215				
				5	700	360				
5	5	5						630	250	225
10	25	70		TS				65	20	10
10	35	30						495	130	130
				10	515	55				
				15	770	90				
				10	1170	330				

N/S STREET				12		E/W STREET				
VINCENT AVE						GLADSTONE STREET				
				20	15	5				
				60	5	10				
				55	5	5				
65	60	55						5	5	5
105	170	585		TS				760	195	240
115	105	150						250	115	150
				310	10	165				
				140	5	170				
				90	5	355				

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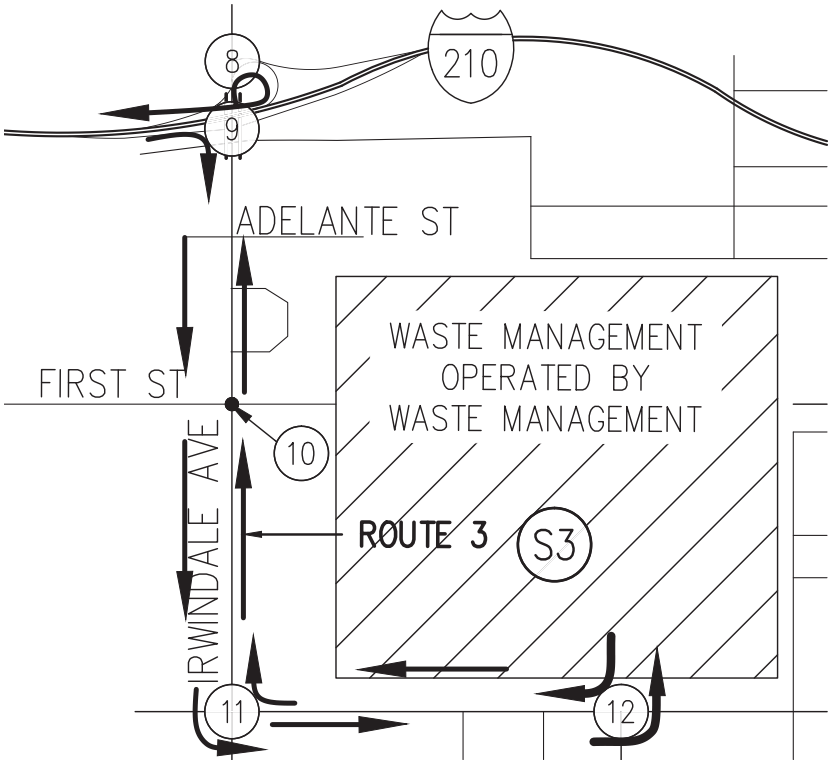
NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 3
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-3D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-3D.dwg
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N/S STREET				8		E/W STREET				
IRWINDALE AVE						I-210 FWY WB RAMPS				
				725	550	0				
				620	645	0				
				495	910	0				
0	0	0						125	120	155
0	0	0		TS				0	0	0
0	0	0						195	315	165
				0	975	830				
				0	950	670				
				0	780	660				

N/S STREET				9		E/W STREET				
IRWINDALE AVE						I-210 FWY EB RAMPS				
				0	660	220				
				0	810	210				
				0	780	315				
540	695	385						0	0	0
5	5	5		TS				0	0	0
890	595	540						0	0	0
				0	1115	215				
				0	925	290				
				0	1135	395				

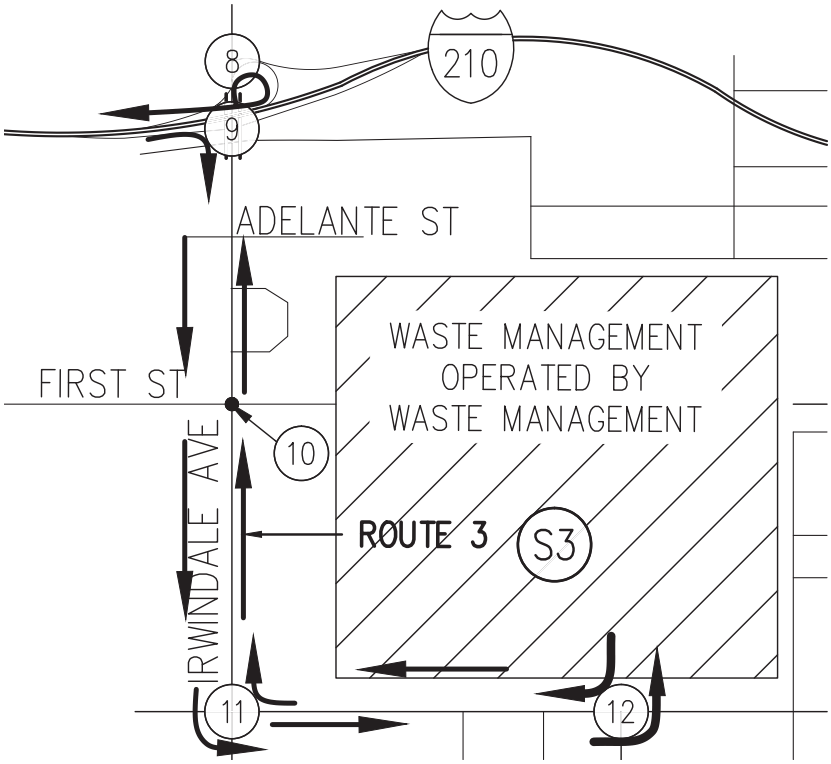
N/S STREET				10		E/W STREET				
IRWINDALE AVE						FIRST STREET				
				170	1365	5				
				280	1090	25				
				75	1225	20				
140	225	235						10	20	20
5	10	5		TS				5	5	5
30	130	45						5	15	15
				50	1360	10				
				120	1330	25				
				35	1540	25				

N/S STREET				11		E/W STREET				
IRWINDALE AVE						GLADSTONE STREET				
				5	850	435				
				5	875	415				
				10	785	510				
5	5	5						850	440	345
15	35	70		TS				70	25	10
20	35	35						535	145	145
				15	595	65				
				20	890	100				
				15	1250	405				

N/S STREET				12		E/W STREET				
VINCENT AVE						GLADSTONE STREET				
				200	20	5				
				170	5	15				
				155	5	5				
185	175	155						5	5	5
115	180	585		TS				765	205	245
175	150	185						255	115	150
				315	20	190				
				180	5	175				
				90	5	360				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 3
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-3E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-3E.dwg
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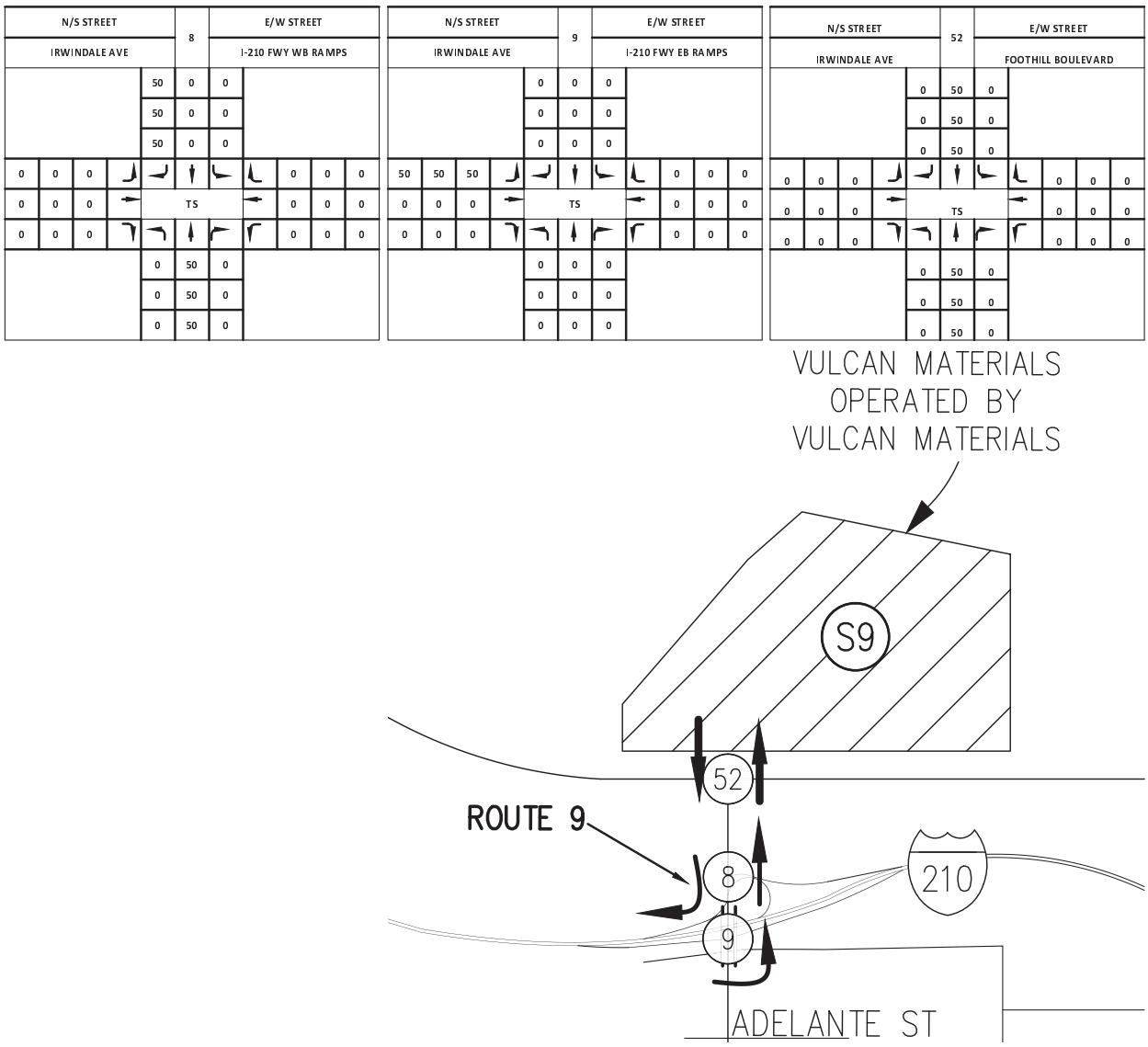

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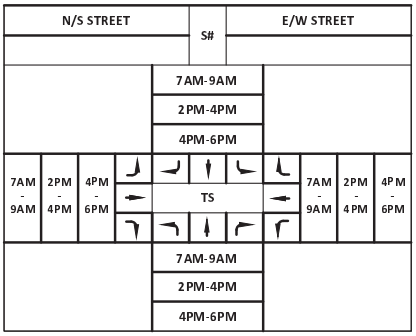

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ROUTE 9 PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-4A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-4A.dwg
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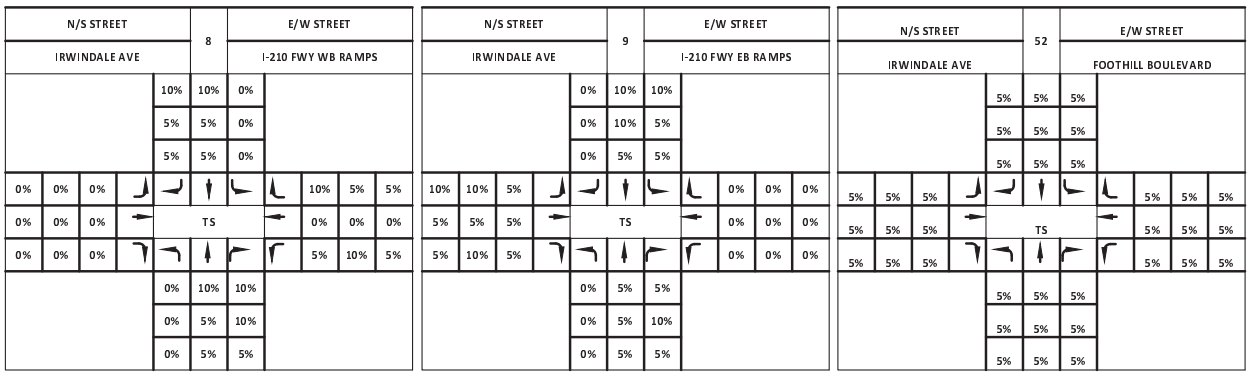

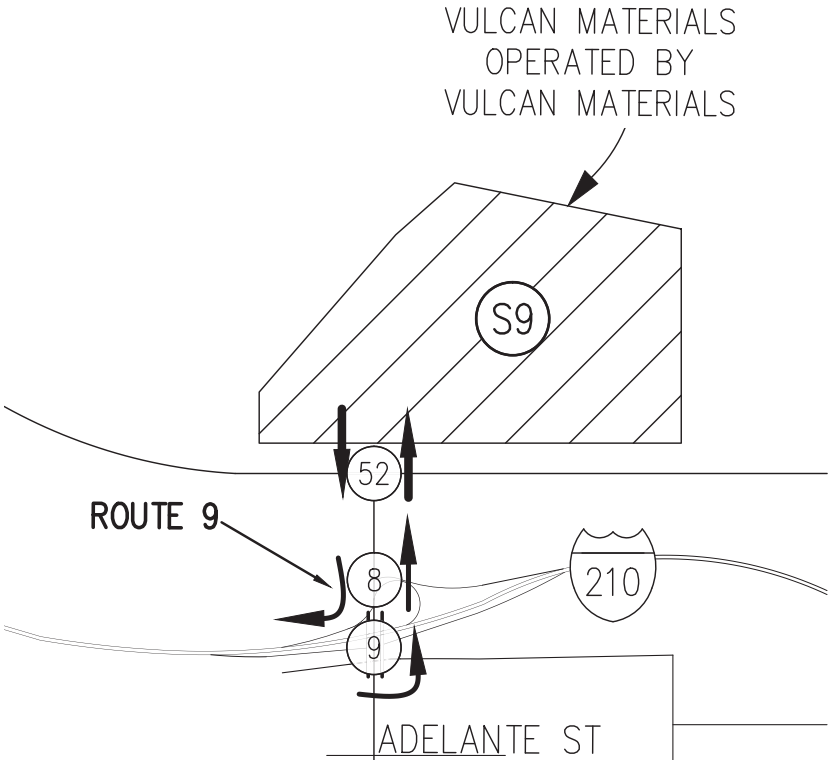

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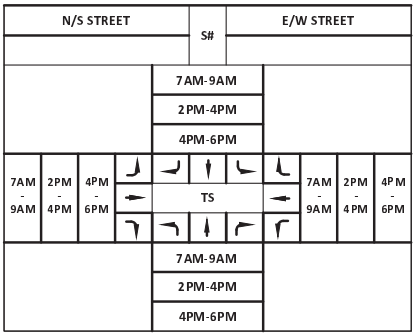

LEGEND

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ROUTE 9 TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-4B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-4B.dwg
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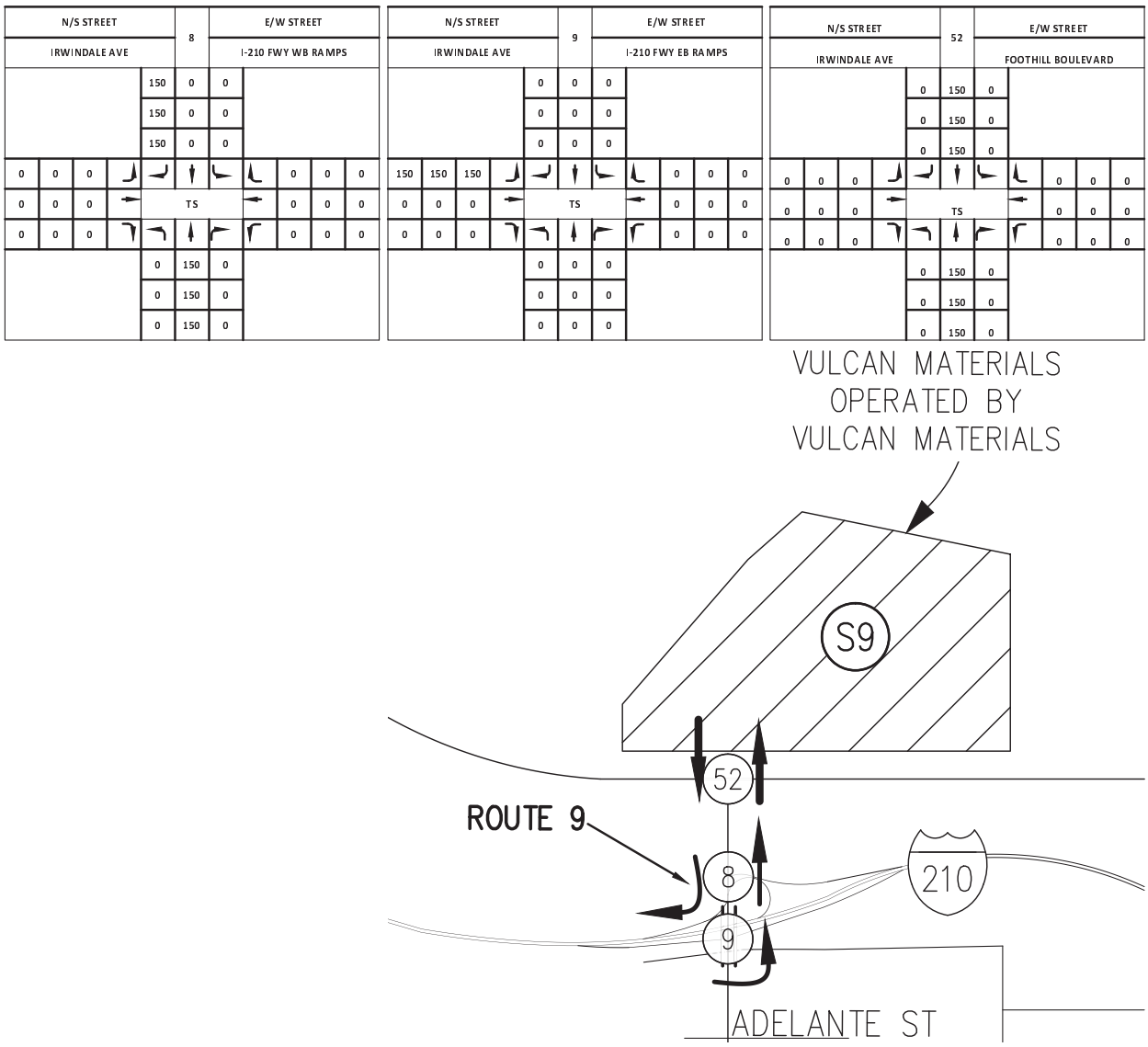

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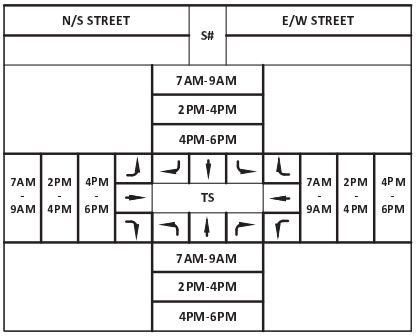

LEGEND

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ROUTE 9
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-4C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-4C.dwg
Last Opened: Oct 04, 2013 – 10:54am by: TMunoz

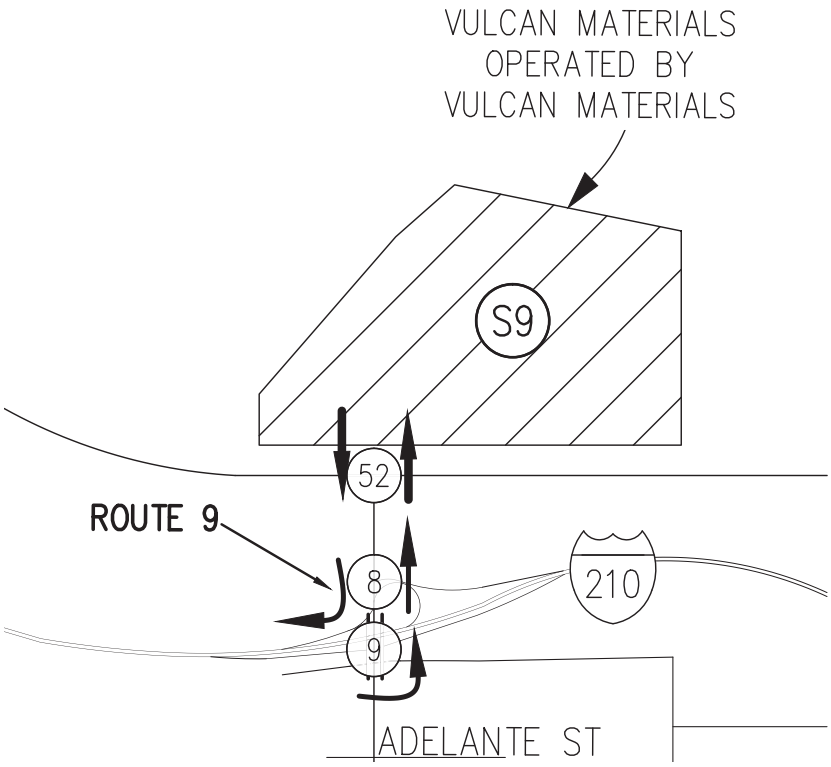
N/S STREET				8		E/W STREET				
IRWINDALE AVE						I-210 FWY WB RAMPS				
				660	100	0				
				595	110	0				
				525	145	0				
0	0	0						100	110	145
0	0	0		TS				0	0	0
0	0	0						175	255	145
				0	895	585				
				0	915	420				
				0	805	475				

N/S STREET				9		E/W STREET				
IRWINDALE AVE						I-210 FWY EB RAMPS				
				0	545	175				
				0	670	200				
				0	740	300				
520	640	425						0	0	0
5	5	5		TS				0	0	0
645	365	385						0	0	0
				0	895	195				
				0	690	240				
				0	960	385				

N/S STREET				52		E/W STREET				
IRWINDALE AVE						FOOTHILL BOULEVARD				
				5	55	5				
				5	55	5				
				5	55	5				
5	5	5						5	5	5
5	5	5		TS				5	5	5
5	5	5						5	5	5
				5	55	5				
				5	55	5				
				5	55	5				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 9 EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-2-4D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 2\FIG 4-2-4D.dwg
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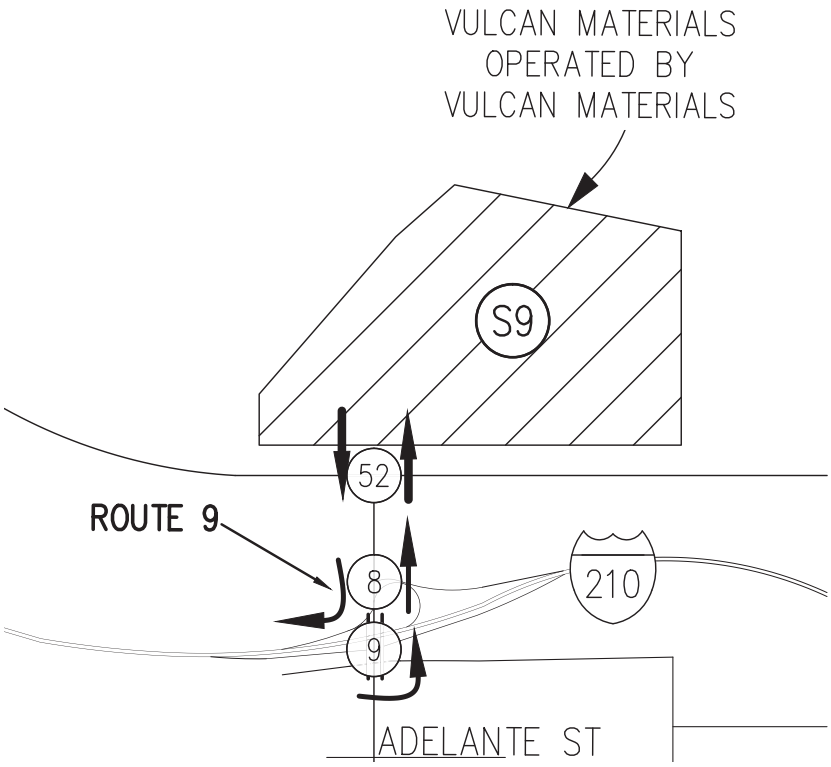
N/S STREET				8		E/W STREET				
IRWINDALE AVE						I-210 FWY WB RAMPS				
				875	550	0				
				770	645	0				
				645	910	0				
0	0	0	↱	↰	↑	↳	↲	125	120	155
0	0	0	←	TS			←	0	0	0
0	0	0	↰	↰	↑	↱	↱	195	315	165
				0	1125	680				
				0	1100	520				
				0	930	510				

N/S STREET				9		E/W STREET				
IRWINDALE AVE						I-210 FWY EB RAMPS				
				0	660	220				
				0	810	210				
				0	780	315				
690	845	535	↱	↰	↑	↳	↲	0	0	0
5	5	5	←	TS			←	0	0	0
740	445	390	↰	↰	↑	↱	↱	0	0	0
				0	965	215				
				0	775	290				
				0	985	395				

N/S STREET				52		E/W STREET				
IRWINDALE AVE						FOOTHILL BOULEVARD				
				5	155	5				
				5	155	5				
				5	155	5				
5	5	5	↱	↰	↑	↳	↲	5	5	5
5	5	5	←	TS			←	5	5	5
5	5	5	↰	↰	↑	↱	↱	5	5	5
				5	155	5				
				5	155	5				
				5	155	5				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↰	↰	↑	↱	↱			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 9
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-2-4E

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Table 4-2-3
Intersection Capacity Analysis – Existing + Project Conditions (Route 3)
Traffic Impact Analysis - Site 3

Route 3		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.5	0.50	A	A	6.8	0.48	A	A	6.5	0.50	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	22.3	0.85	C	B	19.0	0.72	B	C	21.5	0.84	C
10	Irwindale Ave and First Street	B	12.6	0.64	A	B	17.4	0.63	B	D	39.1	0.88	B
11	Irwindale Ave and Gladstone Street	C	29.4	0.87	C	B	12.7	0.60	B	C	21.7	0.87	D
12	Vincent Ave and Gladstone Street	B	11.4	0.65	B	A	8.7	0.31	A	B	11.0	0.57	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 3 Analysis

As presented in *Table 4-2-3*, under the existing conditions for Site 3 (Route 3) all intersections are anticipated to operating at an acceptable HCM LOS of D or better for the AM, Mid-day and PM peak hours. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Table 4-2-4
Intersection Capacity Analysis – Existing + Project Conditions (Route 9)
Traffic Impact Analysis - Site 9

Route 9		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	6.6	0.51	A	A	6.6	0.48	A	A	6.7	0.52	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	22.8	0.85	C	B	18.4	0.73	B	C	21.9	0.84	C
53	Irwindale Ave and Foothill Boulevard	C	25.2	0.81	C	D	35.3	0.87	C	D	53.0	1.05	F

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: Hall & Foreman, Inc.

Haul Route 9 Analysis

As presented in *Table 4-2-4*, under the existing conditions for Site 9 (Route 9) all intersections are anticipated to operating at an acceptable HCM LOS of D or better for the AM, Mid-day and PM peak hours. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Section 3: Scholl Canyon Landfill (Site 4)

Haul Route 4A

The Haul Route 4A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-3-1A* through *Figure 4-3-1C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-3-1D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-3-1E.*

Haul Route 4B

The Haul Route 4B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-3-2A* through *Figure 4-3-2C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-3-2D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-3-2E.*

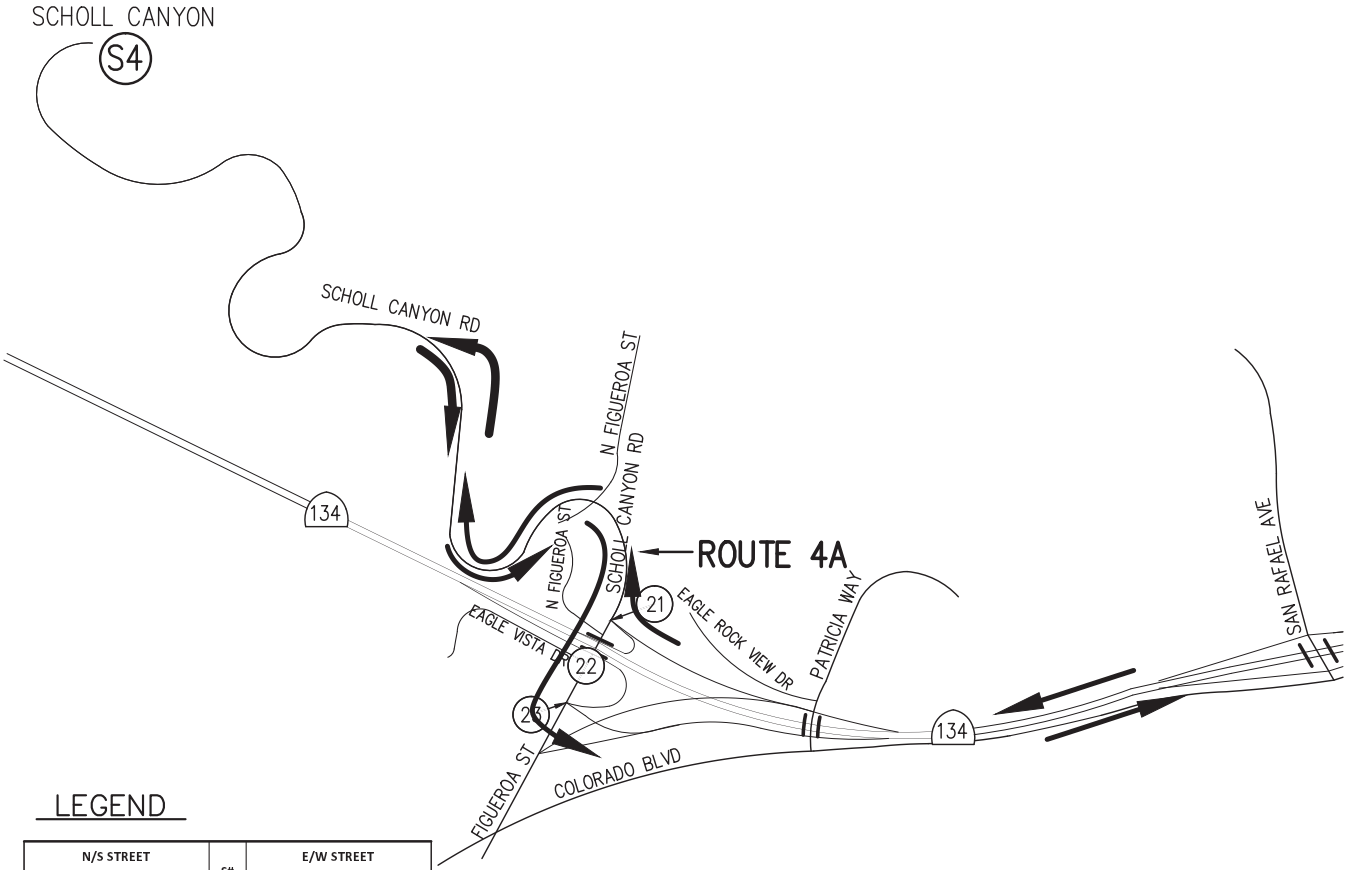
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						50	50	50
0	0	0						0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0						0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 4A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-3-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-1A.dwg
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N/S STREET	21	E/W STREET
SCHOLL CANYON RD		WB 134 FWY

				0%	65%	60%				
				0%	60%	70%				
				0%	30%	25%				
0%	0%	0%						80%	65%	30%
0%	0%	0%						0%	0%	0%
0%	0%	0%						5%	5%	5%
				0%	35%	5%				
				0%	65%	5%				
				0%	5%	5%				

N/S STREET	22	E/W STREET
FIGUEROA ST		EAGLE VISTA DRIVE

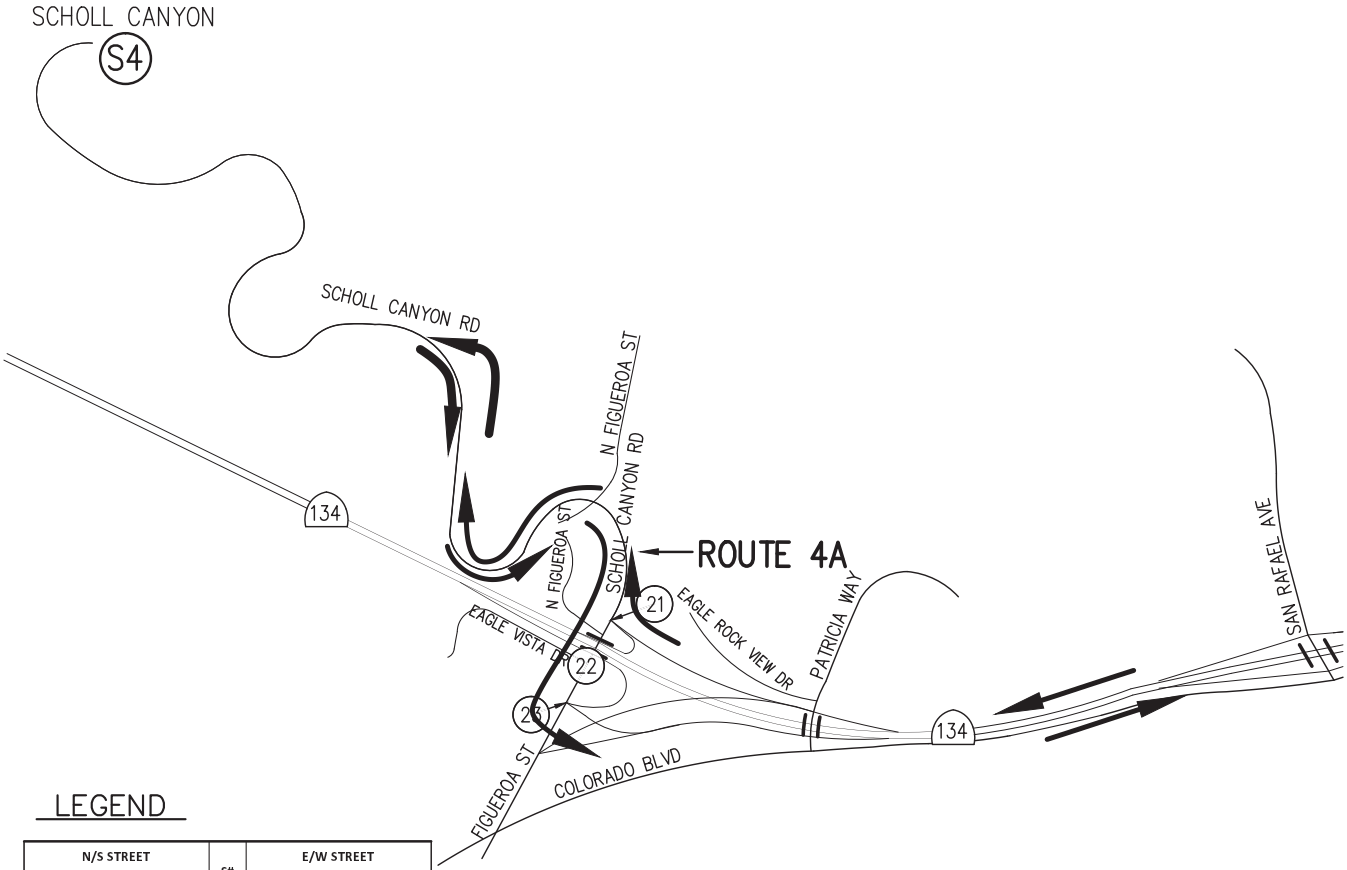
				5%	5%	0%				
				5%	10%	0%				
				5%	5%	0%				
5%	5%	5%						0%	0%	0%
0%	0%	0%						0%	0%	0%
5%	5%	5%						0%	0%	0%
				30%	5%	0%				
				5%	10%	0%				
				5%	5%	0%				

N/S STREET	23	E/W STREET
FIGUEROA ST		EB 134 FWY

				0%	5%	5%				
				0%	5%	35%				
				0%	5%	15%				
0%	0%	0%						10%	25%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						5%	5%	5%
				0%	5%	5%				
				0%	5%	5%				
				0%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 4A TRUCK PERCENTAGE

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-3-1B

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Last Opened: Oct 04, 2013 - 11:03am by: TMunoz

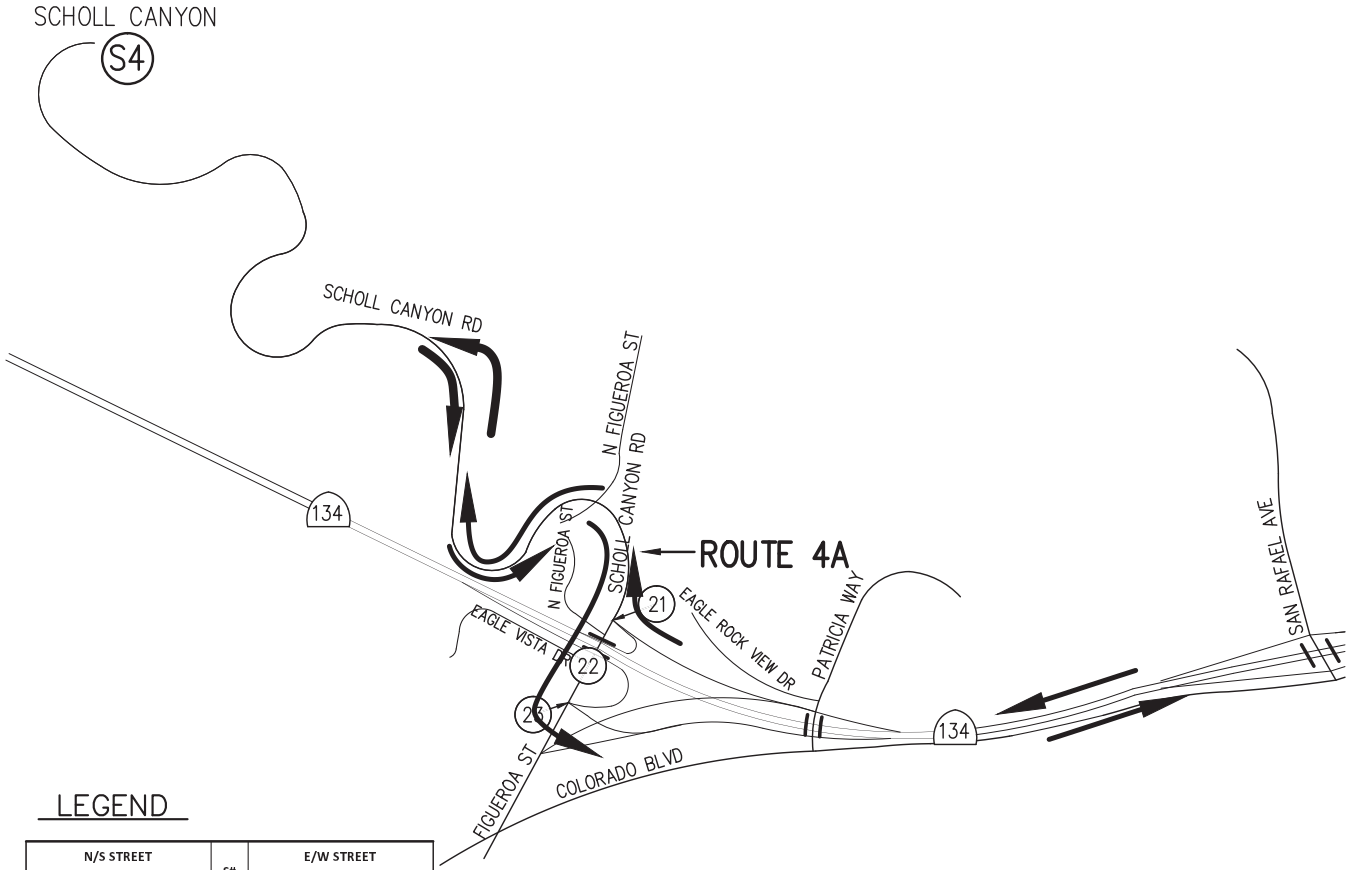
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0	170	10				
				0	245	40				
				0	210	20				
0	0	0						185	235	165
0	0	0						0	0	0
0	0	0						235	270	435
				0	40	645				
				0	80	325				
				0	10	470				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				10	380	0				
				20	485	0				
				25	610	0				
50	30	40						0	0	0
0	0	0						0	0	0
60	50	70						0	0	0
				40	665	0				
				40	390	0				
				105	440	0				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0	220	200				
				0	290	260				
				0	450	225				
0	0	0						50	110	60
0	0	0		TS				0	0	0
0	0	0						380	255	455
				0	650	290				
				0	270	235				
				0	490	275				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 4A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-3-1C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-1C.dwg
Last Opened: Oct 04, 2013 - 11:03am by: TMunoz

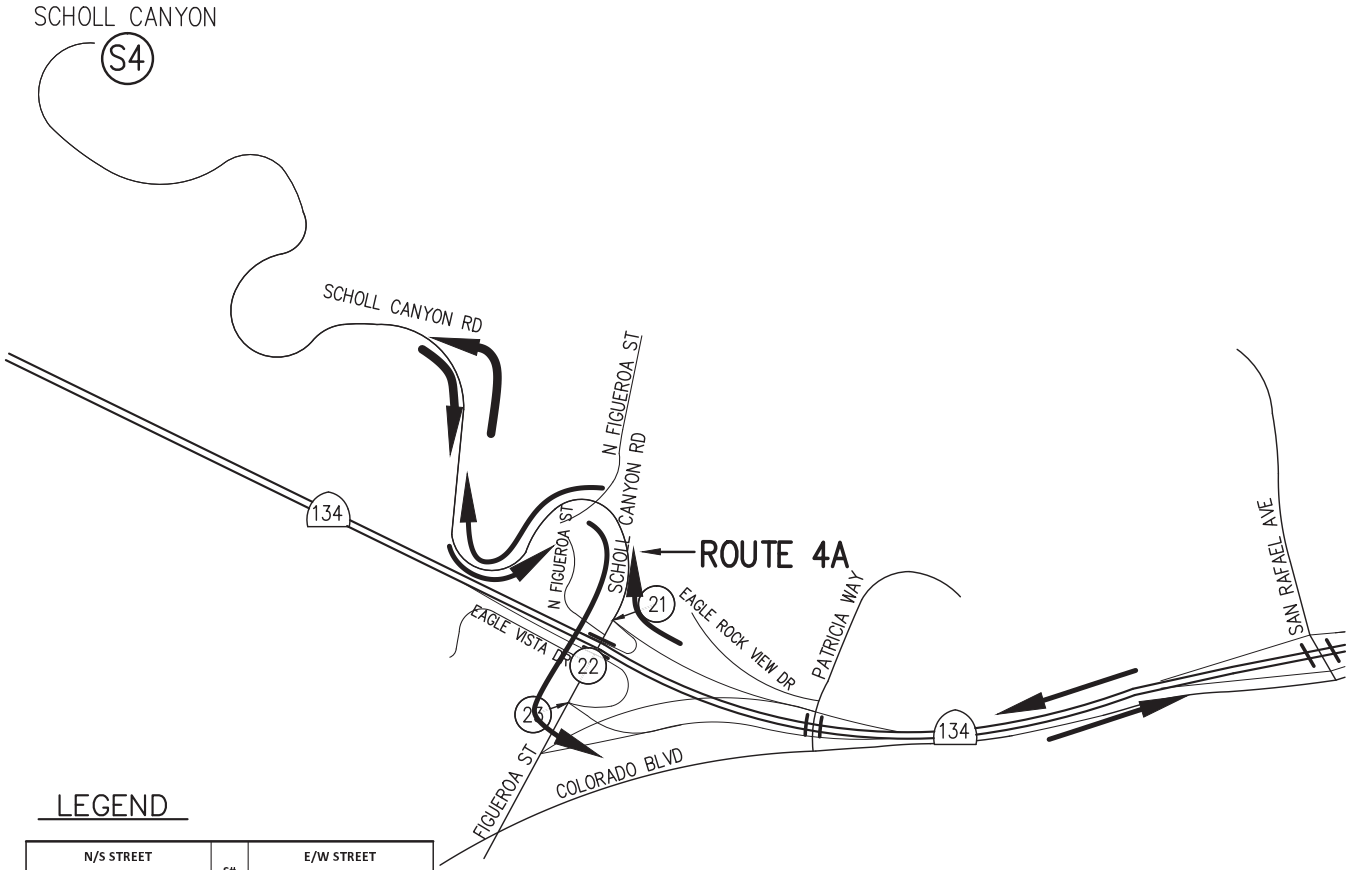
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0	60	5				
				0	95	15				
				0	85	15				
0	0	0						65	85	60
0	0	0						0	0	0
0	0	0						210	260	430
				0	20	635				
				0	35	310				
				0	10	460				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				10	270	0				
				15	325	0				
				25	485	0				
45	30	40						0	0	0
0	0	0						0	0	0
60	50	70						0	0	0
				25	625	0				
				40	325	0				
				105	430	0				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0	210	100				
				0	280	115				
				0	445	105				
0	0	0						40	75	55
0	0	0		TS				0	0	0
0	0	0						365	235	455
				0	615	285				
				0	260	225				
				0	480	265				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 4A EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-3-1D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-1D.dwg
Last Opened: Oct 04, 2013 - 11:03am by: TMunoz

N/S STREET				21			E/W STREET			
SCHOLL CANYON RD							WB 134 FWY			
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						150	150	150
0	0	0						0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				22			E/W STREET			
FIGUEROA ST							EAGLE VISTA DRIVE			
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0						0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				23			E/W STREET			
FIGUEROA ST							EB 134 FWY			
				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

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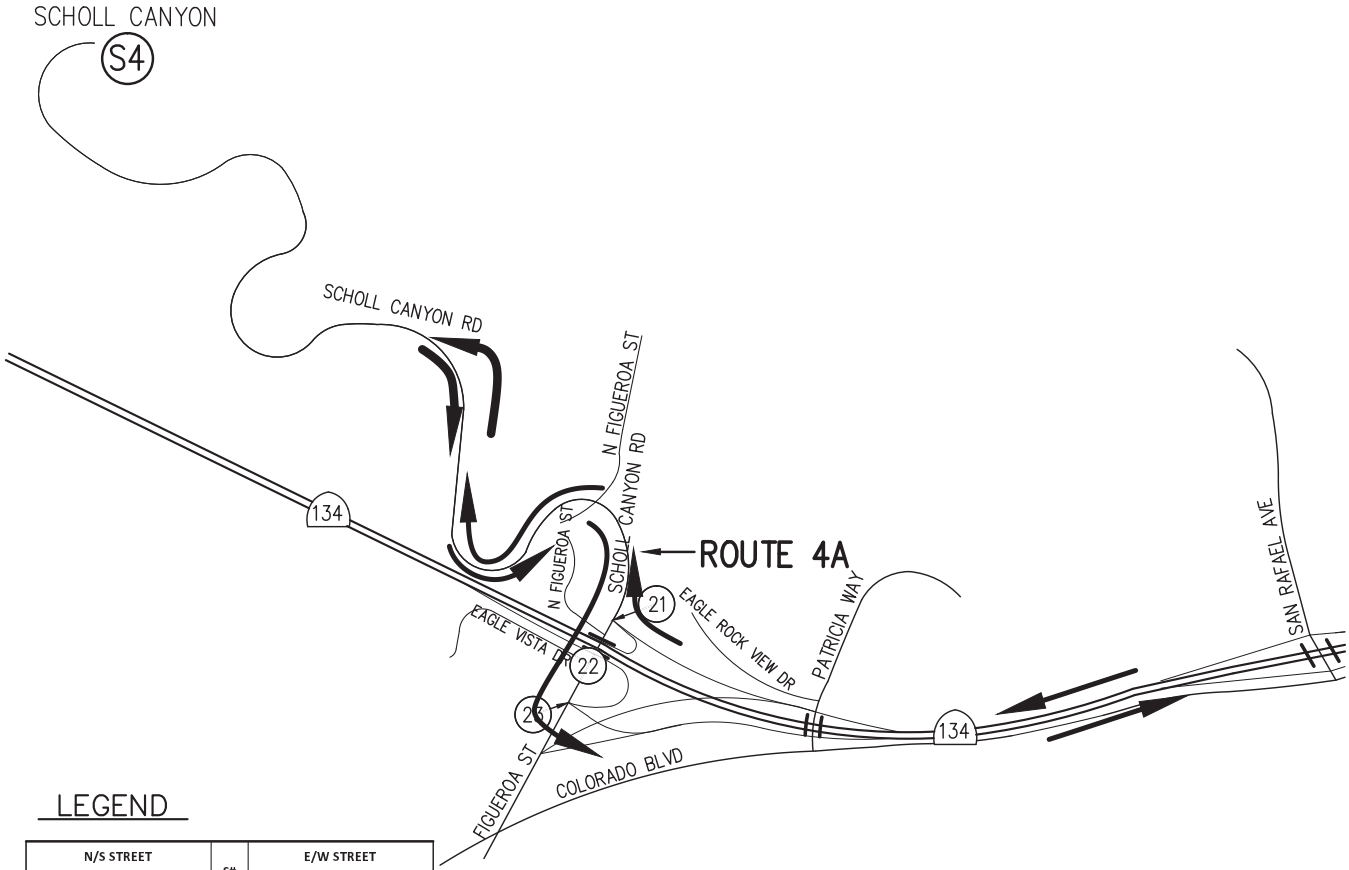

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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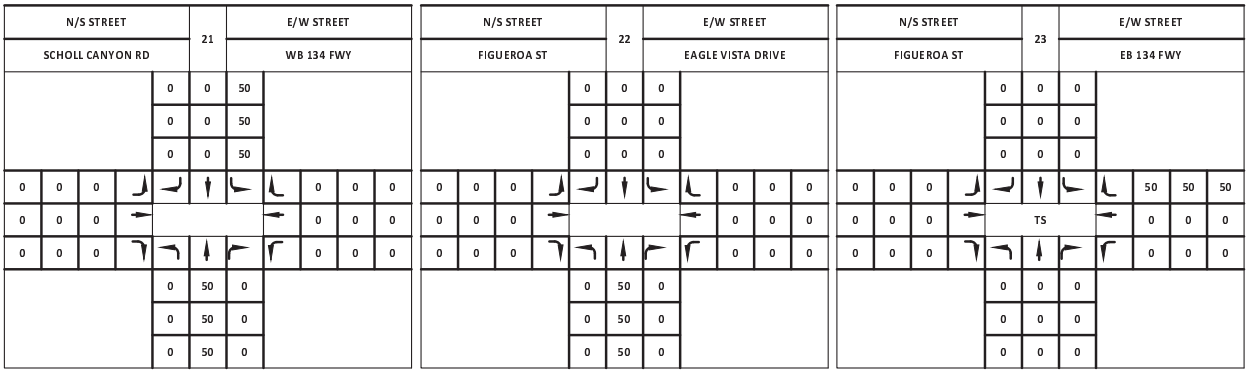
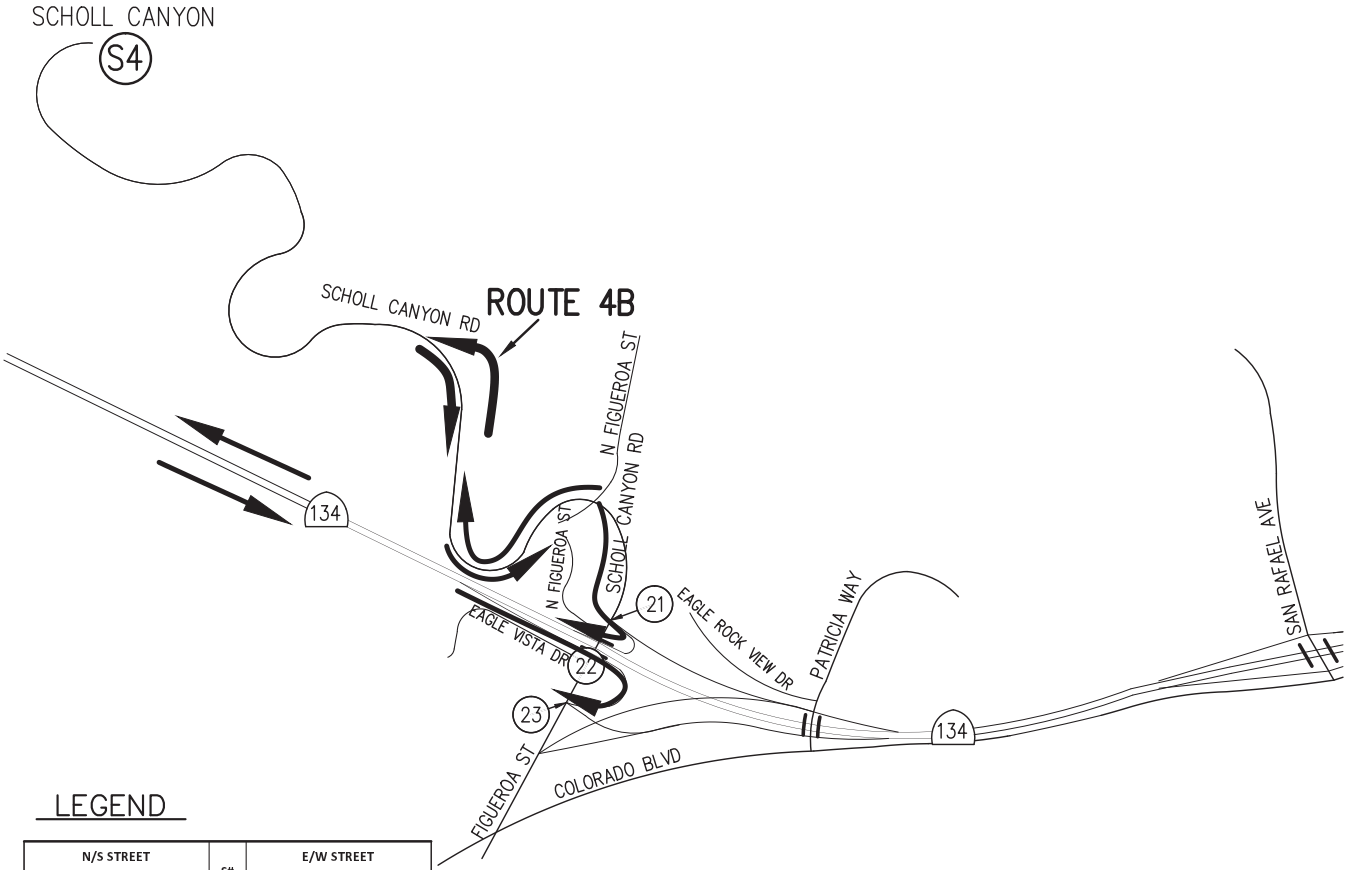
ROUTE 4A
PCE EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-3-1E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-1E.dwg
Last Opened: Oct 04, 2013 - 11:03am by: TMunoz





LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 4B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-3-2A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-2A.dwg
Last Opened: Oct 04, 2013 - 11:04am by: TMunoz

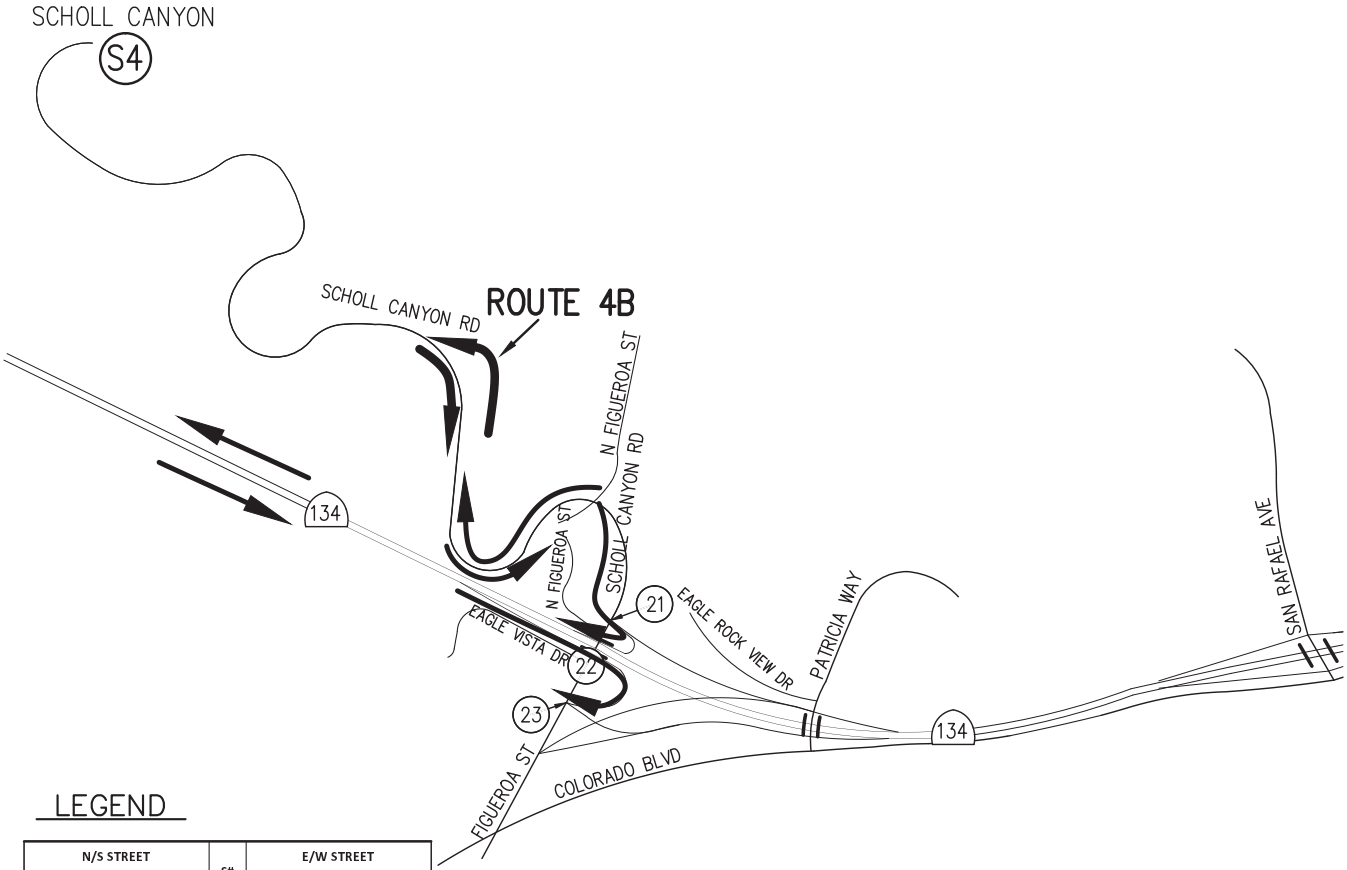
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0%	65%	60%				
				0%	60%	70%				
				0%	30%	25%				
0%	0%	0%						80%	65%	30%
0%	0%	0%						0%	0%	0%
0%	0%	0%						5%	5%	5%
				0%	35%	5%				
				0%	65%	5%				
				0%	5%	5%				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				5%	5%	0%				
				5%	10%	0%				
				5%	5%	0%				
5%	5%	5%						0%	0%	0%
0%	0%	0%						0%	0%	0%
5%	5%	5%						0%	0%	0%
				30%	5%	0%				
				5%	10%	0%				
				5%	5%	0%				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0%	5%	5%				
				0%	5%	35%				
				0%	5%	15%				
0%	0%	0%						10%	25%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						5%	5%	5%
				0%	5%	5%				
				0%	5%	5%				
				0%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 4B TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-3-2B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 3\FIG 4-3-2B.dwg
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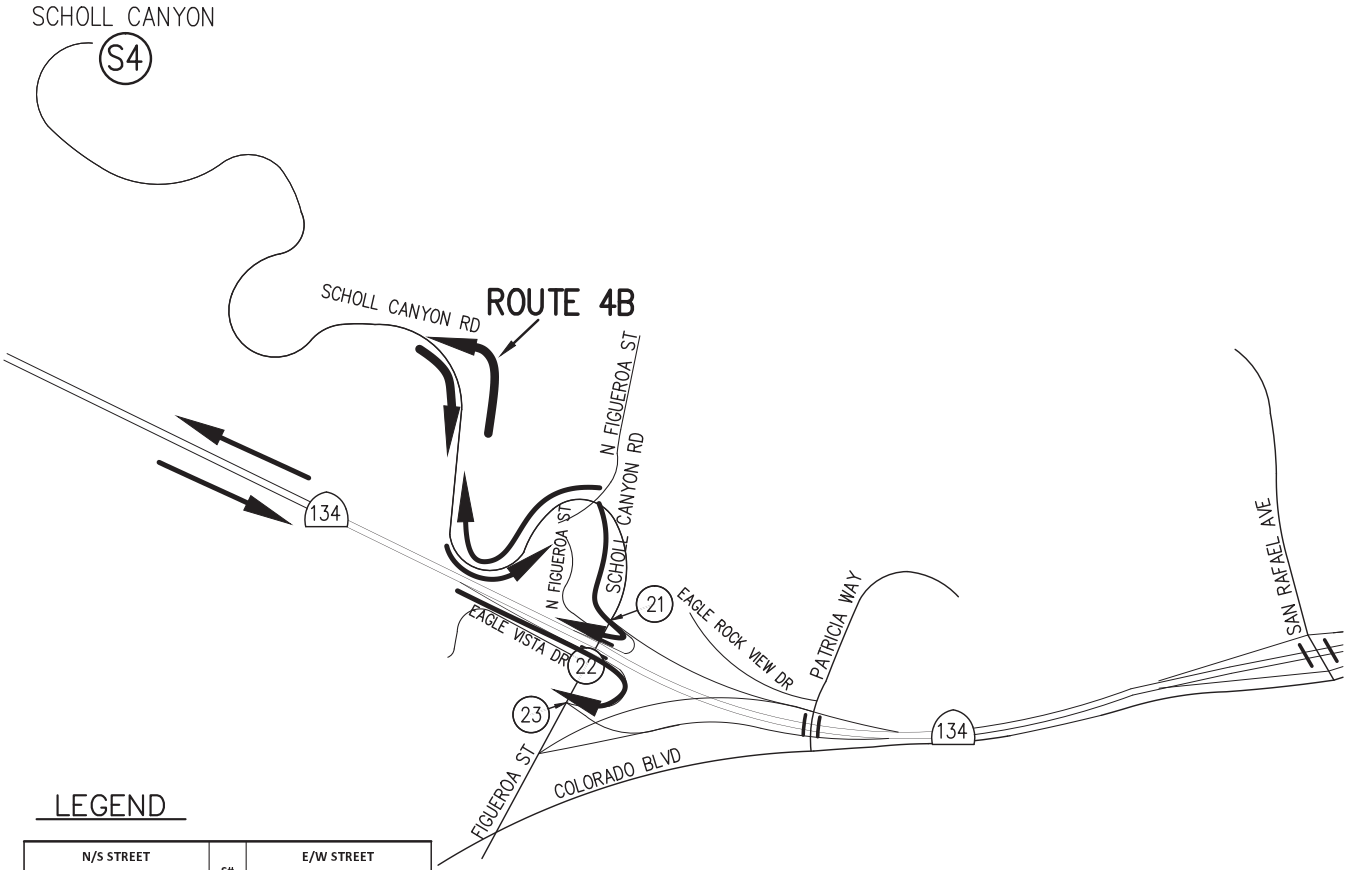
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						0	0	0
0	0	0						0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0						0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 4B
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-3-2C

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Last Opened: Oct 04, 2013 - 11:04am by: TMunoz

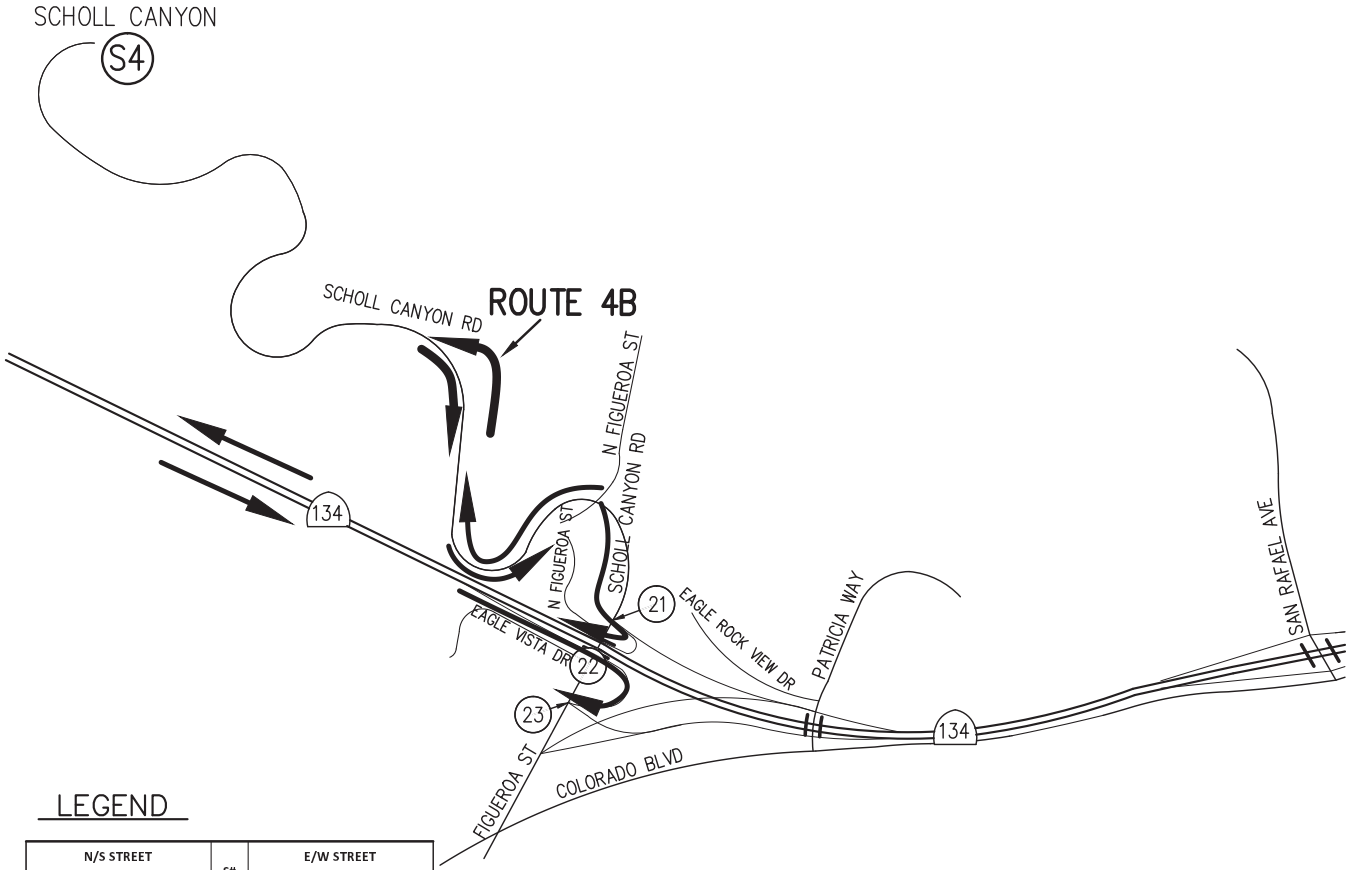
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0	10	55				
				0	45	65				
				0	35	65				
0	0	0						15	35	10
0	0	0						0	0	0
0	0	0						210	260	430
				0	70	635				
				0	85	310				
				0	60	460				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				10	220	0				
				15	275	0				
				25	435	0				
45	30	40						0	0	0
0	0	0						0	0	0
60	50	70						0	0	0
				25	675	0				
				40	375	0				
				105	480	0				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0	210	50				
				0	280	65				
				0	445	55				
0	0	0						90	125	105
0	0	0		TS				0	0	0
0	0	0						365	235	455
				0	615	285				
				0	260	225				
				0	480	265				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 4B EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-3-2D

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Last Opened: Oct 04, 2013 - 11:04am by: TMunoz

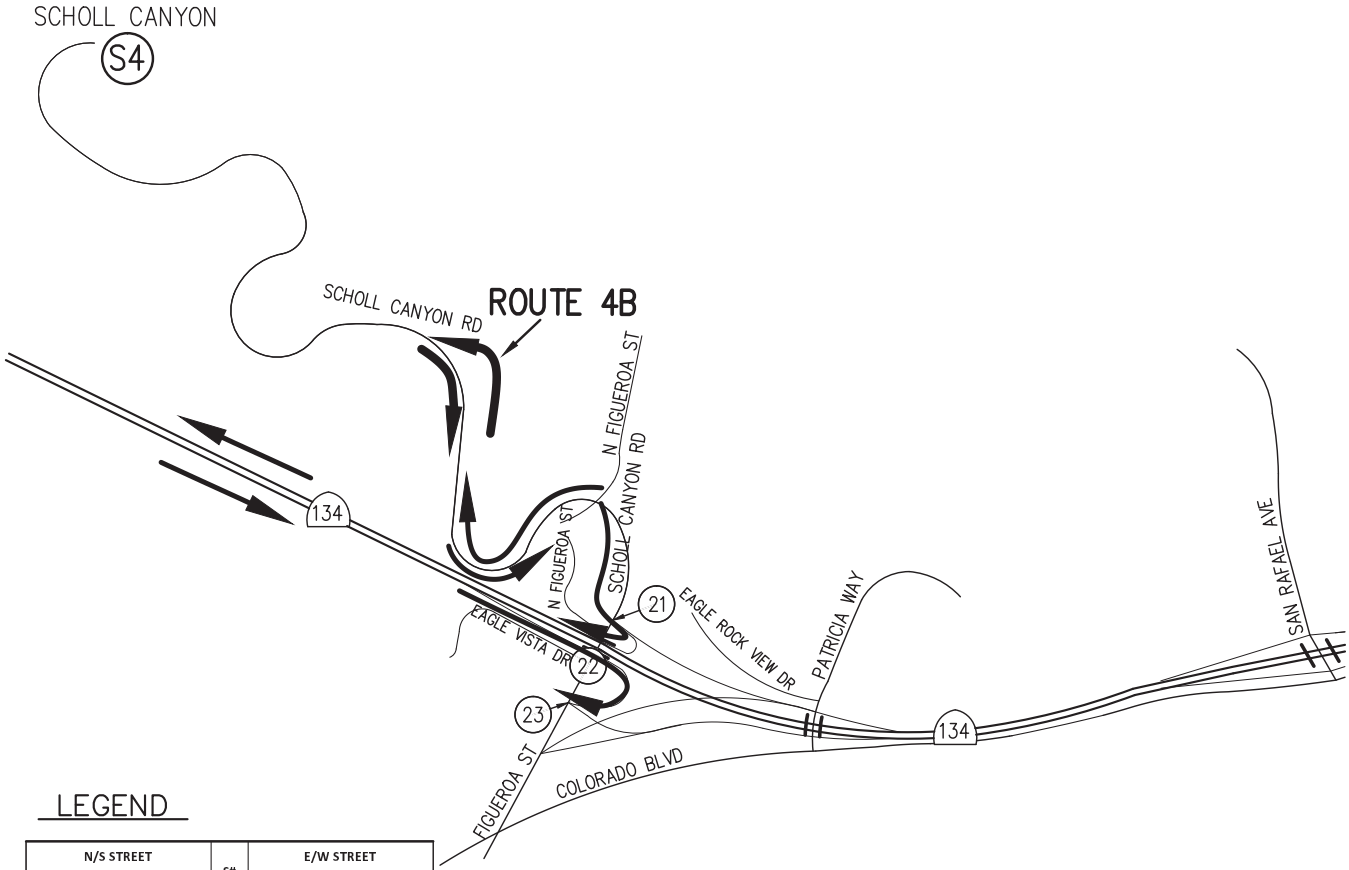
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0	20	160				
				0	95	190				
				0	60	170				
0	0	0						35	85	15
0	0	0						0	0	0
0	0	0						235	270	435
				0	190	645				
				0	230	325				
				0	160	470				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				10	230	0				
				20	335	0				
				25	460	0				
50	30	40						0	0	0
0	0	0						0	0	0
60	50	70						0	0	0
				40	815	0				
				40	540	0				
				105	590	0				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0	220	50				
				0	290	110				
				0	450	75				
0	0	0						200	260	210
0	0	0		TS				0	0	0
0	0	0						380	255	455
				0	650	290				
				0	270	235				
				0	490	275				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 4B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-3-2E

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Table 4-3-1
Intersection Capacity Analysis – Existing + Project Conditions (Route 4A)
Traffic Impact Analysis - Site 4

Route 4A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	E	36.2	-	-	B	12.9	-	-	D	34	-	-
22	Figueroa St and Eagle Vista Drive	B	13.2	-	-	B	12	-	-	C	19	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	8	0.57	A	A	6.2	0.42	A	A	7.8	0.55	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 4-3-2
Intersection Capacity Analysis – Existing + Project Conditions (Route 4B)
Traffic Impact Analysis - Site 4

Route 4B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	D	32.2	-	-	B	13.2	-	-	E	35.4	-	-
22	Figueroa St and Eagle Vista Drive	B	12.9	-	-	B	11.7	-	-	C	18.1	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	7.4	0.52	A	A	6.1	0.31	A	A	7.4	0.48	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 4A and 4B Analysis

As presented in *Table 4-3-1* and *Table 4-3-2*, under existing plus project conditions for Site 4 (Route 4A-4B) most intersections are expected to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours. The Intersection of Figueroa Street and SR-134 Westbound Ramps is anticipated to operate at HCM LOS E for Haul Route 4A during the AM peak hour and for Haul Route 4B E during the PM peak hour. Mitigation is recommended for Figueroa Street and SR-134 Westbound Ramps.

Section 4: Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8)

Haul Route 5A

The Haul Route 5A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-1A* through *Figure 4-4-1C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-1D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-1E.*

N/S STREET	24	E/W STREET
FOOTHILL BLVD		WB I-210 FWY RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	25	E/W STREET
FOOTHILL BLVD		EB I-210 FWY RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	26	E/W STREET
OSBORNE STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	27	E/W STREET
GLEN OAKS BLVD		OSBORNE STREET

				0	0	0				
				0	0	0				
				0	0	0				
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	28	E/W STREET
GLEN OAKS BLVD		MONTAGUE STREET

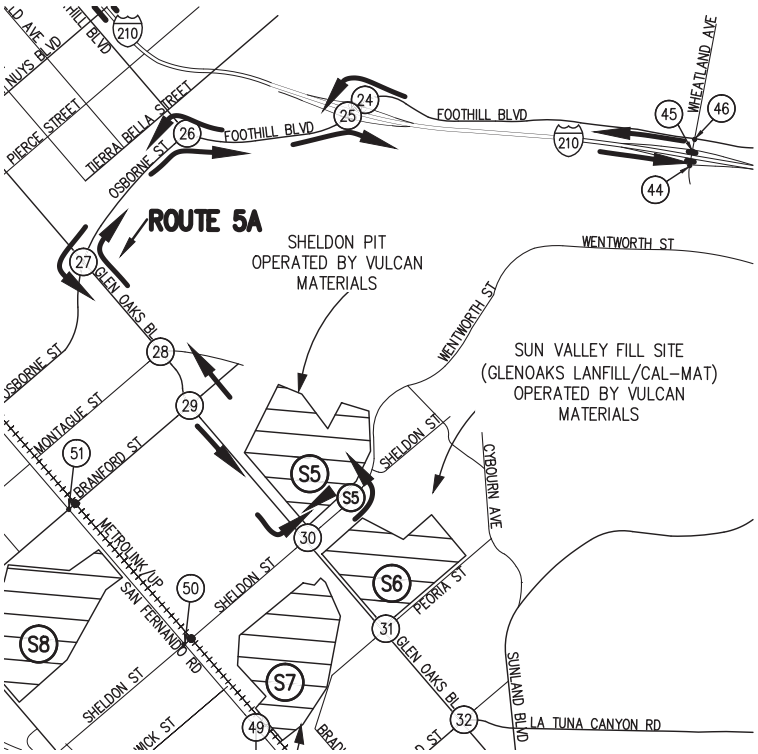
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	29	E/W STREET
GLEN OAKS BLVD		BRANFORD STREET

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 5A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-1A

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N/S STREET	24	E/W STREET
FOOTHILL BLVD		WB I-210 FWY RAMPS

				5%	5%	0%				
				5%	5%	0%				
				5%	5%	0%				
0%	0%	0%						5%	10%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						5%	10%	5%
				5%	5%	0%				
				5%	5%	0%				
				5%	5%	0%				

N/S STREET	25	E/W STREET
FOOTHILL BLVD		EB I-210 FWY RAMPS

				0%	5%	5%				
				0%	5%	5%				
				0%	5%	5%				
5%	5%	5%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
5%	20%	5%						0%	0%	0%
				0%	5%	5%				
				0%	5%	10%				
				0%	5%	5%				

N/S STREET	26	E/W STREET
OSBORNE STREET		FOOTHILL BLVD

				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	5%	5%
5%	10%	5%		TS				5%	10%	5%
5%	5%	5%						5%	15%	5%
				5%	5%	5%				
				10%	5%	10%				
				5%	5%	5%				

N/S STREET	27	E/W STREET
GLEN OAKS BLVD		OSBORNE STREET

				10%	5%	20%				
				5%	10%	5%				
				5%	10%	5%				
5%	5%	5%						15%	10%	5%
5%	10%	5%		TS				5%	5%	5%
20%	10%	15%						10%	10%	10%
				45%	15%	20%				
				10%	10%	20%				
				5%	5%	5%				

N/S STREET	28	E/W STREET
GLEN OAKS BLVD		MONTAGUE STREET

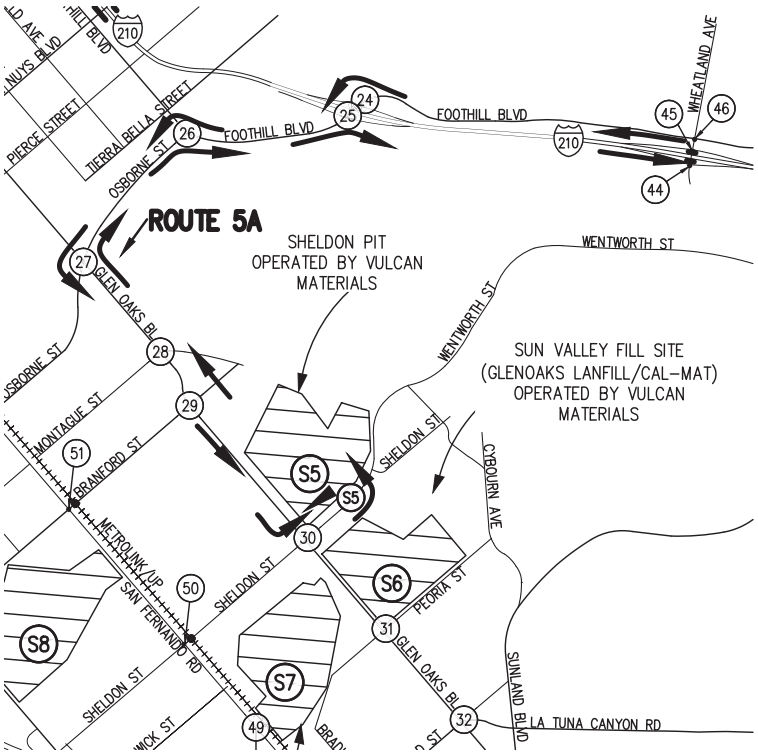
				15%	10%	5%				
				15%	10%	5%				
				15%	5%	5%				
30%	30%	10%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
20%	20%	5%						5%	5%	5%
				5%	10%	15%				
				5%	10%	15%				
				25%	5%	5%				

N/S STREET	29	E/W STREET
GLEN OAKS BLVD		BRANFORD STREET

				5%	5%	45%				
				5%	5%	15%				
				15%	10%	5%				
5%	5%	5%						35%	5%	5%
10%	5%	5%		TS				50%	5%	5%
10%	5%	5%						40%	10%	10%
				5%	10%	50%				
				10%	10%	10%				
				5%	5%	5%				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 5A TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-1B

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Last Opened: Oct 04, 2013 - 11:11am by: TMunoz

N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

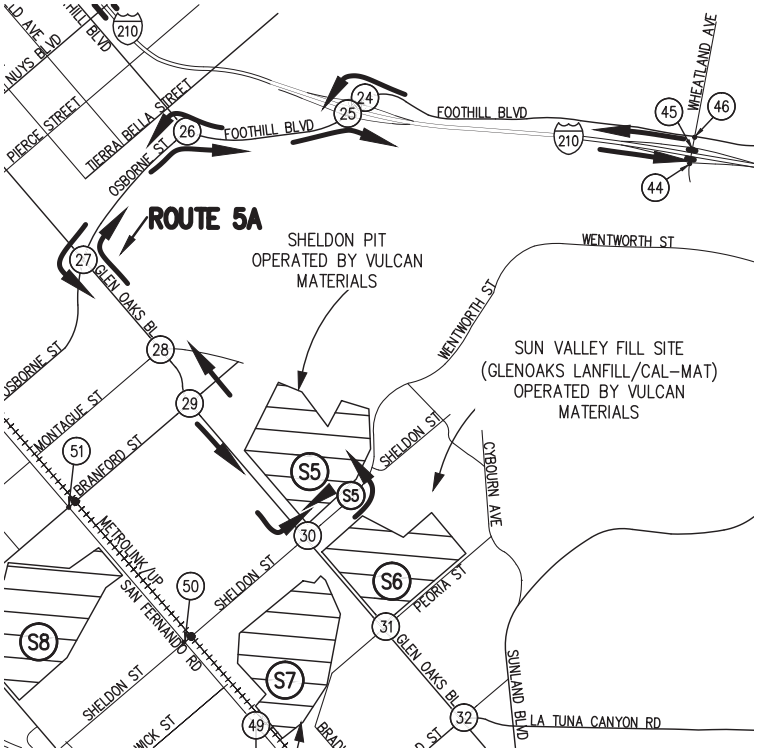
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 5A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-1C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-1C.dwg
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N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				490	390	0				
				205	255	0				
				225	260	0				
0	0	0	↲	↰	↑	↳	↳	60	35	65
0	0	0	←	TS			←	0	0	0
0	0	0	↱	↰	↑	↳	↳	220	165	305
				130	570	0				
				105	445	0				
				210	510	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	355	195				
				0	305	75				
				0	460	55				
355	260	335	↲	↰	↑	↳	↳	0	0	0
0	0	0	←	TS			←	0	0	0
100	40	80	↱	↰	↑	↳	↳	0	0	0
				0	350	340				
				0	265	210				
				0	390	290				

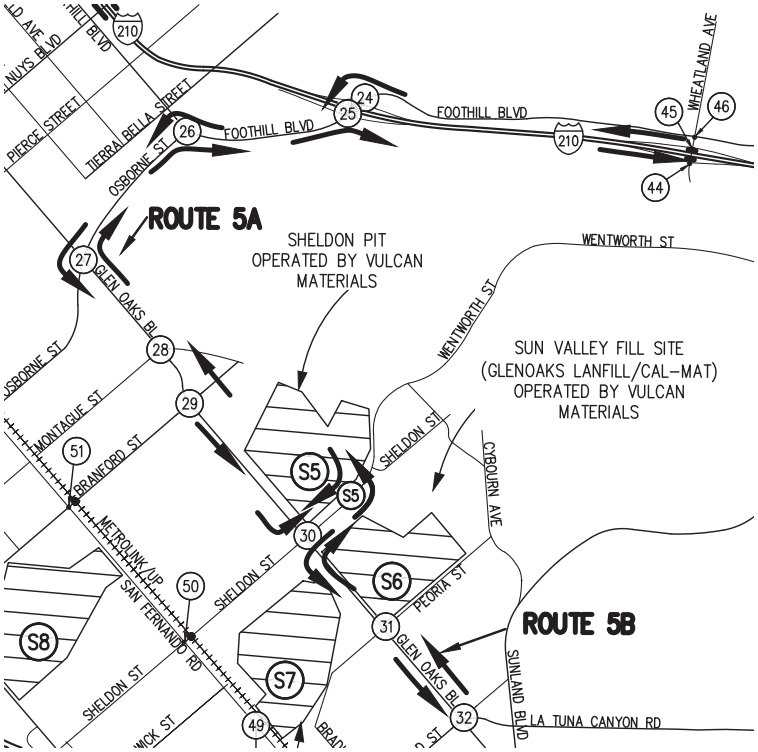
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				5	5	5				
				15	5	5				
				15	5	5				
5	20	15	↲	↰	↑	↳	↳	5	5	5
320	225	315	←	TS			←	245	200	305
520	25	265	↱	↰	↑	↳	↳	310	215	255
				335	10	300				
				230	5	260				
				680	5	445				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				170	1070	45				
				130	425	80				
				205	575	135				
350	220	290	↲	↰	↑	↳	↳	70	70	100
535	425	690	←	TS			←	630	500	535
70	90	90	↱	↰	↑	↳	↳	425	175	255
				50	520	185				
				80	635	200				
				120	875	390				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				55	1625	15				
				35	575	35				
				25	905	15				
10	40	55	↲	↰	↑	↳	↳	10	30	30
5	5	5	←	TS			←	5	5	5
30	45	60	↱	↰	↑	↳	↳	5	35	10
				55	690	5				
				60	610	15				
				50	1230	15				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				175	1410	15				
				80	570	70				
				80	790	115				
130	150	220	↲	↰	↑	↳	↳	10	85	100
15	85	110	←	TS			←	5	90	190
95	90	155	↱	↰	↑	↳	↳	10	70	90
				95	645	10				
				90	615	70				
				115	995	105				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				160	1235	135				
				95	490	100				
				145	730	140				
115	130	325	↲	↰	↑	↳	↳	90	100	110
405	240	355	←	TS			←	595	285	325
45	80	65	↱	↰	↑	↳	↳	90	45	40
				80	480	45				
				80	535	50				
				120	820	70				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↲	↰	↑	↳	↳	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↱	↰	↑	↳	↳			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5A EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-1D

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N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				505	410	0				
				215	290	0				
				230	275	0				
0	0	0						60	40	65
0	0	0		TS				0	0	0
0	0	0						325	290	430
				140	595	0				
				110	480	0				
				220	530	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	385	200				
				0	335	75				
				0	475	55				
365	270	345						0	0	0
0	0	0		TS				0	0	0
115	55	90						0	0	0
				0	380	465				
				0	295	340				
				0	415	400				

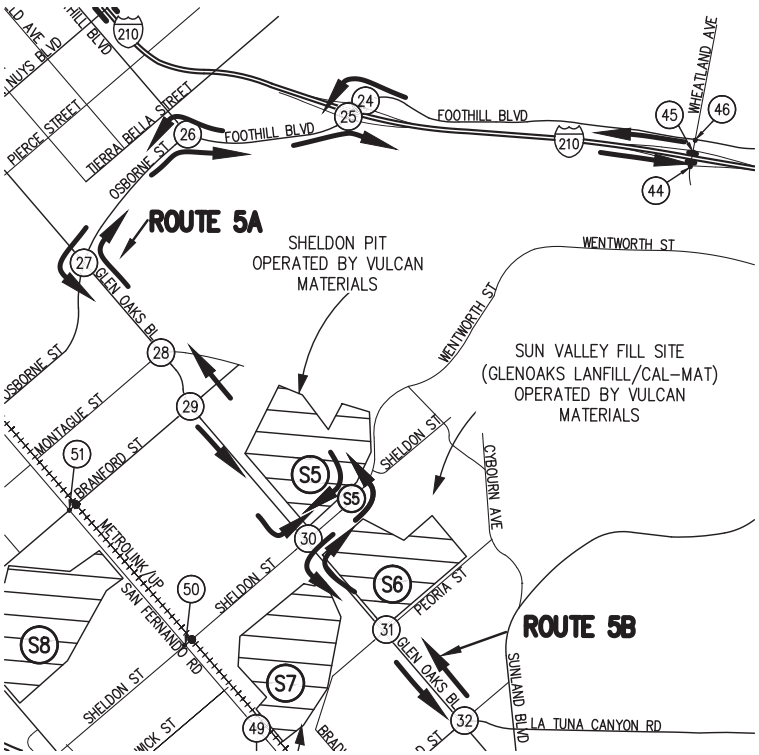
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				5	5	5				
				15	5	5				
				15	5	5				
5	20	15						5	5	5
350	265	330		TS				250	235	345
560	25	295						425	360	375
				355	10	415				
				265	5	400				
				735	5	570				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				200	1215	65				
				140	520	80				
				205	575	135				
465	340	390						90	80	100
600	490	690		TS				695	545	535
95	105	90						490	210	255
				90	655	340				
				100	735	365				
				120	875	490				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				70	1785	20				
				50	765	40				
				30	1110	20				
45	65	65						10	30	30
5	5	5		TS				5	5	5
50	65	65						5	40	10
				65	890	10				
				65	815	15				
				70	1395	15				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				195	1605	25				
				80	750	90				
				105	1000	120				
130	155	225						15	95	105
15	85	110		TS				5	90	195
115	100	170						20	85	105
				105	865	25				
				105	820	80				
				125	1160	110				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				200	1355	285				
				125	555	210				
				155	785	250				
130	150	330						200	210	215
430	370	335		TS				660	370	350
50	120	75						105	50	50
				100	520	50				
				110	605	70				
				140	905	80				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 5A
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-1E

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Table 4-4-1
Intersection Capacity Analysis – Existing + Project Conditions (Route 5A)
Traffic Impact Analysis - Site 5

Route 5A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	8.4	0.57	A	A	5.6	0.29	A	A	8.0	0.50	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.9	0.63	A	A	6.5	0.31	A	A	7.2	0.41	A
26	Foothill Blvd and Osborne Street	D	37.9	1.16	C	A	9.2	0.57	A	B	19.3	0.91	C
27	Glenoaks Blvd and Osborne Street	F	82.9	1.13	E	C	32.7	0.78	B	D	44.9	0.90	D
28	Glenoaks Blvd and Montague Street	A	9.1	0.72	B	B	13.0	0.38	A	A	9.5	0.58	B
29	Glenoaks Blvd and Branford Street	B	15.1	0.81	C	B	18.4	0.57	A	C	23.6	0.80	D
30	Glenoaks Blvd and Sheldon Street	B	12.4	0.78	D	A	7.4	0.49	A	B	16.8	0.95	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 5A Analysis

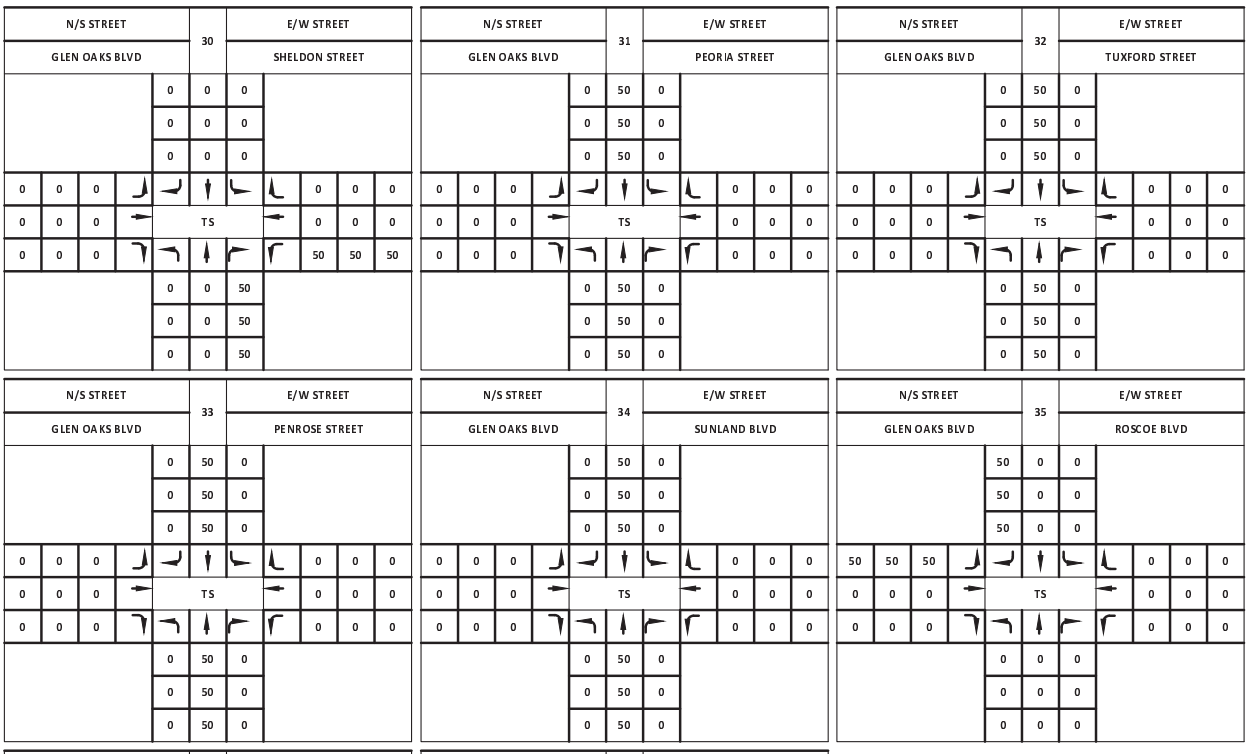
As presented in *Table 4-4-1*, under existing plus project conditions for Site 5 (Route 5A) most study intersections are expected to operate at an acceptable HCM LOS D or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street will continue to operate at HCM LOS F during the AM peak period. As identified under existing conditions, mitigation of the intersection of Glenoaks Blvd and Osborne Street is recommended to improve the intersection to an acceptable level-of-service.

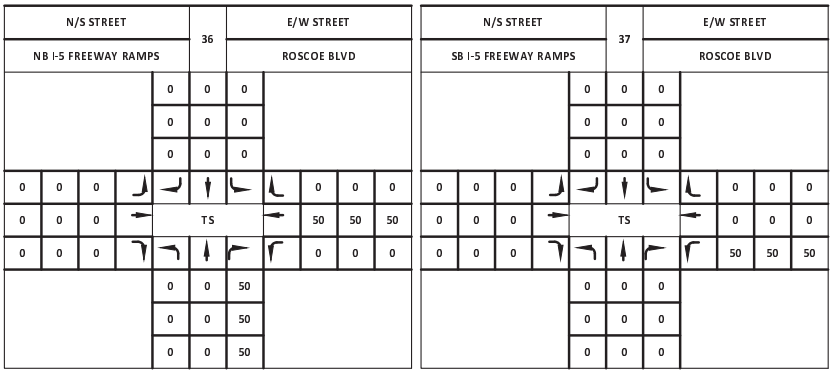
Haul Route 5B

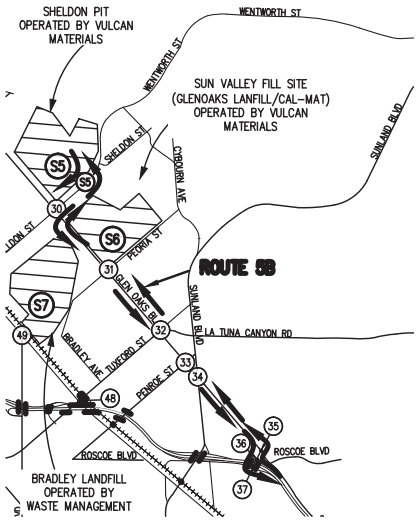
The Haul Route 5B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-2A* through *Figure 4-4-2C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-2D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-2E.*

Haul Route 5C

The Haul Route 5C project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-3A* through *Figure 4-4-3C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-3D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-3E.*







NOT TO SCALE

LEGEND

N/S STREET	S#	E/W STREET
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	
7AM - 9AM / 2PM - 4PM / 4PM - 6PM	TS	7AM - 9AM / 2PM - 4PM / 4PM - 6PM
	7AM-9AM	
	2PM-4PM	
	4PM-6PM	

LEGEND

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ROUTE 5B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-2A

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N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				20%	5%	45%				
				45%	15%	40%				
				45%	5%	50%				
40%	40%	20%						20%	5%	20%
80%	60%	40%		TS				20%	20%	5%
40%	45%	45%						20%	30%	55%
				45%	10%	65%				
				15%	15%	45%				
				45%	5%	50%				

N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				40%	9%	5%				
				45%	25%	10%				
				10%	12%	5%				
25%	45%	25%						10%	10%	5%
5%	5%	5%		TS				5%	5%	5%
15%	15%	10%						5%	5%	5%
				15%	20%	20%				
				15%	19%	5%				
				10%	15%	5%				

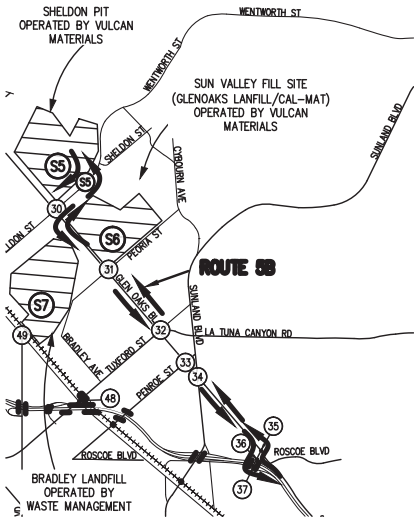
N/S STREET				33			E/W STREET			
GLEN OAKS BLVD							PENROSE STREET			
				5%	10%	15%				
				10%	19%	10%				
				5%	18%	0%				
5%	10%	5%						10%	5%	5%
5%	5%	5%		TS				5%	5%	10%
25%	5%	10%						0%	10%	5%
				0%	21%	0%				
				0%	14%	5%				
				0%	16%	0%				

N/S STREET				34			E/W STREET			
GLEN OAKS BLVD							SUNLAND BLVD			
				5%	12%	35%				
				15%	23%	5%				
				10%	13%	10%				
15%	5%	10%						5%	0%	0%
5%	5%	5%		TS				5%	5%	5%
0%	5%	0%						5%	5%	5%
				35%	23%	5%				
				10%	21%	5%				
				0%	12%	5%				

N/S STREET				35			E/W STREET			
GLEN OAKS BLVD							ROSCOE BLVD			
				15%	5%	0%				
				18%	10%	0%				
				15%	5%	0%				
26%	21%	13%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
10%	20%	10%						0%	0%	0%
				10%	5%	0%				
				10%	5%	0%				
				10%	5%	0%				

N/S STREET				36			E/W STREET			
NB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
10%	10%	15%		TS				14%	16%	14%
0%	0%	0%						0%	0%	0%
				15%	0%	23%				
				20%	0%	22%				
				20%	0%	13%				

N/S STREET				37			E/W STREET			
SB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0%	5%	5%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						15%	5%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						13%	18%	16%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 5B TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-2B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-2B.dwg
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N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD

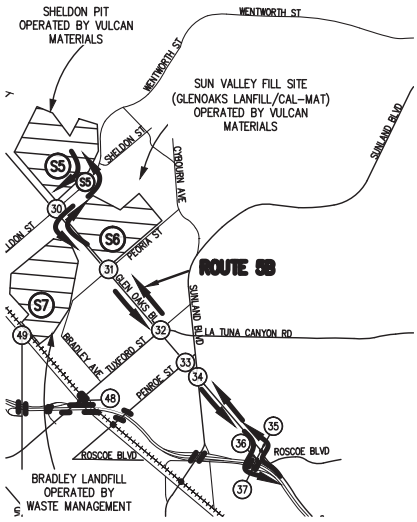
				150	0	0				
				150	0	0				
				150	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				150	150	150
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	37	E/W STREET
SB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 5B PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-2C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-2C.dwg
Last Opened: Oct 04, 2013 – 11:14am by: TMunoz

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				175	1345	90			
				105	535	55			
				160	795	100			
125	140	325						45	55	65
440	260	355		TS				650	310	355
50	85	70						155	105	100
				85	525	105			
				85	585	110			
				130	895	130			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				40	1300	30			
				15	580	10			
				15	795	35			
15	25	40						10	15	55
5	5	10		TS				5	5	5
5	30	20						15	20	30
				15	575	25			
				25	575	15			
				25	1025	25			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				125	1065	90			
				100	405	90			
				90	640	130			
115	110	140						75	45	80
470	390	505		TS				565	425	345
45	60	95						30	25	60
				95	445	20			
				110	485	30			
				120	850	60			

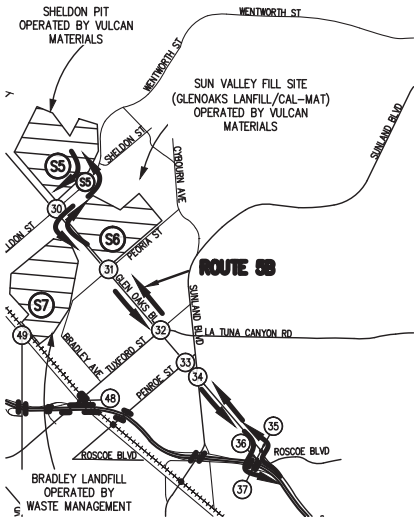
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				95	970	35			
				35	490	25			
				110	570	45			
120	90	185						35	35	75
125	130	200		TS				70	85	140
20	50	55						5	20	45
				25	415	5			
				45	515	25			
				75	750	40			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				205	690	10			
				170	355	35			
				50	560	50			
70	165	165						20	15	5
670	430	650		TS				750	355	395
30	20	55						205	320	360
				10	360	80			
				25	400	245			
				20	690	385			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				470	520	0			
				355	355	0			
				470	530	0			
225	290	595						0	0	0
0	0	0		TS				0	0	0
75	90	120						0	0	0
				70	275	0			
				75	370	0			
				65	540	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
90	120	110		TS				540	425	540
0	0	0						0	0	0
				70	0	265			
				60	0	285			
				65	0	615			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	35	90			
				0	40	120			
				0	30	110			
0	0	0						25	45	100
0	0	0		TS				0	0	0
0	0	0						615	380	425
				0	0	0			
				0	0	0			
				0	0	0			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

NOT TO SCALE

LEGEND

S# – DISPOSAL SITE

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ROUTE 5B PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-2D

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N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				200	1355	135			
				125	555	60			
				155	785	100			
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						255	200	200
				100	520	200			
				110	605	220			
				140	905	230			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				55	1535	55			
				30	855	20			
				30	980	65			
25	45	55						15	15	75
10	10	20		TS				10	5	5
5	60	40						20	30	65
				30	760	60			
				35	810	30			
				45	1260	50			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				220	1270	100			
				195	605	105			
				105	795	145			
175	200	210						90	55	90
510	445	540		TS				615	450	375
55	80	120						30	30	60
				120	620	30			
				140	680	30			
				145	1095	65			

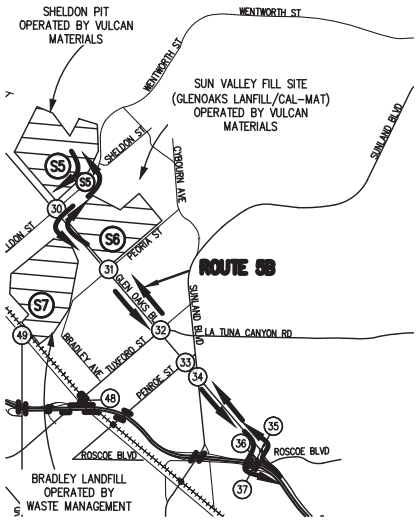
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				100	1160	45			
				40	660	30			
				115	795	45			
135	110	210						45	40	85
130	135	215		TS				75	90	160
30	55	65						5	25	50
				25	585	5			
				45	675	25			
				75	960	40			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				235	855	20			
				230	520	40			
				60	695	60			
85	190	200						25	15	5
720	470	670		TS				790	400	405
30	20	55						220	340	370
				20	510	85			
				25	555	260			
				20	865	415			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				585	560	0			
				490	415	0			
				585	575	0			
340	400	705						0	0	0
0	0	0		TS				0	0	0
90	125	145						0	0	0
				85	305	0			
				95	410	0			
				80	580	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
100	140	135		TS				660	550	655
0	0	0						0	0	0
				90	0	380			
				85	0	395			
				90	0	725			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	40	100			
				0	40	120			
				0	30	110			
0	0	0						35	50	100
0	0	0		TS				0	0	0
0	0	0						735	505	550
				0	0	0			
				0	0	0			
				0	0	0			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 5B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-2E

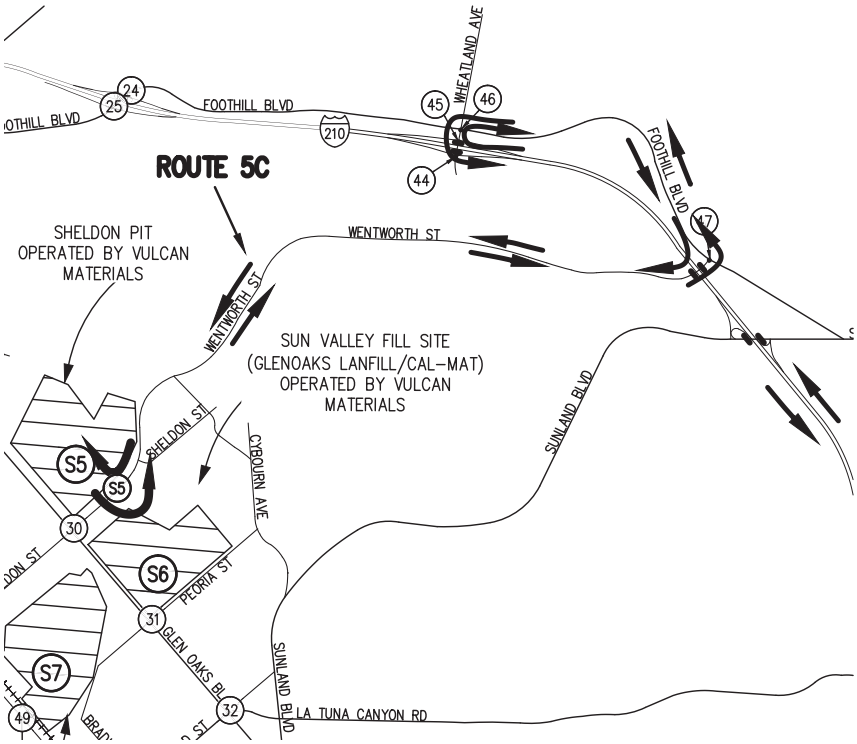
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-2E.dwg
Last Opened: Oct 04, 2013 – 11:14am by: TMunoz

N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-3A

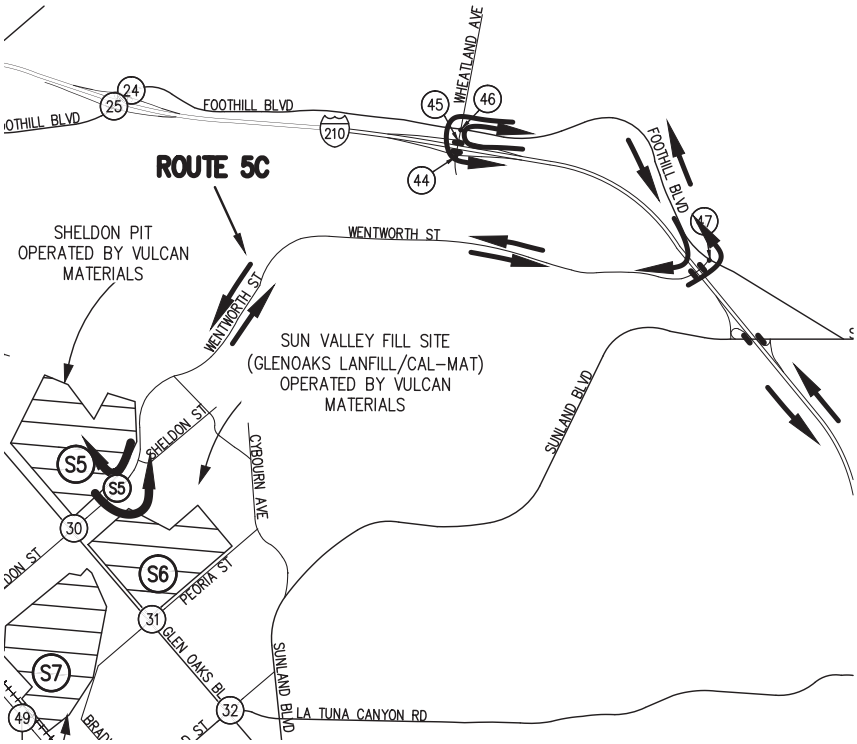
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-3A.dwg
Last Opened: Oct 04, 2013 - 11:14am by: TMunoz

N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0%	0%	33%				
				0%	0%	45%				
				0%	0%	40%				
5%	5%	5%						0%	0%	0%
15%	15%	100%		TS				0%	0%	0%
0%	0%	0%						0%	0%	0%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				5%	35%	0%				
				5%	48%	0%				
				5%	38%	0%				
0%	0%	0%						37%	56%	29%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						50%	5%	5%
				20%	5%	0%				
				5%	10%	0%				
				20%	5%	0%				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				5%	5%	20%				
				5%	5%	5%				
				5%	5%	5%				
30%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						42%	49%	34%
				5%	5%	35%				
				5%	5%	58%				
				5%	5%	33%				

N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
5%	5%	5%		TS				5%	5%	5%
34%	55%	43%						5%	5%	5%
				53%	0%	5%				
				53%	0%	5%				
				35%	0%	5%				



NOT TO SCALE

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 5C TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-3B

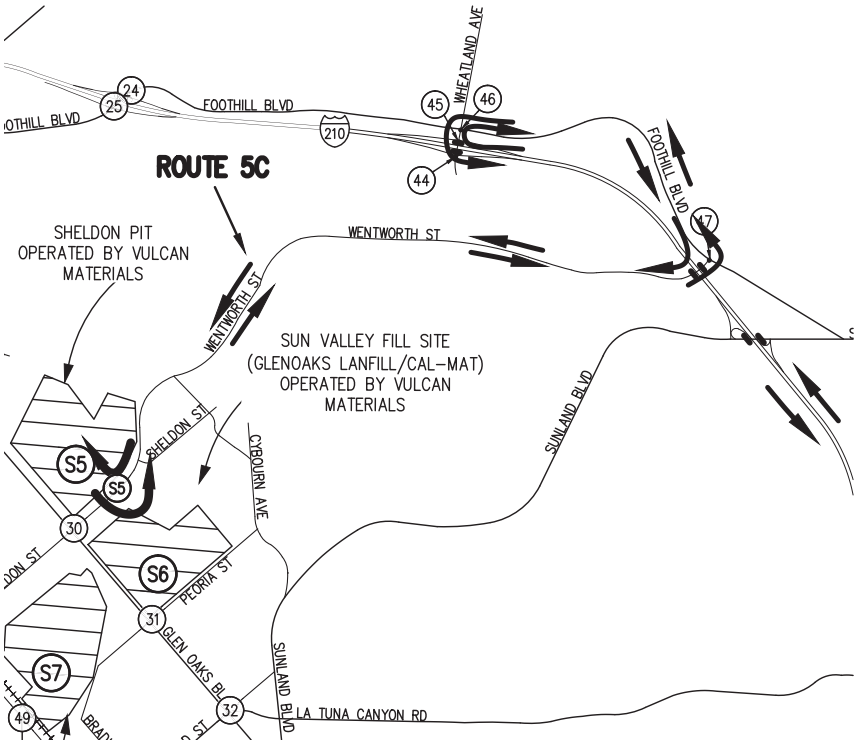
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-3B.dwg
Last Opened: Oct 04, 2013 - 11:14am by: TMunoz

N/S STREET				44		E/W STREET				
WHEATLAND AVE						EB I-210 FWY RAMPS				
				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45		E/W STREET				
WHEATLAND AVE						WB I-210 FWY RAMPS				
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				46		E/W STREET				
WHEATLAND AVE						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET				47		E/W STREET				
WENTWORTH STREET						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				150	0	0				
				150	0	0				
				150	0	0				



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5C
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-3C

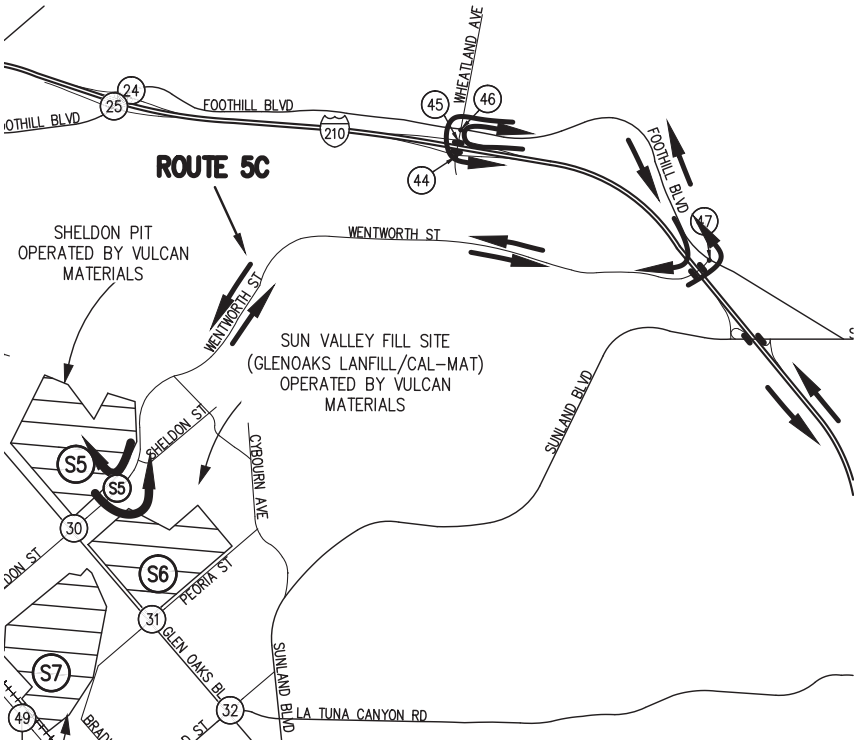
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-3C.dwg
Last Opened: Oct 04, 2013 - 11:14am by: TMunoz

N/S STREET				44		E/W STREET				
WHEATLAND AVE						EB I-210 FWY RAMPS				
				0	0	170				
				0	0	110				
				0	0	135				
105	75	100	⌋	⌉	↑	⌊	⌊	0	0	0
5	5	5	←	TS			←	0	0	0
0	0	0	⌉	⌉	↑	⌊	⌊	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45		E/W STREET				
WHEATLAND AVE						WB I-210 FWY RAMPS				
				65	160	0				
				55	110	0				
				105	130	0				
0	0	0	⌋	⌉	↑	⌊	⌊	150	90	170
0	0	0	←	TS			←	5	5	5
0	0	0	⌉	⌉	↑	⌊	⌊	5	5	5
				5	100	0				
				5	55	0				
				5	95	0				

N/S STREET				46		E/W STREET				
WHEATLAND AVE						FOOTHILL BLVD				
				10	20	20				
				20	25	10				
				10	25	15				
10	15	10	⌋	⌉	↑	⌊	⌊	10	25	20
215	145	185	←	TS			←	240	140	235
100	40	85	⌉	⌉	↑	⌊	⌊	140	125	160
				75	15	175				
				45	30	110				
				100	30	165				

N/S STREET				47		E/W STREET				
WENTWORTH STREET						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	⌋	⌉	↑	⌊	⌊	0	0	0
200	165	200	←	TS			←	175	155	295
165	95	125	⌉	⌉	↑	⌊	⌊	440	215	215
				100	0	225				
				100	0	185				
				160	0	420				



N

NOT TO SCALE

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	⌋	⌉	↑	⌊	⌊	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			⌉	⌉	↑	⌊	⌊			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5C
EXISITNG + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-3D

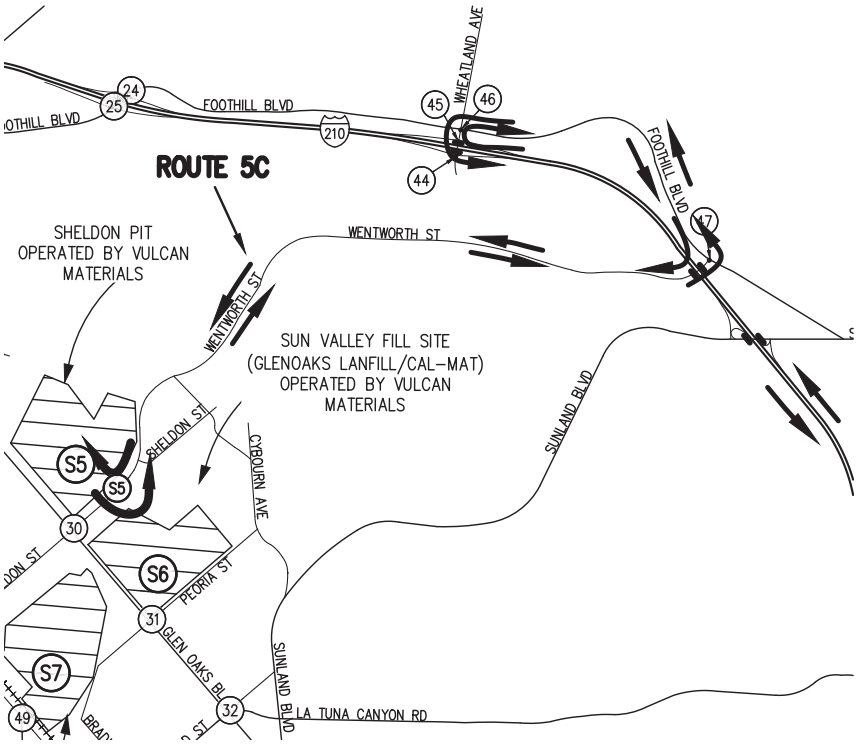
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-3D.dwg
Last Opened: Oct 04, 2013 - 11:14am by: TMunoz

N/S STREET				44		E/W STREET				
WHEATLAND AVE						EB I-210 FWY RAMPS				
				0	0	275				
				0	0	210				
				0	0	240				
115	85	100						0	0	0
10	10	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45		E/W STREET				
WHEATLAND AVE						WB I-210 FWY RAMPS				
				75	265	0				
				60	215	0				
				105	230	0				
0	0	0						260	190	270
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	105	0				
				5	65	0				
				5	100	0				

N/S STREET				46		E/W STREET				
WHEATLAND AVE						FOOTHILL BLVD				
				5	15	20				
				15	20	5				
				5	20	10				
10	10	5						5	20	15
215	150	175		TS				245	145	230
90	40	80						240	230	245
				80	10	265				
				40	25	210				
				90	25	250				

N/S STREET				47		E/W STREET				
WENTWORTH STREET						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
205	175	200		TS				185	165	300
270	200	230						450	225	240
				205	0	240				
				205	0	190				
				265	0	425				



NOT TO SCALE

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5C
PCE EXISITNG + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-3E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-3E.dwg
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Table 4-4-2
Intersection Capacity Analysis – Existing + Project Conditions (Route 5B)
Traffic Impact Analysis - Site 5

Route 5B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	A	7.3	0.45	A	B	11.1	0.75	C	B	13.5	0.85	D
31	Glenoaks Blvd and Peoria Street	B	10.5	0.57	A	A	9.3	0.39	A	B	15.5	0.54	A
32	Glenoaks Blvd and Tuxford Street	B	12.9	0.81	D	A	7.5	0.46	A	A	9.1	0.57	C
33	Glenoaks Blvd and Penrose Street	A	6.4	0.55	A	A	5.9	0.36	A	A	9.5	0.67	B
34	Glenoaks Blvd and Sunland Blvd	C	20.5	0.83	B	B	15.4	0.63	B	C	24.6	0.86	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.8	0.42	A	A	7.1	0.42	A	B	10.3	0.61	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.8	-	-	B	11.7	-	-	C	22.0	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 4-4-3
Intersection Capacity Analysis – Existing + Project Conditions (Route 5C)
Traffic Impact Analysis - Site 5

Route 5C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	10.7	-	-	A	9.0	-	-	A	9.1	-	-
46	Wheatland Ave and Foothill Blvd	B	10.6	0.42	A	B	10.3	0.36	A	B	10.5	0.43	A
47	Wentworth Street and Foothill Blvd	B	19.4	0.78	A	B	12.4	0.40	A	A	9.2	0.43	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 5B & 5C Analysis

As presented in *Table 4-4-2* and *Table 4-4-3*, under existing plus project conditions for Site 5 (Route 5B-5C) all intersections are expected to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hour. Since all intersections operate with an acceptable HCM LOS mitigation is not required under existing plus project conditions.

Haul Route 6A

The Haul Route 6A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-4A* through *Figure 4-4-4C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-4D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-4E.*

N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

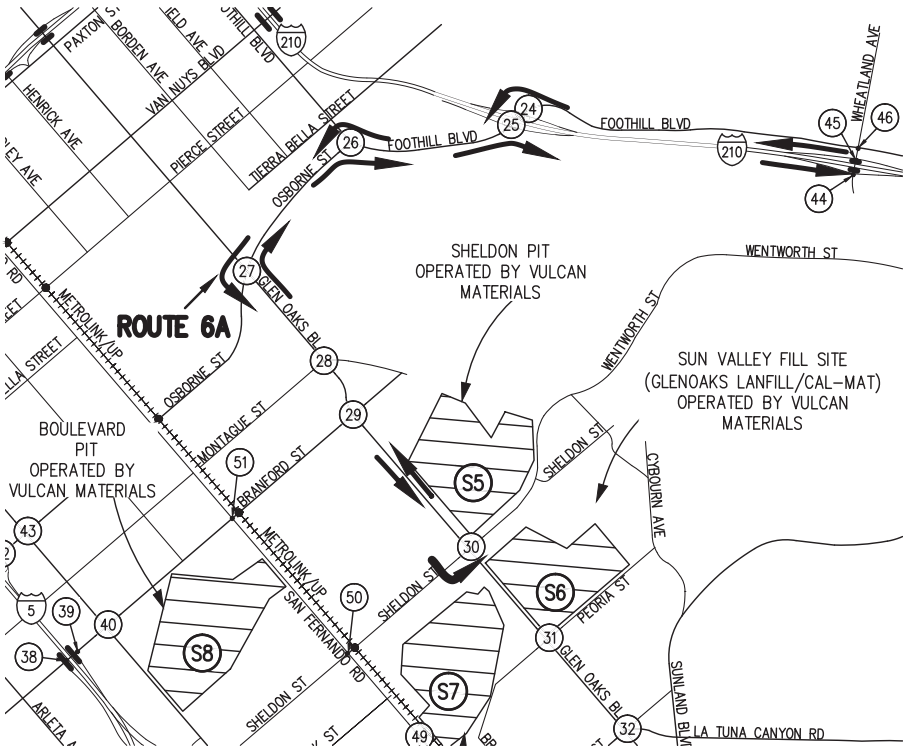
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 6A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-4A

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Last Opened: Oct 04, 2013 - 11:25am by: TMunoz

N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				5%	5%	0%				
				5%	5%	0%				
				5%	5%	0%				
0%	0%	0%						5%	10%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						5%	10%	5%
				5%	5%	0%				
				5%	5%	0%				
				5%	5%	0%				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0%	5%	5%				
				0%	5%	5%				
				0%	5%	5%				
5%	5%	5%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
5%	20%	5%						0%	0%	0%
				0%	5%	5%				
				0%	5%	10%				
				0%	5%	5%				

N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	5%	5%
5%	10%	5%		TS				5%	10%	5%
5%	5%	5%						5%	15%	5%
				5%	5%	5%				
				10%	5%	10%				
				5%	5%	5%				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				10%	5%	20%				
				5%	10%	5%				
				5%	10%	5%				
5%	5%	5%						15%	10%	5%
5%	10%	5%		TS				5%	5%	5%
20%	10%	15%						10%	10%	10%
				45%	15%	20%				
				10%	10%	20%				
				5%	5%	5%				

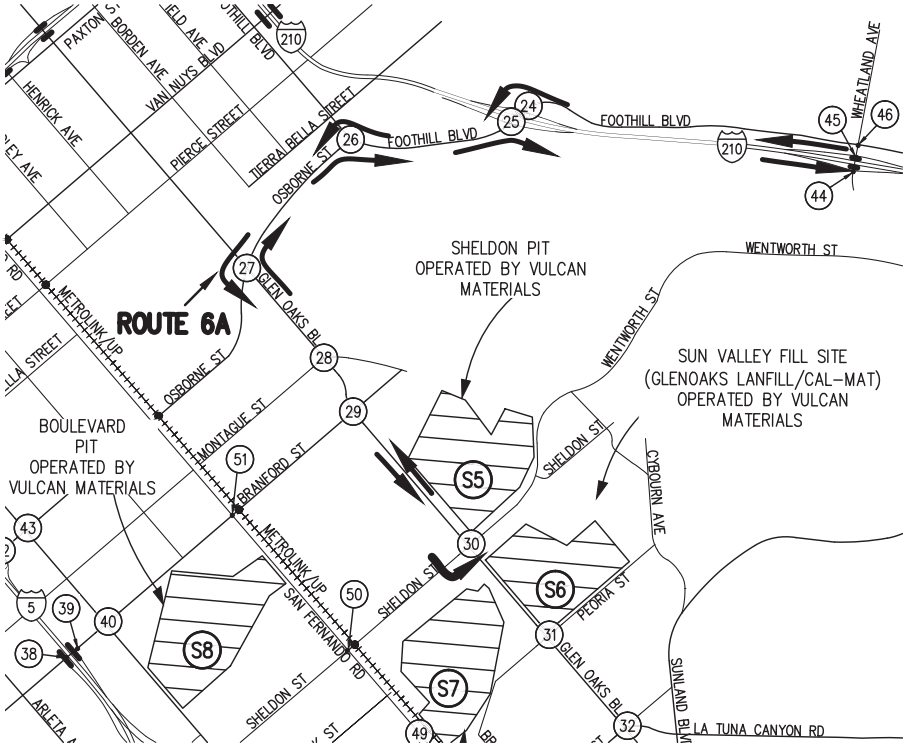
N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				15%	10%	5%				
				15%	10%	5%				
				15%	5%	5%				
30%	30%	10%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
20%	20%	5%						5%	5%	5%
				5%	10%	15%				
				5%	10%	15%				
				25%	5%	5%				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				5%	5%	45%				
				5%	5%	15%				
				15%	10%	5%				
5%	5%	5%						35%	5%	5%
10%	5%	5%		TS				50%	5%	5%
10%	5%	5%						40%	10%	10%
				5%	10%	50%				
				10%	10%	10%				
				5%	5%	5%				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6A TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-4B

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N/S STREET	24	E/W STREET
FOOTHILL BLVD		WB I-210 FWY RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	⌋	⌉	↑	⌊	⌈	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	⌉	⌉	↑	⌊	⌈	150	150	150
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	25	E/W STREET
FOOTHILL BLVD		EB I-210 FWY RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	⌋	⌉	↑	⌊	⌈	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	⌉	⌉	↑	⌊	⌈	0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	26	E/W STREET
OSBORNE STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	⌋	⌉	↑	⌊	⌈	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	⌉	⌉	↑	⌊	⌈	150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	27	E/W STREET
GLEN OAKS BLVD		OSBORNE STREET

				0	0	0				
				0	0	0				
				0	0	0				
150	150	150	⌋	⌉	↑	⌊	⌈	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	⌉	⌉	↑	⌊	⌈	0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	28	E/W STREET
GLEN OAKS BLVD		MONTAGUE STREET

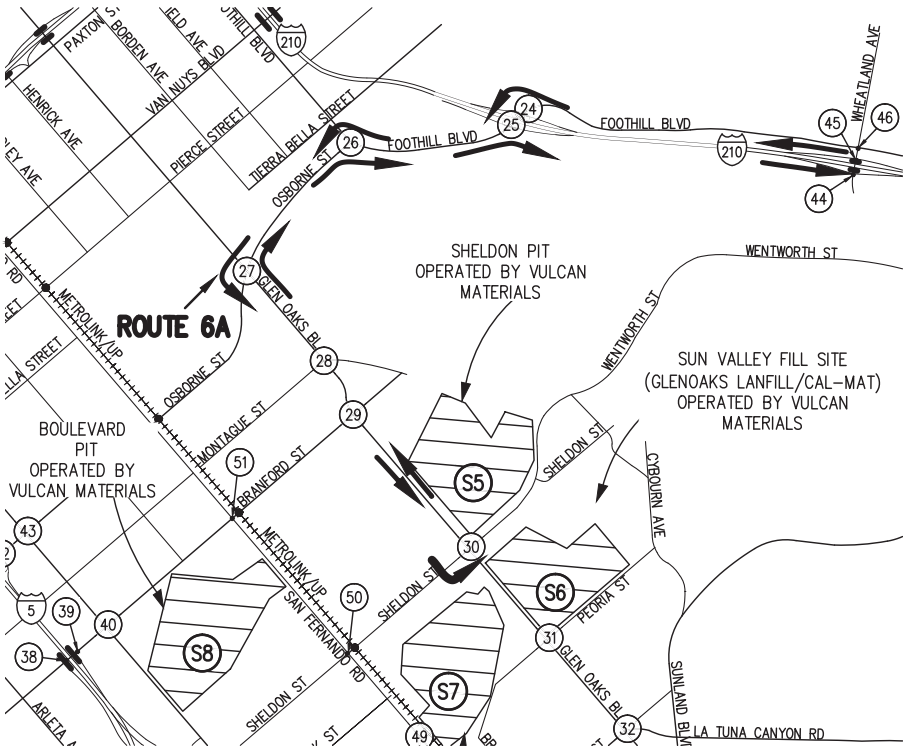
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0	⌋	⌉	↑	⌊	⌈	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	⌉	⌉	↑	⌊	⌈	0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	29	E/W STREET
GLEN OAKS BLVD		BRANFORD STREET

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0	⌋	⌉	↑	⌊	⌈	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	⌉	⌉	↑	⌊	⌈	0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				0	0	150				
				0	0	150				
				0	0	150				
0	0	0	⌋	⌉	↑	⌊	⌈	150	150	150
0	0	0	←	TS			←	0	0	0
0	0	0	⌉	⌉	↑	⌊	⌈	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	⌋	⌉	↑	⌊	⌈	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			⌉	⌉	↑	⌊	⌈			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 6A PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-4C

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N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				490	390	0				
				205	255	0				
				225	260	0				
0	0	0	↳	↰	↑	↱	↳	60	35	65
0	0	0	←	TS			←	0	0	0
0	0	0	↲	↰	↑	↱	↲	220	165	305
				130	570	0				
				105	445	0				
				210	510	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	355	195				
				0	305	75				
				0	460	55				
355	260	335	↳	↰	↑	↱	↳	0	0	0
0	0	0	←	TS			←	0	0	0
100	40	80	↲	↰	↑	↱	↲	0	0	0
				0	350	340				
				0	265	210				
				0	390	290				

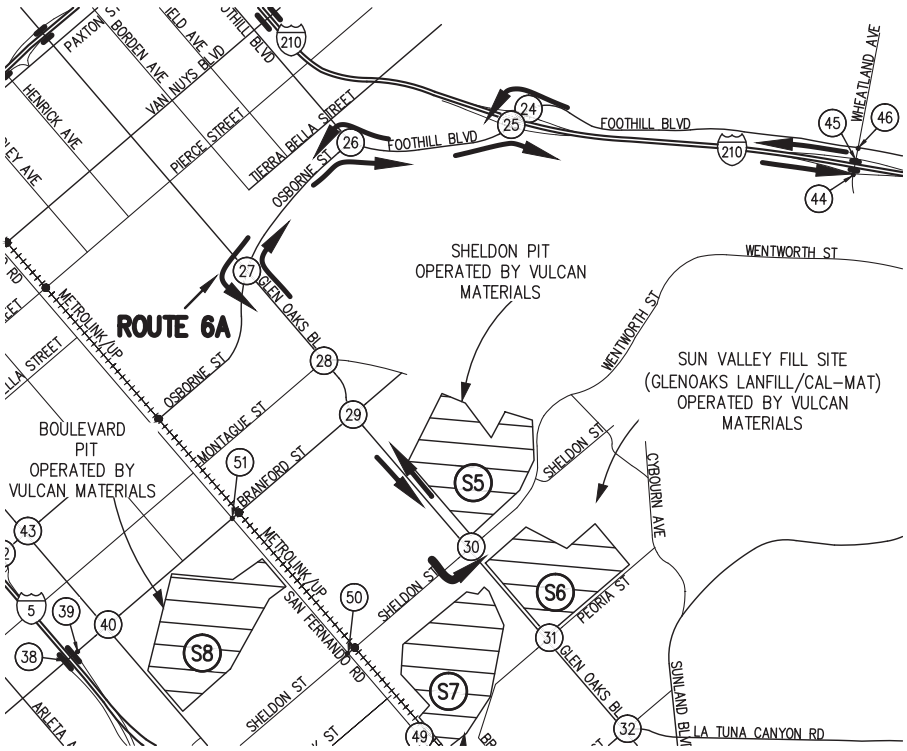
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				5	5	5				
				15	5	5				
				15	5	5				
5	20	15	↳	↰	↑	↱	↳	5	5	5
320	225	315	←	TS			←	245	200	305
520	25	265	↲	↰	↑	↱	↲	310	215	255
				335	10	300				
				230	5	260				
				680	5	445				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				170	1070	45				
				130	425	80				
				205	575	135				
350	220	290	↳	↰	↑	↱	↳	70	70	100
535	425	690	←	TS			←	630	500	535
70	90	90	↲	↰	↑	↱	↲	425	175	255
				50	520	185				
				80	635	200				
				120	875	390				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				55	1625	15				
				35	575	35				
				25	905	15				
10	40	55	↳	↰	↑	↱	↳	10	30	30
5	5	5	←	TS			←	5	5	5
30	45	60	↲	↰	↑	↱	↲	5	35	10
				55	690	5				
				60	610	15				
				50	1230	15				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				175	1410	15				
				80	570	70				
				80	790	115				
130	150	220	↳	↰	↑	↱	↳	10	85	100
15	85	110	←	TS			←	5	90	190
95	90	155	↲	↰	↑	↱	↲	10	70	90
				95	645	10				
				90	615	70				
				115	995	105				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				160	1235	135				
				95	490	100				
				145	730	140				
115	130	300	↳	↰	↑	↱	↳	90	100	110
405	240	325	←	TS			←	595	285	325
45	80	65	↲	↰	↑	↱	↲	90	45	40
				80	480	45				
				80	535	50				
				120	820	70				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↳	↰	↑	↱	↳	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↲	↰	↑	↱	↲			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 6A
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-4D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-4D.dwg
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N/S STREET				24			E/W STREET		
FOOTHILL BLVD							WB I-210 FWY RAMPS		
				505	410	0			
				215	290	0			
				230	275	0			
0	0	0					60	40	65
0	0	0		TS			0	0	0
0	0	0					325	290	430
				140	595	0			
				110	480	0			
				220	530	0			

N/S STREET				25			E/W STREET		
FOOTHILL BLVD							EB I-210 FWY RAMPS		
				0	385	200			
				0	335	75			
				0	475	55			
365	270	345					0	0	0
0	0	0		TS			0	0	0
115	55	90					0	0	0
				0	380	465			
				0	295	340			
				0	415	400			

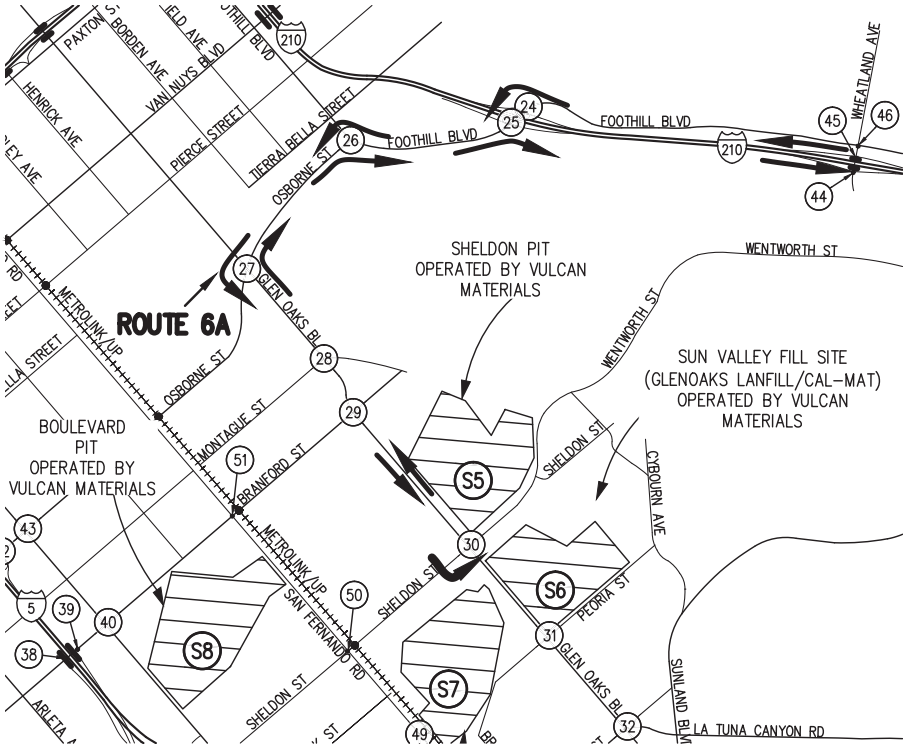
N/S STREET				26			E/W STREET		
OSBORNE STREET							FOOTHILL BLVD		
				5	5	5			
				15	5	5			
				15	5	5			
5	20	15					5	5	5
350	265	330		TS			250	235	345
560	25	295					425	360	375
				355	10	415			
				265	5	400			
				735	5	570			

N/S STREET				27			E/W STREET		
GLEN OAKS BLVD							OSBORNE STREET		
				200	1215	65			
				140	520	80			
				205	575	135			
465	340	390					90	80	100
600	490	690		TS			695	545	535
95	105	90					490	210	255
				90	655	340			
				100	735	365			
				120	875	490			

N/S STREET				28			E/W STREET		
GLEN OAKS BLVD							MONTAGUE STREET		
				70	1785	20			
				50	765	40			
				30	1110	20			
45	65	65					10	30	30
5	5	5		TS			5	5	5
50	65	65					5	40	10
				65	890	10			
				65	815	15			
				70	1395	15			

N/S STREET				29			E/W STREET		
GLEN OAKS BLVD							BRANFORD STREET		
				195	1605	25			
				80	750	90			
				105	1000	120			
130	155	225					15	95	105
15	85	110		TS			5	90	195
115	100	170					20	85	105
				105	865	25			
				105	820	80			
				125	1160	110			

N/S STREET				30			E/W STREET		
GLEN OAKS BLVD							SHELDON STREET		
				200	1355	285			
				125	555	210			
				155	785	250			
130	150	330					200	210	215
430	370	335		TS			660	370	350
50	120	75					105	50	50
				100	520	50			
				110	605	70			
				140	905	80			



LEGEND

N/S STREET				S#			E/W STREET		
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

S# – DISPOSAL SITE

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ROUTE 6A
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-4E

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Table 4-4-4
Intersection Capacity Analysis – Existing + Project Conditions (Route 6A)
Traffic Impact Analysis - Site 6

Route 6A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	8.4	0.57	A	A	5.6	0.29	A	A	8.0	0.50	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.9	0.63	A	A	6.5	0.31	A	A	7.2	0.41	A
26	Foothill Blvd and Osborne Street	D	37.9	1.16	C	A	9.2	0.57	A	B	19.3	0.91	C
27	Glenoaks Blvd and Osborne Street	F	82.9	1.13	E	C	32.7	0.78	B	D	44.9	0.90	D
28	Glenoaks Blvd and Montague Street	A	9.1	0.72	B	B	13.0	0.38	A	A	9.5	0.58	B
29	Glenoaks Blvd and Branford Street	B	15.1	0.81	C	B	18.4	0.57	A	C	23.6	0.80	D
30	Glenoaks Blvd and Sheldon Street	B	12.4	0.78	D	A	7.4	0.49	A	B	16.8	0.95	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 6A Analysis

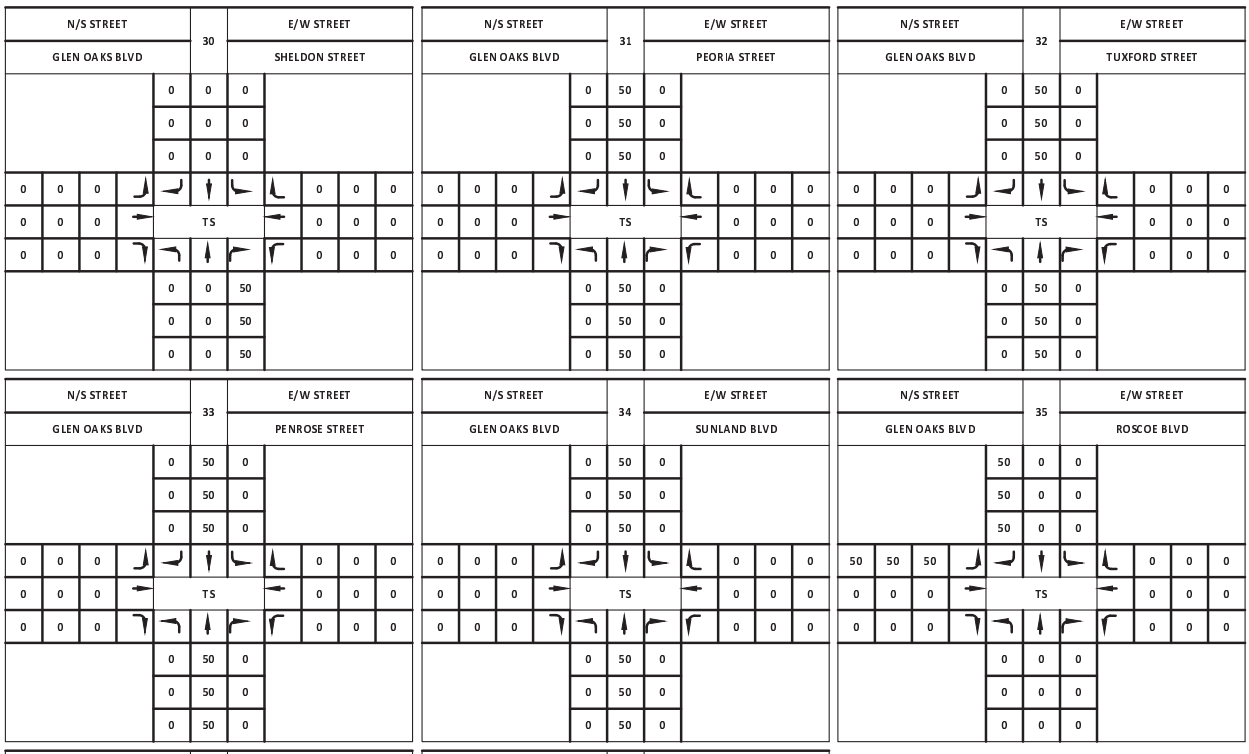
As presented in *Table 4-4-4*, under the existing plus project conditions for Site 6 (Route 6A) most study intersections are expected to operate at an acceptable HCM LOS D or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street will continue to operate at HCM LOS F during the AM peak period. As identified under existing conditions, mitigation of the intersection of Glenoaks Blvd and Osborne Street is recommended to improve the intersection to an acceptable level-of-service.

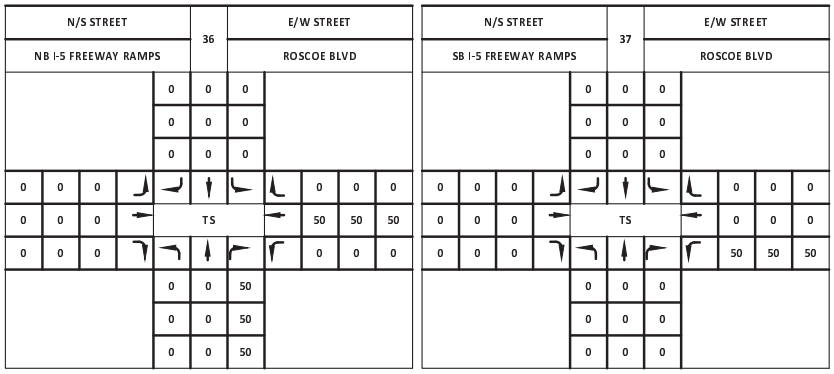
Haul Route 6B

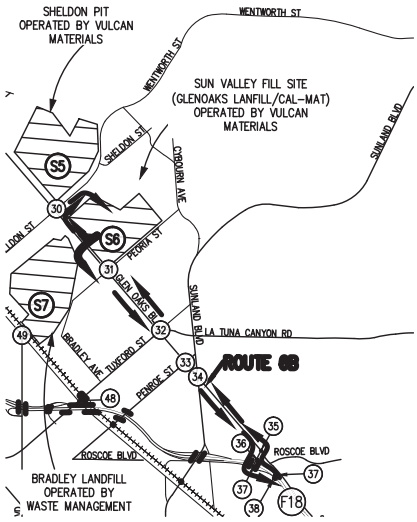
The Haul Route 6B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-5A* through *Figure 4-4-5C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-5D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-5E.*

Haul Route 6C

The Haul Route 6C project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-6A* through *Figure 4-4-6C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-6D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-6E.*







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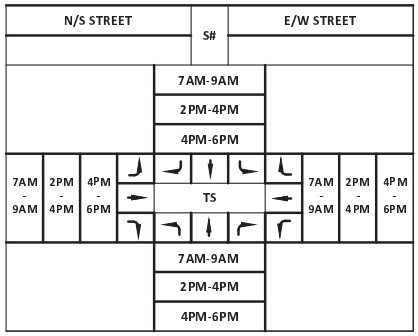

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ROUTE 6B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-5A

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N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				10%	5%	30%			
				15%	5%	5%			
				5%	5%	5%			
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%			
				20%	5%	25%			
				10%	5%	10%			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				20%	5%	45%			
				45%	15%	40%			
				45%	5%	50%			
40%	40%	20%						20%	5%	20%
80%	60%	40%		TS				20%	20%	5%
40%	45%	45%						20%	30%	55%
				45%	10%	65%			
				15%	15%	45%			
				45%	5%	50%			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				40%	9%	5%			
				45%	25%	10%			
				10%	12%	5%			
25%	45%	25%						10%	10%	5%
5%	5%	5%		TS				5%	5%	5%
15%	15%	10%						5%	5%	5%
				15%	20%	20%			
				15%	19%	5%			
				10%	15%	5%			

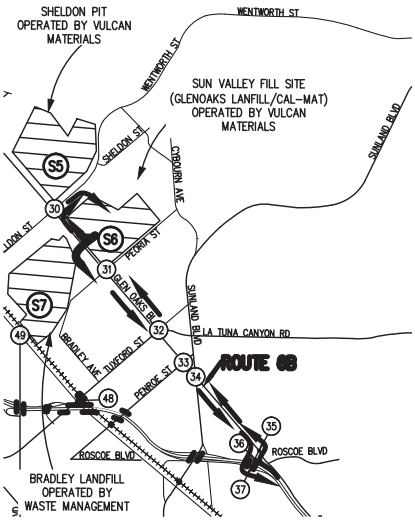
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				5%	10%	15%			
				10%	19%	10%			
				5%	18%	0%			
5%	10%	5%						10%	5%	5%
5%	5%	5%		TS				5%	5%	10%
25%	5%	10%						0%	10%	5%
				0%	21%	0%			
				0%	14%	5%			
				0%	16%	0%			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				5%	12%	35%			
				15%	23%	5%			
				10%	13%	10%			
15%	5%	10%						5%	0%	0%
5%	5%	5%		TS				5%	5%	5%
0%	5%	0%						5%	5%	5%
				35%	23%	5%			
				10%	21%	5%			
				0%	12%	5%			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				15%	5%	0%			
				18%	10%	0%			
				15%	5%	0%			
26%	21%	13%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
10%	20%	10%						0%	0%	0%
				10%	5%	0%			
				10%	5%	0%			
				10%	5%	0%			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0%	0%	0%			
				0%	0%	0%			
				0%	0%	0%			
0%	0%	0%						0%	0%	0%
10%	10%	15%		TS				14%	16%	14%
0%	0%	0%						0%	0%	0%
				15%	0%	23%			
				20%	0%	22%			
				20%	0%	13%			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0%	5%	5%			
				0%	0%	0%			
				0%	0%	0%			
0%	0%	0%						15%	5%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						13%	18%	16%
				0%	0%	0%			
				0%	0%	0%			
				0%	0%	0%			



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LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

S# – DISPOSAL SITE

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ROUTE 6B TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-5B

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N/S STREET				30		E/W STREET				
GLEN OAKS BLVD						SHELDON STREET				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET				31		E/W STREET				
GLEN OAKS BLVD						PEORIA STREET				
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				32		E/W STREET				
GLEN OAKS BLVD						TUXFORD STREET				
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

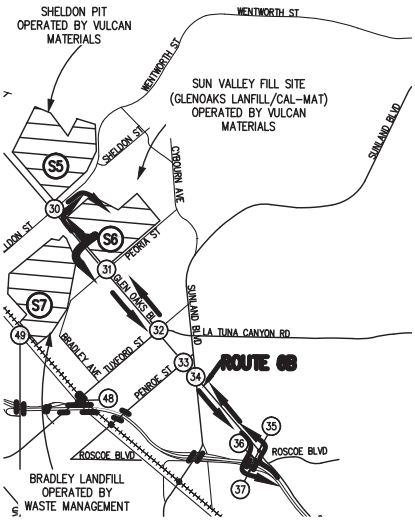
N/S STREET				33		E/W STREET				
GLEN OAKS BLVD						PENROSE STREET				
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				34		E/W STREET				
GLEN OAKS BLVD						SUNLAND BLVD				
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET				35		E/W STREET				
GLEN OAKS BLVD						ROSCOE BLVD				
				150	0	0				
				150	0	0				
				150	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				36		E/W STREET				
NB I-5 FREEWAY RAMPS						ROSCOE BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				150	150	150
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET				37		E/W STREET				
SB I-5 FREEWAY RAMPS						ROSCOE BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	0				
				0	0	0				
				0	0	0				



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N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 6B PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-5C

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N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				160	1235	85			
				95	490	50			
				145	730	90			
115	130	300						40	50	60
405	240	325		TS				595	285	325
45	80	65						90	45	40
				80	480	95			
				80	535	100			
				120	820	50			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				40	1300	30			
				15	580	10			
				15	795	35			
15	25	40						10	15	55
5	5	10		TS				5	5	5
5	30	20						15	20	30
				15	575	25			
				25	575	15			
				25	1025	25			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				125	1065	90			
				100	405	90			
				90	640	130			
115	110	140						75	45	80
470	390	505		TS				565	425	345
45	60	95						30	25	60
				95	445	20			
				110	485	30			
				120	850	60			

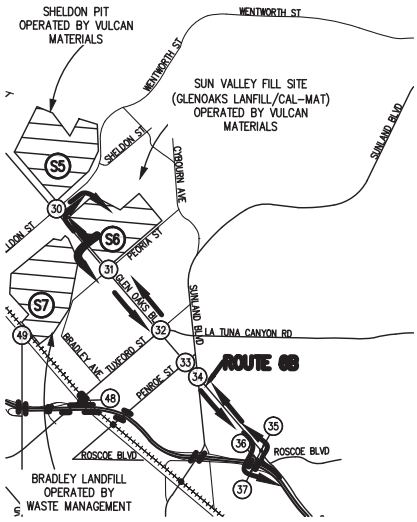
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				95	970	35			
				35	490	25			
				110	570	45			
120	90	185						35	35	75
125	130	200		TS				70	85	140
20	50	55						5	20	45
				25	415	5			
				45	515	25			
				75	750	40			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				205	690	10			
				170	355	35			
				50	560	50			
70	165	165						20	15	5
670	430	650		TS				750	355	395
30	20	55						205	320	360
				10	360	80			
				25	400	245			
				20	690	385			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				470	520	0			
				355	355	0			
				470	530	0			
225	290	595						0	0	0
0	0	0		TS				0	0	0
75	90	120						0	0	0
				70	275	0			
				75	370	0			
				65	540	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
90	120	110		TS				540	425	540
0	0	0						0	0	0
				70	0	265			
				60	0	285			
				65	0	615			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	35	90			
				0	40	120			
				0	30	110			
0	0	0						25	45	100
0	0	0		TS				0	0	0
0	0	0						615	380	425
				0	0	0			
				0	0	0			
				0	0	0			



N

NOT TO SCALE

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 6B EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-5D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-5D.dwg
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N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				200	1355	135			
				125	555	60			
				155	785	100			
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						105	50	50
				100	520	200			
				110	605	220			
				140	905	230			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				55	1535	55			
				30	855	20			
				30	980	65			
25	45	55						15	15	75
10	10	20		TS				10	5	5
5	60	40						20	30	65
				30	760	60			
				35	810	30			
				45	1260	50			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				220	1270	100			
				195	605	105			
				105	795	145			
175	200	210						90	55	90
510	445	540		TS				615	450	375
55	80	120						30	30	60
				120	620	30			
				140	680	30			
				145	1095	65			

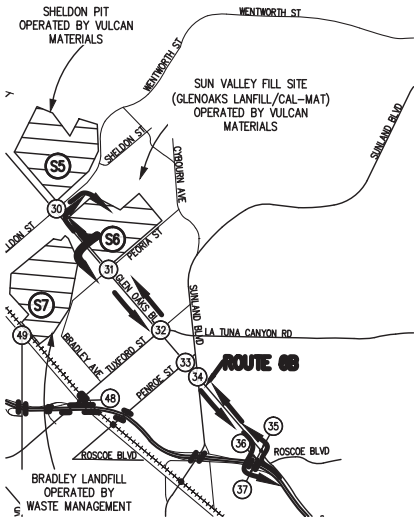
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				100	1160	45			
				40	660	30			
				115	795	45			
135	110	210						45	40	85
130	135	215		TS				75	90	160
30	55	65						5	25	50
				25	585	5			
				45	675	25			
				75	960	40			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				235	855	20			
				230	520	40			
				60	695	60			
85	190	200						25	15	5
720	470	670		TS				790	400	405
30	20	55						220	340	370
				20	510	85			
				25	555	260			
				20	865	415			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				585	560	0			
				490	415	0			
				585	575	0			
340	400	705						0	0	0
0	0	0		TS				0	0	0
90	125	145						0	0	0
				85	305	0			
				95	410	0			
				80	580	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
100	140	135		TS				660	550	655
0	0	0						0	0	0
				90	0	380			
				85	0	395			
				90	0	725			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	40	100			
				0	40	120			
				0	30	110			
0	0	0						35	50	100
0	0	0		TS				0	0	0
0	0	0						735	505	550
				0	0	0			
				0	0	0			
				0	0	0			



N

NOT TO SCALE

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-5E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-5E.dwg
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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

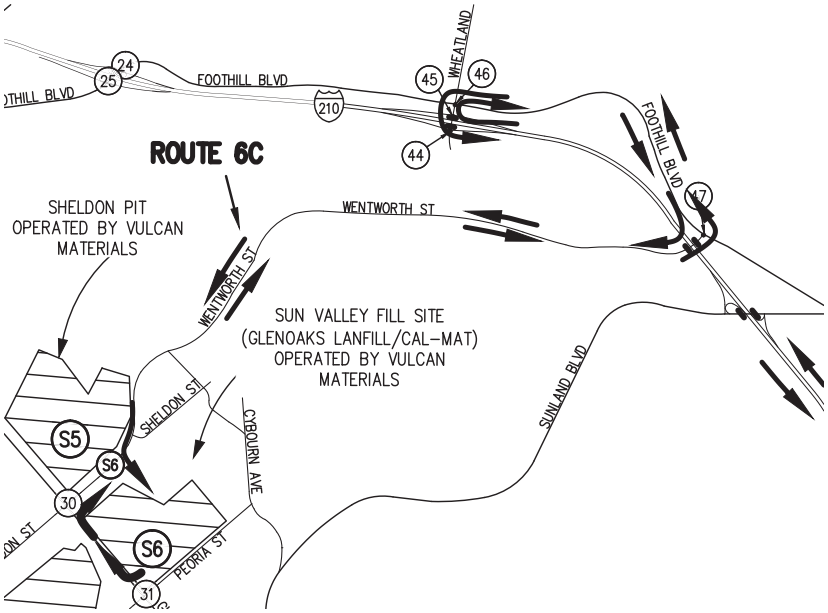
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 6C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-6A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-6A.dwg
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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0%	0%	33%				
				0%	0%	45%				
				0%	0%	40%				
5%	5%	5%						0%	0%	0%
15%	15%	100%		TS				0%	0%	0%
0%	0%	0%						0%	0%	0%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				5%	35%	0%				
				5%	48%	0%				
				5%	38%	0%				
0%	0%	0%						37%	56%	29%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						50%	5%	5%
				20%	5%	0%				
				5%	10%	0%				
				20%	5%	0%				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				5%	5%	20%				
				5%	5%	5%				
				5%	5%	5%				
30%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						42%	49%	34%
				5%	5%	35%				
				5%	5%	58%				
				5%	5%	33%				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

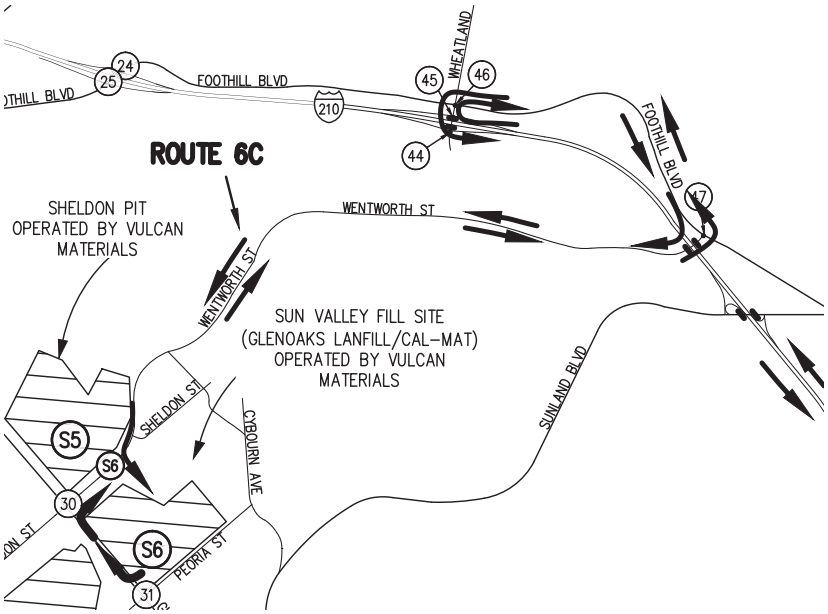
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
5%	5%	5%		TS				5%	5%	5%
34%	55%	43%						5%	5%	5%
				53%	0%	5%				
				53%	0%	5%				
				35%	0%	5%				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 6C TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-6B

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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

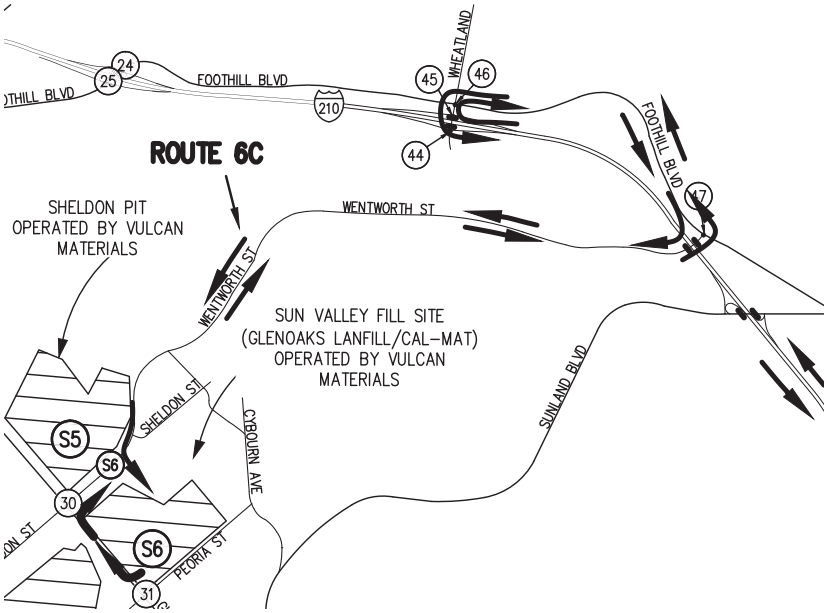
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				150	0	0				
				150	0	0				
				150	0	0				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 6C
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-6C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-6C.dwg
Last Opened: Oct 04, 2013 - 11:51am by: TMunoz

N/S STREET				44		E/W STREET				
WHEATLAND AVE						EB I-210 FWY RAMPS				
				0	0	170				
				0	0	110				
				0	0	135				
105	75	100						0	0	0
5	5	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45		E/W STREET				
WHEATLAND AVE						WB I-210 FWY RAMPS				
				65	160	0				
				55	110	0				
				105	130	0				
0	0	0						150	90	170
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	100	0				
				5	55	0				
				5	95	0				

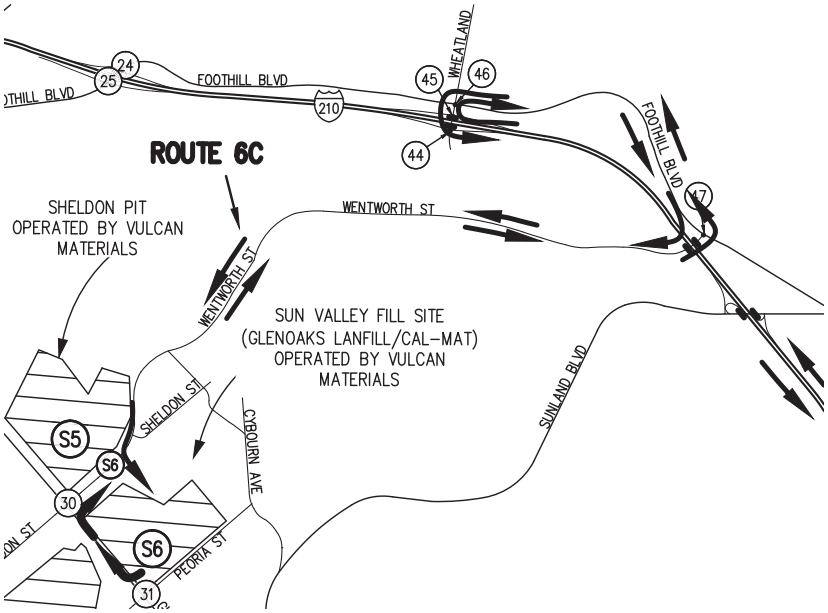
N/S STREET				46		E/W STREET				
WHEATLAND AVE						FOOTHILL BLVD				
				5	15	15				
				15	20	5				
				5	20	10				
5	10	5						5	20	15
195	135	170		TS				220	130	215
90	35	80						130	115	145
				70	10	160				
				40	25	100				
				90	25	150				

N/S STREET				47		E/W STREET				
WENTWORTH STREET						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
200	165	200		TS				175	155	295
165	95	125						440	215	215
				100	0	225				
				100	0	185				
				160	0	420				

N/S STREET				30		E/W STREET				
GLEN OAKS BLVD						SHELDON STREET				
				160	1235	85				
				95	490	50				
				145	730	90				
115	130	300						40	50	60
405	240	325		TS				595	285	325
45	80	65						90	45	40
				80	480	95				
				80	535	100				
				120	820	120				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 6C
EXISITNG + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-6D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-6D.dwg
Last Opened: Oct 04, 2013 - 11:51am by: TMunoz

N/S STREET				44		E/W STREET				
WHEATLAND AVE						EB I-210 FWY RAMPS				
				0	0	275				
				0	0	210				
				0	0	240				
115	85	100						0	0	0
10	10	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45		E/W STREET				
WHEATLAND AVE						WB I-210 FWY RAMPS				
				75	265	0				
				60	215	0				
				105	230	0				
0	0	0						260	190	270
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	105	0				
				5	65	0				
				5	100	0				

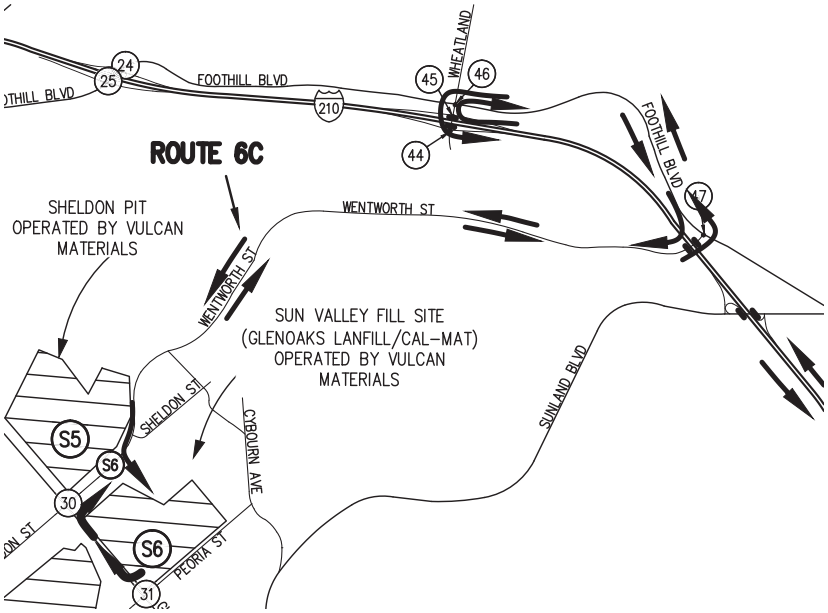
N/S STREET				46		E/W STREET				
WHEATLAND AVE						FOOTHILL BLVD				
				5	15	20				
				15	20	5				
				5	20	10				
10	10	5						5	20	15
215	150	175		TS				245	145	230
90	40	80						240	230	245
				80	10	265				
				40	25	210				
				90	25	250				

N/S STREET				47		E/W STREET				
WENTWORTH STREET						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
205	175	200		TS				185	165	300
270	200	230						450	225	240
				205	0	240				
				205	0	190				
				265	0	425				

N/S STREET				30		E/W STREET				
GLEN OAKS BLVD						SHELDON STREET				
				200	1355	135				
				125	555	60				
				155	785	100				
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						105	50	50
				100	520	200				
				110	605	220				
				140	905	230				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 6C
PCE EXISITNG + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-6E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-6E.dwg
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Table 4-4-5
Intersection Capacity Analysis – Existing + Project Conditions (Route 6B)
Traffic Impact Analysis - Site 6

Route 6B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.1	0.75	D	A	7.2	0.44	A	B	11.1	0.75	C
31	Glenoaks Blvd and Peoria Street	B	10.5	0.57	A	A	9.3	0.39	A	B	15.5	0.54	A
32	Glenoaks Blvd and Tuxford Street	B	12.9	0.81	D	A	7.5	0.46	A	A	9.1	0.57	C
33	Glenoaks Blvd and Penrose Street	A	6.4	0.55	A	A	5.9	0.36	A	A	9.5	0.67	B
34	Glenoaks Blvd and Sunland Blvd	C	20.5	0.83	B	B	15.4	0.63	B	C	24.6	0.86	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.8	0.42	A	A	7.1	0.42	A	B	10.3	0.61	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.8	-	-	B	11.7	-	-	C	22.0	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 4-4-6
Intersection Capacity Analysis – Existing + Project Conditions (Route 6C)
Traffic Impact Analysis - Site 6

Route 6C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.1	0.75	D	A	7.2	0.44	A	B	11.1	0.75	C
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	10.7	-	-	A	9	-	-	A	9.1	-	-
46	Wheatland Ave and Foothill Blvd	B	10.6	0.42	A	B	10.3	0.36	A	B	10.5	0.43	A
47	Wentworth Street and Foothill Blvd	B	19.4	0.78	A	B	12.4	0.4	A	A	9.2	0.43	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 6B & 6C Analysis

As presented in *Tables 4-4-5 & 4-4-6* , under the existing plus project conditions for Site 6 (Routes 6B & 6C) all intersections are expected to continue to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours.

Haul Route 7A

The Haul Route 7A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-7A* through *Figure 4-4-7C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-7D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-7E.*

N/S STREET	24	E/W STREET
FOOTHILL BLVD		WB I-210 FWY RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	25	E/W STREET
FOOTHILL BLVD		EB I-210 FWY RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	26	E/W STREET
OSBORNE STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	27	E/W STREET
GLEN OAKS BLVD		OSBORNE STREET

				0	0	0				
				0	0	0				
				0	0	0				
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	28	E/W STREET
GLEN OAKS BLVD		MONTAGUE STREET

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	29	E/W STREET
GLEN OAKS BLVD		BRANFORD STREET

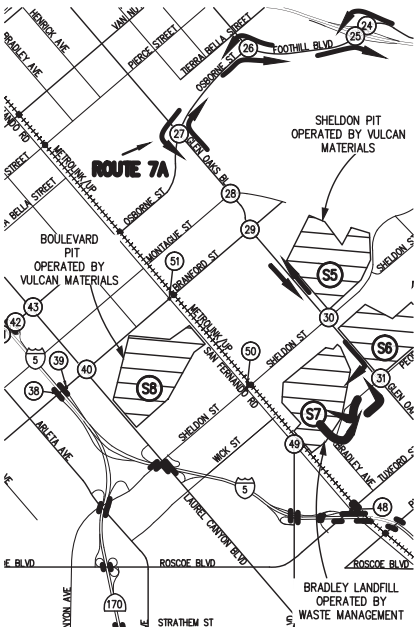
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				50	0	0				
				50	0	0				
				50	0	0				
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				



NOT TO SCALE

LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 7A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-7A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-7A.dwg
Last Opened: Oct 04, 2013 - 11:53am by: TMunoz

N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				5%	5%	0%				
				5%	5%	0%				
				5%	5%	0%				
0%	0%	0%	↱	↰	↑	↳	↲	5%	10%	5%
0%	0%	0%	←	TS			←	0%	0%	0%
0%	0%	0%	↰	↰	↑	↱	↱	5%	10%	5%
				5%	5%	0%				
				5%	5%	0%				
				5%	5%	0%				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0%	5%	5%				
				0%	5%	5%				
				0%	5%	5%				
5%	5%	5%	↱	↰	↑	↳	↲	0%	0%	0%
0%	0%	0%	←	TS			←	0%	0%	0%
5%	20%	5%	↰	↰	↑	↱	↱	0%	0%	0%
				0%	5%	5%				
				0%	5%	10%				
				0%	5%	5%				

N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
5%	5%	5%	↱	↰	↑	↳	↲	5%	5%	5%
5%	10%	5%	←	TS			←	5%	10%	5%
5%	5%	5%	↰	↰	↑	↱	↱	5%	15%	5%
				5%	5%	5%				
				10%	5%	10%				
				5%	5%	5%				

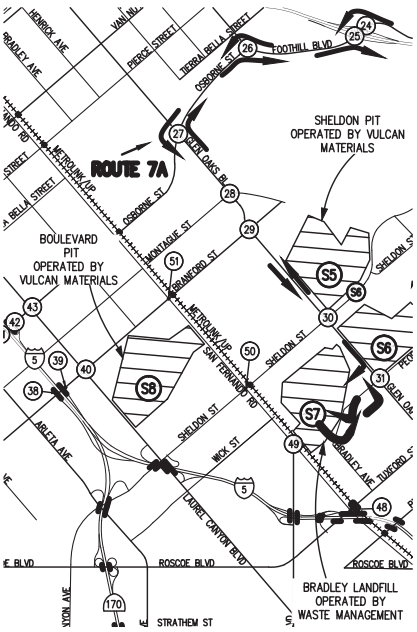
N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				10%	5%	20%				
				5%	10%	5%				
				5%	10%	5%				
5%	5%	5%	↱	↰	↑	↳	↲	15%	10%	5%
5%	10%	5%	←	TS			←	5%	5%	5%
20%	10%	15%	↰	↰	↑	↱	↱	10%	10%	10%
				45%	15%	20%				
				10%	10%	20%				
				5%	5%	5%				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				15%	10%	5%				
				15%	10%	5%				
				15%	5%	5%				
30%	30%	10%	↱	↰	↑	↳	↲	5%	5%	5%
5%	5%	5%	←	TS			←	5%	5%	5%
20%	20%	5%	↰	↰	↑	↱	↱	5%	5%	5%
				5%	10%	15%				
				5%	10%	15%				
				25%	5%	5%				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				5%	5%	45%				
				5%	5%	15%				
				15%	10%	5%				
5%	5%	5%	↱	↰	↑	↳	↲	35%	5%	5%
10%	5%	5%	←	TS			←	50%	5%	5%
10%	5%	5%	↰	↰	↑	↱	↱	40%	10%	10%
				5%	10%	50%				
				10%	10%	10%				
				5%	5%	5%				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%	↱	↰	↑	↳	↲	5%	10%	5%
5%	25%	5%	←	TS			←	5%	15%	5%
5%	25%	5%	↰	↰	↑	↱	↱	5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				20%	5%	45%				
				45%	15%	40%				
				45%	5%	50%				
40%	40%	20%	↱	↰	↑	↳	↲	20%	5%	20%
80%	60%	40%	←	TS			←	20%	20%	5%
40%	45%	45%	↰	↰	↑	↱	↱	20%	30%	55%
				45%	10%	65%
				15%	15%	45%
				45%	5%	50%



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↰	↰	↑	↱	↱			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 7A TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-7B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-7B.dwg
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N/S STREET	24	E/W STREET
FOOTHILL BLVD		WB I-210 FWY RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	25	E/W STREET
FOOTHILL BLVD		EB I-210 FWY RAMPS

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	26	E/W STREET
OSBORNE STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	27	E/W STREET
GLEN OAKS BLVD		OSBORNE STREET

				0	0	0				
				0	0	0				
				0	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	28	E/W STREET
GLEN OAKS BLVD		MONTAGUE STREET

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	29	E/W STREET
GLEN OAKS BLVD		BRANFORD STREET

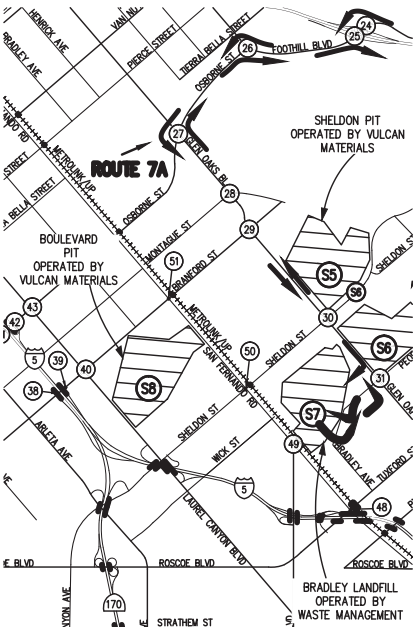
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				150	0	0				
				150	0	0				
				150	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 7A PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-7C

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Last Opened: Oct 04, 2013 - 11:53am by: TMunoz

N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				490	390	0				
				205	255	0				
				225	260	0				
0	0	0						60	35	65
0	0	0		TS				0	0	0
0	0	0						220	165	305
				130	570	0				
				105	445	0				
				210	510	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	355	195				
				0	305	75				
				0	460	55				
355	260	335						0	0	0
0	0	0		TS				0	0	0
100	40	80						0	0	0
				0	350	340				
				0	265	210				
				0	390	290				

N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				5	5	5				
				15	5	5				
				15	5	5				
5	20	15						5	5	5
320	225	315		TS				245	200	305
520	25	265						310	215	255
				335	10	300				
				230	5	260				
				680	5	445				

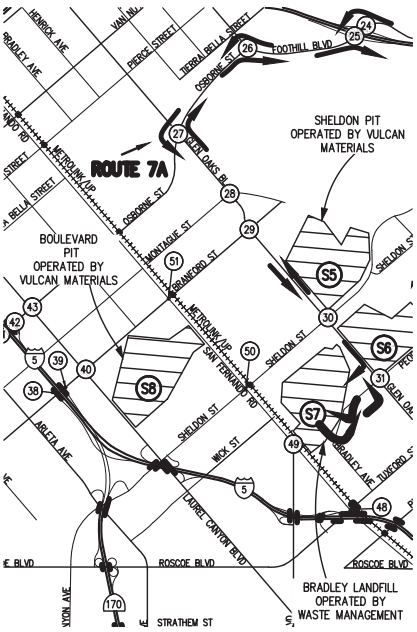
N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				170	1070	45				
				130	425	80				
				205	575	135				
350	220	290						70	70	100
535	425	690		TS				630	500	535
70	90	90						425	175	255
				50	520	185				
				80	635	200				
				120	875	390				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				55	1625	15				
				35	575	35				
				25	905	15				
10	40	55						10	30	30
5	5	5		TS				5	5	5
30	45	60						5	35	10
				55	690	5				
				60	610	15				
				50	1230	15				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				175	1410	15				
				80	570	70				
				80	790	115				
130	150	220						10	85	100
15	85	110		TS				5	90	190
95	90	155						10	70	90
				95	645	10				
				90	615	70				
				115	995	105				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				160	1285	85				
				95	540	50				
				145	780	90				
125	140	325						40	50	60
440	260	355		TS				595	285	325
50	85	70						90	45	40
				80	530	45				
				80	585	50				
				120	870	70				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				90	1250	30				
				65	530	10				
				65	745	35				
65	75	90						10	15	55
5	5	10		TS				5	5	5
5	30	20						15	20	30
				15	525	25				
				25	525	15				
				25	975	25				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 7A
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-7D

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N/S STREET	24	E/W STREET
FOOTHILL BLVD		WB I-210 FWY RAMPS

				505	410	0				
				215	290	0				
				230	275	0				
0	0	0						60	40	65
0	0	0		TS				0	0	0
0	0	0						325	290	430
				140	595	0				
				110	480	0				
				220	530	0				

N/S STREET	25	E/W STREET
FOOTHILL BLVD		EB I-210 FWY RAMPS

				0	385	200				
				0	335	75				
				0	475	55				
365	270	345						0	0	0
0	0	0		TS				0	0	0
115	55	90						0	0	0
				0	380	465				
				0	295	340				
				0	415	400				

N/S STREET	26	E/W STREET
OSBORNE STREET		FOOTHILL BLVD

				5	5	5				
				15	5	5				
				15	5	5				
5	20	15						5	5	5
350	265	330		TS				250	235	345
560	25	295						425	360	375
				355	10	415				
				265	5	400				
				735	5	570				

N/S STREET	27	E/W STREET
GLEN OAKS BLVD		OSBORNE STREET

				200	1215	65				
				140	520	80				
				205	575	135				
465	340	390						90	80	100
600	490	690		TS				695	545	535
95	105	90						490	210	255
				90	655	340				
				100	735	365				
				120	875	490				

N/S STREET	28	E/W STREET
GLEN OAKS BLVD		MONTAGUE STREET

				70	1785	20				
				50	765	40				
				30	1110	20				
45	65	65						10	30	30
5	5	5		TS				5	5	5
50	65	65						5	40	10
				65	890	10				
				65	815	15				
				70	1395	15				

N/S STREET	29	E/W STREET
GLEN OAKS BLVD		BRANFORD STREET

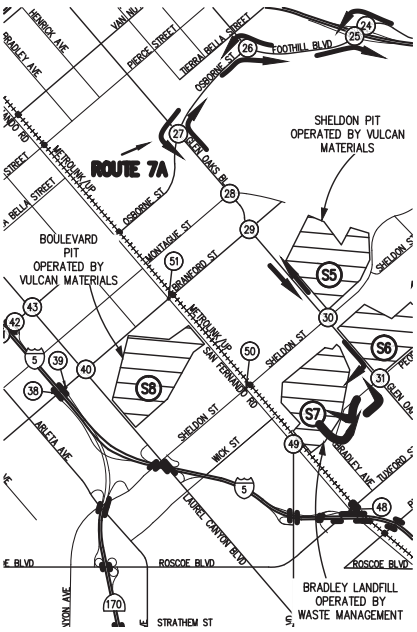
				195	1605	25				
				80	750	90				
				105	1000	120				
130	155	225						15	95	105
15	85	110		TS				5	90	195
115	100	170						20	85	105
				105	865	25				
				105	820	80				
				125	1160	110				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				200	1505	135				
				125	705	60				
				155	935	100				
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						105	50	50
				100	670	50				
				110	755	70				
				140	1055	80				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				205	1385	55				
				180	705	20				
				180	830	65				
175	195	205						15	15	75
10	10	20		TS				10	5	5
5	60	40						20	30	65
				30	610	60				
				35	660	30				
				45	1110	50				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 7A
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-7E

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Table 4-4-7
Intersection Capacity Analysis – Existing + Project Conditions (Route 7A)
Traffic Impact Analysis - Site 7

Route 7A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	8.4	0.57	A	A	5.6	0.29	A	A	8.0	0.50	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	9.9	0.63	A	A	6.5	0.31	A	A	7.2	0.41	A
26	Foothill Blvd and Osborne Street	D	37.9	1.16	C	A	9.2	0.57	A	B	19.3	0.91	C
27	Glenoaks Blvd and Osborne Street	F	82.9	1.13	E	C	32.7	0.78	B	D	44.9	0.90	D
28	Glenoaks Blvd and Montague Street	A	9.1	0.72	B	B	13.0	0.38	A	A	9.5	0.58	B
29	Glenoaks Blvd and Branford Street	B	15.1	0.81	C	B	18.4	0.57	A	C	23.6	0.80	D
30	Glenoaks Blvd and Sheldon Street	B	12.4	0.79	D	A	7.4	0.48	A	B	11.9	0.78	C
31	Glenoaks Blvd and Peoria Street	A	5.2	0.61	A	A	5.2	0.39	A	A	5.9	0.55	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 7A Analysis

As presented in *Table 4-4-7*, under the existing plus project conditions for Site 7 (Route 7A) most study intersections are expected to operate at an acceptable HCM LOS D or better, for the AM, Mid-day and PM peak hours. The Intersection of Glenoaks Blvd and Osborne Street will continue to operate at HCM LOS F during the AM peak period. As identified under existing conditions, mitigation of the intersection of Glenoaks Blvd and Osborne Street is recommended to improve the intersection to an acceptable level-of-service.

Haul Route 7B

The Haul Route 7B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-8A* through *Figure 4-4-8C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-8D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-8E.*

Haul Route 7C

The Haul Route 7C project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-9A* through *Figure 4-4-9C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-9D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-9E.*

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				

N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD

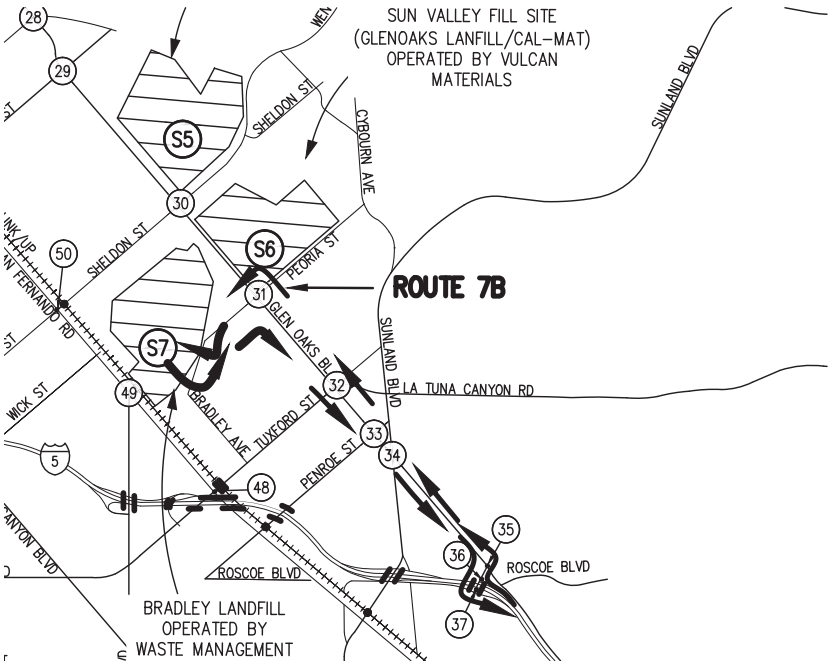
				50	0	0				
				50	0	0				
				50	0	0				
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				50	50	50
0	0	0						0	0	0
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	37	E/W STREET
SB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 7B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-8A

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N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				20%	5%	45%				
				45%	15%	40%				
				45%	5%	50%				
40%	40%	20%						20%	5%	20%
80%	60%	40%		TS				20%	20%	5%
40%	45%	45%						20%	30%	55%
				45%	10%	65%				
				15%	15%	45%				
				45%	5%	50%				

N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET

				40%	9%	5%				
				45%	25%	10%				
				10%	12%	5%				
25%	45%	25%						10%	10%	5%
5%	5%	5%		TS				5%	5%	5%
15%	15%	10%						5%	5%	5%
				15%	20%	20%				
				15%	19%	5%				
				10%	15%	5%				

N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET

				5%	10%	15%				
				10%	19%	10%				
				5%	18%	5%				
5%	10%	5%						10%	5%	5%
5%	5%	5%		TS				5%	5%	10%
25%	5%	10%						5%	10%	5%
				5%	21%	5%				
				5%	14%	5%				
				5%	16%	5%				

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD

				5%	12%	35%				
				15%	23%	5%				
				10%	13%	10%				
15%	5%	10%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						5%	5%	5%
				35%	23%	5%				
				10%	21%	5%				
				5%	12%	5%				

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD

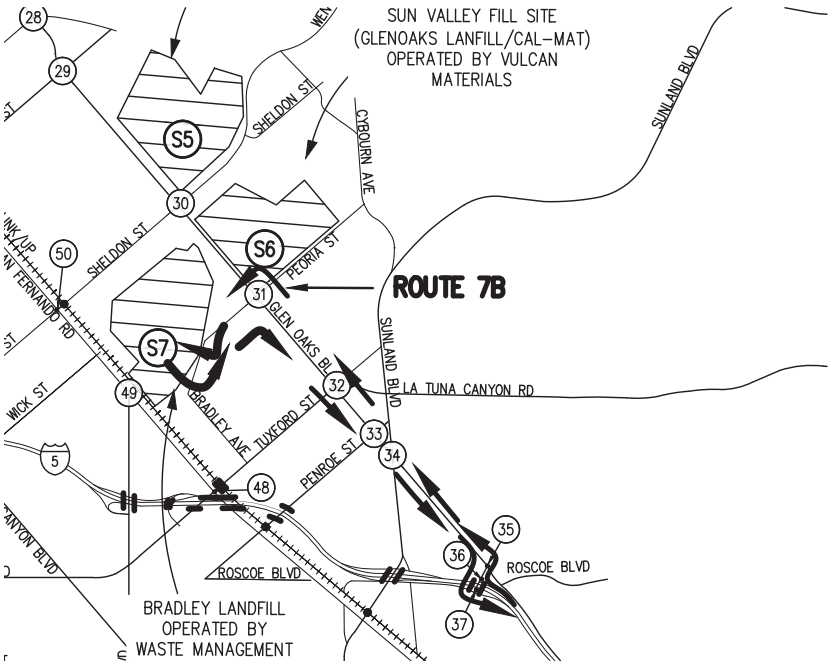
				15%	5%	0%				
				18%	10%	0%				
				15%	5%	0%				
26%	21%	13%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
10%	20%	10%						0%	0%	0%
				10%	5%	0%				
				10%	5%	0%				
				10%	5%	0%				

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
10%	10%	15%		TS				14%	16%	14%
0%	0%	0%						0%	0%	0%
				15%	0%	23%				
				20%	0%	22%				
				20%	0%	13%				

N/S STREET	37	E/W STREET
SB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0%	5%	5%				
				0%	5%	5%				
				0%	5%	5%				
0%	0%	0%						15%	5%	5%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						13%	18%	16%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				



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N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7B TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-8B

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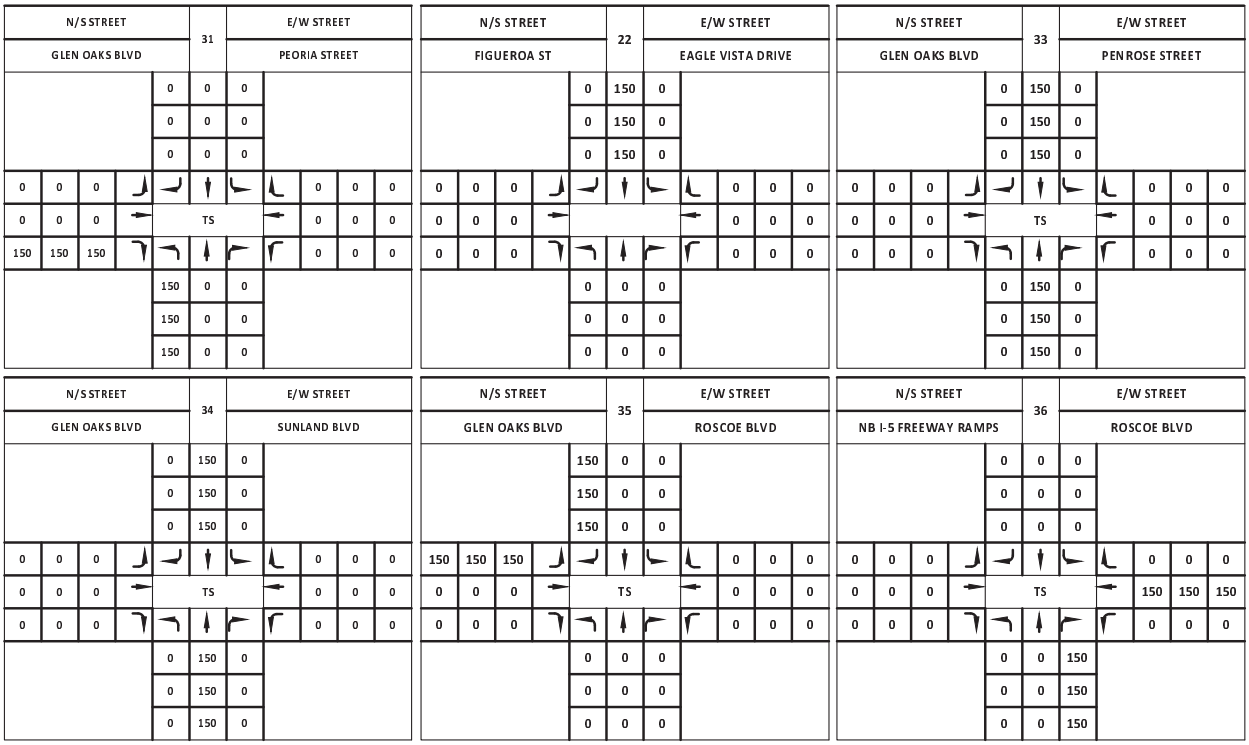

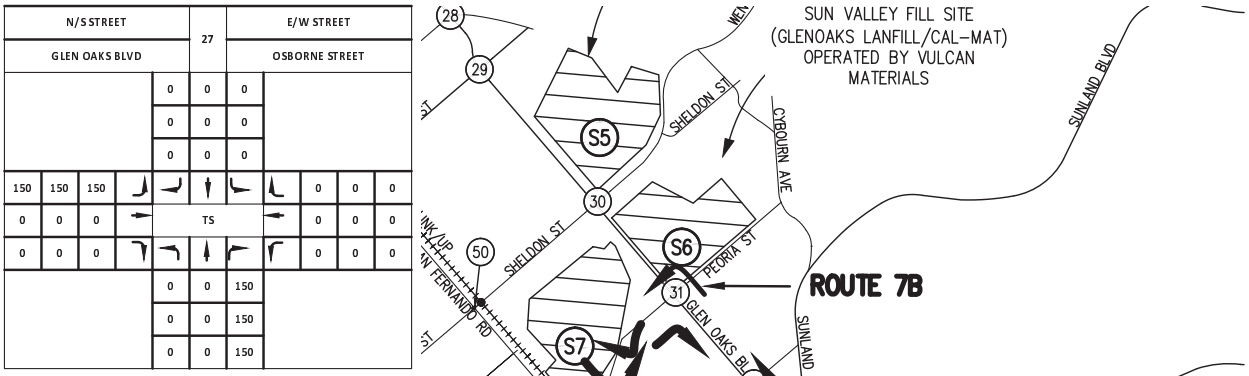

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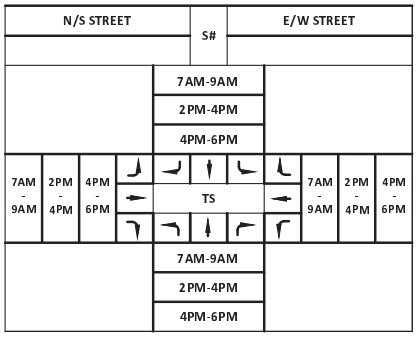

LEGEND

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ROUTE 7B
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-8C

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N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				40	1250	30			
				15	530	10			
				15	745	35			
15	25	40						10	15	55
5	5	10		TS				5	5	5
55	80	70						15	20	30
				65	525	25			
				75	525	15			
				75	975	25			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				125	1065	90			
				100	405	90			
				90	640	130			
115	110	140						75	45	80
470	390	505		TS				565	425	345
45	60	95						30	25	60
				95	445	20			
				110	485	30			
				120	850	60			

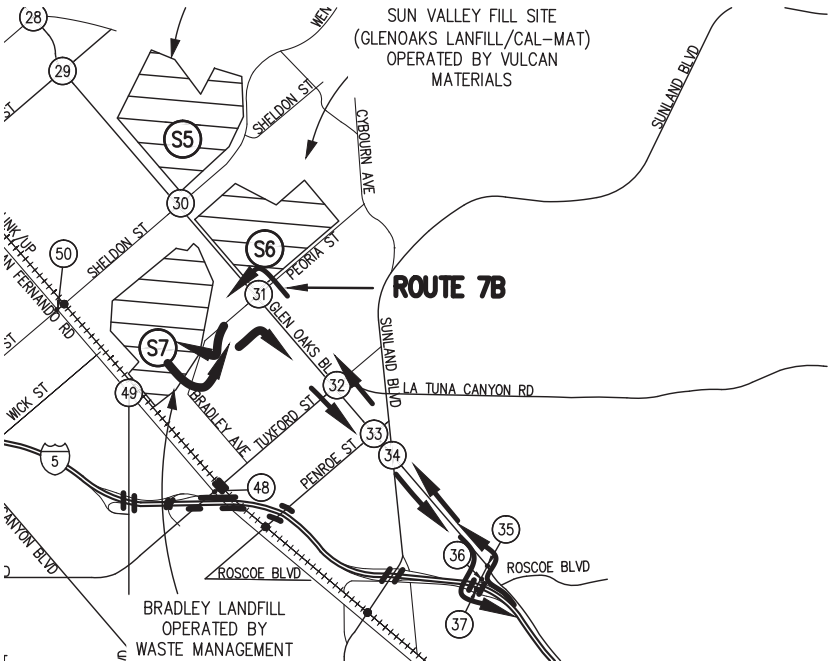
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				95	970	35			
				35	490	25			
				110	570	45			
120	90	185						35	35	75
125	130	200		TS				70	85	140
20	50	55						5	20	45
				25	415	5			
				45	515	25			
				75	750	40			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				205	690	10			
				170	355	35			
				50	560	50			
70	165	165						20	15	5
670	430	650		TS				750	355	395
30	20	55						205	320	360
				10	360	80			
				25	400	245			
				20	690	385			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				470	520	0			
				355	355	0			
				470	530	0			
225	290	595						0	0	0
0	0	0		TS				0	0	0
75	90	120						0	0	0
				70	275	0			
				75	370	0			
				65	540	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
90	120	110		TS				540	425	540
0	0	0						0	0	0
				70	0	265			
				60	0	285			
				65	0	615			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	35	90			
				0	40	120			
				0	30	110			
0	0	0						25	45	100
0	0	0		TS				0	0	0
0	0	0						615	380	425
				0	0	0			
				0	0	0			
				0	0	0			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 7B
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-8D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-8D.dwg
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N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				55	1385	55				
				30	705	20				
				30	830	65				
25	45	55						15	15	75
10	10	20		TS				10	5	5
155	210	190						20	30	65
				180	610	60				
				185	660	30				
				195	1110	50				

N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET

				220	1270	100				
				195	605	105				
				105	795	145				
175	200	210						90	55	90
510	445	540		TS				615	450	375
55	80	120						30	30	60
				120	620	30				
				140	680	30				
				145	1095	65				

N/S STREET	33	E/W STREET
GLEN OAKS BLVD		PENROSE STREET

				100	1160	45				
				40	660	30				
				115	795	45				
135	110	210						45	40	85
130	135	215		TS				75	90	160
30	55	65						5	25	50
				25	585	5				
				45	675	25				
				75	960	40				

N/S STREET	34	E/W STREET
GLEN OAKS BLVD		SUNLAND BLVD

				235	855	20				
				230	520	40				
				60	695	60				
85	190	200						25	15	5
720	470	670		TS				790	400	405
30	20	55						220	340	370
				20	510	85				
				25	555	260				
				20	865	415				

N/S STREET	35	E/W STREET
GLEN OAKS BLVD		ROSCOE BLVD

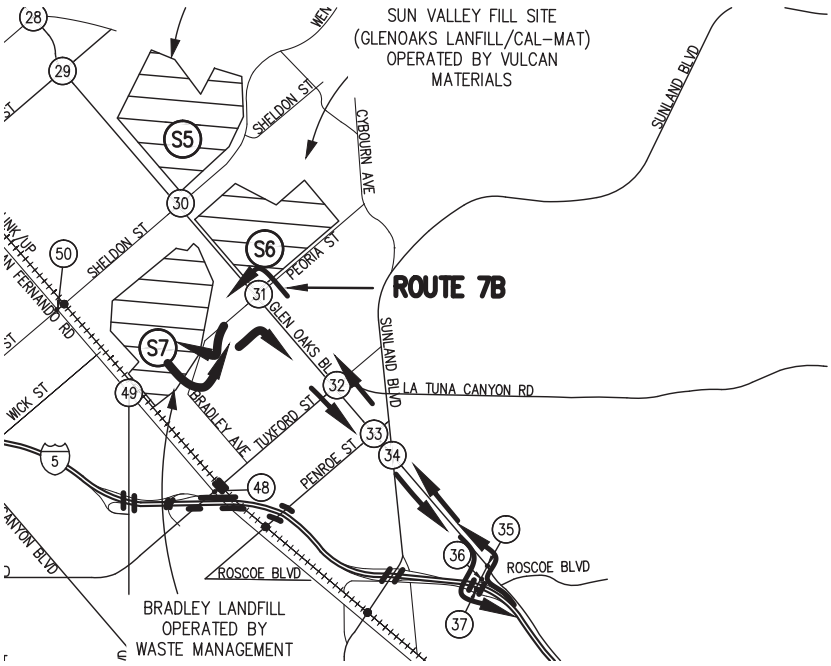
				585	560	0				
				490	415	0				
				585	575	0				
340	400	705						0	0	0
0	0	0		TS				0	0	0
90	125	145						0	0	0
				85	305	0				
				95	410	0				
				80	580	0				

N/S STREET	36	E/W STREET
NB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
100	140	135		TS				660	550	655
0	0	0						0	0	0
				90	0	380				
				85	0	395				
				90	0	725				

N/S STREET	37	E/W STREET
SB I-5 FREEWAY RAMPS		ROSCOE BLVD

				0	40	100				
				0	40	120				
				0	30	110				
0	0	0						35	50	100
0	0	0		TS				0	0	0
0	0	0						735	505	550
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET	S#	E/W STREET

					7AM-9AM					
					2PM-4PM					
					4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
					7AM-9AM					
					2PM-4PM					
					4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7B
PCE EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-8E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-8E.dwg
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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

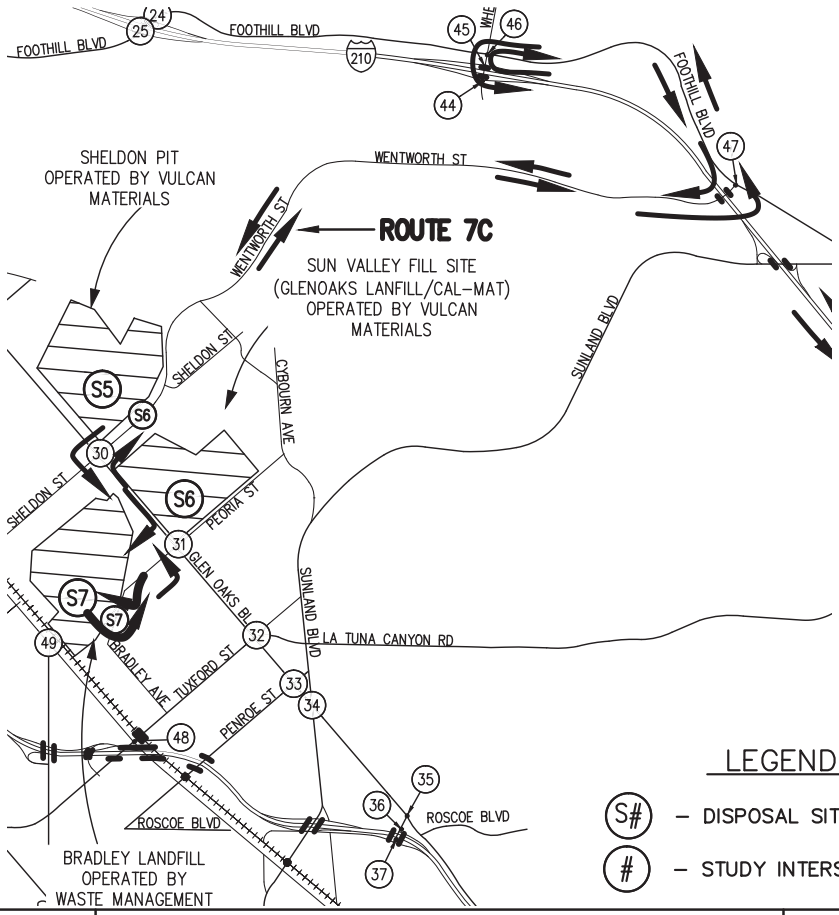
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				50	0	0				
				50	0	0				
				50	0	0				
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-9A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-9A.dwg
Last Opened: Oct 04, 2013 – 11:58am by: TMunoz

N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0%	0%	33%				
				0%	0%	45%				
				0%	0%	40%				
5%	5%	5%						0%	0%	0%
15%	15%	100%		TS				0%	0%	0%
0%	0%	0%						0%	0%	0%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				5%	35%	0%				
				5%	48%	0%				
				5%	38%	0%				
0%	0%	0%						37%	56%	29%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						50%	5%	5%
				20%	5%	0%				
				5%	10%	0%				
				20%	5%	0%				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				5%	5%	20%				
				5%	5%	5%				
				5%	5%	5%				
30%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						42%	49%	34%
				5%	5%	35%				
				5%	5%	58%				
				5%	5%	33%				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
5%	5%	5%		TS				5%	5%	5%
34%	55%	43%						5%	5%	5%
				53%	0%	5%				
				53%	0%	5%				
				35%	0%	5%				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

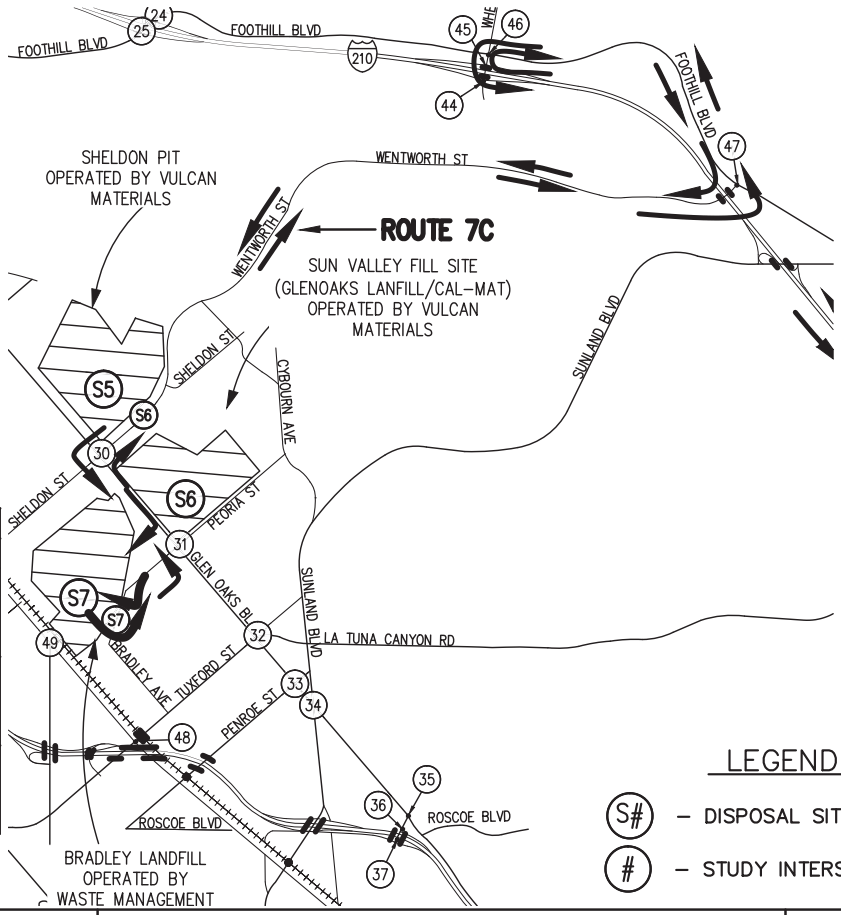
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				20%	5%	45%				
				45%	15%	40%				
				45%	5%	50%				
40%	40%	20%						20%	5%	20%
80%	60%	40%		TS				20%	20%	5%
40%	45%	45%						20%	30%	55%
				45%	10%	65%				
				15%	15%	45%				
				45%	5%	50%				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 7C TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-9B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-9B.dwg
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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				150	0	0				
				150	0	0				
				150	0	0				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

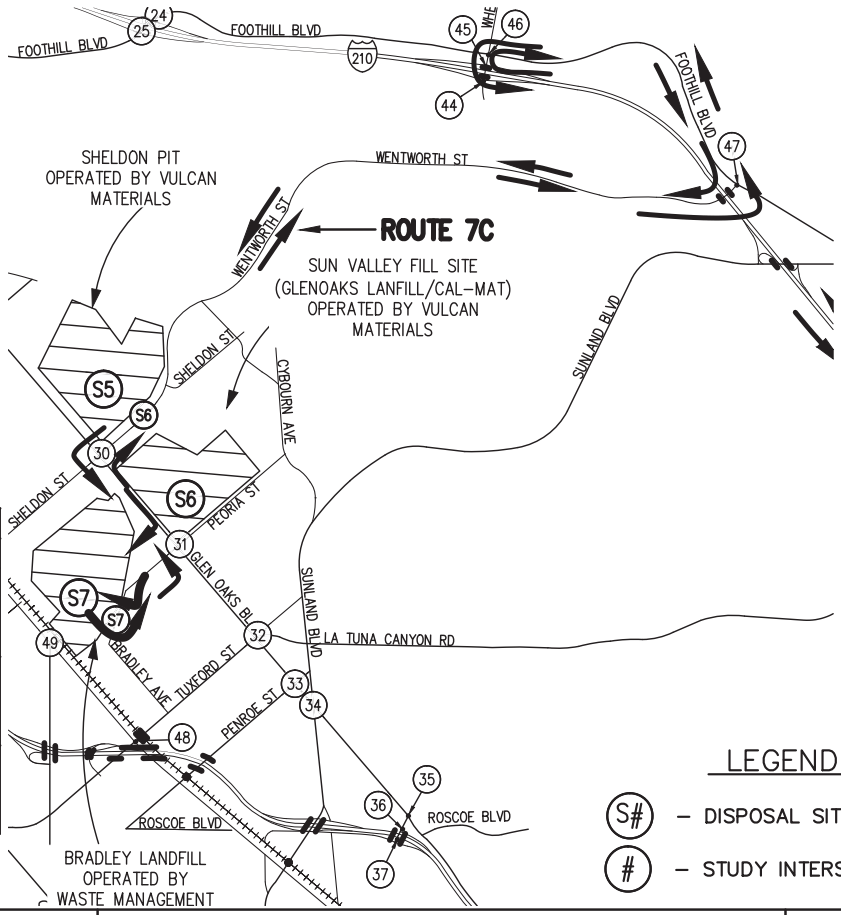
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				150	0	0				
				150	0	0				
				150	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 7C
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-9C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-9C.dwg
Last Opened: Oct 04, 2013 - 11:58am by: TMunoz

N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0	0	170				
				0	0	110				
				0	0	135				
105	75	100						0	0	0
5	5	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				65	160	0				
				55	110	0				
				105	130	0				
0	0	0						150	90	170
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	100	0				
				5	55	0				
				5	95	0				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				5	15	15				
				15	20	5				
				5	20	10				
5	10	5						5	20	15
195	135	170		TS				220	130	215
90	35	80						130	115	145
				70	10	160				
				40	25	100				
				90	25	150				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
200	165	200		TS				175	155	295
165	95	125						440	215	215
				100	0	225				
				100	0	185				
				160	0	420				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

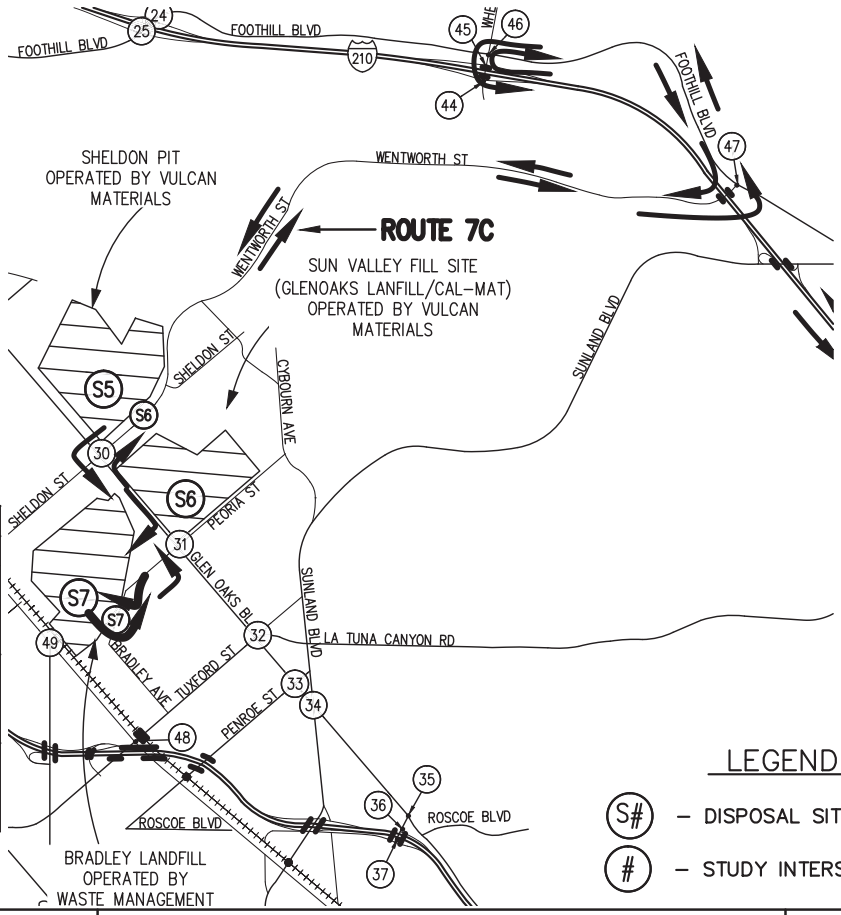
				160	1235	85				
				95	490	50				
				145	730	90				
115	130	300						40	50	60
405	240	325		TS				595	285	325
45	80	65						140	95	90
				80	480	95				
				80	535	100				
				120	820	120				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				90	1250	30				
				65	530	10				
				65	745	35				
65	75	90						10	15	55
5	5	10		TS				5	5	5
5	30	20						15	20	30
				15	525	25				
				25	525	15				
				25	975	25				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 7C
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-9D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-9D.dwg
Last Opened: Oct 04, 2013 - 11:58am by: TMunoz

N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
				0	0	275			
				0	0	210			
				0	0	240			
115	85	100						0	0	0
10	10	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0			
				0	0	0			
				0	0	0			

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
				75	265	0			
				60	215	0			
				105	230	0			
0	0	0						260	190	270
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	105	0			
				5	65	0			
				5	100	0			

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
				10	20	25			
				20	25	10			
				10	25	15			
15	15	10						10	25	20
235	165	190		TS				265	160	250
100	45	85						260	250	265
				85	15	290			
				45	30	230			
				100	30	275			

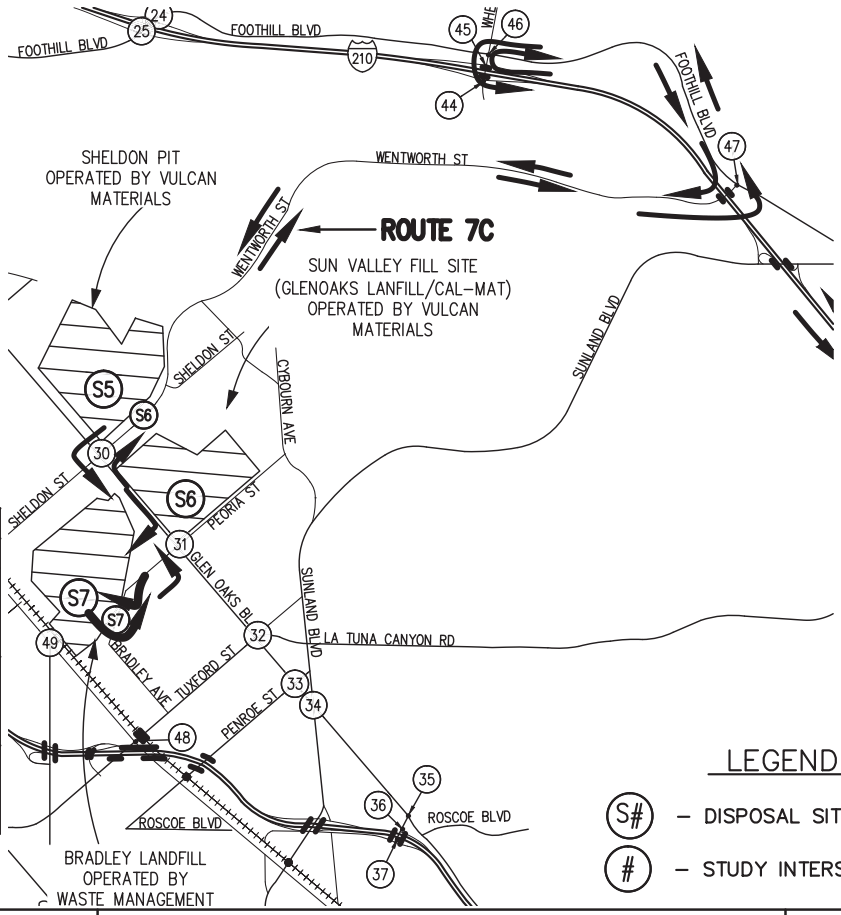
N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
225	190	220		TS				200	180	325
295	220	250						490	245	260
				225	0	260			
				225	0	205			
				290	0	465			

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				200	1355	135			
				125	555	60			
				155	785	100			
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						255	200	200
				100	520	200			
				110	605	220			
				140	905	230			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				205	1385	55			
				180	705	20			
				180	830	65			
175	195	205						15	15	75
10	10	20		TS				10	5	5
5	60	40						20	30	65
				30	610	60			
				35	660	30			
				45	1110	50			

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 7C
PCE EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-9E

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-9E.dwg
Last Opened: Oct 04, 2013 - 11:59am by: TMunoz

Table 4-4-8
Intersection Capacity Analysis – Existing + Project Conditions (Route 7B)
Traffic Impact Analysis - Site 7

Route 7B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
31	Glenoaks Blvd and Peoria Street	A	4.1	0.51	A	A	4.4	0.31	A	A	4.9	0.48	A
32	Glenoaks Blvd and Tuxford Street	B	12.9	0.81	D	A	7.5	0.46	A	A	9.1	0.57	C
33	Glenoaks Blvd and Penrose Street	A	6.4	0.55	A	A	5.9	0.36	A	A	9.5	0.67	B
34	Glenoaks Blvd and Sunland Blvd	C	20.5	0.83	B	B	15.4	0.63	B	C	24.6	0.86	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.8	0.42	A	A	7.1	0.42	A	B	10.3	0.61	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	11.8	-	-	B	11.7	-	-	C	22.0	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 4-4-9
Intersection Capacity Analysis – Existing + Project Conditions (Route 7C)
Traffic Impact Analysis - Site 7

Route 7C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	11.7	0.78	D	A	7.3	0.45	A	B	11.1	0.75	D
31	Glenoaks Blvd and Peoria Street	A	5.2	0.61	A	A	5.2	0.39	A	A	5.9	0.55	A
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	10.7	-	-	A	9	-	-	A	9.1	-	-
46	Wheatland Ave and Foothill Blvd	B	10.6	0.42	A	B	10.3	0.36	A	B	10.5	0.43	A
47	Wentworth Street and Foothill Blvd	B	19.4	0.78	A	B	12.4	0.4	A	A	9.2	0.43	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 7B & 7C Analysis

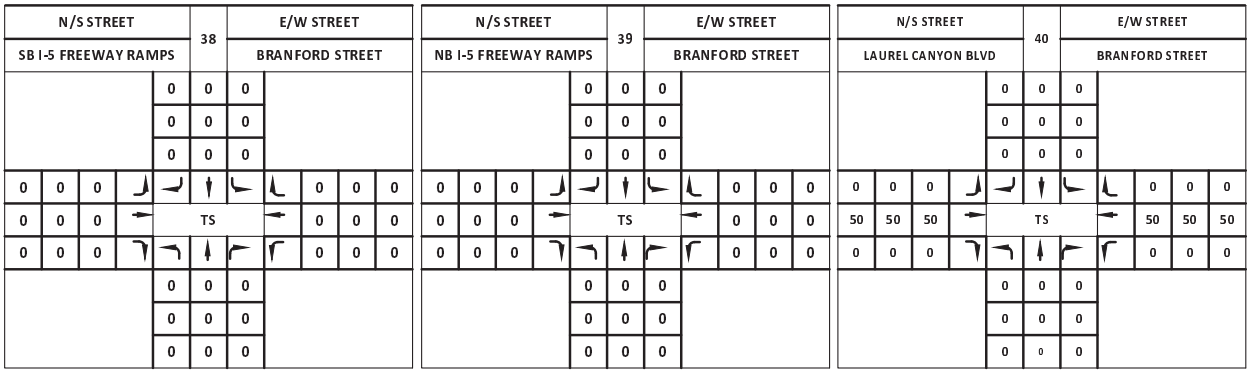
As presented in *Tables 4-4-8 and 4-4-9*, under the existing plus project conditions for Site 7 (Routes 7B & 7C) all intersections are expected to continue to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours.

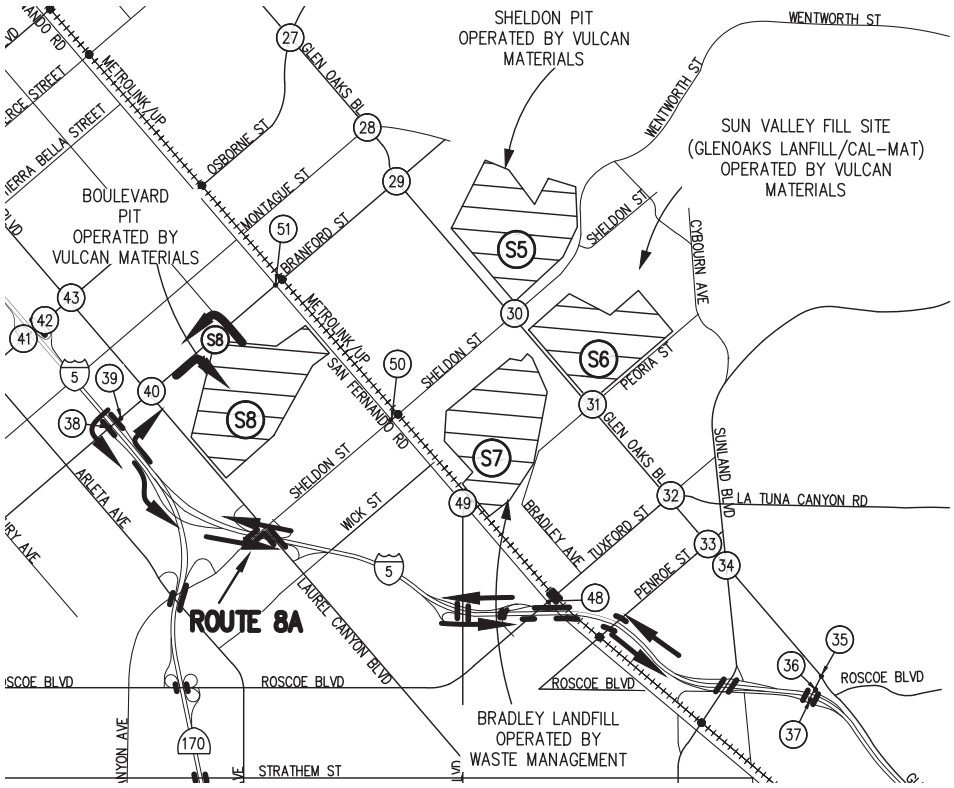
Haul Route 8A

The Haul Route 8A project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-10A* through *Figure 4-4-10C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-10D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-10E.*

Haul Route 8B

The Haul Route 8B project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-11A* through *Figure 4-4-11C.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-11D.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-11E.*





LEGEND

N/S STREET				S#				E/W STREET		
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8A PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-10A

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Last Opened: Oct 04, 2013 – 12:01pm by: TMunoz

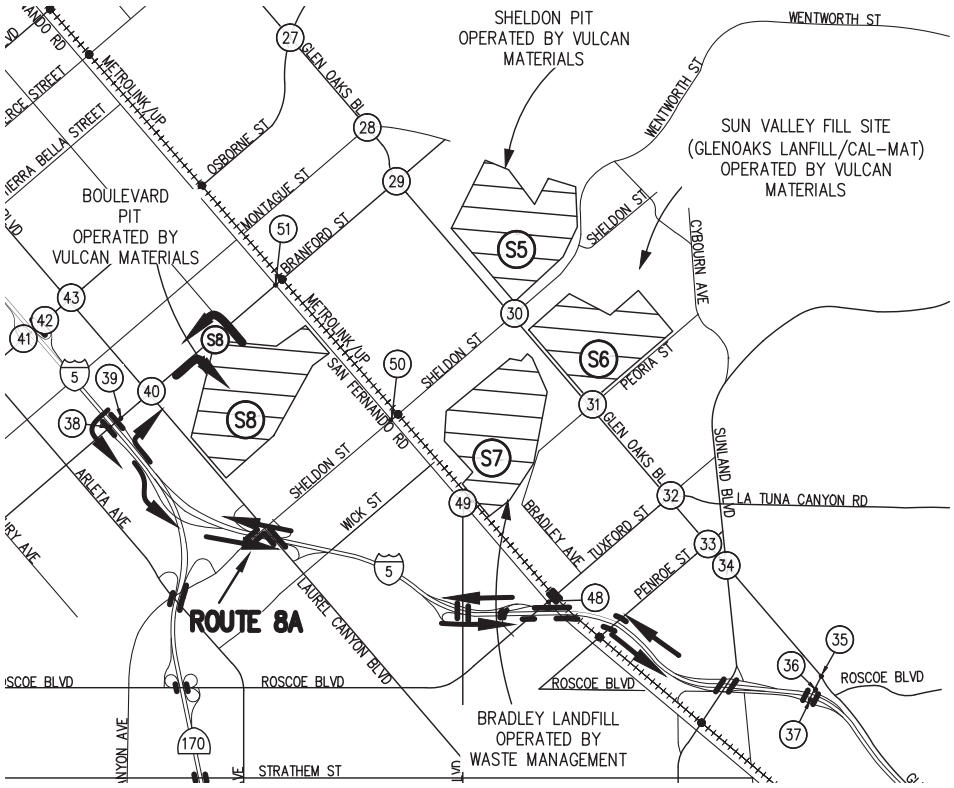
N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	⌋	⌉	↑	⌊	⌈	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	⌉	⌉	↑	⌈	⌈	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				39			E/W STREET			
NB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	⌋	⌉	↑	⌊	⌈	0	0	0
0	0	0	←	TS			←	0	0	0
0	0	0	⌉	⌉	↑	⌈	⌈	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
5%	5%	5%	⌋	⌉	↑	⌊	⌈	5%	5%	5%
37%	34%	20%	←	TS			←	28%	35%	21%
10%	5%	5%	⌉	⌉	↑	⌈	⌈	5%	5%	5%
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	⌋	⌉	↑	⌊	⌈	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			⌉	⌉	↑	⌈	⌈			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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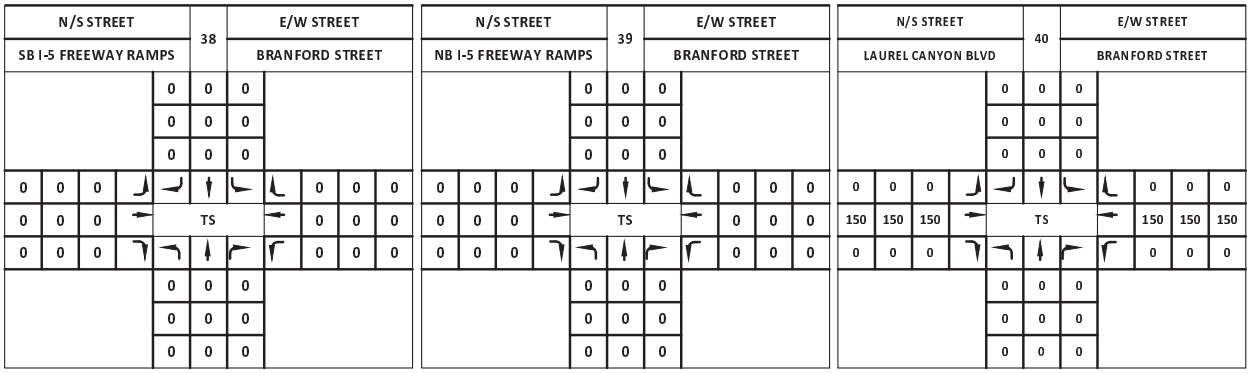
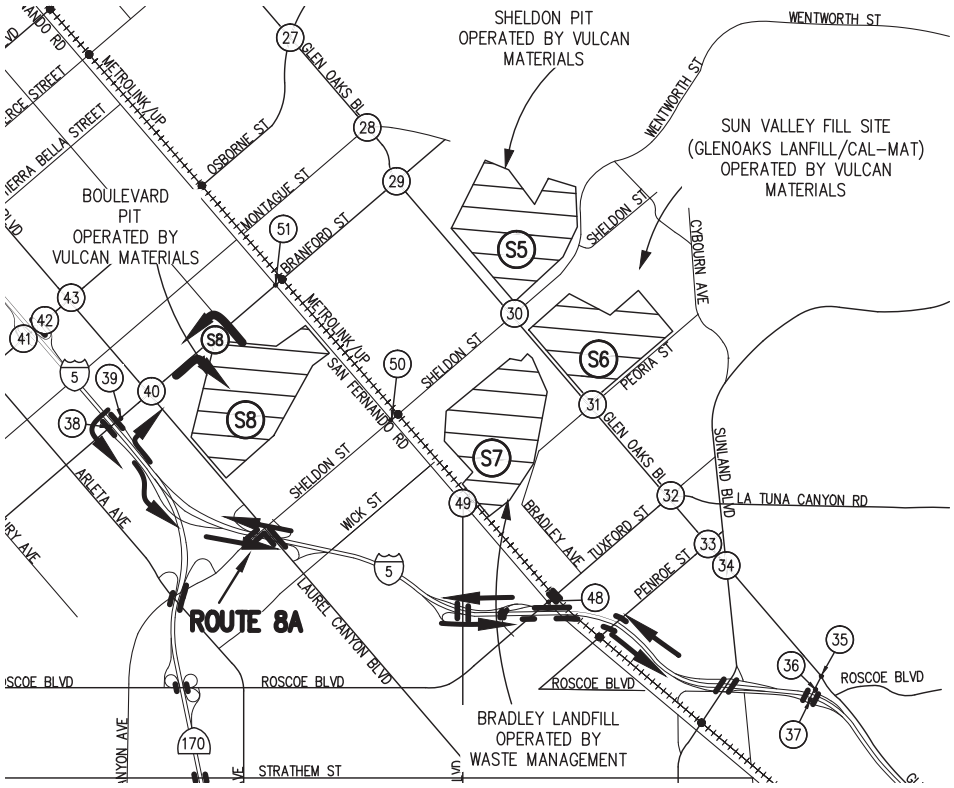
ROUTE 8A
TRUCK PERCENTAGES
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-10B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-10B.dwg
Last Opened: Oct 04, 2013 – 12:01pm by: TMunoz





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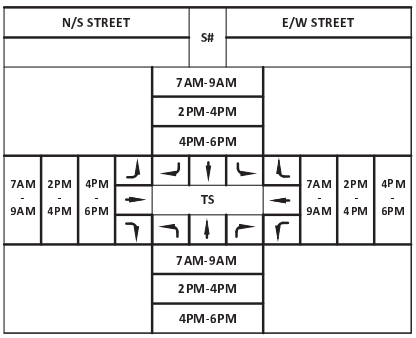

LEGEND

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ROUTE 8A
PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-10C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-10C.dwg
Last Opened: Oct 04, 2013 – 12:01pm by: TMunoz

N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				39			E/W STREET			
NB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				150	365	130				
				95	585	65				
				135	445	60				
150	115	190						110	85	125
195	220	430		TS				255	210	415
65	210	185						85	90	100
				90	585	140				
				85	460	85				
				115	1120	120				

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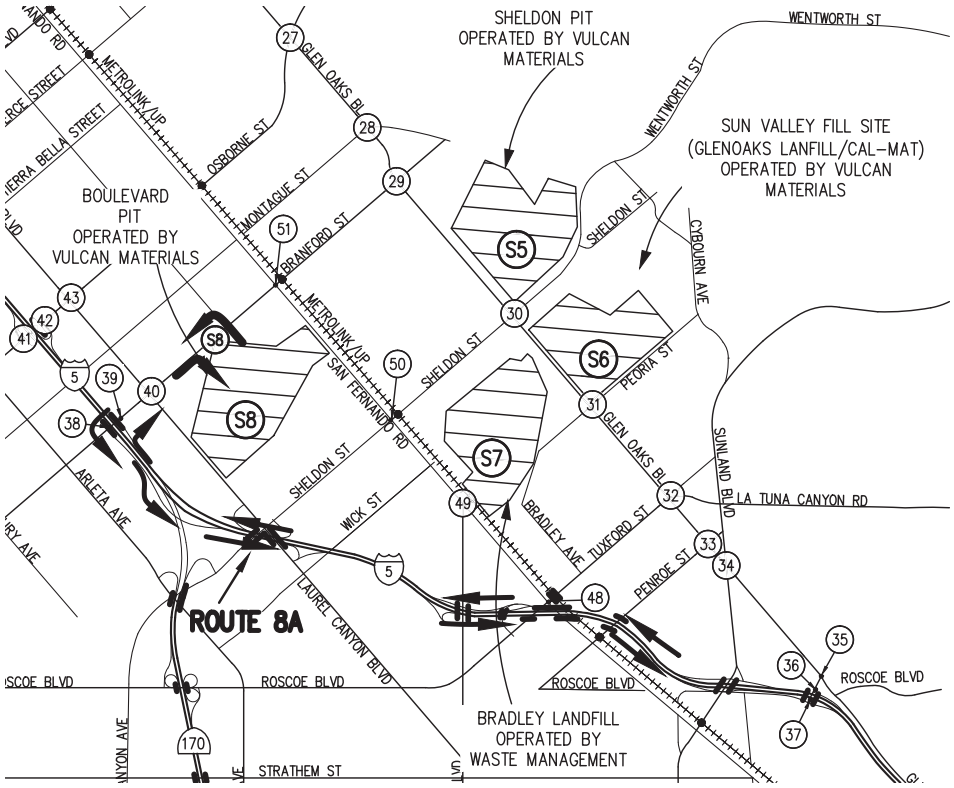
NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8A
EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-10D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-10D.dwg
Last Opened: Oct 04, 2013 – 12:01pm by: TMunoz

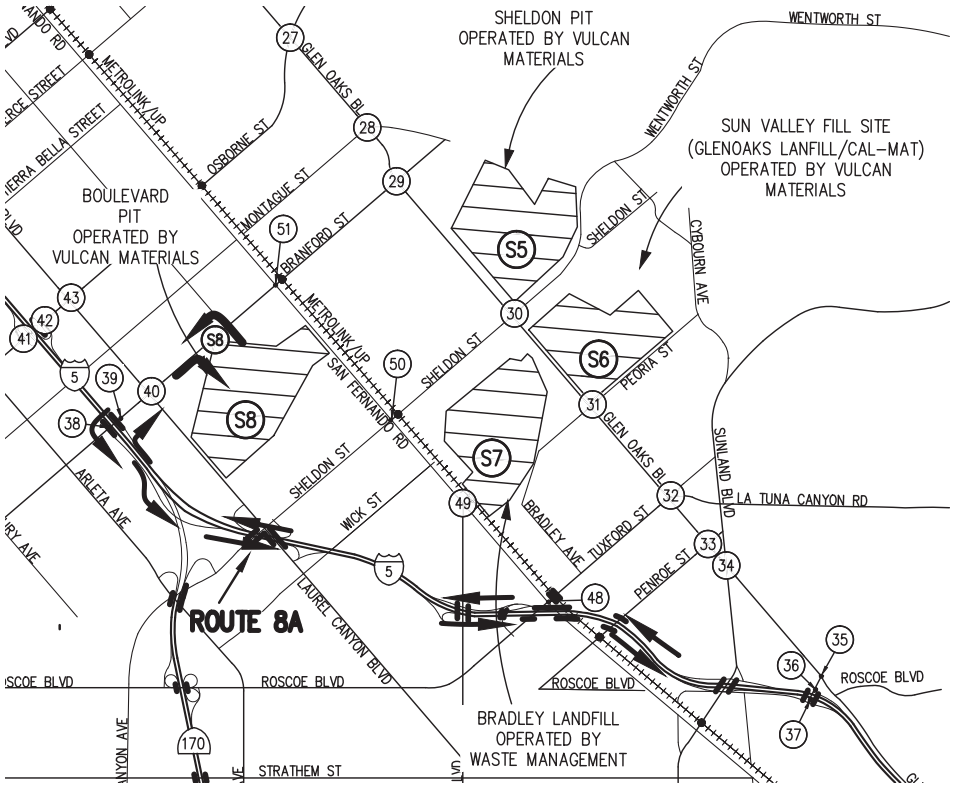
N/S STREET				38			E/W STREET			
SB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				39			E/W STREET			
NB I-5 FREEWAY RAMPS							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				150	380	135				
				95	605	65				
				140	460	65				
155	125	195						120	100	130
330	375	600		TS				395	365	580
80	220	195						95	95	105
				90	595	145				
				85	475	95				
				120	1140	130				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8A
PCE EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-10E

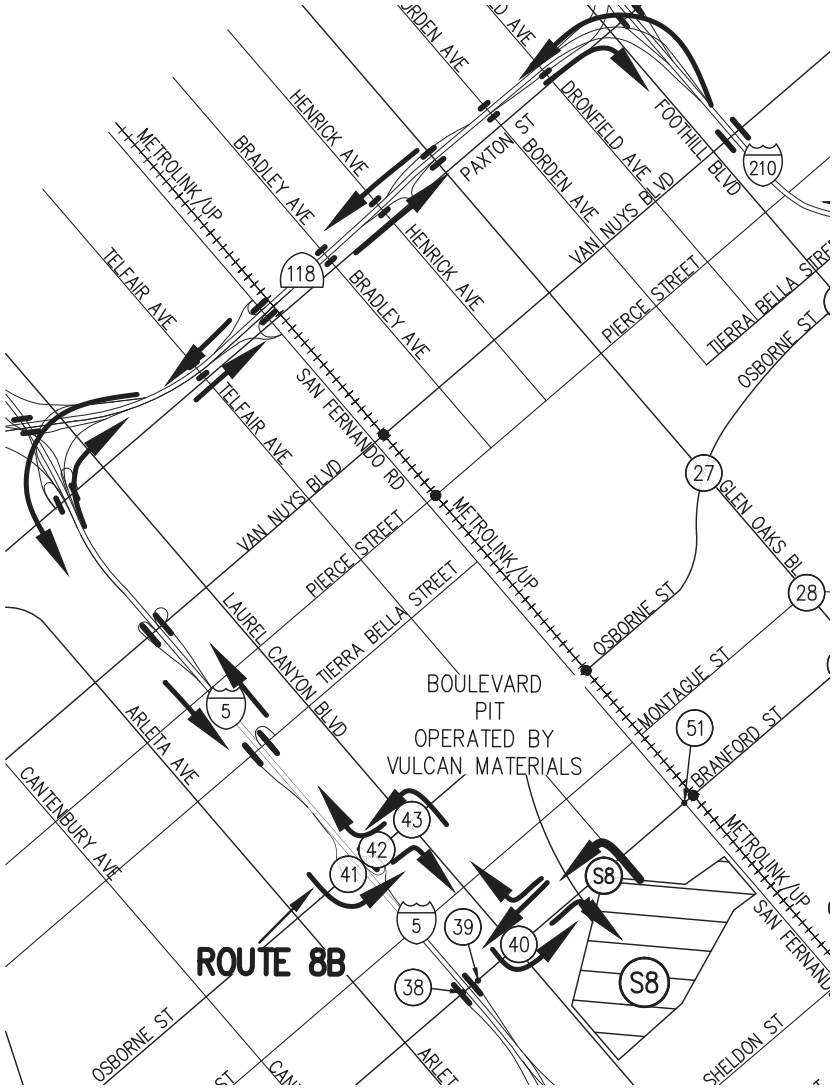
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-10E.dwg
Last Opened: Oct 04, 2013 - 12:01pm by: TMunoz

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				41			E/W STREET			
SB I-5 FREEWAY RAMPS							OSBORNE STREET			
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42			E/W STREET			
NB I-5 FREEWAY RAMPS							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						50	50	50
50	50	50		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				43			E/W STREET			
LAUREL CANYON BLVD							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8B PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-11A

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Last Opened: Oct 04, 2013 - 12:01pm by: TMunoz

N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				5%	5%	31%				
				5%	5%	43%				
				5%	5%	48%				
5%	5%	5%						35%	40%	32%
15%	15%	10%		TS				10%	15%	10%
10%	5%	5%						5%	5%	5%
				5%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				

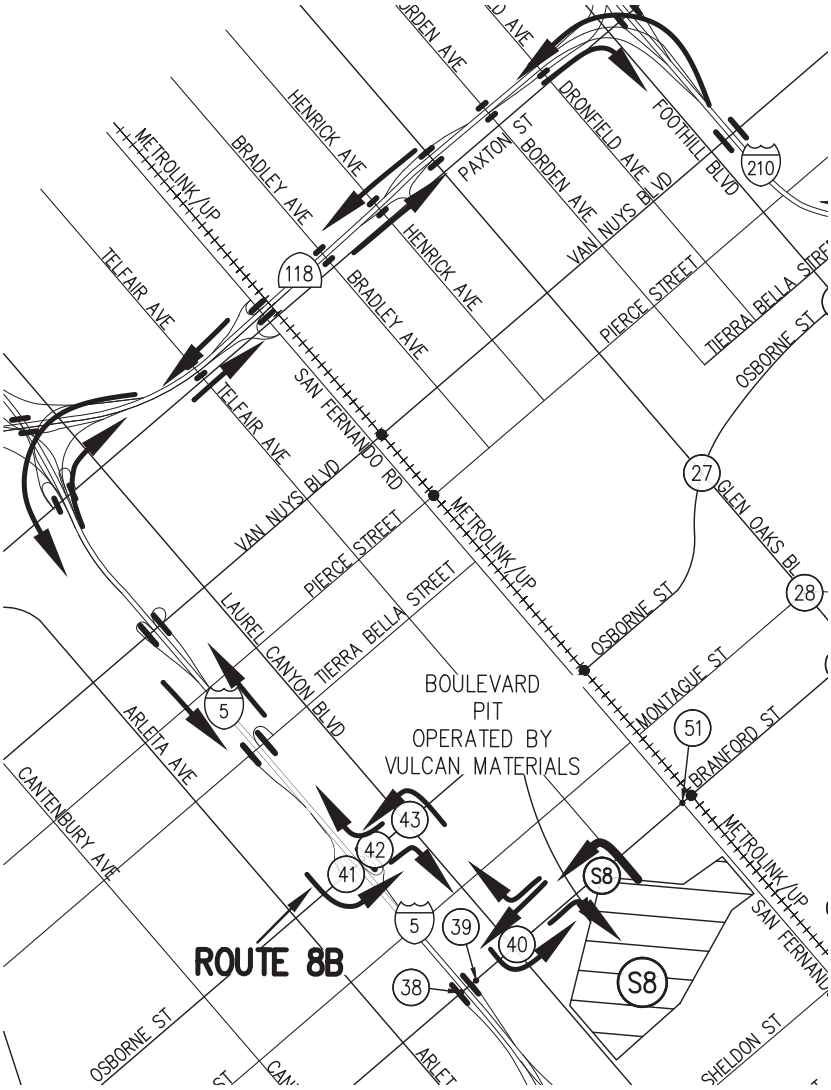
N/S STREET				41			E/W STREET			
SB I-5 FREEWAY RAMPS							OSBORNE STREET			
				10%	5%	41%				
				5%	5%	16%				
				5%	5%	14%				
0%	0%	0%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						5%	5%	5%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				

N/S STREET				42			E/W STREET			
NB I-5 FREEWAY RAMPS							OSBORNE STREET			
				5%	0%	5%				
				5%	0%	5%				
				5%	0%	5%				
5%	5%	5%						67%	77%	63%
10%	10%	5%		TS				5%	5%	5%
0%	0%	0%						0%	0%	0%
				10%	0%	10%				
				5%	0%	5%				
				5%	0%	5%				

N/S STREET				43			E/W STREET			
LAUREL CANYON BLVD							OSBORNE STREET			
				10%	5%	5%				
				5%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
45%	42%	52%						5%	10%	5%
				40%	5%	5%				
				42%	5%	5%				
				36%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8B TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-11B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-11B.dwg
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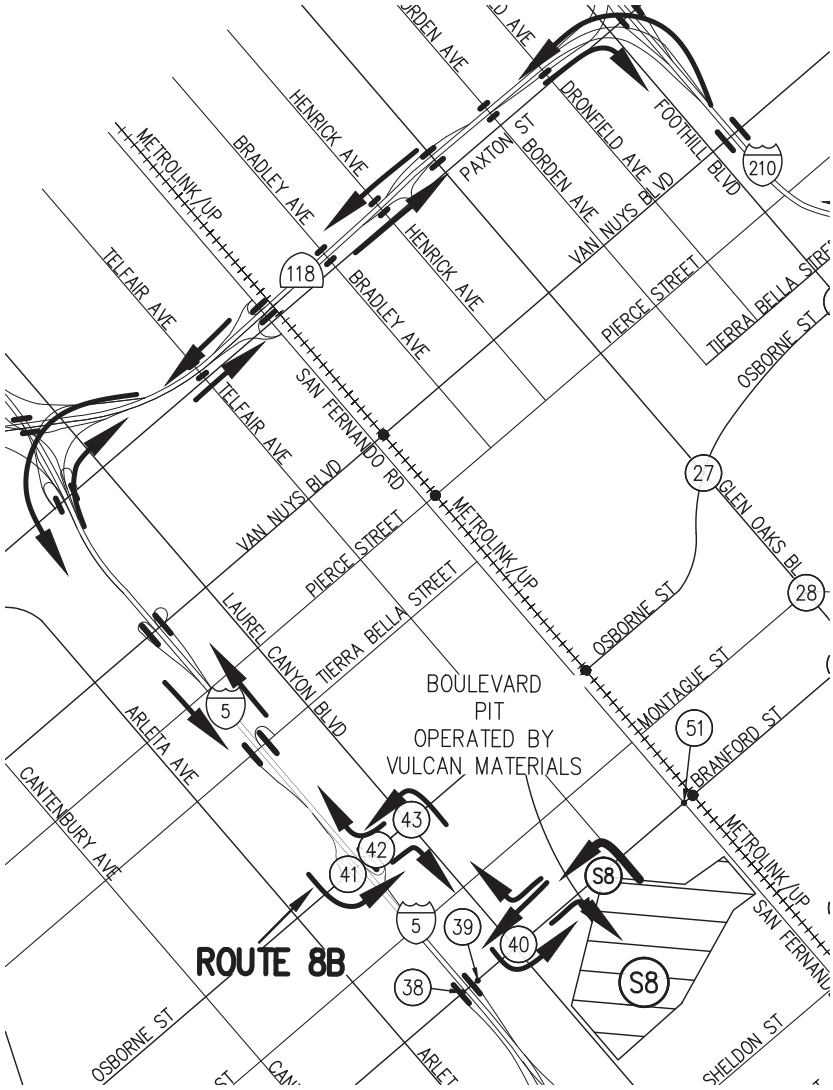
N/S STREET				40			E/W STREET			
LAUREL CANYON BLVD							BRANFORD STREET			
				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				41			E/W STREET			
SB I-5 FREEWAY RAMPS							OSBORNE STREET			
				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42			E/W STREET			
NB I-5 FREEWAY RAMPS							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						150	150	150
150	150	150		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				43			E/W STREET			
LAUREL CANYON BLVD							OSBORNE STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				150	0	0				
				150	0	0				
				150	0	0				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 8B PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-11C

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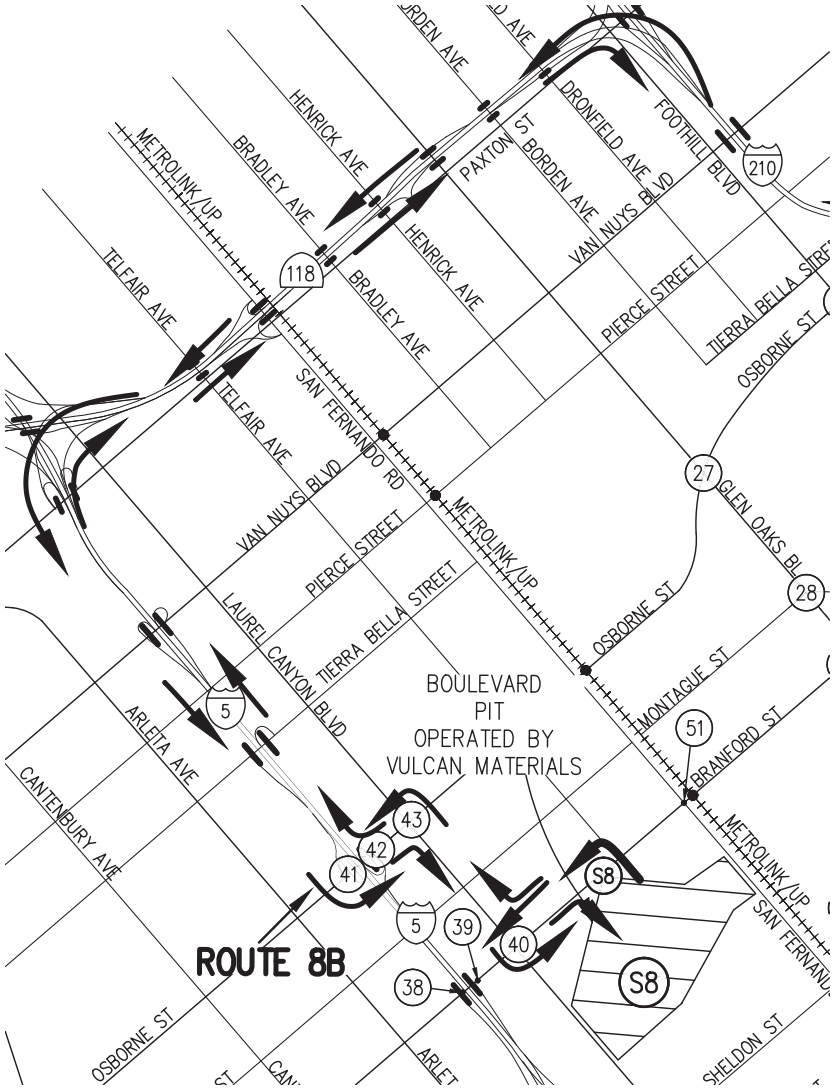
Last Opened: Oct 04, 2013 - 12:02pm by: TMunoz

N/S STREET				40		E/W STREET				
LAUREL CANYON BLVD						BRANFORD STREET				
				150	365	180				
				95	585	115				
				135	445	110				
150	115	190						160	135	175
145	170	380		TS				205	160	365
65	210	185						85	90	100
				90	585	140				
				85	460	85				
				115	1120	120				

N/S STREET				41		E/W STREET				
SB I-5 FREEWAY RAMPS						OSBORNE STREET				
				190	20	195				
				360	20	430				
				610	20	505				
0	0	0						515	220	225
795	595	895		TS				1155	910	1220
685	165	275						60	35	35
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42		E/W STREET				
NB I-5 FREEWAY RAMPS						OSBORNE STREET				
				5	0	5				
				5	0	5				
				5	0	5				
5	5	5						75	65	80
1005	1005	1390		TS				1500	820	1075
0	0	0						0	0	0
				230	0	180				
				305	0	220				
				410	0	205				

N/S STREET				43		E/W STREET				
LAUREL CANYON BLVD						OSBORNE STREET				
				50	335	110				
				90	515	75				
				75	460	75				
120	90	95						170	110	110
840	995	1315		TS				1375	690	850
130	130	115						110	80	120
				135	605	105				
				130	460	90				
				210	1130	120				



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8B
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-11D

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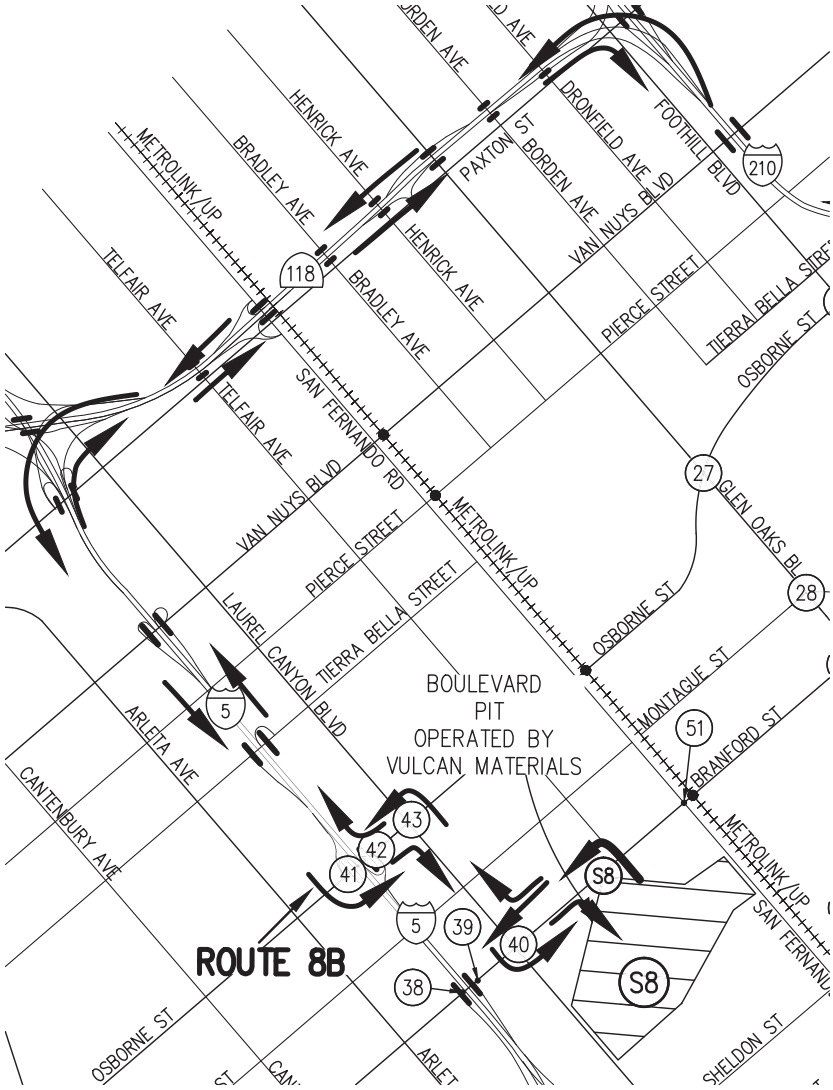
N/S STREET				40		E/W STREET				
LAUREL CANYON BLVD						BRANFORD STREET				
				150	380	285				
				95	605	215				
				140	460	215				
155	125	195						270	250	280
180	225	450		TS				245	215	430
80	220	195						95	95	105
				90	595	145				
				85	475	95				
				120	1140	130				

N/S STREET				41		E/W STREET				
SB I-5 FREEWAY RAMPS						OSBORNE STREET				
				235	20	350				
				400	20	585				
				620	20	630				
0	0	0						560	250	235
870	645	950		TS				1220	930	1280
685	165	275						60	35	35
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42		E/W STREET				
NB I-5 FREEWAY RAMPS						OSBORNE STREET				
				5	0	5				
				5	0	5				
				5	0	5				
5	5	5						175	165	180
1085	1165	1550		TS				1490	880	1160
0	0	0						0	0	0
				240	0	195				
				315	0	245				
				425	0	215				

N/S STREET				43		E/W STREET				
LAUREL CANYON BLVD						OSBORNE STREET				
				60	345	115				
				100	520	85				
				80	465	85				
125	95	100						180	110	120
900	1055	1375		TS				1425	735	925
250	240	235						120	100	130
				240	620	115				
				230	470	100				
				310	1135	130				



NOT TO SCALE

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8B
PCE EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-11E

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Table 4-4-10
Intersection Capacity Analysis – Existing + Project Conditions (Route 8A)
Traffic Impact Analysis - Site 8

Route 8A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
38	Branford Street and I-5 Freeway Southbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
39	Branford Street and I-5 Freeway Northbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
40	Branford Street and Laurel Canyon Blvd	B	10.4	0.52	B	A	9.6	0.40	B	B	14.1	0.80	D

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 4-4-11
Intersection Capacity Analysis – Existing + Project Conditions (Route 8B)
Traffic Impact Analysis - Site 8

Route 8B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
40	Branford Street and Laurel Canyon Blvd	B	15.4	0.81	C	B	10.3	0.47	B	C	25.8	1.06	F
41	Osborne Street and I-5 Freeway Southbound Ramps	B	12.0	0.75	C	B	16.3	0.85	B	C	25.3	0.91	D
42	Osborne Street and I-5 Freeway Northbound Ramps	B	13.6	0.70	A	B	11.7	0.66	A	B	15.6	0.83	C
43	Osborne Street and Laurel Canyon Blvd	C	31.8	0.88	D	C	20.9	0.73	C	D	45.8	0.98	F

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

As presented in *Table 4-4-10* and *Table 4-4-11*, under the existing plus project conditions for Site 8 (Routes 8A-8B) all intersections are expected to operate at an acceptable HCM LOS of C or better for the AM, Mid-day, and PM peak hours.

Haul Route 8C

The Haul Route 8C project trips, truck percentages and passenger car equivalent (PCE) project trips are illustrated in *Figure 4-4-12A* through *Figure 4-4-12F.* The existing plus project AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 4-4-12G* and *Figure 4-4-12H.* For comparison the (PCE) existing plus project turn movement volumes are provided in *Figure 4-4-12I* and *Figure 4-4-12J.*

N/S STREET				44			E/W STREET			
WHEATLAND AVE							EB I-210 FWY RAMPS			
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45			E/W STREET			
WHEATLAND AVE							WB I-210 FWY RAMPS			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				46			E/W STREET			
WHEATLAND AVE							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	50				
				0	0	50				
				0	0	50				

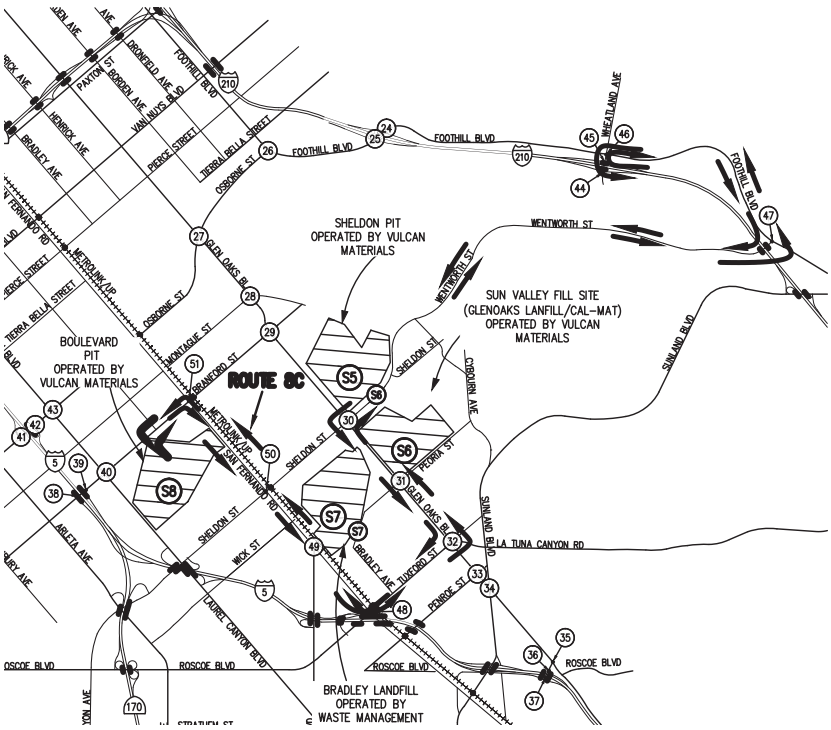
N/S STREET				47			E/W STREET			
WENTWORTH STREET							FOOTHILL BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						50	50	50
				0	0	50				
				0	0	50				
				0	0	50				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-12A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-12A.dwg
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N/S STREET				32			E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				50	0	0				
				50	0	0				
				50	0	0				
50	50	50						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				48			E/W STREET			
SAN FERNANDO ROAD							TUXFORD STREET			
				0	0	50				
				0	0	50				
				0	0	50				
0	0	0						50	50	50
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

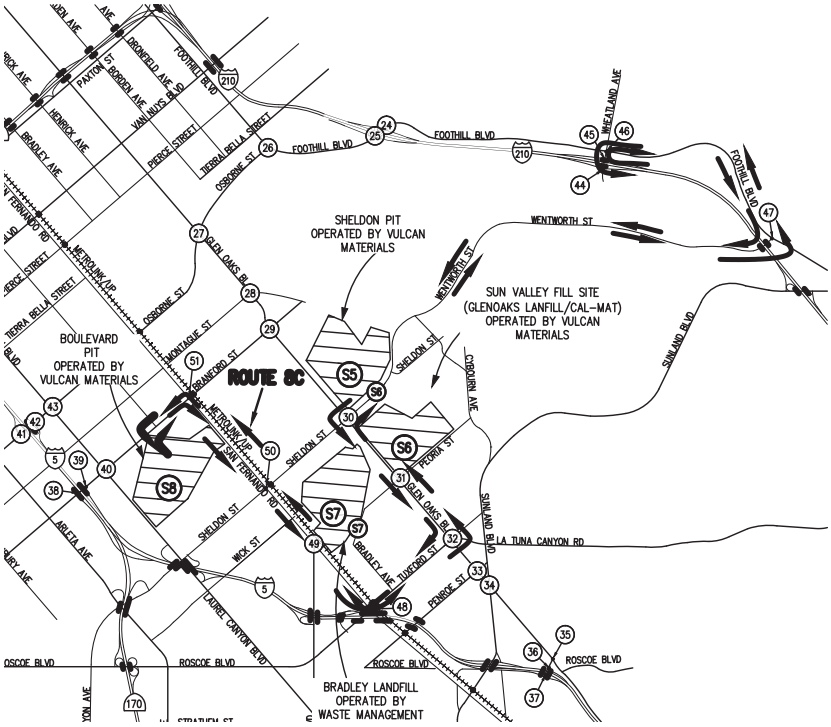
N/S STREET				49			E/W STREET			
SAN FERNANDO ROAD							LANKERSHIM BLVD			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET				50			E/W STREET			
SAN FERNANDO ROAD							SHELDON STREET			
				0	50	0				
				0	50	0				
				0	50	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	50	0				
				0	50	0				
				0	50	0				

N/S STREET				51			E/W STREET			
SAN FERNANDO ROAD							BRANFORD STREET			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
50	50	50						0	0	0
				50	0	0				
				50	0	0				
				50	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 8C PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-12B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-12B.dwg
Last Opened: Oct 04, 2013 – 12:04pm by: TMunoz

N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0%	0%	33%				
				0%	0%	45%				
				0%	0%	40%				
5%	5%	5%						0%	0%	0%
15%	15%	100%		TS				0%	0%	0%
0%	0%	0%						0%	0%	0%
				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				5%	35%	0%				
				5%	48%	0%				
				5%	38%	0%				
0%	0%	0%						37%	56%	29%
0%	0%	0%		TS				0%	0%	0%
0%	0%	0%						50%	5%	5%
				20%	5%	0%				
				5%	10%	0%				
				20%	5%	0%				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				5%	5%	20%				
				5%	5%	5%				
				5%	5%	5%				
30%	5%	5%						5%	5%	5%
5%	5%	5%		TS				5%	5%	5%
5%	5%	5%						42%	49%	34%
				5%	5%	35%				
				5%	5%	58%				
				5%	5%	33%				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

				0%	0%	0%				
				0%	0%	0%				
				0%	0%	0%				
0%	0%	0%						0%	0%	0%
5%	5%	5%		TS				5%	5%	5%
34%	55%	43%						5%	5%	5%
				53%	0%	5%				
				53%	0%	5%				
				35%	0%	5%				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

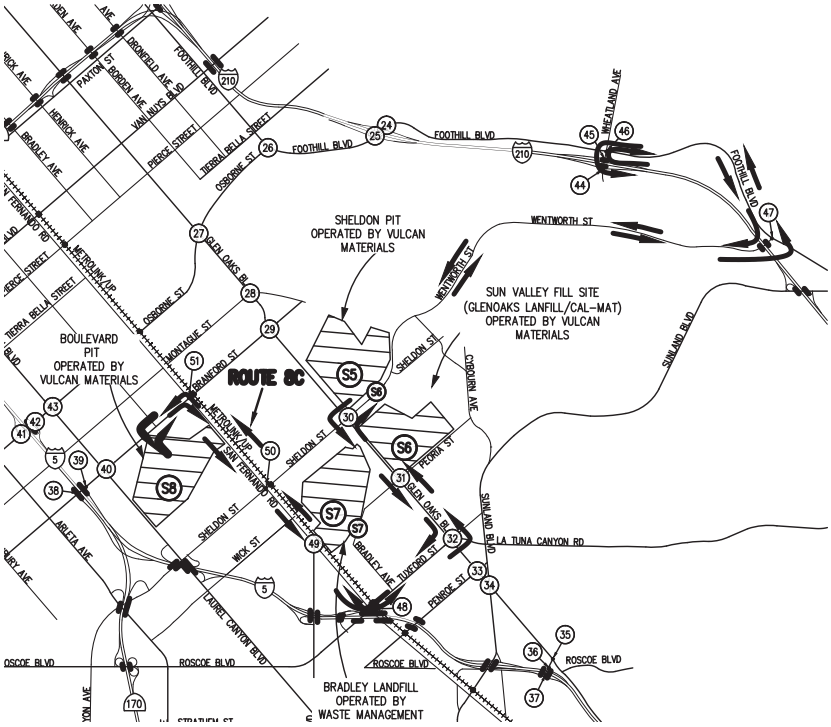
				10%	5%	30%				
				15%	5%	5%				
				5%	5%	5%				
5%	5%	5%						5%	10%	5%
5%	25%	5%		TS				5%	15%	5%
5%	25%	5%						5%	10%	20%
				10%	5%	10%				
				20%	5%	25%				
				10%	5%	10%				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				20%	5%	45%				
				45%	15%	40%				
				45%	5%	50%				
40%	40%	20%						20%	5%	20%
80%	60%	40%		TS				20%	20%	5%
40%	45%	45%						20%	30%	55%
				45%	10%	65%				
				15%	15%	45%				
				45%	5%	50%				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 8C TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-12C

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-12C.dwg
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N/S STREET				32		E/W STREET				
GLEN OAKS BLVD						TUXFORD STREET				
				57%	5%	5%				
				63%	15%	10%				
				42%	5%	5%				
48%	62%	45%						10%	10%	5%
5%	5%	5%		TS				5%	5%	5%
15%	15%	10%						5%	5%	5%
				15%	10%	20%				
				15%	10%	5%				
				10%	10%	5%				

N/S STREET				48		E/W STREET				
SAN FERNANDO ROAD						TUXFORD STREET				
				10%	20%	43%				
				10%	35%	54%				
				5%	5%	39%				
5%	15%	10%						39%	37%	35%
15%	15%	10%		TS				20%	40%	10%
5%	5%	5%						5%	5%	5%
				10%	30%	5%				
				5%	30%	10%				
				5%	5%	10%				

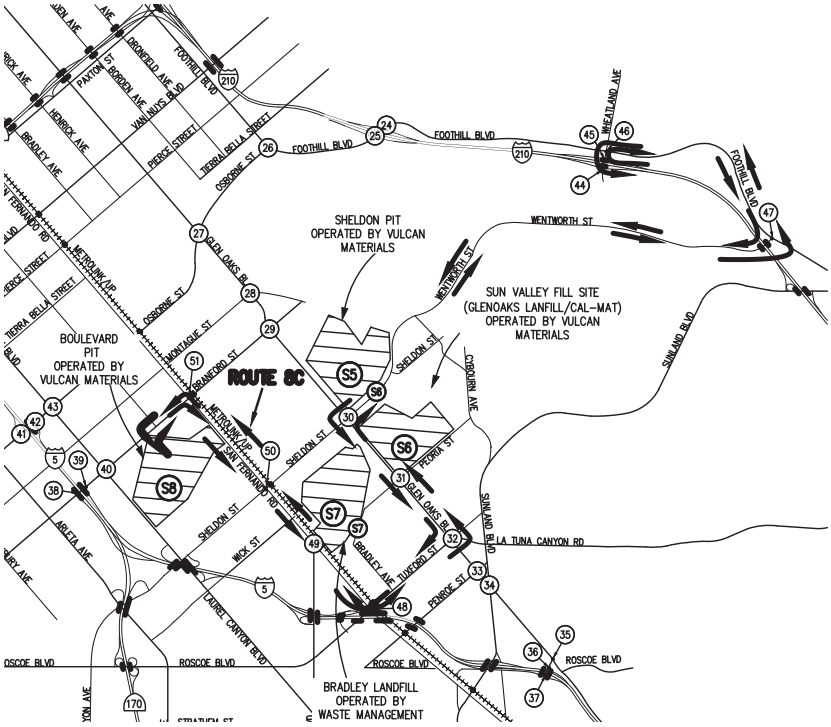
N/S STREET				49		E/W STREET				
SAN FERNANDO ROAD						LANKERSHIM BLVD				
				15%	24%	0%				
				10%	27%	0%				
				5%	23%	0%				
15%	10%	5%						0%	0%	0%
0%	0%	0%		TS				0%	0%	0%
20%	25%	15%						0%	0%	0%
				15%	29%	0%				
				25%	28%	0%				
				15%	12%	0%				

N/S STREET				50		E/W STREET				
SAN FERNANDO ROAD						SHELDON STREET				
				30%	12%	15%				
				5%	22%	5%				
				45%	12%	25%				
15%	5%	15%						15%	5%	25%
5%	5%	5%		TS				5%	15%	5%
20%	5%	20%						10%	5%	15%
				30%	23%	25%				
				15%	16%	5%				
				5%	10%	10%				

N/S STREET				51		E/W STREET				
SAN FERNANDO ROAD						BRANFORD STREET				
				5%	5%	10%				
				5%	5%	5%				
				5%	10%	10%				
5%	10%	15%						5%	15%	5%
5%	10%	15%		TS				5%	15%	15%
39%	62%	36%						20%	10%	10%
				60%	5%	15%				
				58%	10%	25%				
				27%	5%	5%				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 8C TRUCK PERCENTAGES

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-12D

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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				150	0	0				
				150	0	0				
				150	0	0				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

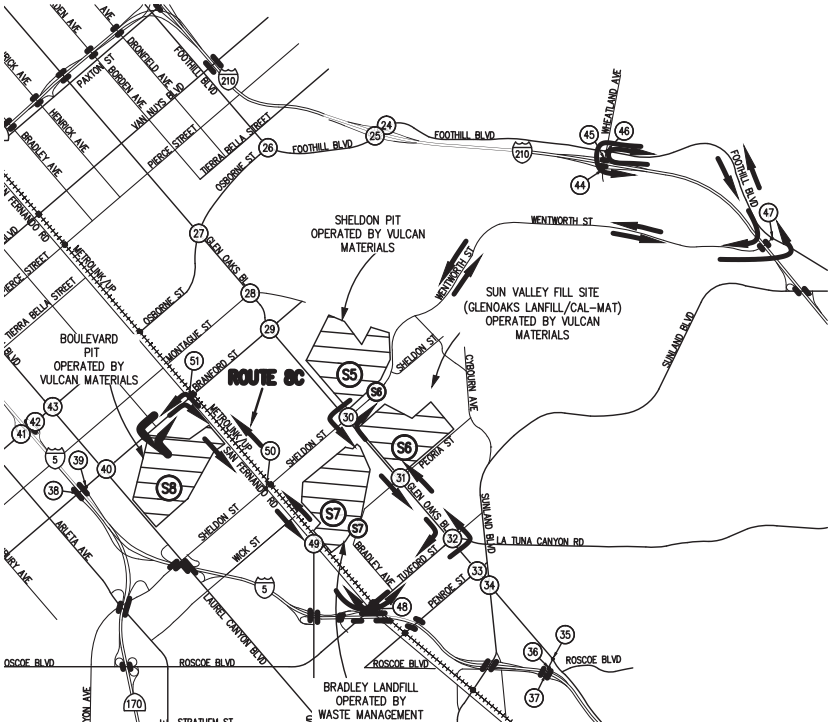
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						150	150	150
				0	0	150				
				0	0	150				
				0	0	150				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8C PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-12E

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N/S STREET	32	E/W STREET
GLEN OAKS BLVD		TUXFORD STREET

				150	0	0				
				150	0	0				
				150	0	0				
150	150	150						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	48	E/W STREET
SAN FERNANDO ROAD		TUXFORD STREET

				0	0	150				
				0	0	150				
				0	0	150				
0	0	0						150	150	150
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	49	E/W STREET
SAN FERNANDO ROAD		LANKERSHIM BLVD

				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	50	E/W STREET
SAN FERNANDO ROAD		SHELDON STREET

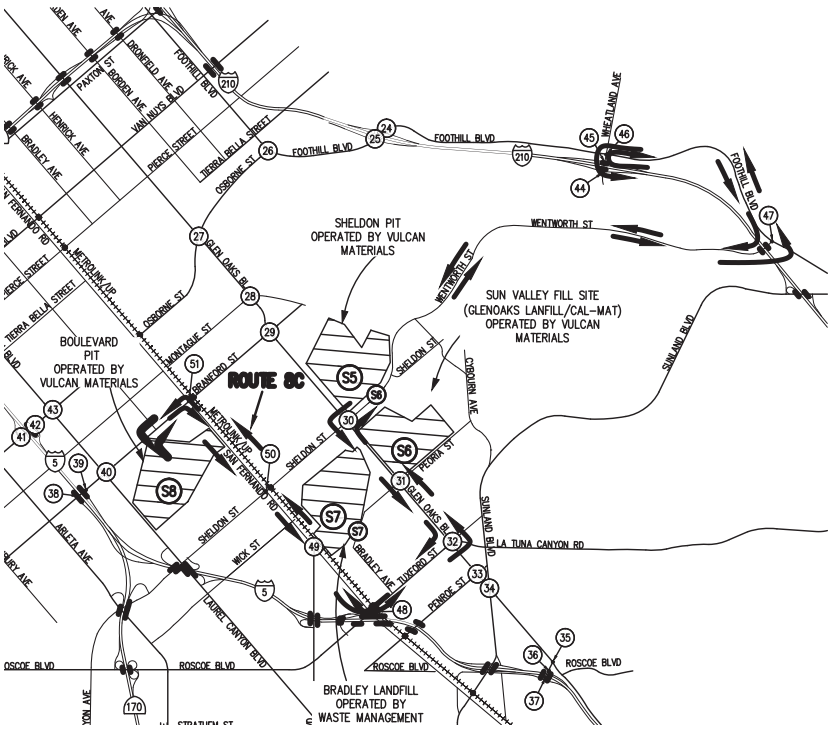
				0	150	0				
				0	150	0				
				0	150	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
0	0	0						0	0	0
				0	150	0				
				0	150	0				
				0	150	0				

N/S STREET	51	E/W STREET
SAN FERNANDO ROAD		BRANFORD STREET

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
0	0	0		TS				0	0	0
150	150	150						0	0	0
				150	0	0				
				150	0	0				
				150	0	0				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8C PCE PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-12F

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-12F.dwg
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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0	0	170				
				0	0	110				
				0	0	135				
105	75	100	↲	↱	↑	↳	↰	0	0	0
5	5	5	←	TS			←	0	0	0
0	0	0	↰	↱	↑	↳	↰	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				65	160	0				
				55	110	0				
				105	130	0				
0	0	0	↲	↱	↑	↳	↰	150	90	170
0	0	0	←	TS			←	5	5	5
0	0	0	↰	↱	↑	↳	↰	5	5	5
				5	100	0				
				5	55	0				
				5	95	0				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				5	15	15				
				15	20	5				
				5	20	10				
5	10	5	↲	↱	↑	↳	↰	5	20	15
195	135	170	←	TS			←	220	130	215
90	35	80	↰	↱	↑	↳	↰	130	115	145
				70	10	160				
				40	25	100				
				90	25	150				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	↲	↱	↑	↳	↰	0	0	0
200	165	200	←	TS			←	175	155	295
165	95	125	↰	↱	↑	↳	↰	440	215	215
				100	0	225				
				100	0	185				
				160	0	420				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				160	1235	85				
				95	490	50				
				145	730	90				
115	130	300	↲	↱	↑	↳	↰	40	50	60
405	240	325	←	TS			←	595	285	325
45	80	65	↰	↱	↑	↳	↰	140	95	90
				80	480	95				
				80	535	100				
				120	820	120				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				40	1300	30				
				15	580	10				
				15	795	35				
15	25	40	↲	↱	↑	↳	↰	10	15	55
5	5	10	←	TS			←	5	5	5
5	30	20	↰	↱	↑	↳	↰	15	20	30
				15	575	25				
				25	575	15				
				25	1025	25				

N

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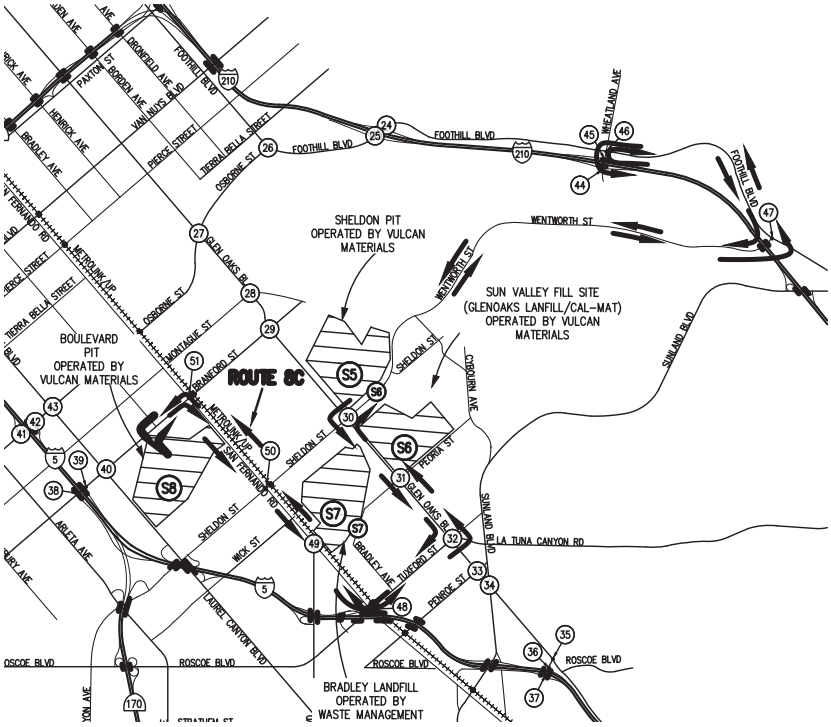

LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↲	↱	↑	↳	↰	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↰	↱	↑	↳	↰			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8C
EXISTING + PROJECT TRIPS

DEVIL'S GATE DAM & RESERVOIR

FIGURE

4-4-12G

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Last Opened: Oct 04, 2013 – 12:04pm by: TMunoz

N/S STREET				32		E/W STREET				
GLEN OAKS BLVD						TUXFORD STREET				
				175	1015	90				
				150	355	90				
				140	590	130				
165	160	190						75	45	80
470	390	505		TS				565	425	345
45	60	95						30	25	60
				95	395	20				
				110	435	30				
				120	800	60				

N/S STREET				48		E/W STREET				
SAN FERNANDO ROAD						TUXFORD STREET				
				70	325	175				
				70	220	110				
				40	275	140				
65	80	30						155	150	180
515	380	570		TS				650	355	430
110	185	145						115	175	80
				250	210	60				
				315	185	135				
				330	580	65				

N/S STREET				49		E/W STREET				
SAN FERNANDO ROAD						LANKERSHIM BLVD				
				470	495	0				
				280	355	0				
				360	360	0				
225	275	550						0	0	0
0	0	0		TS				0	0	0
35	60	55						0	0	0
				50	310	0				
				55	335	0				
				80	670	0				

N/S STREET				50		E/W STREET				
SAN FERNANDO ROAD						SHELDON STREET				
				85	660	65				
				45	385	65				
				30	645	75				
60	60	125						55	55	100
355	320	560		TS				635	320	405
75	40	65						220	125	165
				35	340	80				
				50	425	95				
				115	1025	160				

N/S STREET				51		E/W STREET				
SAN FERNANDO ROAD						BRANFORD STREET				
				70	635	40				
				55	330	65				
				115	530	100				
35	35	90						20	45	105
300	180	385		TS				145	150	285
155	95	155						55	70	125
				100	240	90				
				100	345	70				
				220	820	130				

N

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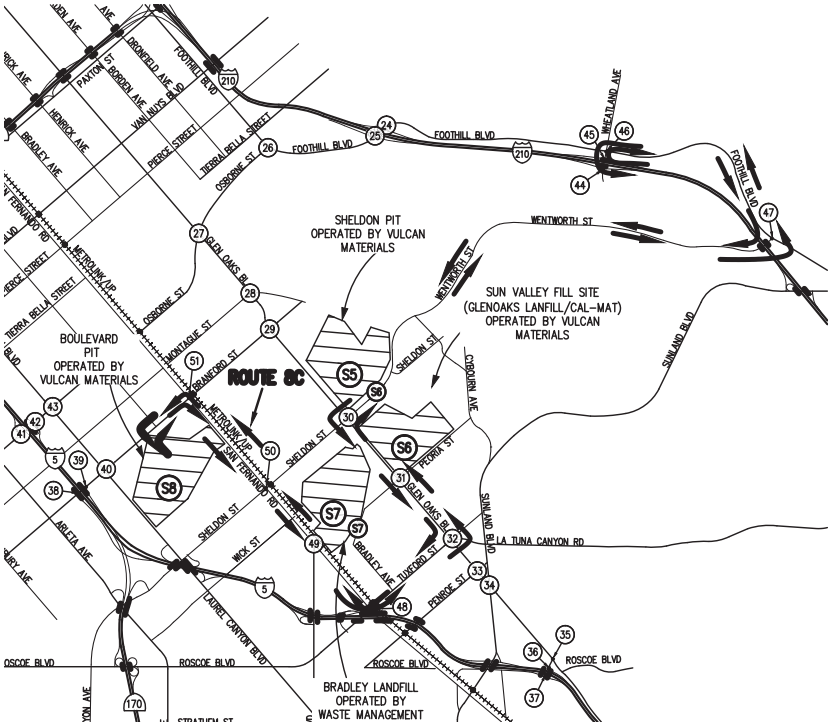

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8C
EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-12H

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 4\Ch. 4 Section 4\FIG 4-4-12H.dwg
Last Opened: Oct 04, 2013 - 12:04pm by: TMunoz

N/S STREET				44		E/W STREET				
WHEATLAND AVE						EB I-210 FWY RAMPS				
				0	0	275				
				0	0	210				
				0	0	240				
115	85	100						0	0	0
10	10	5		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45		E/W STREET				
WHEATLAND AVE						WB I-210 FWY RAMPS				
				75	265	0				
				60	215	0				
				105	230	0				
0	0	0						260	190	270
0	0	0		TS				5	5	5
0	0	0						5	5	5
				5	105	0				
				5	65	0				
				5	100	0				

N/S STREET				46		E/W STREET				
WHEATLAND AVE						FOOTHILL BLVD				
				5	15	20				
				15	20	5				
				5	20	10				
10	10	5						5	20	15
215	150	175		TS				245	145	230
90	40	80						240	230	245
				80	10	265				
				40	25	210				
				90	25	250				

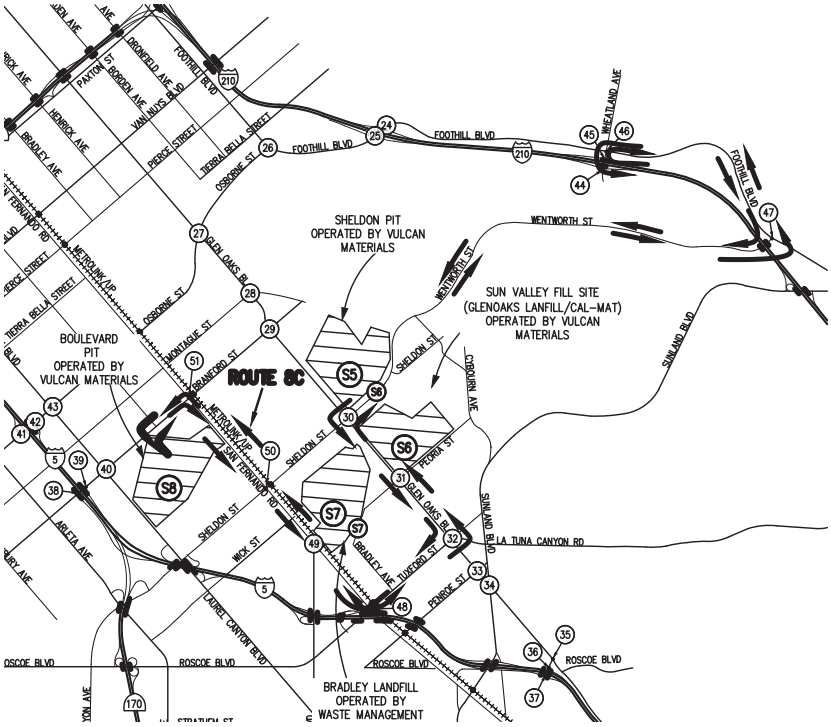
N/S STREET				47		E/W STREET				
WENTWORTH STREET						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
205	175	200		TS				185	165	300
270	200	230						450	225	240
				205	0	240				
				205	0	190				
				265	0	425				

N/S STREET				30		E/W STREET				
GLEN OAKS BLVD						SHELDON STREET				
				200	1355	135				
				125	555	60				
				155	785	100				
130	150	330						50	60	65
430	370	335		TS				660	370	350
50	120	75						255	200	200
				100	520	200				
				110	605	220				
				140	905	230				

N/S STREET				31		E/W STREET				
GLEN OAKS BLVD						PEORIA STREET				
				205	1385	55				
				180	705	20				
				180	830	65				
175	195	205						15	15	75
10	10	20		TS				10	5	5
5	60	40						20	30	65
				30	610	60				
				35	660	30				
				45	1110	50				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

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PCE EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE
4-4-12I

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N/S STREET				32		E/W STREET				
GLEN OAKS BLVD						TUXFORD STREET				
				370	1120	100				
				345	455	105				
				230	561	122				
325	350	257						90	55	77
510	445	487		TS				615	450	332
55	80	86						30	30	56
				120	470	30				
				140	530	30				
				106	725	55				

N/S STREET				48		E/W STREET				
SAN FERNANDO ROAD						TUXFORD STREET				
				85	445	320				
				85	360	230				
				40	315	285				
70	105	35						270	260	315
650	510	680		TS				910	660	520
125	205	160						125	200	90
				315	340	65				
				340	305	160				
				350	655	75				

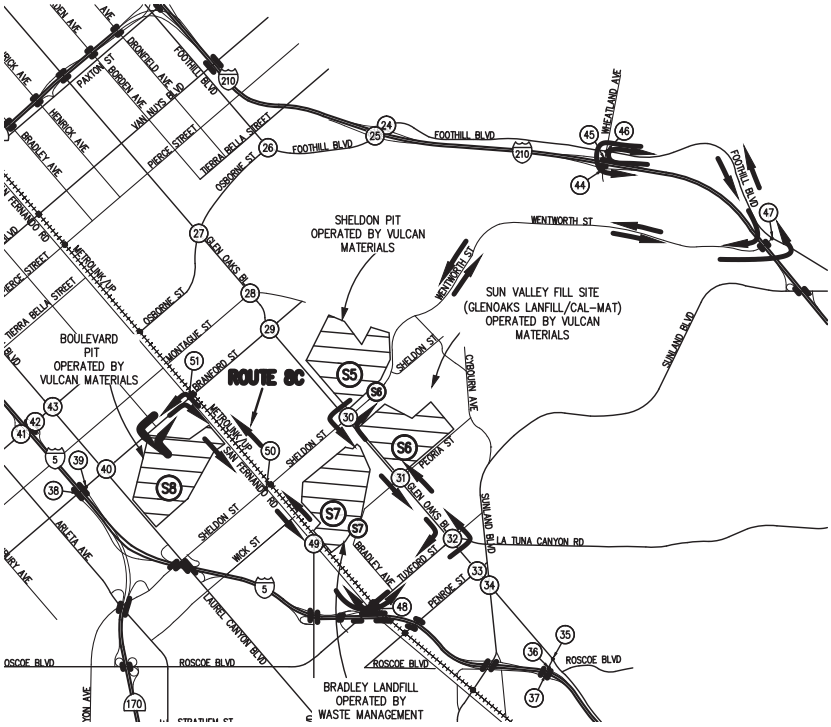
N/S STREET				49		E/W STREET				
SAN FERNANDO ROAD						LANKERSHIM BLVD				
				625	725	0				
				330	545	0				
				400	515	0				
295	335	625						0	0	0
0	0	0		TS				0	0	0
45	90	70						0	0	0
				65	480	0				
				80	515	0				
				105	860	0				

N/S STREET				50		E/W STREET				
SAN FERNANDO ROAD						SHELDON STREET				
				135	805	85				
				45	550	65				
				30	745	75				
75	60	125						70	55	100
380	365	560		TS				670	405	405
100	40	65						255	135	165
				60	490	120				
				60	570	95				
				115	1125	160				

N/S STREET				51		E/W STREET				
SAN FERNANDO ROAD						BRANFORD STREET				
				75	715	50				
				65	370	70				
				120	620	120				
40	45	120						20	55	105
330	220	490		TS				165	190	380
275	215	260						80	80	150
				220	275	115				
				215	415	105				
				335	920	140				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8C
PCE EXISTING + PROJECT TRIPS
DEVIL'S GATE DAM & RESERVOIR

FIGURE 4-4-12J

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Table 4-4-12
Intersection Capacity Analysis – Existing + Project Conditions (Route 8C)
Traffic Impact Analysis - Site 8

Route 8C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glen Oaks Blvd and Sheldon Street	B	11.7	0.78	D	A	7.3	0.45	A	B	11.1	0.75	D
31	Glen Oaks Blvd and Peoria Street	B	10.5	0.57	A	A	9.3	0.39	A	B	15.5	0.54	A
32	Glen Oaks Blvd and Tuxford Street	C	20.2	0.96	D	A	8.1	0.57	A	A	9.8	0.65	C
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramp	B	10.7	-	-	A	9	-	-	A	9.1	-	-
46	Wheatland Ave and Foothill Blvd	B	10.6	0.42	A	B	10.3	0.36	A	B	10.5	0.43	A
47	Wentworth Street and Foothill Blvd	B	19.4	0.78	A	B	12.4	0.4	A	A	9.2	0.43	A
48	Tuxford Street and San Fernando Road	D	41.5	0.76	C	C	34.2	0.72	B	D	35.5	0.71	B
49	Lankershim Blvd and San Fernando Road	A	8.0	0.52	A	A	7.5	0.43	A	A	9.1	0.51	A
50	Sheldon Street and San Fernando Road	C	31.5	0.75	B	C	23.7	0.50	A	D	46.0	0.94	D
51	Branford Street and San Fernando Road	C	31.8	0.85	B	C	26.9	0.46	A	E	68.9	0.95	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 8C Analysis

As presented in *Table 4-4-12*, under the existing plus project conditions for Site 8 (Routes 8C) most study intersections are expected to operate at an acceptable HCM LOS of D or better for the AM, Mid-day, and PM peak hours. As identified earlier the intersection of Branford Street and San Fernando Road is anticipated to operate at a HCM LOS E during the PM peak hours and will require mitigation to improve to acceptable HCM LOS.

Existing + Project Intersection Capacity Analysis

In Summary, most of the intersections associated with the twenty five routes are expected to operate at an acceptable level of service with the exception of intersections noted for existing conditions and two additional intersections that will require traffic mitigation. The intersections include Berkshire Place and I-210 Freeway Eastbound Ramps anticipated (Route 1A,1D, 1E,1G) AM peak period HCM LOS E and Figueroa Street and SR-134 Westbound Ramps anticipated (Route 4A) AM peak hour and Haul (Route 4B) PM peak hour HCM LOS E. As previously identified the intersections Glenoaks Blvd and Osborne Street (Haul Routes 5A, 6A, 7A) with an AM peak hour HCM LOS E and Branford Street and San Fernando Road (Haul Route 8C) with a PM peak hour HCM LOS E are anticipated to continue to operate at HCM LOS E or lower.

Section 5: (Caltrans)

Existing plus project AM (7-9), MID-DAY (12-2), and PM (4-6) freeway segment volumes are provided in *Figure 4-5-1* and *Figure 4-5-2.* Existing plus project AM (7-9), MID-DAY (12-2), and PM (4-6) ramp volumes are provided in *Figure 4-5-3* and *Figure 4-5-4.*

S1–EB I–210 FWY		S1–WB I–210 FWY	
SEGMENT BETWEEN BERKSHIRE PLACE AND WINDSOR AVE.		SEGMENT BETWEEN WINDSOR AVE AND BERKSHIRE PLACE .	
AM	5620→	AM	←3415
MID–DAY	3560→	MID–DAY	←2510
PM	4385→	PM	←4110

S2–EB I–210 FWY		S2–WB I–210 FWY	
SEGMENT BETWEEN WINDSOR AVE AND LINCOLN AVE.		SEGMENT BETWEEN LINCOLN AVE AND WINDSOR AVE.	
AM	5715→	AM	←3830
MID–DAY	3650→	MID–DAY	←3685
PM	4400→	PM	←5660

S3–EB I–210 FWY		S3–WB I–210 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND SR–134/1–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/1–210 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	5570→	AM	←4825
MID–DAY	3545→	MID–DAY	←3955
PM	4150→	PM	←5665

S4–EB SR–134 FWY		S4–WB SR–134 FWY	
SEGMENT BETWEEN FIGUEROA ST AND SAN RAFAEL AVE.		SEGMENT BETWEEN SAN RAFAEL AVE AND FIGUEROA ST.	
AM	6020→	AM	←8030
MID–DAY	5660→	MID–DAY	←5655
PM	6775→	PM	←7425

S5–EB SR–134 FWY		S5–WB SR–134 FWY	
SEGMENT BETWEEN SAN RAFAEL AVE AND SR–134/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/I–210 FWY INTERCHANGE AND SAN RAFAEL AVENUE.	
AM	7465→	AM	←7520*
MID–DAY	6680→	MID–DAY	←5265*
PM	8135→	PM	←7150*

S6–EB I–210 FWY		S6–WB I–210 FWY	
SEGMENT BETWEEN WB SR–134/EB I–210 FWY INTERCHANGE AND LAKE AVE.		SEGMENT BETWEEN LAKE AVE AND EB SR–134/WB I–210 FWY INTERCHANGE.	
AM	5165→	AM	←9760
MID–DAY	4190→	MID–DAY	←7470
PM	4375→	PM	←8450

S7–EB I–210 FWY		S7–WB I–210 FWY	
SEGMENT BETWEEN I–605 FREEWAY AND IRWINDALE AVE.		SEGMENT BETWEEN IRWINDALE AVE AND I–605 FREEWAY.	
AM	5565→	AM	←7120
MID–DAY	5250→	MID–DAY	←6875
PM	5665→	PM	←7570

S8–EB I–210 FWY		S8–WB I–210 FWY	
SEGMENT BETWEEN IRWINDALE AVE AND AZUSA AVE.		SEGMENT BETWEEN AZUSA AVE AND IRWINDALE AVE.	
AM	6275→	AM	←6765
MID–DAY	6710→	MID–DAY	←6680
PM	6315→	PM	←8550

S9–EB I–210 FWY		S9–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND BERKSHIRE PLACE.		SEGMENT BETWEEN BERKSHIRE PLACE AND FOOTHILL BLVD	
AM	5620*→	AM	←3755
MID–DAY	3610*→	MID–DAY	←3695
PM	4225*→	PM	←5815

S10–EB I–210 FWY		S10–WB I–210 FWY	
SEGMENT BETWEEN SR–2 FWY AND ANGELES CREST HWY.		SEGMENT BETWEEN ANGELES CREST HWY AND SR–2 FWY.	
AM	N/D→	AM	←3500
MID–DAY	N/D→	MID–DAY	←3355
PM	N/D→	PM	←5545

S11–NB SR–2 FWY		S11–SB SR–2 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND I–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN I–210/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	2640→	AM	←6065
MID–DAY	5250→	MID–DAY	←2145
PM	5660→	PM	←2840

S12–NB SR–2 FWY		S12–SB SR–2 FWY	
SEGMENT BETWEEN SR–134/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.		SEGMENT BETWEEN MOUNTAIN ST AND SR–134/SR–2 FWY INTERCHANGE.	
AM	N/D→	AM	←6525
MID–DAY	N/D→	MID–DAY	←2630
PM	N/D→	PM	←3285

S13–EB SR–134 FWY		S13–WB SR–134 FWY	
SEGMENT BETWEEN SR–2 FWY AND FIGUEROA ST.		SEGMENT BETWEEN FIGUEROA ST AND SR–2 FWY.	
AM	6080*→	AM	←6350
MID–DAY	6295*→	MID–DAY	←5085
PM	6955*→	PM	←6375

S14–EB SR–134 FWY		S14–WB SR–134 FWY	
SEGMENT BETWEEN GLENDALE AVE AND SR–2 FWY.		SEGMENT BETWEEN SR–2 FWY AND GLENDALE AVE.	
AM	6540→	AM	←N/D
MID–DAY	7225→	MID–DAY	←N/D
PM	8485→	PM	←N/D

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

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EXISTING + PROJECT TRIPS FREEWAY SEGMENTS 1–14

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4–5–1

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S15–EB SR–134 FWY		S15–WB SR–134 FWY	
SEGMENT BETWEEN SAN FERNANDO ST AND PACIFIC AVE.		SEGMENT BETWEEN PACIFIC AVE AND SAN FERNANDO ST.	
AM	7235→	AM	←7880
MID-DAY	7010→	MID-DAY	←7635
PM	7505→	PM	←8175

S16–EB SR–134 FWY		S16–WB SR–134 FWY	
SEGMENT BETWEEN SR–134/I–5 FWY INTERCHANGE AND SAN FERNANDO ST.		SEGMENT BETWEEN SAN FERNANDO ST. AND SR–134/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6420
MID-DAY	N/D→	MID-DAY	←5050
PM	N/D→	PM	←8435

S17–SB I–5 FWY		S17–NB I–5 FWY	
SEGMENT BETWEEN WESTERN AVE AND I–5/SR–134 FWY INTERCHANGE.		SEGMENT BETWEEN I–5/SR–134 FWY INTERCHANGE AND WESTERN AVE.	
AM	6500→	AM	←N/D
MID-DAY	7145→	MID-DAY	←N/D
PM	7045→	PM	←N/D

S18–SB I–5 FWY		S18–NB I–5 FWY	
SEGMENT BETWEEN ROSCOE BLVD/GLEN OAKS BLVD AND N. HOLLYWOOD WAY.		SEGMENT BETWEEN N. HOLLYWOOD WAY AND ROSCOE BLVD/GLEN OAKS BLVD.	
AM	6040→	AM	←5540
MID-DAY	5010→	MID-DAY	←6080
PM	4675→	PM	←6620

S19–SB I–5 FWY		S19–NB I–5 FWY	
SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND SHELDON ST.		SEGMENT BETWEEN SHELDON ST AND I–5/SR–170 FWY INTERCHANGE.	
AM	N/D→	AM	←5000
MID-DAY	N/D→	MID-DAY	←5495
PM	N/D→	PM	←4805

S20–SB I–5 FWY		S20–NB I–5 FWY	
SEGMENT BETWEEN BRANFORD ST. AND I–5/SR–170 FWY INTERCHANGE		SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND BRANFORD ST.	
AM	12645→	AM	←N/D
MID-DAY	8470→	MID-DAY	←N/D
PM	9295→	PM	←N/D

S21–EB I–210 FWY		S21–WB I–210 FWY	
SEGMENT BETWEEN MONTROSE AVE AND EB–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN EB–210/SR–2 FWY INTERCHANGE AND MONTROSE AVE.	
AM	N/D→	AM	←N/D
MID-DAY	N/D→	MID-DAY	←N/D
PM	N/D→	PM	←N/D

S22–EB I–210 FWY		S22–WB I–210 FWY	
SEGMENT BETWEEN WHEATLAND AVE AND SUNLAND AVE.		SEGMENT BETWEEN SUNLAND AVE AVE WHEATLAND AVE.	
AM	4785→	AM	←N/D
MID-DAY	2720→	MID-DAY	←N/D
PM	3700→	PM	←N/D

S23–EB I–210 FWY		S23–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND WHEATLAND AVE.		SEGMENT BETWEEN WHEATLAND AVE AND FOOTHILL BLVD.	
AM	4455→	AM	←4130
MID-DAY	3480→	MID-DAY	←3530
PM	4900→	PM	←6740

S24–EB I–210 FWY		S24–WB I–210 FWY	
SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND FOOTHILL BLVD		SEGMENT BETWEEN FOOTHILL BLVD AND SR–118/I–210 FWY INTERCHANGE.	
AM	N/D→	AM	←4080
MID-DAY	N/D→	MID-DAY	←3380
PM	N/D→	PM	←5690

S25–EB SR–118 FWY		S25–WB SR–118 FWY	
SEGMENT BETWEEN GLEN OAKS BLVD AND SR–118/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND GLEN OAKS BLVD.	
AM	N/D→	AM	←N/D
MID-DAY	N/D→	MID-DAY	←N/D
PM	N/D→	PM	←N/D

S26–EB SR–118 FWY		S26–WB SR–118 FWY	
SEGMENT BETWEEN SR–118/I–5 FWY INTERCHANGE AND SAN FERNANDO RD.		SEGMENT BETWEEN SAN FERNANDO RD AND SR–118/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6265
MID-DAY	N/D→	MID-DAY	←3600
PM	N/D→	PM	←5740

S27–SB I–5 FWY		S27–NB I–5 FWY	
SEGMENT BETWEEN I–5/ SR–118 FWY INTERCHANGE AND VAN NUYS BLVD.		SEGMENT BETWEEN VAN NUYS BLVD AND I–5/ SR–118 FWY INTERCHANGE.	
AM	9120→	AM	←8035
MID-DAY	7155→	MID-DAY	←8390
PM	7860→	PM	←8555

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

S28–SB I–5 FWY		S28–NB I–5 FWY	
SEGMENT BETWEEN VAN NUYS BLVD AND OSBORNE ST.		SEGMENT BETWEEN OSBORNE ST AND VAN NUYS BLVD.	
AM	N/D→	AM	←N/D
MID-DAY	N/D→	MID-DAY	←N/D
PM	N/D→	PM	←N/D

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EXISTING + PROJECT TRIPS FREEWAY SEGMENTS 15–28

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4–5–2

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R1–EB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	465
MID–DAY	205
PM	310

R2–WB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	400
MID–DAY	270
PM	525

R3–EB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	315
MID–DAY	185
PM	455

R4–WB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	390
MID–DAY	180
PM	230

R5–EB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	710
MID–DAY	430
PM	755

R6–WB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	625
MID–DAY	380
PM	600

R7–EB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	485
MID–DAY	360
PM	490

R8–WB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	630
MID–DAY	250
PM	485

R9–EB 210 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY AND WB SR–134 FREEWAY TRANSITION/OFF–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R10–WB 210 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R11–WB 134 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R12–EB 134 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R13–WB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD OFF–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R14–EB 210 FREEWAY	
MERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD ON–RAMP	
AM	385
MID–DAY	340
PM	370

R15–EB 210 FREEWAY	
MERGE POINT	
EB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R16–WB 210 FREEWAY	
DIVERGE POINT	
WB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R17–EB 210 FREEWAY	
DIVERGE POINT	
IRWINDALE AVENUE OFF–RAMP	
AM	1170
MID–DAY	1010
PM	815

R18–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE ON–RAMP	
AM	635
MID–DAY	470
PM	525

R19–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE SLIP ON–RAMP	
AM	660
MID–DAY	595
PM	525

R20–WB 210 FREEWAY	
MERGE POINT	
AZUSA AVENUE/FIRST STREET ON–RAMP	
AM	915
MID–DAY	410
PM	450

R21–WB 210 FREEWAY	
DIVERGE POINT	
SB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	1535
MID–DAY	710
PM	870

R22–EB 210 FREEWAY	
MERGE POINT	
NB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	575
MID–DAY	610
PM	835

R23–SB 2 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	1535
MID–DAY	710
PM	920

R24–NB 2 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	575
MID–DAY	610
PM	835

R25–SB 2 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R26–NB 2 FREEWAY	
MERGE POINT	
WB AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	1270
MID–DAY	1660
PM	2420

R27–EB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D
MID–DAY	N/D
PM	N/D

R28–WB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	1120
MID–DAY	790
PM	1230

R29–EB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD OFF–RAMP	
AM	445
MID–DAY	360
PM	560

LEGEND

XXX → EXISTING VOLUMES
N/D → NO DATA AVAILABLE
* → CALCULATED VOLUME

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EXISTING + PROJECT TRIPS RAMPS 1–29

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4–5–3

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R30–WB 134 FREEWAY	
MERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R31–WB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R32–EB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	2050 ►
MID–DAY	2310 ►
PM	3230 ►

R33–WB 134 FREEWAY	
DIVERGE POINT	
NB I–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ 2930
MID–DAY	◄ 2675
PM	◄ 2805

R34–EB 134 FREEWAY	
MERGE POINT	
SB I–5 FREEWAY TRANSITION/ ON–RAMP	
AM	2920 ►
MID–DAY	2680 ►
PM	3035 ►

R35–NB 5 FREEWAY	
MERGE POINT	
WB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	◄ 2950
MID–DAY	◄ 2540
PM	◄ 2805

R36–SB 5 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R37–NB 5 FREEWAY	
DIVERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD OFF–RAMP	
AM	◄ 335
MID–DAY	◄ 345
PM	◄ 680

R38–SB 5 FREEWAY	
MERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD ON–RAMP	
AM	650 ►
MID–DAY	420 ►
PM	455 ►

R39–SB 5 FREEWAY	
MERGE POINT	
BRANFORD STREET ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R40–NB 5 FREEWAY	
DIVERGE POINT	
BRANFORD STREET OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R41–WB 210 FREEWAY	
DIVERGE POINT	
WHEATLAND AVE OFF–RAMP	
AM	◄ 120
MID–DAY	◄ 115
PM	◄ 160

R42–EB 210 FREEWAY	
MERGE POINT	
WHEATLAND AVE ON–RAMP	
AM	175 ►
MID–DAY	115 ►
PM	140 ►

R43–WB 210 FREEWAY	
DIVERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET OFF–RAMP	
AM	◄ 280
MID–DAY	◄ 200
PM	◄ 320

R44–EB 210 FREEWAY	
MERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET ON–RAMP	
AM	535 ►
MID–DAY	285 ►
PM	345 ►

R45–WB 210 FREEWAY	
DIVERGE POINT	
WB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R46–EB 210 FREEWAY	
MERGE POINT	
EB SR–118 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R47–WB 118 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R48–EB 118 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R49–WB 118 FREEWAY	
DIVERGE POINT	
SB 1–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R50–EB 118 FREEWAY	
MERGE POINT	
NB I–5 FREEWAY TRANSITION/ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R51–SB 5 FREEWAY	
MERGE POINT	
WB SR–118 FREEWAY TRANSITION/ON–RAMP	
AM	N/D ►
MID–DAY	N/D ►
PM	N/D ►

R52–NB 5 FREEWAY	
DIVERGE POINT	
EB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄ N/D
MID–DAY	◄ N/D
PM	◄ N/D

R53–SB 5 FREEWAY	
MERGE POINT	
OSBORNE STREET ON–RAMP	
AM	405 ►
MID–DAY	810 ►
PM	1135 ►

R54–NB 5 FREEWAY	
DIVERGE POINT	
OSBORNE STREET OFF–RAMP	
AM	◄ 460
MID–DAY	◄ 575
PM	◄ 665

LEGEND

XXX► EXISTING VOLUMES
N/D► NO DATA AVAILABLE
*► CALCULATED VOLUME

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EXISTING + PROJECT TRIPS RAMPS 30–54

DEVIL'S GATE DAM & RESERVOIR

FIGURE 4–5–4

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Last Opened: Oct 04, 2013 – 12:08pm by: TMunoz

Existing + Project Freeway Mainline HCM Analysis

Freeway mainline capacity analyses were conducted for the 28 freeway segments identified utilizing the methods as discussed previously and using the existing geometrics. The resulting LOS for the existing plus project conditions of each freeway segment analyzed is presented in *Table 4-5-1*.

Table 4-5-1
Freeway Mainline Capacity Analysis – Existing + Project Conditions
Traffic Impact Analysis

Segment/Freeway Name		AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
1	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	12.2	B	9.1	A	14.7	B
2	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	21.4	C	13.7	B	16.5	B
3	I-210 WB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	14.3	B	14.2	B	22.1	C
4	I-210 EB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	21.3	C	13.3	B	15.9	B
5	I-210 WB between the SR-134 Fwy and Mountain Street.	13.7	B	11.8	B	16.6	B
6	I-210 EB between the SR-134 Fwy and Mountain Street.	20.9	C	12.8	B	15.2	B
7	SR-134 WB between San Rafael Ave and Figueroa Street	24.9	C	16.5	B	22.6	C
8	SR-134 EB between San Rafael Ave and Figueroa Street	17.2	B	16.1	B	19.7	C
9	SR-134 WB between the I-210 Fwy and San Rafael Ave.	23.8	C	15.7	B	22.3	C
10	SR-134 EB between the I-210 Fwy and San Rafael Ave.	17.2	B	19.3	C	24.9	C
11	I-210 WB between the SR-134 Fwy and Lake Ave.	33.7	D	23.3	C	28.7	D
12	I-210 EB between the SR-134 Fwy and Lake Ave.	31.1	D	32.4	D	34.6	D
13	I-210 WB between the I-605 Fwy and Irwindale Avenue.	21.4	C	20.5	C	23.4	C
14	I-210 EB between the I-605 Fwy and Irwindale Avenue.	15.9	B	15.1	B	16.4	B
15	I-210 WB between Irwindale Avenue and Azusa Avenue.	20.0	C	19.7	C	27.3	D
16	I-210 EB between Irwindale Avenue and Azusa Avenue.	18.4	C	19.9	C	18.8	C
17	I-210 WB between Berkshire Place and Foothill Blvd.	14.0	B	14.2	B	22.7	C
18	I-210 EB between Berkshire Place and Foothill Blvd.	21.8	C	13.4	B	15.7	B
19	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	12.7	B	12.5	B	20.8	C
20	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
21	SR-2 NB between the I-210 Fwy and Mountain Street.	7.9	A	15.6	B	16.9	B
22	SR-2 SB between the I-210 Fwy and Mountain Street.	24.1	C	8.0	A	10.6	A
23	SR-2 NB between Mountain Street and the SR-134 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
24	SR-2 SB between Mountain Street and the SR-134 Fwy.	26.8	D	9.8	A	12.2	B

Table 4-5-1 -Continued-
Freeway Mainline Capacity Analysis – Existing + Project Conditions
Traffic Impact Analysis

	Segment/Freeway Name	AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
25	SR-134 WB between the SR-2 Fwy and Figueroa Street.	18.4	C	14.5	B	18.5	C
26	SR-134 EB between the SR-2 Fwy and Figueroa Street.	18.3	C	19.1	C	21.4	C
27	SR-134 WB between the SR-2 Fwy and Glendale Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
28	SR-134 EB between the SR-2 Fwy and Glendale Avenue.	20.0	C	22.6	C	28.4	D
29	SR-134 WB between San Fernando Street and Pacific Ave.	27.9	D	18.4	C	19.9	C
30	SR-134 EB between San Fernando Street and Pacific Ave.	31.5	D	29.9	D	33.6	D
31	SR-134 WB between San Fernando Street and the I-5 Freeway.	26.1	D	19.2	C	42.5	E
32	SR-134 EB between San Fernando Street and the I-5 Freeway.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
33	I-5 SB between the SR-134 Fwy and Western Avenue.	26.4	D	30.7	D	30.4	D
34	I-5 NB between the SR-134 Fwy and Western Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	I-5 NB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	20.7	C	23.3	C	26.0+	D
36	I-5 SB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	24.0	C	19.0	C	17.5	B
37	I-5 SB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	I-5 NB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy.	18.9	C	21.2	C	17.5	B
39	I-5 SB between the SR-170 Fwy and Branford Street.	272.4	F	40.3	E	49.6	F
40	I-5 NB between the SR-170 Fwy and Branford Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
41	I-210WB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
42	I-210EB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
43	I-210 WB between Wheatland Ave and Sunland Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
44	I-210 EB between Wheatland Ave and Sunland Blvd.	17.3	B	10.3	A	14.2	B
45	I-210 WB between Wheatland Ave and Foothill Blvd/Osborne Street.	14.8	B	13.1	B	26.7	C
46	I-210 EB between Wheatland Ave and Foothill Blvd/Osborne Street.	16.5	B	12.9	B	18.8	C
47	I-210 WB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	15.2	B	12.6	B	22.3	C
48	I-210 EB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	SR-118WB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	SR-118EB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 4-5-1 -Continued-
Freeway Mainline Capacity Analysis – Existing + Project Conditions
Traffic Impact Analysis

Segment/Freeway Name		AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
51	SR-118 WB between San Fernando Rd and the I-210 Fwy.	40.5	E	17.7	B	34.0	D
52	SR-118 EB between San Fernando Rd and the I-210 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
53	I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	35.5	E	39.1	E	40.7	E
54	I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	24.0	C	17.9	B	20.0	C
55	I-5 NB between Tierra Bella Street and Osborne Street.	38.7	E	42.9	E	43.5	E
56	I-5 SB between Tierra Bella Street and Osborne Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

(1) Density – (pc/mi/ln)
(2) HCM LOS - Highway Capacity Manual Level of Service
(*) N/D*- No Available Data from Caltrans

Source: **Hall & Foreman Inc**

As presented in *Table 4-5-1*, under existing plus project conditions most of the 28 freeway segments are expected to operate at an acceptable HCM LOS of D or better for the AM, Mid-day, and PM peak hours. Freeway segments identified in existing conditions are estimated to continue to operate at a level-of-service E or lower. The freeway segment SR-134 Westbound between San Fernando road and the I-5 Freeway (Haul Routes 5B, 6B, 7B, 8A) with an HCM LOS E for the PM peak hour. The freeway segment I-5 Southbound between SR-170 and Branford Street (Haul Route 8A) with an HCM LOS F for the AM and PM peak hours and HCM LOS E for the MIDDAY peak hour. The freeway segment SR-118 Westbound Freeway between San Fernando road and the I-210 Freeway (Haul Route 8B) with an HCM LOS E for the AM peak hours. The freeway segment I-5 Northbound between the SR-118 Westbound Freeway and Van Nuys Blvd (Haul Route 8B) with an HCM LOS E MID-DAY and P.M. peak hours. The freeway segment I-5 Northbound between Tierra Bella Street and Osborne Street (Haul Route 8B) with an HCM LOS E AM, MID-DAY and P.M. peak hours. Mitigation is recommended under existing conditions to improve the HCM LOS for these five freeway segments.

Existing + Project Freeway Ramp HCM Analysis

Freeway ramp analyses was conducted for the 54 on and off-ramps identified utilizing the methods as discussed previously and using the existing geometrics The resulting HCM LOS for the existing conditions of each ramp analyzed is presented in *Table 4-5-2*.

Table 4-5-2
Freeway Ramp Analysis – Existing + Project Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
1	1E, 1G	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	18.0	B	9.0	A	12.6	B
2	1E, 1H	Berkshire Place and the Westbound I-210 Freeway On-ramp.(Merge Point)	13.6	B	13.4	B	22.0	C
3	1A, 1C	Berkshire Place and the Eastbound I-210 Freeway On-ramp. (Merge Point)	25.9	C	19.4	B	23.7	C
4	1A, 1D	Berkshire Place and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	22.1	C	21.2	C	31.9	D
5	1F, 1H	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	31.0	D	21.5	C	26.1	C
6	1F, 1G	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. (Merge Point)	21.9	C	17.2	B	24.0	C
7	1B, 1C	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. (Merge Point)	17.3	B	10.5	B	12.8	B
8	1B, 1D	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	9.6	A	4.2	A	11.6	B
9	4A	Southbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline and Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
10	2A, 2B,3	Westbound I-210 Fwy and Eastbound SR-134 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
11	2B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
12	2B	Eastbound SR-134 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
13	4A	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
14	4A	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	23.4	C	22.4	C	24.5	C
15	2A, 3	Eastbound I-210 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline.(Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
16	2A, 3	Westbound I-210 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
17	2A, 2B, 3,9	Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	1.6	A	2.6	A	2.5	A
18	2A,3	Irwindale Ave and the Westbound loop I-210 Freeway On-ramp. (Merge Point)	18.5	B	17.0	B	18.8	B
19	9	Irwindale Ave and the Westbound slip I-210 Freeway On-ramp. (Merge Point)	20.2	C	18.6	B	19.9	B
20	2B	First Street/Azusa Avenue and the Westbound I-210 Freeway On-ramp. (Merge Point)	22.2	C	18.0	B	22.8	C

Table 4-5-2 -Continued-
Freeway Ramp Analysis – Existing + Project Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
21	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Diverge Point)	14.1	A	19.9	A	12.9	A
22	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	22.3	C	21.3	C	22.6	C
23	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Merge Point)	22.0	C	0.0	A	4.1	A
24	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	19.0	B	13.2	B	17.0	B
25	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
26	2B, 4B,5B, 6B, 7B, 8A	Westbound and Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
27	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*		N/D*	N/D*	N/D*
28	2B,4B	Westbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	24.9	C	21.0	C	26.1	C
29	4B	Figueroa Street and the Eastbound SR-134 Fwy Off-ramp. (Diverge Point)	28.0+	D	26.3	C	29.8	D
30	4B	Figueroa Street and the Westbound SR-134 Fwy On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
31	5B, 6B, 7B,8A	Southbound SR-2 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
32	5B, 6B, 7B,8A	Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	9.7	A	12.2	B	20.4	C
33	5B, 6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
34	5B,6B, 7B,8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	5B,6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
36	5B, 6B, 7B, 8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
37	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
39	8A	Branford Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 4-5-2 -Continued-
Freeway Ramp Analysis – Existing + Project Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
40	8A	Branford Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	22.9	C	19.6	B	30.1	D
41	5C,6C, 7C,8C	Wheatland Avenue and the Westbound I-210 Fwy mainline Off-Ramp. (Diverge Point)	23.8	C	18.9	B	23.9	C
42	5C,6C, 7C, 8C	Wheatland Avenue and the Eastbound I-210 Fwy mainline On-Ramp. (Merge Point)	21.6	C	19.7	B	32.3	D
43	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Westbound I-210 Fwy mainline Off-ramp. (Diverge Point)	23.5	C	19.5	B	24.4	C
44	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Eastbound I-210 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
45	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
46	8B	Eastbound SR-118 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
47	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
48	8B	Eastbound SR-118 Fwy Transition Ramp to the -Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
51	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
52	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline (Diverge Point)	25.1	F	16.7	B	21.1	C
53	8B	Osborne Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	29.9	D	32.3	D	32.4	D
54	8B	Osborne Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	22.9	C	19.6	B	30.1	D

(1) Density – (pc/mi/ln)
(2) HCM LOS - Highway Capacity Manual Level of Service
(*) N/D*- No Available Data from Caltrans

Source: **Hall & Foreman Inc**

As presented in *Table 4-5-2*, under the existing plus project conditions most of the freeway ramps are expected to operate at an acceptable HCM LOS of D or better throughout the day, with the exception of the Southbound I-5 Freeway on-ramp at Osborne Street. The Southbound I-5 Freeway on-ramp at Osborne Street (Haul Route 8B) is anticipated to operate at an HCM LOS F during the AM peak hour. Mitigation is recommended under existing conditions to improve the HCM LOS for the ramp.

5. PROJECT CONDITIONS - YEAR 2014

Project Trip Growth

The Devils Gate Dam and Reservoir Area included the cumulative projects in the cities of La Cañada Flintridge and Pasadena. The NASA Jet Propulsion Laboratory (JPL) On-Site Parking Structure project was included for the study area within the City of La Cañada Flintridge. The Rose Bowl National Football League (NFL) Stadium designation project was included for the study area within the City of Pasadena.

The Manning's Pit and Waste Management deposit sites included cumulative projects in the cities of Azusa and Irwindale. The cumulative projects included for the study area within the cities of Azusa and Irwindale include the Azusa Material Recovery Facility and Waste Transfer Station project and the Gold Line Station project.

For the project conditions at the Year 2014, vehicular growth is expected to occur. An annual increase factor of 4.5% totaling 9% for 2 years is incorporated to the report to account for any construction improvements and cumulative projects expected to occur in the surrounding area up to project year. The cumulative projects included in the growth factor are specific to disposal site. The report accounts for this growth and incorporated into the calculations. This helps to identify significant impacts specific to the project.

Project Traffic Analysis

Intersection capacity analyses for the project conditions were conducted for the 52 study intersections utilizing the methods as discussed in section 2 and using the existing intersection geometrics. The resulting HCM LOS for the project conditions Year 2014 of each intersection analyzed are presented in *Table 5-1-1* thru *Table 5-4-12*. The LOS of both the HCM and ICU methods are presented.

Section 1: Devil's Gate Dam and Reservoir (Site 1)

Haul Route 1A

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-1A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-1B.*

Haul Route 1B

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-2A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-2B.*

N/S STREET				1			E/W STREET			
I-210 FWY EB RAMPS							BERKSHIRE PLACE			
				90	10	355				
				50	10	115				
				65	10	225				
				100	10	180				
0	0	0	0					0	0	0	0
275	110	135	85		TS			130	120	180	175
135	60	85	75					215	145	285	425
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2			E/W STREET			
I-210 FWY WB RAMPS							BERKSHIRE PLACE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
105	55	55	70					280	185	185	445
310	190	190	195		TS			265	180	180	500
0	0	0	0					0	0	0	0
				65	10	360				
				60	10	135				
				70	10	185				
				105	10	145				

N/S STREET				3			E/W STREET			
OAK GROVE DRIVE							BERKSHIRE PLACE			
				390	75	0				
				235	110	0				
				810	155	0				
				820	265	0				
555	165	360	200					0	0	0	0
0	0	0	0		TS			0	0	0	0
135	125	110	155					0	0	0	0
				215	490	0				
				130	145	0				
				140	105	0				
				130	165	0				

N

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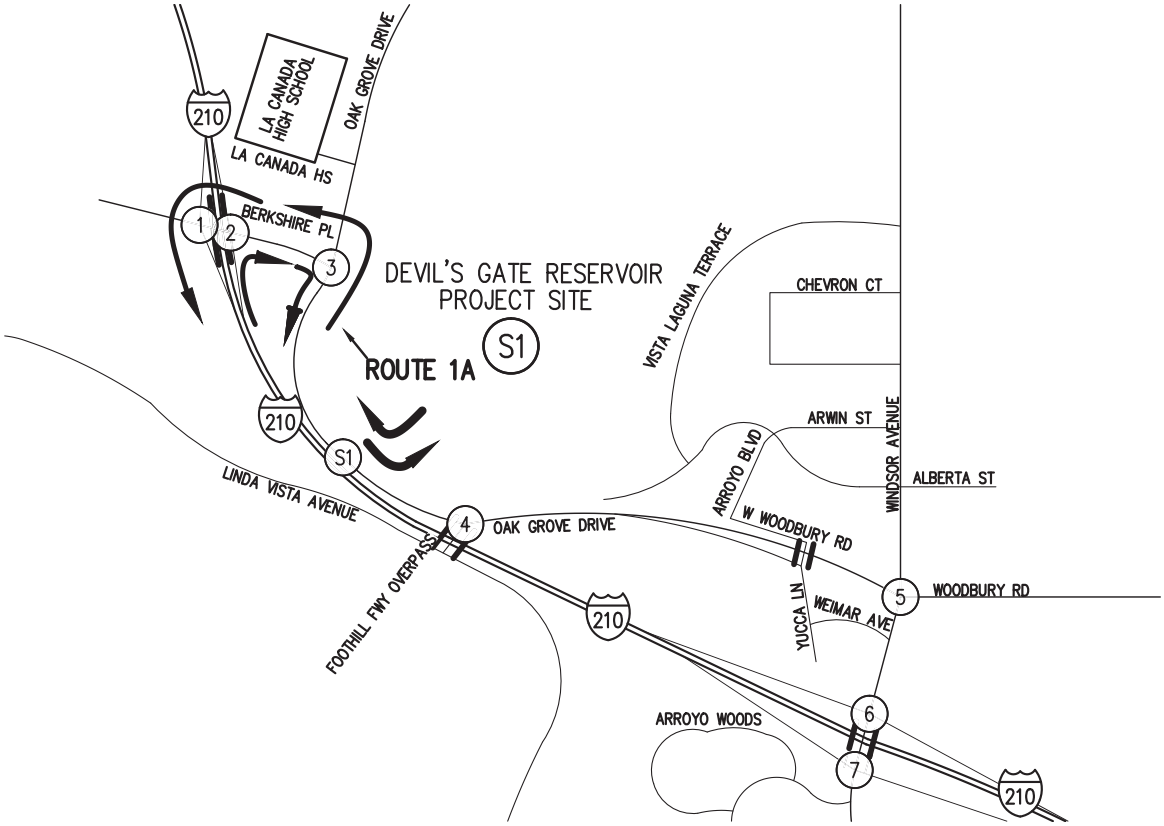

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

Hall & Foreman, Inc.
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ROUTE 1A PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-1A.dwg
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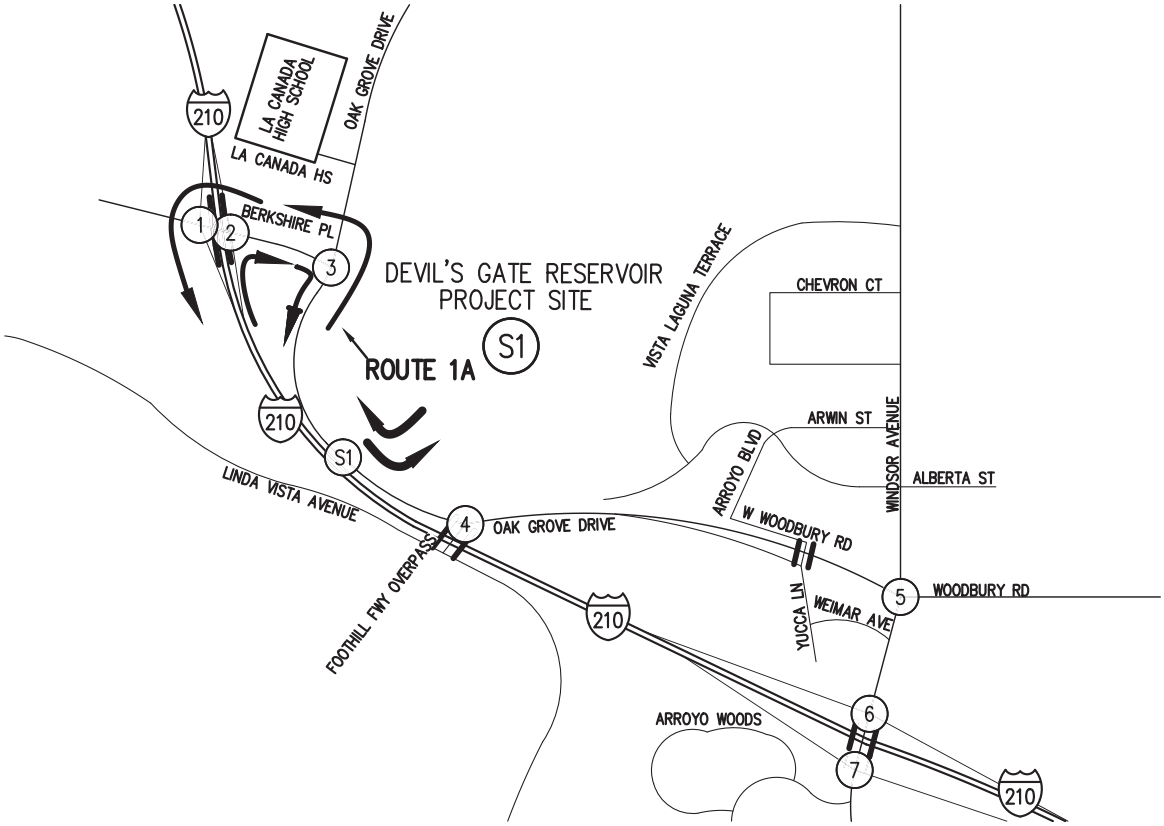
N/S STREET					1			E/W STREET			
I-210 FWY EB RAMPS								BERKSHIRE PLACE			
					100	10	365				
					55	10	125				
					75	10	255				
					100	10	180				
0	0	0	0						0	0	0	0
275	115	160	90		TS				135	125	205	175
140	65	100	75						340	280	435	545
					0	0	0				
					0	0	0				
					0	0	0				
					0	0	0				

N/S STREET					2			E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
					0	0	0				
					0	0	0				
					0	0	0				
					0	0	0				
105	60	80	70						295	185	630	445
320	200	345	195		TS				400	310	545	625
0	0	0	0						0	0	0	0
					65	10	465				
					65	10	230				
					80	10	300				
					105	10	245				

N/S STREET					3			E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
					400	90	0				
					245	125	0				
					930	195	0				
					825	275	0				
565	175	415	220						0	0	0	0
0	0	0	0		TS				0	0	0	0
230	225	205	245						0	0	0	0
					340	495	0				
					250	155	0				
					275	120	0				
					250	175	0				

N

NOT TO SCALE



LEGEND

N/S STREET					S#			E/W STREET			
					7AM-9AM						
					2PM-4PM						
					4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM
					TS						
					7AM-9AM						
					2PM-4PM						
					4PM-6PM						

LEGEND

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ROUTE 1A
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-1B

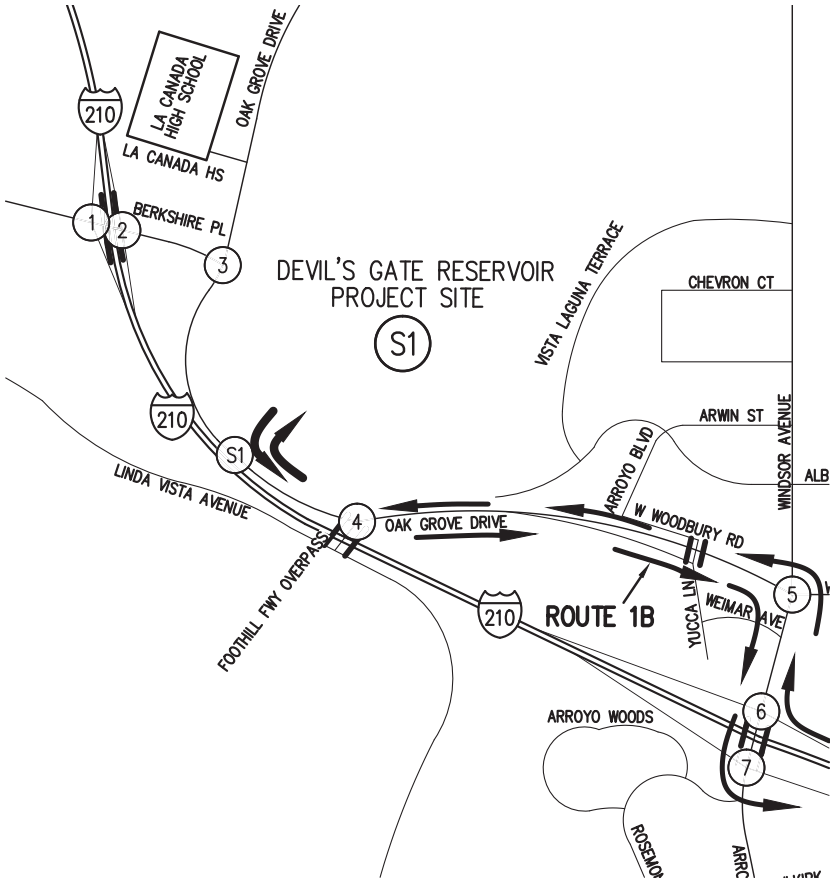
Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-1B.dwg
Last Opened: Oct 04, 2013 – 12:15pm by: TMunoz

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0						0	0	0	0
185	175	215	350		TS				565	245	195	200
55	70	65	85						195	65	45	65
				135	0	105					
				60	0	65					
				65	0	70					
				75	0	65					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	645	60					
				15	325	45					
				25	370	45					
				10	570	65					
25	30	25	45						50	40	35	55
115	155	155	260		TS				465	175	120	170
105	75	90	85						605	325	380	480
				135	660	495					
				90	315	400					
				80	385	475					
				85	540	620					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				580	700	0					
				305	465	0					
				300	535	0					
				485	660	0					
0	0	0	0						680	360	425	500
0	0	0	0		TS				10	10	10	10
0	0	0	0						10	25	25	30
				45	605	0					
				50	460	0					
				50	545	0					
				110	750	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	205	510					
				0	110	380					
				0	175	365					
				0	180	510					
600	350	405	650						0	0	0	0
10	10	10	10		TS				0	0	0	0
115	60	55	115						0	0	0	0
				0	140	25					
				0	160	20					
				0	175	20					
				0	215	20					



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LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

S# – DISPOSAL SITE

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ROUTE 1B
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-5-2A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-2A.dwg
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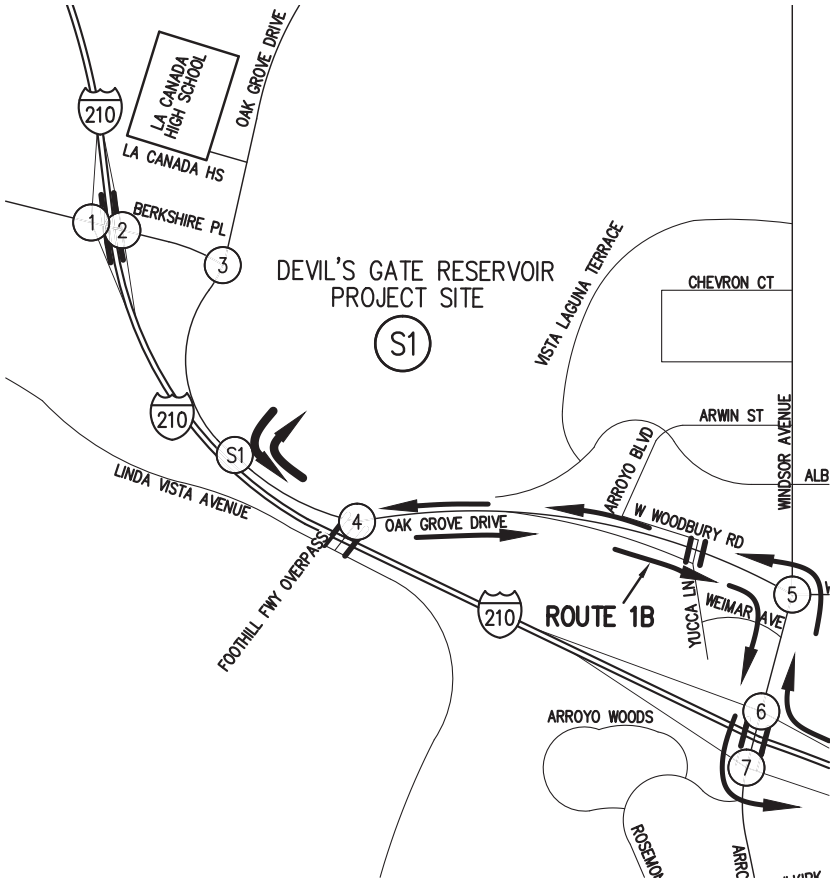
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0						0	0	0	0
325	315	355	475		TS				675	355	310	305
60	70	75	85						205	70	50	65
				140	0	110					
				65	0	70					
				75	0	80					
				75	0	65					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	655	60					
				20	340	45					
				30	425	45					
				10	570	65					
25	30	25	45						60	50	50	55
125	165	175	275		TS				480	180	135	190
230	195	220	205						625	360	440	485
				235	665	540					
				185	330	415					
				180	445	545					
				180	540	625					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				585	830	0					
				325	595	0					
				345	725	0					
				495	780	0					
0	0	0	0						785	460	570	600
0	0	0	0		TS				10	10	10	10
0	0	0	0						10	25	25	30
				45	630	0					
				50	465	0					
				55	625	0					
				110	750	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	220	640					
				0	115	505					
				0	200	530					
				0	180	630					
600	350	405	650						0	0	0	0
10	10	10	10		TS				0	0	0	0
115	60	55	115						0	0	0	0
				0	140	25					
				0	165	25					
				0	200	20					
				0	215	20					



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LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1B
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-2B

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Table 5-1-1
Intersection Capacity Analysis – Year 2014 Conditions (Route 1A)
Traffic Impact Analysis - Site 1

Route1A		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	F	51.4	-	-	B	10.8	-	-	C	23.7	-	-	D	31.6	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	13.1	-	-	A	7.0	-	-	A	9.3	-	-	A	5.6	-	-
3	Oak Grove Drive and Berkshire Place	C	26.6	0.97	B	A	6.2	0.30	A	A	7.1	0.49	A	A	8.4	0.57	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Table 5-1-2
Intersection Capacity Analysis – Year 2014 Conditions (Route 1B)
Traffic Impact Analysis - Site 1

Route1B		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	21.0	-	-	A	9.9	-	-	A	9.8	-	-	B	12.0	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.6	0.94	D	B	14.4	0.59	A	B	17.1	0.58	A	C	24.7	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	B	10.8	0.68	B	A	6.8	0.37	A	A	6.9	0.37	A	A	8.3	0.48	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	23.7	0.39	A	C	30.9	0.42	A	C	28.4	0.42	A	C	28.5	0.62	A

1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Routes 1A & 1B Analysis

As presented in *Table 5-1-1* through *Table 5-1-2*, under the project conditions Year 2014 for Site 1 (Routes 1A & 1B) most intersections are expected to operate at an acceptable HCM LOS of D or better for the AM, Mid-day, and PM peak hours. Mitigation is recommended for the intersection of Berkshire Place and I-210 Freeway Westbound Ramps AM peak hour anticipated HCM LOS F (Route 1A).

Haul Route 1C

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-3A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-3B.*

N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
105	55	55	70					280	185	185	445
310	190	190	195		TS			205	120	120	440
0	0	0	0					0	0	0	0
				65	10	360					
				60	10	135					
				70	10	185					
				105	10	145					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				390	75	0					
				235	110	0					
				810	155	0					
				820	265	0					
510	165	360	200					0	0	0	0
0	0	0	0		TS			0	0	0	0
125	125	110	155					0	0	0	0
				155	490	0					
				70	145	0					
				80	105	0					
				70	165	0					

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
185	175	215	350		TS			505	185	135	140
55	70	65	85					195	65	45	65
				135	0	105					
				60	0	65					
				65	0	70					
				75	0	65					

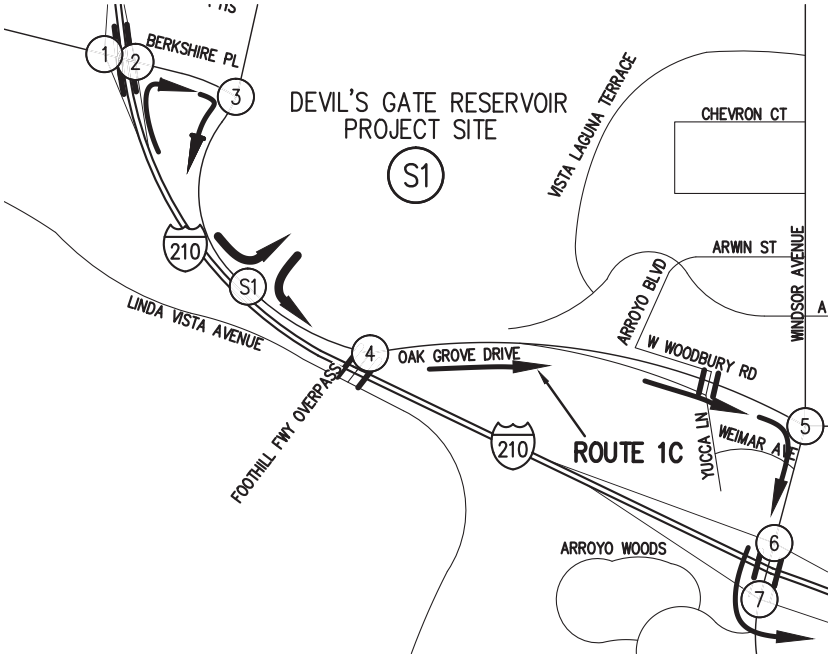
N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	645	60					
				15	325	45					
				25	370	45					
				10	570	65					
25	30	25	45					50	40	35	55
115	155	155	260		TS			465	175	120	170
105	75	90	85					605	325	380	480
				75	660	495					
				35	315	400					
				25	385	475					
				30	540	620					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				580	700	0					
				305	465	0					
				300	535	0					
				485	660	0					
0	0	0	0					620	300	365	440
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	605	0					
				50	460	0					
				50	545	0					
				110	750	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	205	510					
				0	110	380					
				0	175	365					
				0	180	510					
600	350	405	650					0	0	0	0
10	10	10	10		TS			0	0	0	0
115	60	55	115					0	0	0	0
				0	140	25					
				0	160	20					
				0	175	20					
				0	215	20					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1C
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-1-3A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-3A.dwg
Last Opened: Oct 04, 2013 – 12:17pm by: TMunoz

N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
105	60	80	70					295	185	630	445
320	200	345	195		TS			220	130	365	445
0	0	0	0					0	0	0	0
				65	10	465					
				65	10	230					
				80	10	300					
				105	10	245					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				400	90	0					
				245	125	0					
				930	195	0					
				825	275	0					
565	175	415	220					0	0	0	0
0	0	0	0		TS			0	0	0	0
230	225	205	245					0	0	0	0
				160	495	0					
				70	155	0					
				90	120	0					
				70	175	0					

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
325	315	355	475		TS			525	200	160	155
60	70	75	85					205	70	50	65
				140	0	110					
				65	0	70					
				75	0	80					
				75	0	65					

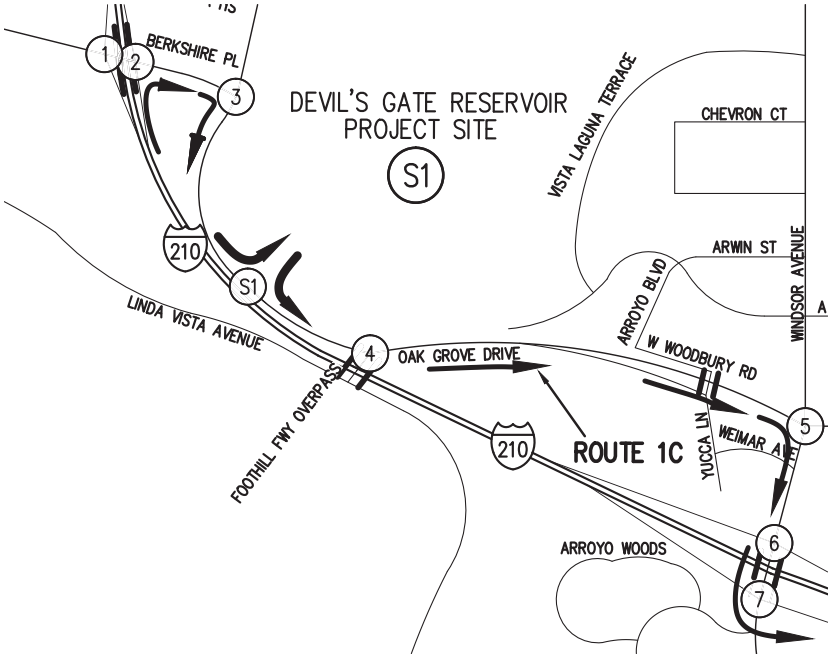
N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	655	60					
				20	340	45					
				30	425	45					
				10	570	65					
25	30	25	45					60	50	50	55
125	165	175	275		TS			480	180	135	190
230	195	220	205					625	360	440	485
				80	665	540					
				35	330	415					
				30	445	545					
				30	540	625					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				585	830	0					
				325	595	0					
				345	725	0					
				495	780	0					
0	0	0	0					630	305	420	445
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	630	0					
				50	465	0					
				55	625	0					
				110	750	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	220	640					
				0	115	505					
				0	200	530					
				0	180	630					
600	350	405	650					0	0	0	0
10	10	10	10		TS			0	0	0	0
115	60	55	115					0	0	0	0
				0	140	25					
				0	165	25					
				0	200	20					
				0	215	20					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
				TS							
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1C
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-3B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-3B.dwg
Last Opened: Oct 04, 2013 – 12:17pm by: TMunoz

Table 5-1-3
Intersection Capacity Analysis – Year 2014 Conditions (Route 1C)
Traffic Impact Analysis - Site 1

Route1C		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	13.1	-	-	A	6.9	-	-	A	8.4	-	-	A	5.7	-	-
3	Oak Grove Drive and Berkshire Place	B	10.9	0.68	A	A	6.1	0.22	A	A	8.4	0.59	A	A	7.1	0.54	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	18.1	-	-	A	9.4	-	-	A	9.6	-	-	B	11.5	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	29	0.95	D	B	14.5	0.53	A	B	17.3	0.55	A	C	24.9	0.69	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	B	10.2	0.65	B	A	5.7	0.33	A	A	6.4	0.4	A	A	7.6	0.45	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	23.7	0.39	A	C	30.9	0.42	A	C	28.4	0.42	A	C	28.5	0.62	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1C Analysis

As presented in *Table 5-1-3*, under the project conditions Year 2014 for Site 1 (Routes 1C) all intersections are anticipated to operate at an HCM LOS C or better.

Haul Route 1D

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-5A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-5B.*

Haul Route 1E

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-5A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-5B.*

N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

					90	10	355					
					50	10	115					
					65	10	225					
					100	10	180					
0	0	0	0						0	0	0	0
275	110	135	85		TS				130	120	180	175
135	60	85	75						215	145	285	425
					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
105	55	70	70						280	185	185	445
310	190	195	195		TS				265	180	180	500
0	0	0	0						0	0	0	0
					65	10	300					
					60	10	75					
					70	10	125					
					105	10	85					

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

					390	75	0					
					235	110	0					
					810	155	0					
					820	265	0					
555	165	360	200						0	0	0	0
0	0	0	0		TS				0	0	0	0
75	65	50	90						0	0	0	0
					215	490	0					
					130	145	0					
					140	105	0					
					130	165	0					

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

					0	0	0					
					0	0	0					
					0	0	0					
					0	0	0					
0	0	0	0						0	0	0	0
125	115	290	290		TS				565	245	195	200
55	70	85	85						195	65	45	65
					135	0	105					
					60	0	65					
					65	0	70					
					75	0	65					

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

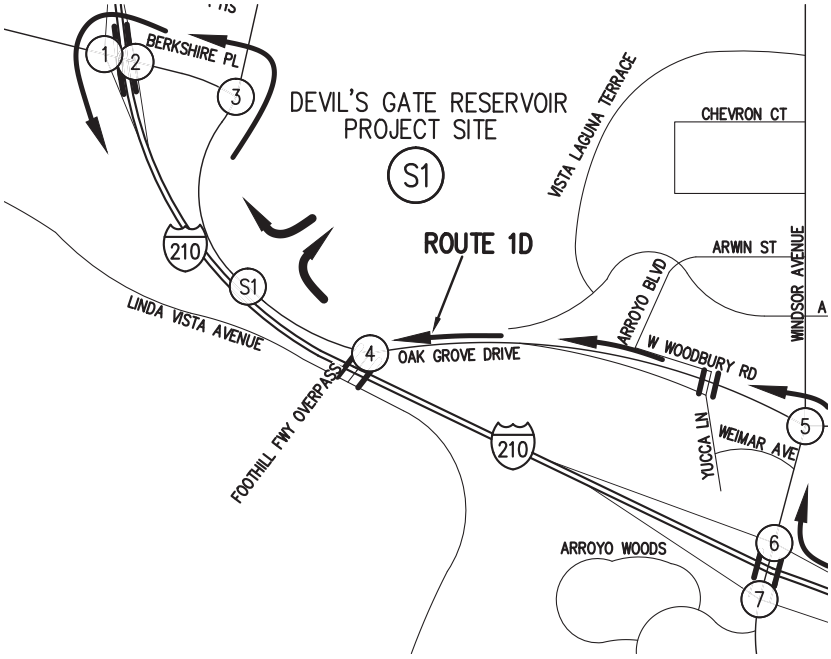
					40	645	60					
					15	325	45					
					25	370	45					
					10	570	65					
25	30	45	45						50	40	35	55
115	155	260	260		TS				465	175	120	170
45	20	30	30						605	325	380	480
					135	660	495					
					90	315	400					
					80	385	475					
					85	540	620					

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

					580	640	0					
					305	405	0					
					300	475	0					
					485	600	0					
0	0	0	0						680	360	425	500
0	0	0	0		TS				10	10	10	10
0	0	0	0						10	25	25	30
					45	605	0					
					50	460	0					
					50	545	0					
					110	750	0					

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

					7AM-9AM							
					2PM-4PM							
					4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS							
					7AM-9AM							
					2PM-4PM							
					4PM-6PM							

LEGEND

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ROUTE 1D PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-4A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-4A.dwg
Last Opened: Oct 04, 2013 – 12:19pm by: TMunoz

N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

0	0	0	0									0	0	0	0																
275	115	160	90									135	125	205	175																
140	65	100	75									340	280	435	545																

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

105	60	70	70									295	185	630	445																
320	200	195	195									400	310	545	625																
0	0	0	0									0	0	0	0																
												65	10	310																	
												65	10	75																	
												80	10	145																	
												105	10	90																	

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

565	175	415	220									0	0	0	0																
0	0	0	0									0	0	0	0																
75	70	55	90									0	0	0	0																
												340	495	0																	
												250	155	0																	
												275	120	0																	
												250	175	0																	

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

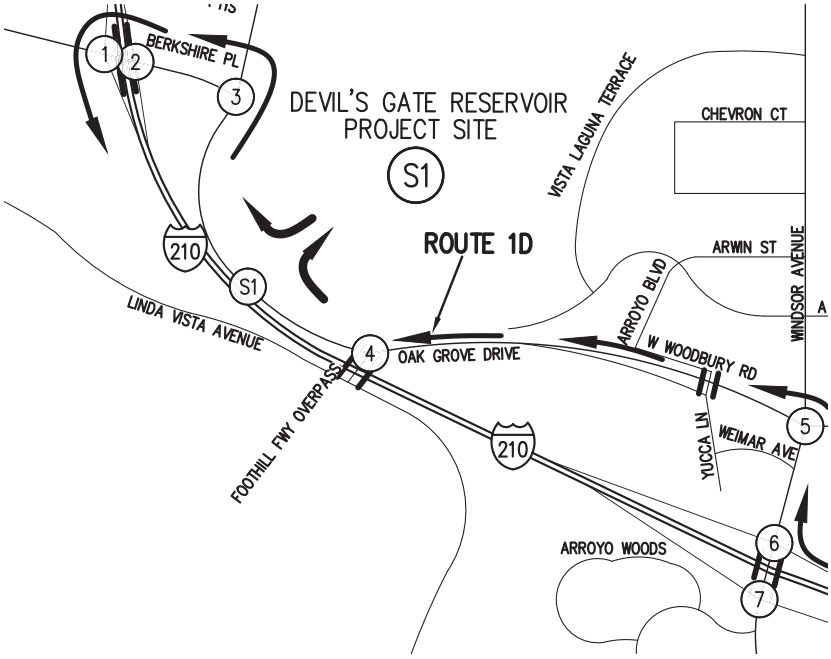
0	0	0	0									0	0	0	0																
145	135	295	295									675	355	310	305																
60	70	85	85									205	70	50	65																
												140	0	110																	
												65	0	70																	
												75	0	80																	
												75	0	65																	

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

25	30	25	45									60	50	50	55																
125	165	175	275									480	180	135	190																
50	20	40	30									625	360	440	485																
												235	665	540																	
												185	330	415																	
												180	445	545																	
												180	540	625																	

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

0	0	0	0									785	460	570	600																
0	0	0	0									10	10	10	10																
0	0	0	0									10	25	25	30																
												45	630	0																	
												50	465	0																	
												55	625	0																	
												110	750	0																	



LEGEND

N/S STREET	S#	E/W STREET

7AM - 9AM	2PM - 4PM	4PM - 6PM										7AM - 9AM	2PM - 4PM	4PM - 6PM																	

LEGEND

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ROUTE 1D
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-1-4B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-4B.dwg
Last Opened: Oct 04, 2013 – 12:20pm by: TMunoz

N/S STREET				1			E/W STREET			
I-210 FWY EB RAMPS							BERKSHIRE PLACE			
				90	10	415				
				50	10	175				
				65	10	225				
				100	10	240				
0	0	0	0					0	0	0	0
275	110	135	85		TS			130	120	180	175
135	60	85	75					155	85	285	365
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2			E/W STREET			
I-210 FWY WB RAMPS							BERKSHIRE PLACE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
105	55	55	70					340	245	245	505
370	250	250	255		TS			205	120	120	440
0	0	0	0					0	0	0	0
				65	10	300				
				60	10	75				
				70	10	125				
				105	10	85				

N/S STREET				3			E/W STREET			
OAK GROVE DRIVE							BERKSHIRE PLACE			
				390	75	0				
				235	110	0				
				810	155	0				
				820	265	0				
555	165	360	200					0	0	0	0
0	0	0	0		TS			0	0	0	0
135	125	110	155					0	0	0	0
				215	490	0				
				130	145	0				
				140	105	0				
				130	165	0				

N

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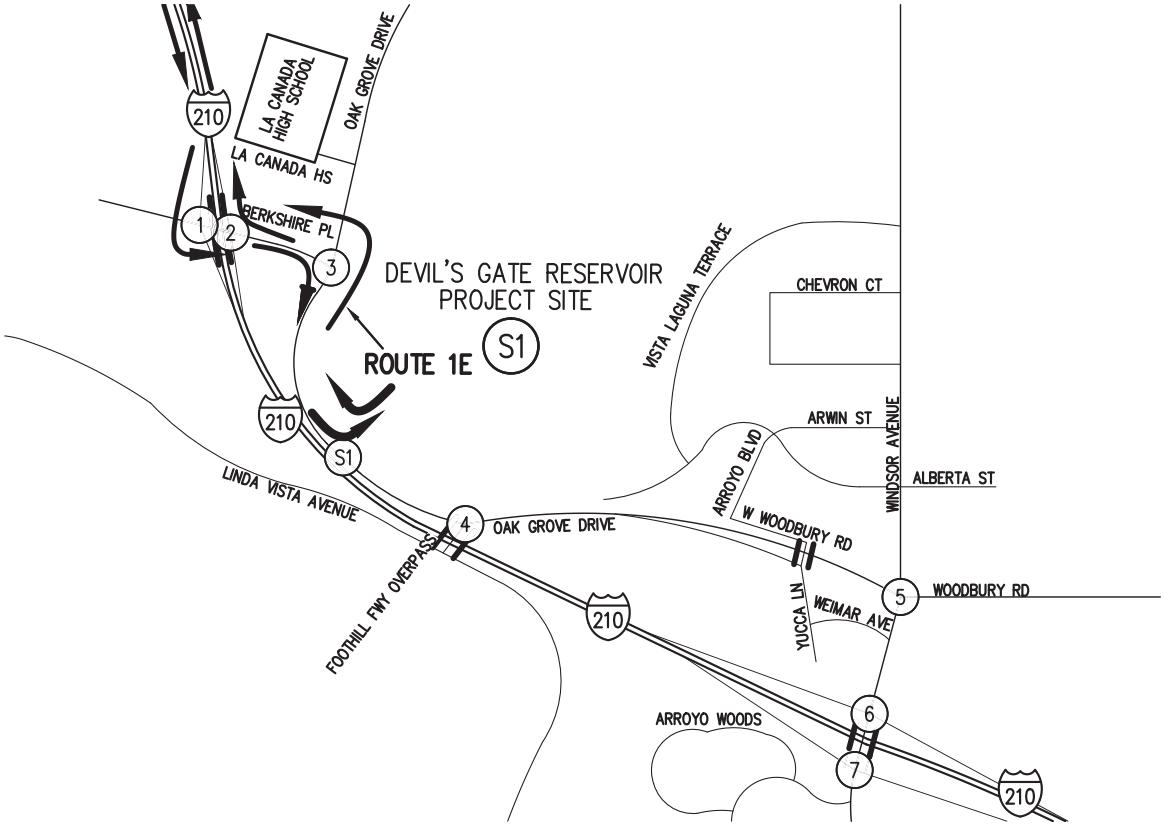

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 1E
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-1-5A

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N/S STREET				1			E/W STREET			
I-210 FWY EB RAMPS							BERKSHIRE PLACE			
				100	10	520				
				55	10	280				
				75	10	255				
				100	10	330				
0	0	0	0					0	0	0	0
275	115	160	90		TS			135	125	205	175
140	65	100	75					160	100	435	365
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2			E/W STREET			
I-210 FWY WB RAMPS							BERKSHIRE PLACE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
105	60	80	70					475	365	810	625
475	355	495	350		TS			220	130	365	445
0	0	0	0					0	0	0	0
				65	10	310				
				65	10	75				
				80	10	145				
				105	10	90				

N/S STREET				3			E/W STREET			
OAK GROVE DRIVE							BERKSHIRE PLACE			
				400	90	0				
				245	125	0				
				930	195	0				
				825	275	0				
565	175	415	220					0	0	0	0
0	0	0	0		TS			0	0	0	0
230	225	205	245					0	0	0	0
				340	495	0				
				250	155	0				
				275	120	0				
				250	175	0				

N

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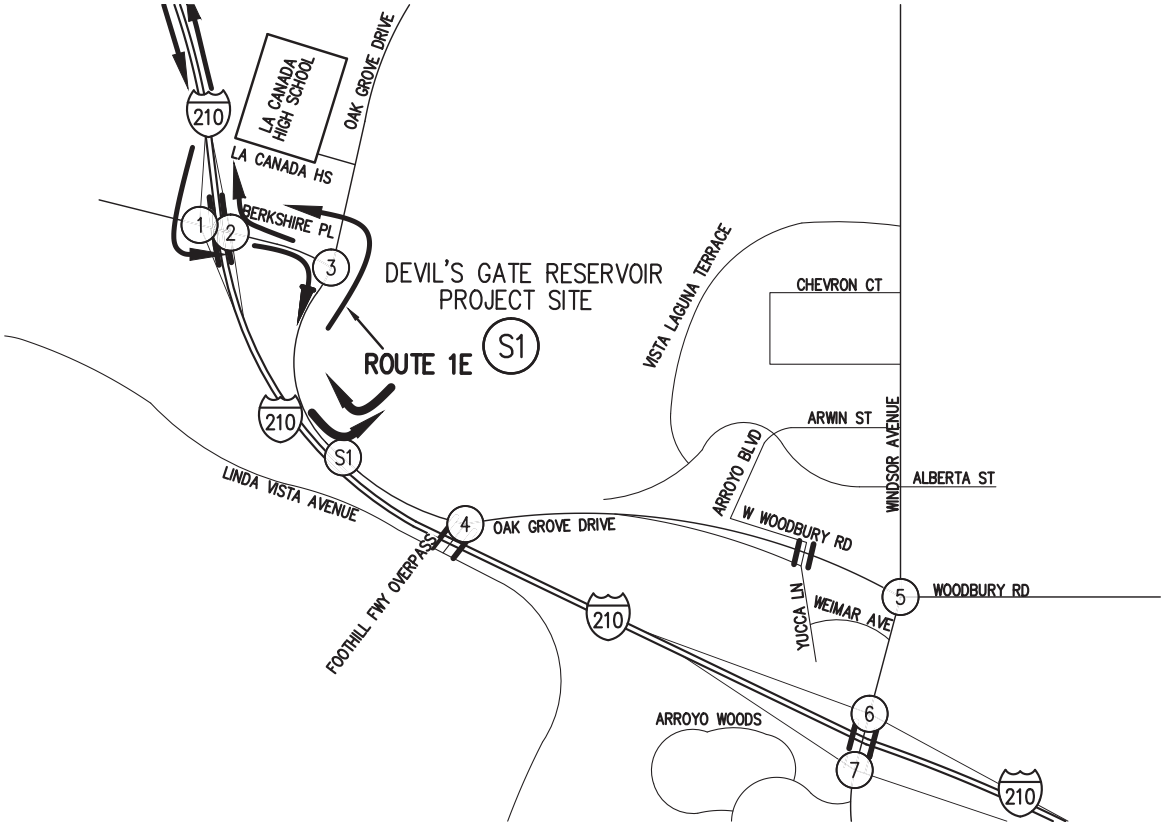

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
					TS					
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 1E
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-5B

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Table 5-1-4
Intersection Capacity Analysis – Year 2014 Conditions (Route 1D)
Traffic Impact Analysis - Site 1

Route1D		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	F	51.4	-	-	B	10.8	-	-	C	23.7	-	-	D	31.6	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	9.5	-	-	A	4.9	-	-	A	7.2	-	-	A	3.8	-	-
3	Oak Grove Drive and Berkshire Place	B	19.2	0.93	B	A	5.6	0.29	A	A	8.4	0.57	B	A	8	0.57	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	19.2	-	-	A	9.6	-	-	A	9.5	-	-	B	11.3	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.7	0.94	D	B	14.3	0.54	A	B	17.1	0.58	A	C	24.9	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	B	10.4	0.66	B	A	6	0.31	A	A	7.3	0.41	A	A	8.2	0.45	B

Table 5-1-5
Intersection Capacity Analysis – Year 2014 Conditions (Route 1E)
Traffic Impact Analysis - Site 1

Route1E		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	48.2	-	-	B	10.6	-	-	C	18.9	-	-	C	21.8	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps	B	11.0	-	-	A	4.7	-	-	A	6.9	-	-	A	3.7	-	-
3	Oak Grove Drive and Berkshire Place (3)	C	26.6	0.97	B	A	6.2	0.30	A	A	7.1	0.49	A	A	8.4	0.57	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Routes 1D & 1E Analysis

As presented in *Table 5-1-4* and *Table 5-1-5*, under the project conditions Year 2014 for Site 1 (Routes 1D & 1E) most intersections are expected to operate at an acceptable HCM LOS of C or better. Mitigation is recommended for the intersection of Berkshire Place and I-210 Freeway Westbound Ramps AM peak hour anticipated HCM LOS F (Route 1D) and HCM LOS E (Route 1E).

Haul Route 1F

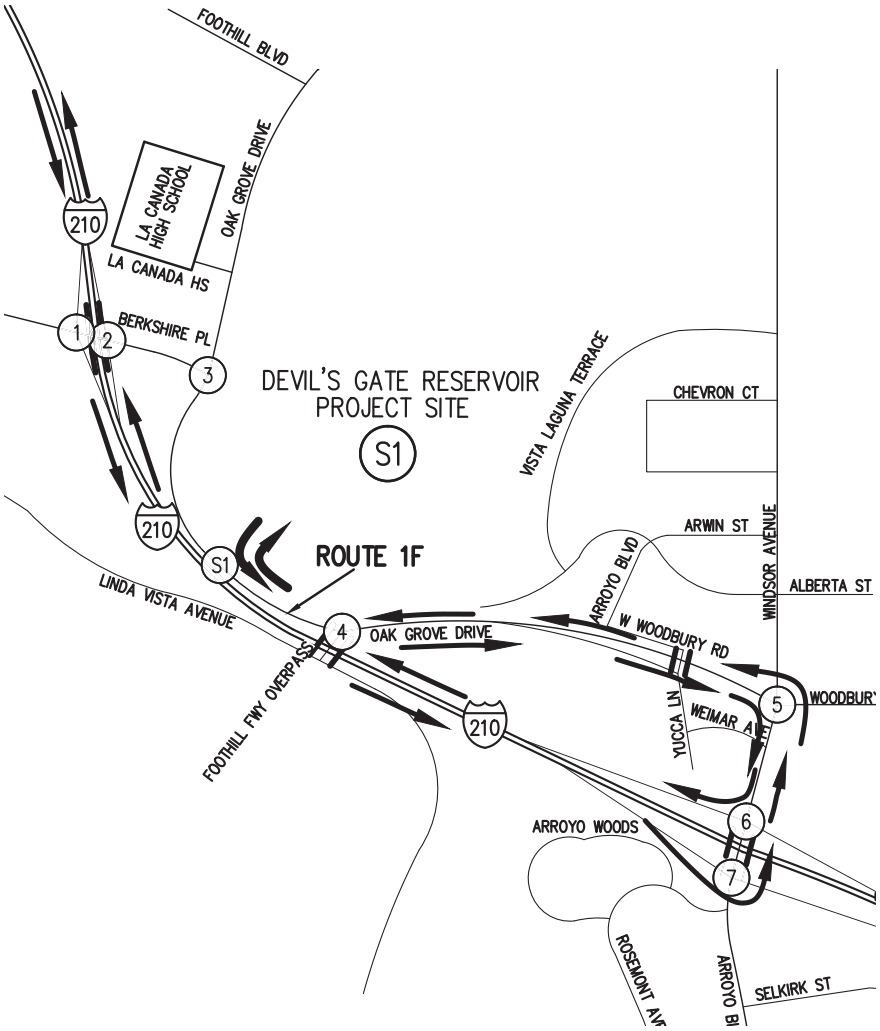
The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-6A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-6B.*

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0						0	0	0	0
185	175	215	350		TS				565	245	195	200
55	70	65	85						195	65	45	65
				135	0	105					
				60	0	65					
				65	0	70					
				75	0	65					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	645	60					
				15	325	45					
				25	370	45					
				10	570	65					
25	30	25	45						50	40	35	55
115	155	155	260		TS				465	175	120	170
105	75	90	85						605	325	380	480
				135	660	495					
				90	315	400					
				80	385	475					
				85	540	620					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				640	640	0					
				365	405	0					
				360	475	0					
				545	600	0					
0	0	0	0						620	300	365	440
0	0	0	0		TS				10	10	10	10
0	0	0	0						10	25	25	30
				45	665	0					
				50	520	0					
				50	605	0					
				110	810	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	205	450					
				0	110	320					
				0	175	305					
				0	180	450					
660	410	465	710						0	0	0	0
10	10	10	10		TS				0	0	0	0
115	60	55	115						0	0	0	0
				0	140	25					
				0	160	20					
				0	175	20					
				0	215	20					



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

Hall & Foreman, Inc.
Engineering • Surveying • Planning
14297 Cajon St., Suite 101 Victorville, CA., 92392-2335
Phn. 760-524-9100 Fax. 760-524-9101

ROUTE 1F PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-6A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-6A.dwg
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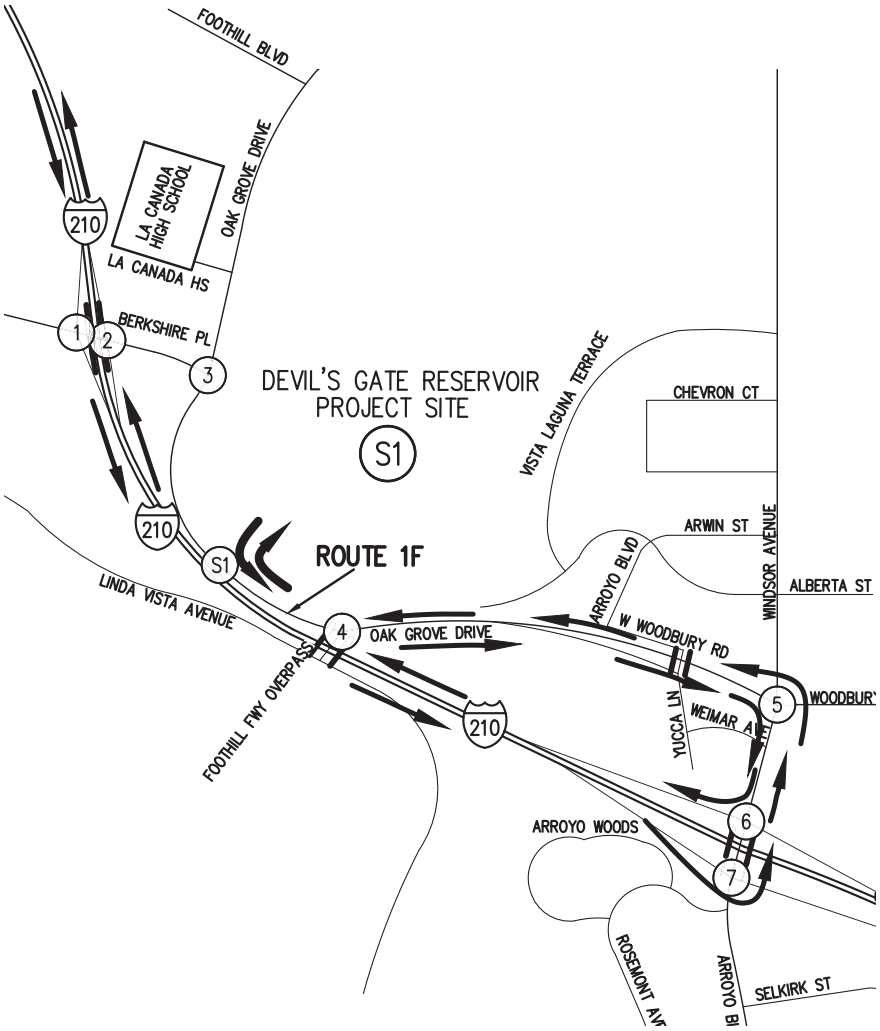
N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0						0	0	0	0
325	315	355	475		TS				675	355	310	305
60	70	75	85						205	70	50	65
				140	0	110					
				65	0	70					
				75	0	80					
				75	0	65					

N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	655	60					
				20	340	45					
				30	425	45					
				10	570	65					
25	30	25	45						60	50	50	55
125	165	175	275		TS				480	180	135	190
230	195	220	205						625	360	440	485
				235	665	540					
				185	330	415					
				180	445	545					
				180	540	625					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				765	650	0					
				505	415	0					
				525	545	0					
				675	600	0					
0	0	0	0						630	305	420	445
0	0	0	0		TS				10	10	10	10
0	0	0	0						10	25	25	30
				45	785	0					
				50	615	0					
				55	780	0					
				110	905	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	220	460					
				0	115	325					
				0	200	350					
				0	180	450					
750	500	555	800						0	0	0	0
10	10	10	10		TS				0	0	0	0
115	60	55	115						0	0	0	0
				0	140	25					
				0	165	25					
				0	200	20					
				0	215	20					



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

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ROUTE 1F
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-6B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-6B.dwg
Last Opened: Oct 04, 2013 – 12:23pm by: TMunoz

Table 5-1-6
Intersection Capacity Analysis – Year 2014 Conditions (Route 1F)
Traffic Impact Analysis - Site 1

Route1F		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	21	-	-	A	9.9	-	-	A	9.8	-	-	B	12	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.6	0.94	D	B	14.4	0.59	A	B	17.1	0.58	A	C	24.7	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.9	0.62	B	A	5.5	0.31	A	A	5.6	0.27	A	A	7.9	0.47	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	28.6	0.57	A	B	16.1	0.39	A	B	17.4	0.42	A	C	26.8	0.63	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1F Analysis

As presented in *Table 5-1-6*, under the project conditions Year 2014 for Site 1 (Routes 1F) all intersections are anticipated to operate at an HCM LOS C or better.

Haul Route 1G

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-7A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-7B.*

N/S STREET				1			E/W STREET			
I-210 FWY EB RAMPS							BERKSHIRE PLACE			
				90	10	415				
				50	10	175				
				65	10	225				
				100	10	240				
0	0	0	0					0	0	0	0
275	110	135	85		TS			130	120	180	175
135	60	85	75					155	85	285	365
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				2			E/W STREET			
I-210 FWY WB RAMPS							BERKSHIRE PLACE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
105	55	55	70					280	185	245	445
370	250	250	255		TS			205	120	120	440
0	0	0	0					0	0	0	0
				65	10	300				
				60	10	75				
				70	10	125				
				105	10	85				

N/S STREET				3			E/W STREET			
OAK GROVE DRIVE							BERKSHIRE PLACE			
				390	75	0				
				235	110	0				
				810	155	0				
				820	265	0				
510	165	360	200					0	0	0	0
0	0	0	0		TS			0	0	0	0
125	125	110	155					0	0	0	0
				155	490	0				
				70	145	0				
				80	105	0				
				70	165	0				

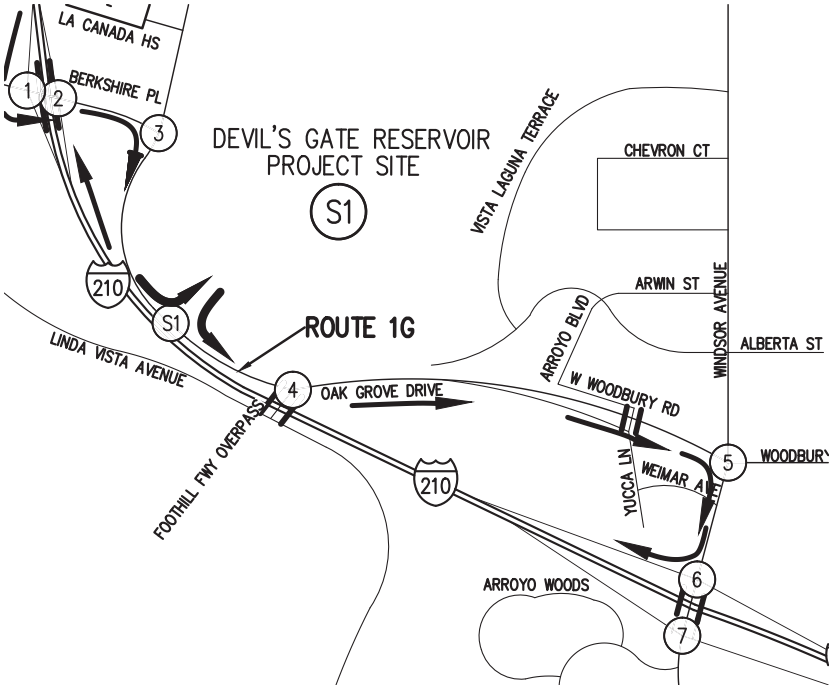
N/S STREET				4			E/W STREET			
FOOTHILL FWY OVERPASS							OAK GROVE DRIVE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	0					0	0	0	0
185	175	215	350		TS			505	185	135	140
55	70	65	85					195	65	45	65
				135	0	105				
				60	0	65				
				65	0	70				
				75	0	65				

N/S STREET				5			E/W STREET			
WINDSOR AVE							OAK GROVE DRIVE			
				40	645	60				
				15	325	45				
				25	370	45				
				10	570	65				
25	30	25	45					50	40	35	55
115	155	155	260		TS			465	175	120	170
105	75	90	85					605	325	380	480
				75	660	495				
				35	315	400				
				25	385	475				
				30	540	620				

N/S STREET				6			E/W STREET			
WINDSOR AVE							I-210 FWY WB RAMPS			
				640	640	0				
				365	405	0				
				360	475	0				
				545	600	0				
0	0	0	0					620	300	365	440
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	605	0				
				50	460	0				
				50	545	0				
				110	750	0				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 1G PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-7A

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N/S STREET	1	E/W STREET
I-210 FWY EB RAMPS		BERKSHIRE PLACE

					100	10	520								
					55	10	280								
					75	10	255								
					100	10	330								
0	0	0	0						0	0	0	0
275	115	160	90			TS			135	125	205	175
140	65	100	75						160	100	435	365
					0	0	0								
					0	0	0								
					0	0	0								
					0	0	0								

N/S STREET	2	E/W STREET
I-210 FWY WB RAMPS		BERKSHIRE PLACE

					0	0	0								
					0	0	0								
					0	0	0								
					0	0	0								
105	60	80	70						295	185	810	445
475	355	495	350			TS			220	130	365	445
0	0	0	0						0	0	0	0
					65	10	310								
					65	10	75								
					80	10	145								
					105	10	90								

N/S STREET	3	E/W STREET
OAK GROVE DRIVE		BERKSHIRE PLACE

					400	90	0								
					245	125	0								
					930	195	0								
					825	275	0								
565	175	415	220						0	0	0	0
0	0	0	0			TS			0	0	0	0
230	225	205	245						0	0	0	0
					160	495	0								
					70	155	0								
					90	120	0								
					70	175	0								

N/S STREET	4	E/W STREET
FOOTHILL FWY OVERPASS		OAK GROVE DRIVE

					0	0	0								
					0	0	0								
					0	0	0								
					0	0	0								
0	0	0	0						0	0	0	0
325	315	355	475			TS			525	200	160	155
60	70	75	85						205	70	50	65
					140	0	110								
					65	0	70								
					75	0	80								
					75	0	65								

N/S STREET	5	E/W STREET
WINDSOR AVE		OAK GROVE DRIVE

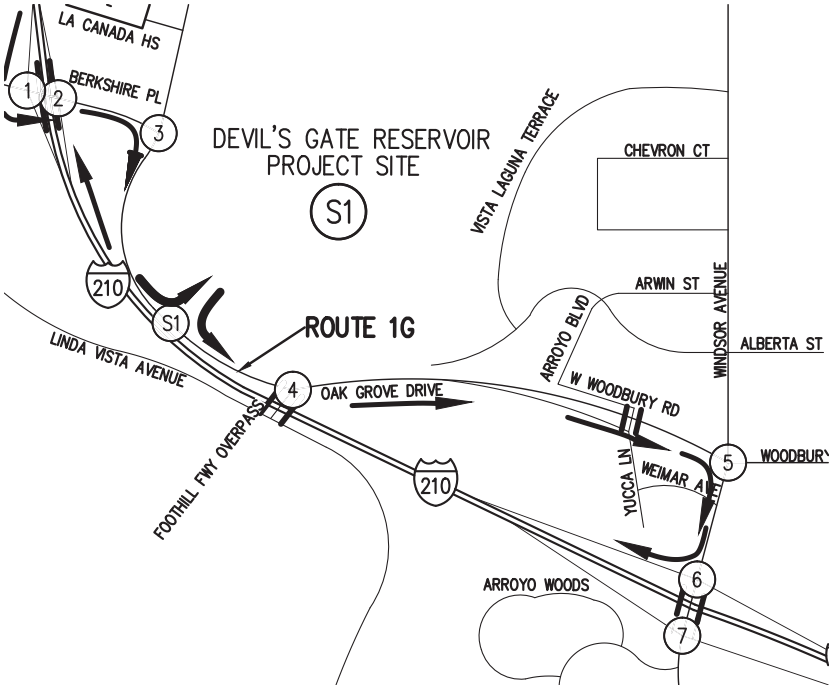
					40	655	60								
					20	340	45								
					30	425	45								
					10	570	65								
25	30	25	45						60	50	50	55
125	165	175	275			TS			480	180	135	190
230	195	220	205						625	360	440	485
					80	665	540								
					35	330	415								
					30	445	545								
					30	540	625								

N/S STREET	6	E/W STREET
WINDSOR AVE		I-210 FWY WB RAMPS

					765	650	0								
					505	415	0								
					525	545	0								
					675	600	0								
0	0	0	0						630	305	420	445
0	0	0	0			TS			10	10	10	10
0	0	0	0						10	25	25	30
					45	630	0								
					50	465	0								
					55	625	0								
					110	750	0								

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

					7AM-9AM										
					2PM-4PM										
					4PM-6PM										
7AM - 9AM	2PM - 4PM	4PM - 6PM							7AM - 9AM	2PM - 4PM	4PM - 6PM
					TS										
					7AM-9AM										
					2PM-4PM										
					4PM-6PM										

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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14297 Cajon St., Suite 101 Victorville, CA., 92392-2335
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ROUTE 1G
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-7B

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Table 5-1-7
Intersection Capacity Analysis – Year 2014 Conditions (Route 1G)
Traffic Impact Analysis - Site 1

Route1G		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
1	Berkshire Place and I-210 Freeway Eastbound Ramps (3)	E	48.2	-	-	B	10.6	-	-	C	18.9	-	-	C	21.8	-	-
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	A	4.7	-	-	A	6.9	-	-	A	6.9	-	-	A	3.7	-	-
3	Oak Grove Drive and Berkshire Place	B	10.9	0.68	A	A	6.1	0.22	A	A	8.4	0.59	A	A	7.1	0.54	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	18.1	-	-	A	9.4	-	-	A	9.6	-	-	B	11.5	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	29	0.95	D	B	14.5	0.53	A	B	17.3	0.55	A	C	24.9	0.69	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.6	0.61	B	A	5.6	0.31	A	A	6.3	0.37	A	A	7.6	0.45	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1G Analysis

As presented in *Table 5-1-7*, under the project conditions Year 2014 for Site 1 (Routes 1G) most intersections are expected to operate at an acceptable HCM LOS of C or better for the AM, Mid-day, and PM peak hours. Mitigation is recommended for the intersection of Berkshire Place and I-210 Freeway Westbound Ramps AM peak hour anticipated HCM LOS E (Route 1G).

Haul Route 1H

The Year 2014 AM (7-9), MID-DAY (12-2), MID-DAY (2-4), PM (4-6) turn movement volumes, are provided in *Figure 5-1-8.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-1-8B.*

N/S STREET				2				E/W STREET			
I-210 FWY WB RAMPS								BERKSHIRE PLACE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
105	55	55	70					340	245	245	505
310	190	190	195		TS			205	120	120	440
0	0	0	0					0	0	0	0
				65	10	300					
				60	10	75					
				70	10	125					
				105	10	85					

N/S STREET				3				E/W STREET			
OAK GROVE DRIVE								BERKSHIRE PLACE			
				390	75	0					
				235	110	0					
				810	155	0					
				820	265	0					
555	165	360	200					0	0	0	0
0	0	0	0		TS			0	0	0	0
75	65	50	90					0	0	0	0
				215	490	0					
				130	145	0					
				140	105	0					
				130	165	0					

N/S STREET				4				E/W STREET			
FOOTHILL FWY OVERPASS								OAK GROVE DRIVE			
				0	0	0					
				0	0	0					
				0	0	0					
				0	0	0					
0	0	0	0					0	0	0	0
125	115	290	290		TS			565	245	195	200
55	70	85	85					195	65	45	65
				135	0	105					
				60	0	65					
				65	0	70					
				75	0	65					

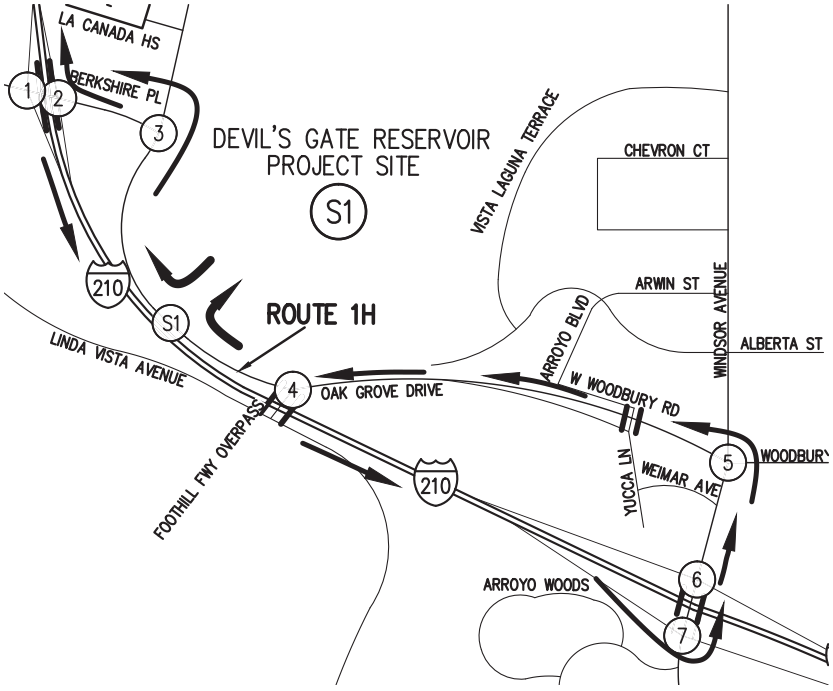
N/S STREET				5				E/W STREET			
WINDSOR AVE								OAK GROVE DRIVE			
				40	645	60					
				15	325	45					
				25	370	45					
				10	570	65					
25	30	45	45					50	40	35	55
115	155	260	260		TS			465	175	120	170
45	20	30	30					605	325	380	480
				135	660	495					
				90	315	400					
				80	385	475					
				85	540	620					

N/S STREET				6				E/W STREET			
WINDSOR AVE								I-210 FWY WB RAMPS			
				580	640	0					
				305	405	0					
				300	475	0					
				485	600	0					
0	0	0	0					620	300	365	440
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	665	0					
				50	520	0					
				50	605	0					
				110	810	0					

N/S STREET				7				E/W STREET			
WINDSOR AVE								I-210 FWY EB RAMPS			
				0	205	450					
				0	110	320					
				0	175	305					
				0	180	450					
660	410	465	710					0	0	0	0
10	10	10	10		TS			0	0	0	0
115	60	55	115					0	0	0	0
				0	140	25					
				0	160	20					
				0	175	20					
				0	215	20					

N

NOT TO SCALE



LEGEND

N/S STREET				S#				E/W STREET			
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM	
					TS						
				7AM-9AM							
				2PM-4PM							
				4PM-6PM							

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 1H
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-1-8A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 1\FIG 5-1-8A.dwg
Last Opened: Oct 04, 2013 – 12:24pm by: TMunoz

N/S STREET				2			E/W STREET			
I-210 FWY WB RAMPS							BERKSHIRE PLACE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
105	60	80	70					475	365	810	625
320	200	345	195		TS			220	130	365	445
0	0	0	0					0	0	0	0
				65	10	310				
				65	10	75				
				80	10	145				
				105	10	90				

N/S STREET				3			E/W STREET			
OAK GROVE DRIVE							BERKSHIRE PLACE			
				400	90	0				
				245	125	0				
				930	195	0				
				825	275	0				
565	175	415	220					0	0	0	0
0	0	0	0		TS			0	0	0	0
75	70	55	90					0	0	0	0
				340	495	0				
				250	155	0				
				275	120	0				
				250	175	0				

N/S STREET				4			E/W STREET			
FOOTHILL FWY OVERPASS							OAK GROVE DRIVE			
				0	0	0				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	0					0	0	0	0
145	135	295	295		TS			675	355	310	305
60	70	85	85					205	70	50	65
				140	0	110				
				65	0	70				
				75	0	80				
				75	0	65				

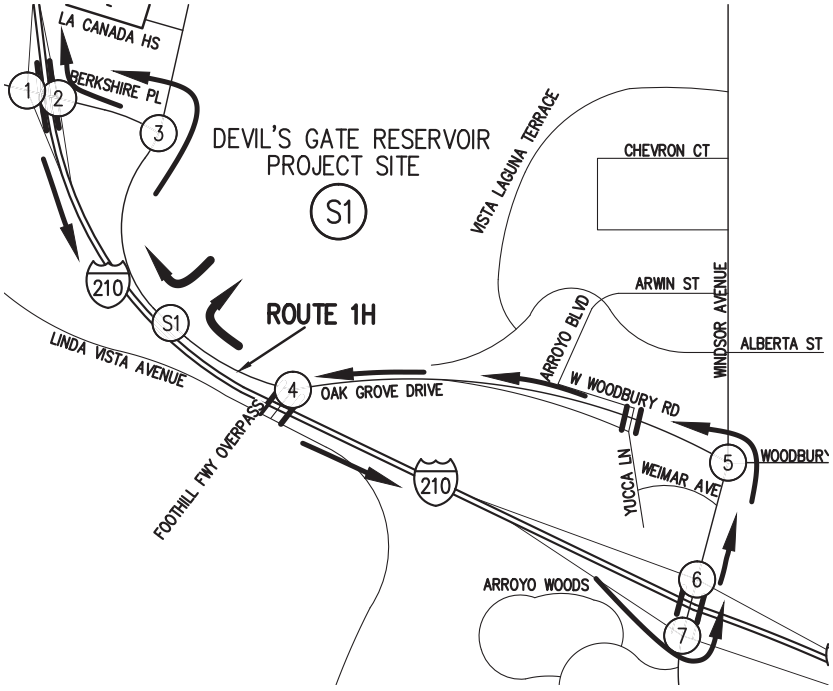
N/S STREET				5			E/W STREET			
WINDSOR AVE							OAK GROVE DRIVE			
				40	655	60				
				20	340	45				
				30	425	45				
				10	570	65				
25	30	25	45					60	50	50	55
125	165	175	275		TS			480	180	135	190
50	20	40	30					625	360	440	485
				235	665	540				
				185	330	415				
				180	445	545				
				180	540	625				

N/S STREET				6			E/W STREET			
WINDSOR AVE							I-210 FWY WB RAMPS			
				585	650	0				
				325	415	0				
				345	545	0				
				495	600	0				
0	0	0	0					630	305	420	445
0	0	0	0		TS			10	10	10	10
0	0	0	0					10	25	25	30
				45	785	0				
				50	615	0				
				55	780	0				
				110	905	0				

N/S STREET				7			E/W STREET			
WINDSOR AVE							I-210 FWY EB RAMPS			
				0	220	460				
				0	115	325				
				0	200	350				
				0	180	450				
750	500	555	800					0	0	0	0
10	10	10	10		TS			0	0	0	0
115	60	55	115					0	0	0	0
				0	140	25				
				0	165	25				
				0	200	20				
				0	215	20				

N

NOT TO SCALE



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 1H
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-1-8B

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Table 5-1-8
Intersection Capacity Analysis – Year 2014 Conditions (Route 1H)
Traffic Impact Analysis - Site 1

Route1H		AM				MID-DAY (12-2 PM)				MID-DAY (2-4 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
2	Berkshire Place and I-210 Freeway Westbound Ramps (3)	B	10.4	-	-	A	4.6	-	-	A	6.6	-	-	A	3.5	-	-
3	Oak Grove Drive and Berkshire Place	B	19.2	0.93	B	A	5.6	0.29	A	A	8.4	0.57	B	A	8	0.57	B
4	Oak Grove Drive and Foothill Freeway Overpass (3)	C	19.2	-	-	A	9.6	-	-	A	9.5	-	-	B	11.3	-	-
5	Windsor Ave and Oak Grove Drive/Woodbury Rd	C	34.7	0.94	D	B	14.3	0.54	A	B	17.1	0.58	A	C	24.9	0.76	C
6	Windsor Ave/Arroyo Blvd and I-210 Freeway Westbound Ramps	A	9.7	0.61	B	A	5.7	0.37	A	A	6.4	0.37	A	A	7.8	0.44	B
7	Windsor Ave/Arroyo Blvd and I-210 Freeway Eastbound Ramps	C	28.6	0.57	A	B	16.1	0.39	A	B	17.4	0.42	A	C	26.8	0.63	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 1H Analysis

As presented in *Table 5-1-8*, under the project conditions Year 2014 for Site 1 (Routes 1H) all intersections are anticipated to operate at an HCM LOS C or better.

Section 2: Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9)

Haul Route 2A

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-2-1A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-2-1B.*

N/S STREET				8		E/W STREET			
IRWINDALE AVE						I-210 FWY WB RAMPS			
				665	510	0			
				595	650	0			
				520	975	0			
0	0	0					110	120	160
0	0	0		TS			0	0	0
0	0	0					190	280	160
				0	920	690			
				0	945	510			
				0	825	570			

N/S STREET				9		E/W STREET			
IRWINDALE AVE						I-210 FWY EB RAMPS			
				0	595	190			
				0	730	220			
				0	805	325			
510	645	410					0	0	0
10	10	10		TS			0	0	0
760	450	475					0	0	0
				0	1030	215			
				0	805	260			
				0	1100	420			

N/S STREET				10		E/W STREET			
IRWINDALE AVE						FIRST STREET			
				135	1205	10			
				185	870	25			
				45	1110	20			
85	145	205					15	20	20
10	15	10		TS			10	10	10
25	105	40					10	20	20
				50	1145	10			
				100	1115	30			
				35	1475	20			

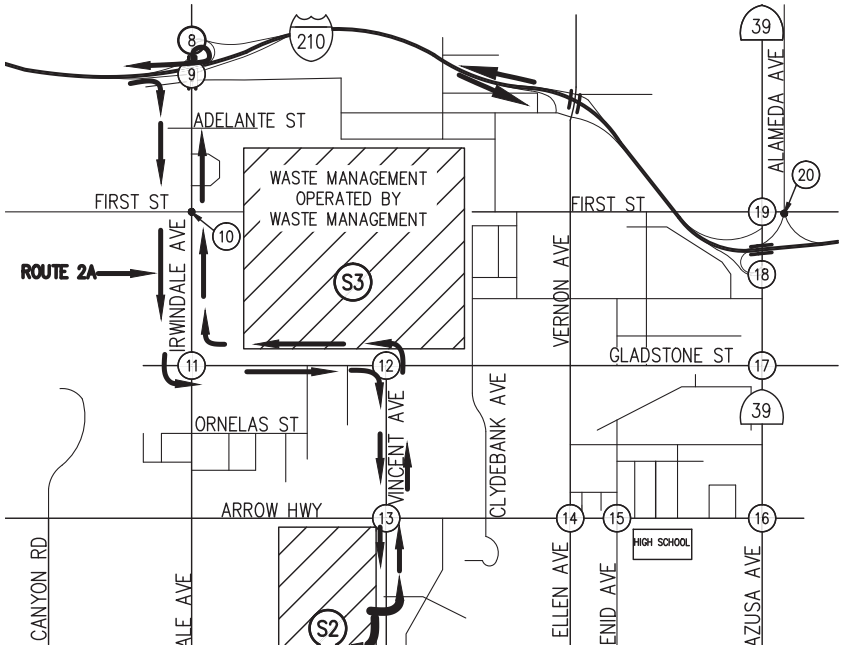
N/S STREET				11		E/W STREET			
IRWINDALE AVE						GLADSTONE STREET			
				10	850	255			
				10	820	235			
				10	765	390			
10	10	10					685	275	245
15	30	75		TS			70	25	15
15	40	35					540	140	140
				15	560	60			
				20	840	100			
				15	1275	360			

N/S STREET				12		E/W STREET			
VINCENT AVE						GLADSTONE STREET			
				25	20	10			
				15	10	15			
				10	10	10			
20	15	10					10	10	10
115	185	640		TS			830	215	260
180	170	220					275	125	165
				390	15	180			
				205	10	185			
				155	10	385			

N/S STREET				13		E/W STREET			
VINCENT AVE						ARROW HWY			
				75	345	35			
				65	225	30			
				60	280	50			
60	85	145					100	50	80
580	715	1520		TS			1325	625	570
85	100	230					130	110	120
				185	365	90			
				80	225	125			
				45	285	115			

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 2A
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE

5-2-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 2\FIG 5-2-1A.dwg
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N/S STREET				8		E/W STREET			
IRWINDALE AVE						I-210 FWY WB RAMPS			
				790	600	0			
				675	705	0			
				540	990	0			
0	0	0					135	130	170
0	0	0		TS			0	0	0
0	0	0					215	345	180
				0	1065	905			
				0	1035	730			
				0	850	720			

N/S STREET				9		E/W STREET			
IRWINDALE AVE						I-210 FWY EB RAMPS			
				0	720	240			
				0	885	230			
				0	850	345			
590	760	420					0	0	0
10	10	10		TS			0	0	0
970	650	590					0	0	0
				0	1215	235			
				0	1010	315			
				0	1235	430			

N/S STREET				10		E/W STREET			
IRWINDALE AVE						FIRST STREET			
				185	1490	10			
				305	1190	30			
				80	1335	25			
155	245	255					15	25	25
10	15	10		TS			10	10	10
35	140	50					10	20	20
				55	1480	15			
				130	1450	30			
				40	1680	30			

N/S STREET				11		E/W STREET			
IRWINDALE AVE						GLADSTONE STREET			
				10	925	475			
				10	955	450			
				15	855	555			
10	10	10					925	480	375
20	40	75		TS			75	30	15
25	40	40					585	160	160
				20	650	70			
				25	970	110			
				20	1365	440			

N/S STREET				12		E/W STREET			
VINCENT AVE						GLADSTONE STREET			
				55	25	10			
				25	10	20			
				10	10	10			
40	30	10					10	10	10
125	195	640		TS			835	225	265
355	325	365					280	125	165
				505	25	205			
				360	10	190			
				260	10	390			

N/S STREET				13		E/W STREET			
VINCENT AVE						ARROW HWY			
				90	500	35			
				70	385	30			
				60	385	50			
65	100	145					100	50	80
590	730	1530		TS			1345	640	580
90	115	230					135	110	120
				190	500	90			
				105	380	125			
				45	395	120			

N

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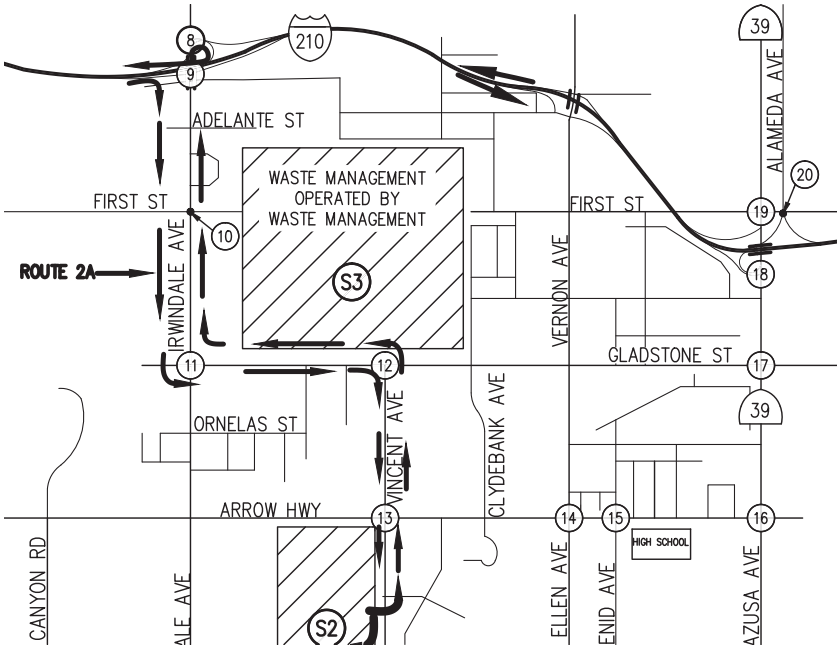

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

S# – DISPOSAL SITE

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ROUTE 2A
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-1B

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Table 5-2-1
Intersection Capacity Analysis – Year 2014 Conditions (Route 2A)
Traffic Impact Analysis - Site 2

Route2A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Ave and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Ave and Gladstone Street	B	14.3	0.80	C	A	8.9	0.45	A	B	14.4	0.72	C
13	Vincent Ave and Arrow Hwy	B	17.6	0.90	D	A	9.8	0.45	A	B	15.4	0.93	D

1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

As presented in *Table 5-2-1*, under the project conditions year 2014 for Site 2 (Route 2A) all of the intersections are anticipated to operate at an acceptable HCM LOS C or better.

Haul Route 2B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-2-2A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-2-2C.*

N/S STREET				9		E/W STREET			
IRWINDALE AVE						I-210 FWY EB RAMPS			
				0	595	190			
				0	730	220			
				0	805	325			
510	645	410					0	0	0
10	10	10		TS			0	0	0
760	450	475					0	0	0
				0	975	215			
				0	750	260			
				0	1045	420			

N/S STREET				10		E/W STREET			
IRWINDALE AVE						FIRST STREET			
				135	1205	10			
				185	870	20			
				45	1110	20			
85	145	205					15	20	20
10	15	10		TS			10	10	10
25	105	40					10	20	20
				50	1090	10			
				100	1065	25			
				35	1420	20			

N/S STREET				11		E/W STREET			
IRWINDALE AVE						GLADSTONE STREET			
				10	850	255			
				10	820	235			
				10	765	390			
10	10	10					630	220	190
15	30	75		TS			70	25	15
15	40	35					540	140	140
				15	560	60			
				20	840	100			
				15	1275	360			

N/S STREET				12		E/W STREET			
VINCENT AVE						GLADSTONE STREET			
				25	20	10			
				65	10	15			
				10	10	10			
20	15	10					10	10	10
115	185	640		TS			830	215	260
180	170	220					275	125	165
				340	15	180			
				155	10	185			
				100	10	385			

N/S STREET				13		E/W STREET			
VINCENT AVE						ARROW HWY			
				75	345	35			
				65	225	30			
				60	280	50			
60	85	145					100	50	80
580	715	1520		TS			1325	625	570
85	100	230					130	110	120
				185	345	145			
				80	190	180			
				45	255	170			

N/S STREET				14		E/W STREET			
LARK ELLEN AVE						ARROW HWY			
				75	360	120			
				30	230	75			
				60	360	110			
80	80	125					35	35	40
615	790	1520		TS			1315	590	650
100	65	125					125	120	90
				180	360	185			
				70	205	120			
				80	355	125			

N

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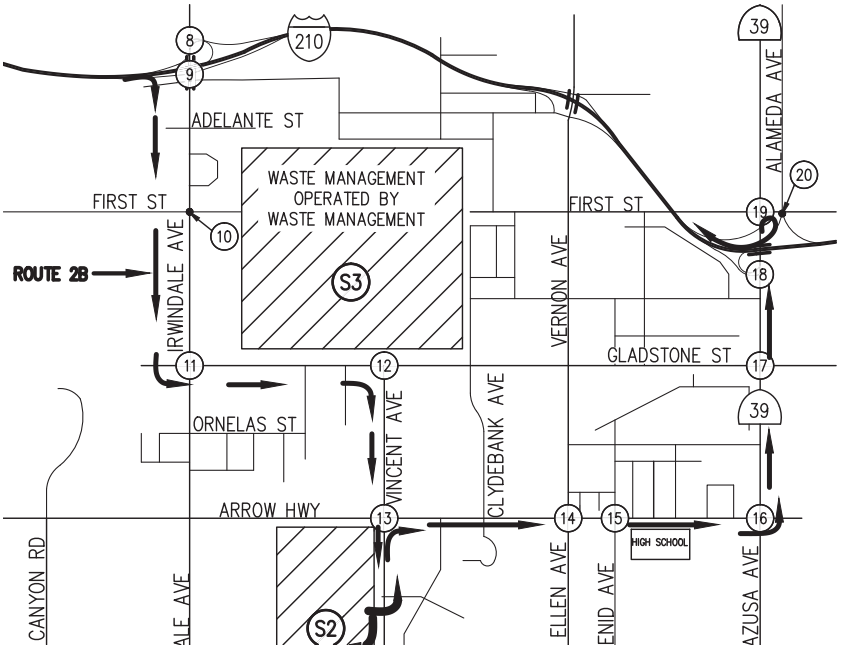

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 2B
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-2-2A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 2\FIG 5-2-2A.dwg
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N/S STREET				15			E/W STREET			
ENID AVE							ARROW HWY			
				65	160	35				
				30	25	30				
				35	40	30				
20	30	90						25	30	35
750	935	1610		TS				1415	690	685
120	25	65						185	50	55
				105	120	170				
				30	25	60				
				40	45	60				

N/S STREET				16			E/W STREET			
AZUSA AVE							ARROW HWY			
				225	535	105				
				110	830	135				
				90	690	285				
220	215	290						115	125	105
555	540	1230		TS				975	430	500
85	130	145						75	205	135
				245	565	50				
				220	730	145				
				175	505	250				

N/S STREET				17			E/W STREET			
AZUSA AVE							GLADSTONE STREET			
				130	685	175				
				125	835	190				
				70	900	195				
160	165	195						65	90	60
175	215	730		TS				900	195	280
30	40	60						170	220	140
				120	775	45				
				110	860	105				
				60	800	80				

N/S STREET				18			E/W STREET			
AZUSA AVE							I-210 FWY EB RAMPS			
				230	805	0				
				185	785	0				
				205	870	0				
275	305	245						0	0	0
0	0	0		TS				0	0	0
255	285	235						0	0	0
				0	775	215				
				0	945	235				
				0	750	265				

N/S STREET				19			E/W STREET			
AZUSA AVE							FIRST STREET			
				185	400	175				
				15	705	85				
				25	870	130				
130	50	100						350	170	240
330	90	200		TS				545	140	225
135	35	40						530	295	280
				175	410	465				
				75	715	410				
				55	470	415				

N/S STREET				20			E/W STREET			
ALAMEDA ST/WB I-210 FWY							FIRST STREET			
				85	40	50				
				70	30	35				
				70	40	55				
20	30	25						45	30	40
350	230	430		TS				700	240	260
510	290	290						445	130	165
				340	55	20				
				380	60	50				
				485	80	75				

N

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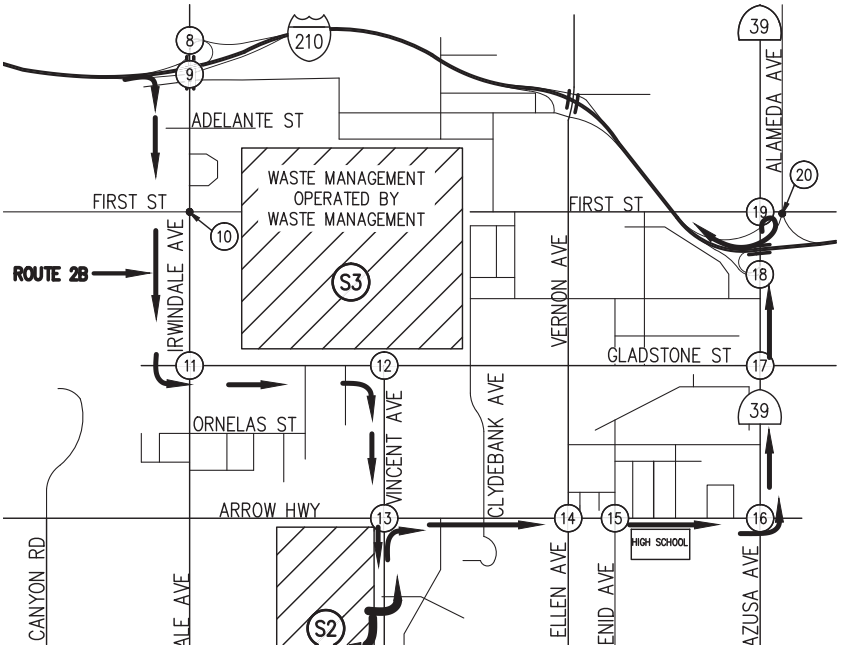

LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 2B PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-2B

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N/S STREET	9	E/W STREET
IRWINDALE AVE		I-210 FWY EB RAMPS

				0	720	240				
				0	885	230				
				0	850	345				
590	760	420						0	0	0
10	10	10			TS			0	0	0
970	650	590						0	0	0
				0	1050	235				
				0	845	315				
				0	1075	430				

N/S STREET	10	E/W STREET
IRWINDALE AVE		FIRST STREET

				185	1490	10				
				305	1190	25				
				80	1335	25				
155	245	255						15	25	25
10	15	10			TS			10	10	10
35	140	50						10	20	20
				55	1320	15				
				130	1285	25				
				40	1515	30				

N/S STREET	11	E/W STREET
IRWINDALE AVE		GLADSTONE STREET

				10	925	475				
				10	955	450				
				15	855	555				
10	10	10						765	315	215
20	40	75			TS			75	30	15
25	40	40						585	160	160
				20	650	70				
				25	970	110				
				20	1365	440				

N/S STREET	12	E/W STREET
VINCENT AVE		GLADSTONE STREET

				55	25	10				
				25	10	20				
				10	10	10				
40	30	10						10	10	10
125	195	640			TS			835	225	265
355	325	365						280	125	165
				345	25	205				
				195	10	190				
				100	10	390				

N/S STREET	13	E/W STREET
VINCENT AVE		ARROW HWY

				90	500	35				
				70	385	30				
				60	385	50				
65	100	145						100	50	80
590	730	1530			TS			1345	640	580
90	115	230						135	110	120
				190	380	255				
				105	250	290				
				45	265	285				

N/S STREET	14	E/W STREET
LARK ELLEN AVE		ARROW HWY

				80	370	125				
				35	240	80				
				60	360	110				
85	90	130						35	35	40
795	990	1675			TS			1410	670	665
110	70	125						125	120	90
				185	375	190				
				75	235	120				
				85	355	125				

N

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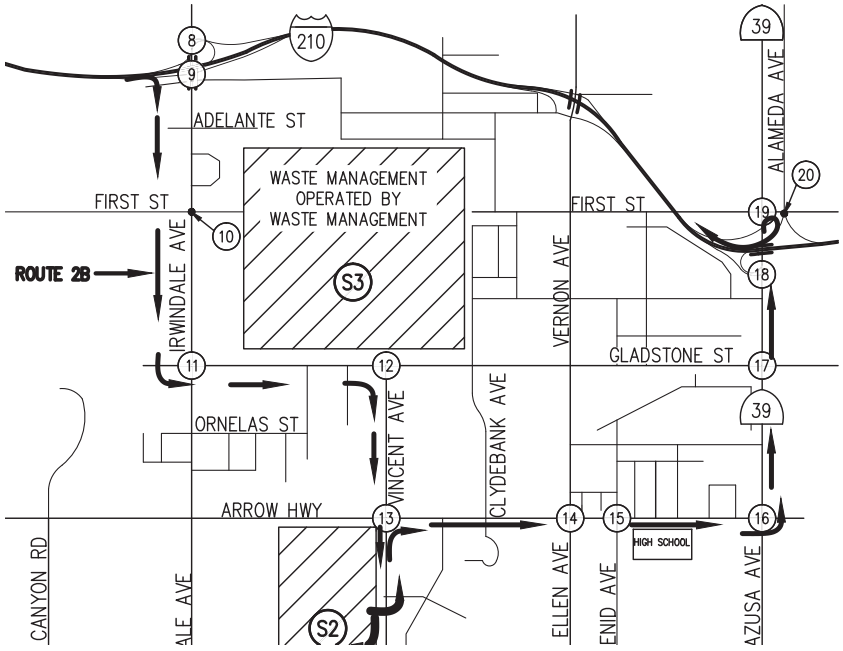

LEGEND

N/S STREET	S#	E/W STREET

					7AM-9AM					
					2PM-4PM					
					4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM			TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
					7AM-9AM					
					2PM-4PM					
					4PM-6PM					

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ROUTE 2B
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-2C

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N/S STREET				15		E/W STREET			
ENID AVE						ARROW HWY			
				65	160	35			
				30	25	30			
				40	40	30			
20	35	90						25	35	40
955	1170	1765		TS				1510	760	705
120	25	65						190	50	55
				105	125	175			
				30	25	60			
				40	45	60			

N/S STREET				16		E/W STREET			
AZUSA AVE						ARROW HWY			
				235	565	105			
				110	855	140			
				90	715	295			
330	330	405						120	130	105
650	565	1250		TS				1025	460	520
85	140	155						75	250	140
				260	605	50			
				230	765	160			
				175	520	255			

N/S STREET				17		E/W STREET			
AZUSA AVE						GLADSTONE STREET			
				145	760	195			
				135	900	200			
				80	930	205			
195	195	215						70	100	60
195	245	760		TS				925	225	290
35	50	60						175	230	140
				130	925	50			
				120	1025	110			
				65	935	85			

N/S STREET				18		E/W STREET			
AZUSA AVE						I-210 FWY EB RAMPS			
				260	890	0			
				225	850	0			
				225	920	0			
290	340	265						0	0	0
0	0	0		TS				0	0	0
280	305	265						0	0	0
				0	970	245			
				0	1110	260			
				0	900	295			

N/S STREET				19		E/W STREET			
AZUSA AVE						FIRST STREET			
				230	520	190			
				15	800	85			
				25	900	135			
130	50	105						360	185	245
330	105	205		TS				550	145	235
135	45	40						550	320	295
				180	465	605			
				75	775	540			
				55	495	535			

N/S STREET				20		E/W STREET			
ALAMEDA ST/WB I-210 FWY						FIRST STREET			
				85	45	50			
				70	30	35			
				70	45	55			
20	30	25						45	40	40
375	235	440		TS				725	250	265
645	420	410						465	135	170
				380	60	20			
				450	65	50			
				520	80	75			

N

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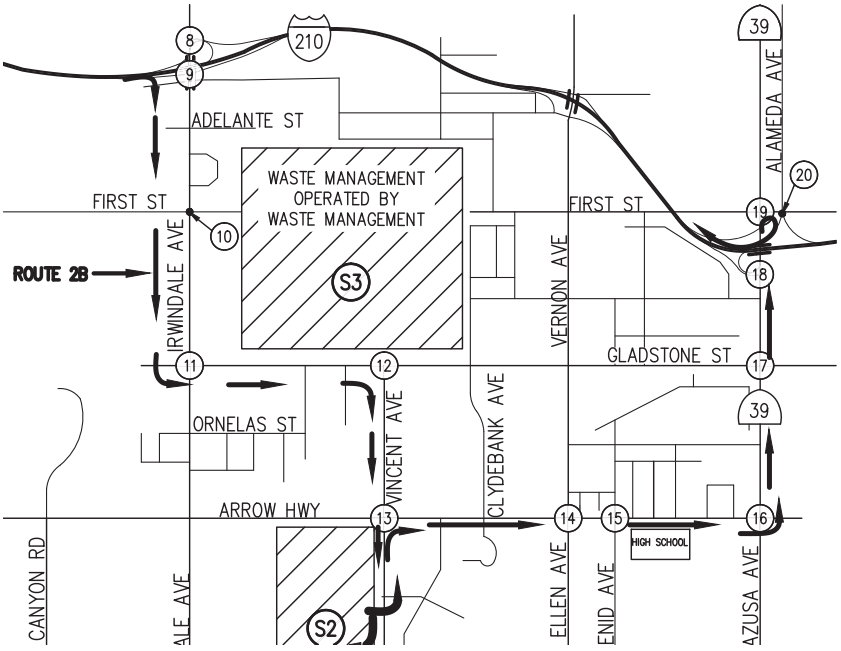

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 2B
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-2-2D

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Table 5-2-2
Intersection Capacity Analysis – Year 2014 Conditions (Route 2B)
Traffic Impact Analysis - Site 2

Route2B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.2	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	13.8	0.65	B	B	18.5	0.65	B	D	50.3	0.93	C
11	Irwindale Ave and Gladstone Street	C	31.9	0.91	D	B	15.2	0.67	B	C	27.6	0.95	D
12	Vincent Ave and Gladstone Street	B	12.6	0.74	B	A	8.7	0.38	A	B	14.2	0.72	C
13	Vincent Ave and Arrow Hwy	B	17.5	0.90	D	A	9.8	0.45	A	B	15.4	0.93	D
14	Arrow Hwy and Lark Ellen Ave	E	61.5	0.97	D	D	40.3	0.72	B	E	55.4	0.94	E
15	Arrow Hwy and Enid Ave	D	55.0	1.35	E	B	12.8	0.50	A	B	14.4	0.70	C
16	Azusa Ave and Arrow Hwy	E	63.8	1.15	D	E	55.4	0.96	D	E	58.4	1.04	E
17	Azusa Ave and Gladstone Street	E	61.5	1.01	D	D	38.3	0.91	C	D	38.0	0.87	D
18	Azusa Ave and I-210 Freeway Eastbound Ramps	B	12.1	0.71	A	B	11.7	0.75	A	B	10.3	0.65	A
19	Azusa Ave and First Street	D	46.2	0.87	D	B	16.3	0.57	A	B	18.9	0.69	B
20	First Street and Alameda Street/I-210 Freeway Westbound Ramps	E	69.2	1.40	E	B	11.6	0.63	B	B	17.1	0.87	C

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
(5)V/C-HCM Volume to Capacity Ratio

Source: **Hall & Foreman, Inc.**

Haul Route 2B Analysis

As presented in *Table 5-2-2*, under the project conditions year 2014 for Site 2 (Route 2B) most of the intersections are anticipated to operate at an acceptable HCM LOS D or better. Route 2B will have negative impacts on intersections Arrow Hwy and Lark Ellen Ave anticipated AM and PM peak hours HCM LOS E, Azusa Ave and Arrow Hwy anticipated AM, Mid-day, and PM peak hours HCM LOS E, Azusa Ave and Gladstone Street anticipated AM peak hour HCM LOS E, First Street and Alameda Street/I-210 Freeway Westbound Ramps AM peak hour HCM LOS E. Mitigations are recommended to improve the HCM LOS at these four intersections.

Haul Route 3

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-2-3A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-2-3B.*

Haul Route 9

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-2-4A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-2-4B.*

N/S STREET				8		E/W STREET				
IRWINDALE AVE						I-210 FWY WB RAMPS				
				665	510	0				
				595	650	0				
				520	975	0				
0	0	0						110	120	160
0	0	0		TS				0	0	0
0	0	0						190	280	160
				0	920	690				
				0	945	510				
				0	825	570				

N/S STREET				9		E/W STREET				
IRWINDALE AVE						I-210 FWY EB RAMPS				
				0	595	190				
				0	730	220				
				0	805	325				
510	645	410						0	0	0
10	10	10		TS				0	0	0
760	450	475						0	0	0
				0	1030	215				
				0	805	260				
				0	1100	420				

N/S STREET				10		E/W STREET				
IRWINDALE AVE						FIRST STREET				
				125	1105	5				
				170	800	20				
				40	1020	15				
80	135	190						10	15	15
5	10	5		TS				5	5	5
20	95	35						5	15	15
				45	1050	5				
				90	1025	25				
				30	1355	15				

N/S STREET				11		E/W STREET				
IRWINDALE AVE						GLADSTONE STREET				
				10	850	255				
				10	820	235				
				10	765	390				
10	10	10						685	275	245
15	30	75		TS				70	25	15
15	40	35						540	140	140
				15	560	60				
				20	840	100				
				15	1275	360				

N/S STREET				12		E/W STREET				
VINCENT AVE						GLADSTONE STREET				
				25	20	10				
				65	10	15				
				60	10	10				
70	65	60						10	10	10
115	185	640		TS				830	215	260
125	115	165						275	125	165
				340	15	180				
				155	10	185				
				100	10	385				

N

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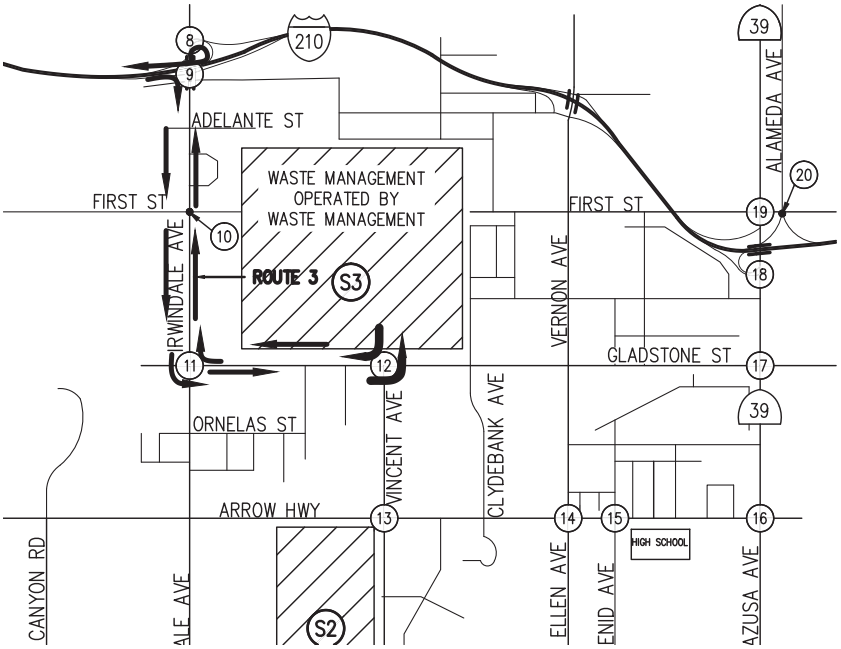

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 3
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-3A

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N/S STREET				8		E/W STREET			
IRWINDALE AVE						I-210 FWY WB RAMPS			
				790	600	0			
				675	705	0			
				540	990	0			
0	0	0					135	130	170
0	0	0		TS			0	0	0
0	0	0					215	345	180
				0	1065	905			
				0	1035	730			
				0	850	720			

N/S STREET				9		E/W STREET			
IRWINDALE AVE						I-210 FWY EB RAMPS			
				0	720	240			
				0	885	230			
				0	850	345			
590	760	420					0	0	0
10	10	10		TS			0	0	0
970	650	590					0	0	0
				0	1215	235			
				0	1010	315			
				0	1235	430			

N/S STREET				10		E/W STREET			
IRWINDALE AVE						FIRST STREET			
				185	1490	10			
				305	1190	30			
				80	1335	25			
155	245	255					15	25	25
10	15	10		TS			10	10	10
35	140	50					10	20	20
				55	1480	15			
				130	1450	30			
				40	1680	30			

N/S STREET				11		E/W STREET			
IRWINDALE AVE						GLADSTONE STREET			
				10	925	475			
				10	955	450			
				15	855	555			
10	10	10					925	480	375
20	40	75		TS			75	30	15
25	40	40					585	160	160
				20	650	70			
				25	970	110			
				20	1365	440			

N/S STREET				12		E/W STREET			
VINCENT AVE						GLADSTONE STREET			
				220	25	10			
				185	10	20			
				170	10	10			
200	190	170					10	10	10
125	195	640		TS			835	225	265
190	165	200					280	125	165
				345	25	205			
				195	10	190			
				100	10	390			

N

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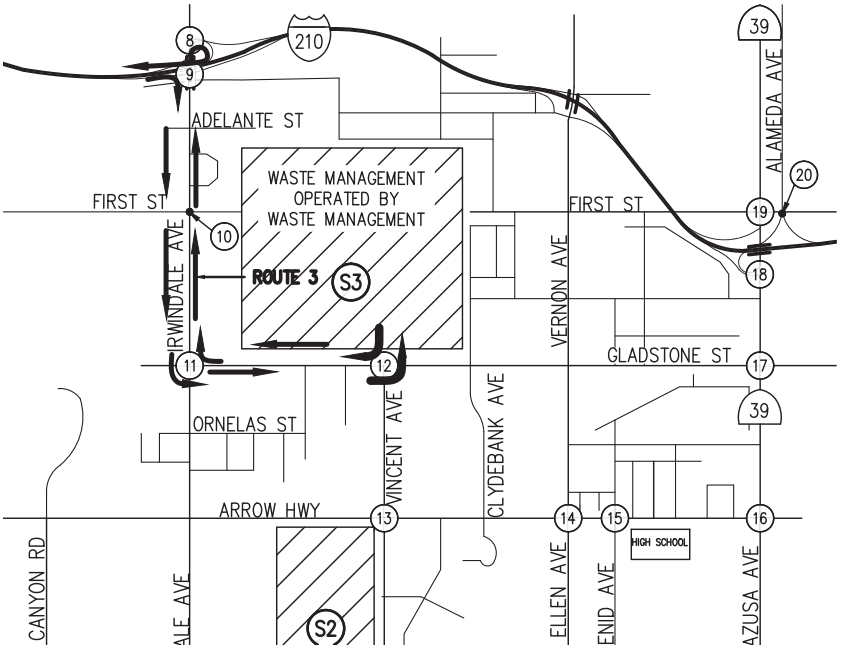

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 3
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-3B

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Last Opened: Oct 04, 2013 – 1:13pm by: TMunoz

N/S STREET				8		E/W STREET				
IRWINDALE AVE						I-210 FWY WB RAMPS				
				720	110	0				
				650	120	0				
				570	160	0				
0	0	0						110	120	160
0	0	0		TS				0	0	0
0	0	0						190	280	160
				0	975	640				
				0	995	460				
				0	875	520				

N/S STREET				9		E/W STREET				
IRWINDALE AVE						I-210 FWY EB RAMPS				
				0	595	190				
				0	730	220				
				0	805	325				
565	700	465						0	0	0
10	10	10		TS				0	0	0
705	400	420						0	0	0
				0	975	215				
				0	750	260				
				0	1045	420				

N/S STREET				52		E/W STREET				
IRWINDALE AVE						FOOTHILL BOULEVARD				
				10	60	10				
				10	60	10				
				10	60	10				
10	10	10						10	10	10
10	10	10		TS				10	10	10
10	10	10						10	10	10
				10	60	10				
				10	60	10				
				10	60	10				

N

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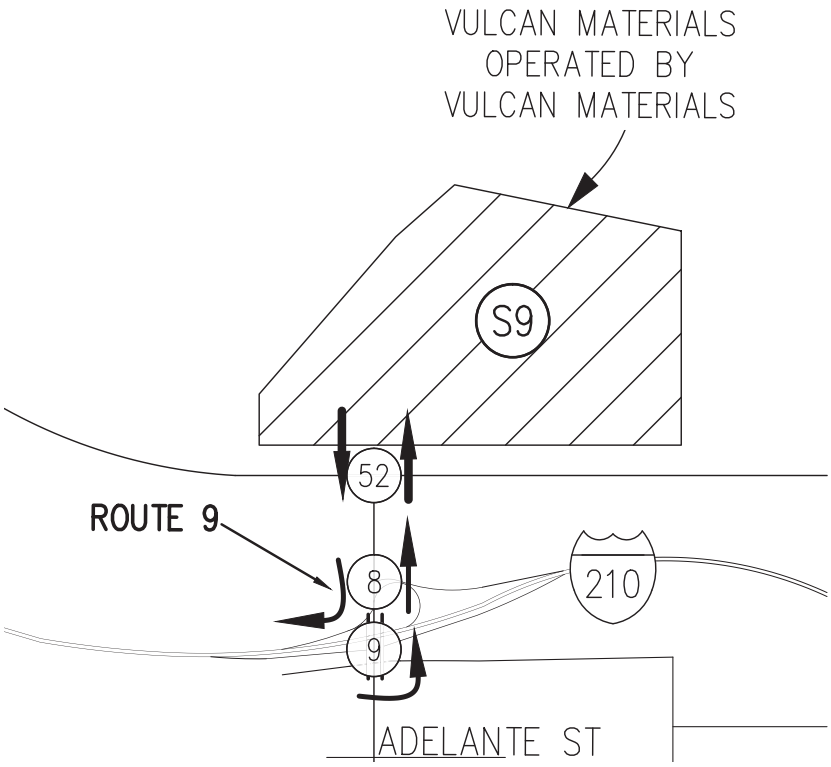

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 9 PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-4A

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N/S STREET				8		E/W STREET				
IRWINDALE AVE						I-210 FWY WB RAMPS				
				955	600	0				
				840	705	0				
				705	990	0				
0	0	0						135	130	170
0	0	0		TS				0	0	0
0	0	0						215	345	180
				0	1225	740				
				0	1200	565				
				0	1015	555				

N/S STREET				9		E/W STREET				
IRWINDALE AVE						I-210 FWY EB RAMPS				
				0	720	240				
				0	885	230				
				0	850	345				
750	920	585						0	0	0
10	10	10		TS				0	0	0
805	485	425						0	0	0
				0	1050	235				
				0	845	315				
				0	1075	430				

N/S STREET				52		E/W STREET				
IRWINDALE AVE						FOOTHILL BOULEVARD				
				10	170	10				
				10	170	10				
				10	170	10				
10	10	10						10	10	10
10	10	10		TS				10	10	10
10	10	10						10	10	10
				10	170	10				
				10	170	10				
				10	170	10				

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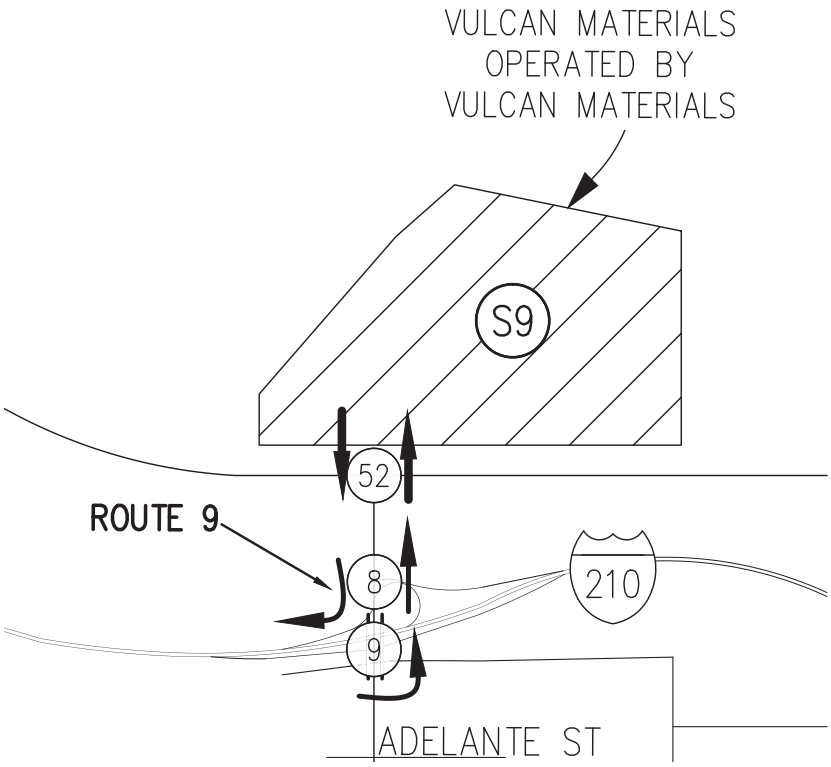

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 9
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-2-4B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 2\FIG 5-2-4B.dwg
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Table 5-2-3
Intersection Capacity Analysis – Year 2014 Conditions (Route 3)
Traffic Impact Analysis - Site 3

Route 3		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.1	0.56	A	A	7.4	0.53	A	A	7.3	0.56	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.93	C	C	22.0	0.79	C	C	26.9	0.91	D
10	Irwindale Ave and First Street	B	10.6	0.63	B	B	14.2	0.65	B	C	23.2	0.86	C
11	Irwindale Ave and Gladstone Street	C	29.9	0.92	D	B	16.0	0.72	B	C	30.2	0.95	D
12	Vincent Ave and Gladstone Street	B	11.7	0.68	B	A	8.7	0.31	A	B	11.0	0.57	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 3 Analysis

As presented in *Table 5-2-3*, under the project conditions Year 2014 for Site 3 (Route 3) all of the intersections are anticipated to operate at an acceptable HCM LOS C or better.

Table 5-2-4
Intersection Capacity Analysis – Year 2014 Conditions (Route 9)
Traffic Impact Analysis - Site 9

Route 9		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
8	Irwindale Ave and I-210 Freeway Westbound Ramps	A	7.2	0.57	A	A	7.5	0.54	A	A	7.5	0.58	A
9	Irwindale Ave and I-210 Freeway Eastbound Ramps	C	27.9	0.90	C	C	22.5	0.80	C	C	26.6	0.88	D
53	Irwindale Ave and Foothill Boulevard	C	30.0	0.87	C	D	46.8	1.01	D	E	77.1	1.09	F*

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 9 Analysis

As presented in *Table 5-2-4*, under the project conditions Year 2014 for Site 9 (Route 9) most of the intersections are anticipated to operate at an acceptable HCM LOS C or better. The intersection of Irwindale Ave and Foothill Boulevard is anticipated to operate at an unacceptable HCM LOS E during the PM peak period.

Section 3: Scholl Canyon Landfill (Site 4)

Haul Route 4A

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-3-1A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-3-1B.*

Haul Route 4B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-3-2A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-3-2B.*

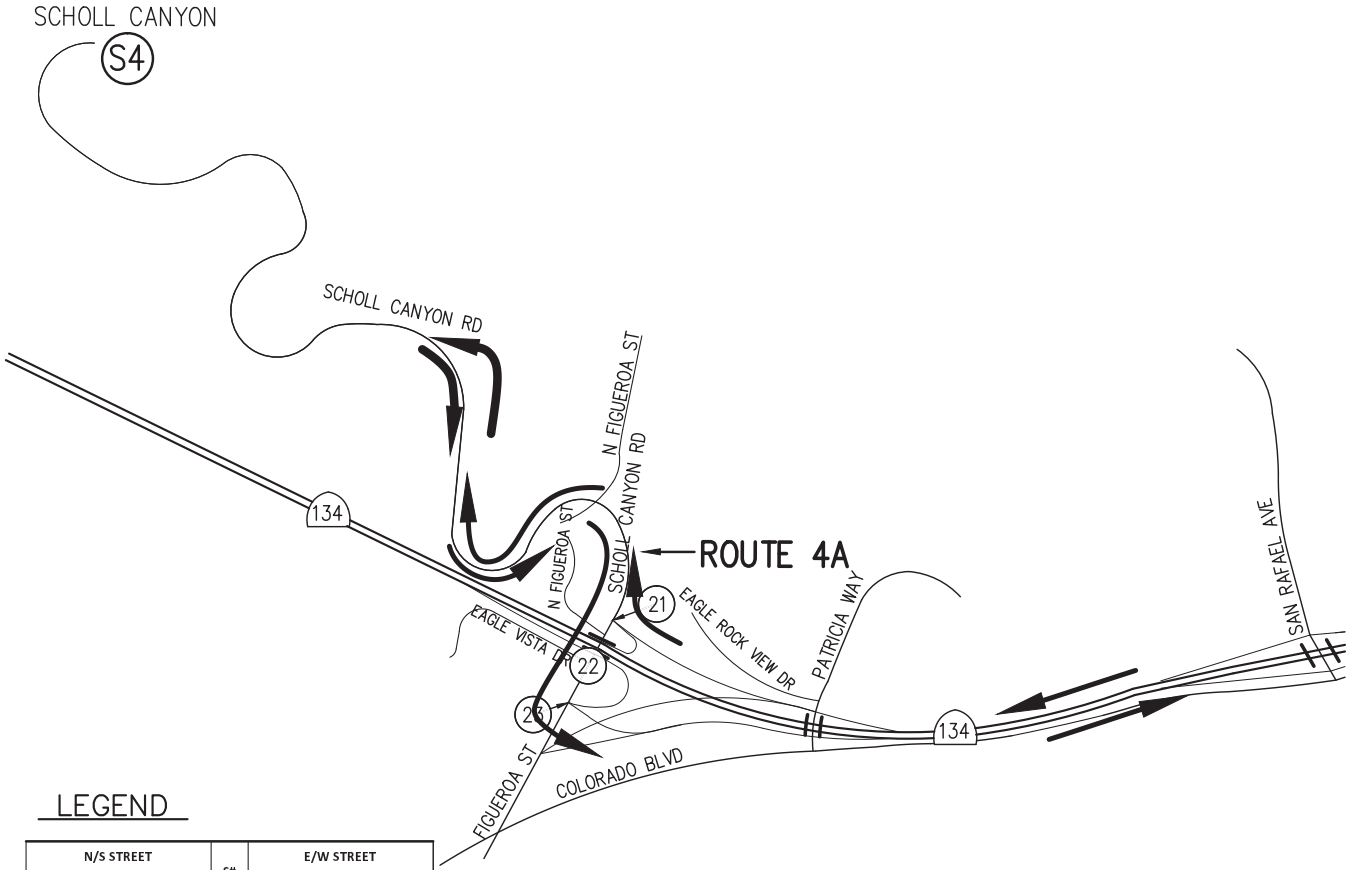
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0	65	10				
				0	105	20				
				0	90	20				
0	0	0						70	90	65
0	0	0						0	0	0
0	0	0						230	285	470
				0	25	690				
				0	40	340				
				0	15	500				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				15	295	0				
				20	355	0				
				30	530	0				
50	35	45						0	0	0
0	0	0						0	0	0
65	55	75						0	0	0
				30	680	0				
				45	355	0				
				115	470	0				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0	230	110				
				0	305	125				
				0	485	115				
0	0	0						45	80	60
0	0	0		TS				0	0	0
0	0	0						400	255	495
				0	670	310				
				0	285	245				
				0	525	290				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 4A
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE

5-3-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 3\FIG 5-3-1A.dwg
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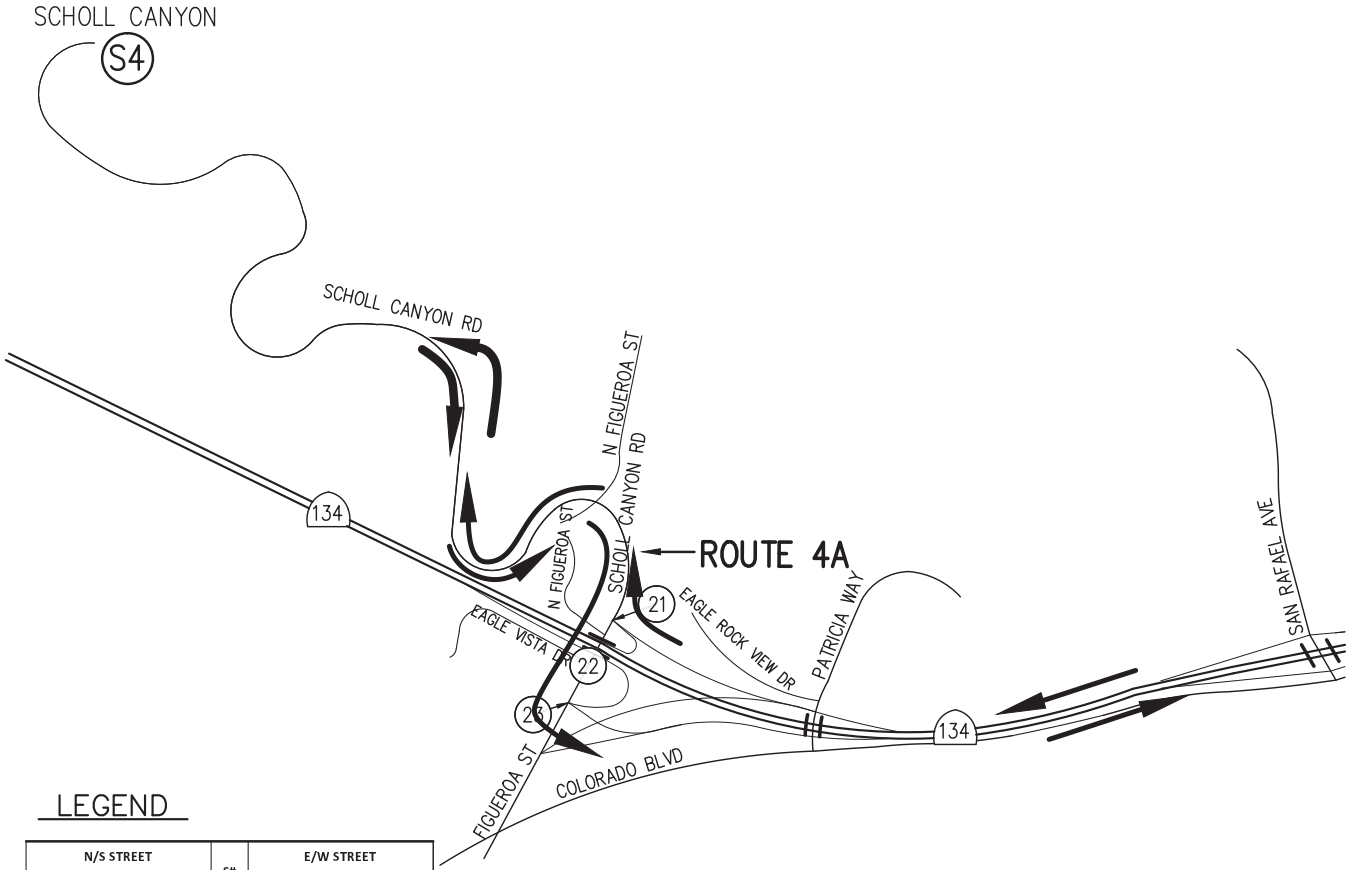
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0	185	15				
				0	265	45				
				0	230	25				
0	0	0						200	255	180
0	0	0						0	0	0
0	0	0						255	295	475
				0	45	705				
				0	85	355				
				0	15	510				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				15	415	0				
				25	530	0				
				30	665	0				
55	35	45						0	0	0
0	0	0						0	0	0
65	55	75						0	0	0
				45	725	0				
				45	425	0				
				115	480	0				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0	240	220				
				0	315	285				
				0	490	245				
0	0	0						55	120	65
0	0	0		TS				0	0	0
0	0	0						415	280	495
				0	710	315				
				0	295	255				
				0	535	300				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 4A
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-3-1B

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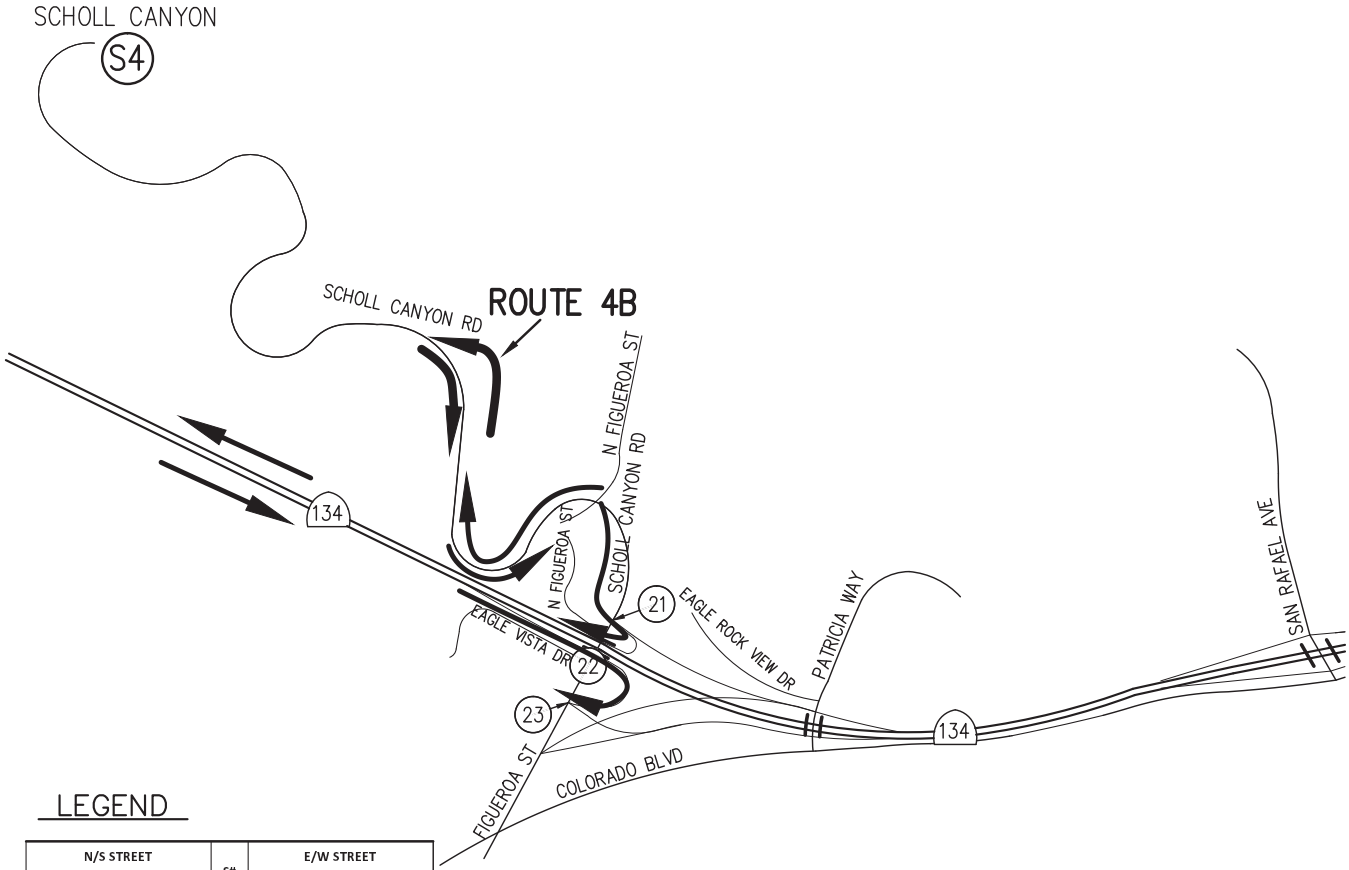
N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0	15	60				
				0	50	70				
				0	40	70				
0	0	0	↳	↰	↑	↱	↳	20	40	15
0	0	0	←				←	0	0	0
0	0	0	↲	↰	↑	↱	↲	230	285	470
				0	75	690				
				0	90	340				
				0	65	500				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				15	240	0				
				20	300	0				
				30	475	0				
50	35	45	↳	↰	↑	↱	↳	0	0	0
0	0	0	←				←	0	0	0
65	55	75	↲	↰	↑	↱	↲	0	0	0
				30	735	0				
				45	410	0				
				115	525	0				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0	230	55				
				0	305	70				
				0	485	60				
0	0	0	↳	↰	↑	↱	↳	100	135	115
0	0	0	←	TS			←	0	0	0
0	0	0	↲	↰	↑	↱	↲	400	255	495
				0	670	310				
				0	285	245				
				0	525	290				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↳	↰	↑	↱	↳	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↲	↰	↑	↱	↲			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 4B PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-3-2A

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Last Opened: Oct 04, 2013 – 1:19pm by: TMunoz

N/S STREET				21		E/W STREET				
SCHOLL CANYON RD						WB 134 FWY				
				0	25	175				
				0	105	205				
				0	65	185				
0	0	0						40	90	20
0	0	0						0	0	0
0	0	0						255	295	475
				0	205	705				
				0	250	355				
				0	175	510				

N/S STREET				22		E/W STREET				
FIGUEROA ST						EAGLE VISTA DRIVE				
				15	250	0				
				25	365	0				
				30	500	0				
55	35	45						0	0	0
0	0	0						0	0	0
65	55	75						0	0	0
				45	890	0				
				45	590	0				
				115	645	0				

N/S STREET				23		E/W STREET				
FIGUEROA ST						EB 134 FWY				
				0	240	55				
				0	315	120				
				0	490	80				
0	0	0						220	285	230
0	0	0		TS				0	0	0
0	0	0						415	280	495
				0	710	315				
				0	295	255				
				0	535	300				

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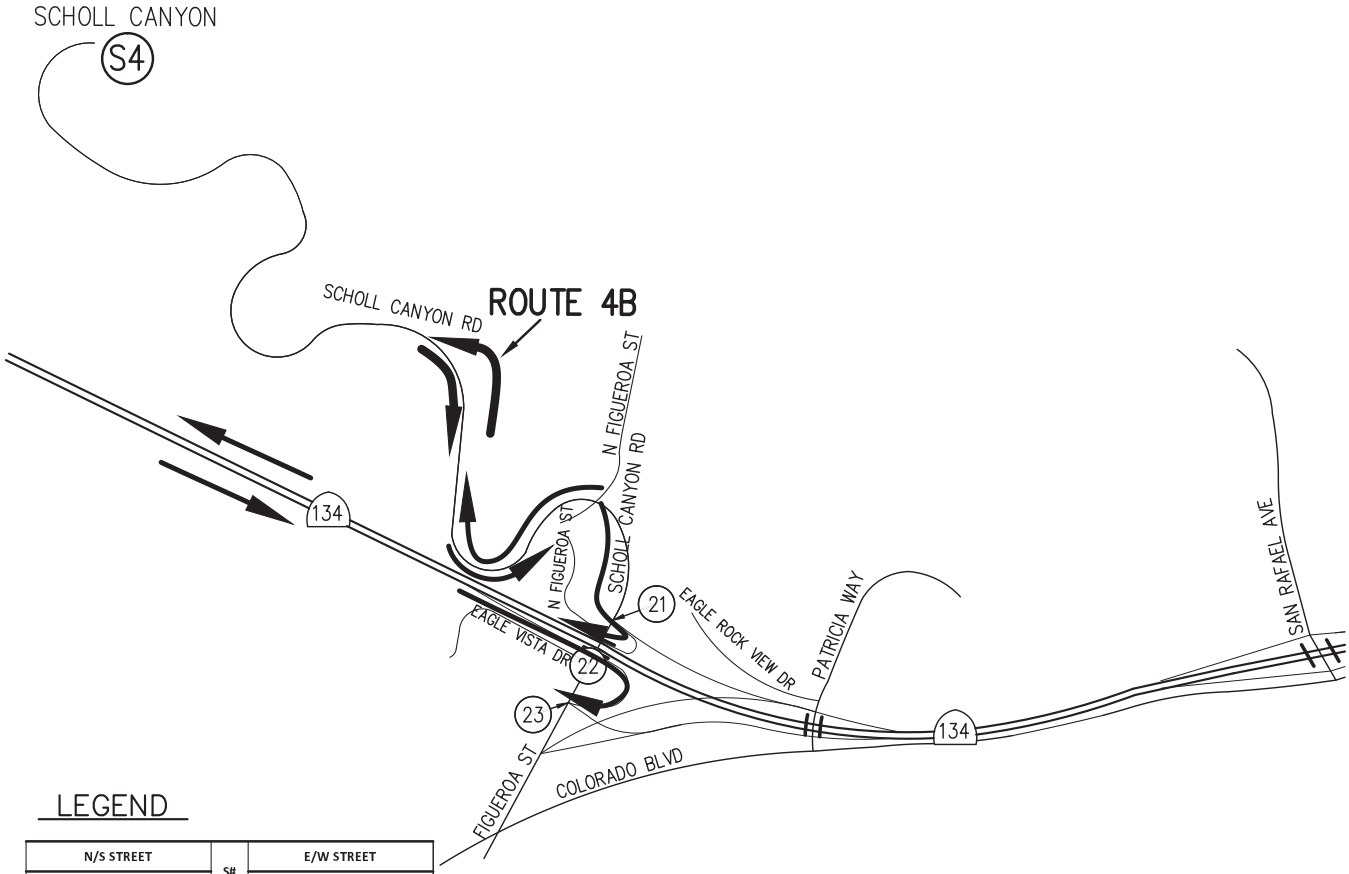

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 4B
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-3-2B

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Table 5-3-1
Intersection Capacity Analysis – Year 2014 Conditions (Route 4A)
Traffic Impact Analysis - Site 4

Route 4A		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	E	41.2	-	-	B	14.4	-	-	E	49.9	-	-
22	Figueroa St and Eagle Vista Drive	B	14.2	-	-	B	12.8	-	-	C	22.9	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	9.2	0.66	B	A	6.4	0.44	A	A	8.6	0.63	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 5-3-2
Intersection Capacity Analysis – Year 2014 Conditions (Route 4B)
Traffic Impact Analysis - Site 4

Route 4B		AM				MID-DAY				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
21	Figueroa St/Scholl Canyon Road and SR-134 Freeway Westbound Ramps	E	41.3	-	-	B	14.3	-	-	F	53.8	-	-
22	Figueroa St and Eagle Vista Drive	B	14.2	-	-	B	12.8	-	-	C	22.9	-	-
23	Figueroa St and SR-134 Freeway Eastbound Ramps	A	8.1	0.54	B	A	7.1	0.37	A	A	8	0.55	B

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 4A & 4C Analysis

As presented in *Table 5-3-1* and *Table 5-3-2*, under project conditions Year 2014 for Site 4 (Route 4A-4B) most of the study intersections are expected to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours. The Intersection of Figueroa Street and SR-134 Freeway Westbound and Figureoa Street (Routes 4A) anticipated AM and PM peak hour HCM LOS E and (Routes 4B) anticipated AM peak hour HCM LOS E and PM peak hour HCM LOS F; mitigations are recommended under existing plus project conditions.

Section 4: Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8)

Haul Route 5A

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-1A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-1B.*

Haul Route 5B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-2A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-2B.*

N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				535	425	0				
				225	280	0				
				245	285	0				
0	0	0						65	40	70
0	0	0		TS				0	0	0
0	0	0						240	180	330
				140	620	0				
				115	485	0				
				230	555	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	385	215				
				0	330	80				
				0	500	60				
385	285	365						0	0	0
0	0	0		TS				0	0	0
110	45	85						0	0	0
				0	380	370				
				0	290	230				
				0	425	315				

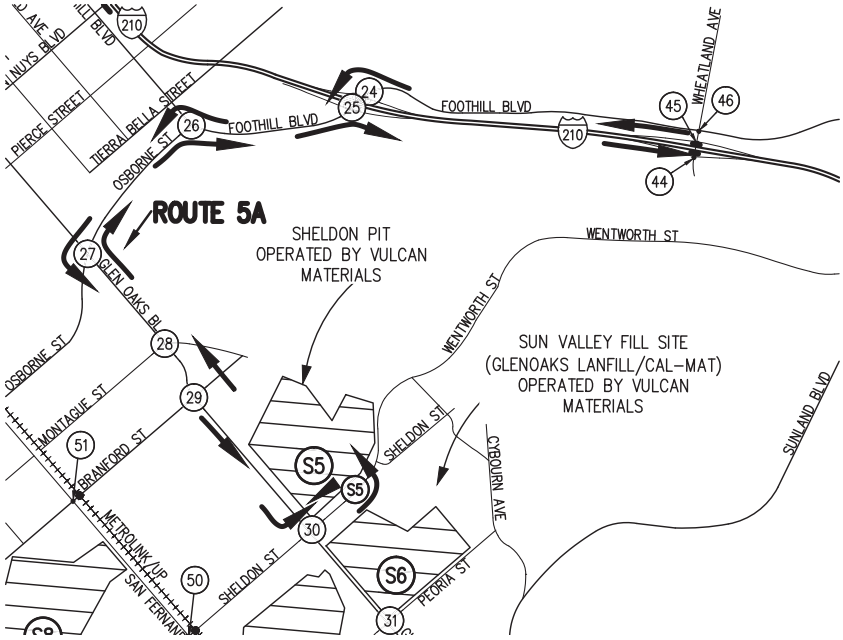
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				10	10	10				
				20	10	10				
				20	10	10				
10	25	20						10	10	10
350	245	345		TS				265	220	330
565	30	290						340	235	280
				365	15	325				
				250	10	285				
				740	10	485				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				185	1165	50				
				140	465	85				
				225	625	145				
380	240	315						75	75	110
585	465	750		TS				685	545	585
75	100	100						465	190	280
				55	565	200				
				85	690	220				
				130	955	425				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				60	1770	20				
				40	625	40				
				30	985	20				
15	45	60						15	35	35
10	10	10		TS				10	10	10
35	50	65						10	40	15
				60	750	10				
				65	665	20				
				55	1340	20				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				190	1535	20				
				85	620	75				
				85	860	125				
135	165	240						10	90	110
25	90	120		TS				10	100	205
100	100	170						15	75	100
				105	705	15				
				100	670	75				
				125	1085	115				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				175	1345	145				
				105	535	110				
				160	795	155				
125	140	325						100	110	120
440	260	355		TS				650	310	355
50	85	70						100	50	45
				85	525	50				
				85	585	55				
				130	895	75				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

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ROUTE 5A PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-1A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 4\FIG 5-4-1A.dwg
Last Opened: Oct 04, 2013 – 1:26pm by: TMunoz

N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				550	445	0				
				235	315	0				
				250	300	0				
0	0	0						65	45	70
0	0	0		TS				0	0	0
0	0	0						355	315	470
				155	650	0				
				120	525	0				
				240	580	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	420	220				
				0	365	80				
				0	520	60				
400	295	375						0	0	0
0	0	0		TS				0	0	0
125	60	100						0	0	0
				0	415	505				
				0	320	370				
				0	450	435				

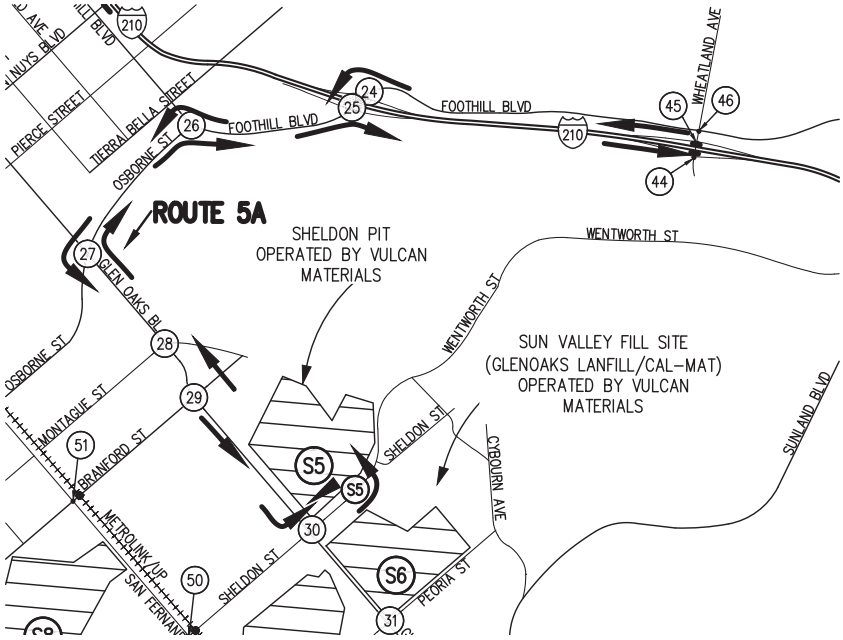
N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				10	10	10				
				20	10	10				
				20	10	10				
10	25	20						10	10	10
380	290	360		TS				275	255	375
610	30	320						465	390	410
				385	15	450				
				290	10	435				
				800	10	620				

N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				220	1325	70				
				155	565	85				
				225	625	145				
505	370	425						100	85	110
655	535	750		TS				760	595	585
105	115	100						535	230	280
				100	715	370				
				110	800	400				
				130	955	535				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				75	1945	25				
				55	835	45				
				35	1210	25				
50	70	70						15	35	35
10	10	10		TS				10	10	10
55	70	70						10	45	15
				70	970	15				
				70	890	20				
				75	1520	20				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				215	1750	30				
				85	820	100				
				115	1090	130				
135	170	245						15	105	115
25	90	120		TS				10	100	215
120	110	185						25	90	115
				115	945	30				
				115	895	85				
				135	1265	120				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				280	1875	395				
				170	770	290				
				215	1085	350				
180	210	455						280	290	300
595	515	465		TS				915	515	485
70	165	100						145	70	70
				140	720	70				
				150	840	95				
				195	1250	110				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM						7AM - 9AM	2PM - 4PM	4PM - 6PM
				TS						
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

S# – DISPOSAL SITE

– STUDY INTERSECTIONS

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ROUTE 5A
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-1B

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 4\FIG 5-4-1B.dwg
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N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				175	1345	90			
				105	535	55			
				160	795	100			
125	140	325						45	55	65
440	260	355		TS				650	310	355
50	85	70						155	105	100
				85	525	105			
				85	585	110			
				130	895	130			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				45	1415	35			
				20	630	15			
				20	865	40			
20	30	45						15	20	60
10	10	15		TS				10	10	10
10	35	25						20	25	35
				20	625	30			
				30	625	20			
				30	1115	30			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				135	1160	100			
				110	440	100			
				100	700	140			
125	120	155						80	50	85
510	425	550		TS				615	465	375
50	65	105						35	30	65
				105	485	20			
				120	530	35			
				130	925	65			

N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				105	1055	40			
				40	535	30			
				120	620	50			
130	100	200						40	40	80
135	140	220		TS				75	90	155
25	55	60						10	25	50
				30	450	10			
				50	560	30			
				80	820	45			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				225	750	15			
				185	385	40			
				55	610	55			
75	180	180						25	20	10
730	470	710		TS				820	385	430
35	25	60						225	350	390
				15	390	85			
				30	435	265			
				25	750	420			

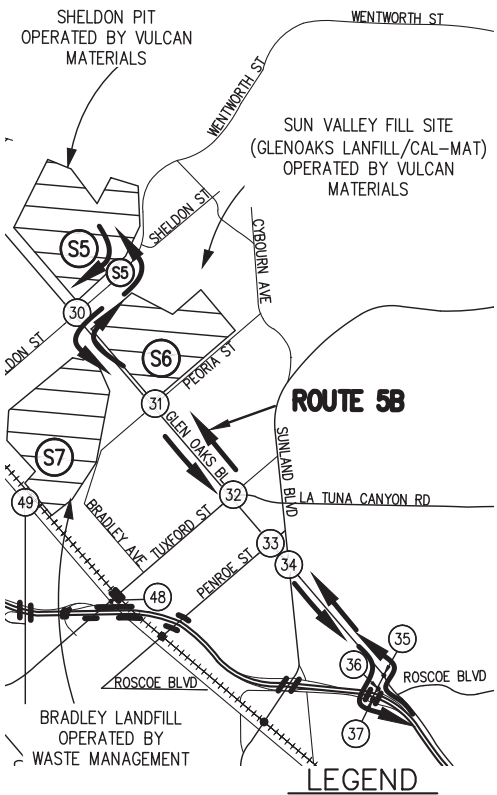
N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				510	565	0			
				385	385	0			
				510	580	0			
245	315	650						0	0	0
0	0	0		TS				0	0	0
80	100	130						0	0	0
				75	300	0			
				80	405	0			
				70	590	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
100	130	120		TS				590	465	590
0	0	0						0	0	0
				75	0	290			
				65	0	310			
				70	0	670			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	40	100			
				0	45	130			
				0	35	120			
0	0	0						30	50	110
0	0	0		TS				0	0	0
0	0	0						670	415	465
				0	0	0			
				0	0	0			
				0	0	0			

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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– STUDY INTERSECTIONS

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ROUTE 5B
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-2A

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N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				220	1475	145			
				135	605	65			
				170	855	110			
140	165	360	↱	↰	↑	↳	↲	55	65	70
470	405	365	←	TS			→	720	405	380
55	130	80	↰	↰	↑	↱	↱	280	220	220
				110	565	220			
				120	660	240			
				155	985	250			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				60	1675	60			
				35	930	25			
				35	1070	70			
30	50	60	↱	↰	↑	↳	↲	20	20	80
15	15	25	←	TS			→	15	10	10
10	65	45	↰	↰	↑	↱	↱	25	35	70
				35	830	65			
				40	885	35			
				50	1375	55			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				240	1385	110			
				215	660	115			
				115	865	160			
190	220	230	↱	↰	↑	↳	↲	100	60	100
555	485	590	←	TS			→	670	490	410
60	85	130	↰	↰	↑	↱	↱	35	35	65
				130	675	35			
				155	740	35			
				160	1195	70			

N

NOT TO SCALE

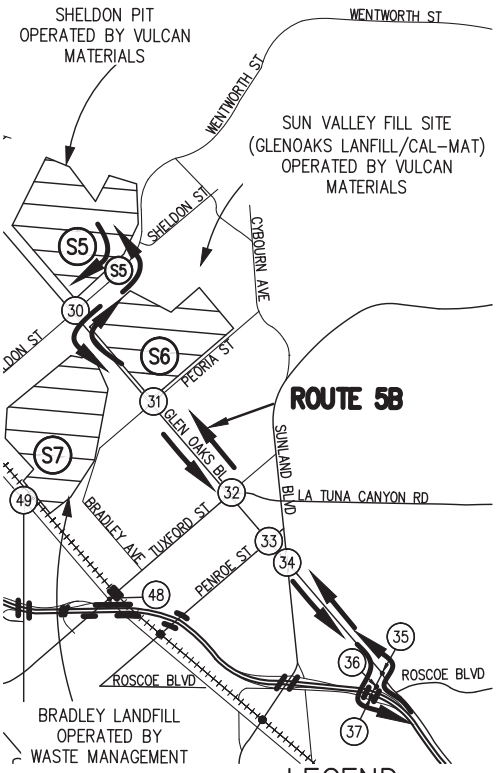
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				110	1265	50			
				45	720	35			
				125	865	50			
145	120	230	↱	↰	↑	↳	↲	50	45	90
140	145	235	←	TS			→	80	100	175
35	60	70	↰	↰	↑	↱	↱	10	30	55
				30	640	10			
				50	735	30			
				80	1045	45			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				255	930	25			
				250	565	45			
				65	760	65			
90	205	220	↱	↰	↑	↳	↲	30	20	10
785	510	730	←	TS			→	860	435	440
35	25	60	↰	↰	↑	↱	↱	240	370	405
				25	555	90			
				30	605	285			
				25	945	450			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				640	610	0			
				535	450	0			
				640	625	0			
370	435	770	↱	↰	↑	↳	↲	0	0	0
0	0	0	←	TS			→	0	0	0
100	135	160	↰	↰	↑	↱	↱	0	0	0
				90	330	0			
				105	445	0			
				85	630	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0	↱	↰	↑	↳	↲	0	0	0
110	155	145	←	TS			→	720	600	715
0	0	0	↰	↰	↑	↱	↱	0	0	0
				100	0	415			
				90	0	430			
				100	0	790			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	45	110			
				0	45	130			
				0	35	120			
0	0	0	↱	↰	↑	↳	↲	40	55	110
0	0	0	←	TS			→	0	0	0
0	0	0	↰	↰	↑	↱	↱	800	550	600
				0	0	0			
				0	0	0			
				0	0	0			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			→			
			↰	↰	↑	↱	↱			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5B
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-2B

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Table 5-4-1
Intersection Capacity Analysis – Year 2014 Conditions (Route 5A)
Traffic Impact Analysis - Site 5

Route 5A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D

Table 5-4-1
Intersection Capacity Analysis – Year 2014 Conditions (Route 5B)
Traffic Impact Analysis - Site 5

Route 5B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	13.5	0.85	D	A	7.5	0.48	A	B	13.6	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.6	0.59	A	A	9.0	0.39	A	B	16.9	0.53	A
32	Glenoaks Blvd and Tuxford Street	B	15.7	0.89	D	A	7.8	0.49	A	A	10.2	0.67	C
33	Glenoaks Blvd and Penrose Street	A	6.6	0.58	A	A	6.0	0.36	A	B	11.3	0.70	B
34	Glenoaks Blvd and Sunland Blvd	C	22.9	0.88	C	B	16.3	0.67	B	C	27.4	0.92	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.7	0.41	A	A	7.1	0.42	A	B	10.6	0.65	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	12.0	-	-	B	11.8	-	-	C	26.3	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 5A & 5B Analysis

As presented in *Table 5-4-1*, under project conditions Year 2014 for Site 5 (Routes 5A & 5B) most intersections are expected to operate at an acceptable HCM LOS of C or better for the AM, Mid-day, and PM peak hours. The intersection of Glenoaks Blvd and Osborne Street is anticipated to operate at HCM LOS F during the AM peak hour and HCM LOS E during the PM peak hour, mitigations are recommended under existing conditions.

Haul Route 5C

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-3A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-3B.*

Haul Route 6A

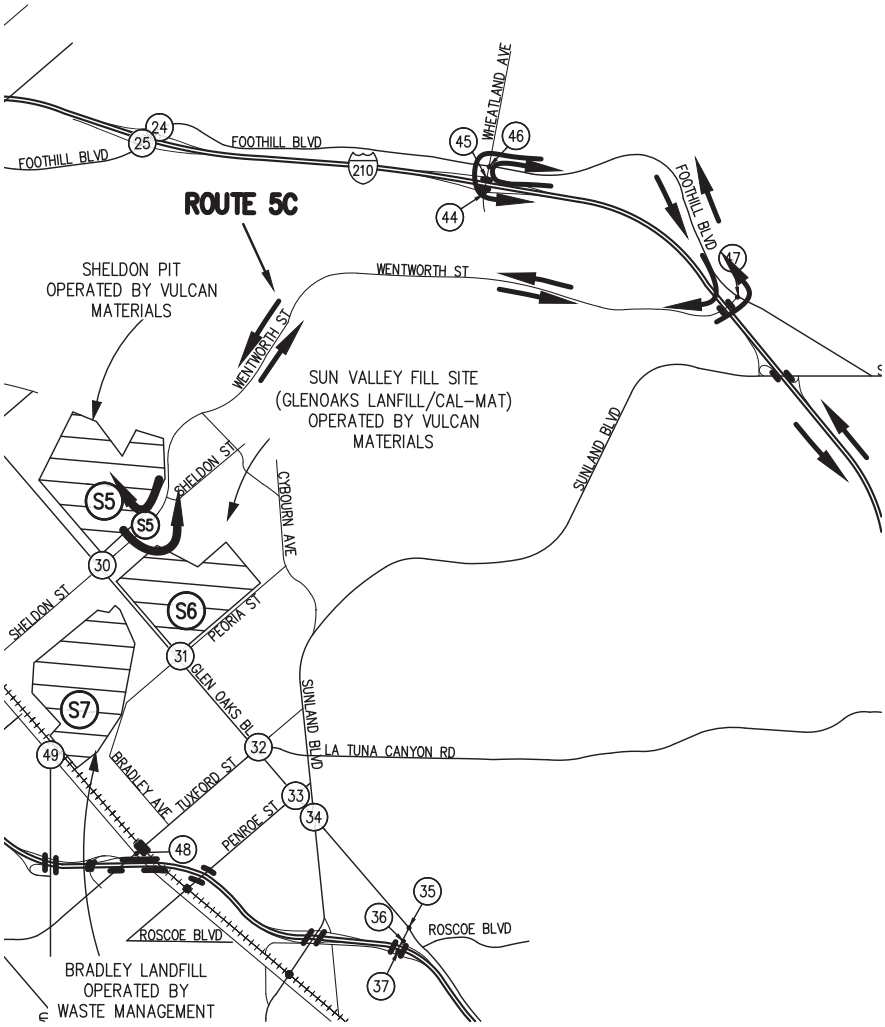
The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-5A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-5B.*

N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
				0	0	185			
				0	0	120			
				0	0	145			
115	80	110	↱	↰	↑	↳	↲	0	0	0
10	10	10	←	TS			→	0	0	0
0	0	0	↰	↰	↑	↱	↱	0	0	0
				0	0	0			
				0	0	0			
				0	0	0			

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
				70	175	0			
				60	120	0			
				115	140	0			
0	0	0	↱	↰	↑	↳	↲	165	100	185
0	0	0	←	TS			→	10	10	10
0	0	0	↰	↰	↑	↱	↱	10	10	10
				10	110	0			
				10	60	0			
				10	105	0			

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
				10	20	20			
				20	25	10			
				10	25	15			
10	15	10	↱	↰	↑	↳	↲	10	25	20
215	145	185	←	TS			→	240	140	235
100	40	85	↰	↰	↑	↱	↱	140	125	160
				75	15	175			
				45	30	110			
				100	30	165			

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0	↱	↰	↑	↳	↲	0	0	0
220	180	220	←	TS			→	190	170	320
180	105	135	↰	↰	↑	↱	↱	480	235	235
				110	0	245			
				110	0	200			
				175	0	460			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			→			
			↰	↰	↑	↱	↱			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 5C
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-3A

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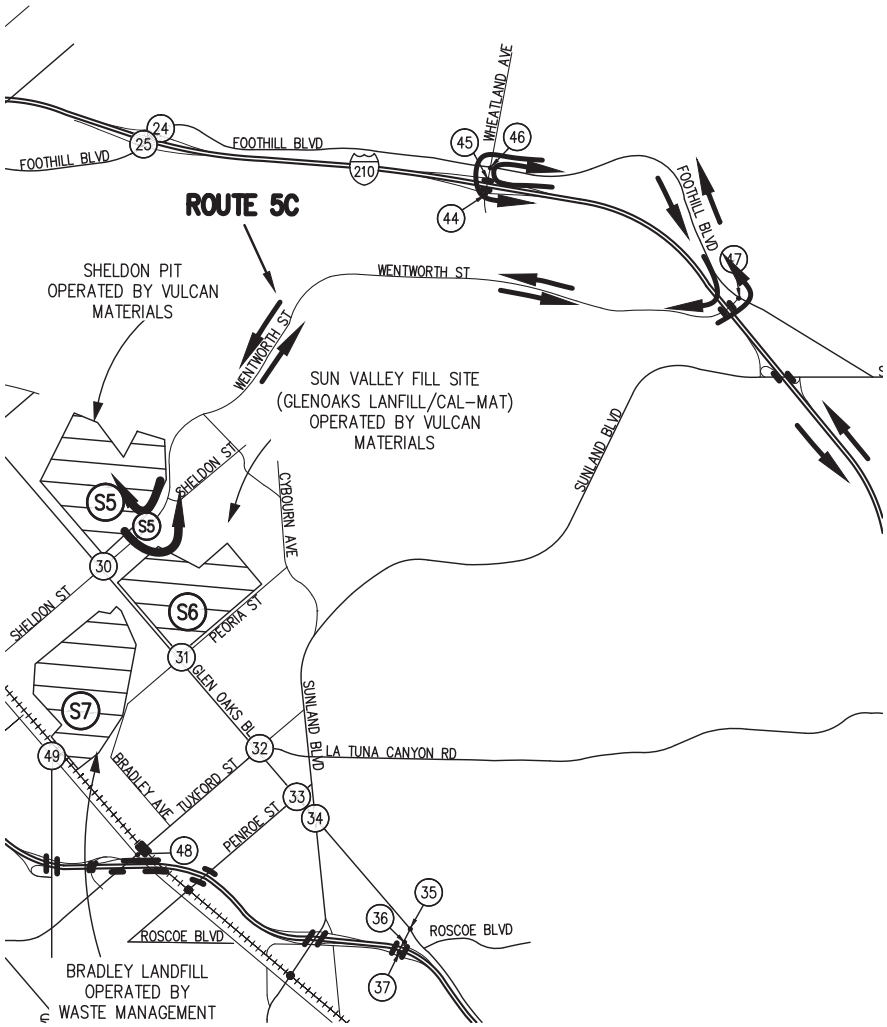
N/S STREET				44		E/W STREET				
WHEATLAND AVE						EB I-210 FWY RAMPS				
				0	0	300				
				0	0	230				
				0	0	260				
125	90	110						0	0	0
15	15	10		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				45		E/W STREET				
WHEATLAND AVE						WB I-210 FWY RAMPS				
				80	290	0				
				65	235	0				
				115	250	0				
0	0	0						285	205	295
0	0	0		TS				10	10	10
0	0	0						10	10	10
				10	115	0				
				10	70	0				
				10	110	0				

N/S STREET				46		E/W STREET				
WHEATLAND AVE						FOOTHILL BLVD				
				10	20	25				
				20	25	10				
				10	25	15				
15	15	10						10	25	20
235	165	190		TS				265	160	250
100	45	85						260	250	265
				85	15	290				
				45	30	230				
				100	30	275				

N/S STREET				47		E/W STREET				
WENTWORTH STREET						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
225	190	220		TS				200	180	325
295	220	250						490	245	260
				225	0	260				
				225	0	205				
				290	0	465				



NOT TO SCALE

LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 5C
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-3B

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N/S STREET				24			E/W STREET		
FOOTHILL BLVD							WB I-210 FWY RAMPS		
				535	425	0			
				225	280	0			
				245	285	0			
0	0	0					65	40	70
0	0	0		TS			0	0	0
0	0	0					240	180	330
				140	620	0			
				115	485	0			
				230	555	0			

N/S STREET				25			E/W STREET		
FOOTHILL BLVD							EB I-210 FWY RAMPS		
				0	385	215			
				0	330	80			
				0	500	60			
385	285	365					0	0	0
0	0	0		TS			0	0	0
110	45	85					0	0	0
				0	380	370			
				0	290	230			
				0	425	315			

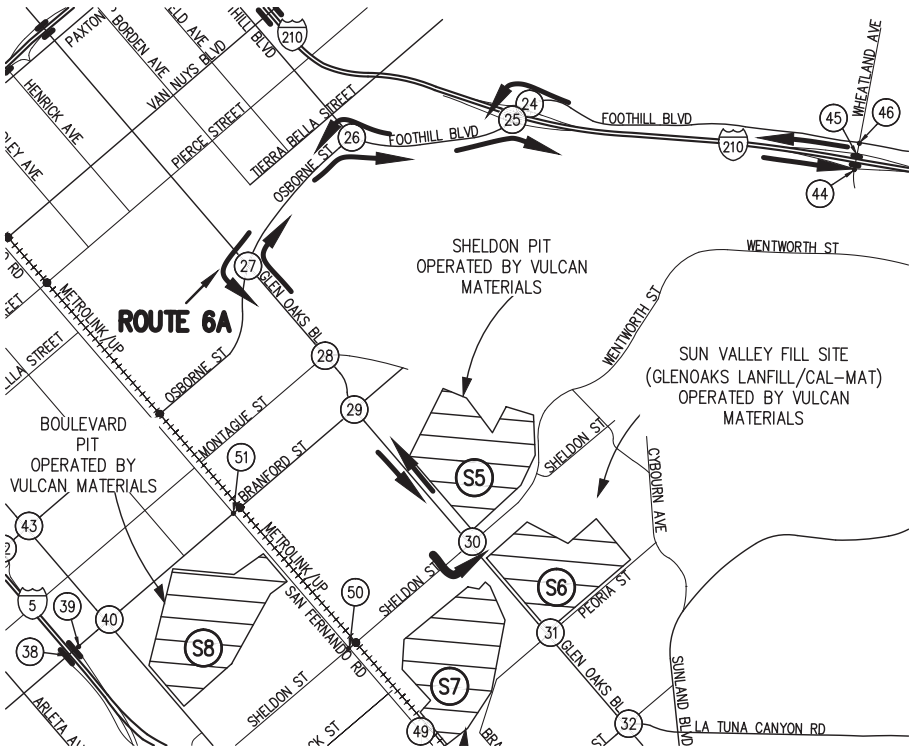
N/S STREET				26			E/W STREET		
OSBORNE STREET							FOOTHILL BLVD		
				10	10	10			
				20	10	10			
				20	10	10			
10	25	20					10	10	10
350	245	345		TS			265	220	330
565	30	290					340	235	280
				365	15	325			
				250	10	285			
				740	10	485			

N/S STREET				27			E/W STREET		
GLEN OAKS BLVD							OSBORNE STREET		
				185	1165	50			
				140	465	85			
				225	625	145			
380	240	315					75	75	110
585	465	750		TS			685	545	585
75	100	100					465	190	280
				55	565	200			
				85	690	220			
				130	955	425			

N/S STREET				28			E/W STREET		
GLEN OAKS BLVD							MONTAGUE STREET		
				60	1770	20			
				40	625	40			
				30	985	20			
15	45	60					15	35	35
10	10	10		TS			10	10	10
35	50	65					10	40	15
				60	750	10			
				65	665	20			
				55	1340	20			

N/S STREET				29			E/W STREET		
GLEN OAKS BLVD							BRANFORD STREET		
				190	1535	20			
				85	620	75			
				85	860	125			
135	165	240					10	90	110
25	90	120		TS			10	100	205
100	100	170					15	75	100
				105	705	15			
				100	670	75			
				125	1085	115			

N/S STREET				30			E/W STREET		
GLEN OAKS BLVD							SHELDON STREET		
				175	1345	145			
				105	535	110			
				160	795	155			
125	140	325					100	110	120
440	260	355		TS			650	310	355
50	85	70					100	50	45
				85	525	50			
				85	585	55			
				130	895	75			



LEGEND

N/S STREET				S#			E/W STREET		
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 6A PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-4A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 4\FIG 5-4-4A.dwg
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N/S STREET				24			E/W STREET		
FOOTHILL BLVD							WBI-210 FWY RAMPS		
				550	445	0			
				235	315	0			
				250	300	0			
0	0	0					65	45	70
0	0	0		TS			0	0	0
0	0	0					355	315	470
				155	650	0			
				120	525	0			
				240	580	0			

N/S STREET				25			E/W STREET		
FOOTHILL BLVD							EBI-210 FWY RAMPS		
				0	420	220			
				0	365	80			
				0	520	60			
400	295	375					0	0	0
0	0	0		TS			0	0	0
125	60	100					0	0	0
				0	415	505			
				0	320	370			
				0	450	435			

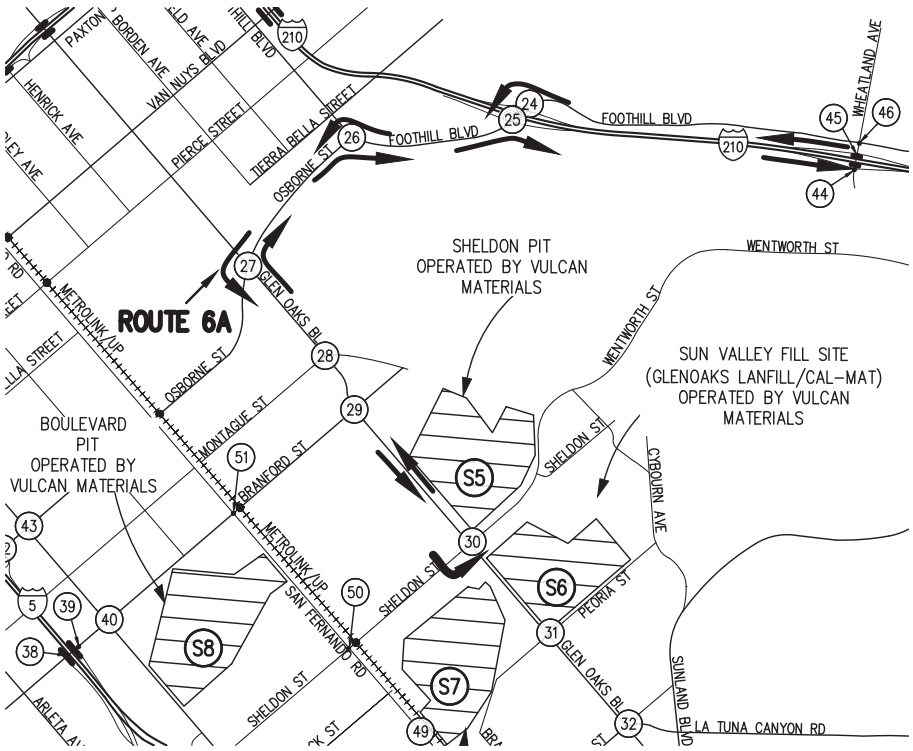
N/S STREET				26			E/W STREET		
OSBORNE STREET							FOOTHILL BLVD		
				10	10	10			
				20	10	10			
				20	10	10			
10	25	20					10	10	10
380	290	360		TS			275	255	375
610	30	320					465	390	410
				385	15	450			
				290	10	435			
				800	10	620			

N/S STREET				27			E/W STREET		
GLEN OAKS BLVD							OSBORNE STREET		
				220	1325	70			
				155	565	85			
				225	625	145			
505	370	425					100	85	110
655	535	750		TS			760	595	585
105	115	100					535	230	280
				100	715	370			
				110	800	400			
				130	955	535			

N/S STREET				28			E/W STREET		
GLEN OAKS BLVD							MONTAGUE STREET		
				75	1945	25			
				55	835	45			
				35	1210	25			
50	70	70					15	35	35
10	10	10		TS			10	10	10
55	70	70					10	45	15
				70	970	15			
				70	890	20			
				75	1520	20			

N/S STREET				29			E/W STREET		
GLEN OAKS BLVD							BRANFORD STREET		
				215	1750	30			
				85	820	100			
				115	1090	130			
135	170	245					15	105	115
25	90	120		TS			10	100	215
120	110	185					25	90	115
				115	945	30			
				115	895	85			
				135	1265	120			

N/S STREET				30			E/W STREET		
GLEN OAKS BLVD							SHELDON STREET		
				220	1475	310			
				135	605	230			
				170	855	275			
140	165	360					220	230	235
470	405	365		TS			720	405	380
55	130	80					115	55	55
				110	565	55			
				120	660	75			
				155	985	85			



LEGEND

N/S STREET				S#			E/W STREET		
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 6A
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-4B

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Table 5-4-3
Intersection Capacity Analysis – Year 2014 Conditions (Route 5C)
Traffic Impact Analysis - Site 5

Route 5C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10.0	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

Haul Route 5C Analysis

As presented in *Table 5-4-3*, project conditions Year 2014 for Site 5 (Route 5C) all intersections are anticipated to continue operating at an acceptable HCM LOS C or better throughout the day.

Table 5-4-4
Intersection Capacity Analysis – Year 2014 Conditions (Route 6A)
Traffic Impact Analysis - Site 6

Route 6A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	14.2	0.86	E	A	8.1	0.56	B	C	21.8	1.10	D

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 6A Analysis

As presented in *Table 5-4-4*, under the project conditions Year 2014 for Site 6 (Route 6A) most intersections are expected to operate at an acceptable HCM LOS of C or better for the AM, Mid-day, and PM peak hours. The intersection of Glenoaks Blvd and Osborne Street is anticipated to operate at HCM LOS F during the AM peak hour and HCM LOS E during the PM peak hour, mitigations are recommended under existing conditions.

Haul Route 6B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-5A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-5B.*

Haul Route 6C

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-6A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-6B.*

N/S STREET					30		E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				175	1345	90				
				105	535	55				
				160	795	100				
125	140	325	↱	↰	↑	↳	↲	45	55	0
440	260	355	←	TS			→	650	310	355
50	85	70	↰	↰	↑	↱	↱	100	50	45
				85	525	105				
				85	585	110				
				130	895	130				

N/S STREET					31		E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				45	1415	35				
				20	630	15				
				20	865	40				
20	30	45	↱	↰	↑	↳	↲	15	20	60
10	10	15	←	TS			→	10	10	10
10	35	25	↰	↰	↑	↱	↱	20	25	35
				20	625	30				
				30	625	20				
				30	1115	30				

N/S STREET					32		E/W STREET			
GLEN OAKS BLVD							TUXFORD STREET			
				135	1160	100				
				110	440	100				
				100	700	140				
125	120	155	↱	↰	↑	↳	↲	80	50	85
510	425	550	←	TS			→	615	465	375
50	65	105	↰	↰	↑	↱	↱	35	30	65
				105	485	20				
				120	530	35				
				130	925	65				

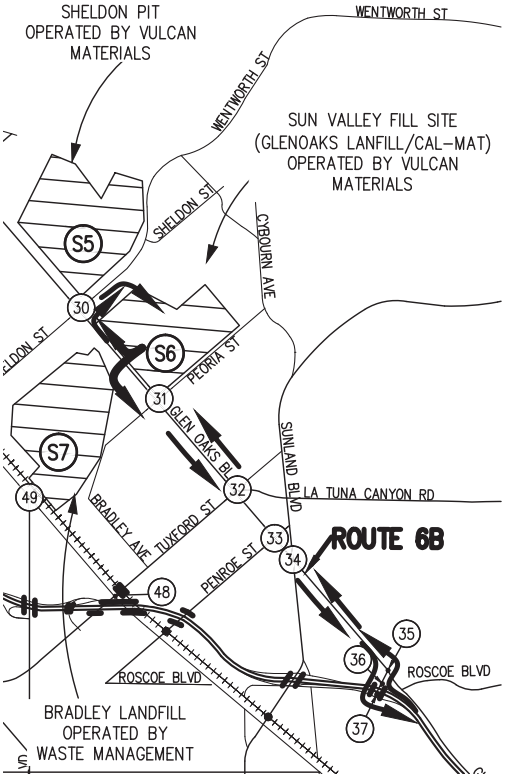
N/S STREET					33		E/W STREET			
GLEN OAKS BLVD							PENROSE STREET			
				105	1055	40				
				40	535	30				
				120	620	50				
130	100	200	↱	↰	↑	↳	↲	40	40	80
135	140	220	←	TS			→	75	90	155
25	55	60	↰	↰	↑	↱	↱	10	25	50
				30	450	10				
				50	560	30				
				80	820	45				

N/S STREET					34		E/W STREET			
GLEN OAKS BLVD							SUNLAND BLVD			
				225	750	15				
				185	385	40				
				55	610	55				
75	180	180	↱	↰	↑	↳	↲	25	20	10
730	470	710	←	TS			→	820	385	430
35	25	60	↰	↰	↑	↱	↱	225	350	390
				15	390	85				
				30	435	265				
				25	750	420				

N/S STREET					35		E/W STREET			
GLEN OAKS BLVD							ROSCOE BLVD			
				510	565	0				
				385	385	0				
				510	580	0				
245	315	650	↱	↰	↑	↳	↲	0	0	0
0	0	0	←	TS			→	0	0	0
80	100	130	↰	↰	↑	↱	↱	0	0	0
				75	300	0				
				80	405	0				
				70	590	0				

N/S STREET					36		E/W STREET			
NB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	↱	↰	↑	↳	↲	0	0	0
100	130	120	←	TS			→	590	465	590
0	0	0	↰	↰	↑	↱	↱	0	0	0
				75	0	290				
				65	0	310				
				70	0	670				

N/S STREET					37		E/W STREET			
SB I-5 FREEWAY RAMPS							ROSCOE BLVD			
				0	40	100				
				0	45	130				
				0	35	120				
0	0	0	↱	↰	↑	↳	↲	30	50	110
0	0	0	←	TS			→	0	0	0
0	0	0	↰	↰	↑	↱	↱	670	415	465
				0	0	0				
				0	0	0				
				0	0	0				



LEGEND

N/S STREET					S#		E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			→			
			↰	↰	↑	↱	↱			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 6B
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-5A

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N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				220	1475	145			
				135	605	65			
				170	855	110			
140	165	360	↱	↰	↑	↳	↲	55	65	70
470	405	365	←	TS			→	720	405	380
55	130	80	↲	↰	↑	↳	↱	115	55	55
				110	565	220			
				120	660	240			
				155	985	250			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				60	1675	60			
				35	930	25			
				35	1070	70			
30	50	60	↱	↰	↑	↳	↲	20	20	80
15	15	25	←	TS			→	15	10	10
10	65	45	↲	↰	↑	↳	↱	25	35	70
				35	830	65			
				40	885	35			
				50	1375	55			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				240	1385	110			
				215	660	115			
				115	865	160			
190	220	230	↱	↰	↑	↳	↲	100	60	100
555	485	590	←	TS			→	670	490	410
60	85	130	↲	↰	↑	↳	↱	35	35	65
				130	675	35			
				155	740	35			
				160	1195	70			

N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				110	1265	50			
				45	720	35			
				125	865	50			
145	120	230	↱	↰	↑	↳	↲	50	45	90
140	145	235	←	TS			→	80	100	175
35	60	70	↲	↰	↑	↳	↱	10	30	55
				30	640	10			
				50	735	30			
				80	1045	45			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				255	930	25			
				250	565	45			
				65	760	65			
90	205	220	↱	↰	↑	↳	↲	30	20	10
785	510	730	←	TS			→	860	435	440
35	25	60	↲	↰	↑	↳	↱	240	370	405
				25	555	90			
				30	605	285			
				25	945	450			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				640	610	0			
				535	450	0			
				640	625	0			
370	435	770	↱	↰	↑	↳	↲	0	0	0
0	0	0	←	TS			→	0	0	0
100	135	160	↲	↰	↑	↳	↱	0	0	0
				90	330	0			
				105	445	0			
				85	630	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0	↱	↰	↑	↳	↲	0	0	0
110	155	145	←	TS			→	720	600	715
0	0	0	↲	↰	↑	↳	↱	0	0	0
				100	0	415			
				90	0	430			
				100	0	790			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	45	110			
				0	45	130			
				0	35	120			
0	0	0	↱	↰	↑	↳	↲	40	55	110
0	0	0	←	TS			→	0	0	0
0	0	0	↲	↰	↑	↳	↱	800	550	600
				0	0	0			
				0	0	0			
				0	0	0			

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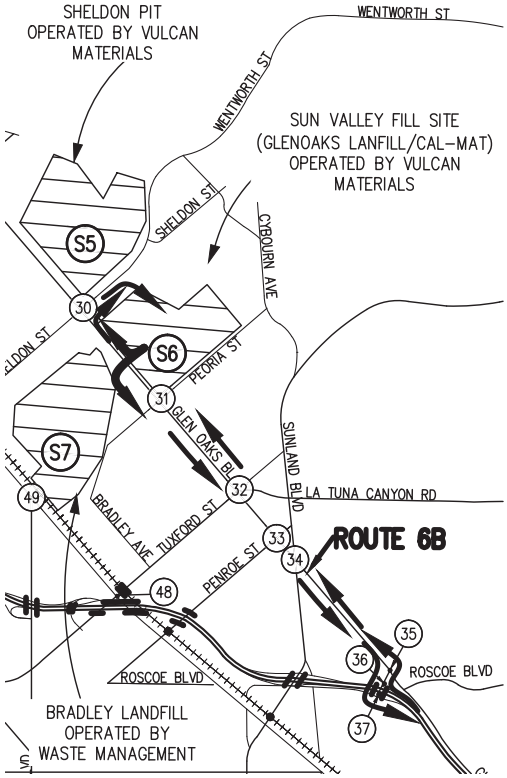

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			→			
			↲	↰	↑	↳	↱			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 6B
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-5B

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N/S STREET				44		E/W STREET				
WHEATLAND AVE						EB I-210 FWY RAMPS				
				0	0	185				
				0	0	120				
				0	0	145				
115	80	110						0	0	0
10	10	10		TS				0	0	0
0	0	0						0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

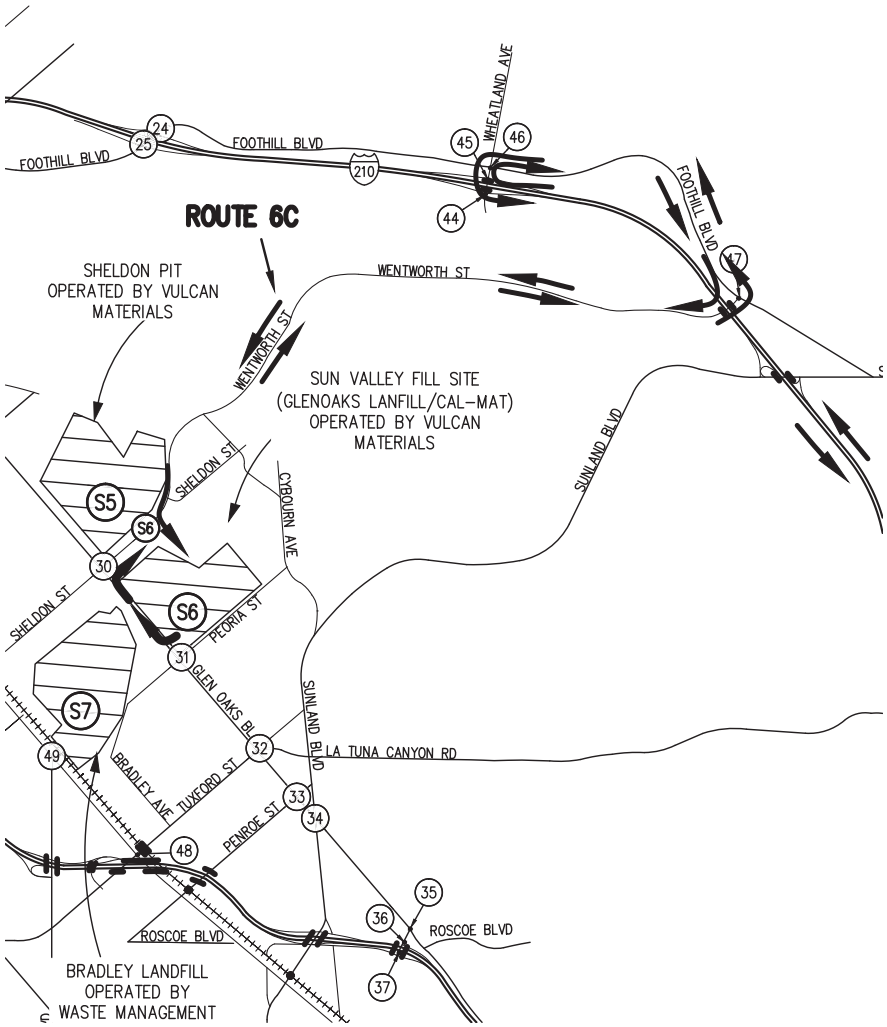
N/S STREET				45		E/W STREET				
WHEATLAND AVE						WB I-210 FWY RAMPS				
				70	175	0				
				60	120	0				
				115	140	0				
0	0	0						165	100	185
0	0	0		TS				10	10	10
0	0	0						10	10	10
				10	110	0				
				10	60	0				
				10	105	0				

N/S STREET				46		E/W STREET				
WHEATLAND AVE						FOOTHILL BLVD				
				10	20	20				
				20	25	10				
				10	25	15				
10	15	10						10	25	20
215	145	185		TS				240	140	235
100	40	85						140	125	160
				75	15	175				
				45	30	110				
				100	30	165				

N/S STREET				47		E/W STREET				
WENTWORTH STREET						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0						0	0	0
220	180	220		TS				190	170	320
180	105	135						480	235	235
				110	0	245				
				110	0	200				
				175	0	460				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 6C
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE

5-4-6A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 4\FIG 5-4-6A.dwg
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N/S STREET				44		E/W STREET				
WHEATLAND AVE						EB I-210 FWY RAMPS				
				0	0	300				
				0	0	230				
				0	0	260				
125	90	110	↱	↰	↑	↳	↲	0	0	0
15	15	10	←	TS			→	0	0	0
0	0	0	↰	↰	↑	↱	↱	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

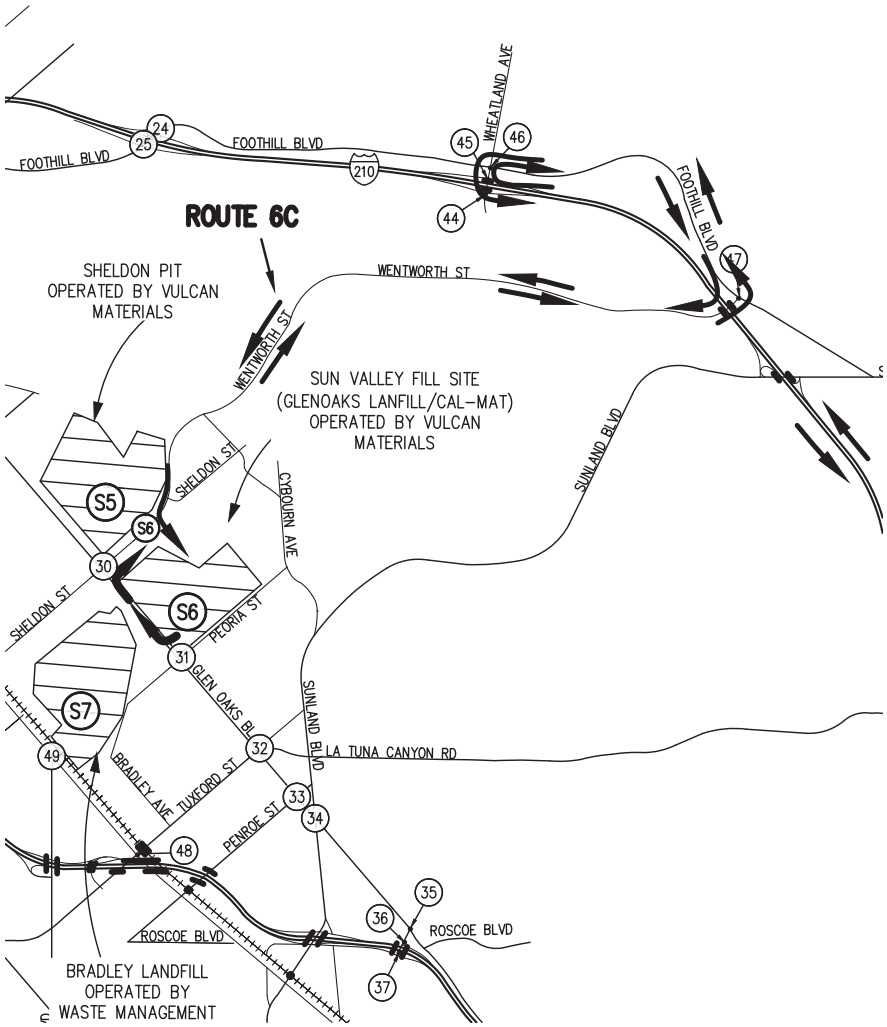
N/S STREET				45		E/W STREET				
WHEATLAND AVE						WB I-210 FWY RAMPS				
				80	290	0				
				65	235	0				
				115	250	0				
0	0	0	↱	↰	↑	↳	↲	285	205	295
0	0	0	←	TS			→	10	10	10
0	0	0	↰	↰	↑	↱	↱	10	10	10
				10	115	0				
				10	70	0				
				10	110	0				

N/S STREET				46		E/W STREET				
WHEATLAND AVE						FOOTHILL BLVD				
				10	20	25				
				20	25	10				
				10	25	15				
15	15	10	↱	↰	↑	↳	↲	10	25	20
235	165	190	←	TS			→	265	160	250
100	45	85	↰	↰	↑	↱	↱	260	250	265
				85	15	290				
				45	30	230				
				100	30	275				

N/S STREET				47		E/W STREET				
WENTWORTH STREET						FOOTHILL BLVD				
				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	↱	↰	↑	↳	↲	0	0	0
225	190	220	←	TS			→	200	180	325
295	220	250	↰	↰	↑	↱	↱	490	245	260
				225	0	260				
				225	0	205				
				290	0	465				

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			→			
			↰	↰	↑	↱	↱			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 6C
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-3B

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Table 5-4-5
Intersection Capacity Analysis – Year 2014 Conditions (Route 6B)
Traffic Impact Analysis - Site 6

Route 6B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	13.3	0.85	D	A	7.4	0.48	A	B	13.7	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.6	0.59	A	A	9.0	0.39	A	B	16.9	0.53	A
32	Glenoaks Blvd and Tuxford Street	B	15.7	0.89	D	A	7.8	0.49	A	A	10.2	0.67	C
33	Glenoaks Blvd and Penrose Street	A	6.6	0.58	A	A	6.0	0.36	A	B	11.3	0.70	B
34	Glenoaks Blvd and Sunland Blvd	C	22.9	0.88	C	B	16.3	0.67	B	C	27.4	0.92	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.7	0.41	A	A	7.1	0.42	A	B	10.6	0.65	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	12.0	-	-	B	11.8	-	-	C	26.3	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 5-4-6
Intersection Capacity Analysis – Year 2014 Conditions (Route 6C)
Traffic Impact Analysis - Site 6

Route 6C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	17.4	0.92	E	A	8.0	0.54	A	B	15.9	0.89	D
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 6B & 6C Analysis

As presented in *Tables 5-4-5* and *5-4-6*, under the project conditions Year 2014 for Site 6 (Routes 6B & 6C) all intersections are anticipated to continue operating at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours.

Haul Route 7A

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-7A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-7B.*

Haul Route 7B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-8A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-8B.*

N/S STREET				24			E/W STREET			
FOOTHILL BLVD							WB I-210 FWY RAMPS			
				535	425	0				
				225	280	0				
				245	285	0				
0	0	0	↲	↰	↑	↳	↳	65	40	70
0	0	0	←	TS			←	0	0	0
0	0	0	↱	↰	↑	↳	↳	240	180	330
				140	620	0				
				115	485	0				
				230	555	0				

N/S STREET				25			E/W STREET			
FOOTHILL BLVD							EB I-210 FWY RAMPS			
				0	385	215				
				0	330	80				
				0	500	60				
385	285	365	↲	↰	↑	↳	↳	0	0	0
0	0	0	←	TS			←	0	0	0
110	45	85	↱	↰	↑	↳	↳	0	0	0
				0	380	370				
				0	290	230				
				0	425	315				

N/S STREET				26			E/W STREET			
OSBORNE STREET							FOOTHILL BLVD			
				10	10	10				
				20	10	10				
				20	10	10				
10	25	20	↲	↰	↑	↳	↳	10	10	10
350	245	345	←	TS			←	265	220	330
565	30	290	↱	↰	↑	↳	↳	340	235	280
				365	15	325				
				250	10	285				
				740	10	485				

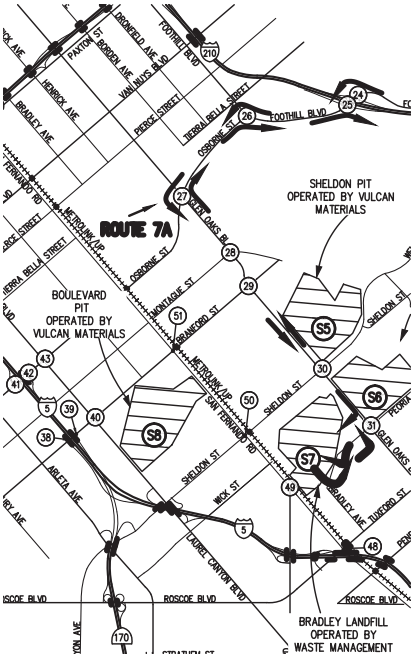
N/S STREET				27			E/W STREET			
GLEN OAKS BLVD							OSBORNE STREET			
				185	1165	50				
				140	465	85				
				225	625	145				
380	240	315	↲	↰	↑	↳	↳	75	75	110
585	465	750	←	TS			←	685	545	585
75	100	100	↱	↰	↑	↳	↳	465	190	280
				55	565	200				
				85	690	220				
				130	955	425				

N/S STREET				28			E/W STREET			
GLEN OAKS BLVD							MONTAGUE STREET			
				60	1770	20				
				40	625	40				
				30	985	20				
15	45	60	↲	↰	↑	↳	↳	15	35	35
10	10	10	←	TS			←	10	10	10
35	50	65	↱	↰	↑	↳	↳	10	40	15
				60	750	10				
				65	665	20				
				55	1340	20				

N/S STREET				29			E/W STREET			
GLEN OAKS BLVD							BRANFORD STREET			
				190	1535	20				
				85	620	75				
				85	860	125				
135	165	240	↲	↰	↑	↳	↳	10	90	110
25	90	120	←	TS			←	10	100	205
100	100	170	↱	↰	↑	↳	↳	15	75	100
				105	705	15				
				100	670	75				
				125	1085	115				

N/S STREET				30			E/W STREET			
GLEN OAKS BLVD							SHELDON STREET			
				175	1400	90				
				105	590	55				
				160	850	100				
125	140	325	↲	↰	↑	↳	↳	45	55	65
440	260	355	←	TS			←	650	310	355
50	85	70	↱	↰	↑	↳	↳	100	50	45
				85	580	50				
				85	640	55				
				130	950	75				

N/S STREET				31			E/W STREET			
GLEN OAKS BLVD							PEORIA STREET			
				100	1365	35				
				70	580	15				
				70	810	40				
70	80	100	↲	↰	↑	↳	↳	15	20	60
10	10	15	←	TS			←	10	10	10
10	35	25	↱	↰	↑	↳	↳	20	25	35
				20	570	30				
				30	570	20				
				30	1065	30				



LEGEND

N/S STREET				S#			E/W STREET			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↲	↰	↑	↳	↳	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↱	↰	↑	↳	↳			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 7A
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-7A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 4\FIG 5-4-7A.dwg
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N/S STREET	24	E/W STREET
FOOTHILL BLVD		WB I-210 FWY RAMPS

				550	445	0				
				235	315	0				
				250	300	0				
0	0	0						65	45	70
0	0	0		TS				0	0	0
0	0	0						355	315	470
				155	650	0				
				120	525	0				
				240	580	0				

N/S STREET	25	E/W STREET
FOOTHILL BLVD		EB I-210 FWY RAMPS

				0	420	220				
				0	365	80				
				0	520	60				
400	295	375						0	0	0
0	0	0		TS				0	0	0
125	60	100						0	0	0
				0	415	505				
				0	320	370				
				0	450	435				

N/S STREET	26	E/W STREET
OSBORNE STREET		FOOTHILL BLVD

				10	10	10				
				20	10	10				
				20	10	10				
10	25	20						10	10	10
380	290	360		TS				275	255	375
610	30	320						465	390	410
				385	15	450				
				290	10	435				
				800	10	620				

N/S STREET	27	E/W STREET
GLEN OAKS BLVD		OSBORNE STREET

				220	1325	70				
				155	565	85				
				225	625	145				
505	370	425						100	85	110
655	535	750		TS				760	595	585
105	115	100						535	230	280
				100	715	370				
				110	800	400				
				130	955	535				

N/S STREET	28	E/W STREET
GLEN OAKS BLVD		MONTAGUE STREET

				75	1945	25				
				55	835	45				
				35	1210	25				
50	70	70						15	35	35
10	10	10		TS				10	10	10
55	70	70						10	45	15
				70	970	15				
				70	890	20				
				75	1520	20				

N/S STREET	29	E/W STREET
GLEN OAKS BLVD		BRANFORD STREET

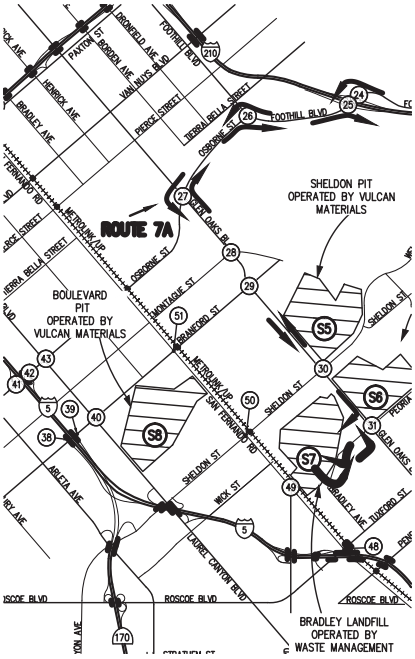
				215	1750	30				
				85	820	100				
				115	1090	130				
135	170	245						15	105	115
25	90	120		TS				10	100	215
120	110	185						25	90	115
				115	945	30				
				115	895	85				
				135	1265	120				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				220	1640	145				
				135	770	65				
				170	1020	110				
140	165	360						55	65	70
470	405	365		TS				720	405	380
55	130	80						115	55	55
				110	730	55				
				120	825	75				
				155	1150	85				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				225	1510	60				
				195	770	25				
				195	905	70				
190	215	225						20	20	80
15	15	25		TS				15	10	10
10	65	45						25	35	70
				35	665	65				
				40	720	35				
				50	1210	55				



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 7A
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-7B

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N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				100	1365	35			
				70	580	15			
				70	810	40			
70	80	100	↱	↰	↑	↳	↲	15	20	60
10	10	15	←	TS		→	10	10	10
10	35	25	↰	↰	↑	↱	↱	20	25	35
				20	570	30			
				30	570	20			
				30	1065	30			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				135	1160	100			
				110	440	100			
				100	700	140			
125	120	155	↱	↰	↑	↳	↲	80	50	85
510	425	550	←	TS		→	615	465	375
50	65	105	↰	↰	↑	↱	↱	35	30	65
				105	485	20			
				120	530	35			
				130	925	65			

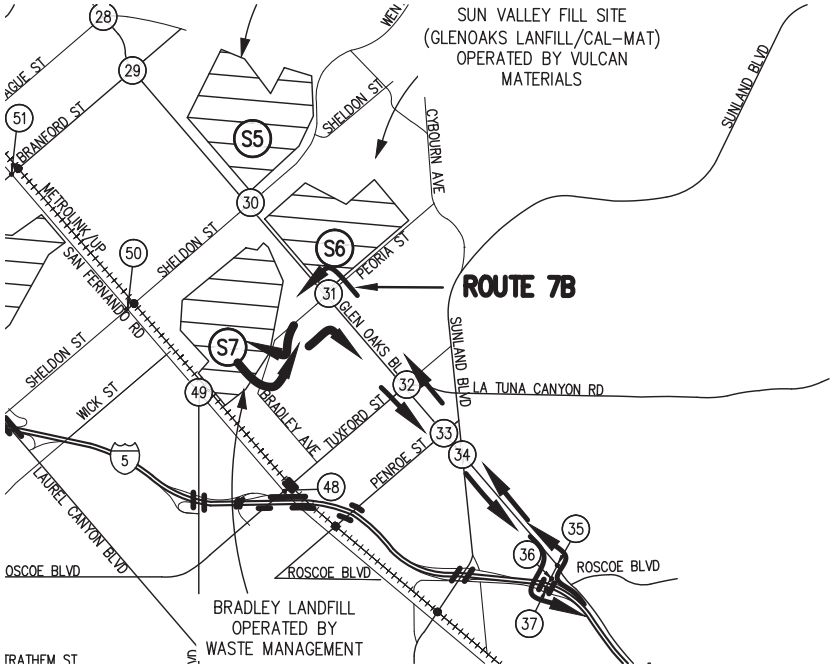
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				105	1055	40			
				40	535	30			
				120	620	50			
130	100	200	↱	↰	↑	↳	↲	40	40	80
135	140	220	←	TS		→	75	90	155
25	55	60	↰	↰	↑	↱	↱	10	25	50
				30	450	10			
				50	560	30			
				80	820	45			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				225	750	15			
				185	385	40			
				55	610	55			
75	180	180	↱	↰	↑	↳	↲	25	20	10
730	470	710	←	TS		→	820	385	430
35	25	60	↰	↰	↑	↱	↱	225	350	390
				15	390	85			
				30	435	265			
				25	750	420			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				510	565	0			
				385	385	0			
				510	580	0			
245	315	650	↱	↰	↑	↳	↲	0	0	0
0	0	0	←	TS		→	0	0	0
80	100	130	↰	↰	↑	↱	↱	0	0	0
				75	300	0			
				80	405	0			
				70	590	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0	↱	↰	↑	↳	↲	0	0	0
100	130	120	←	TS		→	590	465	590
0	0	0	↰	↰	↑	↱	↱	0	0	0
				75	0	290			
				65	0	310			
				70	0	670			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	40	100			
				0	45	130			
				0	35	120			
0	0	0	↱	↰	↑	↳	↲	30	50	110
0	0	0	←	TS		→	0	0	0
0	0	0	↰	↰	↑	↱	↱	670	415	465
				0	0	0			
				0	0	0			
				0	0	0			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS		→			
			↰	↰	↑	↱	↱			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 7B
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-8A

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 4\FIG 5-4-8A.dwg
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N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				60	1510	60			
				35	770	25			
				35	905	70			
30	50	60					20	20	80
15	15	25		TS			15	10	10
170	230	205					25	35	70
				195	665	65			
				200	720	35			
				215	1210	55			

N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				240	1385	110			
				215	660	115			
				115	865	160			
190	220	230					100	60	100
555	485	590		TS			670	490	410
60	85	130					35	35	65
				130	675	35			
				155	740	35			
				160	1195	70			

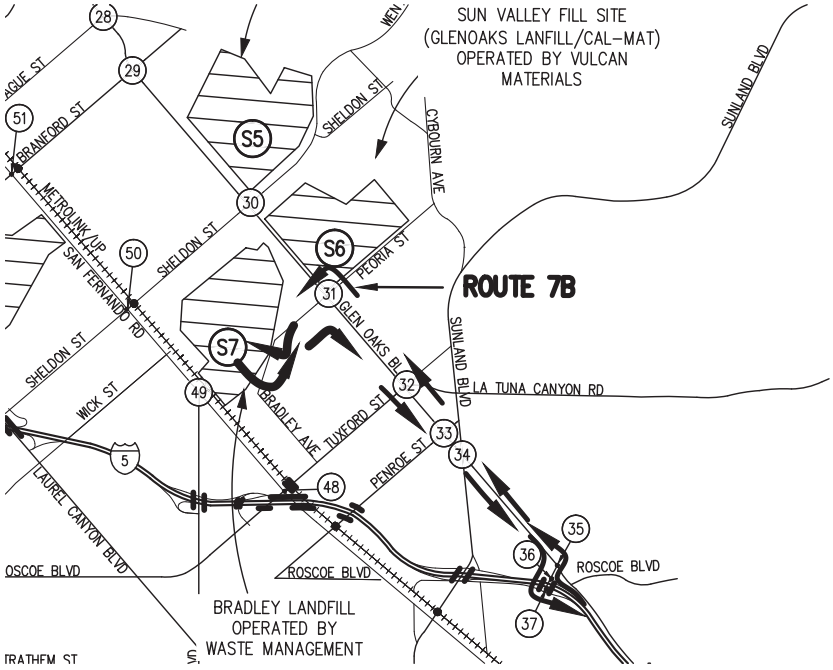
N/S STREET				33		E/W STREET			
GLEN OAKS BLVD						PENROSE STREET			
				110	1265	50			
				45	720	35			
				125	865	50			
145	120	230					50	45	90
140	145	235		TS			80	100	175
35	60	70					10	30	55
				30	640	10			
				50	735	30			
				80	1045	45			

N/S STREET				34		E/W STREET			
GLEN OAKS BLVD						SUNLAND BLVD			
				255	930	25			
				250	565	45			
				65	760	65			
90	205	220					30	20	10
785	510	730		TS			860	435	440
35	25	60					240	370	405
				25	555	90			
				30	605	285			
				25	945	450			

N/S STREET				35		E/W STREET			
GLEN OAKS BLVD						ROSCOE BLVD			
				640	610	0			
				535	450	0			
				640	625	0			
370	435	770					0	0	0
0	0	0		TS			0	0	0
100	135	160					0	0	0
				90	330	0			
				105	445	0			
				85	630	0			

N/S STREET				36		E/W STREET			
NB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0					0	0	0
110	155	145		TS			720	600	715
0	0	0					0	0	0
				100	0	415			
				90	0	430			
				100	0	790			

N/S STREET				37		E/W STREET			
SB I-5 FREEWAY RAMPS						ROSCOE BLVD			
				0	45	110			
				0	45	130			
				0	35	120			
0	0	0					40	55	110
0	0	0		TS			0	0	0
0	0	0					800	550	600
				0	0	0			
				0	0	0			
				0	0	0			



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS			7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 7B
PCE PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-8B

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Table 5-4-7
Intersection Capacity Analysis – Year 2014 Conditions (Route 7A)
Traffic Impact Analysis - Site 7

Route 7A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
24	Foothill Blvd and I-210 Westbound Ramps	A	5.8	0.30	A	A	5.9	0.31	A	A	8.5	0.56	A
25	Foothill Blvd and I-210 Eastbound Ramps	A	6.4	0.32	A	A	6.7	0.33	A	A	7.9	0.44	A
26	Foothill Blvd and Osborne Street	C	20.7	0.78	D	B	10.8	0.56	A	C	21.1	0.88	D
27	Glenoaks Blvd and Osborne Street	F	105.7	1.15	F	D	35.4	0.88	C	E	55.4	0.95	E
28	Glenoaks Blvd and Montague Street	B	10.5	0.79	B	A	9.5	0.41	A	A	10.0	0.62	C
29	Glenoaks Blvd and Branford Street	B	17.9	0.80	C	B	16.5	0.65	B	C	21.9	0.91	D
30	Glenoaks Blvd and Sheldon Street	B	16.0	0.89	E	A	7.7	0.52	A	B	14.7	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.2	0.64	A	A	5.4	0.42	A	A	6.4	0.56	A

Table 5-4-8
Intersection Capacity Analysis – Year 2014 Conditions (Route 7B)
Traffic Impact Analysis - Site 7

Route 7B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
31	Glenoaks Blvd and Peoria Street	A	6.0	0.76	B	A	4.4	0.33	A	A	5.3	0.48	A
32	Glenoaks Blvd and Tuxford Street	B	15.7	0.89	D	A	7.8	0.49	A	A	10.2	0.67	C
33	Glenoaks Blvd and Penrose Street	A	6.6	0.58	A	A	6.0	0.36	A	B	11.3	0.70	B
34	Glenoaks Blvd and Sunland Blvd	C	22.9	0.88	C	B	16.3	0.67	B	C	27.4	0.92	D
35	Glenoaks Blvd and Roscoe Blvd	A	6.7	0.41	A	A	7.1	0.42	A	B	10.6	0.65	A
36	Roscoe Blvd and I-5 Freeway Northbound Ramps	B	12.0	-	-	B	11.8	-	-	C	26.3	-	-
37	Roscoe Blvd and I-5 Freeway Southbound Ramps	A	0.0	-	-	A	0.0	-	-	A	0.0	-	-

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 7A & 7B Analysis

As presented in *Tables 5-4-7* and *5-4-8*, under the project conditions Year 2014 for Site 7 (Routes 7A & 7B) most intersections are expected to operate at an acceptable HCM LOS of C or better for the AM, Mid-day, and PM peak hours. The intersection of Glenoaks Blvd and Osborne Street is anticipated to operate at HCM LOS F during the AM peak hour and HCM LOS E during the PM peak hour, mitigations are recommended under existing conditions.

Haul Route 7C

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-9A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-9B.*

N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
				0	0	185			
				0	0	120			
				0	0	145			
115	80	110	↲	↱	↑	↳	↳	0	0	0
10	10	10	←	TS			←	0	0	0
0	0	0	↰	↰	↑	↱	↱	0	0	0
				0	0	0			
				0	0	0			
				0	0	0			

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
				70	175	0			
				60	120	0			
				115	140	0			
0	0	0	↲	↱	↑	↳	↳	165	100	185
0	0	0	←	TS			←	10	10	10
0	0	0	↰	↰	↑	↱	↱	10	10	10
				10	110	0			
				10	60	0			
				10	105	0			

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
				10	20	20			
				20	25	10			
				10	25	15			
10	15	10	↲	↱	↑	↳	↳	10	25	20
215	145	185	←	TS			←	240	140	235
100	40	85	↰	↰	↑	↱	↱	140	125	160
				75	15	175			
				45	30	110			
				100	30	165			

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0	↲	↱	↑	↳	↳	0	0	0
220	180	220	←	TS			←	190	170	320
180	105	135	↰	↰	↑	↱	↱	480	235	235
				110	0	245			
				110	0	200			
				175	0	460			

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				175	1345	90			
				105	535	55			
				160	795	100			
125	140	325	↲	↱	↑	↳	↳	45	55	65
440	260	355	←	TS			←	650	310	355
50	85	70	↰	↰	↑	↱	↱	155	105	100
				85	525	105			
				85	585	110			
				130	895	130			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				100	1365	35			
				70	580	15			
				70	810	40			
70	80	100	↲	↱	↑	↳	↳	15	20	60
10	10	15	←	TS			←	10	10	10
10	35	25	↰	↰	↑	↱	↱	20	25	35
				20	570	30			
				30	570	20			
				30	1065	30			

N

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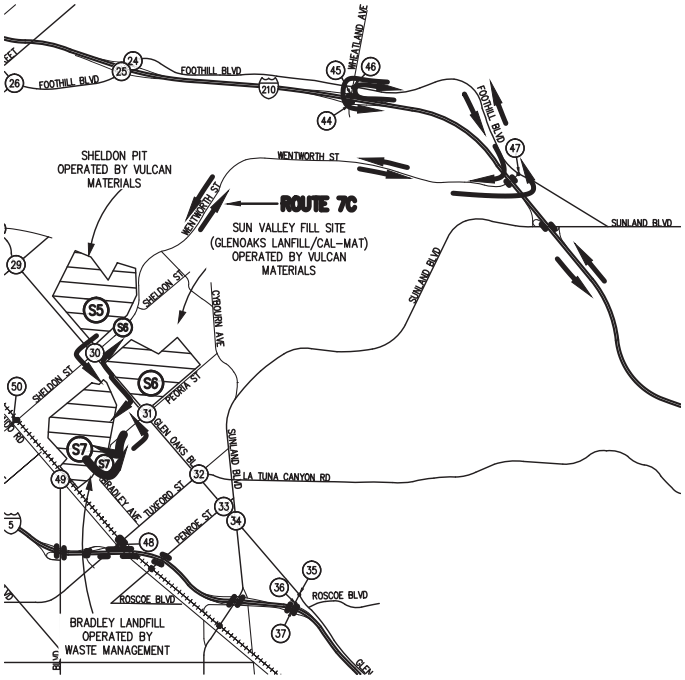

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	↲	↱	↑	↳	↳	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↰	↰	↑	↱	↱			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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ROUTE 7C
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE

5-4-9A

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N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0	0	300				
				0	0	230				
				0	0	260				
125	90	110	↳	↲	↑	↳	↲	0	0	0
15	15	10	←	TS			←	0	0	0
0	0	0	↰	↰	↑	↱	↰	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				80	290	0				
				65	235	0				
				115	250	0				
0	0	0	↳	↲	↑	↳	↲	285	205	295
0	0	0	←	TS			←	10	10	10
0	0	0	↰	↰	↑	↱	↰	10	10	10
				10	115	0				
				10	70	0				
				10	110	0				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				10	20	25				
				20	25	10				
				10	25	15				
15	15	10	↳	↲	↑	↳	↲	10	25	20
235	165	190	←	TS			←	265	160	250
100	45	85	↰	↰	↑	↱	↰	260	250	265
				85	15	290				
				45	30	230				
				100	30	275				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	↳	↲	↑	↳	↲	0	0	0
225	190	220	←	TS			←	200	180	325
295	220	250	↰	↰	↑	↱	↰	490	245	260
				225	0	260				
				225	0	205				
				290	0	465				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

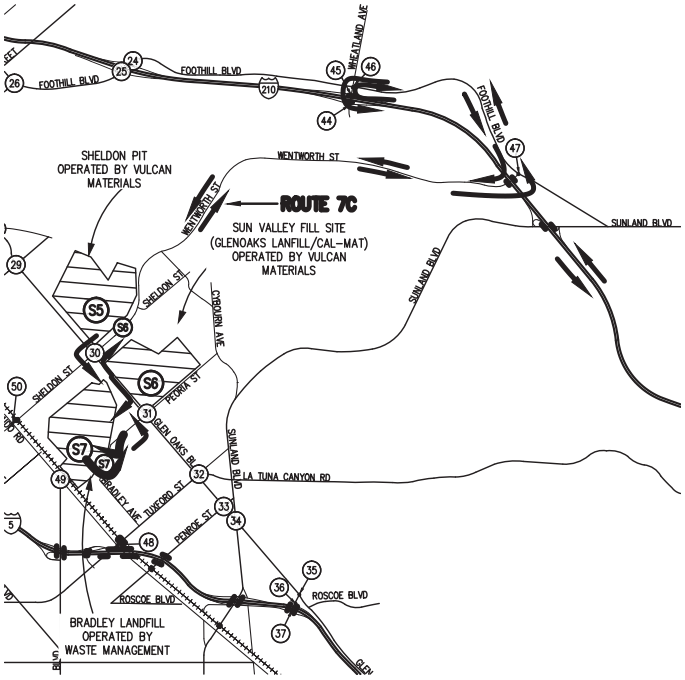
				220	1475	145				
				135	605	65				
				170	855	110				
140	165	360	↳	↲	↑	↳	↲	55	65	70
470	405	365	←	TS			←	720	405	380
55	130	80	↰	↰	↑	↱	↰	280	220	220
				110	565	220				
				120	660	240				
				155	985	250				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				225	1510	60				
				195	770	25				
				195	905	70				
190	215	225	↳	↲	↑	↳	↲	20	20	80
15	15	25	←	TS			←	15	10	10
10	65	45	↰	↰	↑	↱	↰	25	35	70
				35	665	65				
				40	720	35				
				50	1210	55				

N

NOT TO SCALE



LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↳	↲	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↰	↰	↑	↱	↰			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

(S#) – DISPOSAL SITE

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ROUTE 7C
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-9B

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Table 5-4-9
Intersection Capacity Analysis – Year 2014 Conditions (Route 7C)
Traffic Impact Analysis - Site 7

Route 7C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glenoaks Blvd and Sheldon Street	B	14.7	0.87	D	A	7.6	0.50	A	B	13.7	0.86	D
31	Glenoaks Blvd and Peoria Street	A	6.2	0.64	A	A	5.4	0.42	A	A	6.4	0.56	A
44	Wheatland Ave and I-210 Freeway Eastbound Ramps	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramps	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 7C Analysis

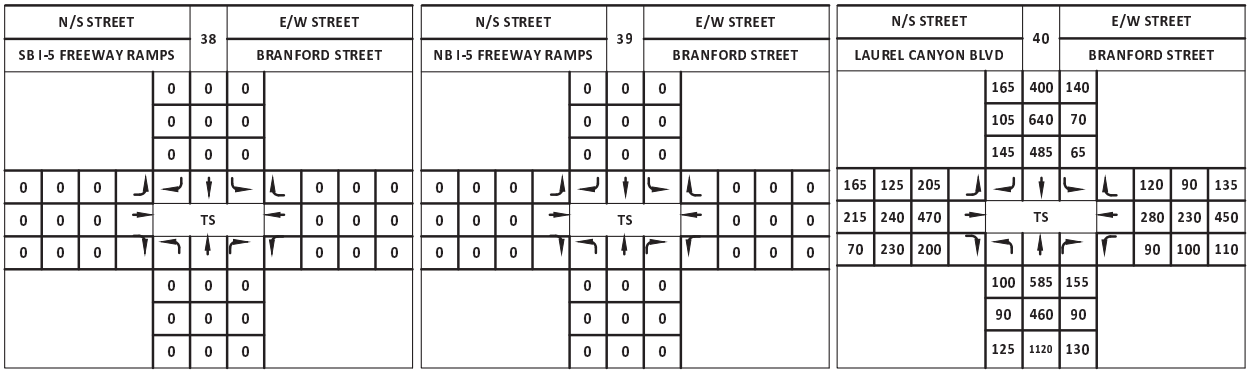
As presented in *Table 5-4-9*, under the project conditions Year 2014 for Site 7 (Route 7C) all intersections are expected to operate at an acceptable HCM LOS C or better, for the AM, Mid-day and PM peak hours.

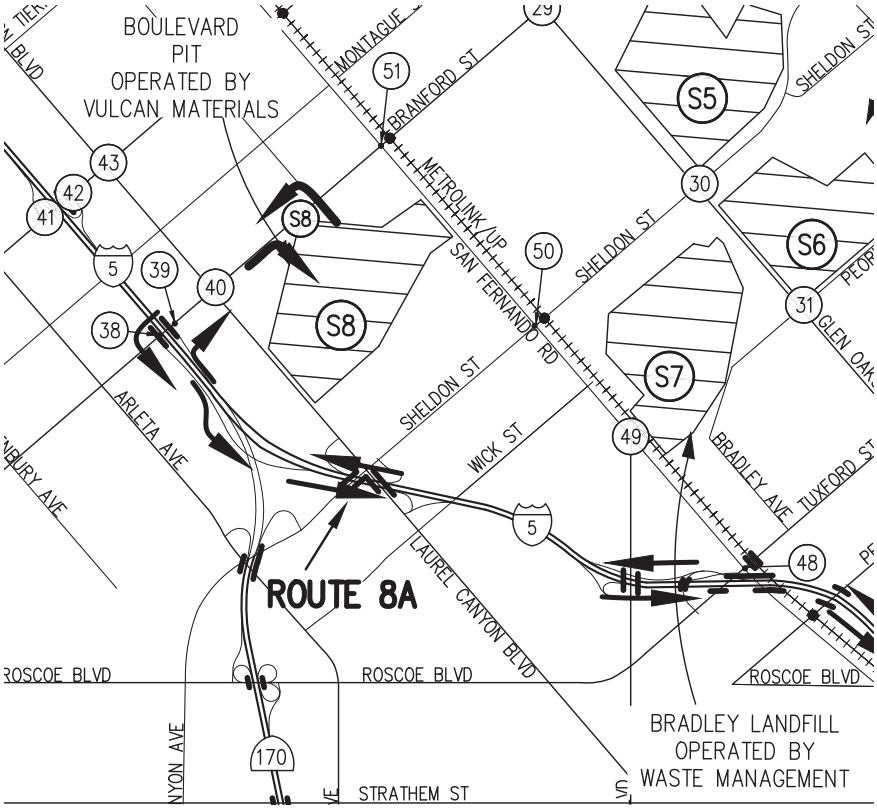
Haul Route 8A

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-10A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-10B.*

Haul Route 8B

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-11A.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-11B.*





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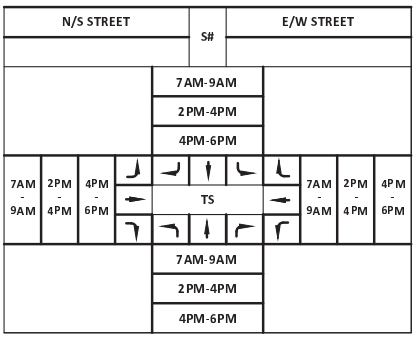

LEGEND

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ROUTE 8A
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-10A

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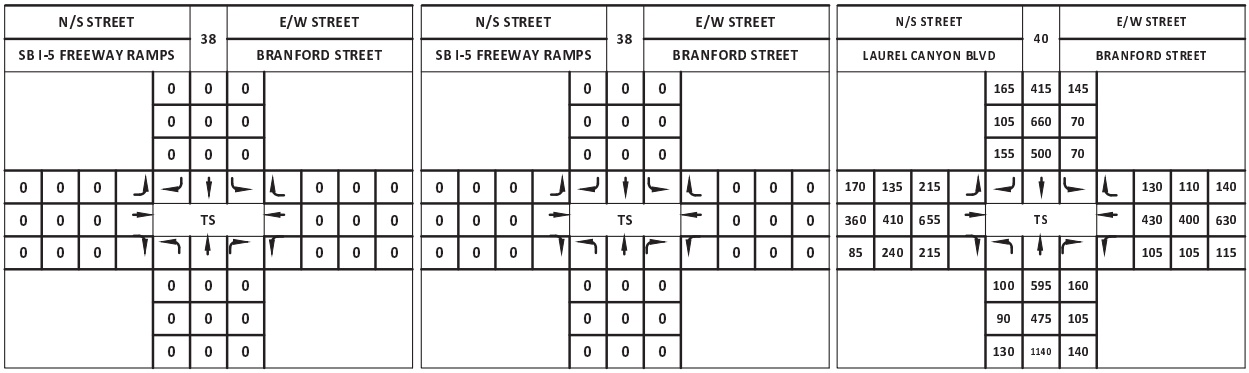

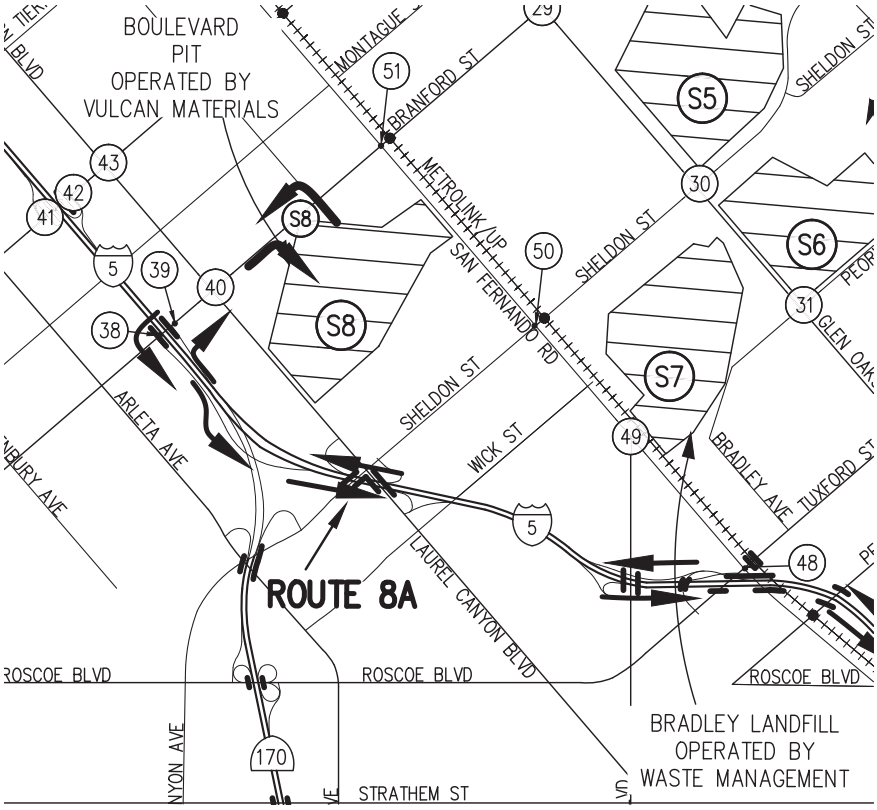

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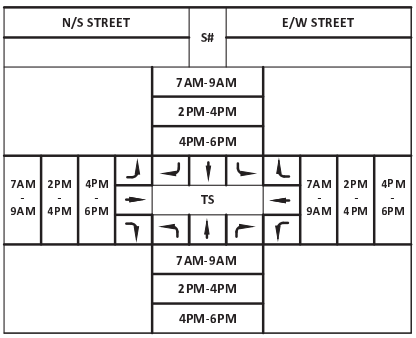

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ROUTE 8A
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-10B

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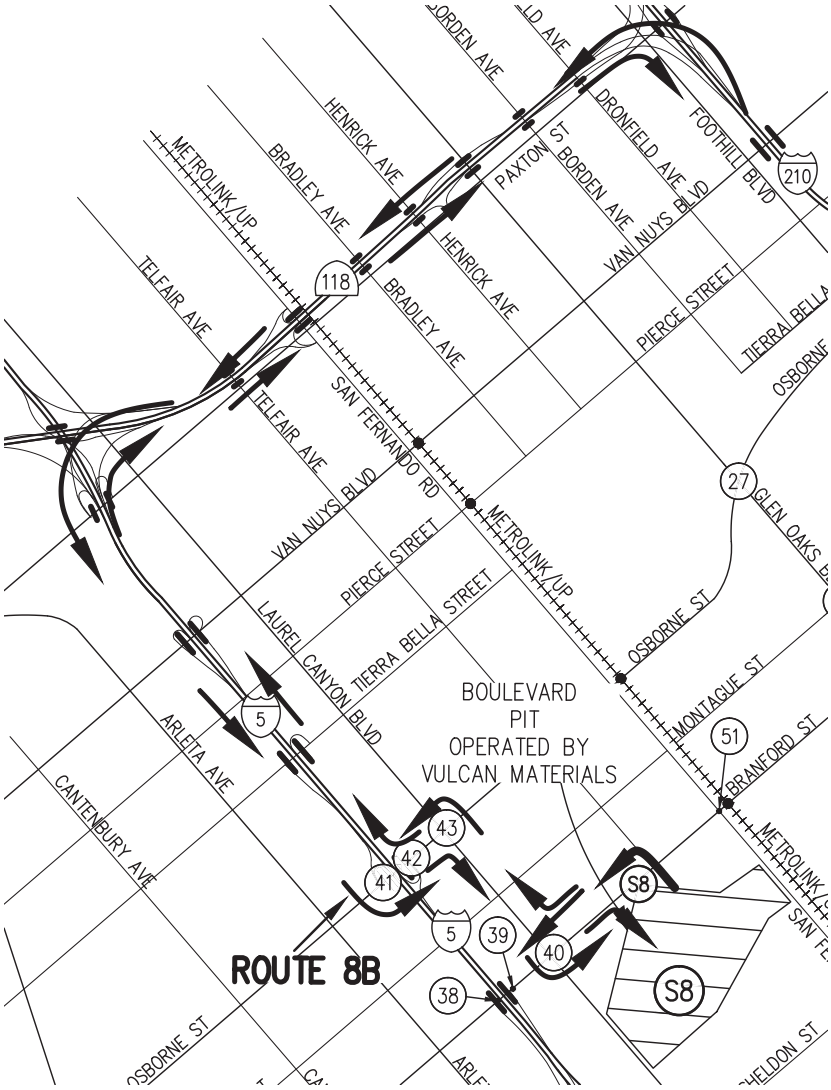
N/S STREET				40		E/W STREET				
LAUREL CANYON BLVD						BRANFORD STREET				
				165	400	195				
				105	640	125				
				145	485	120				
165	125	205						175	145	190
160	185	415		TS				225	175	400
70	230	200						90	100	110
				100	640	155				
				90	500	90				
				125	1220	130				

N/S STREET				41		E/W STREET				
SB I-5 FREEWAY RAMPS						OSBORNE STREET				
				205	25	215				
				390	25	470				
				665	25	550				
0	0	0						560	240	245
865	650	975		TS				1260	990	1330
745	180	300						65	40	40
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42		E/W STREET				
NB I-5 FREEWAY RAMPS						OSBORNE STREET				
				10	0	10				
				10	0	10				
				10	0	10				
10	10	10						80	70	85
1095	1095	1515		TS				1635	895	1170
0	0	0						0	0	0
				250	0	195				
				330	0	240				
				445	0	225				

N/S STREET				43		E/W STREET				
LAUREL CANYON BLVD						OSBORNE STREET				
				55	365	120				
				100	560	80				
				80	500	80				
130	100	105						185	120	120
915	1085	1435		TS				1500	750	925
140	140	125						120	85	130
				145	605	115				
				140	460	100				
				230	1130	130				



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LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8B
PROJECT TRIPS – YEAR 2014
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5-4-11A

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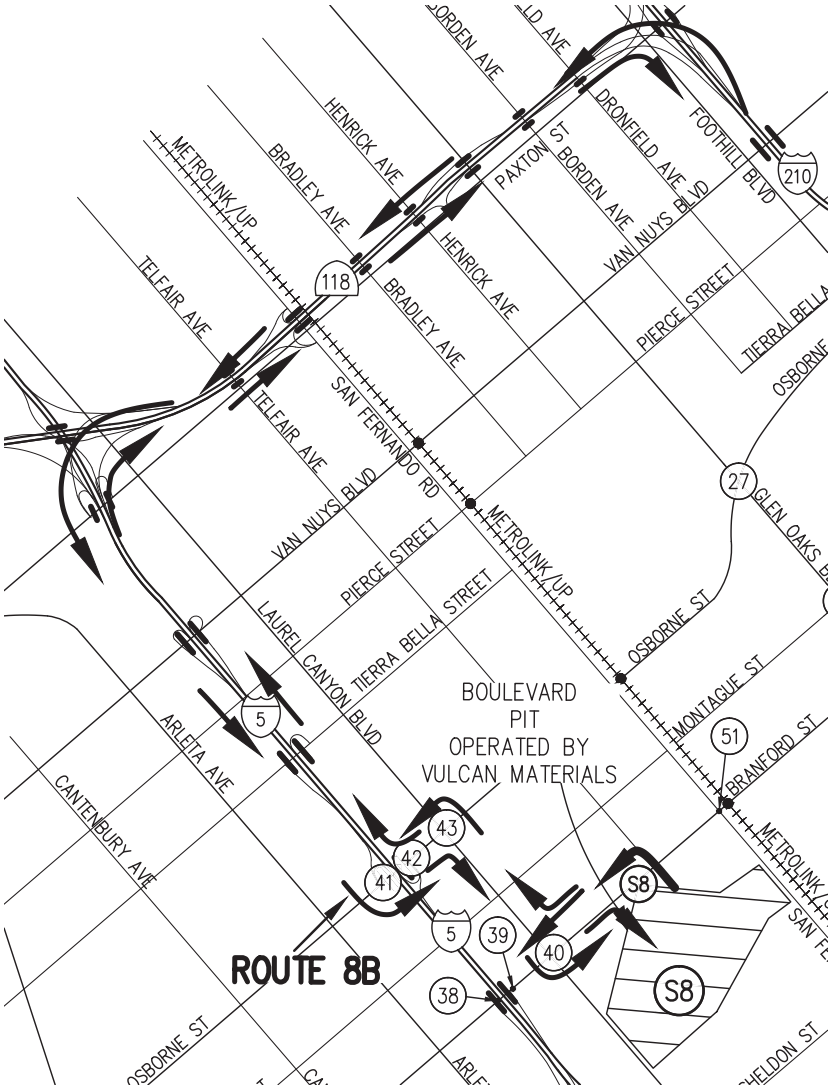
N/S STREET				40		E/W STREET				
LAUREL CANYON BLVD						BRANFORD STREET				
				165	415	310				
				105	660	235				
				155	500	235				
170	135	215	↱	↰	↑	↳	↲	295	275	305
195	245	490	←	TS			←	265	235	470
85	240	215	↰	↰	↑	↱	↱	105	105	115
				100	650	160				
				90	520	105				
				130	1245	140				

N/S STREET				41		E/W STREET				
SB I-5 FREEWAY RAMPS						OSBORNE STREET				
				255	25	380				
				435	25	640				
				675	25	685				
0	0	0	↱	↰	↑	↳	↲	610	275	255
950	705	1035	←	TS			←	1330	1015	1395
745	180	300	↰	↰	↑	↱	↱	65	40	40
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET				42		E/W STREET				
NB I-5 FREEWAY RAMPS						OSBORNE STREET				
				10	0	10				
				10	0	10				
				10	0	10				
10	10	10	↱	↰	↑	↳	↲	190	180	195
1185	1270	1690	←	TS			←	1625	960	1265
0	0	0	↰	↰	↑	↱	↱	0	0	0
				260	0	215				
				345	0	265				
				465	0	235				

N/S STREET				43		E/W STREET				
LAUREL CANYON BLVD						OSBORNE STREET				
				65	375	125				
				110	565	90				
				85	505	90				
135	105	110	↱	↰	↑	↳	↲	195	120	130
980	1150	1500	←	TS			←	1555	800	1010
275	260	255	↰	↰	↑	↱	↱	130	110	140
				260	620	125				
				250	470	110				
				340	1135	140				



LEGEND

N/S STREET				S#		E/W STREET				
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↰	↰	↑	↱	↱			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8B
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-11B

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Table 5-4-10
Intersection Capacity Analysis – Year 2014 Conditions (Route 8A)
Traffic Impact Analysis - Site 8

Route 8A		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
38	Branford Street and I-5 Freeway Southbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
39	Branford Street and I-5 Freeway Northbound Ramps	-	-	-	-	-	-	-	-	-	-	-	-
40	Branford Street and Laurel Canyon Blvd	B	11.2	0.62	C	B	10.1	0.45	B	B	17.6	0.88	E

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Table 5-4-11
Intersection Capacity Analysis – Year 2014 Conditions (Route 8**B**)
Traffic Impact Analysis - Site 8

Route 8B		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
40	Branford Street and Laurel Canyon Blvd	C	21.9	1.00	D	B	11.0	0.54	C	D	37.2	1.21	F*
41	Osborne Street and I-5 Freeway Southbound Ramps	B	13.7	0.83	D	C	20.9	0.93	B	D	37.0	1.00	E
42	Osborne Street and I-5 Freeway Northbound Ramps	B	14.7	0.75	B	B	12.1	0.70	B	B	19.3	0.89	D
43	Osborne Street and Laurel Canyon Blvd	D	42.3	0.98	E	C	25.2	0.80	D	E	66.3	1.03	F

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Routes 8A & 8B Analysis

As presented in *Table 5-4-10* and *Table 5-4-11*, under the project conditions Year 2014 for Site 8 (Routes 8A-8B) most of the study intersections are expected to operate at an acceptable HCM LOS D or better, for the AM, Mid-day and PM peak hours. The intersection requiring mitigations includes Osborne Street and Laurel Canyon Blvd (Route 8B) anticipated PM peak hour HCM LOS E. Mitigations for the intersection of Osborne Street and Laurel Canyon Blvd is recommended under project conditions.

Haul Route 8C

The Year 2014 AM (7-9), MID-DAY (12-2), PM (4-6) turn movement volumes, are provided in *Figure 5-5-12A* and *Figure 5-5-12B.* For comparison the (PCE) Year 2014 turn movement volumes are provided in *Figure 5-5-12C* and *Figure 5-5-12D.*

N/S STREET	44	E/W STREET
WHEATLAND AVE		EB I-210 FWY RAMPS

				0	0	185				
				0	0	120				
				0	0	145				
115	80	110	↲	↰	↑	↳	↳	0	0	0
10	10	10	←	TS			←	0	0	0
0	0	0	↰	↰	↑	↱	↱	0	0	0
				0	0	0				
				0	0	0				
				0	0	0				

N/S STREET	45	E/W STREET
WHEATLAND AVE		WB I-210 FWY RAMPS

				70	175	0				
				60	120	0				
				115	140	0				
0	0	0	↲	↰	↑	↳	↳	165	100	185
0	0	0	←	TS			←	10	10	10
0	0	0	↰	↰	↑	↱	↱	10	10	10
				10	110	0				
				10	60	0				
				10	105	0				

N/S STREET	46	E/W STREET
WHEATLAND AVE		FOOTHILL BLVD

				10	20	20				
				20	25	10				
				10	25	15				
10	15	10	↲	↰	↑	↳	↳	10	25	20
215	145	185	←	TS			←	240	140	235
100	40	85	↰	↰	↑	↱	↱	140	125	160
				75	15	175				
				45	30	110				
				100	30	165				

N/S STREET	47	E/W STREET
WENTWORTH STREET		FOOTHILL BLVD

				0	0	0				
				0	0	0				
				0	0	0				
0	0	0	↲	↰	↑	↳	↳	0	0	0
220	180	220	←	TS			←	190	170	320
180	105	135	↰	↰	↑	↱	↱	480	235	235
				110	0	245				
				110	0	200				
				175	0	460				

N/S STREET	30	E/W STREET
GLEN OAKS BLVD		SHELDON STREET

				175	1345	90				
				105	535	55				
				160	795	100				
125	140	325	↲	↰	↑	↳	↳	45	55	65
440	260	355	←	TS			←	650	310	355
50	85	70	↰	↰	↑	↱	↱	155	105	100
				85	525	105				
				85	585	110				
				130	895	130				

N/S STREET	31	E/W STREET
GLEN OAKS BLVD		PEORIA STREET

				45	1415	35				
				20	630	15				
				20	865	40				
20	30	45	↲	↰	↑	↳	↳	15	20	60
10	10	15	←	TS			←	10	10	10
10	35	25	↰	↰	↑	↱	↱	20	25	35
				20	625	30				
				30	625	20				
				30	1115	30				

N

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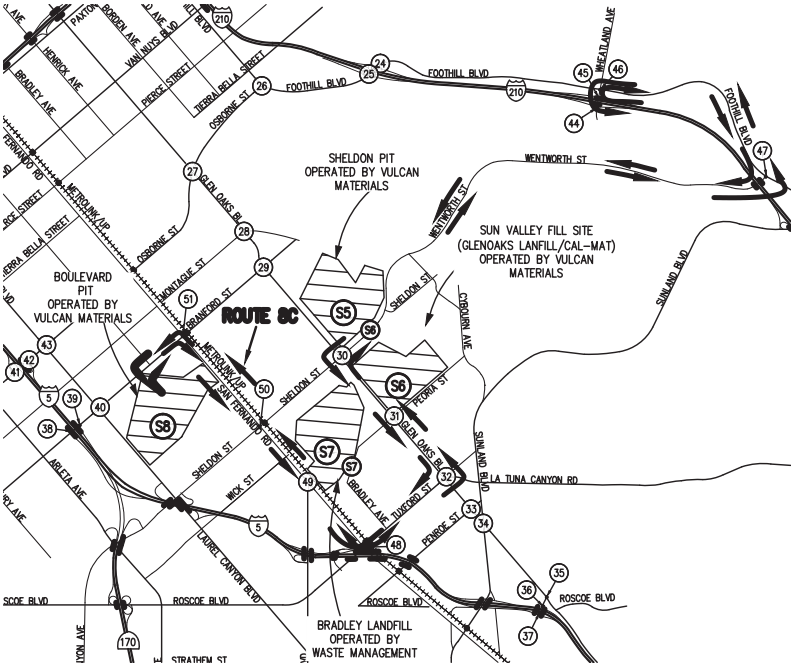

LEGEND

N/S STREET	S#	E/W STREET

				7AM-9AM						
				2PM-4PM						
				4PM-6PM						
7AM - 9AM	2PM - 4PM	4PM - 6PM	↲	↰	↑	↳	↳	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↰	↰	↑	↱	↱			
				7AM-9AM						
				2PM-4PM						
				4PM-6PM						

LEGEND

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ROUTE 8C
PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-12A

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N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				190	1105	100			
				165	385	100			
				155	645	140			
180	175	205	↲	↰	↑	↳	↳	80	50	85
510	425	550	←	TS			←	615	465	375
50	65	105	↱	↰	↑	↱	↱	35	30	65
				105	430	25			
				120	475	35			
				130	870	65			

N/S STREET				48		E/W STREET			
SAN FERNANDO ROAD						TUXFORD STREET			
				75	355	190			
				75	240	120			
				45	300	155			
70	85	35	↲	↰	↑	↳	↳	170	165	195
560	415	620	←	TS			←	710	385	470
120	200	160	↱	↰	↑	↱	↱	125	190	85
				275	210	65			
				345	185	145			
				360	580	70			

N/S STREET				49		E/W STREET			
SAN FERNANDO ROAD						LANKERSHIM BLVD			
				510	540	0			
				305	385	0			
				390	390	0			
245	300	600	↲	↰	↑	↳	↳	0	0	0
0	0	0	←	TS			←	0	0	0
40	65	60	↱	↰	↑	↱	↱	0	0	0
				55	310	0			
				60	335	0			
				85	670	0			

N/S STREET				50		E/W STREET			
SAN FERNANDO ROAD						SHELDON STREET			
				90	720	70			
				50	420	70			
				35	705	80			
65	65	135	↲	↰	↑	↳	↳	60	60	110
385	350	610	←	TS			←	690	350	440
80	45	70	↱	↰	↑	↱	↱	240	135	180
				40	340	85			
				55	425	105			
				125	1025	175			

N/S STREET				51		E/W STREET			
SAN FERNANDO ROAD						BRANFORD STREET			
				75	690	45			
				60	360	70			
				125	580	110			
40	40	100	↲	↰	↑	↳	↳	25	50	115
325	195	420	←	TS			←	160	165	310
170	105	170	↱	↰	↑	↱	↱	60	75	135
				110	240	100			
				110	345	75			
				240	820	140			

N

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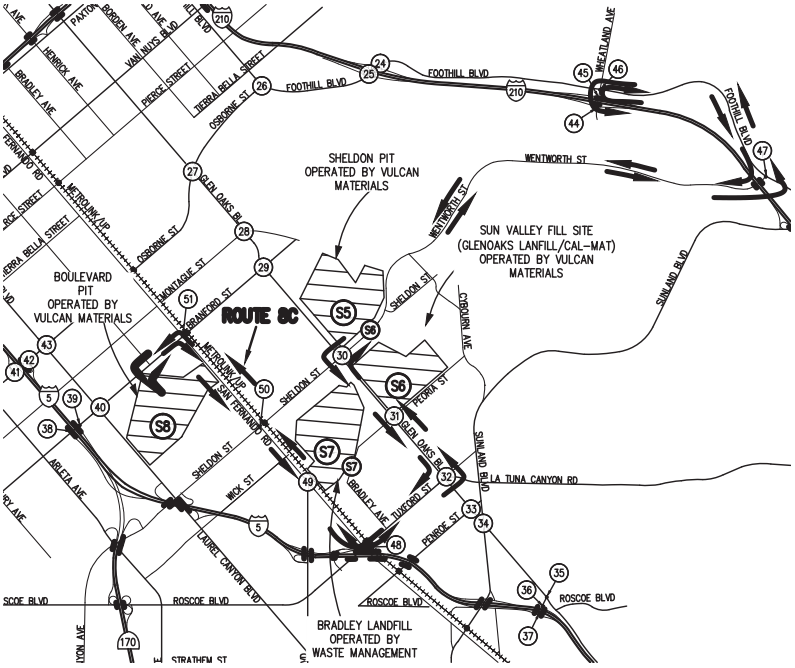

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	↲	↰	↑	↳	↳	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↱	↰	↑	↱	↱			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

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PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-12B

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N/S STREET				44		E/W STREET			
WHEATLAND AVE						EB I-210 FWY RAMPS			
				0	0	300			
				0	0	230			
				0	0	260			
125	90	110						0	0	0
15	15	10		TS				0	0	0
0	0	0						0	0	0
				0	0	0			
				0	0	0			
				0	0	0			

N/S STREET				45		E/W STREET			
WHEATLAND AVE						WB I-210 FWY RAMPS			
				80	290	0			
				65	235	0			
				115	250	0			
0	0	0						285	205	295
0	0	0		TS				10	10	10
0	0	0						10	10	10
				10	115	0			
				10	70	0			
				10	110	0			

N/S STREET				46		E/W STREET			
WHEATLAND AVE						FOOTHILL BLVD			
				10	20	25			
				20	25	10			
				10	25	15			
15	15	10						10	25	20
235	165	190		TS				265	160	250
100	45	85						260	250	265
				85	15	290			
				45	30	230			
				100	30	275			

N/S STREET				47		E/W STREET			
WENTWORTH STREET						FOOTHILL BLVD			
				0	0	0			
				0	0	0			
				0	0	0			
0	0	0						0	0	0
225	190	220		TS				200	180	325
295	220	250						490	245	260
				225	0	260			
				225	0	205			
				290	0	465			

N/S STREET				30		E/W STREET			
GLEN OAKS BLVD						SHELDON STREET			
				220	1475	145			
				135	605	65			
				170	855	110			
140	165	360						55	65	70
470	405	365		TS				720	405	380
55	130	80						280	220	220
				110	565	220			
				120	660	240			
				155	985	250			

N/S STREET				31		E/W STREET			
GLEN OAKS BLVD						PEORIA STREET			
				60	1675	60			
				35	930	25			
				35	1070	70			
30	50	60						20	20	80
15	15	25		TS				15	10	10
10	65	45						25	35	70
				35	830	65			
				40	885	35			
				50	1375	55			

N

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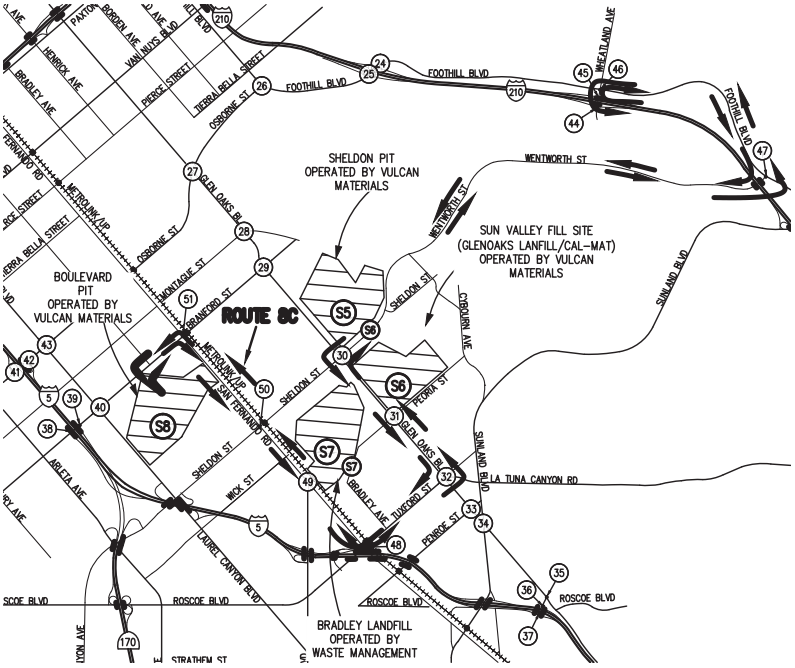

LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM		TS				7AM - 9AM	2PM - 4PM	4PM - 6PM
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

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FIGURE 5-4-12C

DEVIL'S GATE DAM & RESERVOIR

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N/S STREET				32		E/W STREET			
GLEN OAKS BLVD						TUXFORD STREET			
				405	1220	110			
				375	495	115			
				250	611	132			
355	380	282	↱	↰	↑	↳	↲	100	60	82
555	485	532	←	TS			←	670	490	362
60	85	91	↰	↰	↑	↱	↱	35	35	61
				130	510	35			
				155	580	35			
				116	790	60			

N/S STREET				48		E/W STREET			
SAN FERNANDO ROAD						TUXFORD STREET			
				90	485	350			
				90	390	250			
				45	345	310			
75	115	40	↱	↰	↑	↳	↲	295	285	345
710	555	740	←	TS			←	990	720	565
135	225	175	↰	↰	↑	↱	↱	135	220	100
				345	340	70			
				370	305	175			
				380	655	80			

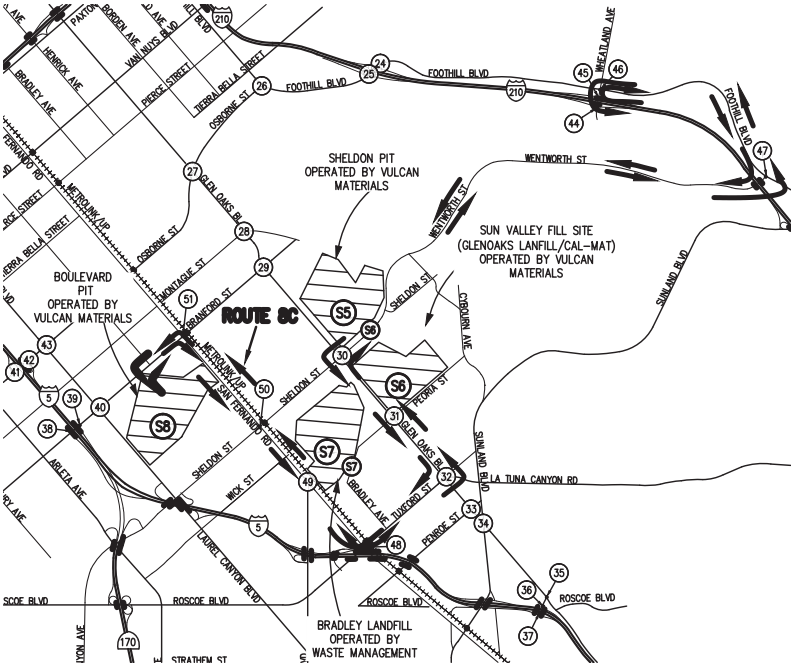
N/S STREET				49		E/W STREET			
SAN FERNANDO ROAD						LANKERSHIM BLVD			
				680	790	0			
				360	595	0			
				435	560	0			
320	365	680	↱	↰	↑	↳	↲	0	0	0
0	0	0	←	TS			←	0	0	0
50	100	75	↰	↰	↑	↱	↱	0	0	0
				70	480	0			
				85	515	0			
				115	860	0			

N/S STREET				50		E/W STREET			
SAN FERNANDO ROAD						SHELDON STREET			
				145	875	90			
				50	600	70			
				35	810	80			
80	65	135	↱	↰	↑	↳	↲	75	60	110
415	400	610	←	TS			←	730	440	440
110	45	70	↰	↰	↑	↱	↱	280	145	180
				65	490	130			
				65	570	105			
				125	1125	175			

N/S STREET				51		E/W STREET			
SAN FERNANDO ROAD						BRANFORD STREET			
				80	780	55			
				70	405	75			
				130	675	130			
45	50	130	↱	↰	↑	↳	↲	25	60	115
360	240	535	←	TS			←	180	205	415
300	235	285	↰	↰	↑	↱	↱	85	85	165
				240	275	125			
				235	415	115			
				365	920	155			

N

NOT TO SCALE



LEGEND

N/S STREET				S#		E/W STREET			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					
7AM - 9AM	2PM - 4PM	4PM - 6PM	↱	↰	↑	↳	↲	7AM - 9AM	2PM - 4PM	4PM - 6PM
			←	TS			←			
			↰	↰	↑	↱	↱			
				7AM-9AM					
				2PM-4PM					
				4PM-6PM					

LEGEND

(S#) – DISPOSAL SITE

(#) – STUDY INTERSECTIONS

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ROUTE 8C
PCE PROJECT TRIPS – YEAR 2014

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-4-12D

Drawing Name: V:\110264\Eng\110264-000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 4\FIG 5-4-12D.dwg
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Table 5-4-12
Intersection Capacity Analysis – Year 2014 Conditions (Route 8C)
Traffic Impact Analysis - Site 8

Route 8C		AM				MID-DAY (12-2 PM)				PM			
Intersection # / Name		HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS	HCM LOS	HCM Delay	HCM V/C	ICU LOS
30	Glen Oaks Blvd and Sheldon Street	B	14.7	0.87	D	A	7.6	0.50	A	B	13.7	0.86	D
31	Glen Oaks Blvd and Peoria Street	A	6.6	0.59	A	A	9.0	0.39	A	B	16.9	0.53	A
32	Glen Oaks Blvd and Tuxford Street	D	40.1	1.10	E	A	8.9	0.63	B	B	11.1	0.81	C
44	Wheatland Ave and I-210 Freeway Eastbound Ramp	A	0	-	-	A	0	-	-	A	0	-	-
45	Wheatland Ave and I-210 Freeway Westbound Ramp	B	11.1	-	-	A	8.8	-	-	B	10.2	-	-
46	Wheatland Ave and Foothill Blvd	B	11.3	0.46	A	B	10.6	0.39	A	B	10	0.47	A
47	Wentworth Street and Foothill Blvd	C	28.4	0.88	A	B	10.4	0.45	A	A	9.7	0.48	A
48	Tuxford Street and San Fernando Road	D	40.1	0.80	C	C	34.7	0.80	B	C	34.8	0.75	C
49	Lankershim Blvd and San Fernando Road	A	8.6	0.57	A	A	7.8	0.47	A	A	9.6	0.55	A
50	Sheldon Street and San Fernando Road	C	34.8	0.80	C	C	24.3	0.54	A	E	58.1	1.03	E
51	Branford Street and San Fernando Road	D	38.0	0.89	B	C	30.7	0.51	A	F	84.0	0.99	D

(1) Delay – In seconds
(2) HCM LOS– Highway Capacity Manual Level of Service
(3) Un-Signalized Intersection
(4) ICU LOS – Intersection Capacity Utilization Level of Service
Source: **Hall & Foreman, Inc.**

Haul Route 8C Analysis

As presented in *Table 5-4-12*, under the project conditions Year 2014 for Site 8 (Route 8C) most intersections are operating at an acceptable HCM LOS of D or better for the AM, Mid-day, and PM peak hours. Mitigation is recommended for Sheldon Street and San Fernando Road under project conditions and Branford Street and San Fernando Road under existing conditions.

In Summary, most of the intersections are expected to operate at an acceptable HCM LOS. Mitigation is required for intersection Berkshire Place and I-210 Freeway Westbound Ramps (Routes 1A, 1D) AM HCM LOS F (Routes 1E, 1G) AM peak hour HCM LOS E, Arrow Hwy and Lark Ellen Ave (Route 2B) anticipated AM and PM peak hours HCM LOS E, Azusa Ave and Arrow Hwy (Route 2B) anticipated AM, Mid-day, and PM peak hours HCM LOS E, Azusa Ave and Gladstone Street(Route 2B) anticipated AM peak hour HCM LOS E, First Street and Alameda Street/I-210 Freeway Westbound Ramps (Route 2B) anticipated AM peak hour HCM LOS E, Figueroa Street and SR-134 Freeway Westbound and Figureoa Street (Routes 4A) anticipated AM and PM peak hour HCM LOS E and (Routes 4B) anticipated AM peak hour HCM LOS E and PM peak hour HCM LOS F, Glenoaks Blvd and Osborne Street (Route 5A, 6A, 7A) anticipated AM peak hour HCM LOS F, Osborne Street and Laurel Canyon (Route 8B) anticipated PM peak hours HCM LOS E, Sheldon Street and San Fernando Road (Route 8C) with an anticipated PM peak hour HCM LOS E, and Branford Street and San Fernando Road (Route 8C) with an anticipated PM peak hour HCM LOS F. Improvements implemented during existing conditions and project conditions will mitigate issues increased by additional traffic.

Section 5: (Caltrans)

The Year 2014 AM (7-9), MID-DAY (12-2), and PM (4-6) freeway segment volumes are provided in *Figure 5-5-1* and *Figure 5-5-2.* Year 2014 AM (7-9), MID-DAY (12-2), and PM (4-6) ramp volumes are provided in *Figure 5-5-3* and *Figure 5-5-5.*

S1–EB I–210 FWY		S1–WB I–210 FWY	
SEGMENT BETWEEN BERKSHIRE PLACE AND WINDSOR AVE.		SEGMENT BETWEEN WINDSOR AVE AND BERKSHIRE PLACE.	
AM	6120→	AM	←3415
MID–DAY	3875→	MID–DAY	←2510
PM	4775→	PM	←4110

S2–EB I–210 FWY		S2–WB I–210 FWY	
SEGMENT BETWEEN WINDSOR AVE AND LINCOLN AVE.		SEGMENT BETWEEN LINCOLN AVE AND WINDSOR AVE.	
AM	6280→	AM	←4170
MID–DAY	4030→	MID–DAY	←4010
PM	4845→	PM	←6165

S3–EB I–210 FWY		S3–WB I–210 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND SR–134/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/I–210 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	6065→	AM	←5255
MID–DAY	3860→	MID–DAY	←4305
PM	4520→	PM	←6170

S4–EB SR–134 FWY		S4–WB SR–134 FWY	
SEGMENT BETWEEN FIGUEROA ST AND SAN RAFAEL AVE.		SEGMENT BETWEEN SAN RAFAEL AVE AND FIGUEROA ST.	
AM	6555→	AM	←8750
MID–DAY	6165→	MID–DAY	←6160
PM	7380→	PM	←8090

S5–EB SR–134 FWY		S5–WB SR–134 FWY	
SEGMENT BETWEEN SAN RAFAEL AVE AND SR–134/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–134/I–210 FWY INTERCHANGE AND SAN RAFAEL AVENUE.	
AM	8130→	AM	←8190*
MID–DAY	7275→	MID–DAY	←5735*
PM	8865→	PM	←7790*

S6–EB I–210 FWY		S6–WB I–210 FWY	
SEGMENT BETWEEN WB SR–134/EB I–210 FWY INTERCHANGE AND LAKE AVE.		SEGMENT BETWEEN LAKE AVE AND EB SR–134/WB I–210 FWY INTERCHANGE.	
AM	5625→	AM	←10635
MID–DAY	4565→	MID–DAY	←8140
PM	4765→	PM	←9205

S7–EB I–210 FWY		S7–WB I–210 FWY	
SEGMENT BETWEEN I–605 FREEWAY AND IRWINDALE AVE.		SEGMENT BETWEEN IRWINDALE AVE AND I–605 FREEWAY.	
AM	6060→	AM	←7755
MID–DAY	5720→	MID–DAY	←7490
PM	6170→	PM	←8245

S8–EB I–210 FWY		S8–WB I–210 FWY	
SEGMENT BETWEEN IRWINDALE AVE AND AZUSA AVE.		SEGMENT BETWEEN AZUSA AVE AND IRWINDALE AVE.	
AM	6835→	AM	←6765
MID–DAY	7310→	MID–DAY	←6680
PM	6880→	PM	←8550

S9–EB I–210 FWY		S9–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND BERKSHIRE PLACE.		SEGMENT BETWEEN BERKSHIRE PLACE AND FOOTHILL BLVD	
AM	6120*→	AM	←4090
MID–DAY	3930*→	MID–DAY	←4025
PM	4600*→	PM	←6335

S10–EB I–210 FWY		S10–WB I–210 FWY	
SEGMENT BETWEEN SR–2 FWY AND ANGELES CREST HWY.		SEGMENT BETWEEN ANGELES CREST HWY AND SR–2 FWY.	
AM	N/D→	AM	←3810
MID–DAY	N/D→	MID–DAY	←3650
PM	N/D→	PM	←6040

S11–NB SR–2 FWY		S11–SB SR–2 FWY	
SEGMENT BETWEEN MOUNTAIN ST AND I–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN I–210/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.	
AM	2875→	AM	←6605
MID–DAY	5720→	MID–DAY	←2335
PM	6165→	PM	←3090

S12–NB SR–2 FWY		S12–SB SR–2 FWY	
SEGMENT BETWEEN SR–134/SR–2 FWY INTERCHANGE AND MOUNTAIN ST.		SEGMENT BETWEEN MOUNTAIN ST AND SR–134/SR–2 FWY INTERCHANGE.	
AM	N/D→	AM	←7110
MID–DAY	N/D→	MID–DAY	←2860
PM	N/D→	PM	←3575

S13–EB SR–134 FWY		S13–WB SR–134 FWY	
SEGMENT BETWEEN SR–2 FWY AND FIGUEROA ST.		SEGMENT BETWEEN FIGUEROA ST AND SR–2 FWY.	
AM	6625*→	AM	←6915
MID–DAY	6855*→	MID–DAY	←5540
PM	7575*→	PM	←6945

S14–EB SR–134 FWY		S14–WB SR–134 FWY	
SEGMENT BETWEEN GLENDALE AVE AND SR–2 FWY.		SEGMENT BETWEEN SR–2 FWY AND GLENDALE AVE.	
AM	7125→	AM	←N/D
MID–DAY	7870→	MID–DAY	←N/D
PM	9245→	PM	←N/D

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

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PROJECT YEAR 2014 TRIPS FREEWAY SEGMENTS 1–14

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5–5–1

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S15–EB SR–134 FWY		S15–WB SR–134 FWY	
SEGMENT BETWEEN SAN FERNANDO ST AND PACIFIC AVE.		SEGMENT BETWEEN PACIFIC AVE AND SAN FERNANDO ST.	
AM	7880→	AM	←9130
MID-DAY	7635→	MID-DAY	←6650
PM	8175→	PM	←7100

S16–EB SR–134 FWY		S16–WB SR–134 FWY	
SEGMENT BETWEEN SR–134/I–5 FWY INTERCHANGE AND SAN FERNANDO ST.		SEGMENT BETWEEN SAN FERNANDO ST. AND SR–134/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6995
MID-DAY	N/D→	MID-DAY	←5500
PM	N/D→	PM	←9190

S17–SB I–5 FWY		S17–NB I–5 FWY	
SEGMENT BETWEEN WESTERN AVE AND I–5/SR–134 FWY INTERCHANGE.		SEGMENT BETWEEN I–5/SR–134 FWY INTERCHANGE AND WESTERN AVE.	
AM	7080→	AM	←N/D
MID-DAY	7785→	MID-DAY	←N/D
PM	7675→	PM	←N/D

S18–SB I–5 FWY		S18–NB I–5 FWY	
SEGMENT BETWEEN ROSCOE BLVD/GLEN OAKS BLVD AND N. HOLLYWOOD WAY.		SEGMENT BETWEEN N. HOLLYWOOD WAY AND ROSCOE BLVD/GLEN OAKS BLVD.	
AM	6580→	AM	←6035
MID-DAY	5455→	MID-DAY	←6625
PM	5090→	PM	←7210

S19–SB I–5 FWY		S19–NB I–5 FWY	
SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND SHELDON ST.		SEGMENT BETWEEN SHELDON ST AND I–5/SR–170 FWY INTERCHANGE.	
AM	N/D→	AM	←5445
MID-DAY	N/D→	MID-DAY	←5985
PM	N/D→	PM	←5235

S20–SB I–5 FWY		S20–NB I–5 FWY	
SEGMENT BETWEEN BRANFORD ST. AND I–5/SR–170 FWY INTERCHANGE		SEGMENT BETWEEN I–5/SR–170 FWY INTERCHANGE AND BRANFORD ST.	
AM	13780→	AM	←N/D
MID-DAY	9230→	MID-DAY	←N/D
PM	10125→	PM	←N/D

S21–EB I–210 FWY		S21–WB I–210 FWY	
SEGMENT BETWEEN MONTROSE AVE AND EB–210/SR–2 FWY INTERCHANGE.		SEGMENT BETWEEN EB–210/SR–2 FWY INTERCHANGE AND MONTROSE AVE.	
AM	N/D→	AM	←N/D
MID-DAY	N/D→	MID-DAY	←N/D
PM	N/D→	PM	←N/D

S22–EB I–210 FWY		S22–WB I–210 FWY	
SEGMENT BETWEEN WHEATLAND AVE AND SUNLAND AVE.		SEGMENT BETWEEN SUNLAND AVE AVE WHEATLAND AVE.	
AM	5210→	AM	←N/D
MID-DAY	2960→	MID-DAY	←N/D
PM	4030→	PM	←N/D

S23–EB I–210 FWY		S23–WB I–210 FWY	
SEGMENT BETWEEN FOOTHILL BLVD AND WHEATLAND AVE.		SEGMENT BETWEEN WHEATLAND AVE AND FOOTHILL BLVD.	
AM	4850→	AM	←4495
MID-DAY	3790→	MID-DAY	←3845
PM	5335→	PM	←7340

S24–EB I–210 FWY		S24–WB I–210 FWY	
SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND FOOTHILL BLVD		SEGMENT BETWEEN FOOTHILL BLVD AND SR–118/I–210 FWY INTERCHANGE.	
AM	N/D→	AM	←4445
MID-DAY	N/D→	MID-DAY	←3680
PM	N/D→	PM	←6200

S25–EB SR–118 FWY		S25–WB SR–118 FWY	
SEGMENT BETWEEN GLEN OAKS BLVD AND SR–118/I–210 FWY INTERCHANGE.		SEGMENT BETWEEN SR–118/I–210 FWY INTERCHANGE AND GLEN OAKS BLVD.	
AM	N/D→	AM	←N/D
MID-DAY	N/D→	MID-DAY	←N/D
PM	N/D→	PM	←N/D

S26–EB SR–118 FWY		S26–WB SR–118 FWY	
SEGMENT BETWEEN SR–118/I–5 FWY INTERCHANGE AND SAN FERNANDO RD.		SEGMENT BETWEEN SAN FERNANDO RD AND SR–118/I–5 FWY INTERCHANGE.	
AM	N/D→	AM	←6825
MID-DAY	N/D→	MID-DAY	←3920
PM	N/D→	PM	←6250

S27–SB I–5 FWY		S27–NB I–5 FWY	
SEGMENT BETWEEN I–5/ SR–118 FWY INTERCHANGE AND VAN NUYS BLVD.		SEGMENT BETWEEN VAN NUYS BLVD AND I–5/ SR–118 FWY INTERCHANGE.	
AM	9935→	AM	←8755
MID-DAY	7795→	MID-DAY	←9140
PM	8565→	PM	←9320

LEGEND

X%→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

S28–SB I–5 FWY		S28–NB I–5 FWY	
SEGMENT BETWEEN VAN NUYS BLVD AND OSBORNE ST.		SEGMENT BETWEEN OSBORNE ST AND VAN NUYS BLVD.	
AM	N/D→	AM	←N/D
MID-DAY	N/D→	MID-DAY	←N/D
PM	N/D→	PM	←N/D

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PROJECT YEAR 2014 TRIPS FREEWAY SEGMENTS 15–28

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5-5-2

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R1–EB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	500►
MID–DAY	220►
PM	335►

R2–WB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	◄430
MID–DAY	◄290
PM	◄570

R3–EB 210 FREEWAY	
MERGE POINT	
BERKSHIRE PLACE ON–RAMP	
AM	340►
MID–DAY	195►
PM	490►

R4–WB 210 FREEWAY	
DIVERGE POINT	
BERKSHIRE PLACE OFF–RAMP	
AM	◄420
MID–DAY	◄190
PM	◄245

R5–EB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	770►
MID–DAY	465►
PM	820►

R6–WB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	◄675
MID–DAY	◄410
PM	◄650

R7–EB 210 FREEWAY	
MERGE POINT	
WINDSOR AVENUE ON–RAMP	
AM	525►
MID–DAY	390►
PM	520►

R8–WB 210 FREEWAY	
DIVERGE POINT	
WINDSOR AVENUE OFF–RAMP	
AM	◄680
MID–DAY	◄270
PM	◄525

R9–EB 210 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY AND WB SR–134 FREEWAY TRANSITION/OFF–RAMP	
AM	N/D►
MID–DAY	N/D►
PM	N/D►

R10–WB 210 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	◄N/D
MID–DAY	◄N/D
PM	◄N/D

R11–WB 134 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	◄N/D
MID–DAY	◄N/D
PM	◄N/D

R12–EB 134 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D►
MID–DAY	N/D►
PM	N/D►

R13–WB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD OFF–RAMP	
AM	◄N/D
MID–DAY	◄N/D
PM	◄N/D

R14–EB 210 FREEWAY	
MERGE POINT	
FIGUEROA ST/ SCHOLL CANYON RD ON–RAMP	
AM	415►
MID–DAY	365►
PM	400►

R15–EB 210 FREEWAY	
MERGE POINT	
EB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D►
MID–DAY	N/D►
PM	N/D►

R16–WB 210 FREEWAY	
DIVERGE POINT	
WB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄N/D
MID–DAY	◄N/D
PM	◄N/D

R17–EB 210 FREEWAY	
DIVERGE POINT	
IRWINDALE AVENUE OFF–RAMP	
AM	1270►
MID–DAY	1095►
PM	885►

R18–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE ON–RAMP	
AM	◄690
MID–DAY	◄510
PM	◄570

R19–WB 210 FREEWAY	
MERGE POINT	
IRWINDALE AVENUE SLIP ON–RAMP	
AM	◄ 715
MID–DAY	◄645
PM	◄570

R20–WB 210 FREEWAY	
MERGE POINT	
AZUSA AVENUE/FIRST STREET ON–RAMP	
AM	◄995
MID–DAY	◄440
PM	◄485

R21–WB 210 FREEWAY	
DIVERGE POINT	
SB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄1670
MID–DAY	◄770
PM	◄1000

R22–EB 210 FREEWAY	
MERGE POINT	
NB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	620►
MID–DAY	660►
PM	905►

R23–SB 2 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	◄1670
MID–DAY	◄770
PM	◄1000

R24–NB 2 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	620►
MID–DAY	660►
PM	905►

R25–SB 2 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D►
MID–DAY	N/D►
PM	N/D►

R26–NB 2 FREEWAY	
MERGE POINT	
WB AND EB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	◄2230
MID–DAY	◄2515
PM	◄3515

R27–EB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D►
MID–DAY	N/D►
PM	N/D►

R28–WB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	◄1215
MID–DAY	◄855
PM	◄1335

R29–EB 134 FREEWAY	
DIVERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD OFF–RAMP	
AM	490►
MID–DAY	390►
PM	605►

LEGEND

XXX► EXISTING VOLUMES
N/D► NO DATA AVAILABLE
*► CALCULATED VOLUME

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PROJECT YEAR 2014 TRIPS
RAMPS 1–29
DEVIL'S GATE DAM & RESERVOIR

FIGURE
5–5–3

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R30–WB 134 FREEWAY	
MERGE POINT	
FIGUEROA ST/SCHOLL CANYON RD ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R31–WB 134 FREEWAY	
MERGE POINT	
SB SR–2 FREEWAY TRANSITION/ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R32–EB 134 FREEWAY	
DIVERGE POINT	
NB SR–2 FREEWAY TRANSITION/ OFF–RAMP	
AM	2230→
MID–DAY	2515→
PM	3515→

R33–WB 134 FREEWAY	
DIVERGE POINT	
NB I–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	←3190
MID–DAY	←2910
PM	←3055

R34–EB 134 FREEWAY	
MERGE POINT	
SB I–5 FREEWAY TRANSITION/ ON–RAMP	
AM	3180→
MID–DAY	2915→
PM	3305→

R35–NB 5 FREEWAY	
MERGE POINT	
WB SR–134 FREEWAY TRANSITION/ ON–RAMP	
AM	←3210
MID–DAY	←2765
PM	←3055

R36–SB 5 FREEWAY	
DIVERGE POINT	
EB SR–134 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R37–NB 5 FREEWAY	
DIVERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD OFF–RAMP	
AM	←360
MID–DAY	←370
PM	←630

R38–SB 5 FREEWAY	
MERGE POINT	
ROSCOE BLVD/GLEN OAKS BLVD ON–RAMP	
AM	705→
MID–DAY	455→
PM	490→

R39–SB 5 FREEWAY	
MERGE POINT	
BRANFORD STREET ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R40–NB 5 FREEWAY	
DIVERGE POINT	
BRANFORD STREET OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R41–WB 210 FREEWAY	
DIVERGE POINT	
WHEATLAND AVE OFF–RAMP	
AM	←125
MID–DAY	←120
PM	←170

R42–EB 210 FREEWAY	
MERGE POINT	
WHEATLAND AVE ON–RAMP	
AM	185→
MID–DAY	120→
PM	150→

R43–WB 210 FREEWAY	
DIVERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET OFF–RAMP	
AM	←300
MID–DAY	←215
PM	←400

R44–EB 210 FREEWAY	
MERGE POINT	
FOOTHILL BLVD/ OSBORNE STREET ON–RAMP	
AM	580→
MID–DAY	305→
PM	370→

R45–WB 210 FREEWAY	
DIVERGE POINT	
WB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R46–EB 210 FREEWAY	
MERGE POINT	
EB SR–118 FREEWAY TRANSITION/ ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R47–WB 118 FREEWAY	
MERGE POINT	
WB I–210 FREEWAY TRANSITION/ ON–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R48–EB 118 FREEWAY	
DIVERGE POINT	
EB I–210 FREEWAY TRANSITION/ OFF–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R49–WB 118 FREEWAY	
DIVERGE POINT	
SB 1–5 FREEWAY TRANSITION/ OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R50–EB 118 FREEWAY	
MERGE POINT	
NB I–5 FREEWAY TRANSITION/ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R51–SB 5 FREEWAY	
MERGE POINT	
WB SR–118 FREEWAY TRANSITION/ON–RAMP	
AM	N/D→
MID–DAY	N/D→
PM	N/D→

R52–NB 5 FREEWAY	
DIVERGE POINT	
EB SR–118 FREEWAY TRANSITION/ OFF–RAMP	
AM	←N/D
MID–DAY	←N/D
PM	←N/D

R53–SB 5 FREEWAY	
MERGE POINT	
OSBORNE STREET ON–RAMP	
AM	435→
MID–DAY	880→
PM	1235→

R54–NB 5 FREEWAY	
DIVERGE POINT	
OSBORNE STREET OFF–RAMP	
AM	←495
MID–DAY	←620
PM	←720

LEGEND

XXX→ EXISTING VOLUMES
N/D→ NO DATA AVAILABLE
*→ CALCULATED VOLUME

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PROJECT YEAR 2014 TRIPS RAMPS 30–54

DEVIL'S GATE DAM & RESERVOIR

FIGURE 5–5–4

Drawing Name: V:\110264\Eng\110264–000\Exhibit\02 Traffic Study\Route Figures\Chapter 5\Ch. 5 Section 5\FIG 5–5–4.dwg
Last Opened: Oct 04, 2013 – 2:31pm by: TMunoz

Year 2014 Freeway Mainline HCM Analysis

Freeway mainline capacity analyses were conducted for the 28 freeway segments identified utilizing the methods as discussed previously and using the existing geometrics. The resulting HCM LOS for the existing conditions of each freeway segment analyzed is presented in *Table 5-5-1*.

Table 5-5-1
Freeway Mainline Capacity Analysis – Year 2014 Conditions
Traffic Impact Analysis

Segment/Freeway Name		AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
1	I-210 WB between Windsor Ave/Arroyo Blvd and Berkshire Place	13.3	B	9.9	A	16.4	B
2	I-210 EB between Windsor Ave/Arroyo Blvd and Berkshire Place	21.4	C	14.9	B	18.1	C
3	I-210 WB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	15.7	B	15.5	B	24.8	C
4	I-210 EB between Lincoln Avenue and Windsor Ave/Arroyo Blvd.	23.8	C	14.5	B	17.5	B
5	I-210 WB between the SR-134 Fwy and Mountain Street.	15.0	B	12.8	B	18.2	C
6	I-210 EB between the SR-134 Fwy and Mountain Street.	23.3	C	14.4	B	16.6	B
7	SR-134 WB between San Rafael Ave and Figueroa Street	28.3	D	18.1	C	25.4	C
8	SR-134 EB between San Rafael Ave and Figueroa Street	18.9	C	17.6	B	21.8	C
9	SR-134 WB between the I-210 Fwy and San Rafael Ave.	26.9	D	17.2	B	25.0	C
10	SR-134 EB between the I-210 Fwy and San Rafael Ave.	24.8	C	21.4	C	28.2	D
11	I-210 WB between the SR-134 Fwy and Lake Ave.	39.8	E	26.3	D	33.0	D
12	I-210 EB between the SR-134 Fwy and Lake Ave.	36.3	E	38.1	E	41.1	E
13	I-210 WB between the I-605 Fwy and Irwindale Avenue.	23.9	C	22.8	C	26.4	D
14	I-210 EB between the I-605 Fwy and Irwindale Avenue.	17.5	B	16.6	B	18.0+	C
15	I-210 WB between Irwindale Avenue and Azusa Avenue.	22.2	C	21.8	C	31.3	D
16	I-210 EB between Irwindale Avenue and Azusa Avenue.	20.3	C	22.1	C	20.9	C
17	I-210 WB between Berkshire Place and Foothill Blvd.	15.3	B	15.5	B	25.4	C
18	I-210 EB between Berkshire Place and Foothill Blvd.	24.4	C	14.6	B	17.2	B
19	I-210 WB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	13.8	B	13.6	B	23.2	C
20	I-210 EB between Angeles Crest Hwy (SR-2 Hwy) and the SR-2 Fwy (Glendale Fwy)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
21	SR-2 NB between the I-210 Fwy and Mountain Street.	8.6	A	17.1	B	18.6	C
22	SR-2 SB between the I-210 Fwy and Mountain Street.	27.3	D	8.7	A	11.5	B
23	SR-2 NB between Mountain Street and the SR-134 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
24	SR-2 SB between Mountain Street and the SR-134 Fwy.	30.6	D	10.6	A	13.2	B

Table 5-5-1 -Continued-
Freeway Mainline Capacity Analysis – Year 2014 Conditions
Traffic Impact Analysis

Segment/Freeway Name		AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
25	SR-134 WB between the SR-2 Fwy and Figueroa Street.	20.4	C	15.9	B	20.5	C
26	SR-134 EB between the SR-2 Fwy and Figueroa Street.	20.3	C	21.2	C	24.1	C
27	SR-134 WB between the SR-2 Fwy and Glendale Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
28	SR-134 EB between the SR-2 Fwy and Glendale Avenue.	22.2	C	25.4	C	32.7	D
29	SR-134 WB between San Fernando Street and Pacific Ave.	32.0	D	20.4	C	22.1	C
30	SR-134 EB between San Fernando Street and Pacific Ave.	36.8	E	34.7	D	39.7	E
31	SR-134 WB between San Fernando Street and the I-5 Freeway.	29.8	D	21.2	C	52.7	F
32	SR-134 EB between San Fernando Street and the I-5 Freeway.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
33	I-5 SB between the SR-134 Fwy and Western Avenue.	30.1	D	36.7	E	35.3	E
34	I-5 NB between the SR-134 Fwy and Western Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	I-5 NB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	23.0	C	26.2	D	29.6	D
36	I-5 SB between North Hollywood Way and Roscoe Blvd/Glenoaks Blvd.	27.1	D	21.0	C	19.3	C
37	I-5 SB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	I-5 NB between Sheldon Street/Laurel Canyon Blvd and the SR-170 Fwy.	21.0	C	23.5	C	19.3	C
39	I-5 SB between the SR-170 Fwy and Branford Street.	-	F	49.4	F	64.2	F
40	I-5 NB between the SR-170 Fwy and Branford Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
41	I-210WB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
42	I-210EB between the SR-2 Fwy and Montrose Avenue.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
43	I-210 WB between Wheatland Ave and Sunland Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
44	I-210 EB between Wheatland Ave and Sunland Blvd.	19.1	C	11.2	B	15.5	B
45	I-210 WB between Wheatland Ave and Foothill Blvd/Osborne Street.	16.2	B	14.2	B	30.5	D
46	I-210 EB between Wheatland Ave and Foothill Blvd/Osborne Street.	18.2	C	14.1	B	20.8	C
47	I-210 WB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	16.7	B	13.7	B	25.0	C
48	I-210 EB between Foothill Blvd/Osborne Street and the SR-118 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	SR-118WB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	SR-118EB between the I-210 Fwy and Glenoaks Blvd.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 5-5-1 -Continued-
Freeway Mainline Capacity Analysis – Year 2014 Conditions
Traffic Impact Analysis

Segment/Freeway Name		AM		MID-DAY		PM	
		Density	LOS	Density	LOS	Density	LOS
51	SR-118 WB between San Fernando Rd and the I-210 Fwy.	51.3	F	19.9	C	41.4	E
52	SR-118 EB between San Fernando Rd and the I-210 Fwy.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
53	I-5 NB between the SR-118 Fwy and Van Nuys Blvd.	42.4	E	47.5	F	50.0	F
54	I-5 SB between the SR-118 Fwy and Van Nuys Blvd.	27.2	D	19.8	C	22.3	C
55	I-5 NB between Tierra Bella Street and Osborne Street.	47.0	F	53.4	F	54.2	F
56	I-5 SB between Tierra Bella Street and Osborne Street.	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

(1) Density – (pc/mi/ln)
(2) HCM LOS - Highway Capacity Manual Level of Service
(N/D*)- No Data
Source: **Hall & Foreman Inc**

As presented in *Table 5-5-1*, under project conditions some of the freeway segments are expected to continue to operate and acceptable HCM LOS during the AM, MID-DAY, and PM peak hours. Mitigation is recommended for I-210 WB between the SR-134 Fwy and Lake Ave (Haul Routes 2A, 2B, 3, 4A, 4C) anticipated AM peak hour HCM LOS E, I-210 EB between the SR-134 Fwy and Lake Ave (Haul Routes 2A, 2B, 3, 4A, 4C) anticipated AM, MID-DAY, and PM peak hours HCM LOS E, SR-134 EB between San Fernando Street and Pacific Ave (Haul Routes 5B, 6B, 7B, 8A) anticipated AM and PM peak hours HCM LOS E, and I-5 SB between the SR-134 Fwy and Western Avenue anticipated MID-DAY and PM peak hours HCM LOS E.
As identified in existing conditions the following segments are anticipated to continue to operating at a level-of-service E or lower. The identified segments were SR-134 Westbound between San Fernando road and the I-5 Freeway (Haul Routes 5B, 6B, 7B, and 8A) anticipated AM, MID-DAY, and PM peak hours HCM LOS E, I-5 Southbound between SR-170 and Branford (Haul Route 8A) anticipated AM, MID-DAY, and PM peak hours HCM LOS E, SR-118 Westbound Freeway between San Fernando road and the I-210 Freeway (Haul Route 8B) anticipated AM peak hour HCM LOS F and anticipated PM peak hour HCM LOS E, I-5 Northbound between the SR-118 Westbound Freeway and Van Nuys Blvd (Haul Route 8B) anticipated AM peak hour HCM LOS E and anticipated MID-DAY and PM peak hours HCM LOS F, and lastly I-5 Northbound between Tierra Bella Street and Osborne Street (Haul Route 8B) anticipated AM, MID-DAY and PM peak hours HCM LOS F. Mitigation will be required to improve the HCM LOS for these freeway segments. Per CalTrans criteria these segments will need to be identified for roadway improvements to obtain acceptable HCM LOS.

Year 2014 Freeway Ramp HCM Analysis

Freeway ramp analyses was conducted for the 54 on and off-ramps identified utilizing the methods as discussed previously and using the existing geometrics The resulting LOS for the existing conditions of each ramp analyzed is presented in *Table 5-5-2*.

Table 5-5-2
Freeway Ramp Analysis – Year 2014 Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
1	1E, 1G	Berkshire Place and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	20.3	C	10.5	B	14.4	B
2	1E, 1H	Berkshire Place and the Westbound I-210 Freeway On-ramp.(Merge Point)	14.9	B	14.7	B	24.1	C
3	1A, 1C	Berkshire Place and the Eastbound I-210 Freeway On-ramp. (Merge Point)	27.7	C	20.6	C	25.2	C
4	1A, 1D	Berkshire Place and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	23.7	C	22.7	C	31.9	D
5	1F, 1H	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	33.4	D	23.1	C	28.0-	C
6	1F, 1G	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway On-Ramp. (Merge Point)	23.3	C	18.2	B	25.6	C
7	1B, 1C	Windsor Ave/Arroyo Blvd and the Eastbound I-210 Freeway On-Ramp. (Merge Point)	19.1	B	11.8	B	14.2	B
8	1B, 1D	Windsor Ave/Arroyo Blvd and the Westbound I-210 Freeway Off-ramp. (Diverge Point)	11.1	B	5.2	A	13.3	B
9	4A	Southbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline and Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
10	2A, 2B,3	Westbound I-210 Fwy and Eastbound SR-134 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
11	2B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
12	2B	Eastbound SR-134 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
13	4A	Figueroa St/Scholl Canyon Road and the Westbound SR-134 Freeway Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
14	4A	Figueroa St and the Eastbound SR-134 Freeway Eastbound On-ramp. (Merge Point)	30.1	D	28.7	D	32.5	D
15	2A, 3	Eastbound I-210 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline.(Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
16	2A, 3	Westbound I-210 Fwy Transition Ramp to the Westbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
17	2A, 2B, 3,9	Irwindale Ave and the Eastbound I-210 Freeway Off-ramp. (Diverge Point)	0.6	A	0.8	A	2.0	A
18	2A,3	Irwindale Ave and the Westbound loop I-210 Freeway On-ramp. (Merge Point)	20.5	C	18.6	B	21.0	C
19	9	Irwindale Ave and the Westbound slip I-210 Freeway On-ramp. (Merge Point)	22.6	C	20.4	C	22.7	C
20	2B	First Street/Azusa Avenue and the Westbound I-210 Freeway On-ramp. (Merge Point)	23.9	C	19.4	B	25.6	C

Table 5-5-2 -Continued-
Freeway Ramp Analysis – Year 2014 Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
21	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Diverge Point)	12.3	A	18.7	A	11.0	A
22	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	23.9	C	22.8	C	24.3	C
23	2B, 4B,5B, 6B, 7B, 8A	Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline. (Merge Point)	25.1	F	1.2	A	5.6	A
24	2B, 4B,5B, 6B, 7B, 8A	Northbound SR-2 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Diverge Point)	21.0	C	14.7	B	18.9	B
25	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
26	2B, 4B,5B, 6B, 7B, 8A	Westbound and Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
27	2B, 4B	Southbound SR-2 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
28	2B,4B	Westbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	26.7	C	22.4	C	28.0+	D
29	4B	Figueroa Street and the Eastbound SR-134 Fwy Off-ramp. (Diverge Point)	28.7	D	28.3	D	32.1	D
30	4B	Figueroa Street and the Westbound SR-134 Fwy On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
31	5B, 6B, 7B,8A	Southbound SR-2 Fwy Transition Ramp to the Westbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
32	5B, 6B, 7B,8A	Eastbound SR-134 Fwy Transition Ramp to the Northbound SR-2 Fwy mainline. (Diverge Point)	12.1	B	14.9	B	23.8	C
33	5B, 6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
34	5B,6B, 7B,8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
35	5B,6B, 7B,8A	Westbound SR-134 Fwy Transition Ramp to the Northbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
36	5B, 6B, 7B, 8A	Southbound I-5 Fwy Transition Ramp to the Eastbound SR-134 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
37	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
38	5B, 6B, 7B	Roscoe Blvd/Glenoaks Blvd and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
39	8A	Branford Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*

Table 5-5-2 -Continued-
Freeway Ramp Analysis – Year 2014 Conditions
Traffic Impact Analysis

Intersection # / Routes / Name			AM		MID-DAY		PM	
			Density	LOS	Density	LOS	Density	LOS
40	8A	Branford Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
41	5C, 6C, 7C, 8C	Wheatland Avenue and the Westbound I-210 Fwy mainline Off-Ramp. (Diverge Point)	24.5	C	20.9	C	32.4	D
42	5C, 6C, 7C, 8C	Wheatland Avenue and the Eastbound I-210 Fwy mainline On-Ramp. (Merge Point)	25.4	C	20.1	C	25.5	C
43	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Westbound I-210 Fwy mainline Off-ramp. (Diverge Point)	23.1	C	21.0	C	34.8	D
44	5A, 6A, 7A	Foothill Blvd/Osborne Street and the Eastbound I-210 Fwy mainline On-ramp. (Merge Point)	25.1	C	16.8	B	20.7	C
45	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
46	8B	Eastbound SR-118 Fwy Transition Ramp to the Eastbound I-210 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
47	8B	Westbound I-210 Fwy Transition Ramp to the Westbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
48	8B	Eastbound SR-118 Fwy Transition Ramp to the -Eastbound I-210 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
49	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
50	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
51	8B	Westbound SR-118 Fwy Transition Ramp to the Southbound I-5 Fwy mainline. (Merge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
52	8B	Northbound I-5 Fwy Transition Ramp to the Eastbound SR-118 Fwy mainline (Diverge Point)	N/D*	N/D*	N/D*	N/D*	N/D*	N/D*
53	8B	Osborne Street and the Southbound I-5 Fwy mainline On-ramp. (Merge Point)	28.7	F	19.1	B	24.4	C
54	8B	Osborne Street and the Northbound I-5 Fwy mainline Off-ramp. (Diverge Point)	32.1	D	34.8	D	34.9	D

(1) Density – Highway Capacity Manual (pc/mi/ln)
(2) LOS - Highway Capacity Manual Level of Service
(N/D*)- No Data

Source: **Hall & Foreman Inc**

As presented in *Table 5-5-2*, under the project conditions year 2014 most ramps are anticipated to continue to operate at an acceptable HCM LOS throughout the day. Mitigation will be required for the Westbound I-210 Fwy Transition Ramp to the Southbound SR-2 Fwy mainline (Routes 4B, 5B, 6B, 7B, 8A) anticipated AM peak hour HCM LOS F, and as previously noted the section of Osborne Street and the Southbound I-5 Freeway (Haul Route 8B) anticipated AM peak hour HCM LOS F.

6. PROJECT IMPACTS, MITIGATION, AND SUMMARY

This study has examined and identified regional impacts related to the Devil's Gate Reservoir Sediment Removal and Management Project, and identified traffic impacts due to the expected increase of truck traffic generated along proposed routes. Route recommendations considered access and traffic mitigation in the impacted intersections, freeway segments, and ramps.

The Devil's Gate Dam and Reservoir site is located to the north east of the I-210 Freeway on Oak Grove Drive between Berkshire Place and the Foothill Freeway Overpass. Access to the project site will be obtained from Oak Grove Drive. Due to the project site vicinity to residential communities north, south, and east of the site further attention to route designation was required. The sediment and organic materials removed from the dam is proposed to be transported to eight disposal sites within the county of Los Angeles.

Twenty-six (26) haul routes were proposed and evaluated for the transportation of the sediment and organic materials to the proposed disposal sites. Along the 26 haul routes 51 intersections were identified for analysis. Twenty-eight (28) freeway segments along the I-210 Freeway, I-5 Freeway, SR-2 Freeway, and SR-134 Freeway and fifty-four (54) on and off-ramps within those freeway segments were also identified for analysis.

The hours of operation are 7 AM to 7 PM Monday through Friday and 8 AM to 5 PM on Saturday. The operational period is divided into three peak hour periods. The AM peak period consists of the hours 7 AM to 10 AM. The MIDDAY peak period consists of the hours 10 AM to 4 PM. The PM peak period consists of the hours 4 PM to 7 PM. Removal of sediment and organic materials off-site is expected to take place between these hours.

The proposed Haul Trucks are Double Dump Trucks estimated to haul 18 cubic yards of sediment. The trucks are anticipated to haul approximately 10.8 thousand cubic yards per day. During the life of the project approximately 4 million cubic yards of sediment and organic materials will be removed by 50 trucks per hour.

This traffic study analyzed the existing conditions, the existing conditions with project trips (existing + project conditions), and the year 2014 project conditions for the identified study intersections, freeway segments, and ramps. Based on the results of the traffic analysis recommendations to maintain acceptable operating conditions at the intersections, freeway segments, and ramps were made.

Analysis, Scope, and Methodology

This traffic study report consists of the following analysis, scope, and methodologies listed below:

- Peak hour Synchro analysis of the existing, existing plus project, and year 2014 project conditions of the study intersections per the Highway Capacity Manual (HCM) methodology.

- Peak hour HCM analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the freeway segments and ramps in the study areas.

- Peak hour HCM weaving analysis of the existing conditions, existing plus project conditions, and year 2014 project conditions for the study areas.

6.1 Intersection Impacts

This traffic study analyzed 52 intersections in order to determine the optimal truck haul routes which would provide the least traffic impacts. From the traffic analysis it was determined that the increase in truck trips does not significantly impact the study intersections.

This study verified that most of the intersections associated with the twenty five routes are expected to continue to operate at an acceptable level of service (LOS) D or better during the AM, Mid-day, and PM peak periods. There are some intersections that would require traffic mitigations as a result of route and peak hour selection. The intersections with unacceptable LOS E or lower are provided here identifying the condition when the intersection operates at an unacceptable level of service.

Existing Conditions

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project two existing condition intersections are at an unacceptable LOS E. These intersections are as follows:

Intersection Impacts – Existing Plus Project

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM	E
51.	Branford Street and San Fernando Road	8C	PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Existing Plus Project

The project conditions will impact two additional intersections. These intersections are Berkshire Place and I-210 Freeway Eastbound Ramps and Figueroa St and SR-134 WB Ramps. Intersections identified during existing conditions are anticipated to continue to operate at LOS E or lower. These intersections are provided below:

Intersection Impacts – Existing Plus Project

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1A/1D/1E/1G	AM	E
21.	Figueroa St and SR-134 WB Ramps	4A/4B	AM/PM	E
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM	F
51.	Branford Street and San Fernando Road	8C	PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

The Year 2014 project conditions will impact 6 additional intersections. The level of service issues are anticipated to occur predominately during the AM and PM peak hours. The exception to this is in route 2B for Site 2, Manning's pit at the intersection of Arrow Hwy and Azusa Ave is anticipated operate and an unacceptable LOS E throughout the day. Intersections identified during existing conditions and project conditions are anticipated to continue to operate at LOS E or lower. These intersections are expected to be minimally impacted by the project. Two intersections are anticipated to be noticeably impacted. The intersection of Berkshire Place and I-210 Freeway Eastbound Ramps of Routes 1A and 1D is anticipated to lower to an LOS F during the AM peak hour. Also the intersection of Figueroa Street and SR-134 Westbound Ramps of route 4B is anticipated to lower to an LOS F during the PM peak hour. These intersections are provided below:

Intersection Impacts – Project Year 2014

	INTERSECTIONS	HAUL ROUTE	PEAK HOUR	LOS(1)
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1A/1D	AM	F
1.	Berkshire Place and I-210 Freeway Eastbound Ramps	1E/1G	AM	E
14.	Arrow Hwy and Lark Ellen Ave	2B	AM and PM	E
16.	Azusa Ave and Arrow Hwy	2B	AM, Mid-day, PM	E
17.	Azusa Ave and Gladstone St	2B	AM	E
20.	First St and Alameda St/I-210 Fwy WB Ramps	2B	AM	E
21.	Figueroa St and SR-134 WB Ramps	4A	AM/PM	E
21.	Figueroa St and SR-134 WB Ramps	4B	AM/PM	E/F
27.	Glenoaks Blvd and Osborne Street	5A/6A/7A	AM/PM	F/E
43.	Osborne Street and Laurel Canyon Blvd	8B	PM	E
50.	Sheldon Street and San Fernando Road	8C	PM	E
51.	Branford Street and San Fernando Road	8C	PM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

6.2 Freeway Impacts

This traffic study analyzed 28 freeway segments to determine the mainline Level-of-Service (LOS). From the traffic analysis it was determined that the increase in truck trips do not cause any major traffic impacts at the identified freeway segments.

Existing Conditions and Existing Plus Project

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project five existing condition freeway segments are at an unacceptable LOS E. The freeway segments are at an unacceptable LOS E predominately during the AM and PM peak hours. The inclusion of the project provides no additional unacceptable freeway segments. These freeway segments are as follows:

Freeway Segment Impacts – Existing Conditions

	FREEWAY SEGMENT	HAUL ROUTE	PEAK HOUR	LOS(1)
31	WB SR-134 between San Fernando Rd and the I-5 Fwy	5B, 6B, 7B, 8A	PM	E
39	SB I-5 between SR-170 and Branford St	8A	AM, PM	F
39	SB I-5 between SR-170 and Branford St	8A	Mid-day	E
51	WB SR-118 between San Fernando Rd and the I-210 Fwy	8B	AM	E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	Mid-day, PM	E
55	NB I-5 between Tierra Bella St and Osborne St	8B	AM, Mid-day, PM	E

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

Anticipated impact the freeway segments for Year 2014 are WB I-210 between the SR-134 Fwy and Lake Ave, EB I-210 between the SR-134 Fwy and Lake Ave, EB SR-134 between the Pacific Ave and Concord St, and SB I-5 between the SR-134 Fwy and Western Ave. Freeway segments identified in existing conditions are anticipated to continue to operate at LOS E or lower. Year 2014 freeway segments with an anticipated LOS E or lower are as follows:

Freeway Segment Impacts – Project Year 2014

	FREEWAY SEGMENT	HAUL ROUTE	PEAK HOUR	LOS(1)
11	WB I-210 between the SR-134 Fwy and Lake Ave	2A, 2B, 3	AM	E
12	EB I-210 between the SR-134 Fwy and Lake Ave	2A, 2B, 3	AM, Mid-day, PM	E
30	EB SR-134 between the Pacific Ave and Concord St	5B, 6B, 7B, 8A	AM, PM	E
31	WB SR-134 between San Fernando Rd and the I-5 Fwy	5B, 6B, 7B, 8A	PM	F
33	SB I-5 between the SR-134 Fwy and Western Ave	5B, 6B, 7B, 8A	Mid-day, PM	E
39	SB I-5 between SR-170 and Branford St	8A	AM, Mid-day, PM	F
51	WB SR-118 between San Fernando Rd and the I-210 Fwy	8B	AM/PM	F/E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	AM	E
53	NB I-5 between the SR-118 and Van Nuys Blvd	8B	Mid-day, PM	F
55	NB I-5 between Tierra Bella St and Osborne St	8B	AM, Mid-day, PM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

6.3 Ramp Impacts

This traffic study analyzed 54 on and off-ramps to determine the Level-of-Service (LOS) of the utilized ramps with the study area. From the traffic analysis it was determined that the increase in truck trips does not cause any major traffic impacts to the identified ramps. The LOS of the ramps remained acceptable when the expected increase in truck trips were applied to the ramps being studied.

Existing Conditions and Existing Plus Project

Prior to the initiation of the Devil's Gate Reservoir Sediment Removal and Management Project one ramp is at an unacceptable LOS E during existing condition. The inclusion of the project does not noticeably impact the ramps. The project condition provides no additional unacceptable ramps. The ramp is as follows:

Freeway Ramp Impacts – Existing Conditions

	RAMP	HAUL ROUTE	PEAK HOUR	LOS (1)
52	Osborne St and the SB I-5 Fwy mainline off-ramp	8B	AM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

Project Year 2014

The Year 2014 project conditions will negatively impact one additional ramp. The ramp identified during existing conditions is anticipated to continue to operate at LOS F. The ramps anticipated to operate at an unacceptable level are provided below:

Freeway Ramp Impacts – Project Year 2014

	RAMP	HAUL ROUTE	PEAK HOUR	LOS (1)
22	WB I-210 Fwy Transition Ramp to the SB SR-2 Fwy mainline	5B, 6B, 7B, 8A	AM	F
52	Osborne St and the SB I-5 Fwy mainline off-ramp	8B	AM	F

(1) LOS–Level of Service
Source: **Hall & Foreman, Inc**

6.4 Route Summary and Mitigations/Potential Impact Reduction Measures

The Preferred and Alternative Routes include the intersections, freeway segments, and freeway ramps operating and anticipated to continue to operate at an acceptable LOS providing the shortest distance, least traffic impacts, and shortest delay time while maintaining acceptable operating conditions.

The Haul Trucks are estimated to haul 18 cubic yards of sediment and organic materials. Utilizing the proposed haul route hours of operation and 50 trucks per hour an approximate thousand cubic yards of sediment and organic materials will be removed from the dam per day.

6.4.1 Devil's Gate Dam Area

The reservoir requires two preferred routes. A route will accommodate trucks outbound to the deposit sites south and east of the reservoir, Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), Scholl Canyon Landfill (Site 4). The other route will accommodate trucks outbound to the deposit sites west of the reservoir, Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8).

Devil's Gate Dam Area (Site 1): Haul Route 1A

Haul Route 1A is an optional route to the disposal sites south and east of Devil's Gate Dam and Reservoir. The sites east of Devil's Gate Dam and Reservoir are Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Materials - Irwindale Site (Site 9). The site south of Devil's Gate Dam and Reservoir is Scholl Canyon Landfill (Site 4). The use of Haul Route 1A requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1A is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1B

Haul Route 1B is the alternative route to the disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4).

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1B is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1C

Haul Route 1C is an optional route for disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4). The use of Haul Route 1C requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1C is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1D

Haul Route 1D is the preferred route for disposal sites south and east of Devil's Gate Dam and Reservoir. These sites are Manning's Pit (Site 2), Waste Management (Site 3), Vulcan Materials - Irwindale Site (Site 9), and Scholl Canyon Landfill (Site 4).

AM Mitigations and Potential Impact Reduction Measures

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1D is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir driveway does not require potential impact reduction measures.

Devil's Gate Dam Area (Site 1): Haul Route 1E

Haul Route 1E is an optional route for disposal sites west of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1E requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1E is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1F

Haul Route 1F is an alternative route for disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1F requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1F is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1G

Haul Route 1G is an optional route to the disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8). The use of Haul Route 1G requires that the median along the frontage of the Devils Gate Dam and Reservoir be restriped to a Two Way Left Turn Lane (TWLTL). This requires the approval of the City of Pasadena.

AM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Berkshire Place (EW) and I-210 Freeway Eastbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak period. The optional measures of this intersection are beyond of the scope of the project.

MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1G is anticipated to continue to operate at an LOS C or better for all utilized intersections during the MID-DAY and PM peak periods.

An optional measure is to provide applicable construction signing at the Devil's Gate Dam and Reservoir driveway.

Devil's Gate Dam Area (Site 1): Haul Route 1H

Haul Route 1H is the preferred route for disposal sites east of Devil's Gate Dam and Reservoir. These sites are Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8).

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 1H is anticipated to continue to operate at an LOS C or better for all utilized intersections throughout the day without the need for potential impact reduction measures. The Devil's Gate Dam and Reservoir entrance and access to Oak Grove Drive Oak Grove Drive for Route 1H to access the Devil's Gate Dam and Reservoir does not require potential impact reduction measures.

6.4.2 Waste Management, Manning's Pit, and Vulcan Materials - Irwindale Site Area

The Manning's Pit (Site 2), Waste Management (Site 3), and Vulcan Material (Site 9) are the disposal sites east of Devil's Gate Dam and Reservoir.

Manning's Pit (Site 2): Haul Route 2A

Haul Route 2A is the preferred route for Manning's Pit, east of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 2A is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods:

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Manning's Pit (Site 2): Haul Route 2B

Haul Route 2B is the alternate route for Manning's Pit, a disposal site east of Devil's Gate Dam and Reservoir.

AM, MID-DAY, and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to operate at an unacceptable LOS at Arrow Hwy and Lark Ellen Ave, Azusa Ave and Arrow Hwy, Azusa Ave and Gladstone Street, and First Street and Alameda Street/I-210 Freeway Westbound Ramps during the AM and PM peak periods.

The Haul Route is anticipated to operate at an unacceptable LOS at Arrow Hwy and Lark Ellen Ave, Azusa Ave and Arrow Hwy, Azusa Ave and Gladstone Street, and First Street and Alameda Street/I-210 Freeway Westbound Ramps during the AM and PM peak periods.

Arrow Hwy (EW) and Lark Ellen Ave (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Azusa Ave (NS) and Arrow Hwy (EW): The Intersection is anticipated to operate at an unacceptable LOS throughout the day. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS throughout the day.

Azusa Ave (NS) and Gladstone Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

First Street (EW) and Alameda Street/I-210 Freeway Westbound Ramps (NS): The Intersection is anticipated to operate at an unacceptable LOS during the AM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM peak period.

An optional measure is to provide applicable construction signing at the Manning's Pit driveway.

Waste Management (Site 3): Haul Route 3

Haul Route 3 is the preferred route for Waste Management, east of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 3 is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods without the need for potential impact reduction measures. The Waste Management driveway is at the signalized study intersection of Vincent Avenue and Gladstone Street that does not require potential impact reduction measures.

Vulcan Materials (Site 9): Haul Route 9

Haul Route 9 is the preferred route for Vulcan Material – Irwindale Site, east of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 9 is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM, and MID-DAY peak periods without the need for potential impact reduction measures. The Vulcan Materials driveway is at the signalized study intersection of Irwindale Avenue and Foothill Boulevard that does not require potential impact reduction measures.

PM Mitigations and Potential Impact Reduction Measures

Irwindale Avenue (NS) and Foothill Boulevard (EW) (Vulcan Materials driveway): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures of this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

6.4.3 Scholl Canyon Landfill (Site 4)

The Scholl Canyon Landfill (Site 4) is the green waste disposal site east of Devil's Gate Dam and Reservoir.

Scholl Canyon Landfill Haul (Site 4): Route 4A

Haul Route 4A is the Scholl Canyon Landfill preferred route, east of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 4A utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures. The Scholl Canyon Landfill driveway does not require potential impact reduction measures during the MID-DAY peak period.

AM and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an acceptable LOS for all utilized intersections during the AM and PM peak periods with the following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

Scholl Canyon Landfill Haul (Site 4): Haul Route 4B

Haul Route 4B is an optional route for the green waste disposal site Scholl Canyon Landfill, east of Devil's Gate Dam and Reservoir. The Scholl Canyon Landfill driveway does not require potential impact reduction measures.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route utilized intersections are anticipated to continue to operate at an LOS B or better during the MID-DAY peak period without the need for potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an acceptable LOS for all utilized intersections during the AM and PM peak periods with the following potential impact reduction measures will improve the utilized intersections to an acceptable LOS during the AM and PM peak periods:

1. Figueroa St/Scholl Canyon Road (NS) and SR-134 Freeway Westbound Ramps (EW): Restripe the westbound right turn lane to a shared left-right turn lane and the northbound through lane to a shared through-right turn lane. The northbound direction will include a shared through-right turn lane and a right turn lane. The southbound direction will include a shared through-left turn lane and a through turn lane. The westbound direction will include a left turn lane and a shared left-right turn lane. This optional measure requires the approval of the City of Los Angeles and Caltrans.

6.4.4 Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8)

The Sheldon Pit (Site 5), Sun Valley Fill Site (Site 6), Bradley Landfill (Site 7), and Boulevard Pit (Site 8) are the disposal site west of Devil's Gate Dam and Reservoir.
Sheldon Pit (Site 5): Haul Route 5A

Haul Route 5A is the preferred route for Sheldon Pit, west of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the MID-DAY peak period
An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

AM and PM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Sheldon Pit (Site 5): Haul Route 5B

Haul Route 5B is an optional route for Sheldon Pit, a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 5B is anticipated to continue to operate at an LOS C or better for all utilized intersections during the AM, MID-DAY, and PM peak periods.

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sheldon Pit (Site 5): Haul Route 5C

Haul Route 5C is the alternate route for Sheldon Pit, a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 5C utilized intersections are anticipated to continue to operate at an LOS C or better throughout the day:

An optional measure is to provide applicable construction signing at the Sheldon Pit driveway.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6A

Haul Route 6A is the preferred route for Sun Valley Fill Site, west of Devil's Gate Dam and Reservoir.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 6A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

The Sun Valley Fill Site driveway does not require potential impact reduction measures during the AM and PM peak periods.

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6B

Haul Route 6B is an optional route for Sun Valley Fill Site, a disposal site west of Devil's Gate Dam and Reservoir. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

MID-DAY Mitigation and Potential Impact Reduction Measures

The Haul Route 6B utilized intersections are anticipated to continue to operate at an acceptable LOS during the MID-DAY peak period without the need for potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project.

Sun Valley Fill Site (Glenoaks Landfill/Cal-Mat) (Site 6): Haul Route 6C

Haul Route 6C is the alternate route for Sun Valley Fill Site, a disposal site west of Devil's Gate Dam and Reservoir. The Sun Valley Fill Site driveway does not require potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 6C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day without the need for potential impact reduction measures.

Bradley Landfill (Site 7): Haul Route 7A

Haul Route 7A is the Bradley Landfill is the preferred route, west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require potential impact reduction measures.

MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 7A utilized intersections are anticipated to continue to operate at an LOS D or better during the MID-DAY peak period without the need for potential impact reduction measures.

AM and PM Mitigations and Potential Impact Reduction Measures

Glenoaks Blvd (NS) and Osborne Street (EW): The Intersection is anticipated to operate at an unacceptable LOS during the AM and PM peak hours. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the AM and PM peak periods.

Bradley Landfill (Site 7): Haul Route 7B

Haul Route 7B is an optional route for Bradley Landfill, a disposal site west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require mitigation.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 7B is anticipated to continue to operate at an LOS C or better throughout the day without the need for potential impact reduction measures.

Bradley Landfill (Site 7): Haul Route 7C

Haul Route 7C is the alternate route for Bradley Landfill, a disposal site west of Devil's Gate Dam and Reservoir. The Bradley Landfill driveway does not require potential impact reduction measures.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 7C utilized intersections are anticipated to continue to operate at an LOS D or better throughout the day without the need for potential impact reduction measures.

Boulevard Pit (Site 8): Haul Route 8A

Haul Route 8A is an optional route for a disposal site west of Devil's Gate Dam and Reservoir.

AM, MID-DAY and PM Mitigations and Potential Impact Reduction Measures

The Haul Route 8A is anticipated to continue to operate at an acceptable LOS for all utilized intersections throughout the day.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Boulevard Pit (Site 8): Haul Route 8B

Haul Route 8B is an alternative route for a disposal site west of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route 8B is anticipated to continue to operate at an acceptable LOS during the AM and MID-DAY peak periods

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

PM Mitigations and Potential Impact Reduction Measures

Osborne Street (EW) and Laurel Canyon Blvd (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Boulevard Pit (Site 8): Haul Route 8C

Haul Route 8C is the Boulevard Pit preferred route west of Devil's Gate Dam and Reservoir.

AM and MID-DAY Mitigations and Potential Impact Reduction Measures

The Haul Route is anticipated to continue to operate at an LOS D or better for all utilized intersections during the AM and MID-DAY peak periods

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

PM Mitigations and Potential Impact Reduction Measures

An optional measure is to provide applicable construction signing at the Boulevard Pit driveway.

Sheldon Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

Branford Street (EW) and San Fernando Road (NS): The Intersection is anticipated to operate at an unacceptable LOS during the PM peak hour. The optional measures for this intersection are beyond of the scope of the project. The Haul Route is, therefore, anticipated to continue to operate at an unacceptable LOS during the PM peak period.

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APPENDIX B: INTERSECTION CAPACITY ANALYSIS WORKSHEETS

Devil's Gate Reservoir Sediment Removal and Management Project

Los Angeles County, California

TRAFFIC IMPACT ANALYSIS

Prepared by:

Hall & Foreman, Inc.

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Victorville, CA 92392
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September 12, 2013

TUSTIN

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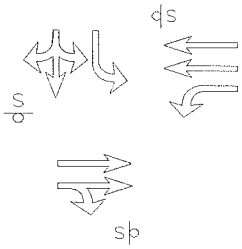
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	JV	9-Sep-13	VV.110264.0000	1 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	0	0%	**0**	0	0	0
EB THRU	250	0%	**0**	250	25	275
EB RIGHT	125	5%	**0**	125	10	135
WB LEFT	140	30%	**55**	195	20	215
WB THRU	120	5%	**0**	120	10	130
WB RIGHT	0	0%	**0**	0	0	0
I-210 FWY EB RAMPS						
NB LEFT	0	0%	**0**	0	0	0
NB THRU	0	0%	**0**	0	0	0
NB RIGHT	0	0%	**0**	0	0	0
SB LEFT	325	5%	**0**	325	30	355
SB THRU	5	0%	**0**	5	5	10
SB RIGHT	85	5%	**0**	85	5	90
TOTALS	**1050**		**55**	**1105**	**105**	**1210**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	2 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	0	0%	**0**	0	0	0
EB THRU	250	0%	**0**	250	25	275
EB RIGHT	125	5%	**0**	125	10	135
WB LEFT	140	5%	**0**	140	15	155
WB THRU	120	5%	**0**	120	10	130
WB RIGHT	0	0%	**0**	0	0	0
I-210 FWY EB RAMPS						
NB LEFT	0	0%	**0**	0	0	0
NB THRU	0	0%	**0**	0	0	0
NB RIGHT	0	0%	**0**	0	0	0
SB LEFT	325	18%	**55**	380	35	415
SB THRU	5	0%	**0**	5	5	10
SB RIGHT	85	5%	**0**	85	5	90
TOTALS	**1050**		**55**	**1105**	**105**	**1210**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	0	0%	**0**	0	0	0
EB THRU	100	5%	**0**	100	10	110
EB RIGHT	55	5%	**0**	55	5	60
WB LEFT	80	42%	**55**	135	10	145
WB THRU	110	5%	**0**	110	10	120
WB RIGHT	0	0%	**0**	0	0	0
I-210 FWY EB RAMPS						
NB LEFT	0	0%	**0**	0	0	0
NB THRU	0	0%	**0**	0	0	0
NB RIGHT	0	0%	**0**	0	0	0
SB LEFT	105	5%	**0**	105	10	115
SB THRU	5	0%	**0**	5	5	10
SB RIGHT	45	5%	**0**	45	5	50
TOTALS	**500**		**55**	**555**	**55**	**610**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	4 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	
SCENERIO #							
BERKSHIRE PLACE							
EB LEFT	0	0%	**0**	0	0	0	
EB THRU	100	5%	**0**	100	10	110	#
EB RIGHT	55	5%	**0**	55	5	60	#
WB LEFT	80	5%	**0**	80	5	85	#
WB THRU	110	5%	**0**	110	10	120	#
WB RIGHT	0	0%	**0**	0	0	0	
I-210 FWY EB RAMPS							
NB LEFT	0	0%	**0**	0	0	0	
NB THRU	0	0%	**0**	0	0	0	
NB RIGHT	0	0%	**0**	0	0	0	
SB LEFT	105	36%	**55**	160	15	175	#
SB THRU	5	0%	**0**	5	5	10	#
SB RIGHT	45	5%	**0**	45	5	50	#
TOTALS	**500**		**55**	**555**	**55**	**610**	

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	5 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	
SCENERIO #							
BERKSHIRE PLACE							
EB LEFT	0	0%	**0**	0	0	0	
EB THRU	125	5%	**0**	125	10	135	#
EB RIGHT	80	5%	**0**	80	5	85	#
WB LEFT	205	22%	**55**	260	25	285	#
WB THRU	165	5%	**0**	165	15	180	#
WB RIGHT	0	0%	**0**	0	0	0	
I-210 FWY EB RAMPS							
NB LEFT	0	0%	**0**	0	0	0	
NB THRU	0	0%	**0**	0	0	0	
NB RIGHT	0	0%	**0**	0	0	0	
SB LEFT	205	5%	**0**	205	20	225	#
SB THRU	5	0%	**0**	5	5	10	#
SB RIGHT	60	5%	**0**	60	5	65	
TOTALS	**845**		**55**	**900**	**85**	**985**	

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	
SCENERIO #							
BERKSHIRE PLACE							
EB LEFT	0	0%	**0**	0	0	0	
EB THRU	125	5%	**0**	125	10	135	#
EB RIGHT	80	5%	**0**	80	5	85	#
WB LEFT	205	5%	**0**	205	20	225	#
WB THRU	165	5%	**0**	165	15	180	#
WB RIGHT	0	0%	**0**	0	0	0	
I-210 FWY EB RAMPS							
NB LEFT	0	0%	**0**	0	0	0	
NB THRU	0	0%	**0**	0	0	0	
NB RIGHT	0	0%	**0**	0	0	0	
SB LEFT	205	23%	**55**	260	25	285	#
SB THRU	5	0%	**0**	5	5	10	c
SB RIGHT	60	5%	**0**	60	5	65	
TOTALS	**845**		**55**	**900**	**85**	**985**	

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	0	0%		0	0	0
EB THRU	80	5%		80	5	85
EB RIGHT	70	0%		70	5	75
WB LEFT	335	17%	**55**	390	35	425
WB THRU	160	0%		160	15	175
WB RIGHT	0	0%		0	0	0
I-210 FWY EB RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	165	0%		165	15	180
SB THRU	5	0%		5	5	10
SB RIGHT	90	0%		90	10	100
TOTALS	**905**		**55**	**960**	**90**	**1050**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	0	0%	**0**	0	0	0
EB THRU	80	5%	**0**	80	5	85
EB RIGHT	70	0%	**0**	70	5	75
WB LEFT	335	5%	**0**	335	30	365
WB THRU	160	0%	**0**	160	15	175
WB RIGHT	0	0%	**0**	0	0	0
I-210 FWY EB RAMPS						
NB LEFT	0	0%	**0**	0	0	0
NB THRU	0	0%	**0**	0	0	0
NB RIGHT	0	0%	**0**	0	0	0
SB LEFT	165	23%	**55**	220	20	240
SB THRU	5	0%	**0**	5	5	10
SB RIGHT	90	0%	**0**	90	10	100
TOTALS	**905**		**55**	**960**	**90**	**1050**

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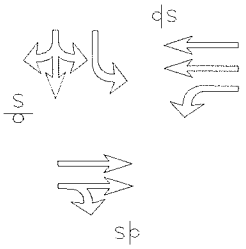
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	PCE EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	250	0	0	250	**0**	250	25	275
EB RIGHT	126	1	3	130	**0**	130	10	140
WB LEFT	134	4	12	145	**165**	310	30	340
WB THRU	115	3	9	125	**0**	125	10	135
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	324	3	9	335	**0**	335	30	365
SB THRU	4	0	0	5	**0**	5	5	10
SB RIGHT	82	3	9	90	**0**	90	10	100
TOTALS	**1035**				**165**	**1245**	**120**	**1365**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	2 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	250	0	0	250	**0**	250	25	275
EB RIGHT	126	1	3	130	**0**	130	10	140
WB LEFT	134	4	12	145	**0**	145	15	160
WB THRU	115	3	9	125	**0**	125	10	135
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	324	3	9	335	**140**	475	45	520
SB THRU	4	0	0	5	**0**	5	5	10
SB RIGHT	82	3	9	90	**0**	90	10	100
TOTALS	**1035**				**140**	**1220**	**120**	**1340**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	ROUNDED PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	98	3	9	105	**0**	105	10	115
EB RIGHT	56	1	3	60	**0**	60	5	65
WB LEFT	79	3	9	90	**165**	255	25	280
WB THRU	107	2	6	115	**0**	115	10	125
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	104	3	9	115	**0**	115	10	125
SB THRU	1	0	0	5	**0**	5	5	10
SB RIGHT	41	3	9	50	**0**	50	5	55
TOTALS	**486**				**165**	**705**	**70**	**775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	98	3	9	105	**0**	105	10	115
EB RIGHT	56	1	3	60	**0**	60	5	65
WB LEFT	79	3	9	90	**0**	90	10	100
WB THRU	107	2	6	115	**0**	115	10	125
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	104	3	9	115	**140**	255	25	280
SB THRU	1	0	0	5	**0**	5	5	10
SB RIGHT	41	3	9	50	**0**	50	5	55
TOTALS	**486**					**680**	**70**	**750**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	5 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	125	6	19	145	**0**	145	15	160
EB RIGHT	80	4	12	90	**0**	90	10	100
WB LEFT	205	10	31	235	**165**	400	35	435
WB THRU	165	8	25	190	**0**	190	15	205
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	205	10	31	235	**0**	235	20	255
SB THRU	5	0	1	5	**0**	5	5	10
SB RIGHT	60	3	9	70	**0**	70	5	75
TOTALS	**845**				**165**	**1135**	**105**	**1240**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	6 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	125	6	19	145	**0**	145	15	160
EB RIGHT	80	4	12	90	**0**	90	10	100
WB LEFT	205	10	31	235	**0**	235	20	255
WB THRU	165	8	25	190	**0**	190	15	205
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	205	10	31	235	**140**	236	20	256
SB THRU	5	0	1	5	**0**	6	5	11
SB RIGHT	60	3	9	70	**0**	69	5	74
TOTALS	**845**				**140**	**971**	**90**	**1061**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1A, 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	78	3	9	85	**0**	85	5	90
EB RIGHT	70	0	0	70	**0**	70	5	75
WB LEFT	333	1	3	335	**165**	500	45	545
WB THRU	160	0	0	160	**0**	160	15	175
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	163	0	0	165	**0**	165	15	180
SB THRU	1	0	0	5	**0**	5	5	10
SB RIGHT	89	0	0	90	**0**	90	10	100
TOTALS	**894**				**165**	**1075**	**100**	**1175**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 8

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY EB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 1
ROUTE 1E, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	78	3	9	85	**0**	85	5	90
EB RIGHT	70	0	0	70	**0**	70	5	75
WB LEFT	333	1	3	335	**0**	335	30	365
WB THRU	160	0	0	160	**0**	160	15	175
WB RIGHT	0	0	0	0	**0**	0	0	0
I-210 FWY EB RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	163	0	0	165	**140**	305	25	330
SB THRU	1	0	0	5	**0**	5	5	10
SB RIGHT	89	0	0	90	**0**	90	10	100
TOTALS	**894**				**140**	**1050**	**95**	**1145**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 07:30AM

Birkshire Place (WB)
NORTH LEG

TOTAL: 256

TT = 5
TT% = 5/256 = 1.95% ≈ 2%

	Rt	Thru	Lt	
		118 (120)	138 (140)	Total
		39	65	1st
		42	34	2nd
		21	15	3rd
		16	24	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
327 (325)	102	76	75	74	Lt
4 (5)	1	0	2	1	Thru
85	15	25	11	34	Rt

WEST LEG TOTAL: 416
EB 210 Fwy

TT = 6
TT = 6/416 = 1.44% ≈ 1%

	Lt	Thru	Rt
1st		137	55
2nd		86	38
3rd		16	16
4th		11	18
Total		250	127 (125)

SOUTH LEG
Birkshire Place (EB)

TOTAL: 377

TT = 1
TT% = 1/377 = 0.27% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.62
SOUTH LEG = 0.49
EAST LEG =
WEST LEG = 0.88

ALL LEGS = 0.63

HOUR TOTAL: 1,049

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt	
		119	137	Total
		23	18	1st
		15	20	2nd
		39	65	3rd
		42	34	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
220	14	28	102	76	Lt
4	0	3	1	0	Thru
63	11	12	15	25	Rt

	Lt	Thru	Rt
1st		34	24
2nd		54	26
3rd		137	55
4th		86	38
Total		311	143

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt	
Total		71	99	
1st		21	15	
2nd		16	24	
3rd		19	34	
4th		15	26	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
278	75	74	69	60	Lt
3	2	1	0	0	Thru
76	11	34	15	16	Rt

	Lt	Thru	Rt
1st		16	16
2nd		11	18
3rd		14	22
4th		10	20
Total		51	76

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 EB RAMPS 05-31-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
0	20	17	0	3	0	0	0	0	0	0	1	41
0	15	20	0	0	0	0	0	0	0	0	0	35
0	37	65	0	2	0	0	0	0	0	0	0	104
0	41	32	0	1	2	0	0	0	0	0	0	76
0	21	14	0	0	0	0	0	1	0	0	0	36
0	16	23	0	0	1	0	0	0	0	0	0	40
0	18	34	0	1	4 0	0	0	1 0	0	0	0 0	256 53
0	14	25	0	1	1	0	0	0	0	0	0	41
						TT=4+1+0=5						
0	182	230	0	8	4	0	0	1	0	0	1	426
					EB SOUTH LEG							
24	33	0	0	1	0	0	0	0	0	0	0	58
26	54	0	0	0	0	0	0	0	0	0	0	80
54	137	0	1	0	0	0	0	0	0	0	0	192
38	86	0	0	0	0	0	0	0	0	0	0	124
16	16	0	0	0	0	0	0	0	0	0	0	32
18	11	0	0	0	0	0	0	0	0	0	0	29
22	14	0	0	0 1	0	0	0 0	0	0	0 0	0	377 36
20	10	0	0	0	0	0	0	0	0	0	0	30
						TT=1+0+0=1						
218	361	0	1	1	0	0	0	0	0	0	0	581
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					SB WEST LEG							
10	0	14	1	0	0	0	0	0	0	0	0	25
12	3	27	0	0	1	0	0	0	0	0	0	43
15	1	100	0	0	1	0	0	1	0	0	0	118
24	0	76	0	0	0	0	0	0	1	0	0	101
10	2	74	1	0	1	0	0	0	0	0	0	88
33	1	74	1	0	0	0	0	0	0	0	0	109
14	0	69	0	0 4	0	1	0	1 0	0	0	1 0	416 84
16	0	58	0	0	2	0	0	0	0	0	0	76
						TT=4+1+1=6						
134	7	492	3	0	5	1	0	1	1	0	0	644

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 01:00PM

Birkshire Place (WB)
NORTH LEG

TOTAL: 191

TT = 5

TT% = 5/191 = 2.62%
≈ 3%

	Rt	Thru	Lt	
		109 110	82 80	Total
		25	10	1st
		22	23	2nd
		28	24	3rd
		34	25	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th	
	107 105	24	27	27	29	Lt
	5 1	1	0	0	0	Thru
	45 44	16	12	7	9	Rt

WEST LEG TOTAL: 152
EB 210 Fwy

TT = 6

TT = 6/152 = 3.95%
≈ 4%

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.67
EAST LEG =
WEST LEG = 0.93

ALL LEGS = 0.80

TT = 4

TT% = 4/158 = 2.53%
≈ 3%

	Lt	Thru	Rt	
1st		10	13	
2nd		19	13	
3rd		30	14	
4th		42	17	
Total		101 100	57 55	

TOTAL: 158

SOUTH LEG
Birkshire Place (EB)

HOUR TOTAL: 501

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt	
Total		96	63	
1st		28	24	
2nd		22	15	
3rd		28	14	
4th		18	10	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
152	27	44	46	35	Lt
5	1	1	1	2	Thru
43	9	16	5	13	Rt

	Lt	Thru	Rt
1st		26	7
2nd		14	12
3rd		29	12
4th		16	20
Total		85	51

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt	
		109	82	Total
		25	10	1st
		22	23	2nd
		28	24	3rd
		34	25	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
107	24	27	27	29	Lt
1	1	0	0	0	Thru
44	16	12	7	9	Rt

	Lt	Thru	Rt
1st		10	13
2nd		19	13
3rd		30	14
4th		42	17
Total		101	57

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 EB RAMPS 05-31-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
0	27	24	0	1	0	0	0	0	0	0	0	52
0	21	14	0	1	0	0	0	0	0	0	1	37
0	27	13	0	1	1	0	0	0	0	0	0	42
0	17	9	0	1	1	0	0	0	0	0	0	28
0	25	10	0	0	0	0	0	0	0	0	0	35
0	21	21	0	1	2	0	0	0	0	0	0	45
0	28	24	0	0	0	0	0	0	0	0	0	52
0	33	24	0	1	0	0	0	0	0	0	1	59
				4		TT=4+0+1=5		0			1	191
0	199	139	0	6	4	0	0	0	0	0	2	350
						EB SOUTH LEG						
7	24	0	0	2	0	0	0	0	0	0	0	33
12	14	0	0	0	0	0	0	0	0	0	0	26
12	27	0	0	2	0	0	0	0	0	0	0	41
20	16	0	0	0	0	0	0	0	0	0	0	36
13	9	0	0	0	0	0	1	0	0	0	0	23
13	18	0	0	0	0	0	1	0	0	0	0	32
13	29	0	1	0	0	0	1	0	0	0	0	44
17	42	0	0	0	0	0	0	0	0	0	0	59
				1		TT=1+3+0=4		3			0	158
107	179	0	1	4	0	0	3	0	0	0	0	294
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SB WEST LEG						
8	1	26	0	0	1	1	0	0	0	0	0	37
16	1	44	0	0	0	0	0	0	0	0	0	61
5	1	46	0	0	0	0	0	0	0	0	0	52
13	2	33	0	0	2	0	0	0	0	0	0	50
16	1	23	0	0	1	0	0	0	0	0	0	41
9	0	26	1	0	1	2	0	0	0	0	0	39
7	0	27	0	0	0	0	0	0	0	0	0	34
9	0	28	0	0	1	0	0	0	0	0	0	38
				4		TT=4+2+0=6		2			0	152
83	6	253	1	0	6	3	0	0	0	0	0	352

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BERKSHIRE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA CANADA

DATE: 04-10-12

PEAK HOUR: 02:45PM

NORTH LEG (SB)

TOTAL: 370

	Rt	Thru	Lt
Total		167	203
1st		33	24
2nd		67	57
3rd		32	66
4th		35	56

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	205	79	65	39	22
Thru					
Rt	62	11	26	17	8

WEST LEG TOTAL: 267
(EB)

PEAK HOUR FACTORS

NORTH LEG = 0.75
SOUTH LEG = 0.66
EAST LEG =
WEST LEG = 0.73

ALL LEGS = 0.72

	Lt	Thru	Rt
1st		34	23
2nd		51	28
3rd		25	16
4th		17	14
Total		127	81

TOTAL: 208

SOUTH LEG (NB)

HOUR TOTAL: 845

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 02:00PM-03:00PM DATE: 04-10-12

NORTH LEG

	Rt	Thru	Lt	
		92	95	Total
		24	22	1st
		16	25	2nd
		19	24	3rd
		33	24	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
151	32	30	10	79	Lt
					Thru
24	8	5	0	11	Rt

	Lt	Thru	Rt
1st		27	9
2nd		20	11
3rd		30	3
4th		34	23
Total		111	46

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 03:00PM-04:00PM DATE: 04-10-12

NORTH LEG

	Rt	Thru	Lt	
		157	221	Total
		67	57	1st
		32	66	2nd
		35	56	3rd
		23	42	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
162	65	39	22	36	Lt
					Thru
63	26	17	8	12	Rt

	Lt	Thru	Rt
1st		51	28
2nd		25	16
3rd		17	14
4th		25	12
Total		118	70

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 495

TT = 1

TT% = $\frac{1}{495}$ = 0.2 %
≈ 1%

	Rt	Thru	Lt	
		161 (160)	334 (335)	Total
		45	100	1st
		39	87	2nd
		40	95	3rd
		37	52	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 253

EB 210 Fwy

TT = 0

TT% = $\frac{0}{253}$ = 0 %
≈ 1%

	Total	1st	2nd	3rd	4th	
	163 (165)	32	37	56	38	Lt
	1 (5)	0	0	0	1	Thru
	89 (90)	24	24	24	17	Rt

SOUTH LEG

	Lt	Thru	Rt
1st		13	12
2nd		11	11
3rd		27	19
4th		30	28
Total		81 (80)	70

TOTAL: 151

TT = 3

TT% = $\frac{3}{151}$ = 1.99 %
≈ 2%

PEAK HOUR FACTORS

NORTH LEG = 0.85
SOUTH LEG = 0.65
EAST LEG =
WEST LEG = 0.79

ALL LEGS = 0.86

HOUR TOTAL: 899

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt	
		108	240	Total
		20	69	1st
		31	56	2nd
		33	63	3rd
		24	52	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
100	26	21	28	25	Lt
0	0	0	0	0	Thru
56	6	14	12	24	Rt

	Lt	Thru	Rt
1st		21	18
2nd		15	20
3rd		22	22
4th		21	24
Total		79	84

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt	
		161	334	Total
		45	100	1st
		39	87	2nd
		40	95	3rd
		37	52	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
163	32	37	56	38	Lt
1	0	0	0	1	Thru
89	24	24	24	17	Rt

	Lt	Thru	Rt
1st		13	12
2nd		11	11
3rd		27	19
4th		30	28
Total		81	70

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 EB RAMPS 05-31-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
					WB NORTH LEG							
0	20	68	0	0	1	0	0	0	0	0	0	89
0	31	56	0	0	0	0	0	0	0	0	0	87
0	33	62	0	0	1	0	0	0	0	0	0	96
0	24	52	0	0	0	0	0	0	0	0	0	76
0	45	100	0	0	0	0	0	0	0	0	0	145
0	39	87	0	0	0	0	0	0	0	0	0	126
0	40	94	0	0	1	0	0	0	0	0	0	135
0	37	52	0	0	0	0	0	0	0	0	0	89
				1		TT=1+0+0=1		0			0	
0	269	571	0	0	3	0	0	0	0	0	0	843
					EB SOUTH LEG							
18	20	0	0	0	0	0	1	0	0	0	0	39
19	14	0	1	1	0	0	0	0	0	0	0	35
22	22	0	0	0	0	0	0	0	0	0	0	44
24	21	0	0	0	0	0	0	0	0	0	0	45
12	12	0	0	1	0	0	0	0	0	0	0	25
11	9	0	0	1	0	0	1	0	0	0	0	22
19	27	0	0	0	0	0	0	0	0	0	0	46
28	30	0	0	0	0	0	0	0	0	0	0	58
				2		TT=2+1+0=3		1			0	
153	155	0	1	3	0	0	2	0	0	0	0	314
					EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					SB WEST LEG							
6	0	26	0	0	0	0	0	0	0	0	0	32
14	0	20	0	0	0	0	0	1	0	0	0	35
12	0	28	0	0	0	0	0	0	0	0	0	40
24	0	25	0	0	0	0	0	0	0	0	0	49
24	0	32	0	0	0	0	0	0	0	0	0	56
24	0	37	0	0	0	0	0	0	0	0	0	61
24	0	56	0	0	0	0	0	0	0	0	0	80
17	1	38	0	0	0	0	0	0	0	0	0	56
				0		TT=0+0+0=0		0			0	
145	1	262	0	0	0	0	0	1	0	0	0	409

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Intersection	
Intersection Delay (sec/veh)	27.9
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	250	125	140	120	0	0	0	0	325	5	85
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Heavy Vehicles(%)	0	0	5	5	5	0	0	0	0	5	0	5
Movement Flow Rate	0	397	198	222	190	0	0	0	0	516	8	135
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	27.1	19.2	34.1
HCM LOS	D	C	D

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	56%
Volume Thru (%)	100%	40%	0%	100%	100%	0%	2%
Volume Right (%)	0%	60%	0%	0%	0%	0%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	167	208	140	60	60	211	204
Left Turning Volume	167	83	0	60	60	0	5
Through Volume	0	125	0	0	0	0	85
Right Turning Volume	0	0	140	0	0	211	114
Lane Flow Rate	265	331	222	95	95	335	323
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.612	0.734	0.57	0.231	0.228	0.806	0.723
Departure Headway, Hd	8.333	7.986	9.233	8.717	8.629	8.656	8.047
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	434	453	391	411	415	419	450
Service Time	6.096	5.749	6.999	6.483	6.395	6.417	5.808
HCM Lane V/C Ratio	0.611	0.731	0.568	0.231	0.229	0.8	0.718
HCM Control Delay	23.5	29.9	23.6	14.1	13.9	38.9	29.2
HCM Lane LOS	C	D	C	B	B	E	D
HCM 95th Percentile Queue	4.7	8.2	4	0.9	0.9	12.2	7.8

Intersection	
Intersection Delay (sec/veh)	9.5
Intersection LOS	A

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	100	55	80	110	0	0	0	0	105	5	45
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	5	0	5
Movement Flow Rate	0	125	69	100	138	0	0	0	0	131	6	56
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	9.2	9.4	9.8
HCM LOS	A	A	A

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	34%
Volume Thru (%)	100%	38%	0%	100%	100%	0%	7%
Volume Right (%)	0%	62%	0%	0%	0%	0%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	67	88	80	55	55	80	75
Left Turning Volume	67	33	0	55	55	0	5
Through Volume	0	55	0	0	0	0	45
Right Turning Volume	0	0	80	0	0	80	25
Lane Flow Rate	83	110	100	69	69	100	94
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.132	0.161	0.169	0.107	0.105	0.173	0.141
Departure Headway, Hd	5.705	5.265	6.092	5.588	5.503	6.255	5.417
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	623	676	585	637	646	570	656
Service Time	3.484	3.044	3.87	3.366	3.281	4.037	3.199
HCM Lane V/C Ratio	0.133	0.163	0.171	0.108	0.107	0.175	0.143
HCM Control Delay	9.4	9.1	10.1	9	8.9	10.4	9.1
HCM Lane LOS	A	A	B	A	A	B	A
HCM 95th Percentile Queue	0.5	0.6	0.6	0.4	0.4	0.6	0.5

Intersection	
Intersection Delay (sec/veh)	14.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	125	80	205	165	0	0	0	0	205	5	60
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	5	0	5
Movement Flow Rate	0	174	111	285	229	0	0	0	0	285	7	83
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	12.6	15.8	14.5
HCM LOS	B	C	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	51%
Volume Thru (%)	100%	34%	0%	100%	100%	0%	4%
Volume Right (%)	0%	66%	0%	0%	0%	0%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	122	205	82	82	137	133
Left Turning Volume	83	42	0	82	82	0	5
Through Volume	0	80	0	0	0	0	60
Right Turning Volume	0	0	205	0	0	137	68
Lane Flow Rate	116	169	285	115	115	191	184
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.234	0.32	0.573	0.214	0.212	0.402	0.355
Departure Headway, Hd	7.278	6.807	7.246	6.737	6.651	7.58	6.928
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	490	524	495	529	536	473	516
Service Time	5.072	4.601	5.028	4.519	4.433	5.366	4.713
HCM Lane V/C Ratio	0.237	0.323	0.576	0.217	0.215	0.404	0.357
HCM Control Delay	12.3	12.8	19.4	11.4	11.2	15.4	13.5
HCM Lane LOS	B	B	C	B	B	C	B
HCM 95th Percentile Queue	0.9	1.4	4	0.8	0.8	2	1.7

Intersection	
Intersection Delay (sec/veh)	16.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	80	70	335	160	0	0	0	0	165	5	90
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles(%)	0	5	0	5	0	0	0	0	0	0	0	0
Movement Flow Rate	0	93	81	390	186	0	0	0	0	192	6	105
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	10.9	20	12.4
HCM LOS	B	C	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	24%
Volume Thru (%)	100%	28%	0%	100%	100%	0%	4%
Volume Right (%)	0%	72%	0%	0%	0%	0%	72%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	53	97	335	80	80	135	125
Left Turning Volume	53	27	0	80	80	0	5
Through Volume	0	70	0	0	0	0	90
Right Turning Volume	0	0	335	0	0	135	30
Lane Flow Rate	62	112	390	93	93	157	145
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.122	0.202	0.72	0.157	0.157	0.318	0.257
Departure Headway, Hd	7.064	6.46	6.656	6.064	6.064	7.271	6.38
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	506	553	541	591	591	494	561
Service Time	4.83	4.227	4.403	3.811	3.811	5.032	4.14
HCM Lane V/C Ratio	0.123	0.203	0.721	0.157	0.157	0.318	0.258
HCM Control Delay	10.8	10.9	24.8	9.9	9.9	13.4	11.4
HCM Lane LOS	B	B	C	A	A	B	B
HCM 95th Percentile Queue	0.4	0.8	7.7	0.6	0.6	1.4	1

Intersection	
Intersection Delay (sec/veh)	35.5
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	250	125	195	120	0	0	0	0	325	5	85
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Heavy Vehicles(%)	0	0	5	30	5	0	0	0	0	5	0	5
Movement Flow Rate	0	397	198	310	190	0	0	0	0	516	8	135
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	30.9	35.2	40
HCM LOS	D	E	E

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	56%
Volume Thru (%)	100%	40%	0%	100%	100%	0%	2%
Volume Right (%)	0%	60%	0%	0%	0%	0%	42%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	167	208	195	60	60	211	204
Left Turning Volume	167	83	0	60	60	0	5
Through Volume	0	125	0	0	0	0	85
Right Turning Volume	0	0	195	0	0	211	114
Lane Flow Rate	265	331	310	95	95	335	323
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.644	0.773	0.844	0.234	0.232	0.847	0.762
Departure Headway, Hd	8.766	8.418	9.817	8.86	8.773	9.092	8.481
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	410	430	368	404	409	399	427
Service Time	6.546	6.197	7.597	6.64	6.552	6.87	6.258
HCM Lane V/C Ratio	0.646	0.77	0.842	0.235	0.232	0.84	0.756
HCM Control Delay	26.2	34.7	48.1	14.3	14.2	45.9	33.9
HCM Lane LOS	D	D	E	B	B	E	D
HCM 95th Percentile Queue	5.4	10.1	15.7	0.9	0.9	16	9.5

Intersection	
Intersection Delay (sec/veh)	10.4
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	100	55	135	110	0	0	0	0	105	5	45
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles(%)	0	5	5	42	5	0	0	0	0	5	0	5
Movement Flow Rate	0	125	69	169	138	0	0	0	0	131	6	56
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	9.5	11.1	10.2
HCM LOS	A	B	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	34%
Volume Thru (%)	100%	38%	0%	100%	100%	0%	7%
Volume Right (%)	0%	62%	0%	0%	0%	0%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	67	88	135	55	55	80	75
Left Turning Volume	67	33	0	55	55	0	5
Through Volume	0	55	0	0	0	0	45
Right Turning Volume	0	0	135	0	0	80	25
Lane Flow Rate	83	110	169	69	69	100	94
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.139	0.171	0.321	0.109	0.107	0.183	0.151
Departure Headway, Hd	6.012	5.572	6.849	5.711	5.625	6.605	5.766
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	597	645	527	630	639	545	623
Service Time	3.735	3.295	4.568	3.429	3.344	4.328	3.489
HCM Lane V/C Ratio	0.139	0.171	0.321	0.11	0.108	0.183	0.151
HCM Control Delay	9.7	9.4	12.8	9.1	9	10.8	9.5
HCM Lane LOS	A	A	B	A	A	B	A
HCM 95th Percentile Queue	0.5	0.6	1.4	0.4	0.4	0.7	0.5

Intersection	
Intersection Delay (sec/veh)	18.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	125	80	260	165	0	0	0	0	205	5	60
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles(%)	0	5	5	22	5	0	0	0	0	5	0	5
Movement Flow Rate	0	174	111	361	229	0	0	0	0	285	7	83
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	13.3	23.5	15.4
HCM LOS	B	C	C

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	51%
Volume Thru (%)	100%	34%	0%	100%	100%	0%	4%
Volume Right (%)	0%	66%	0%	0%	0%	0%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	122	260	82	82	137	133
Left Turning Volume	83	42	0	82	82	0	5
Through Volume	0	80	0	0	0	0	60
Right Turning Volume	0	0	260	0	0	137	68
Lane Flow Rate	116	169	361	115	115	191	184
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.246	0.337	0.763	0.217	0.214	0.422	0.374
Departure Headway, Hd	7.661	7.189	7.724	6.921	6.834	7.971	7.317
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	471	502	473	521	528	454	494
Service Time	5.378	4.906	5.424	4.621	4.534	5.682	5.028
HCM Lane V/C Ratio	0.246	0.337	0.763	0.221	0.218	0.421	0.372
HCM Control Delay	12.9	13.5	31.2	11.5	11.4	16.4	14.3
HCM Lane LOS	B	B	D	B	B	C	B
HCM 95th Percentile Queue	1	1.5	9.5	0.8	0.8	2.2	1.8

Intersection	
Intersection Delay (sec/veh)	23.2
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	80	70	390	160	0	0	0	0	165	5	90
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles(%)	0	5	0	17	0	0	0	0	0	0	0	0
Movement Flow Rate	0	93	81	453	186	0	0	0	0	192	6	105
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	11.2	31.4	12.9
HCM LOS	B	D	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	24%
Volume Thru (%)	100%	28%	0%	100%	100%	0%	4%
Volume Right (%)	0%	72%	0%	0%	0%	0%	72%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	53	97	390	80	80	135	125
Left Turning Volume	53	27	0	80	80	0	5
Through Volume	0	70	0	0	0	0	90
Right Turning Volume	0	0	390	0	0	135	30
Lane Flow Rate	62	112	453	93	93	157	145
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.125	0.209	0.87	0.158	0.158	0.328	0.267
Departure Headway, Hd	7.281	6.678	6.905	6.107	6.107	7.511	6.619
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	490	534	526	586	586	477	541
Service Time	5.063	4.459	4.659	3.86	3.86	5.284	4.391
HCM Lane V/C Ratio	0.127	0.21	0.861	0.159	0.159	0.329	0.268
HCM Control Delay	11.1	11.2	40.2	10	10	13.9	11.8
HCM Lane LOS	B	B	E	A	A	B	B
HCM 95th Percentile Queue	0.4	0.8	19.3	0.6	0.6	1.5	1.1

Intersection	
Intersection Delay (sec/veh)	51.4
Intersection LOS	F

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	275	135	215	130	0	0	0	0	355	5	85
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Heavy Vehicles(%)	0	0	5	30	5	0	0	0	0	5	0	5
Movement Flow Rate	0	437	214	341	206	0	0	0	0	563	8	135
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	44.7	51.5	57.4
HCM LOS	E	F	F

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	59%
Volume Thru (%)	100%	40%	0%	100%	100%	0%	2%
Volume Right (%)	0%	60%	0%	0%	0%	0%	39%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	183	227	215	65	65	227	218
Left Turning Volume	183	92	0	65	65	0	5
Through Volume	0	135	0	0	0	0	85
Right Turning Volume	0	0	215	0	0	227	128
Lane Flow Rate	291	360	341	103	103	361	346
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.751	0.894	0.968	0.265	0.263	0.954	0.859
Departure Headway, Hd	9.292	8.946	10.325	9.366	9.278	9.64	9.06
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	393	407	355	386	390	379	401
Service Time	6.992	6.646	8.025	7.066	6.978	7.34	6.76
HCM Lane V/C Ratio	0.74	0.885	0.961	0.267	0.264	0.953	0.863
HCM Control Delay	35.2	52.4	73.3	15.4	15.3	67.1	47.2
HCM Lane LOS	E	F	F	C	C	F	E
HCM 95th Percentile Queue	8.9	23.6	54.8	1.1	1.1	45.9	17.5

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	275	135	215	130	0	0	0	0	355	5	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frt		0.95		1.00	1.00					1.00	0.94	
Flt Protected		1.00		0.95	1.00					0.95	0.97	
Satd. Flow (prot)		3376		1388	3438					1633	1574	
Flt Permitted		1.00		0.23	1.00					0.95	0.97	
Satd. Flow (perm)		3376		336	3438					1633	1574	
Peak-hour factor, PHF	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Adj. Flow (vph)	0	437	214	341	206	0	0	0	0	563	8	135
RTOR Reduction (vph)	0	113	0	0	0	0	0	0	0	0	42	0
Lane Group Flow (vph)	0	538	0	341	206	0	0	0	0	360	304	0
Heavy Vehicles (%)	0%	0%	5%	30%	5%	0%	0%	0%	0%	5%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		13.4		28.3	28.3					14.5	14.5	
Effective Green, g (s)		13.4		28.3	28.3					14.5	14.5	
Actuated g/C Ratio		0.26		0.56	0.56					0.29	0.29	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		891		413	1915					466	449	
v/s Ratio Prot		0.16		c0.18	0.06							
v/s Ratio Perm				c0.28						c0.22	0.19	
v/c Ratio		0.60		0.83	0.11					0.77	0.68	
Uniform Delay, d1		16.4		8.3	5.3					16.6	16.1	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		1.2		12.7	0.0					7.8	4.0	
Delay (s)		17.5		20.9	5.3					24.4	20.1	
Level of Service		B		C	A					C	C	
Approach Delay (s)		17.5			15.1			0.0			22.3	
Approach LOS		B			B			A			C	

Intersection Summary			
HCM Average Control Delay	18.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	50.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	10.8
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	110	60	145	120	0	0	0	0	115	5	50
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles(%)	0	5	5	42	5	0	0	0	0	5	0	5
Movement Flow Rate	0	138	75	181	150	0	0	0	0	144	6	62
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	9.9	11.6	10.5
HCM LOS	A	B	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	33%
Volume Thru (%)	100%	38%	0%	100%	100%	0%	6%
Volume Right (%)	0%	62%	0%	0%	0%	0%	61%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	73	97	145	60	60	87	83
Left Turning Volume	73	37	0	60	60	0	5
Through Volume	0	60	0	0	0	0	50
Right Turning Volume	0	0	145	0	0	87	28
Lane Flow Rate	92	121	181	75	75	109	103
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.157	0.192	0.351	0.122	0.12	0.205	0.169
Departure Headway, Hd	6.157	5.718	6.978	5.838	5.752	6.749	5.905
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	583	628	517	615	625	533	608
Service Time	3.886	3.447	4.701	3.562	3.476	4.479	3.634
HCM Lane V/C Ratio	0.158	0.193	0.35	0.122	0.12	0.205	0.169
HCM Control Delay	10	9.8	13.4	9.4	9.3	11.2	9.8
HCM Lane LOS	A	A	B	A	A	B	A
HCM 95th Percentile Queue	0.6	0.7	1.6	0.4	0.4	0.8	0.6

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	110	60	145	120	0	0	0	0	115	5	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frt		0.95		1.00	1.00					1.00	0.91	
Flt Protected		1.00		0.95	1.00					0.95	0.98	
Satd. Flow (prot)		3257		1271	3438					1633	1542	
Flt Permitted		1.00		0.42	1.00					0.95	0.98	
Satd. Flow (perm)		3257		563	3438					1633	1542	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	0	138	75	181	150	0	0	0	0	144	6	62
RTOR Reduction (vph)	0	63	0	0	0	0	0	0	0	0	41	0
Lane Group Flow (vph)	0	150	0	181	150	0	0	0	0	109	62	0
Heavy Vehicles (%)	0%	5%	5%	42%	5%	0%	0%	0%	0%	5%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		5.5		14.1	14.1					11.4	11.4	
Effective Green, g (s)		5.5		14.1	14.1					11.4	11.4	
Actuated g/C Ratio		0.16		0.42	0.42					0.34	0.34	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		535		334	1447					556	525	
v/s Ratio Prot		0.05		c0.07	0.04							
v/s Ratio Perm				c0.15						c0.07	0.04	
v/c Ratio		0.28		0.54	0.10					0.20	0.12	
Uniform Delay, d1		12.3		6.8	5.9					7.8	7.6	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3		1.8	0.0					0.2	0.1	
Delay (s)		12.6		8.6	5.9					8.0	7.7	
Level of Service		B		A	A					A	A	
Approach Delay (s)		12.6			7.4			0.0			7.8	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	33.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	27.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	23.7
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	135	85	285	180	0	0	0	0	225	5	65
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles(%)	0	5	5	22	5	0	0	0	0	5	0	5
Movement Flow Rate	0	188	118	396	250	0	0	0	0	312	7	90
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	14.4	32.3	17.1
HCM LOS	B	D	C

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	51%
Volume Thru (%)	100%	35%	0%	100%	100%	0%	3%
Volume Right (%)	0%	65%	0%	0%	0%	0%	45%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	90	130	285	90	90	151	144
Left Turning Volume	90	45	0	90	90	0	5
Through Volume	0	85	0	0	0	0	65
Right Turning Volume	0	0	285	0	0	151	74
Lane Flow Rate	125	181	396	125	125	209	200
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.278	0.378	0.874	0.248	0.245	0.48	0.423
Departure Headway, Hd	8.002	7.531	7.95	7.145	7.059	8.254	7.602
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	449	478	455	504	509	438	475
Service Time	5.746	5.275	5.687	4.882	4.795	5.994	5.342
HCM Lane V/C Ratio	0.278	0.379	0.87	0.248	0.246	0.477	0.421
HCM Control Delay	13.8	14.8	45.1	12.2	12.1	18.4	15.8
HCM Lane LOS	B	B	E	B	B	C	C
HCM 95th Percentile Queue	1.2	1.8	19.9	1	1	2.8	2.2

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	135	85	285	180	0	0	0	0	225	5	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frpb, ped/bikes		0.94		1.00	1.00					1.00	1.00	
Flpb, ped/bikes		1.00		1.00	1.00					1.00	1.00	
Frt		0.94		1.00	1.00					1.00	0.93	
Flt Protected		1.00		0.95	1.00					0.95	0.97	
Satd. Flow (prot)		3042		1480	3438					1633	1565	
Flt Permitted		1.00		0.39	1.00					0.95	0.97	
Satd. Flow (perm)		3042		605	3438					1633	1565	
Peak-hour factor, PHF	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Adj. Flow (vph)	0	188	118	396	250	0	0	0	0	312	7	90
RTOR Reduction (vph)	0	94	0	0	0	0	0	0	0	0	50	0
Lane Group Flow (vph)	0	212	0	396	250	0	0	0	0	209	150	0
Confl. Peds. (#/hr)			110									
Confl. Bikes (#/hr)			60									
Heavy Vehicles (%)	0%	5%	5%	22%	5%	0%	0%	0%	0%	5%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		8.8		25.0	25.0					11.0	11.0	
Effective Green, g (s)		8.8		25.0	25.0					11.0	11.0	
Actuated g/C Ratio		0.20		0.57	0.57					0.25	0.25	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		608		586	1953					408	391	
v/s Ratio Prot		0.07		c0.19	0.07							
v/s Ratio Perm				c0.20						c0.13	0.10	
v/c Ratio		0.35		0.68	0.13					0.51	0.38	
Uniform Delay, d1		15.1		5.9	4.4					14.2	13.7	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3		3.1	0.0					1.1	0.6	
Delay (s)		15.5		9.0	4.5					15.3	14.3	
Level of Service		B		A	A					B	B	
Approach Delay (s)		15.5			7.3			0.0			14.8	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	31.6
Intersection LOS	D

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	85	75	425	175	0	0	0	0	180	5	100
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles(%)	0	5	0	17	0	0	0	0	0	0	0	0
Movement Flow Rate	0	99	87	494	203	0	0	0	0	209	6	116
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	11.8	45.4	13.8
HCM LOS	B	E	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	24%
Volume Thru (%)	100%	27%	0%	100%	100%	0%	4%
Volume Right (%)	0%	73%	0%	0%	0%	0%	73%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	57	103	425	87	87	148	137
Left Turning Volume	57	28	0	87	87	0	5
Through Volume	0	75	0	0	0	0	100
Right Turning Volume	0	0	425	0	0	148	32
Lane Flow Rate	66	120	494	102	102	172	160
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.14	0.236	0.972	0.178	0.178	0.369	0.304
Departure Headway, Hd	7.667	7.059	7.081	6.281	6.281	7.738	6.84
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	470	512	509	568	568	462	521
Service Time	5.367	4.759	4.854	4.053	4.053	5.535	4.636
HCM Lane V/C Ratio	0.14	0.234	0.971	0.18	0.18	0.372	0.307
HCM Control Delay	11.6	11.9	59.8	10.4	10.4	15	12.6
HCM Lane LOS	B	B	F	B	B	B	B
HCM 95th Percentile Queue	0.5	0.9	64.6	0.6	0.6	1.8	1.3

HCM Signalized Intersection Capacity Analysis
1: EB 20 Fwy/EB 210 Fwy & Birkshire Place

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	85	75	425	175	0	0	0	0	180	5	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95	1.00	1.00	0.95					0.95	0.95	
Frt		1.00	0.85	1.00	1.00					1.00	0.89	
Flt Protected		1.00	1.00	0.95	1.00					0.95	0.99	
Satd. Flow (prot)		3438	1615	1543	3610					1715	1590	
Flt Permitted		1.00	1.00	0.44	1.00					0.95	0.99	
Satd. Flow (perm)		3438	1615	714	3610					1715	1590	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	99	87	494	203	0	0	0	0	209	6	116
RTOR Reduction (vph)	0	0	76	0	0	0	0	0	0	0	88	0
Lane Group Flow (vph)	0	99	11	494	203	0	0	0	0	171	72	0
Heavy Vehicles (%)	0%	5%	0%	17%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type		NA	Perm	pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases			4	8						6		
Actuated Green, G (s)		5.1	5.1	22.3	22.3					9.8	9.8	
Effective Green, g (s)		5.1	5.1	22.3	22.3					9.8	9.8	
Actuated g/C Ratio		0.13	0.13	0.56	0.56					0.24	0.24	
Clearance Time (s)		4.0	4.0	4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0	3.0	3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		437	205	670	2008					419	389	
v/s Ratio Prot		0.03		c0.24	0.06							
v/s Ratio Perm			0.01	c0.17						c0.10	0.05	
v/c Ratio		0.23	0.05	0.74	0.10					0.41	0.19	
Uniform Delay, d1		15.7	15.4	6.1	4.2					12.7	12.0	
Progression Factor		1.00	1.00	1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3	0.1	4.2	0.0					0.7	0.2	
Delay (s)		16.0	15.5	10.4	4.2					13.4	12.2	
Level of Service		B	B	B	A					B	B	
Approach Delay (s)		15.8			8.6			0.0			12.8	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	40.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	37
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	250	125	140	120	0	0	0	0	380	5	85
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Heavy Vehicles(%)	0	0	5	5	5	0	0	0	0	18	0	5
Movement Flow Rate	0	397	198	222	190	0	0	0	0	603	8	135
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	29.6	20.3	52.1
HCM LOS	D	C	F

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	61%
Volume Thru (%)	100%	40%	0%	100%	100%	0%	2%
Volume Right (%)	0%	60%	0%	0%	0%	0%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	167	208	140	60	60	239	231
Left Turning Volume	167	83	0	60	60	0	5
Through Volume	0	125	0	0	0	0	85
Right Turning Volume	0	0	140	0	0	239	141
Lane Flow Rate	265	331	222	95	95	380	366
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.634	0.761	0.589	0.239	0.236	0.947	0.834
Departure Headway, Hd	8.633	8.285	9.535	9.017	8.929	8.975	8.201
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	418	437	378	398	402	403	439
Service Time	6.399	6.051	7.303	6.786	6.698	6.74	5.966
HCM Lane V/C Ratio	0.634	0.757	0.587	0.239	0.236	0.943	0.834
HCM Control Delay	25.3	33.1	25.2	14.6	14.5	63	40.7
HCM Lane LOS	D	D	D	B	B	F	E
HCM 95th Percentile Queue	5.2	9.4	4.3	0.9	0.9	42.3	14.7

Intersection	
Intersection Delay (sec/veh)	10.2
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	100	55	80	110	0	0	0	0	160	5	45
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	36	0	5
Movement Flow Rate	0	125	69	100	138	0	0	0	0	200	6	56
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	9.6	9.9	11
HCM LOS	A	A	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	51%
Volume Thru (%)	100%	38%	0%	100%	100%	0%	5%
Volume Right (%)	0%	62%	0%	0%	0%	0%	44%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	67	88	80	55	55	107	103
Left Turning Volume	67	33	0	55	55	0	5
Through Volume	0	55	0	0	0	0	45
Right Turning Volume	0	0	80	0	0	107	53
Lane Flow Rate	83	110	100	69	69	134	128
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.141	0.173	0.179	0.114	0.112	0.258	0.205
Departure Headway, Hd	6.081	5.64	6.46	5.955	5.869	6.92	5.756
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	591	637	557	603	612	521	626
Service Time	3.806	3.365	4.185	3.68	3.594	4.64	3.476
HCM Lane V/C Ratio	0.14	0.173	0.18	0.114	0.113	0.257	0.204
HCM Control Delay	9.8	9.5	10.6	9.4	9.3	12	10
HCM Lane LOS	A	A	B	A	A	B	A
HCM 95th Percentile Queue	0.5	0.6	0.7	0.4	0.4	1	0.8

Intersection	
Intersection Delay (sec/veh)	16.3
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	125	80	205	165	0	0	0	0	260	5	60
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	23	0	5
Movement Flow Rate	0	174	111	285	229	0	0	0	0	361	7	83
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	13.4	17	17.2
HCM LOS	B	C	C

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	59%
Volume Thru (%)	100%	34%	0%	100%	100%	0%	3%
Volume Right (%)	0%	66%	0%	0%	0%	0%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	122	205	82	82	166	159
Left Turning Volume	83	42	0	82	82	0	5
Through Volume	0	80	0	0	0	0	60
Right Turning Volume	0	0	205	0	0	166	94
Lane Flow Rate	116	169	285	115	115	231	220
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.249	0.341	0.598	0.224	0.222	0.512	0.435
Departure Headway, Hd	7.732	7.259	7.673	7.163	7.076	8.085	7.216
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	468	498	473	504	511	448	502
Service Time	5.432	4.959	5.373	4.863	4.776	5.785	4.916
HCM Lane V/C Ratio	0.248	0.339	0.603	0.228	0.225	0.516	0.438
HCM Control Delay	13	13.7	21.1	11.9	11.8	19	15.4
HCM Lane LOS	B	B	C	B	B	C	C
HCM 95th Percentile Queue	1	1.6	4.4	0.9	0.9	3.1	2.3

Intersection	
Intersection Delay (sec/veh)	17.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	80	70	335	160	0	0	0	0	220	5	90
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles(%)	0	5	0	5	0	0	0	0	0	23	0	0
Movement Flow Rate	0	93	81	390	186	0	0	0	0	256	6	105
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	11.3	22.1	14.3
HCM LOS	B	C	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	38%
Volume Thru (%)	100%	28%	0%	100%	100%	0%	3%
Volume Right (%)	0%	72%	0%	0%	0%	0%	59%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	53	97	335	80	80	163	152
Left Turning Volume	53	27	0	80	80	0	5
Through Volume	0	70	0	0	0	0	90
Right Turning Volume	0	0	335	0	0	163	57
Lane Flow Rate	62	112	390	93	93	189	177
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.127	0.211	0.75	0.164	0.164	0.407	0.325
Departure Headway, Hd	7.375	6.769	6.931	6.337	6.337	7.736	6.613
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	484	527	522	564	564	464	542
Service Time	5.16	4.554	4.692	4.098	4.098	5.507	4.383
HCM Lane V/C Ratio	0.128	0.213	0.747	0.165	0.165	0.407	0.327
HCM Control Delay	11.2	11.4	27.8	10.3	10.3	15.8	12.6
HCM Lane LOS	B	B	D	B	B	C	B
HCM 95th Percentile Queue	0.4	0.8	8.9	0.6	0.6	2.1	1.4

Intersection	
Intersection Delay (sec/veh)	48.2
Intersection LOS	E

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	275	135	155	130	0	0	0	0	415	5	95
Peak Hour Factor	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Heavy Vehicles(%)	0	0	5	5	5	0	0	0	0	18	0	5
Movement Flow Rate	0	437	214	246	206	0	0	0	0	659	8	151
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	37.5	23	70.6
HCM LOS	E	C	F

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	61%
Volume Thru (%)	100%	40%	0%	100%	100%	0%	2%
Volume Right (%)	0%	60%	0%	0%	0%	0%	37%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	183	227	155	65	65	261	254
Left Turning Volume	183	92	0	65	65	0	5
Through Volume	0	135	0	0	0	0	95
Right Turning Volume	0	0	155	0	0	261	154
Lane Flow Rate	291	360	246	103	103	415	402
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.713	0.847	0.664	0.264	0.261	1	0.96
Departure Headway, Hd	8.819	8.474	9.721	9.203	9.115	9.371	8.588
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	413	432	374	392	395	390	427
Service Time	6.489	6.159	7.423	6.923	6.839	7.071	6.288
HCM Lane V/C Ratio	0.705	0.833	0.658	0.263	0.261	1.064	0.941
HCM Control Delay	30.5	43.1	29.7	15.2	15	77	63.9
HCM Lane LOS	D	E	D	C	B	F	F
HCM 95th Percentile Queue	7.4	16.1	5.9	1.1	1.1	93	51.2

HCM Signalized Intersection Capacity Analysis
1: EB 20 Fwy/EB 210 Fwy & Berkshire Place

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	275	135	155	130	0	0	0	0	415	5	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0					4.0	4.0	
Lane Util. Factor		0.95			0.95					0.95	0.95	
Frt		0.95			1.00					1.00	0.94	
Flt Protected		1.00			0.97					0.95	0.97	
Satd. Flow (prot)		3376			3347					1453	1466	
Flt Permitted		1.00			0.62					0.95	0.97	
Satd. Flow (perm)		3376			2130					1453	1466	
Peak-hour factor, PHF	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Adj. Flow (vph)	0	437	214	246	206	0	0	0	0	659	8	151
RTOR Reduction (vph)	0	96	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	555	0	0	452	0	0	0	0	415	365	0
Heavy Vehicles (%)	0%	0%	5%	5%	5%	0%	0%	0%	0%	18%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		14.9			14.9					17.4	17.4	
Effective Green, g (s)		14.9			14.9					17.4	17.4	
Actuated g/C Ratio		0.37			0.37					0.43	0.43	
Clearance Time (s)		4.0			4.0					4.0	4.0	
Vehicle Extension (s)		3.0			3.0					3.0	3.0	
Lane Grp Cap (vph)		1248			788					627	633	
v/s Ratio Prot		0.16										
v/s Ratio Perm					c0.21					c0.29	0.25	
v/c Ratio		0.44			1.06dl					0.66	0.58	
Uniform Delay, d1		9.6			10.2					9.1	8.7	
Progression Factor		1.00			1.00					1.00	1.00	
Incremental Delay, d2		0.3			1.0					2.6	1.3	
Delay (s)		9.8			11.2					11.7	9.9	
Level of Service		A			B					B	A	
Approach Delay (s)		9.8			11.2			0.0			10.9	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	40.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	10.6
Intersection LOS	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	110	60	85	120	0	0	0	0	175	5	50
Peak Hour Factor	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	36	0	5
Movement Flow Rate	0	138	75	106	150	0	0	0	0	219	6	62
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	10	10.2	11.5
HCM LOS	A	B	B

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	51%
Volume Thru (%)	100%	38%	0%	100%	100%	0%	4%
Volume Right (%)	0%	62%	0%	0%	0%	0%	44%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	73	97	85	60	60	117	113
Left Turning Volume	73	37	0	60	60	0	5
Through Volume	0	60	0	0	0	0	50
Right Turning Volume	0	0	85	0	0	117	58
Lane Flow Rate	92	121	106	75	75	147	141
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.159	0.194	0.195	0.127	0.125	0.287	0.23
Departure Headway, Hd	6.232	5.791	6.61	6.104	6.018	7.046	5.877
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	577	620	544	588	596	512	612
Service Time	3.962	3.522	4.339	3.833	3.747	4.774	3.605
HCM Lane V/C Ratio	0.159	0.195	0.195	0.128	0.126	0.287	0.23
HCM Control Delay	10.1	9.9	10.9	9.7	9.6	12.6	10.4
HCM Lane LOS	B	A	B	A	A	B	B
HCM 95th Percentile Queue	0.6	0.7	0.7	0.4	0.4	1.2	0.9

HCM Signalized Intersection Capacity Analysis
1: EB 20 Fwy/EB 210 Fwy & Berkshire Place

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	110	60	85	120	0	0	0	0	175	5	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frt		0.95		1.00	1.00					1.00	0.93	
Flt Protected		1.00		0.95	1.00					0.95	0.97	
Satd. Flow (prot)		3257		1719	3438					1261	1361	
Flt Permitted		1.00		0.41	1.00					0.95	0.97	
Satd. Flow (perm)		3257		746	3438					1261	1361	
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	0	138	75	106	150	0	0	0	0	219	6	62
RTOR Reduction (vph)	0	62	0	0	0	0	0	0	0	0	38	0
Lane Group Flow (vph)	0	151	0	106	150	0	0	0	0	147	102	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	0%	0%	0%	0%	36%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		5.7		11.8	11.8					12.9	12.9	
Effective Green, g (s)		5.7		11.8	11.8					12.9	12.9	
Actuated g/C Ratio		0.17		0.36	0.36					0.39	0.39	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		568		332	1241					497	537	
v/s Ratio Prot		0.05		c0.02	0.04							
v/s Ratio Perm				c0.09						c0.12	0.08	
v/c Ratio		0.27		0.32	0.12					0.30	0.19	
Uniform Delay, d1		11.7		7.4	7.0					6.8	6.5	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3		0.6	0.0					0.3	0.2	
Delay (s)		11.9		7.9	7.0					7.1	6.7	
Level of Service		B		A	A					A	A	
Approach Delay (s)		11.9			7.4			0.0			6.9	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	32.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	26.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	18.9
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	135	85	225	180	0	0	0	0	285	5	65
Peak Hour Factor	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Heavy Vehicles(%)	0	5	5	5	5	0	0	0	0	23	0	5
Movement Flow Rate	0	188	118	312	250	0	0	0	0	396	7	90
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	14.6	20.3	19.9
HCM LOS	B	C	C

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	59%
Volume Thru (%)	100%	35%	0%	100%	100%	0%	3%
Volume Right (%)	0%	65%	0%	0%	0%	0%	38%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	90	130	225	90	90	182	173
Left Turning Volume	90	45	0	90	90	0	5
Through Volume	0	85	0	0	0	0	65
Right Turning Volume	0	0	225	0	0	182	103
Lane Flow Rate	125	181	312	125	125	253	240
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.28	0.381	0.688	0.257	0.254	0.587	0.498
Departure Headway, Hd	8.075	7.603	7.927	7.415	7.328	8.339	7.472
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	445	473	456	485	490	433	482
Service Time	5.819	5.346	5.664	5.153	5.066	6.078	5.21
HCM Lane V/C Ratio	0.281	0.383	0.684	0.258	0.255	0.584	0.498
HCM Control Delay	13.9	15	26.5	12.7	12.6	22.3	17.4
HCM Lane LOS	B	B	D	B	B	C	C
HCM 95th Percentile Queue	1.2	1.8	6.6	1	1	4.3	3

HCM Signalized Intersection Capacity Analysis
1: EB 20 Fwy/EB 210 Fwy & Berkshire Place

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	135	85	225	180	0	0	0	0	285	5	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frt		0.94		1.00	1.00					1.00	0.94	
Flt Protected		1.00		0.95	1.00					0.95	0.97	
Satd. Flow (prot)		3239		1719	3438					1394	1431	
Flt Permitted		1.00		0.38	1.00					0.95	0.97	
Satd. Flow (perm)		3239		682	3438					1394	1431	
Peak-hour factor, PHF	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Adj. Flow (vph)	0	188	118	312	250	0	0	0	0	396	7	90
RTOR Reduction (vph)	0	93	0	0	0	0	0	0	0	0	44	0
Lane Group Flow (vph)	0	213	0	312	250	0	0	0	0	253	196	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	0%	0%	0%	0%	23%	0%	5%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		8.0		18.1	18.1					12.0	12.0	
Effective Green, g (s)		8.0		18.1	18.1					12.0	12.0	
Actuated g/C Ratio		0.21		0.48	0.48					0.31	0.31	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		680		490	1633					439	451	
v/s Ratio Prot		0.07		c0.10	0.07							
v/s Ratio Perm				c0.20						c0.18	0.14	
v/c Ratio		0.31		0.64	0.15					0.58	0.43	
Uniform Delay, d1		12.7		6.7	5.7					10.9	10.4	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3		2.7	0.0					1.8	0.7	
Delay (s)		13.0		9.4	5.7					12.8	11.0	
Level of Service		B		A	A					B	B	
Approach Delay (s)		13.0			7.8			0.0			11.9	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	38.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Intersection	
Intersection Delay (sec/veh)	21.8
Intersection LOS	C

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	85	75	365	175	0	0	0	0	240	5	100
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles(%)	0	5	0	5	0	0	0	0	0	23	0	0
Movement Flow Rate	0	99	87	424	203	0	0	0	0	279	6	116
Number of Lanes	0	2	0	1	2	0	0	0	0	1	1	0

Approach	EB	WB	SB
Opposing Approach	WB	EB	
Opposing Lanes	3	2	0
Conflicting Approach Left	SB		WB
Conflicting Lanes Left	2	0	3
Conflicting Approach Right		SB	EB
Conflicting Lanes Right	0	2	2
HCM Control Delay	12	28.7	15.5
HCM LOS	B	D	C

Lane	EBLn1	EBLn2	WBLn1	WBLn2	WBLn3	SBLn1	SBLn2
Volume Left (%)	0%	0%	100%	0%	0%	100%	37%
Volume Thru (%)	100%	27%	0%	100%	100%	0%	3%
Volume Right (%)	0%	73%	0%	0%	0%	0%	60%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	57	103	365	87	87	178	167
Left Turning Volume	57	28	0	87	87	0	5
Through Volume	0	75	0	0	0	0	100
Right Turning Volume	0	0	365	0	0	178	62
Lane Flow Rate	66	120	424	102	102	207	195
Geometry Group	8	8	8	8	8	8	8
Degree of Utilization, X	0.142	0.239	0.84	0.184	0.184	0.456	0.369
Departure Headway, Hd	7.768	7.159	7.122	6.527	6.527	7.953	6.822
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	465	505	505	546	546	450	524
Service Time	5.468	4.859	4.904	4.309	4.309	5.747	4.616
HCM Lane V/C Ratio	0.142	0.238	0.84	0.187	0.187	0.46	0.372
HCM Control Delay	11.7	12.1	37.3	10.8	10.8	17.3	13.6
HCM Lane LOS	B	B	E	B	B	C	B
HCM 95th Percentile Queue	0.5	0.9	15.4	0.7	0.7	2.5	1.8

HCM Signalized Intersection Capacity Analysis
1: EB 20 Fwy/EB 210 Fwy & Birkshire Place

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	85	75	365	175	0	0	0	0	240	5	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0					4.0	4.0	
Lane Util. Factor		0.95		1.00	0.95					0.95	0.95	
Frt		0.93		1.00	1.00					1.00	0.91	
Flt Protected		1.00		0.95	1.00					0.95	0.98	
Satd. Flow (prot)		3270		1719	3610					1394	1486	
Flt Permitted		1.00		0.43	1.00					0.95	0.98	
Satd. Flow (perm)		3270		787	3610					1394	1486	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	0	99	87	424	203	0	0	0	0	279	6	116
RTOR Reduction (vph)	0	75	0	0	0	0	0	0	0	0	82	0
Lane Group Flow (vph)	0	111	0	424	203	0	0	0	0	206	113	0
Heavy Vehicles (%)	0%	5%	0%	5%	0%	0%	0%	0%	0%	23%	0%	0%
Turn Type		NA		pm+pt	NA					Perm	NA	
Protected Phases		4		3	8						6	
Permitted Phases				8						6		
Actuated Green, G (s)		5.2		19.5	19.5					11.2	11.2	
Effective Green, g (s)		5.2		19.5	19.5					11.2	11.2	
Actuated g/C Ratio		0.13		0.50	0.50					0.29	0.29	
Clearance Time (s)		4.0		4.0	4.0					4.0	4.0	
Vehicle Extension (s)		3.0		3.0	3.0					3.0	3.0	
Lane Grp Cap (vph)		439		645	1819					403	430	
v/s Ratio Prot		0.03		c0.18	0.06							
v/s Ratio Perm				c0.16						c0.15	0.08	
v/c Ratio		0.25		0.66	0.11					0.51	0.26	
Uniform Delay, d1		15.0		6.6	5.0					11.5	10.6	
Progression Factor		1.00		1.00	1.00					1.00	1.00	
Incremental Delay, d2		0.3		2.4	0.0					1.1	0.3	
Delay (s)		15.3		9.0	5.1					12.6	10.9	
Level of Service		B		A	A					B	B	
Approach Delay (s)		15.3			7.8			0.0			11.8	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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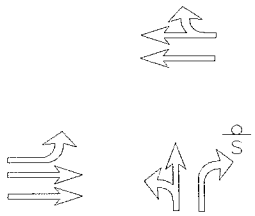
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	95	0%	**0**	95	10	105
EB THRU	285	5%	**0**	285	25	310
EB RIGHT	0	0%	**0**	0	0	0
WB LEFT	0	0%	**0**	0	0	0
WB THRU	190	25%	**55**	245	20	265
WB RIGHT	255	5%	**0**	255	25	280

I-210 FWY WB RAMPS

NB LEFT	60	5%	**0**	60	5	65
NB THRU	5	5%	**0**	5	5	10
NB RIGHT	275	20%	**55**	330	30	360
SB LEFT	0	0%	**0**	0	0	0
SB THRU	0	0%	**0**	0	0	0
SB RIGHT	0	0%	**0**	0	0	0
TOTALS	**1165**		**110**	**1275**	**120**	**1395**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	2 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	95	0%	**0**	95	10	105
EB THRU	285	5%	**0**	285	25	310
EB RIGHT	0	0%	**0**	0	0	0
WB LEFT	0	0%	**0**	0	0	0
WB THRU	190	5%	**0**	190	15	205
WB RIGHT	255	5%	**0**	255	25	280
I-210 FWY WB RAMPS						
NB LEFT	60	5%	**0**	60	5	65
NB THRU	5	5%	**0**	5	5	10
NB RIGHT	275	20%	**55**	330	30	360
SB LEFT	0	0%	**0**	0	0	0
SB THRU	0	0%	**0**	0	0	0
SB RIGHT	0	0%	**0**	0	0	0
TOTALS	**1165**		**55**	**1220**	**115**	**1335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	3 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	95	0%	**0**	95	10	105
EB THRU	285	5%	**0**	285	25	310
EB RIGHT	0	0%	**0**	0	0	0
WB LEFT	0	0%	**0**	0	0	0
WB THRU	190	25%	**55**	245	20	265
WB RIGHT	255	5%	**0**	255	25	280

I-210 FWY WB RAMPS

NB LEFT	60	5%	**0**	60	5	65
NB THRU	5	5%	**0**	5	5	10
NB RIGHT	275	5%	**0**	275	25	300
SB LEFT	0	0%	**0**	0	0	0
SB THRU	0	0%	**0**	0	0	0
SB RIGHT	0	0%	**0**	0	0	0
TOTALS	**1165**		**55**	**1220**	**115**	**1335**

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Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	4 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	95	0%		95	10	105
EB THRU	285	19%	**55**	340	30	370
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	190	5%		190	15	205
WB RIGHT	255	21%	**55**	310	30	340

I-210 FWY WB RAMPS

NB LEFT	60	5%		60	5	65
NB THRU	5	5%		5	5	10
NB RIGHT	275	5%		275	25	300
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1165**		**110**	**1275**	**120**	**1395**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	5 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	95	0%		95	10	105
EB THRU	285	19%	**55**	340	30	370
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	190	5%		190	15	205
WB RIGHT	255	5%		255	25	280
I-210 FWY WB RAMPS						
NB LEFT	60	5%		60	5	65
NB THRU	5	5%		5	5	10
NB RIGHT	275	5%		275	25	300
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1165**		**55**	**1220**	**115**	**1335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	95	0%		95	10	105
EB THRU	285	5%		285	25	310
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	190	5%		190	15	205
WB RIGHT	255	21%	**55**	310	30	340
I-210 FWY WB RAMPS						
NB LEFT	60	5%		60	5	65
NB THRU	5	5%		5	5	10
NB RIGHT	275	5%		275	25	300
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1165**		**55**	**1220**	**115**	**1335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%	**55**	165	15	180
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%	**55**	125	10	135
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**110**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%		170	15	185

I-210 FWY WB RAMPS

NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%	**55**	125	10	135
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**55**	**690**	**65**	**755**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	9 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%	**55**	165	15	180
WB RIGHT	170	5%		170	15	185

I-210 FWY WB RAMPS

NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%		70	5	75
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**55**	**690**	**65**	**755**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	10 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	50	5%		50	5	55
EB THRU	175	5%	**55**	230	20	250
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%	**55**	225	20	245

I-210 FWY WB RAMPS

NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%		70	5	75
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**110**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	11 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%	**55**	230	20	250
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%		70	5	75
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**55**	**690**	**65**	**755**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	12 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%	**55**	225	20	245
I-210 FWY WB RAMPS						
NB LEFT	55	5%		55	5	60
NB THRU	5	5%		5	5	10
NB RIGHT	70	5%		70	5	75
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**635**		**55**	**690**	**65**	**755**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	13 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%	**55**	165	15	180
WB RIGHT	170	5%		170	15	185

I-210 FWY WB RAMPS

NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	5%	**55**	170	15	185
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**110**	**800**	**75**	**875**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	14 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	5%	**55**	170	15	185
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**55**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	15 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%	**55**	165	15	180
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	5%		115	10	125
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**55**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	16 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	50	5%		50	5	55
EB THRU	175	5%	**55**	230	20	250
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%	**55**	225	20	245

I-210 FWY WB RAMPS

NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	5%		115	10	125
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**110**	**800**	**75**	**875**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	17 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	20%	**55**	230	20	250
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	5%		170	15	185
I-210 FWY WB RAMPS						
NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	0%		115	10	125
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**55**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	18 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	50	5%		50	5	55
EB THRU	175	5%		175	15	190
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	110	5%		110	10	120
WB RIGHT	170	14%	**55**	225	20	245
I-210 FWY WB RAMPS						
NB LEFT	65	5%		65	5	70
NB THRU	5	5%		5	5	10
NB RIGHT	115	0%		115	10	125
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**690**		**55**	**745**	**70**	**815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	19 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	65	5%		65	5	70
EB THRU	180	5%		180	15	195
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%	**55**	460	40	500
WB RIGHT	410	5%		410	35	445
I-210 FWY WB RAMPS						
NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%	**55**	135	10	145
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**110**	**1350**	**120**	**1470**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	20 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	65	5%		65	5	70
EB THRU	180	5%		180	15	195
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%		405	35	440
WB RIGHT	410	5%		410	35	445
I-210 FWY WB RAMPS						
NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%	**55**	135	10	145
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**55**	**1295**	**115**	**1410**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	21 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	65	5%		65	5	70
EB THRU	180	5%		180	15	195
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%	**55**	460	40	500
WB RIGHT	410	5%		410	35	445
I-210 FWY WB RAMPS						
NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%		80	5	85
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**55**	**1295**	**115**	**1410**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	22 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	65	5%		65	5	70
EB THRU	180	5%	**55**	235	20	255
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%		405	35	440
WB RIGHT	410	5%	**55**	465	40	505

I-210 FWY WB RAMPS

NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%		80	5	85
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**110**	**1350**	**120**	**1470**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	23 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	65	5%		65	5	70
EB THRU	180	5%	**55**	235	20	255
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%		405	35	440
WB RIGHT	410	5%		410	35	445

I-210 FWY WB RAMPS

NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%		80	5	85
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**55**	**1295**	**115**	**1410**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	24 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BERKSHIRE PLACE

EB LEFT	65	5%		65	5	70
EB THRU	180	5%		180	15	195
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	405	5%		405	35	440
WB RIGHT	410	5%	**55**	465	40	505

I-210 FWY WB RAMPS

NB LEFT	95	5%		95	10	105
NB THRU	5	5%		5	5	10
NB RIGHT	80	5%		80	5	85
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1240**		**55**	**1295**	**115**	**1410**

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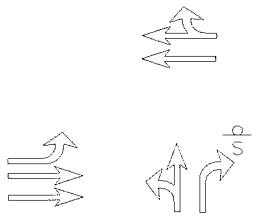
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**0**	295	25	320
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**165**	365	35	400
WB RIGHT	251	6	18	270	**0**	270	25	295
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**140**	425	40	465
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**305**	**1515**	**145**	**1660**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	2 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**0**	295	25	320
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**0**	200	20	220
WB RIGHT	251	6	18	270	**0**	270	25	295
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**140**	425	40	465
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**140**	**1350**	**130**	**1480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**0**	295	25	320
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**165**	365	35	400
WB RIGHT	251	6	18	270	**0**	270	25	295
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**0**	285	25	310
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**165**	**1375**	**130**	**1505**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	4 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**140**	435	40	475
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**0**	200	20	220
WB RIGHT	251	6	18	270	**165**	435	40	475
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**0**	285	25	310
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**305**	**1515**	**145**	**1660**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	5 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**140**	435	40	475
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**0**	200	20	220
WB RIGHT	251	6	18	270	**0**	270	25	295
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**0**	285	25	310
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**140**	**1350**	**130**	**1480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	96	0	0	95	**0**	95	10	105
EB THRU	284	3	9	295	**0**	295	25	320
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	188	4	12	200	**0**	200	20	220
WB RIGHT	251	6	18	270	**165**	435	40	475
I-210 FWY WB RAMPS								
NB LEFT	61	0	0	60	**0**	60	5	65
NB THRU	2	0	0	5	**0**	5	5	10
NB RIGHT	273	4	12	285	**0**	285	25	310
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1155**				**165**	**1375**	**130**	**1505**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**0**	185	15	200
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**165**	285	25	310
WB RIGHT	166	2	6	170	**0**	170	15	185
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**140**	210	20	230
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**305**	**970**	**90**	**1060**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	8 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**0**	185	15	200
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**0**	120	10	130
WB RIGHT	166	2	6	170	**0**	170	15	185
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**140**	210	20	230
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**140**	**805**	**75**	**880**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	9 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**0**	185	15	200
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**165**	285	25	310
WB RIGHT	166	2	6	170	**0**	170	15	185
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**0**	70	5	75
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**165**	**830**	**75**	**905**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**140**	325	30	355
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**0**	120	10	130
WB RIGHT	166	2	6	170	**165**	335	30	365
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**0**	70	5	75
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**305**	**970**	**90**	**1060**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	11 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**140**	325	30	355
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**0**	120	10	130
WB RIGHT	166	2	6	170	**0**	170	15	185
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**0**	70	5	75
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**140**	**805**	**75**	**880**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	12 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	45	3	9	55	**0**	55	5	60
EB THRU	173	4	12	185	**0**	185	15	200
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	103	5	15	120	**0**	120	10	130
WB RIGHT	166	2	6	170	**165**	335	30	365
I-210 FWY WB RAMPS								
NB LEFT	52	3	9	60	**0**	60	5	65
NB THRU	5	0	0	5	**0**	5	5	10
NB RIGHT	70	0	0	70	**0**	70	5	75
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**614**				**165**	**830**	**75**	**905**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	13 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**0**	315	30	345
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**165**	500	45	545
WB RIGHT	505	25	75	580	**0**	580	50	630
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**140**	275	25	300
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**305**	**1820**	**160**	**1980**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	14 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**0**	315	30	345
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**0**	335	30	365
WB RIGHT	505	25	75	580	**0**	580	50	630
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**140**	275	25	300
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**140**	**1655**	**145**	**1800**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	15 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**0**	315	30	345
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**165**	500	45	545
WB RIGHT	505	25	75	580	**0**	580	50	630
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**0**	135	10	145
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**165**	**1680**	**145**	**1825**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	16 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**140**	455	40	495
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**0**	335	30	365
WB RIGHT	505	25	75	580	**165**	745	65	810
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**0**	135	10	145
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**305**	**1820**	**155**	**1975**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	17 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**140**	455	40	495
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**0**	335	30	365
WB RIGHT	505	25	75	580	**0**	580	50	630
I-210 FWY WB RAMPS								
NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**0**	135	10	145
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**140**	**1655**	**140**	**1795**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	18 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

BERKSHIRE PLACE

EB LEFT	65	3	9	75	**0**	75	5	80
EB THRU	275	14	42	315	**0**	315	30	345
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	290	15	45	335	**0**	335	30	365
WB RIGHT	505	25	75	580	**165**	745	65	810

I-210 FWY WB RAMPS

NB LEFT	65	3	9	75	**0**	75	5	80
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	115	6	18	135	**0**	135	10	145
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1315**				**165**	**1680**	**145**	**1825**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	19 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**0**	180	15	195
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**165**	575	50	625
WB RIGHT	407	1	3	410	**0**	410	35	445
I-210 FWY WB RAMPS								
NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**140**	225	20	245
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**305**	**1555**	**140**	**1695**

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Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	20 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**0**	180	15	195
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**0**	410	35	445
WB RIGHT	407	1	3	410	**0**	410	35	445
I-210 FWY WB RAMPS								
NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**140**	225	20	245
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**140**	**1390**	**125**	**1515**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	21 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**0**	180	15	195
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**165**	575	50	625
WB RIGHT	407	1	3	410	**0**	410	35	445
I-210 FWY WB RAMPS								
NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**0**	85	5	90
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**165**	**1415**	**125**	**1540**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	22 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

BERKSHIRE PLACE

EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**140**	320	30	350
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**0**	410	35	445
WB RIGHT	407	1	3	410	**165**	575	50	625

I-210 FWY WB RAMPS

NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**0**	85	5	90
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**305**	**1555**	**140**	**1695**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	23 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**140**	320	30	350
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**0**	410	35	445
WB RIGHT	407	1	3	410	**0**	410	35	445
I-210 FWY WB RAMPS								
NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**0**	85	5	90
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**140**	**1390**	**125**	**1515**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	24 OF 24

E/W STREET : BERKSHIRE PLACE
N/S STREET : I-210 FWY WB RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 2
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	61	2	6	65	**0**	65	5	70
EB THRU	178	0	0	180	**0**	180	15	195
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	400	3	9	410	**0**	410	35	445
WB RIGHT	407	1	3	410	**165**	575	50	625
I-210 FWY WB RAMPS								
NB LEFT	94	0	0	95	**0**	95	10	105
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	80	2	6	85	**0**	85	5	90
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1221**				**165**	**1415**	**125**	**1540**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 07:30AM

Birkshire Place (WB)
NORTH LEG

TOTAL: 449

TT = 10
TT % = 10/449 = 2.2% ≈ 2%

	Rt	Thru	Lt	Total
	257 255	192 190		
1st	39	84		
2nd	114	58		
3rd	48	21		
4th	56	29		

TT = 4
TT % = 4/340 = 1.2% ≈ 1%

WB 210 Fwy
EAST LEG TOTAL: 340

	1st	2nd	3rd	4th	Total
Rt	66	67	76	68	277 295
Thru	1	0	1	0	2 5
Lt	11	16	22	12	61 60

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.65
SOUTH LEG = 0.78
EAST LEG = 0.86
WEST LEG =

ALL LEGS = 0.82

	Lt	Thru	Rt
1st	25	98	
2nd	30	72	
3rd	27	55	
4th	14	62	
Total	96 95	287 285	

TT = 3
TT % = 3/383 = 0.78% ≈ 1%

TOTAL: 383

SOUTH LEG
Birkshire Place (EB)

HOUR TOTAL: 1,172

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt
Total	293	197	
1st	51	28	
2nd	89	27	
3rd	39	84	
4th	114	58	

	1st	2nd	3rd	4th	Total
Rt	60	55	66	67	248
Thru	1	0	1	0	2
Lt	8	14	11	16	49

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	9	42	
2nd	14	41	
3rd	25	98	
4th	30	72	
Total	78	253	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt
Total	188	99	
1st	48	21	
2nd	56	29	
3rd	44	26	
4th	40	23	

	1st	2nd	3rd	4th	Total
Rt	76	68	55	49	248
Thru	1	0	0	0	1
Lt	22	12	20	16	70

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	27	55	
2nd	14	62	
3rd	21	63	
4th	18	56	
Total	80	236	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 WB RAMPS 05-31-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					WB NORTH LEG							
51	28	0	0	0	0	0	0	0	0	0	0	79
89	25	0	0	2	0	0	0	0	0	0	0	116
38	84	0	1	0	0	0	0	0	0	0	0	123
113	57	0	1	1	0	0	0	0	0	0	0	172
46	19	0	2	2	0	0	0	0	0	0	0	69
54	28	0	2	1	0	0	0	0	0	0	0	85
44	25	0	0	1	0	0	0	0	0	0	0	70
40	22	0	0	1	0	0	0	0	0	0	0	63
				10			0			0		449
						TT= 10+0+0= 10						
475	288	0	6	8	0	0	0	0	0	0	0	777
					EB SOUTH LEG							
0	40	8	0	1	1	0	0	0	0	1	0	51
0	41	14	0	0	0	0	0	0	0	0	0	55
0	96	25	0	2	0	0	0	0	0	0	0	123
0	72	30	0	0	0	0	0	0	0	0	0	102
0	54	27	0	1	0	0	0	0	0	0	0	82
0	62	14	0	0	0	0	0	0	0	0	0	76
0	63	21	0	0	0	0	0	0	0	0	0	84
0	54	18	0	2	0	0	0	0	0	0	0	74
				3			0			0		383
						TT= 3+0+0= 3						
0	482	157	0	6	1	0	0	0	0	1	0	647
					NB EAST LEG							
60	1	6	0	0	2	0	0	0	0	0	0	69
55	0	14	0	0	0	0	0	0	0	0	0	69
65	1	11	1	0	0	0	0	0	0	0	0	78
64	0	16	3	0	0	0	0	0	0	0	0	83
76	1	22	0	0	0	0	0	0	0	0	0	99
68	0	12	0	0	0	0	0	0	0	0	0	80
55	0	20	0	0	0	0	0	0	0	0	0	75
49	0	16	0	0	0	0	0	0	0	0	0	65
				4			0			0		340
						TT= 4+0+0= 4						
492	3	117	4	0	2	0	0	0	0	0	0	618
					WEST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 12:00PM

Birkshire Place (WB)
NORTH LEG

TOTAL: 276

TT = 7
$TT\% = \frac{7}{276} = 2.54\%$
$\approx 3\%$

	Rt	Thru	Lt
Total	168 170	108 110	
1st	73	44	
2nd	33	29	
3rd	34	22	
4th	28	13	

TT = 3
$TT\% = \frac{3}{130} = 2.3\%$
$\approx 2\%$

WB 210 Fwy
EAST LEG TOTAL: 130

	1st	2nd	3rd	4th	Total
Rt	15	20	15	20	70
Thru	3	1	1	0	5
Lt	18	14	13	10	55

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.59
SOUTH LEG = 0.85
EAST LEG = 0.90
WEST LEG =

ALL LEGS = 0.79

	Lt	Thru	Rt
1st	10	37	
2nd	12	54	
3rd	15	48	
4th	11	38	
Total	48 50	177 175	

TT = 7
$TT\% = \frac{7}{225} = 3.1\%$
$\approx 3\%$

TOTAL: 225

SOUTH LEG
Birkshire Place (EB)

HOUR TOTAL: 631

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt
Total	168	108	
1st	73	44	
2nd	33	29	
3rd	34	22	
4th	28	13	

	1st	2nd	3rd	4th	Total
Rt	15	20	15	20	70
Thru	3	1	1	0	5
Lt	18	14	13	10	55

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	10	37	
2nd	12	54	
3rd	15	48	
4th	11	38	
Total	48	177	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
106	172		Total
12	29		1st
11	36		2nd
44	55		3rd
39	52		4th

	1st	2nd	3rd	4th	Total
Rt	18	23	19	15	75
Thru	0	0	0	1	1
Lt	20	15	14	10	59

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	11	25	
2nd	9	28	
3rd	12	31	
4th	17	40	
Total	49	124	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 WB RAMPS 05-31-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
73	43	0	0	1	0	0	0	0	0	0	0	117
32	27	0	1	1	0	0	0	0	0	1	0	62
34	21	0	0	1	0	0	0	0	0	0	0	56
27	12	0	1	1	0	0	0	0	0	0	0	41
11	28	0	1	1 6	0	0	0 0	0	0	0 1	0	276 41
9	35	0	2	1	0	0	0	0	0	0	0	47
43	54	0	0	0	0	1	1	0	0	0	0	99
38	51	0	1	1	0	0	0	0	0	0	0	91
						TT=6+0+1=7						
267	271	0	6	7	0	1	1	0	0	1	0	554
						EB SOUTH LEG						
0	35	10	0	2	0	0	0	0	0	0	0	47
0	54	12	0	0	0	0	0	0	0	0	0	66
0	48	14	0	0	1	0	0	0	0	0	0	63
0	36	9	0	2	1	0	0	1	0	0	0	49
0	24	11	0	1 6	0	0	0 1	0	0	0 0	0	225 36
0	26	9	0	1	0	0	1	0	0	0	0	37
0	31	12	0	0	0	0	0	0	0	0	0	43
0	39	17	0	1	0	0	0	0	0	0	0	57
						TT=6+1+0=7						
0	293	94	0	7	2	0	1	1	0	0	0	398
						NB EAST LEG						
15	3	18	0	0	0	0	0	0	0	0	0	36
20	1	13	0	0	1	0	0	0	0	0	0	35
15	1	12	0	0	1	0	0	0	0	0	0	29
20	0	9	0	0	1	0	0	0	0	0	0	30
17	0	20	1	0 3	0	0	0 0	0	0	0 0	0	130 38
23	0	14	0	0	1	0	0	0	0	0	0	38
19	0	14	0	0	0	0	0	0	0	0	0	33
13	1	10	2	0	0	0	0	0	0	0	0	26
						TT=3+0+0=3						
142	6	110	3	0	4	0	0	0	0	0	0	265
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

(2)

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BERKSHIRE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA CANADA

DATE: 04-10-12

PEAK HOUR: 02:45PM

NORTH LEG (SB) NB

TOTAL: 797

	Rt	Thru	Lt
Total	506	291	
1st	74	35	
2nd	232	105	
3rd	113	73	
4th	87	78	

EAST LEG (WB) EB TOTAL: 178

	1st	2nd	3rd	4th	Total
Rt	36	25	33	19	113
Thru					
Lt	10	16	17	22	65

SB →

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.59
SOUTH LEG = 0.75
EAST LEG = 0.89
WEST LEG =

ALL LEGS = 0.69

	Lt	Thru	Rt
1st	10	103	
2nd	16	81	
3rd	16	61	
4th	21	29	
Total	63	274	

TOTAL: 337

SOUTH LEG (NB) EB

HOUR TOTAL: 1,312

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 02:00PM-03:00PM DATE: 04-10-12

NORTH LEG

	Rt	Thru	Lt
Total	231	137	
1st	75	31	
2nd	39	30	
3rd	43	41	
4th	74	35	

	1st	2nd	3rd	4th	Total
Rt	18	11	16	36	81
Thru					
Lt	11	12	18	10	51

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	11	37	
2nd	11	25	
3rd	11	60	
4th	10	103	
Total	43	225	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 03:00PM-04:00PM DATE: 04-10-12

NORTH LEG

	Rt	Thru	Lt
Total	509	313	
1st	232	105	
2nd	113	73	
3rd	87	78	
4th	77	57	

	1st	2nd	3rd	4th	Total
Rt	25	33	19	14	91
Thru					
Lt	16	17	22	18	73

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	16	81	
2nd	16	61	
3rd	21	29	
4th	14	39	
Total	67	210	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BIRKSHIRE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 05:00PM

Birkshire Place (WB)
NORTH LEG

TOTAL: 811

TT = 4
TT% = 4/811 = 0.5%
≈ 1%

Rt	Thru	Lt	
408 410	403 405		Total
129	110		1st
98	103		2nd
93	117		3rd
88	73		4th

TT = 2
TT% = 2/177 = 1.1%
≈ 1%

WB 210 Fwy
EAST LEG TOTAL: 177

	1st	2nd	3rd	4th	Total
Rt	16	13	29	24	82 80
Thru	0	1	0	0	1 5
Lt	27	28	24	15	94 95

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.85
SOUTH LEG = 0.70
EAST LEG = 0.83
WEST LEG =

ALL LEGS = 0.88

	Lt	Thru	Rt
1st	11	37	
2nd	12	37	
3rd	23	63	
4th	17	41	
Total	63 65	178 180	

TT = 2
TT% = 2/241 = 0.8%
≈ 1%

TOTAL: 241

SOUTH LEG
Birkshire Place (EB)

HOUR TOTAL: 1,229

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt
Total	385	259	
1st	98	70	
2nd	93	61	
3rd	103	66	
4th	91	62	

	1st	2nd	3rd	4th	Total
Rt	20	13	9	13	55
Thru	0	0	0	1	1
Lt	14	24	26	22	86

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	16	29	
2nd	12	24	
3rd	11	37	
4th	12	32	
Total	51	122	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BIRKSHIRE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt
Total	408	403	
1st	129	110	
2nd	98	103	
3rd	93	117	
4th	88	73	

	1st	2nd	3rd	4th	Total
Rt	16	13	29	24	82
Thru	0	1	0	0	1
Lt	27	28	24	15	94

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	11	37	
2nd	12	37	
3rd	23	63	
4th	17	41	
Total	63	178	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : BIRKSHIRE PASADENA

EAST-WEST STREET : I-210 WB RAMPS 05-31-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
98	69	0	0	0	0	0	1	0	0	0	0	168
91	58	0	2	3	0	0	0	0	0	0	0	154
101	64	0	1	2	0	1	0	0	0	0	0	169
91	62	0	0	0	0	0	0	0	0	0	0	153
129	109	0	0	1	0	0	0	0	0	0	0	239
98	102	0	0	1	0	0	0	0	0	0	0	201
93	116	0	0	1	0	0	0	0	0	0	0	210
87	73	0	1	0	0	0	0	0	0	0	0	161
				4		TT= 4+0+0= 4		0			0	811
788	653	0	4	8	0	1	1	0	0	0	0	1455
						EB SOUTH LEG						
0	29	16	0	0	0	0	0	0	0	0	0	45
0	24	12	0	0	0	0	0	0	0	0	0	36
0	35	11	0	1	0	0	1	0	0	0	0	48
0	32	12	0	0	0	0	0	0	0	0	0	44
0	37	11	0	0	0	0	0	0	0	0	0	48
0	37	12	0	0	0	0	0	0	0	0	0	49
0	63	21	0	0	1	0	0	1	0	0	0	86
0	41	17	0	0	0	0	0	0	0	0	0	58
				1		TT= 1+1+0 = 2		1			0	241
0	298	112	0	1	1	0	1	1	0	0	0	414
						NB EAST LEG						
19	0	14	1	0	0	0	0	0	0	0	0	34
13	0	24	0	0	0	0	0	0	0	0	0	37
8	0	26	1	0	0	0	0	0	0	0	0	35
12	1	22	1	0	0	0	0	0	0	0	0	36
16	0	27	0	0	0	0	0	0	0	0	0	43
13	1	28	0	0	0	0	0	0	0	0	0	42
28	0	24	1	0	0	0	0	0	0	0	0	53
23	0	15	0	0	0	0	0	0	1	0	0	39
				1		TT= 1+0+1= 2		0			1	177
132	2	180	4	0	0	0	0	0	1	0	0	319
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

Intersection	
Intersection Delay (sec/veh):	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	285	0	0	190	255	60	5	275	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	5	5	0	0	5	0	0	0
Movement Flow Rate	116	348	0	0	232	311	73	6	335	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	543	0	-	-	0	0	695	1122	174	Capacity (vph)
Stage 1	0	0	-	-	0	0	579	579	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	116	543	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	1036	-	-	-	-	-	333	208	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	473	504	-	
Stage 2	-	-	-	-	-	-	882	523	-	
Mov Capacity-1 Maneuver	1036	-	-	-	-	-	-	184.7	830	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	184.7	-	
Stage 1	-	-	-	-	-	-	473	447.6	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.2	0	9.676
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	175	0	0	110	170	55	5	70	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	0	0	0	0
Movement Flow Rate	63	222	0	0	139	215	70	6	89	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	354	0	-	-	0	0	418	702	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	348	348	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	70	354	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1181	-	-	-	-	-	512	365	925	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	633	638	-	
Stage 2	-	-	-	-	-	-	923	634	-	
Mov Capacity-1 Maneuver	1181	-	-	-	-	-	-	345.3	925	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	345.3	-	
Stage 1	-	-	-	-	-	-	633	603.5	-	
Stage 2	-	-	-	-	-	-	923	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.8	0	4.546
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	275	0	0	290	505	65	0	115	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	0	0	0	0
Movement Flow Rate	94	399	0	0	420	732	94	0	167	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1152	0	-	-	0	0	797	1739	199	Capacity (vph)
Stage 1	0	0	-	-	0	0	587	587	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	210	1152	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	585	-	-	-	-	-	272	88	817	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	455	500	-	
Stage 2	-	-	-	-	-	-	764	275	-	
Mov Capacity-1 Maneuver	585	-	-	-	-	-	-	73.8	817	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	73.8	-	
Stage 1	-	-	-	-	-	-	455	419.5	-	
Stage 2	-	-	-	-	-	-	764	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	6.347
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	180	0	0	405	410	95	5	80	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	5	5	0	0	5	0	0	0
Movement Flow Rate	74	205	0	0	460	466	108	6	91	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	926	0	-	-	0	0	582	1278	102	Capacity (vph)
Stage 1	0	0	-	-	0	0	352	352	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	230	926	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	715	-	-	-	-	-	401	168	923	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	643	635	-	
Stage 2	-	-	-	-	-	-	758	350	-	
Mov Capacity-1 Maneuver	715	-	-	-	-	-	-	150.7	923	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	150.7	-	
Stage 1	-	-	-	-	-	-	643	569.6	-	
Stage 2	-	-	-	-	-	-	758	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.8	0	3.578
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	4.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	285	0	0	245	255	60	5	330	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	25	5	0	0	20	0	0	0
Movement Flow Rate	116	348	0	0	299	311	73	6	402	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	610	0	-	-	0	0	728	1189	174	Capacity (vph)
Stage 1	0	0	-	-	0	0	579	579	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	149	610	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.5	HCM Lane LOS
Pot Capacity-1 Maneuver	978	-	-	-	-	-	315	190	786	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	473	504	-	
Stage 2	-	-	-	-	-	-	844	488	-	
Mov Capacity-1 Maneuver	978	-	-	-	-	-	-	167.6	786	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	167.6	-	
Stage 1	-	-	-	-	-	-	473	444.5	-	
Stage 2	-	-	-	-	-	-	844	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	11.782
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	175	0	0	165	170	55	5	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	35	5	5	0	42	0	0	0
Movement Flow Rate	63	222	0	0	209	215	70	6	158	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	424	0	-	-	0	0	452	772	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	348	348	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	104	424	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	1110	-	-	-	-	-	484	333	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	633	638	-	
Stage 2	-	-	-	-	-	-	882	590	-	
Mov Capacity-1 Maneuver	1110	-	-	-	-	-	-	314	805	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	314	-	
Stage 1	-	-	-	-	-	-	633	601.6	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	6.838
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	275	0	0	345	505	65	0	170	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	19	5	5	0	30	0	0	0
Movement Flow Rate	94	399	0	0	500	732	94	0	246	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1232	0	-	-	0	0	837	1819	199	Capacity (vph)
Stage 1	0	0	-	-	0	0	587	587	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	250	1232	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.6	HCM Lane LOS
Pot Capacity-1 Maneuver	545	-	-	-	-	-	254	79	HCM 728	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	455	500	-	
Stage 2	-	-	-	-	-	-	724	252	-	
Mov Capacity-1 Maneuver	545	-	-	-	-	-	-	65.3	728	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	65.3	-	
Stage 1	-	-	-	-	-	-	455	413.5	-	
Stage 2	-	-	-	-	-	-	724	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.5	0	8.766
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	180	0	0	460	410	95	5	135	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	15	5	0	0	42	0	0	0
Movement Flow Rate	74	205	0	0	523	466	108	6	153	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	989	0	-	-	0	0	613	1341	102	Capacity (vph)
Stage 1	0	0	-	-	0	0	352	352	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	261	989	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	677	-	-	-	-	-	381	154	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	643	635	-	
Stage 2	-	-	-	-	-	-	727	327	-	
Mov Capacity-1 Maneuver	677	-	-	-	-	-	-	137.2	822	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	137.2	-	
Stage 1	-	-	-	-	-	-	643	565.8	-	
Stage 2	-	-	-	-	-	-	727	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.9	0	5.549
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	4.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	310	0	0	265	280	65	5	360	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	25	5	0	0	20	0	0	0
Movement Flow Rate	128	378	0	0	323	341	79	6	439	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	665	0	-	-	0	0	796	1299	189	Capacity (vph)
Stage 1	0	0	-	-	0	0	634	634	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	162	665	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.5	HCM Lane LOS
Pot Capacity-1 Maneuver	935	-	-	-	-	-	281	163	767	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	439	476	-	
Stage 2	-	-	-	-	-	-	830	461	-	
Mov Capacity-1 Maneuver	935	-	-	-	-	-	-	140.7	767	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	140.7	-	
Stage 1	-	-	-	-	-	-	439	410.8	-	
Stage 2	-	-	-	-	-	-	830	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	13.065
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	2.3

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	190	0	0	180	185	60	5	135	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	35	5	5	0	42	0	0	0
Movement Flow Rate	70	241	0	0	228	234	76	6	171	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	462	0	-	-	0	0	494	842	120	Capacity (vph)
Stage 1	0	0	-	-	0	0	380	380	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	114	462	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	1074	-	-	-	-	-	451	303	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	606	617	-	
Stage 2	-	-	-	-	-	-	870	568	-	
Mov Capacity-1 Maneuver	1074	-	-	-	-	-	-	283.3	795	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	283.3	-	
Stage 1	-	-	-	-	-	-	606	576.9	-	
Stage 2	-	-	-	-	-	-	870	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	6.965
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	2.2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	300	0	0	375	550	70	0	185	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	19	5	5	0	30	0	0	0
Movement Flow Rate	101	435	0	0	543	797	101	0	268	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1341	0	-	-	0	0	910	1979	217	Capacity (vph)
Stage 1	0	0	-	-	0	0	638	638	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	272	1341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.6	HCM Lane LOS
Pot Capacity-1 Maneuver	495	-	-	-	-	-	225	62	708	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	424	474	-	
Stage 2	-	-	-	-	-	-	702	223	-	
Mov Capacity-1 Maneuver	495	-	-	-	-	-	-	49.3	708	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	49.3	-	
Stage 1	-	-	-	-	-	-	424	376.8	-	
Stage 2	-	-	-	-	-	-	702	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.7	0	9.302
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	195	0	0	500	445	105	5	145	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	15	5	0	0	42	0	0	0
Movement Flow Rate	80	222	0	0	568	506	119	6	165	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1074	0	-	-	0	0	665	1455	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	381	381	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	284	1074	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	628	-	-	-	-	-	349	131	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	619	617	-	
Stage 2	-	-	-	-	-	-	705	299	-	
Mov Capacity-1 Maneuver	628	-	-	-	-	-	-	114.4	805	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	114.4	-	
Stage 1	-	-	-	-	-	-	619	538.6	-	
Stage 2	-	-	-	-	-	-	705	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	3.1	0	5.596
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	4.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	285	0	0	190	255	60	5	330	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	5	5	0	0	20	0	0	0
Movement Flow Rate	116	348	0	0	232	311	73	6	402	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	543	0	-	-	0	0	695	1122	174	Capacity (vph)
Stage 1	0	0	-	-	0	0	579	579	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	116	543	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.5	HCM Lane LOS
Pot Capacity-1 Maneuver	1036	-	-	-	-	-	333	208	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	473	504	-	
Stage 2	-	-	-	-	-	-	882	523	-	
Mov Capacity-1 Maneuver	1036	-	-	-	-	-	-	184.7	786	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	184.7	-	
Stage 1	-	-	-	-	-	-	473	447.6	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.2	0	11.782
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	2.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	175	0	0	110	170	55	5	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	42	0	0	0
Movement Flow Rate	61	213	0	0	134	207	67	6	152	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	341	0	-	-	0	0	402	676	107	Capacity (vph)
Stage 1	0	0	-	-	0	0	335	335	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	67	341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	1194	-	-	-	-	-	526	378	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	644	646	-	
Stage 2	-	-	-	-	-	-	927	642	-	
Mov Capacity-1 Maneuver	1194	-	-	-	-	-	-	358.7	809	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	358.7	-	
Stage 1	-	-	-	-	-	-	644	613.1	-	
Stage 2	-	-	-	-	-	-	927	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.8	0	6.77
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	275	0	0	290	505	65	0	170	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	30	0	0	0
Movement Flow Rate	79	335	0	0	354	616	79	0	207	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	970	0	-	-	0	0	671	1464	168	Capacity (vph)
Stage 1	0	0	-	-	0	0	494	494	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	177	970	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.6	HCM Lane LOS
Pot Capacity-1 Maneuver	688	-	-	-	-	-	336	130	766	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	518	550	-	
Stage 2	-	-	-	-	-	-	799	334	-	
Mov Capacity-1 Maneuver	688	-	-	-	-	-	-	115.1	766	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	115.1	-	
Stage 1	-	-	-	-	-	-	518	486.8	-	
Stage 2	-	-	-	-	-	-	799	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.1	0	7.97
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	180	0	0	405	410	95	5	135	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	0	0	0	5	5	0	0	42	0	0	0
Movement Flow Rate	79	220	0	0	494	500	116	6	165	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	994	0	-	-	0	0	625	1372	110	Capacity (vph)
Stage 1	0	0	-	-	0	0	378	378	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	247	994	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	674	-	-	-	-	-	373	147	806	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	621	619	-	
Stage 2	-	-	-	-	-	-	741	326	-	
Mov Capacity-1 Maneuver	674	-	-	-	-	-	-	129.7	806	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	129.7	-	
Stage 1	-	-	-	-	-	-	621	546	-	
Stage 2	-	-	-	-	-	-	741	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.9	0	5.664
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	4.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	310	0	0	205	280	65	5	360	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	5	5	0	0	20	0	0	0
Movement Flow Rate	128	378	0	0	250	341	79	6	439	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	591	0	-	-	0	0	759	1225	189	Capacity (vph)
Stage 1	0	0	-	-	0	0	634	634	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	125	591	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.5	HCM Lane LOS
Pot Capacity-1 Maneuver	995	-	-	-	-	-	299	180	767	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	439	476	-	
Stage 2	-	-	-	-	-	-	872	498	-	
Mov Capacity-1 Maneuver	995	-	-	-	-	-	-	156.8	767	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	156.8	-	
Stage 1	-	-	-	-	-	-	439	414.6	-	
Stage 2	-	-	-	-	-	-	872	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	13.065
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	2.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	190	0	0	120	185	60	5	135	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	42	0	0	0
Movement Flow Rate	67	232	0	0	146	226	73	6	165	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	372	0	-	-	0	0	439	738	116	Capacity (vph)
Stage 1	0	0	-	-	0	0	366	366	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	73	372	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	1164	-	-	-	-	-	495	348	800	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	618	626	-	
Stage 2	-	-	-	-	-	-	919	622	-	
Mov Capacity-1 Maneuver	1164	-	-	-	-	-	-	327.8	800	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	327.8	-	
Stage 1	-	-	-	-	-	-	618	589.7	-	
Stage 2	-	-	-	-	-	-	919	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	6.898
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	2

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	300	0	0	315	550	70	0	185	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	5	0	0	5	5	5	0	30	0	0	0
Movement Flow Rate	85	366	0	0	384	671	85	0	226	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1055	0	-	-	0	0	729	1592	183	Capacity (vph)
Stage 1	0	0	-	-	0	0	537	537	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	192	1055	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.6	HCM Lane LOS
Pot Capacity-1 Maneuver	638	-	-	-	-	-	305	108	HCM 748	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	488	526	-	
Stage 2	-	-	-	-	-	-	783	305	-	
Mov Capacity-1 Maneuver	638	-	-	-	-	-	-	93.5	748	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	93.5	-	
Stage 1	-	-	-	-	-	-	488	455.5	-	
Stage 2	-	-	-	-	-	-	783	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.2	0	8.359
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	195	0	0	440	445	105	5	145	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	5	0	0	0	5	5	0	0	42	0	0	0
Movement Flow Rate	85	238	0	0	537	543	128	6	177	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1079	0	-	-	0	0	677	1488	119	Capacity (vph)
Stage 1	0	0	-	-	0	0	409	409	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	268	1079	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	625	-	-	-	-	-	343	125	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	596	600	-	
Stage 2	-	-	-	-	-	-	720	297	-	
Mov Capacity-1 Maneuver	625	-	-	-	-	-	-	107.9	796	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	107.9	-	
Stage 1	-	-	-	-	-	-	596	517.8	-	
Stage 2	-	-	-	-	-	-	720	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	3.1	0	5.71
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	285	0	0	245	255	60	5	275	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	25	5	0	0	5	0	0	0
Movement Flow Rate	116	348	0	0	299	311	73	6	335	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	610	0	-	-	0	0	728	1189	174	Capacity (vph)
Stage 1	0	0	-	-	0	0	579	579	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	149	610	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	978	-	-	-	-	-	315	190	830	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	473	504	-	
Stage 2	-	-	-	-	-	-	844	488	-	
Mov Capacity-1 Maneuver	978	-	-	-	-	-	-	167.6	830	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	167.6	-	
Stage 1	-	-	-	-	-	-	473	444.5	-	
Stage 2	-	-	-	-	-	-	844	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	9.676
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	175	0	0	165	170	55	5	70	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	35	5	5	0	0	0	0	0
Movement Flow Rate	63	222	0	0	209	215	70	6	89	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	424	0	-	-	0	0	452	772	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	348	348	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	104	424	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1110	-	-	-	-	-	484	333	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	633	638	-	
Stage 2	-	-	-	-	-	-	882	590	-	
Mov Capacity-1 Maneuver	1110	-	-	-	-	-	-	314	925	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	314	-	
Stage 1	-	-	-	-	-	-	633	601.6	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	5.06
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	275	0	0	345	505	65	0	115	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	19	5	5	0	0	0	0	0
Movement Flow Rate	94	399	0	0	500	732	94	0	167	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1232	0	-	-	0	0	837	1819	199	Capacity (vph)
Stage 1	0	0	-	-	0	0	587	587	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	250	1232	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	545	-	-	-	-	-	254	79	817	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	455	500	-	
Stage 2	-	-	-	-	-	-	724	252	-	
Mov Capacity-1 Maneuver	545	-	-	-	-	-	-	65.3	817	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	65.3	-	
Stage 1	-	-	-	-	-	-	455	413.5	-	
Stage 2	-	-	-	-	-	-	724	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.5	0	6.347
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	180	0	0	460	410	95	5	80	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	15	5	0	0	5	0	0	0
Movement Flow Rate	74	205	0	0	523	466	108	6	91	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	989	0	-	-	0	0	613	1341	102	Capacity (vph)
Stage 1	0	0	-	-	0	0	352	352	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	261	989	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	677	-	-	-	-	-	381	154	923	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	643	635	-	
Stage 2	-	-	-	-	-	-	727	327	-	
Mov Capacity-1 Maneuver	677	-	-	-	-	-	-	137.2	923	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	137.2	-	
Stage 1	-	-	-	-	-	-	643	565.8	-	
Stage 2	-	-	-	-	-	-	727	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.9	0	3.578
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	310	0	0	265	280	65	5	300	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	25	5	0	0	20	0	0	0
Movement Flow Rate	128	378	0	0	323	341	79	6	366	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	665	0	-	-	0	0	796	1299	189	Capacity (vph)
Stage 1	0	0	-	-	0	0	634	634	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	162	665	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.5	HCM Lane LOS
Pot Capacity-1 Maneuver	935	-	-	-	-	-	281	163	767	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	439	476	-	
Stage 2	-	-	-	-	-	-	830	461	-	
Mov Capacity-1 Maneuver	935	-	-	-	-	-	-	140.7	767	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	140.7	-	
Stage 1	-	-	-	-	-	-	439	410.8	-	
Stage 2	-	-	-	-	-	-	830	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	9.507
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	190	0	0	180	185	60	5	75	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	35	5	5	0	42	0	0	0
Movement Flow Rate	70	241	0	0	228	234	76	6	95	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	462	0	-	-	0	0	494	842	120	Capacity (vph)
Stage 1	0	0	-	-	0	0	380	380	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	114	462	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	1074	-	-	-	-	-	451	303	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	606	617	-	
Stage 2	-	-	-	-	-	-	870	568	-	
Mov Capacity-1 Maneuver	1074	-	-	-	-	-	-	283.3	795	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	283.3	-	
Stage 1	-	-	-	-	-	-	606	576.9	-	
Stage 2	-	-	-	-	-	-	870	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	4.946
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	300	0	0	375	550	70	0	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	19	5	5	0	30	0	0	0
Movement Flow Rate	101	435	0	0	543	797	101	0	181	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1341	0	-	-	0	0	910	1979	217	Capacity (vph)
Stage 1	0	0	-	-	0	0	638	638	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	272	1341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.6	HCM Lane LOS
Pot Capacity-1 Maneuver	495	-	-	-	-	-	225	62	708	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	424	474	-	
Stage 2	-	-	-	-	-	-	702	223	-	
Mov Capacity-1 Maneuver	495	-	-	-	-	-	-	49.3	708	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	49.3	-	
Stage 1	-	-	-	-	-	-	424	376.8	-	
Stage 2	-	-	-	-	-	-	702	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.7	0	7.205
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	195	0	0	500	445	105	5	85	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	15	5	0	0	42	0	0	0
Movement Flow Rate	80	222	0	0	568	506	119	6	97	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1074	0	-	-	0	0	665	1455	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	381	381	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	284	1074	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.72	HCM Lane LOS
Pot Capacity-1 Maneuver	628	-	-	-	-	-	349	131	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	619	617	-	
Stage 2	-	-	-	-	-	-	705	299	-	
Mov Capacity-1 Maneuver	628	-	-	-	-	-	-	114.4	805	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	114.4	-	
Stage 1	-	-	-	-	-	-	619	538.6	-	
Stage 2	-	-	-	-	-	-	705	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	3.1	0	3.838
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	340	0	0	190	310	60	5	275	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	19	0	0	5	21	0	0	5	0	0	0
Movement Flow Rate	116	415	0	0	232	378	73	6	335	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	610	0	-	-	0	0	762	1256	207	Capacity (vph)
Stage 1	0	0	-	-	0	0	646	646	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	116	610	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	978	-	-	-	-	-	298	173	789	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	431	470	-	
Stage 2	-	-	-	-	-	-	882	488	-	
Mov Capacity-1 Maneuver	978	-	-	-	-	-	-	152.6	789	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	152.6	-	
Stage 1	-	-	-	-	-	-	431	414.5	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2	0	10.243
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	230	0	0	110	225	55	5	70	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	26	0	0	5	27	5	0	0	0	0	0
Movement Flow Rate	63	291	0	0	139	285	70	6	89	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	424	0	-	-	0	0	488	842	146	Capacity (vph)
Stage 1	0	0	-	-	0	0	5.74[illegible]335E-311			HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	1.36[illegible]025E-321			HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1110	-	-	-	-	-	456	303	[illegible]	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	575	594	-	
Stage 2	-	-	-	-	-	-	923	590	-	
Mov Capacity-1 Maneuver	1110	-	-	-	-	-	-	285.7	880	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	285.7	-	
Stage 1	-	-	-	-	-	-	575	560.1	-	
Stage 2	-	-	-	-	-	-	923	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.5	0	4.654
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	330	0	0	290	560	65	0	115	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	94	478	0	0	420	812	94	0	167	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1232	0	-	-	0	0	877	1899	239	Capacity (vph)
Stage 1	0	0	-	-	0	0	667	667	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	210	1232	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	545	-	-	-	-	-	238	70	769	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	407	460	-	
Stage 2	-	-	-	-	-	-	764	252	-	
Mov Capacity-1 Maneuver	545	-	-	-	-	-	-	57.9	769	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	57.9	-	
Stage 1	-	-	-	-	-	-	407	380.4	-	
Stage 2	-	-	-	-	-	-	764	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.1	0	7.207
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	235	0	0	405	465	95	5	80	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	22	0	0	5	15	0	0	5	0	0	0
Movement Flow Rate	74	267	0	0	460	528	108	6	91	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	989	0	-	-	0	0	645	1404	134	Capacity (vph)
Stage 1	0	0	-	-	0	0	415	415	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	230	989	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	677	-	-	-	-	-	361	141	878	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	591	596	-	
Stage 2	-	-	-	-	-	-	758	327	-	
Mov Capacity-1 Maneuver	677	-	-	-	-	-	-	125.6	878	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	125.6	-	
Stage 1	-	-	-	-	-	-	591	531	-	
Stage 2	-	-	-	-	-	-	758	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	4.374
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	370	0	0	205	340	65	5	300	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	19	0	0	5	21	0	0	5	0	0	0
Movement Flow Rate	128	451	0	0	250	415	79	6	366	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	665	0	-	-	0	0	832	1372	226	Capacity (vph)
Stage 1	0	0	-	-	0	0	707	707	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	125	665	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	935	-	-	-	-	-	265	147	769	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	397	441	-	
Stage 2	-	-	-	-	-	-	872	461	-	
Mov Capacity-1 Maneuver	935	-	-	-	-	-	-	126.9	769	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	126.9	-	
Stage 1	-	-	-	-	-	-	397	380.6	-	
Stage 2	-	-	-	-	-	-	872	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.1	0	11.081
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	250	0	0	120	245	60	5	75	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	26	0	0	5	27	5	0	0	0	0	0
Movement Flow Rate	70	316	0	0	152	310	76	6	95	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	462	0	-	-	0	0	532	918	158	Capacity (vph)
Stage 1	0	0	-	-	0	0	456	456	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	76	462	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1074	-	-	-	-	-	424	274	865	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	546	572	-	
Stage 2	-	-	-	-	-	-	916	568	-	
Mov Capacity-1 Maneuver	1074	-	-	-	-	-	-	256.2	865	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	256.2	-	
Stage 1	-	-	-	-	-	-	546	534.8	-	
Stage 2	-	-	-	-	-	-	916	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.5	0	4.732
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	360	0	0	315	610	70	0	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	101	522	0	0	457	884	101	0	181	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1341	0	-	-	0	0	953	2066	261	Capacity (vph)
Stage 1	0	0	-	-	0	0	725	725	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	228	1341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	495	-	-	-	-	-	209	55	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	376	433	-	
Stage 2	-	-	-	-	-	-	745	223	-	
Mov Capacity-1 Maneuver	495	-	-	-	-	-	-	43.7	745	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	43.7	-	
Stage 1	-	-	-	-	-	-	376	344.2	-	
Stage 2	-	-	-	-	-	-	745	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	6.949
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	255	0	0	440	505	105	5	85	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	22	0	0	5	15	0	0	5	0	0	0
Movement Flow Rate	80	290	0	0	500	574	119	6	97	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1				Major 2		Minor 1			Lane
Conflicting Flow Rate - All	1074	0	-	-	0	0	699	1523	145	Capacity (vph)
Stage 1	0	0	-	-	0	0	449	449	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	250	1074	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	628	-	-	-	-	-	330	119	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	564	576	-	
Stage 2	-	-	-	-	-	-	738	299	-	
Mov Capacity-1 Maneuver	628	-	-	-	-	-	-	103.9	866	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	103.9	-	
Stage 1	-	-	-	-	-	-	564	502.8	-	
Stage 2	-	-	-	-	-	-	738	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.5	0	3.664
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	340	0	0	190	255	60	5	275	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	19	0	0	5	5	0	0	5	0	0	0
Movement Flow Rate	116	415	0	0	232	311	73	6	335	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	543	0	-	-	0	0	762	1189	207	Capacity (vph)
Stage 1	0	0	-	-	0	0	646	646	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	116	543	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	1036	-	-	-	-	-	298	190	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	431	470	-	
Stage 2	-	-	-	-	-	-	882	523	-	
Mov Capacity-1 Maneuver	1036	-	-	-	-	-	-	168.7	789	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	168.7	-	
Stage 1	-	-	-	-	-	-	431	417.4	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	10.243
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	230	0	0	110	170	55	5	70	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	26	0	0	5	5	5	0	0	0	0	0
Movement Flow Rate	63	291	0	0	139	215	70	6	89	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	354	0	-	-	0	0	488	772	146	Capacity (vph)
Stage 1	0	0	-	-	0	0	418	418	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	70	354	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1181	-	-	-	-	-	456	333	880	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	575	594	-	
Stage 2	-	-	-	-	-	-	923	634	-	
Mov Capacity-1 Maneuver	1181	-	-	-	-	-	-	315	880	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	315	-	
Stage 1	-	-	-	-	-	-	575	561.9	-	
Stage 2	-	-	-	-	-	-	923	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.5	0	4.654
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	330	0	0	290	505	65	0	115	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	5	5	0	0	0	0	0
Movement Flow Rate	94	478	0	0	420	732	94	0	167	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1152	0	-	-	0	0	877	1819	239	Capacity (vph)
Stage 1	0	0	-	-	0	0	667	667	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	210	1152	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	585	-	-	-	-	-	238	79	769	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	407	460	-	
Stage 2	-	-	-	-	-	-	764	275	-	
Mov Capacity-1 Maneuver	585	-	-	-	-	-	-	66.3	769	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	66.3	-	
Stage 1	-	-	-	-	-	-	407	385.9	-	
Stage 2	-	-	-	-	-	-	764	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2	0	6.667
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	235	0	0	405	410	95	5	80	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	22	0	0	5	5	0	0	5	0	0	0
Movement Flow Rate	74	267	0	0	460	466	108	6	91	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	926	0	-	-	0	0	645	1341	134	Capacity (vph)
Stage 1	0	0	-	-	0	0	415	415	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	230	926	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	715	-	-	-	-	-	361	154	878	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	591	596	-	
Stage 2	-	-	-	-	-	-	758	350	-	
Mov Capacity-1 Maneuver	715	-	-	-	-	-	-	138.1	878	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	138.1	-	
Stage 1	-	-	-	-	-	-	591	534.6	-	
Stage 2	-	-	-	-	-	-	758	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	3.711
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	250	0	0	120	245	60	5	75	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	26	0	0	5	27	5	0	0	0	0	0
Movement Flow Rate	70	316	0	0	152	310	76	6	95	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	462	0	-	-	0	0	532	918	158	Capacity (vph)
Stage 1	0	0	-	-	0	0	456	456	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	76	462	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1074	-	-	-	-	-	424	274	865	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	546	572	-	
Stage 2	-	-	-	-	-	-	916	568	-	
Mov Capacity-1 Maneuver	1074	-	-	-	-	-	-	256.2	865	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	256.2	-	
Stage 1	-	-	-	-	-	-	546	534.8	-	
Stage 2	-	-	-	-	-	-	916	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.5	0	4.732
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	360	0	0	315	610	70	0	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	101	522	0	0	457	884	101	0	181	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1341	0	-	-	0	0	953	2066	261	Capacity (vph)
Stage 1	0	0	-	-	0	0	725	725	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	228	1341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	495	-	-	-	-	-	209	55	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	376	433	-	
Stage 2	-	-	-	-	-	-	745	223	-	
Mov Capacity-1 Maneuver	495	-	-	-	-	-	-	43.7	745	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	43.7	-	
Stage 1	-	-	-	-	-	-	376	344.2	-	
Stage 2	-	-	-	-	-	-	745	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	6.949
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	360	0	0	315	550	70	0	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	101	522	0	0	457	797	101	0	181	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1254	0	-	-	0	0	953	1979	261	Capacity (vph)
Stage 1	0	0	-	-	0	0	725	725	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	228	1254	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	534	-	-	-	-	-	209	62	745	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	376	433	-	
Stage 2	-	-	-	-	-	-	745	246	-	
Mov Capacity-1 Maneuver	534	-	-	-	-	-	-	50.2	745	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	50.2	-	
Stage 1	-	-	-	-	-	-	376	350.7	-	
Stage 2	-	-	-	-	-	-	745	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.2	0	6.949
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	255	0	0	440	445	105	5	85	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	22	0	0	5	15	0	0	5	0	0	0
Movement Flow Rate	80	290	0	0	500	506	119	6	97	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1006	0	-	-	0	0	699	1455	145	Capacity (vph)
Stage 1	0	0	-	-	0	0	449	449	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	250	1006	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	666	-	-	-	-	-	330	131	866	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	564	576	-	
Stage 2	-	-	-	-	-	-	738	321	-	
Mov Capacity-1 Maneuver	666	-	-	-	-	-	-	115.4	866	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	115.4	-	
Stage 1	-	-	-	-	-	-	564	507.5	-	
Stage 2	-	-	-	-	-	-	738	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	3.664
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	95	285	0	0	190	310	60	5	275	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	5	0	0	5	21	0	0	5	0	0	0
Movement Flow Rate	116	348	0	0	232	378	73	6	335	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	610	0	-	-	0	0	695	1189	174	Capacity (vph)
Stage 1	0	0	-	-	0	0	579	579	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	116	610	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	978	-	-	-	-	-	333	190	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	473	504	-	
Stage 2	-	-	-	-	-	-	882	488	-	
Mov Capacity-1 Maneuver	978	-	-	-	-	-	-	167.6	830	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	167.6	-	
Stage 1	-	-	-	-	-	-	473	444.5	-	
Stage 2	-	-	-	-	-	-	882	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.3	0	9.676
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	50	175	0	0	110	225	55	5	70	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	5	0	0	5	27	5	0	0	0	0	0
Movement Flow Rate	63	222	0	0	139	285	70	6	89	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	424	0	-	-	0	0	418	772	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	348	348	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	70	424	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1110	-	-	-	-	-	512	333	HCM 95th Percentile Queue (veh)	
Stage 1	-	-	-	-	-	-	633	638	-	
Stage 2	-	-	-	-	-	-	923	590	-	
Mov Capacity-1 Maneuver	1110	-	-	-	-	-	-	314	925	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	314	-	
Stage 1	-	-	-	-	-	-	633	601.6	-	
Stage 2	-	-	-	-	-	-	923	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	4.546
HCM LOS	A	A	A

HCM 2010 TWSC
2: WB 20 Fwy/WB 210 Fwy & Berkshire Place 8/11/2012

Intersection	
Intersection Delay (sec/veh):	1.4

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	275	0	0	290	560	65	0	115	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	5	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	94	399	0	0	420	812	94	0	167	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1232	0	-	-	0	0	797	1819	199	Capacity (vph)
Stage 1	0	0	-	-	0	0	3.2[illegible]E-319	[illegible]E-319	[illegible]E-319	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	6.5[illegible]E-310	[illegible]E-310	[illegible]E-310	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	545	-	-	-	-	-	272	79	[illegible]	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	455	500	-	
Stage 2	-	-	-	-	-	-	764	252	-	
Mov Capacity-1 Maneuver	545	-	-	-	-	-	-	65.3	817	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	65.3	-	
Stage 1	-	-	-	-	-	-	455	413.5	-	
Stage 2	-	-	-	-	-	-	764	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.5	0	5.964
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	65	180	0	0	405	465	95	5	80	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	0	0	0	5	15	0	0	5	0	0	0
Movement Flow Rate	74	205	0	0	460	528	108	6	91	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	989	0	-	-	0	0	582	1341	102	Capacity (vph)
Stage 1	0	0	-	-	0	0	352	352	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	230	989	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	677	-	-	-	-	-	401	154	923	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	643	635	-	
Stage 2	-	-	-	-	-	-	758	327	-	
Mov Capacity-1 Maneuver	677	-	-	-	-	-	-	137.2	923	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	137.2	-	
Stage 1	-	-	-	-	-	-	643	565.8	-	
Stage 2	-	-	-	-	-	-	758	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.9	0	3.578
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	310	0	0	205	340	65	5	300	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Heavy Vehicles(%)	0	19	0	0	5	21	0	0	5	0	0	0
Movement Flow Rate	128	378	0	0	250	415	79	6	366	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	665	0	-	-	0	0	759	1299	189	Capacity (vph)
Stage 1	0	0	-	-	0	0	634	634	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	125	665	0	HCM Lane VC Ratio
Follow-up Headway	2.2	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	935	-	-	-	-	-	299	163	811	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	439	476	-	
Stage 2	-	-	-	-	-	-	872	461	-	
Mov Capacity-1 Maneuver	935	-	-	-	-	-	-	140.7	811	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	140.7	-	
Stage 1	-	-	-	-	-	-	439	410.8	-	
Stage 2	-	-	-	-	-	-	872	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.4	0	10.351
HCM LOS	A	A	B

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	55	190	0	0	120	245	60	5	75	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Heavy Vehicles(%)	5	26	0	0	5	27	5	0	0	0	0	0
Movement Flow Rate	70	241	0	0	152	310	76	6	95	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	462	0	-	-	0	0	456	842	120	Capacity (vph)
Stage 1	0	0	-	-	0	0	380	380	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	76	462	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	1074	-	-	-	-	-	481	303	915	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	606	617	-	
Stage 2	-	-	-	-	-	-	916	568	-	
Mov Capacity-1 Maneuver	1074	-	-	-	-	-	-	283.3	915	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	283.3	-	
Stage 1	-	-	-	-	-	-	606	576.9	-	
Stage 2	-	-	-	-	-	-	916	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	1.9	0	4.571
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	300	0	0	315	610	70	0	125	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Heavy Vehicles(%)	5	20	0	0	5	14	5	0	0	0	0	0
Movement Flow Rate	101	435	0	0	457	884	101	0	181	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1341	0	-	-	0	0	866	1979	217	Capacity (vph)
Stage 1	0	0	-	-	0	0	638	638	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	228	1341	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.55	4	3.3	HCM Lane LOS
Pot Capacity-1 Maneuver	495	-	-	-	-	-	242	62	793	HCM 95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	424	474	-	
Stage 2	-	-	-	-	-	-	745	223	-	
Mov Capacity-1 Maneuver	495	-	-	-	-	-	-	49.3	793	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	49.3	-	
Stage 1	-	-	-	-	-	-	424	376.8	-	
Stage 2	-	-	-	-	-	-	745	0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	2.7	0	6.628
HCM LOS	A	A	A

Intersection	
Intersection Delay (sec/veh):	1.1

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	70	195	0	0	440	505	105	5	85	0	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	120		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	5	22	0	0	5	15	0	0	5	0	0	0
Movement Flow Rate	80	222	0	0	500	574	119	6	97	0	0	0
Number of Lanes	1	2	0	0	2	0	0	1	1	0	0	0

Major/Minor	Major 1			Major 2			Minor 1			Lane
Conflicting Flow Rate - All	1074	0	-	-	0	0	631	1455	111	Capacity (vph)
Stage 1	0	0	-	-	0	0	381	381	0	HCM Control Delay (s)
Stage 2	0	0	-	-	0	0	250	1074	0	HCM Lane VC Ratio
Follow-up Headway	2.25	-	-	-	0	0	3.5	4	3.35	HCM Lane LOS
Pot Capacity-1 Maneuver	628	-	-	-	-	-	370	131	914	95th Percentile Queue (veh)
Stage 1	-	-	-	-	-	-	619	617	-	
Stage 2	-	-	-	-	-	-	738	299	-	
Mov Capacity-1 Maneuver	628	-	-	-	-	-	-	114.4	914	
Mov Capacity-2 Maneuver	-	-	-	-	-	-	-	114.4	-	
Stage 1	-	-	-	-	-	-	619	538.6	-	
Stage 2	-	-	-	-	-	-	738	# 0	-	

Approach	EB	WB	NB
HCM Control Delay (s)	3.1	0	3.533
HCM LOS	A	A	A

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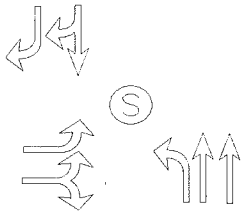
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	JV	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	510	5%		510	45	555
EB THRU	0	0%		0	0	0
EB RIGHT	70	42%	**55**	125	10	135
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	140	30%	**55**	195	20	215
NB THRU	450	5%		450	40	490
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	70	10%		70	5	75
SB RIGHT	360	5%		360	30	390
TOTALS	**1600**		**110**	**1710**	**150**	**1860**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	510	5%		510	45	510
EB THRU	0	0%		0	0	10
EB RIGHT	70	42%	**55**	125	10	125
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	140	5%		140	15	155
NB THRU	450	5%		450	40	490
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	70	10%		70	5	75
SB RIGHT	360	5%		360	30	390
TOTALS	**1600**		**55**	**1655**	**145**	**1755**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	510	5%		510	45	555
EB THRU	0	0%		0	0	0
EB RIGHT	70	0%		70	5	75
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	140	30%	**55**	195	20	215
NB THRU	450	5%		450	40	490
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	70	10%		70	5	75
SB RIGHT	360	5%		360	30	390
TOTALS	**1600**		**55**	**1655**	**145**	**1800**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	150	5%		150	15	165
EB THRU	0	0%		0	0	0
EB RIGHT	60	5%	**55**	115	10	125
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	5%	**55**	120	10	130
NB THRU	135	5%		135	10	145
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	100	10%		100	10	110
SB RIGHT	215	5%		215	20	235
TOTALS	**725**		**110**	**835**	**75**	**910**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	150	5%		150	15	165
EB THRU	0	0%		0	0	0
EB RIGHT	60	5%	**55**	115	10	125
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	5%		65	5	70
NB THRU	135	5%		135	10	145
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	100	10%		100	10	110
SB RIGHT	215	5%		215	20	235
TOTALS	**725**		**55**	**780**	**70**	**850**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	150	5%		150	15	165
EB THRU	0	0%		0	0	0
EB RIGHT	60	5%		60	5	65
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	5%	**55**	120	10	130
NB THRU	135	5%		135	10	145
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	100	10%		100	10	110
SB RIGHT	215	5%		215	20	235
TOTALS	**725**		**55**	**780**	**70**	**850**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	330	5%		330	30	360
EB THRU	0	0%		0	0	0
EB RIGHT	45	5%	**55**	100	10	110
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	75	5%	**55**	130	10	140
NB THRU	95	5%		95	10	105
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	140	10%		140	15	155
SB RIGHT	745	5%		745	65	810
TOTALS	**1430**		**110**	**1540**	**140**	**1680**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	330	5%		330	30	360
EB THRU	0	0%		0	0	0
EB RIGHT	45	5%	**55**	100	10	110
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	75	5%		75	5	80
NB THRU	95	5%		95	10	105
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	140	10%		140	15	155
SB RIGHT	745	5%		745	65	810
TOTALS	**1430**		**55**	**1485**	**135**	**1620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	330	5%		330	30	360
EB THRU	0	0%		0	0	0
EB RIGHT	45	5%		45	5	50
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	75	5%	**55**	130	10	140
NB THRU	95	5%		95	10	105
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	140	10%		140	15	155
SB RIGHT	745	5%		745	65	810
TOTALS	**1430**		**55**	**1485**	**135**	**1620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	185	5%		185	15	200
EB THRU	0	0%		0	0	0
EB RIGHT	85	37%	**55**	140	15	155
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	43%	**55**	120	10	130
NB THRU	150	5%		150	15	165
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	245	5%		245	20	265
SB RIGHT	750	5%		750	70	820
TOTALS	**1480**		**110**	**1590**	**145**	**1735**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	185	5%		185	15	200
EB THRU	0	0%		0	0	0
EB RIGHT	85	37%	**55**	140	15	155
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	0%		65	5	70
NB THRU	150	5%		150	15	165
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	245	5%		245	20	265
SB RIGHT	750	5%		750	70	820
TOTALS	**1480**		**55**	**1535**	**140**	**1675**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BERKSHIRE PLACE						
EB LEFT	185	5%		185	15	200
EB THRU	0	0%		0	0	0
EB RIGHT	85	0%		85	5	90
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
OAK GROVE DRIVE						
NB LEFT	65	43%	**55**	120	10	130
NB THRU	150	5%		150	15	165
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	245	5%		245	20	265
SB RIGHT	750	5%		750	70	820
TOTALS	**1480**		**55**	**1535**	**135**	**1670**

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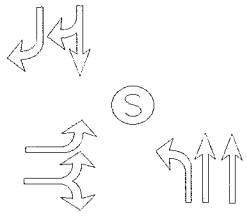
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
3
ROUTE
1A, 1E

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	503	5	15	520	**0**	520	45	565
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	70	0	0	70	**140**	210	20	230
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	139	2	6	145	**165**	310	30	340
NB THRU	448	2	6	455	**0**	455	40	495
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	65	6	18	85	**0**	85	5	90
SB RIGHT	355	4	12	365	**0**	365	35	400
TOTALS	**1580**				**305**	**1945**	**175**	**2120**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	503	5	15	520	**0**	520	45	520
EB THRU	0	0	0	0	**0**	0	0	20
EB RIGHT	70	0	0	70	**140**	210	20	210
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	139	2	6	145	**0**	145	15	160
NB THRU	448	2	6	455	**0**	455	40	495
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	65	6	18	85	**0**	85	5	90
SB RIGHT	355	4	12	365	**0**	365	35	400
TOTALS	**1580**				**140**	**1780**	**160**	**1895**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	503	5	15	520	**0**	520	45	565
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	70	0	0	70	**0**	70	5	75
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	139	2	6	145	**165**	310	30	340
NB THRU	448	2	6	455	**0**	455	40	495
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	65	6	18	85	**0**	85	5	90
SB RIGHT	355	4	12	365	**0**	365	35	400
TOTALS	**1580**				**165**	**1805**	**160**	**1965**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	148	4	12	160	**0**	160	15	175
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	57	3	9	65	**140**	205	20	225
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	67	0	0	65	**165**	230	20	250
NB THRU	130	3	9	140	**0**	140	15	155
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	92	8	24	115	**0**	115	10	125
SB RIGHT	208	6	18	225	**0**	225	20	245
TOTALS	**702**				**305**	**1075**	**100**	**1175**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	148	4	12	160	**0**	160	15	175
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	57	3	9	65	**140**	205	20	225
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	67	0	0	65	**0**	65	5	70
NB THRU	130	3	9	140	**0**	140	15	155
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	92	8	24	115	**0**	115	10	125
SB RIGHT	208	6	18	225	**0**	225	20	245
TOTALS	**702**				**140**	**910**	**85**	**995**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	148	4	12	160	**0**	160	15	175
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	57	3	9	65	**0**	65	5	70
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	67	0	0	65	**165**	230	20	250
NB THRU	130	3	9	140	**0**	140	15	155
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	92	8	24	115	**0**	115	10	125
SB RIGHT	208	6	18	225	**0**	225	20	245
TOTALS	**702**				**165**	**935**	**85**	**1020**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	330	17	50	380	**0**	380	35	415
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	45	2	6	50	**140**	190	15	205
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	75	4	12	85	**165**	250	25	275
NB THRU	95	5	14	110	**0**	110	10	120
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	140	14	42	180	**0**	180	15	195
SB RIGHT	745	37	111	855	**0**	855	75	930
TOTALS	**1430**				**305**	**1965**	**175**	**2140**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	330	17	50	380	**0**	380	35	415
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	45	2	6	50	**140**	190	15	205
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	75	4	12	85	**0**	85	5	90
NB THRU	95	5	14	110	**0**	110	10	120
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	140	14	42	180	**0**	180	15	195
SB RIGHT	745	37	111	855	**0**	855	75	930
TOTALS	**1430**				**140**	**1800**	**155**	**1955**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
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E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	330	17	50	380	**0**	380	35	415
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	45	2	6	50	**0**	50	5	55
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	75	4	12	85	**165**	250	25	275
NB THRU	95	5	14	110	**0**	110	10	120
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	140	14	42	180	**0**	180	15	195
SB RIGHT	745	37	111	855	**0**	855	75	930
TOTALS	**1430**				**165**	**1825**	**165**	**1990**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1A, 1E

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	180	6	18	200	**0**	200	20	220
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	84	0	0	85	**140**	225	20	245
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	66	0	0	65	**165**	230	20	250
NB THRU	145	5	15	160	**0**	160	15	175
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	241	3	9	250	**0**	250	25	275
SB RIGHT	748	3	9	755	**0**	755	70	825
TOTALS	**1464**				**305**	**1820**	**170**	**1990**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	180	6	18	200	**0**	200	20	220
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	84	0	0	85	**140**	225	20	245
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	66	0	0	65	**0**	65	5	70
NB THRU	145	5	15	160	**0**	160	15	175
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	241	3	9	250	**0**	250	25	275
SB RIGHT	748	3	9	755	**0**	755	70	825
TOTALS	**1464**				**140**	**1655**	**155**	**1810**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : BERKSHIRE PLACE
N/S STREET : OAK GROVE DRIVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 3
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BERKSHIRE PLACE								
EB LEFT	180	6	18	200	**0**	200	20	220
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	84	0	0	85	**0**	85	5	90
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
OAK GROVE DRIVE								
NB LEFT	66	0	0	65	**165**	230	20	250
NB THRU	145	5	15	160	**0**	160	15	175
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	241	3	9	250	**0**	250	25	275
SB RIGHT	748	3	9	755	**0**	755	70	825
TOTALS	**1464**				**165**	**1680**	**155**	**1835**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OAK GROVE
EAST-WEST STREET: BIRKSHIRE
JURISDICTION: PASADENA

DATE: 05-26-11

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

TT = 3

TT% = 3/591 = 0.5% ≈ 1%

Oak Grove (NB)

EAST LEG TOTAL: 591

	1st	2nd	3rd	4th	Total
Rt					
Thru	74	196	136	44	450
Lt	20	24	61	36	141 ≈ 140

WEST LEG TOTAL: 430

Oak Grove (SB)

	Total	1st	2nd	3rd	4th
Lt					
Thru	71 ≈ 70	21	19	12	19
Rt	359 ≈ 360	93	98	111	57

N/S ↔

E/W ↕

TT = 10

TT% = 10/430 = 2.3% ≈ 2%

SOUTH LEG

Birkshire (EB)

	Lt	Thru	Rt
1st	82		13
2nd	121		16
3rd	178		20
4th	127		21
Total	508 ≈ 510		70

TOTAL: 578

TT = 5

TT% = 5/578 = 0.87% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.73
EAST LEG = 0.67
WEST LEG = 0.87

ALL LEGS = 0.77

HOUR TOTAL: 1,599

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 07:00AM-08:00AM DATE: 05-26-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	25	74	196	136	431
Lt	11	20	24	61	116

	Total	1st	2nd	3rd	4th
Lt					
Thru	60	8	21	19	12
Rt	370	68	93	98	111

	Lt	Thru	Rt
1st	71		11
2nd	82		13
3rd	121		16
4th	178		20
Total	452		60

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 08:00AM-09:00AM DATE: 05-26-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	44	57	40	60	201
Lt	36	30	11	20	97

	Total	1st	2nd	3rd	4th
Lt					
Thru	85	19	20	25	21
Rt	160	57	48	37	18

	Lt	Thru	Rt
1st	127		21
2nd	124		3
3rd	88		19
4th	82		17
Total	421		60

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : OAK GROVE PASADENA

EAST-WEST STREET : BIRKSHIRE 05-26-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						W NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						E SOUTH LEG (Birkshire)						
11	0	69	0	0	0	0	0	0	0	0	2	82
13	0	81	0	0	1	0	0	0	0	0	0	95
16	0	121	0	0	0	0	0	0	0	0	0	137
20	0	176	0	0	1	0	0	1	0	0	0	198
21	0	125	0	0	2	0	0	0	0	0	0	148
3	0	123	0	0	4 1	0	0	1 0	0	0	0 0	578 127
19	0	87	0	0	1	0	0	0	0	0	0	107
17	0	81	0	0	1	0	0	0	0	0	0	99
						TT = 4+1+0 = 5						
120	0	863	0	0	7	0	0	1	0	0	2	993
						N EAST LEG (Oak Grove)						
0	23	11	0	2	0	0	0	0	0	0	0	36
0	74	19	0	0	0	0	0	1	0	0	0	94
0	196	24	0	0	0	0	0	0	0	0	0	220
0	135	60	0	1	1	0	0	0	0	0	0	197
0	43	36	0	1	0	0	0	0	0	0	0	80
0	55	30	0	2	3 0	0	0	0 0	0	0	0 0	591 87
0	39	11	0	1	0	0	0	0	0	0	0	51
0	60	20	0	0	0	0	0	0	0	0	0	80
						TT = 3+0+0 = 3						
0	625	211	0	7	1	0	0	1	0	0	0	845
						S WEST LEG (Oak Grove)						
67	8	0	1	0	0	0	0	0	0	0	0	76
92	19	0	1	2	0	0	0	0	0	0	0	114
98	18	0	0	1	0	0	0	0	0	0	0	117
109	10	0	2	2	0	0	0	0	0	0	0	123
56	18	0	0	1	0	1	0	0	0	0	0	76
45	20	0	3	0	9 0	0	0	1 0	0	0	0 0	430 68
36	24	0	1	1	0	0	0	0	0	0	0	62
17	19	0	1	2	0	0	0	0	0	0	0	39
						TT = 9+1+0 = 10						
520	136	0	9	9	0	1	0	0	0	0	0	675

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OAK GROVE
EAST-WEST STREET: BIRKSHIRE
JURISDICTION: PASADENA

DATE: 05-26-11

PEAK HOUR: 12:00PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

TT = 3

$TT\% = \frac{3}{200} = 1.5\% \approx 2\%$

Oak Grove (NB)

EAST LEG TOTAL: 200

	1st	2nd	3rd	4th	Total
Rt					
Thru	37	32	31	33	133 ≈ 135
Lt	17	10	33	7	67 ≈ 65

N — S

E — W

WEST LEG TOTAL: 315

Oak Grove (SB)

	Total	1st	2nd	3rd	4th
Lt					
Thru	100	34	26	14	26
Rt	215	55	66	47	47

TT = 15

$TT\% = \frac{15}{315} = 4.8\% \approx 5\%$

SOUTH LEG

Birkshire (EB)

	Lt	Thru	Rt
1st	20		11
2nd	33		18
3rd	44		15
4th	55		16
Total	152 ≈ 150		60

TOTAL: 212

TT = 7

$TT\% = \frac{7}{212} = 3.3\% \approx 3\%$

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.75
EAST LEG = 0.78
WEST LEG = 0.86

ALL LEGS = 0.98

HOUR TOTAL: 727

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 12:00PM-01:00PM DATE: 05-26-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	37	32	31	33	133
Lt	17	10	33	7	67

	Total	1st	2nd	3rd	4th
Lt					
Thru	100	34	26	14	26
Rt	215	55	66	47	47

	Lt	Thru	Rt
1st	20		11
2nd	33		18
3rd	44		15
4th	55		16
Total	152		60

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 01:00PM-02:00PM DATE: 05-26-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	23	51	41	31	146
Lt	14	12	12	12	50

	Total	1st	2nd	3rd	4th
Lt					
Thru	98	25	24	19	30
Rt	153	44	39	34	36

	Lt	Thru	Rt
1st	29		5
2nd	27		15
3rd	27		22
4th	21		15
Total	104		57

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : OAK GROVE PASADENA

EAST-WEST STREET : BIRKSHIRE 05-26-11

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						E SOUTH LEG						
10	0	18	1	0	0	0	0	1	0	0	1	31
18	0	33	0	0	0	0	0	0	0	0	0	51
15	0	42	0	0	2	0	0	0	0	0	0	59
14	0	55	1	0	0	0	0	0	1	0	0	71
5	0	25	0	0	4 2	0	0	1 2	0	0	2 0	212 34
15	0	26	0	0	0	0	0	0	0	0	1	42
22	0	27	0	0	0	0	0	0	0	0	0	49
14	0	20	0	0	0	0	0	0	1	0	1	36
						TT = 4+1+2 = 7						
113	0	246	2	0	4	0	0	3	2	0	3	373
						N EAST LEG						
0	35	17	0	2	0	0	0	0	0	0	0	54
0	31	10	0	1	0	0	0	0	0	0	0	42
0	31	33	0	0	0	0	0	0	0	0	0	64
0	33	7	0	0	0	0	0	0	0	0	0	40
0	21	14	0	2	3 0	0	0	0 0	0	0	0 0	200 37
0	50	12	0	1	0	0	0	0	0	0	0	63
0	39	12	0	2	0	0	0	0	0	0	0	53
0	30	12	0	0	0	0	1	0	0	0	0	43
						TT = 3+0+0 = 3						
0	270	117	0	8	0	0	1	0	0	0	0	396
						S WEST LEG						
55	32	0	0	2	0	0	0	0	0	0	0	89
63	26	0	3	0	0	0	0	0	0	0	0	92
43	12	0	3	2	0	0	0	0	1	0	0	61
47	22	0	0	4	0	0	0	0	0	0	0	73
41	23	0	1	2	14 0	1	0	0 0	1	0	1 0	69
36	24	0	1	0	0	1	0	0	1	0	0	63
34	18	0	0	1	0	0	0	0	0	0	0	53
36	29	0	0	1	0	0	0	0	0	0	0	66
						TT = 14+0+1 = 15						
355	186	0	8	12	0	2	0	0	3	0	0	566

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: BERKSHIRE
EAST-WEST STREET: OAK GROVE
JURISDICTION: LA CANADA

DATE: 04-10-12

PEAK HOUR: 02:45PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG (NB) TOTAL: 171

	1st	2nd	3rd	4th	Total
Rt					
Thru	25	20	27	22	94
Lt	23	18	25	11	77

WEST LEG (SB) TOTAL: 886

	Total	1st	2nd	3rd	4th
Lt					
Thru	142	18	45	48	31
Rt	744	98	259	258	129

SOUTH LEG (EB)

	Lt	Thru	Rt
1st	113		17
2nd	99		9
3rd	68		12
4th	49		8
Total	329		46

TOTAL: 375

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.72
EAST LEG = 0.82
WEST LEG = 0.72

ALL LEGS = 0.80

HOUR TOTAL: 1,432

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: OAK GROVE

TIME: 02:00PM-03:00PM DATE: 04-10-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	18	31	17	25	91
Lt	19	18	23	23	83

	Total	1st	2nd	3rd	4th
Lt					
Thru	82	27	18	19	18
Rt	285	67	63	57	98

	Lt	Thru	Rt
1st	43		9
2nd	34		12
3rd	66		22
4th	113		17
Total	256		60

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: BERKSHIRE

EAST-WEST STREET: OAK GROVE

TIME: 03:00PM-04:00PM DATE: 04-10-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	20	27	22	32	101
Lt	18	25	11	20	74

	Total	1st	2nd	3rd	4th
Lt					
Thru	153	45	48	31	29
Rt	746	259	258	129	100

	Lt	Thru	Rt
1st	99		9
2nd	68		12
3rd	49		8
4th	45		7
Total	261		36

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OAK GROVE
EAST-WEST STREET: BIRKSHIRE
JURISDICTION: PASADENA

DATE: 05-26-11

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

TT = 5
TT% = 5/216 = 2.3%
≈ 2%

Oak Grove (NB)

EAST LEG TOTAL: 216

	1st	2nd	3rd	4th	Total
Rt					
Thru	27	23	47	53	150
Lt	11	14	21	20	66 65

WEST LEG TOTAL: 995

Oak Grove (SB)

	Total	1st	2nd	3rd	4th
Lt					
Thru	244 245	58	66	72	48
Rt	751 750	218	177	199	157

TT = 6
TT% = 6/995 = 0.6%
≈ 1%

SOUTH LEG

Birkshire (EB)

	Lt	Thru	Rt
1st	55		15
2nd	36		18
3rd	42		29
4th	53		22
Total	186 185		84 85

TOTAL: 270

TT = 6
TT% = 6/270 = 2.2%
≈ 2%

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.90
EAST LEG = 0.74
WEST LEG = 0.90

ALL LEGS = 0.90

HOUR TOTAL: 1,481

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 04:00PM-05:00PM DATE: 05-26-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	31	41	32	36	140
Lt	12	15	14	14	55

	Total	1st	2nd	3rd	4th
Lt					
Thru	231	64	62	55	50
Rt	588	132	130	164	162

	Lt	Thru	Rt
1st	26		15
2nd	25		21
3rd	35		15
4th	34		20
Total	120		71

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: BIRKSHIRE

TIME: 05:00PM-06:00PM DATE: 05-26-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	27	23	47	53	150
Lt	11	14	21	20	66

	Total	1st	2nd	3rd	4th
Lt					
Thru	244	58	66	72	48
Rt	751	218	177	199	157

	Lt	Thru	Rt
1st	55		15
2nd	36		18
3rd	42		29
4th	53		22
Total	186		84

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : OAK GROVE PASADENA

EAST-WEST STREET : BIRKSHIRE 05-26-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						E SOUTH LEG						
15	0	26	0	0	0	0	0	0	0	0	0	41
21	0	25	0	0	0	0	0	0	0	0	0	46
15	0	34	0	0	1	0	0	0	0	0	0	50
20	0	34	0	0	0	0	0	0	0	0	0	54
15	0	52	0	0	2	0	0	1	0	0	0	70
18	0	34	0	0	0	0	0	0	0	0	2	54
29	0	41	0	0	1	0	0	0	0	0	0	71
22	0	53	0	0	0	0	0	0	0	0	0	75
					3	TT = 3+1+2		1	TT = 6		2	270
155	0	299	0	0	4	0	0	1	0	0	2	461
						N EAST LEG						
0	30	12	0	1	0	0	0	0	0	0	0	43
0	39	15	0	2	0	0	0	0	0	0	0	56
0	31	14	0	1	0	0	0	0	0	0	0	46
0	33	14	0	3	0	0	0	0	0	0	0	50
0	25	11	0	2	0	0	0	0	0	0	0	38
0	23	14	0	0	0	0	0	0	0	0	0	37
0	45	21	0	2	0	0	0	0	0	0	0	68
0	52	20	0	1	0	0	0	0	0	0	0	73
				5		TT = 5+0+0 =		5			0	216
0	278	121	0	12	0	0	0	0	0	0	0	411
						S WEST LEG						
131	63	0	1	1	0	0	0	0	0	0	0	196
128	60	0	2	2	0	0	0	0	0	0	0	192
163	52	0	1	3	0	0	0	0	0	0	0	219
162	48	0	0	2	0	0	0	0	0	0	0	212
217	56	0	1	2	0	0	0	0	0	0	0	276
176	66	0	1	0	0	0	0	0	0	0	0	243
199	72	0	0	0	0	0	0	0	0	0	0	271
156	47	0	0	1	0	0	0	0	1	0	0	205
				5		TT = 5+0+1 =		6			1	995
1332	464	0	6	11	0	0	0	0	1	0	0	1814

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/10/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	510	70	140	450	70	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3321		1719	3438	1520	1461
Flt Permitted	0.96		0.56	1.00	1.00	1.00
Satd. Flow (perm)	3321		1020	3438	1520	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	662	91	182	584	91	468
RTOR Reduction (vph)	30	0	0	0	112	0
Lane Group Flow (vph)	723	0	182	584	176	271
Heavy Vehicles (%)	5%	0%	5%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	13.4		16.1	16.1	16.1	29.5
Effective Green, g (s)	13.4		16.1	16.1	16.1	29.5
Actuated g/C Ratio	0.36		0.43	0.43	0.43	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1187		438	1476	653	1461
v/s Ratio Prot	c0.22			0.17	0.12	0.07
v/s Ratio Perm			c0.18			0.12
v/c Ratio	0.61		0.42	0.40	0.27	0.19
Uniform Delay, d1	9.9		7.4	7.4	6.9	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9		2.9	0.8	1.0	0.1
Delay (s)	10.8		10.3	8.2	7.9	1.1
Level of Service	B		B	A	A	A
Approach Delay (s)	10.8			8.7	4.6	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	37.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/10/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	60	65	135	100	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.96		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3244		1805	3438	1572	1461
Flt Permitted	0.97		0.65	1.00	1.00	1.00
Satd. Flow (perm)	3244		1227	3438	1572	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	61	66	138	102	219
RTOR Reduction (vph)	50	0	0	0	28	0
Lane Group Flow (vph)	164	0	66	138	140	153
Heavy Vehicles (%)	5%	5%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	5.9		19.0	19.0	19.0	24.9
Effective Green, g (s)	5.9		19.0	19.0	19.0	24.9
Actuated g/C Ratio	0.18		0.58	0.58	0.58	0.76
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	582		709	1985	908	1461
v/s Ratio Prot	c0.05			0.04	c0.09	0.02
v/s Ratio Perm			0.05			0.09
v/c Ratio	0.28		0.09	0.07	0.15	0.10
Uniform Delay, d1	11.7		3.1	3.1	3.2	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		0.3	0.1	0.4	0.0
Delay (s)	11.9		3.4	3.1	3.6	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.9			3.2	2.4	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.18		
Actuated Cycle Length (s)	32.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	29.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/10/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	330	45	75	95	140	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3302		1805	3438	1519	1461
Flt Permitted	0.96		0.32	1.00	1.00	1.00
Satd. Flow (perm)	3302		606	3438	1519	1461
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	412	56	94	119	175	931
RTOR Reduction (vph)	27	0	0	0	162	0
Lane Group Flow (vph)	441	0	94	119	404	540
Heavy Vehicles (%)	5%	5%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	11.8		21.1	21.1	21.1	32.9
Effective Green, g (s)	11.8		21.1	21.1	21.1	32.9
Actuated g/C Ratio	0.29		0.52	0.52	0.52	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	953		313	1774	784	1461
v/s Ratio Prot	0.13			0.03	c0.27	c0.11
v/s Ratio Perm			0.16			0.26
v/c Ratio	0.46		0.30	0.07	0.52	0.37
Uniform Delay, d1	11.9		5.7	5.0	6.5	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4		2.4	0.1	2.4	0.2
Delay (s)	12.3		8.1	5.0	8.9	1.3
Level of Service	B		A	A	A	A
Approach Delay (s)	12.3			6.4	5.2	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	40.9	Sum of lost time (s)	4.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/10/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	85	65	150	245	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.95		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3283		1805	3438	1584	1461
Flt Permitted	0.97		0.34	1.00	1.00	1.00
Satd. Flow (perm)	3283		649	3438	1584	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	94	72	167	272	833
RTOR Reduction (vph)	72	0	0	0	74	0
Lane Group Flow (vph)	228	0	72	167	498	533
Heavy Vehicles (%)	5%	0%	0%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.1		21.1	21.1	21.1	30.2
Effective Green, g (s)	9.1		21.1	21.1	21.1	30.2
Actuated g/C Ratio	0.24		0.55	0.55	0.55	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	782		358	1899	875	1461
v/s Ratio Prot	0.07			0.05	c0.31	c0.09
v/s Ratio Perm			0.11			0.28
v/c Ratio	0.29		0.20	0.09	0.57	0.36
Uniform Delay, d1	11.9		4.3	4.0	5.6	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2		1.3	0.1	2.7	0.2
Delay (s)	12.1		5.6	4.1	8.3	1.3
Level of Service	B		A	A	A	A
Approach Delay (s)	12.1			4.6	4.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	510	125	195	450	70	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.97		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3063		1388	3438	1520	1461
Flt Permitted	0.96		0.56	1.00	1.00	1.00
Satd. Flow (perm)	3063		817	3438	1520	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	662	162	253	584	91	468
RTOR Reduction (vph)	58	0	0	0	114	0
Lane Group Flow (vph)	766	0	253	584	174	271
Heavy Vehicles (%)	5%	42%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	14.0		16.1	16.1	16.1	30.1
Effective Green, g (s)	14.0		16.1	16.1	16.1	30.1
Actuated g/C Ratio	0.37		0.42	0.42	0.42	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1126		345	1453	642	1461
v/s Ratio Prot	c0.25			0.17	0.11	0.07
v/s Ratio Perm			c0.31			0.12
v/c Ratio	0.68		0.73	0.40	0.27	0.19
Uniform Delay, d1	10.2		9.2	7.7	7.2	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7		13.0	0.8	1.0	0.1
Delay (s)	11.9		22.2	8.5	8.2	1.0
Level of Service	B		C	A	A	A
Approach Delay (s)	11.9			12.6	4.7	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	38.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	115	120	135	100	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2711		1262	3438	1572	1461
Flt Permitted	0.97		0.65	1.00	1.00	1.00
Satd. Flow (perm)	2711		858	3438	1572	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	117	122	138	102	219
RTOR Reduction (vph)	94	0	0	0	29	0
Lane Group Flow (vph)	176	0	122	138	139	153
Heavy Vehicles (%)	5%	48%	43%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	6.5		18.8	18.8	18.8	25.3
Effective Green, g (s)	6.5		18.8	18.8	18.8	25.3
Actuated g/C Ratio	0.20		0.56	0.56	0.56	0.76
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	529		484	1941	887	1461
v/s Ratio Prot	c0.06			0.04	0.09	0.02
v/s Ratio Perm			c0.14			0.08
v/c Ratio	0.33		0.25	0.07	0.16	0.10
Uniform Delay, d1	11.5		3.7	3.3	3.5	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4		1.2	0.1	0.4	0.0
Delay (s)	11.9		4.9	3.4	3.8	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.9			4.1	2.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	330	100	130	95	140	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.97		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2937		1289	3438	1519	1461
Flt Permitted	0.96		0.31	1.00	1.00	1.00
Satd. Flow (perm)	2937		424	3438	1519	1461
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	412	125	162	119	175	931
RTOR Reduction (vph)	72	0	0	0	165	0
Lane Group Flow (vph)	465	0	162	119	401	540
Heavy Vehicles (%)	5%	55%	40%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	12.4		21.1	21.1	21.1	33.5
Effective Green, g (s)	12.4		21.1	21.1	21.1	33.5
Actuated g/C Ratio	0.30		0.51	0.51	0.51	0.81
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	878		216	1748	772	1461
v/s Ratio Prot	c0.16			0.03	0.26	0.11
v/s Ratio Perm			c0.38			0.26
v/c Ratio	0.53		0.75	0.07	0.52	0.37
Uniform Delay, d1	12.1		8.1	5.2	6.8	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6		21.1	0.1	2.5	0.2
Delay (s)	12.7		29.2	5.3	9.3	1.3
Level of Service	B		C	A	A	A
Approach Delay (s)	12.7			19.0	5.4	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	41.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	140	120	150	245	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2822		1262	3438	1584	1461
Flt Permitted	0.97		0.34	1.00	1.00	1.00
Satd. Flow (perm)	2822		449	3438	1584	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	156	133	167	272	833
RTOR Reduction (vph)	118	0	0	0	75	0
Lane Group Flow (vph)	244	0	133	167	497	533
Heavy Vehicles (%)	5%	37%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.5		21.1	21.1	21.1	30.6
Effective Green, g (s)	9.5		21.1	21.1	21.1	30.6
Actuated g/C Ratio	0.25		0.55	0.55	0.55	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	695		245	1879	866	1461
v/s Ratio Prot	0.09			0.05	c0.31	c0.09
v/s Ratio Perm			0.30			0.27
v/c Ratio	0.35		0.54	0.09	0.57	0.36
Uniform Delay, d1	12.0		5.6	4.2	5.8	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		8.4	0.1	2.8	0.2
Delay (s)	12.3		14.0	4.3	8.5	1.3
Level of Service	B		B	A	A	A
Approach Delay (s)	12.3			8.6	5.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	870	135	215	490	75	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3148		1388	3438	1519	1461
Flt Permitted	0.96		0.52	1.00	1.00	1.00
Satd. Flow (perm)	3148		756	3438	1519	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	1130	175	279	636	97	506
RTOR Reduction (vph)	32	0	0	0	128	0
Lane Group Flow (vph)	1273	0	279	636	182	293
Heavy Vehicles (%)	5%	42%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	16.0		16.0	16.0	16.0	32.0
Effective Green, g (s)	16.0		16.0	16.0	16.0	32.0
Actuated g/C Ratio	0.40		0.40	0.40	0.40	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1259		302	1375	608	1461
v/s Ratio Prot	c0.40			0.18	0.12	0.08
v/s Ratio Perm			c0.37			0.12
v/c Ratio	1.01		0.92	0.46	0.30	0.20
Uniform Delay, d1	12.0		11.4	8.8	8.2	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	28.2		35.5	1.1	1.3	0.1
Delay (s)	40.2		46.9	10.0	9.4	1.0
Level of Service	D		D	A	A	A
Approach Delay (s)	40.2			21.2	5.4	
Approach LOS	D			C	A	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	165	125	130	145	110	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2712		1262	3438	1573	1461
Flt Permitted	0.97		0.64	1.00	1.00	1.00
Satd. Flow (perm)	2712		845	3438	1573	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	168	128	133	148	112	240
RTOR Reduction (vph)	99	0	0	0	33	0
Lane Group Flow (vph)	197	0	133	148	151	168
Heavy Vehicles (%)	5%	48%	43%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	7.9		18.6	18.6	18.6	26.5
Effective Green, g (s)	7.9		18.6	18.6	18.6	26.5
Actuated g/C Ratio	0.23		0.54	0.54	0.54	0.77
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	621		456	1854	848	1461
v/s Ratio Prot	c0.07			0.04	0.10	0.03
v/s Ratio Perm			c0.16			0.09
v/c Ratio	0.32		0.29	0.08	0.18	0.11
Uniform Delay, d1	11.1		4.3	3.8	4.1	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		1.6	0.1	0.5	0.0
Delay (s)	11.4		6.0	3.9	4.5	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.4			4.9	2.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	140	120	150	245	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2822		1262	3438	1584	1461
Flt Permitted	0.97		0.34	1.00	1.00	1.00
Satd. Flow (perm)	2822		449	3438	1584	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	156	133	167	272	833
RTOR Reduction (vph)	118	0	0	0	75	0
Lane Group Flow (vph)	244	0	133	167	497	533
Heavy Vehicles (%)	5%	37%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.5		21.1	21.1	21.1	30.6
Effective Green, g (s)	9.5		21.1	21.1	21.1	30.6
Actuated g/C Ratio	0.25		0.55	0.55	0.55	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	695		245	1879	866	1461
v/s Ratio Prot	0.09			0.05	c0.31	c0.09
v/s Ratio Perm			0.30			0.27
v/c Ratio	0.35		0.54	0.09	0.57	0.36
Uniform Delay, d1	12.0		5.6	4.2	5.8	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		8.4	0.1	2.8	0.2
Delay (s)	12.3		14.0	4.3	8.5	1.3
Level of Service	B		B	A	A	A
Approach Delay (s)	12.3			8.6	5.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	155	130	165	265	820
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.93		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2816		1262	3438	1583	1461
Flt Permitted	0.97		0.29	1.00	1.00	1.00
Satd. Flow (perm)	2816		387	3438	1583	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	222	172	144	183	294	911
RTOR Reduction (vph)	128	0	0	0	77	0
Lane Group Flow (vph)	266	0	144	183	545	583
Heavy Vehicles (%)	5%	37%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	10.1		21.1	21.1	21.1	31.2
Effective Green, g (s)	10.1		21.1	21.1	21.1	31.2
Actuated g/C Ratio	0.26		0.54	0.54	0.54	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	726		208	1851	852	1461
v/s Ratio Prot	0.09			0.05	0.34	c0.10
v/s Ratio Perm			c0.37			0.30
v/c Ratio	0.37		0.69	0.10	0.64	0.40
Uniform Delay, d1	11.9		6.7	4.4	6.4	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		17.3	0.1	3.7	0.2
Delay (s)	12.2		24.0	4.5	10.0	1.4
Level of Service	B		C	A	B	A
Approach Delay (s)	12.2			13.1	5.8	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	39.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	510	125	140	450	70	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.97		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3063		1388	3438	1520	1461
Flt Permitted	0.96		0.54	1.00	1.00	1.00
Satd. Flow (perm)	3063		796	3438	1520	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	662	162	182	584	91	468
RTOR Reduction (vph)	55	0	0	0	118	0
Lane Group Flow (vph)	769	0	182	584	170	271
Heavy Vehicles (%)	5%	42%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	16.0		16.0	16.0	16.0	32.0
Effective Green, g (s)	16.0		16.0	16.0	16.0	32.0
Actuated g/C Ratio	0.40		0.40	0.40	0.40	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1225		318	1375	608	1461
v/s Ratio Prot	c0.25			0.17	0.11	0.07
v/s Ratio Perm			c0.23			0.11
v/c Ratio	0.63		0.57	0.42	0.28	0.19
Uniform Delay, d1	9.6		9.3	8.7	8.1	0.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	2.4		7.3	1.0	1.1	0.3
Delay (s)	12.1		16.6	9.6	9.2	1.2
Level of Service	B		B	A	A	A
Approach Delay (s)	12.1			11.3	5.4	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	115	65	135	100	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2711		1805	3438	1572	1461
Flt Permitted	0.97		0.65	1.00	1.00	1.00
Satd. Flow (perm)	2711		1227	3438	1572	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	117	66	138	102	219
RTOR Reduction (vph)	94	0	0	0	29	0
Lane Group Flow (vph)	176	0	66	138	139	153
Heavy Vehicles (%)	5%	48%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	6.5		18.8	18.8	18.8	25.3
Effective Green, g (s)	6.5		18.8	18.8	18.8	25.3
Actuated g/C Ratio	0.20		0.56	0.56	0.56	0.76
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	529		693	1941	887	1461
v/s Ratio Prot	c0.06			0.04	c0.09	0.02
v/s Ratio Perm			0.05			0.08
v/c Ratio	0.33		0.10	0.07	0.16	0.10
Uniform Delay, d1	11.5		3.3	3.3	3.5	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4		0.3	0.1	0.4	0.0
Delay (s)	11.9		3.6	3.4	3.8	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.9			3.4	2.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.20		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	31.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	330	100	75	95	140	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.97		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2937		1805	3438	1519	1461
Flt Permitted	0.96		0.31	1.00	1.00	1.00
Satd. Flow (perm)	2937		594	3438	1519	1461
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	412	125	94	119	175	931
RTOR Reduction (vph)	72	0	0	0	165	0
Lane Group Flow (vph)	465	0	94	119	401	540
Heavy Vehicles (%)	5%	55%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	12.4		21.1	21.1	21.1	33.5
Effective Green, g (s)	12.4		21.1	21.1	21.1	33.5
Actuated g/C Ratio	0.30		0.51	0.51	0.51	0.81
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	878		302	1748	772	1461
v/s Ratio Prot	c0.16			0.03	c0.26	0.11
v/s Ratio Perm			0.16			0.26
v/c Ratio	0.53		0.31	0.07	0.52	0.37
Uniform Delay, d1	12.1		6.0	5.2	6.8	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6		2.7	0.1	2.5	0.2
Delay (s)	12.7		8.6	5.3	9.3	1.3
Level of Service	B		A	A	A	A
Approach Delay (s)	12.7			6.8	5.4	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	41.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	140	65	150	245	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2822		1805	3438	1584	1461
Flt Permitted	0.97		0.34	1.00	1.00	1.00
Satd. Flow (perm)	2822		641	3438	1584	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	156	72	167	272	833
RTOR Reduction (vph)	118	0	0	0	75	0
Lane Group Flow (vph)	244	0	72	167	497	533
Heavy Vehicles (%)	5%	37%	0%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.5		21.1	21.1	21.1	30.6
Effective Green, g (s)	9.5		21.1	21.1	21.1	30.6
Actuated g/C Ratio	0.25		0.55	0.55	0.55	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	695		350	1879	866	1461
v/s Ratio Prot	0.09			0.05	c0.31	c0.09
v/s Ratio Perm			0.11			0.27
v/c Ratio	0.35		0.21	0.09	0.57	0.36
Uniform Delay, d1	12.0		4.5	4.2	5.8	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		1.3	0.1	2.8	0.2
Delay (s)	12.3		5.8	4.3	8.5	1.3
Level of Service	B		A	A	A	A
Approach Delay (s)	12.3			4.7	5.1	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	555	135	155	490	75	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.97		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3065		1388	3438	1519	1461
Flt Permitted	0.96		0.52	1.00	1.00	1.00
Satd. Flow (perm)	3065		756	3438	1519	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	721	175	201	636	97	506
RTOR Reduction (vph)	55	0	0	0	128	0
Lane Group Flow (vph)	841	0	201	636	182	293
Heavy Vehicles (%)	5%	42%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	16.0		16.0	16.0	16.0	32.0
Effective Green, g (s)	16.0		16.0	16.0	16.0	32.0
Actuated g/C Ratio	0.40		0.40	0.40	0.40	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1226		302	1375	608	1461
v/s Ratio Prot	c0.27			0.18	0.12	0.08
v/s Ratio Perm			c0.27			0.12
v/c Ratio	0.69		0.67	0.46	0.30	0.20
Uniform Delay, d1	9.9		9.8	8.8	8.2	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1		11.1	1.1	1.3	0.3
Delay (s)	13.1		20.9	10.0	9.4	1.3
Level of Service	B		C	A	A	A
Approach Delay (s)	13.1			12.6	5.5	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	165	125	70	145	110	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.94		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2712		1805	3438	1573	1461
Flt Permitted	0.97		0.64	1.00	1.00	1.00
Satd. Flow (perm)	2712		1208	3438	1573	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	168	128	71	148	112	240
RTOR Reduction (vph)	99	0	0	0	33	0
Lane Group Flow (vph)	197	0	71	148	151	168
Heavy Vehicles (%)	5%	48%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	7.9		18.6	18.6	18.6	26.5
Effective Green, g (s)	7.9		18.6	18.6	18.6	26.5
Actuated g/C Ratio	0.23		0.54	0.54	0.54	0.77
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	621		651	1854	848	1461
v/s Ratio Prot	c0.07			0.04	c0.10	0.03
v/s Ratio Perm			0.06			0.09
v/c Ratio	0.32		0.11	0.08	0.18	0.11
Uniform Delay, d1	11.1		3.9	3.8	4.1	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		0.3	0.1	0.5	0.0
Delay (s)	11.4		4.2	3.9	4.5	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.4			4.0	2.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.22		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	360	110	80	105	155	810
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.96		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2934		1805	3438	1519	1461
Flt Permitted	0.96		0.26	1.00	1.00	1.00
Satd. Flow (perm)	2934		500	3438	1519	1461
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	450	138	100	131	194	1012
RTOR Reduction (vph)	72	0	0	0	163	0
Lane Group Flow (vph)	516	0	100	131	456	587
Heavy Vehicles (%)	5%	55%	0%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	12.8		21.1	21.1	21.1	33.9
Effective Green, g (s)	12.8		21.1	21.1	21.1	33.9
Actuated g/C Ratio	0.31		0.50	0.50	0.50	0.81
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	896		252	1731	765	1461
v/s Ratio Prot	c0.18			0.04	c0.30	0.12
v/s Ratio Perm			0.20			0.28
v/c Ratio	0.58		0.40	0.08	0.60	0.40
Uniform Delay, d1	12.3		6.5	5.4	7.4	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9		4.6	0.1	3.4	0.2
Delay (s)	13.2		11.1	5.5	10.8	1.3
Level of Service	B		B	A	B	A
Approach Delay (s)	13.2			7.9	6.2	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	155	70	165	265	820
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.93		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2816		1805	3438	1583	1461
Flt Permitted	0.97		0.29	1.00	1.00	1.00
Satd. Flow (perm)	2816		553	3438	1583	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	222	172	78	183	294	911
RTOR Reduction (vph)	128	0	0	0	77	0
Lane Group Flow (vph)	266	0	78	183	545	583
Heavy Vehicles (%)	5%	37%	0%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	10.1		21.1	21.1	21.1	31.2
Effective Green, g (s)	10.1		21.1	21.1	21.1	31.2
Actuated g/C Ratio	0.26		0.54	0.54	0.54	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	726		298	1851	852	1461
v/s Ratio Prot	0.09			0.05	c0.34	c0.10
v/s Ratio Perm			0.14			0.30
v/c Ratio	0.37		0.26	0.10	0.64	0.40
Uniform Delay, d1	11.9		4.9	4.4	6.4	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		2.1	0.1	3.7	0.2
Delay (s)	12.2		7.0	4.5	10.0	1.4
Level of Service	B		A	A	B	A
Approach Delay (s)	12.2			5.3	5.8	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	39.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	510	70	195	450	70	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3321		1388	3438	1520	1461
Flt Permitted	0.96		0.56	1.00	1.00	1.00
Satd. Flow (perm)	3321		823	3438	1520	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	662	91	253	584	91	468
RTOR Reduction (vph)	30	0	0	0	112	0
Lane Group Flow (vph)	723	0	253	584	176	271
Heavy Vehicles (%)	5%	0%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	13.4		16.1	16.1	16.1	29.5
Effective Green, g (s)	13.4		16.1	16.1	16.1	29.5
Actuated g/C Ratio	0.36		0.43	0.43	0.43	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1187		353	1476	653	1461
v/s Ratio Prot	c0.22			0.17	0.12	0.07
v/s Ratio Perm			c0.31			0.12
v/c Ratio	0.61		0.72	0.40	0.27	0.19
Uniform Delay, d1	9.9		8.8	7.4	6.9	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9		11.8	0.8	1.0	0.1
Delay (s)	10.8		20.6	8.2	7.9	1.1
Level of Service	B		C	A	A	A
Approach Delay (s)	10.8			11.9	4.6	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	37.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	150	60	120	135	100	215
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.96		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3244		1262	3438	1572	1461
Flt Permitted	0.97		0.65	1.00	1.00	1.00
Satd. Flow (perm)	3244		858	3438	1572	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	153	61	122	138	102	219
RTOR Reduction (vph)	50	0	0	0	28	0
Lane Group Flow (vph)	164	0	122	138	140	153
Heavy Vehicles (%)	5%	5%	43%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	5.9		19.0	19.0	19.0	24.9
Effective Green, g (s)	5.9		19.0	19.0	19.0	24.9
Actuated g/C Ratio	0.18		0.58	0.58	0.58	0.76
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	582		496	1985	908	1461
v/s Ratio Prot	c0.05			0.04	0.09	0.02
v/s Ratio Perm			c0.14			0.09
v/c Ratio	0.28		0.25	0.07	0.15	0.10
Uniform Delay, d1	11.7		3.4	3.1	3.2	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		1.2	0.1	0.4	0.0
Delay (s)	11.9		4.6	3.1	3.6	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.9			3.8	2.4	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	32.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	32.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	330	45	130	95	140	745
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.98		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3302		1289	3438	1519	1461
Flt Permitted	0.96		0.32	1.00	1.00	1.00
Satd. Flow (perm)	3302		433	3438	1519	1461
Peak-hour factor, PHF	0.80	0.80	0.80	0.80	0.80	0.80
Adj. Flow (vph)	412	56	162	119	175	931
RTOR Reduction (vph)	27	0	0	0	162	0
Lane Group Flow (vph)	441	0	162	119	404	540
Heavy Vehicles (%)	5%	5%	40%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	11.8		21.1	21.1	21.1	32.9
Effective Green, g (s)	11.8		21.1	21.1	21.1	32.9
Actuated g/C Ratio	0.29		0.52	0.52	0.52	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	953		223	1774	784	1461
v/s Ratio Prot	0.13			0.03	0.27	c0.11
v/s Ratio Perm			c0.37			0.26
v/c Ratio	0.46		0.73	0.07	0.52	0.37
Uniform Delay, d1	11.9		7.7	5.0	6.5	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4		18.6	0.1	2.4	0.2
Delay (s)	12.3		26.3	5.0	8.9	1.3
Level of Service	B		C	A	A	A
Approach Delay (s)	12.3			17.3	5.2	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	40.9	Sum of lost time (s)	4.0
Intersection Capacity Utilization	50.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	185	85	120	150	245	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.95		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3283		1262	3438	1584	1461
Flt Permitted	0.97		0.34	1.00	1.00	1.00
Satd. Flow (perm)	3283		454	3438	1584	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	206	94	133	167	272	833
RTOR Reduction (vph)	72	0	0	0	74	0
Lane Group Flow (vph)	228	0	133	167	498	533
Heavy Vehicles (%)	5%	0%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.1		21.1	21.1	21.1	30.2
Effective Green, g (s)	9.1		21.1	21.1	21.1	30.2
Actuated g/C Ratio	0.24		0.55	0.55	0.55	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	782		251	1899	875	1461
v/s Ratio Prot	0.07			0.05	c0.31	c0.09
v/s Ratio Perm			0.29			0.28
v/c Ratio	0.29		0.53	0.09	0.57	0.36
Uniform Delay, d1	11.9		5.4	4.0	5.6	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2		7.8	0.1	2.7	0.2
Delay (s)	12.1		13.2	4.1	8.3	1.3
Level of Service	B		B	A	A	A
Approach Delay (s)	12.1			8.1	4.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	38.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	870	75	215	490	75	390
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.99		1.00	1.00	0.90	0.85
Flt Protected	0.96		0.95	1.00	1.00	1.00
Satd. Flow (prot)	3226		1388	3438	1519	1461
Flt Permitted	0.96		0.52	1.00	1.00	1.00
Satd. Flow (perm)	3226		756	3438	1519	1461
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	1130	97	279	636	97	506
RTOR Reduction (vph)	16	0	0	0	128	0
Lane Group Flow (vph)	1211	0	279	636	182	293
Heavy Vehicles (%)	5%	42%	30%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	16.0		16.0	16.0	16.0	32.0
Effective Green, g (s)	16.0		16.0	16.0	16.0	32.0
Actuated g/C Ratio	0.40		0.40	0.40	0.40	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1290		302	1375	608	1461
v/s Ratio Prot	c0.38			0.18	0.12	0.08
v/s Ratio Perm			c0.37			0.12
v/c Ratio	0.94		0.92	0.46	0.30	0.20
Uniform Delay, d1	11.5		11.4	8.8	8.2	1.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	12.9		35.5	1.1	1.3	0.1
Delay (s)	24.4		46.9	10.0	9.4	1.0
Level of Service	C		D	A	A	A
Approach Delay (s)	24.4			21.2	5.4	
Approach LOS	C			C	A	

Intersection Summary			
HCM Average Control Delay	19.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	165	65	130	145	110	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.96		1.00	1.00	0.94	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2909		1262	3438	1573	1461
Flt Permitted	0.97		0.64	1.00	1.00	1.00
Satd. Flow (perm)	2909		845	3438	1573	1461
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	168	66	133	148	112	240
RTOR Reduction (vph)	53	0	0	0	31	0
Lane Group Flow (vph)	181	0	133	148	153	168
Heavy Vehicles (%)	5%	48%	43%	5%	10%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	6.4		18.8	18.8	18.8	25.2
Effective Green, g (s)	6.4		18.8	18.8	18.8	25.2
Actuated g/C Ratio	0.19		0.57	0.57	0.57	0.76
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	561		478	1947	891	1461
v/s Ratio Prot	c0.06			0.04	0.10	0.02
v/s Ratio Perm			c0.16			0.09
v/c Ratio	0.32		0.28	0.08	0.17	0.11
Uniform Delay, d1	11.5		3.7	3.3	3.5	1.1
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		1.4	0.1	0.4	0.0
Delay (s)	11.9		5.2	3.3	3.9	1.1
Level of Service	B		A	A	A	A
Approach Delay (s)	11.9			4.2	2.5	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	33.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	155	130	165	265	820
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.93		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2816		1262	3438	1583	1461
Flt Permitted	0.97		0.29	1.00	1.00	1.00
Satd. Flow (perm)	2816		387	3438	1583	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	222	172	144	183	294	911
RTOR Reduction (vph)	128	0	0	0	77	0
Lane Group Flow (vph)	266	0	144	183	545	583
Heavy Vehicles (%)	5%	37%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	10.1		21.1	21.1	21.1	31.2
Effective Green, g (s)	10.1		21.1	21.1	21.1	31.2
Actuated g/C Ratio	0.26		0.54	0.54	0.54	0.80
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	726		208	1851	852	1461
v/s Ratio Prot	0.09			0.05	0.34	c0.10
v/s Ratio Perm			c0.37			0.30
v/c Ratio	0.37		0.69	0.10	0.64	0.40
Uniform Delay, d1	11.9		6.7	4.4	6.4	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		17.3	0.1	3.7	0.2
Delay (s)	12.2		24.0	4.5	10.0	1.4
Level of Service	B		C	A	B	A
Approach Delay (s)	12.2			13.1	5.8	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	39.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: Oak Grove Dr & Birkshire Place

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	200	95	130	165	265	820
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.97		1.00	0.95	0.95	0.95
Frt	0.95		1.00	1.00	0.92	0.85
Flt Protected	0.97		0.95	1.00	1.00	1.00
Satd. Flow (prot)	2941		1262	3438	1583	1461
Flt Permitted	0.97		0.30	1.00	1.00	1.00
Satd. Flow (perm)	2941		393	3438	1583	1461
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	222	106	144	183	294	911
RTOR Reduction (vph)	80	0	0	0	76	0
Lane Group Flow (vph)	249	0	144	183	546	583
Heavy Vehicles (%)	5%	37%	43%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	pm+ov
Protected Phases	4			2	6	4
Permitted Phases			2			6
Actuated Green, G (s)	9.7		21.1	21.1	21.1	30.8
Effective Green, g (s)	9.7		21.1	21.1	21.1	30.8
Actuated g/C Ratio	0.25		0.54	0.54	0.54	0.79
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	735		214	1870	861	1461
v/s Ratio Prot	0.08			0.05	0.34	c0.10
v/s Ratio Perm			c0.37			0.30
v/c Ratio	0.34		0.67	0.10	0.63	0.40
Uniform Delay, d1	11.9		6.4	4.3	6.2	1.2
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3		15.6	0.1	3.5	0.2
Delay (s)	12.2		22.0	4.4	9.7	1.4
Level of Service	B		C	A	A	A
Approach Delay (s)	12.2			12.1	5.7	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	38.8	Sum of lost time (s)	4.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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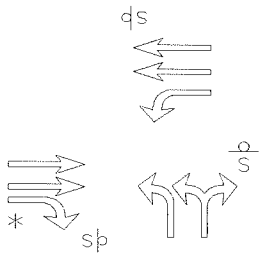
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	115	5%	**55**	170	15	185
EB RIGHT	50	5%		50	5	55
WB LEFT	180	5%		180	15	195
WB THRU	465	5%	**55**	520	45	565
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	125	5%		125	10	135
NB THRU	0	0%		0	0	0
NB RIGHT	95	5%		95	10	105
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1030**		**110**	**1140**	**100**	**1240**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
4
ROUTE
1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	115	5%	**55**	170	15	185
EB RIGHT	50	5%		50	5	55
WB LEFT	180	5%		180	15	195
WB THRU	465	5%		465	40	505
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	125	5%		125	10	135
NB THRU	0	0%		0	0	0
NB RIGHT	95	5%		95	10	105
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1030**		**55**	**1085**	**95**	**1180**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	115	5%		115	10	125
EB RIGHT	50	5%		50	5	55
WB LEFT	180	5%		180	15	195
WB THRU	465	5%	**55**	520	45	565
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	125	5%		125	10	135
NB THRU	0	0%		0	0	0
NB RIGHT	95	5%		95	10	105
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1030**		**55**	**1085**	**95**	**1180**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	105	10%	**55**	160	15	175
EB RIGHT	65	5%		65	5	70
WB LEFT	60	5%		60	5	65
WB THRU	170	5%	**55**	225	20	245
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	55	5%		55	5	60
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**515**		**110**	**625**	**55**	**680**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	105	10%	**55**	160	15	175
EB RIGHT	65	5%		65	5	70
WB LEFT	60	5%		60	5	65
WB THRU	170	5%		170	15	185
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	55	5%		55	5	60
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**515**		**55**	**570**	**50**	**620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	105	10%		105	10	115
EB RIGHT	65	5%		65	5	70
WB LEFT	60	5%		60	5	65
WB THRU	170	5%	**55**	225	20	245
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	55	5%		55	5	60
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**515**		**55**	**570**	**50**	**620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	140	5%	**55**	195	20	215
EB RIGHT	60	5%		60	5	65
WB LEFT	40	5%		40	5	45
WB THRU	125	5%	**55**	180	15	195
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	60	5%		60	5	65
NB THRU	0	0%		0	0	0
NB RIGHT	65	5%		65	5	70
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**490**		**110**	**600**	**55**	**655**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	140	5%	**55**	195	20	215
EB RIGHT	60	5%		60	5	65
WB LEFT	40	5%		40	5	45
WB THRU	125	5%		125	10	135
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	60	5%		60	5	65
NB THRU	0	0%		0	0	0
NB RIGHT	65	5%		65	5	70
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**490**		**55**	**545**	**50**	**595**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	140	10%		140	15	155
EB RIGHT	60	5%		60	5	65
WB LEFT	40	5%		40	5	45
WB THRU	125	5%	**55**	180	15	195
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	60	5%		60	5	65
NB THRU	0	0%		0	0	0
NB RIGHT	65	5%		65	5	70
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**490**		**55**	**545**	**50**	**595**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	265	5%	**55**	320	30	350
EB RIGHT	80	5%		80	5	85
WB LEFT	60	5%		60	5	65
WB THRU	130	5%	**55**	185	15	200
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	70	5%		70	5	75
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**665**		**110**	**775**	**65**	**840**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	265	5%	**55**	320	30	350
EB RIGHT	80	5%		80	5	85
WB LEFT	60	5%		60	5	65
WB THRU	130	5%		130	10	140
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	70	5%		70	5	75
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**665**		**55**	**720**	**60**	**780**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	0	0%		0	0	0
EB THRU	265	5%		265	25	290
EB RIGHT	80	5%		80	5	85
WB LEFT	60	5%		60	5	65
WB THRU	130	5%	**55**	185	15	200
WB RIGHT	0	0%		0	0	0
FOOTHILL FWY OVERPASS						
NB LEFT	70	5%		70	5	75
NB THRU	0	0%		0	0	0
NB RIGHT	60	5%		60	5	65
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**665**		**55**	**720**	**60**	**780**

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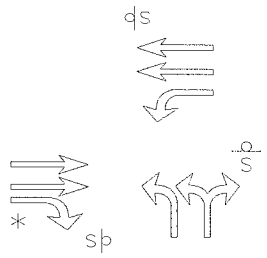
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
4
ROUTE
1B, 1F

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	109	8	24	135	**165**	300	25	325
EB RIGHT	50	1	3	55	**0**	55	5	60
WB LEFT	179	3	9	190	**0**	190	15	205
WB THRU	457	7	21	480	**140**	620	55	675
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	122	2	6	130	**0**	130	10	140
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	95	2	6	100	**0**	100	10	110
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1012**				**305**	**1395**	**120**	**1515**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
4
ROUTE
1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	109	8	24	135	**165**	300	25	325
EB RIGHT	50	1	3	55	**0**	55	5	60
WB LEFT	179	3	9	190	**0**	190	15	205
WB THRU	457	7	21	480	**0**	480	45	525
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	122	2	6	130	**0**	130	10	140
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	95	2	6	100	**0**	100	10	110
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1012**				**165**	**1255**	**110**	**1365**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
4
ROUTE
1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	109	8	24	135	**0**	135	10	145
EB RIGHT	50	1	3	55	**0**	55	5	60
WB LEFT	179	3	9	190	**0**	190	15	205
WB THRU	457	7	21	480	**140**	620	55	675
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	122	2	6	130	**0**	130	10	140
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	95	2	6	100	**0**	100	10	110
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1012**				**140**	**1230**	**105**	**1335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	96	10	30	125	**165**	290	25	315
EB RIGHT	64	1	3	65	**0**	65	5	70
WB LEFT	60	1	3	65	**0**	65	5	70
WB THRU	162	8	24	185	**140**	325	30	355
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	53	2	6	60	**0**	60	5	65
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	60	1	3	65	**0**	65	5	70
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**495**				**305**	**870**	**75**	**945**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
4
ROUTE
1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	96	10	30	125	**165**	290	25	315
EB RIGHT	64	1	3	65	**0**	65	5	70
WB LEFT	60	1	3	65	**0**	65	5	70
WB THRU	162	8	24	185	**0**	185	15	200
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	53	2	6	60	**0**	60	5	65
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	60	1	3	65	**0**	65	5	70
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**495**				**165**	**730**	**60**	**790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	96	10	30	125	**0**	125	10	135
EB RIGHT	64	1	3	65	**0**	65	5	70
WB LEFT	60	1	3	65	**0**	65	5	70
WB THRU	162	8	24	185	**140**	325	30	355
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	53	2	6	60	**0**	60	5	65
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	60	1	3	65	**0**	65	5	70
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**495**				**140**	**705**	**60**	**765**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	140	7	21	160	**165**	325	30	355
EB RIGHT	60	3	9	70	**0**	70	5	75
WB LEFT	40	2	6	45	**0**	45	5	50
WB THRU	125	6	19	145	**140**	285	25	310
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	60	3	9	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	65	3	10	75	**0**	75	5	80
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**490**				**305**	**870**	**75**	**945**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	140	7	21	160	**165**	325	30	355
EB RIGHT	60	3	9	70	**0**	70	5	75
WB LEFT	40	2	6	45	**0**	45	5	50
WB THRU	125	6	19	145	**0**	145	15	160
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	60	3	9	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	65	3	10	75	**0**	75	5	80
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**490**				**165**	**730**	**65**	**795**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	140	7	21	160	**0**	160	15	175
EB RIGHT	60	3	9	70	**0**	70	5	75
WB LEFT	40	2	6	45	**0**	45	5	50
WB THRU	125	6	19	145	**140**	285	25	310
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	60	3	9	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	65	3	10	75	**0**	75	5	80
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**490**				**140**	**705**	**60**	**765**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
4
ROUTE
1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	259	4	12	270	**165**	435	40	475
EB RIGHT	82	0	0	80	**0**	80	5	85
WB LEFT	59	0	0	60	**0**	60	5	65
WB THRU	123	5	15	140	**140**	280	25	305
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	69	0	0	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	59	0	0	60	**0**	60	5	65
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	0	0	0	0
TOTALS	**651**				**305**	**985**	**85**	**1070**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	259	4	12	270	**165**	435	40	475
EB RIGHT	82	0	0	80	**0**	80	5	85
WB LEFT	59	0	0	60	**0**	60	5	65
WB THRU	123	5	15	140	**0**	140	15	155
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	69	0	0	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	59	0	0	60	**0**	60	5	65
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**651**				**165**	**845**	**75**	**920**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : FOOTHILL FWY OVERPASS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 4
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	259	4	12	270	**0**	270	25	295
EB RIGHT	82	0	0	80	**0**	80	5	85
WB LEFT	59	0	0	60	**0**	60	5	65
WB THRU	123	5	15	140	**140**	280	25	305
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL FWY OVERPASS								
NB LEFT	69	0	0	70	**0**	70	5	75
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	59	0	0	60	**0**	60	5	65
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**651**				**140**	**820**	**70**	**890**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL OVERCROSS
EAST-WEST STREET: OAK GROVE
JURISDICTION: PASADENA

DATE: 06-02-11

PEAK HOUR: 07:15AM

NORTH LEG SB

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

TT = 10
TT% = 10/646 = 1.55% ≈ 2%

Oak Grove (~~NB~~) WB

EAST LEG TOTAL: 646

	1st	2nd	3rd	4th	Total
Rt					
Thru	76	162	168	58	464 465
Lt	37	68	41	36	182 180

	1st	2nd	3rd	4th	Total
Lt					
Thru	117 115	21	24	38	34
Rt	51 50	5	16	18	12

WEST LEG TOTAL: 168
Oak Grove (~~SB~~) EB

TT = 9

TT% = 9/168 = 5.36% ≈ 5%

	Lt	Thru	Rt
1st	17		19
2nd	54		21
3rd	31		41
4th	22		16
Total	124 125		97 95

SOUTH LEG
Foothill Fwy Overpass (~~EB~~) NB

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.74
EAST LEG = 0.70
WEST LEG = 0.75

ALL LEGS = 0.75

TT = 4
TT% = 4/221 = 1.81% ≈ 2%

TOTAL: 221

HOUR TOTAL: 1,035

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 07:00AM-08:00AM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	29	76	162	168	435
Lt	22	37	68	41	168

	Total	1st	2nd	3rd	4th
Lt					
Thru	97	14	21	24	38
Rt	45	6	5	16	18

	Lt	Thru	Rt
1st	11		4
2nd	17		19
3rd	54		21
4th	31		41
Total	113		85

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 08:00AM-09:00AM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	58	55	45	46	204
Lt	36	43	20	27	126

	Total	1st	2nd	3rd	4th
Lt					
Thru	116	34	24	29	29
Rt	54	12	12	15	15

	Lt	Thru	Rt
1st	22		16
2nd	9		14
3rd	14		13
4th	17		11
Total	62		54

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL OVERCROSS PASADENA

EAST-WEST STREET : OAK GROVE 06-02-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB SOUTH LEG						
4	0	11	0	0	0	0	0	0	0	0	0	15
19	0	16	0	0	1	0	0	0	0	0	0	36
21	0	54	0	0	0	0	0	0	0	0	0	75
40	0	30	0	0	1	0	0	0	1	0	0	72
15	0	22	1	0	0	0	0	0	0	0	0	38
14	0	9	0	0	3 0	0	0	0 0	0	0	0	23
13	0	13	0	0	1	0	0	0	0	0	1 0	27
11	0	17	0	0	0	0	0	0	0	0	0	28
						TT=3+0+1=4						
137	0	172	1	0	3	0	0	0	1	0	0	314
						NB EAST LEG						
0	29	19	0	0	3	0	0	0	0	0	0	51
0	73	37	0	3	0	0	0	0	0	0	0	113
0	161	65	0	1	2	0	0	0	0	0	1	230
0	166	41	0	2	0	0	0	0	0	0	0	209
0	57	36	0	1	0	0	0	0	0	0	0	94
0	54	43	0	1	9 0	0	0	0 0	0	0	1 0	98
0	45	20	0	0	0	0	0	0	0	0	0	65
0	44	27	0	2	0	0	0	0	0	0	0	73
						TT=9+0+1=10						
0	629	288	0	10	5	0	0	0	0	0	1	933
						SB WEST LEG						
6	14	0	0	0	0	0	0	0	0	0	0	20
5	19	0	0	2	0	0	0	0	0	0	0	26
15	23	0	1	1	0	0	0	0	0	0	0	40
18	35	0	0	3	0	0	0	0	0	0	0	56
12	32	0	0	2	0	0	0	0	0	0	0	46
12	23	0	0	1	9 0	0	0	0 0	0	0	0 0	36
15	27	0	0	2	0	0	0	0	0	0	0	44
15	28	0	0	1	0	0	0	0	0	0	0	44
						TT=9+0+0=9						
98	201	0	1	12	0	0	0	0	0	0	0	312

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL OVERCROSS
EAST-WEST STREET: OAK GROVE
JURISDICTION: PASADENA

DATE: 06-02-11

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

TT = 9

TT% = 9/231 = 3.90% ≈ 4%

Oak Grove (NB)

EAST LEG

EAST LEG TOTAL: 231

	1st	2nd	3rd	4th	Total
Rt					
Thru	47	39	39	45	170
Lt	10	19	15	17	60 61

WEST LEG

	Total	1st	2nd	3rd	4th
Lt					
Thru	~~106~~ 105	38	11	38	19
Rt	65	21	14	15	15

WEST LEG TOTAL: 171

Oak Grove (SB)

TT = 11

TT% = 11/171 = 6.43% ≈ 6%

SOUTH LEG

Foothill Fwy Overpass (EB)

	Lt	Thru	Rt
1st	10		11
2nd	12		13
3rd	18		20
4th	15		17
Total	55		60 61

TT = 3

TT% = 3/116 = 2.59% ≈ 3%

TOTAL: 116

PEAK HOUR FACTORS

NORTH LEG =	
SOUTH LEG =	0.76
EAST LEG =	0.93
WEST LEG =	0.72
ALL LEGS =	0.89

HOUR TOTAL: 518

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 12:00PM-01:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	35	50	47	39	171
Lt	12	22	10	19	63

	Total	1st	2nd	3rd	4th
Lt					
Thru	98	26	23	38	11
Rt	64	19	10	21	14

	Lt	Thru	Rt
1st	9		16
2nd	10		9
3rd	10		11
4th	12		13
Total	41		49

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 01:00PM-02:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	39	45	31	29	144
Lt	15	17	15	23	70

	Total	1st	2nd	3rd	4th
Lt					
Thru	91	38	19	20	14
Rt	60	15	15	10	20

	Lt	Thru	Rt
1st	18		20
2nd	15		17
3rd	11		14
4th	21		15
Total	65		66

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL OVERCROSS PASADENA

EAST-WEST STREET : OAK GROVE 06-02-11

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB SOUTH LEG						
16	0	9	0	0	0	0	0	0	0	0	0	25
9	0	10	0	0	0	0	0	0	0	0	0	19
11	0	10	0	0	0	0	0	0	0	0	0	21
13	0	10	0	0	2	0	0	0	0	0	0	25
20	0	18	0	0	0	0	0	0	0	0	0	38
16	0	15	1	0	0	0	0	0	0	0	0	32
12	0	11	2	0 3	0	0	0 0	0	0	0 0	0	25
15	0	21	0	0	0	0	0	0	0	0	0	36
						TT = 3+0+0 = 3						
112	0	104	3	0	2	0	0	0	0	0	0	221
						NB EAST LEG						
0	34	12	0	1	0	0	0	0	0	0	0	47
0	49	22	0	1	0	0	0	0	0	0	0	72
0	44	9	0	1	0	0	1	1	0	1	0	57
0	38	19	0	0	0	0	1	0	0	0	0	58
0	36	15	0	1	0	0	2	0	0	0	0	54
0	44	17	0	1	0	0	0	0	0	0	0	62
0	28	15	0	3 3	0	0	0 5	0	0	0 1	0	46
0	28	23	0	1	0	0	0	0	0	0	0	52
						TT = 3+5+1 = 9						
0	301	132	0	9	0	0	4	1	0	1	0	448
						SB WEST LEG						
19	23	0	0	3	0	0	0	0	0	0	0	45
10	21	0	0	1	0	0	0	0	0	1	0	33
21	34	0	0	1	0	0	1	0	0	2	0	59
14	10	0	0	1	0	0	0	0	0	0	0	25
14	37	0	0	1	0	1	0	0	0	0	0	53
15	15	0	0	3	0	0	1	0	0	0	0	34
10	19	0	0	1 6	0	0	0 3	0	0	0 2	0	30
20	12	0	0	1	0	0	1	0	0	0	0	34
						TT = 6+3+2 = 11						
123	171	0	0	12	0	1	3	0	0	3	0	313

Prepared by Newport Traffic Studies

(4)

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OAK GROVE
EAST-WEST STREET: FOOTHILL OVERPASS
JURISDICTION: LA CANADA

DATE: 04-12-12

PEAK HOUR: 02:45PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG (NB) TOTAL: 169

	1st	2nd	3rd	4th	Total
Rt					
Thru	39	33	23	32	125 127
Lt	8	11	11	12	40 42

WEST LEG (SB) TOTAL: 200

	Total	1st	2nd	3rd	4th
Lt					
Thru	142	30	33	34	45
Rt	60 58	21	14	12	11

SOUTH LEG (EB)

	Lt	Thru	Rt
1st	17		14
2nd	16		18
3rd	11		17
4th	15		17
Total	60 59		65 66

TOTAL: 125

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.92
EAST LEG = 0.90
WEST LEG = 0.89

ALL LEGS = 0.94

HOUR TOTAL: 494

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: FOOTHILL OVERPASS

TIME: 02:00PM-03:00PM DATE: 04-12-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	22	26	30	39	117
Lt	7	12	9	8	36

	Total	1st	2nd	3rd	4th
Lt					
Thru	98	18	24	26	30
Rt	56	10	10	15	21

	Lt	Thru	Rt
1st	12		4
2nd	15		11
3rd	13		6
4th	17		14
Total	57		35

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OAK GROVE

EAST-WEST STREET: FOOTHILL OVERPASS

TIME: 03:00PM-04:00PM DATE: 04-12-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	33	23	32	34	122
Lt	11	11	12	7	41

	Total	1st	2nd	3rd	4th
Lt					
Thru	156	33	34	45	44
Rt	52	14	12	11	15

	Lt	Thru	Rt
1st	16		18
2nd	11		17
3rd	15		17
4th	14		12
Total	56		64

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL OVERCROSS
EAST-WEST STREET: OAK GROVE
JURISDICTION: PASADENA
DATE: 06-02-11

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt	Total
1st				
2nd				
3rd				
4th				

TT = 5
TT% = 5/187 = 2.67% ≈ 3%

Oak Grove NB

EAST LEG

EAST LEG TOTAL: 187

	1st	2nd	3rd	4th	Total
Rt					
Thru	28	31	39	30	128 130
Lt	12	14	18	15	59 60

WEST LEG

	Total	1st	2nd	3rd	4th
Lt					
Thru	263 265	71	58	71	63
Rt	82 80	21	24	16	21

WEST LEG TOTAL: 345

Oak Grove (SB)

TT = 4
TT% = 4/345 = 1.16% ≈ 1%

SOUTH LEG

Foothill Fwy overpass (EB)

	Lt	Thru	Rt
1st	14		13
2nd	18		12
3rd	22		19
4th	15		15
Total	69 70		59 60

TOTAL: 128

TT = 0
TT% = 0/128 = 0% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.78
EAST LEG = 0.82
WEST LEG = 0.94

ALL LEGS = 0.89

HOUR TOTAL: 660

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 04:00PM-05:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	26	29	36	31	122
Lt	7	16	15	12	50

	Total	1st	2nd	3rd	4th
Lt					
Thru	222	48	58	53	63
Rt	49	18	8	13	10

	Lt	Thru	Rt
1st	16		21
2nd	9		14
3rd	11		14
4th	16		12
Total	52		61

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL OVERCROSS

EAST-WEST STREET: OAK GROVE

TIME: 05:00PM-06:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	28	31	39	30	128
Lt	12	14	18	15	59

	Total	1st	2nd	3rd	4th
Lt					
Thru	263	71	58	71	63
Rt	82	21	24	16	21

	Lt	Thru	Rt
1st	14		13
2nd	18		12
3rd	22		19
4th	15		15
Total	69		59

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL OVERCROSS PASADENA

EAST-WEST STREET : OAK GROVE 06-02-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0				0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB SOUTH LEG						
21	0	16	0	0	0	0	0	0				37
14	0	8	0	0	1	0	0	0				23
14	0	11	0	0	0	0	0	0				25
12	0	15	0	0	1	0	0	0				28
13	0	14	0	0	0	0	0	0				27
12	0	18	0	0	0	0	0	0				30
19	0	22	0	0	0	0	0	0				41
15	0	15	0	0	0	0	0	0				30
				0			0					
						TT= 0+0=0						
120	0	119	0	0	2	0	0	0	0	0	0	241
						NB EAST LEG						
0	24	7	0	2	0	0	0	0				33
0	28	16	0	1	0	0	0	0				45
0	35	15	0	1	0	0	0	0				51
0	29	12	0	2	0	0	0	0				43
0	26	12	0	2	0	0	0	0				40
0	31	14	0	0	0	0	0	0				45
0	38	18	0	1	0	0	0	0				57
0	28	15	0	2	0	0	0	0				45
				5			0					
						TT= 5+0=5						
0	239	109	0	11	0	0	0	0	0	0	0	359
						SB WEST LEG						
18	46	0	0	2	0	0	0	0				66
8	56	0	0	2	0	0	0	0				66
12	53	0	1	0	0	0	0	0				66
9	61	0	1	2	0	0	0	0				73
21	70	0	0	1	0	0	0	0				92
24	56	0	0	2	0	0	0	0				82
16	71	0	0	0	0	0	0	0				87
21	62	0	0	1	0	0	0	0				84
				4			0					
						TT= 4+0=4						
129	475	0	2	10	0	0	0	0	0	0	0	616

Prepared by Newport Traffic Studies

Intersection	
Intersection Delay (sec/veh)	14.8
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	115	50	180	465	125	95
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	5	5	5	5	5	5
Movement Flow Rate	153	67	240	620	167	127
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	11.4	16.1	13.6
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	137	57	57	50	180	232	232
Left Turning Volume	0	0	57	57	0	0	232	232
Through Volume	0	95	0	0	50	0	0	0
Right Turning Volume	83	42	0	0	0	180	0	0
Lane Flow Rate	111	182	77	77	67	240	310	310
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.244	0.358	0.161	0.161	0.125	0.457	0.547	0.539
Departure Headway, Hd	7.898	7.064	7.546	7.546	6.745	6.859	6.351	6.265
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	452	507	472	472	527	523	564	574
Service Time	5.682	4.847	5.342	5.342	4.54	4.627	4.119	4.033
HCM Lane V/C Ratio	0.246	0.359	0.163	0.163	0.127	0.459	0.55	0.54
HCM Control Delay	13.2	13.8	11.8	11.8	10.5	15.3	16.6	16.2
HCM Lane LOS	B	B	B	B	B	C	C	C
HCM 95th Percentile Queue	1	1.7	0.6	0.6	0.4	2.5	3.6	3.5

Intersection	
Intersection Delay (sec/veh)	8.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	105	65	60	170	55	60
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	10	5	5	5	5	5
Movement Flow Rate	118	73	67	191	62	67
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	8.5	9	9.1
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	23%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	77%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	37	78	52	52	65	60	85	85
Left Turning Volume	0	0	52	52	0	0	85	85
Through Volume	0	60	0	0	65	0	0	0
Right Turning Volume	37	18	0	0	0	60	0	0
Lane Flow Rate	41	88	59	59	73	67	96	96
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.071	0.13	0.092	0.09	0.096	0.11	0.142	0.14
Departure Headway, Hd	6.223	5.306	5.599	5.513	4.724	5.863	5.36	5.275
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	573	672	638	648	754	609	667	677
Service Time	3.983	3.067	3.354	3.268	2.479	3.617	3.115	3.029
HCM Lane V/C Ratio	0.072	0.131	0.092	0.091	0.097	0.11	0.144	0.142
HCM Control Delay	9.5	8.9	8.9	8.8	8	9.3	9	8.9
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.2	0.4	0.3	0.3	0.3	0.4	0.5	0.5

Intersection	
Intersection Delay (sec/veh)	8.8
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	140	60	40	125	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	10	5	5	5	5	5
Movement Flow Rate	157	67	45	140	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	8.6	8.9	9
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	70	70	60	40	62	62
Left Turning Volume	0	0	70	70	0	0	62	62
Through Volume	0	65	0	0	60	0	0	0
Right Turning Volume	40	20	0	0	0	40	0	0
Lane Flow Rate	45	96	79	79	67	45	70	70
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.076	0.138	0.12	0.118	0.086	0.074	0.106	0.105
Departure Headway, Hd	6.127	5.212	5.488	5.402	4.613	5.954	5.452	5.366
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	583	685	651	661	773	600	655	666
Service Time	3.885	2.97	3.237	3.152	2.362	3.708	3.205	3.119
HCM Lane V/C Ratio	0.077	0.14	0.121	0.12	0.087	0.075	0.107	0.105
HCM Control Delay	9.4	8.8	9	8.9	7.8	9.2	8.9	8.8
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.2	0.5	0.4	0.4	0.3	0.2	0.4	0.4

Intersection	
Intersection Delay (sec/veh)	10.2
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	265	80	60	130	70	60
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	5	0	0	5	0	0
Movement Flow Rate	353	107	80	173	93	80
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	10.3	10.1	10.3
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	47	83	132	132	80	60	65	65
Left Turning Volume	0	0	132	132	0	0	65	65
Through Volume	0	60	0	0	80	0	0	0
Right Turning Volume	47	23	0	0	0	60	0	0
Lane Flow Rate	62	111	177	177	107	80	87	87
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.119	0.186	0.286	0.281	0.149	0.146	0.148	0.146
Departure Headway, Hd	6.903	6.04	5.82	5.735	5.029	6.581	6.162	6.076
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	520	594	618	627	715	546	582	591
Service Time	4.635	3.772	3.544	3.458	2.752	4.31	3.891	3.805
HCM Lane V/C Ratio	0.119	0.187	0.286	0.282	0.15	0.147	0.149	0.147
HCM Control Delay	10.6	10.2	10.9	10.7	8.6	10.4	10	9.8
HCM Lane LOS	B	B	B	B	A	B	A	A
HCM 95th Percentile Queue	0.4	0.7	1.2	1.2	0.5	0.5	0.5	0.5

Intersection	
Intersection Delay (sec/veh)	17.5
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	170	50	180	520	125	95
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	34	5	5	14	5	5
Movement Flow Rate	227	67	240	693	167	127
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	13.1	19.7	14.8
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	137	85	85	50	180	260	260
Left Turning Volume	0	0	85	85	0	0	260	260
Through Volume	0	95	0	0	50	0	0	0
Right Turning Volume	83	42	0	0	0	180	0	0
Lane Flow Rate	111	182	113	113	67	240	347	347
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.262	0.387	0.265	0.249	0.132	0.476	0.654	0.631
Departure Headway, Hd	8.479	7.641	8.424	7.92	7.117	7.268	6.914	6.672
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	426	474	428	456	505	499	527	544
Service Time	6.195	5.356	6.143	5.639	4.836	4.968	4.614	4.372
HCM Lane V/C Ratio	0.261	0.384	0.264	0.248	0.133	0.481	0.658	0.638
HCM Control Delay	14.2	15.1	14.2	13.3	10.9	16.4	21.7	20.1
HCM Lane LOS	B	C	B	B	B	C	C	C
HCM 95th Percentile Queue	1.1	1.9	1.1	1	0.5	2.7	5.6	5.1

Intersection	
Intersection Delay (sec/veh)	9.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	160	65	60	225	55	60
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	39	5	5	27	5	5
Movement Flow Rate	180	73	67	253	62	67
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.3	9.8	9.6
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	23%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	77%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	37	78	80	80	65	60	112	112
Left Turning Volume	0	0	80	80	0	0	112	112
Through Volume	0	60	0	0	65	0	0	0
Right Turning Volume	37	18	0	0	0	60	0	0
Lane Flow Rate	41	88	90	90	73	67	126	126
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.075	0.138	0.156	0.141	0.099	0.113	0.207	0.191
Departure Headway, Hd	6.562	5.645	6.248	5.666	4.877	6.022	5.895	5.434
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	541	628	570	627	727	591	604	655
Service Time	4.359	3.441	4.03	3.449	2.659	3.802	3.675	3.213
HCM Lane V/C Ratio	0.076	0.14	0.158	0.144	0.1	0.113	0.209	0.192
HCM Control Delay	9.9	9.4	10.2	9.4	8.2	9.6	10.2	9.5
HCM Lane LOS	A	A	B	A	A	A	B	A
HCM 95th Percentile Queue	0.2	0.5	0.6	0.5	0.3	0.4	0.8	0.7

Intersection	
Intersection Delay (sec/veh)	9.5
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	195	60	40	180	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	34	5	5	32	5	5
Movement Flow Rate	219	67	45	202	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.4	9.6	9.5
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	97	97	60	40	90	90
Left Turning Volume	0	0	97	97	0	0	90	90
Through Volume	0	65	0	0	60	0	0	0
Right Turning Volume	40	20	0	0	0	40	0	0
Lane Flow Rate	45	96	110	110	67	45	101	101
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.081	0.148	0.184	0.169	0.089	0.076	0.171	0.155
Departure Headway, Hd	6.476	5.56	6.057	5.562	4.772	6.113	6.072	5.525
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	549	639	588	640	743	582	587	643
Service Time	4.266	3.35	3.838	3.341	2.551	3.897	3.856	3.308
HCM Lane V/C Ratio	0.082	0.15	0.187	0.172	0.09	0.077	0.172	0.157
HCM Control Delay	9.8	9.3	10.2	9.5	8	9.4	10.1	9.3
HCM Lane LOS	A	A	B	A	A	A	B	A
HCM 95th Percentile Queue	0.3	0.5	0.7	0.6	0.3	0.2	0.6	0.6

Intersection	
Intersection Delay (sec/veh)	11.4
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	320	80	60	185	70	60
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	20	0	0	31	0	0
Movement Flow Rate	427	107	80	247	93	80
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	11.7	11.1	11
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	47	83	160	160	80	60	92	92
Left Turning Volume	0	0	160	160	0	0	92	92
Through Volume	0	60	0	0	80	0	0	0
Right Turning Volume	47	23	0	0	0	60	0	0
Lane Flow Rate	62	111	213	213	107	80	123	123
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.127	0.2	0.374	0.354	0.156	0.151	0.234	0.216
Departure Headway, Hd	7.343	6.478	6.313	5.97	5.263	6.809	6.837	6.304
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	488	553	570	602	681	526	525	569
Service Time	5.095	4.23	4.052	3.708	3.001	4.554	4.581	4.048
HCM Lane V/C Ratio	0.127	0.201	0.374	0.354	0.157	0.152	0.234	0.216
HCM Control Delay	11.2	10.9	12.8	12	9	10.8	11.7	10.8
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.4	0.7	1.8	1.6	0.6	0.5	0.9	0.8

Intersection	
Intersection Delay (sec/veh)	21
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	185	55	195	565	135	105
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	34	5	5	14	5	5
Movement Flow Rate	247	73	260	753	180	140
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	14.1	24.7	16.3
HCM LOS	B	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	90	150	92	92	55	195	282	282
Left Turning Volume	0	0	92	92	0	0	282	282
Through Volume	0	105	0	0	55	0	0	0
Right Turning Volume	90	45	0	0	0	195	0	0
Lane Flow Rate	120	200	123	123	73	260	377	377
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.294	0.443	0.301	0.284	0.152	0.541	0.747	0.721
Departure Headway, Hd	8.817	7.971	8.79	8.284	7.479	7.493	7.138	6.895
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	408	452	408	433	479	481	508	524
Service Time	6.567	5.722	6.546	6.04	5.235	5.234	4.879	4.636
HCM Lane V/C Ratio	0.294	0.442	0.301	0.284	0.152	0.541	0.742	0.719
HCM Control Delay	15.2	16.9	15.3	14.3	11.6	18.8	28.1	25.5
HCM Lane LOS	C	C	C	B	B	C	D	D
HCM 95th Percentile Queue	1.2	2.4	1.3	1.2	0.5	3.5	8.8	7.7

Intersection	
Intersection Delay (sec/veh)	9.9
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	175	70	65	245	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	39	5	5	27	5	5
Movement Flow Rate	197	79	73	275	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.6	10.1	9.8
HCM LOS	A	B	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	87	87	70	65	122	122
Left Turning Volume	0	0	87	87	0	0	122	122
Through Volume	0	65	0	0	70	0	0	0
Right Turning Volume	40	20	0	0	0	65	0	0
Lane Flow Rate	45	96	98	98	79	73	138	138
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.085	0.156	0.176	0.157	0.109	0.124	0.229	0.211
Departure Headway, Hd	6.804	5.887	6.448	5.874	5.083	6.221	6.094	5.632
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	529	612	559	614	709	580	593	641
Service Time	4.508	3.592	4.157	3.574	2.783	3.921	3.794	3.332
HCM Lane V/C Ratio	0.085	0.157	0.175	0.16	0.111	0.126	0.233	0.215
HCM Control Delay	10.1	9.7	10.5	9.7	8.4	9.8	10.6	9.8
HCM Lane LOS	B	A	B	A	A	A	B	A
HCM 95th Percentile Queue	0.3	0.6	0.6	0.6	0.4	0.4	0.9	0.8

Intersection	
Intersection Delay (sec/veh)	9.8
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	215	65	45	195	65	70
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	34	5	5	32	5	5
Movement Flow Rate	242	73	51	219	73	79
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.7	9.9	9.8
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	43	92	107	107	65	45	97	97
Left Turning Volume	0	0	107	107	0	0	97	97
Through Volume	0	70	0	0	65	0	0	0
Right Turning Volume	43	22	0	0	0	45	0	0
Lane Flow Rate	49	103	121	121	73	51	110	110
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.091	0.166	0.206	0.19	0.099	0.087	0.188	0.171
Departure Headway, Hd	6.714	5.8	6.254	5.757	4.966	6.324	6.283	5.735
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	537	622	577	627	726	570	575	629
Service Time	4.414	3.5	3.954	3.457	2.666	4.024	3.983	3.435
HCM Lane V/C Ratio	0.091	0.166	0.21	0.193	0.101	0.089	0.191	0.175
HCM Control Delay	10.1	9.7	10.6	9.8	8.2	9.6	10.4	9.6
HCM Lane LOS	B	A	B	A	A	A	B	A
HCM 95th Percentile Queue	0.3	0.6	0.8	0.7	0.3	0.3	0.7	0.6

Intersection	
Intersection Delay (sec/veh)	12
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	350	85	65	200	75	65
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	20	0	0	31	0	0
Movement Flow Rate	467	113	87	267	100	87
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	12.5	11.6	11.4
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	50	90	175	175	85	65	100	100
Left Turning Volume	0	0	175	175	0	0	100	100
Through Volume	0	65	0	0	85	0	0	0
Right Turning Volume	50	25	0	0	0	65	0	0
Lane Flow Rate	67	120	233	233	113	87	133	133
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.14	0.223	0.418	0.396	0.17	0.168	0.26	0.24
Departure Headway, Hd	7.552	6.683	6.456	6.113	5.405	6.985	7.012	6.479
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	474	535	558	588	662	513	512	553
Service Time	5.314	4.445	4.206	3.862	3.154	4.739	4.767	4.233
HCM Lane V/C Ratio	0.141	0.224	0.418	0.396	0.171	0.17	0.26	0.241
HCM Control Delay	11.5	11.4	13.8	12.8	9.3	11.2	12.2	11.3
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.5	0.9	2.2	2	0.6	0.6	1.1	0.9

Intersection	
Intersection Delay (sec/veh)	15.8
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	170	50	180	465	125	95
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	34	5	5	5	5	5
Movement Flow Rate	227	67	240	620	167	127
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	12.7	17.3	14.4
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	137	85	85	50	180	232	232
Left Turning Volume	0	0	85	85	0	0	232	232
Through Volume	0	95	0	0	50	0	0	0
Right Turning Volume	83	42	0	0	0	180	0	0
Lane Flow Rate	111	182	113	113	67	240	310	310
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.256	0.378	0.26	0.244	0.129	0.474	0.569	0.561
Departure Headway, Hd	8.305	7.467	8.25	7.746	6.944	7.225	6.716	6.629
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	434	485	437	466	519	502	539	549
Service Time	6.021	5.183	5.965	5.461	4.658	4.925	4.416	4.329
HCM Lane V/C Ratio	0.256	0.375	0.259	0.242	0.129	0.478	0.575	0.565
HCM Control Delay	13.9	14.7	13.8	12.9	10.7	16.3	17.9	17.5
HCM Lane LOS	B	B	B	B	B	C	C	C
HCM 95th Percentile Queue	1	1.8	1.1	1	0.4	2.7	4	3.8

Intersection	
Intersection Delay (sec/veh)	9.2
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	160	65	60	170	55	60
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	39	5	5	5	5	5
Movement Flow Rate	180	73	67	191	62	67
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.1	9.2	9.3
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	23%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	77%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	37	78	80	80	65	60	85	85
Left Turning Volume	0	0	80	80	0	0	85	85
Through Volume	0	60	0	0	65	0	0	0
Right Turning Volume	37	18	0	0	0	60	0	0
Lane Flow Rate	41	88	90	90	73	67	96	96
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.073	0.134	0.153	0.138	0.096	0.112	0.146	0.144
Departure Headway, Hd	6.397	5.48	6.108	5.526	4.737	6.007	5.504	5.419
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	557	649	584	644	751	593	648	657
Service Time	4.176	3.259	3.875	3.294	2.504	3.777	3.274	3.189
HCM Lane V/C Ratio	0.074	0.136	0.154	0.14	0.097	0.113	0.148	0.146
HCM Control Delay	9.7	9.1	10	9.2	8	9.5	9.2	9.1
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.2	0.5	0.5	0.5	0.3	0.4	0.5	0.5

Intersection	
Intersection Delay (sec/veh)	9.2
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	195	60	40	125	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	34	5	5	5	5	5
Movement Flow Rate	219	67	45	140	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.2	9.1	9.3
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	97	97	60	40	62	62
Left Turning Volume	0	0	97	97	0	0	62	62
Through Volume	0	65	0	0	60	0	0	0
Right Turning Volume	40	20	0	0	0	40	0	0
Lane Flow Rate	45	96	110	110	67	45	70	70
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.079	0.143	0.18	0.165	0.087	0.076	0.109	0.107
Departure Headway, Hd	6.3	5.384	5.91	5.414	4.625	6.097	5.594	5.509
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	566	661	605	658	769	584	636	646
Service Time	4.072	3.157	3.674	3.178	2.388	3.869	3.366	3.28
HCM Lane V/C Ratio	0.08	0.145	0.182	0.167	0.087	0.077	0.11	0.108
HCM Control Delay	9.6	9.1	10	9.3	7.8	9.4	9.1	8.9
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.3	0.5	0.7	0.6	0.3	0.2	0.4	0.4

Intersection	
Intersection Delay (sec/veh)	10.9
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	320	80	60	130	70	60
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	20	0	0	5	0	0
Movement Flow Rate	427	107	80	173	93	80
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	11.3	10.3	10.6
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	47	83	160	160	80	60	65	65
Left Turning Volume	0	0	160	160	0	0	65	65
Through Volume	0	60	0	0	80	0	0	0
Right Turning Volume	47	23	0	0	0	60	0	0
Lane Flow Rate	62	111	213	213	107	80	87	87
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.123	0.193	0.362	0.342	0.15	0.15	0.153	0.151
Departure Headway, Hd	7.103	6.24	6.111	5.768	5.062	6.759	6.34	6.254
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	505	574	589	623	708	531	566	574
Service Time	4.844	3.981	3.842	3.499	2.792	4.497	4.078	3.992
HCM Lane V/C Ratio	0.123	0.193	0.362	0.342	0.151	0.151	0.154	0.152
HCM Control Delay	10.8	10.5	12.3	11.5	8.7	10.7	10.2	10.1
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.4	0.7	1.7	1.6	0.5	0.5	0.5	0.5

Intersection	
Intersection Delay (sec/veh)	18.1
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	185	55	195	505	135	105
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	34	5	5	5	5	5
Movement Flow Rate	247	73	260	673	180	140
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	13.7	20.5	15.7
HCM LOS	B	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	90	150	92	92	55	195	252	252
Left Turning Volume	0	0	92	92	0	0	252	252
Through Volume	0	105	0	0	55	0	0	0
Right Turning Volume	90	45	0	0	0	195	0	0
Lane Flow Rate	120	200	123	123	73	260	337	337
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.287	0.432	0.294	0.277	0.148	0.538	0.648	0.64
Departure Headway, Hd	8.621	7.776	8.591	8.085	7.281	7.444	6.934	6.847
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	418	464	418	444	492	486	522	529
Service Time	6.365	5.52	6.338	5.833	5.028	5.181	4.67	4.584
HCM Lane V/C Ratio	0.287	0.431	0.294	0.277	0.148	0.535	0.646	0.637
HCM Control Delay	14.8	16.3	14.9	13.9	11.3	18.6	21.6	21
HCM Lane LOS	B	C	B	B	B	C	C	C
HCM 95th Percentile Queue	1.2	2.3	1.2	1.1	0.5	3.5	5.5	5.3

Intersection	
Intersection Delay (sec/veh)	9.4
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	175	70	65	185	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	39	5	5	5	5	5
Movement Flow Rate	197	79	73	208	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.3	9.5	9.6
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	87	87	70	65	92	92
Left Turning Volume	0	0	87	87	0	0	92	92
Through Volume	0	65	0	0	70	0	0	0
Right Turning Volume	40	20	0	0	0	65	0	0
Lane Flow Rate	45	96	98	98	79	73	104	104
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.081	0.148	0.169	0.153	0.105	0.124	0.161	0.159
Departure Headway, Hd	6.511	5.595	6.197	5.616	4.826	6.097	5.594	5.508
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	546	634	575	633	735	584	636	645
Service Time	4.304	3.388	3.977	3.395	2.605	3.876	3.373	3.288
HCM Lane V/C Ratio	0.082	0.151	0.17	0.155	0.107	0.125	0.164	0.161
HCM Control Delay	9.9	9.4	10.2	9.4	8.2	9.7	9.5	9.3
HCM Lane LOS	A	A	B	A	A	A	A	A
HCM 95th Percentile Queue	0.3	0.5	0.6	0.5	0.4	0.4	0.6	0.6

Intersection	
Intersection Delay (sec/veh)	9.4
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	215	65	45	135	65	70
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	34	5	5	5	5	5
Movement Flow Rate	242	73	51	152	73	79
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.5	9.3	9.5
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	43	92	107	107	65	45	67	67
Left Turning Volume	0	0	107	107	0	0	67	67
Through Volume	0	70	0	0	65	0	0	0
Right Turning Volume	43	22	0	0	0	45	0	0
Lane Flow Rate	49	103	121	121	73	51	76	76
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.087	0.157	0.201	0.184	0.095	0.087	0.12	0.118
Departure Headway, Hd	6.414	5.5	5.99	5.494	4.704	6.196	5.692	5.607
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	555	646	595	649	754	574	625	634
Service Time	4.2	3.286	3.765	3.268	2.478	3.978	3.474	3.389
HCM Lane V/C Ratio	0.088	0.159	0.203	0.186	0.097	0.089	0.122	0.12
HCM Control Delay	9.8	9.3	10.3	9.5	8	9.6	9.3	9.1
HCM Lane LOS	A	A	B	A	A	A	A	A
HCM 95th Percentile Queue	0.3	0.6	0.8	0.7	0.3	0.3	0.4	0.4

Intersection	
Intersection Delay (sec/veh)	11.5
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	350	85	65	140	75	65
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	20	0	0	5	0	0
Movement Flow Rate	467	113	87	187	100	87
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	12	10.7	11
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	50	90	175	175	85	65	70	70
Left Turning Volume	0	0	175	175	0	0	70	70
Through Volume	0	65	0	0	85	0	0	0
Right Turning Volume	50	25	0	0	0	65	0	0
Lane Flow Rate	67	120	233	233	113	87	93	93
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.135	0.214	0.404	0.382	0.163	0.167	0.169	0.166
Departure Headway, Hd	7.286	6.419	6.232	5.889	5.182	6.925	6.505	6.419
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	492	558	579	611	691	517	551	558
Service Time	5.036	4.169	3.97	3.627	2.92	4.672	4.252	4.166
HCM Lane V/C Ratio	0.136	0.215	0.402	0.381	0.164	0.168	0.169	0.167
HCM Control Delay	11.2	10.9	13.2	12.2	8.9	11.1	10.6	10.4
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.5	0.8	2	1.9	0.6	0.6	0.6	0.6

Intersection	
Intersection Delay (sec/veh)	16.3
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	115	50	180	520	125	95
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	5	5	5	14	5	5
Movement Flow Rate	153	67	240	693	167	127
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	11.7	18.2	13.9
HCM LOS	B	C	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	83	137	57	57	50	180	260	260
Left Turning Volume	0	0	57	57	0	0	260	260
Through Volume	0	95	0	0	50	0	0	0
Right Turning Volume	83	42	0	0	0	180	0	0
Lane Flow Rate	111	182	77	77	67	240	347	347
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.249	0.365	0.166	0.166	0.13	0.46	0.63	0.606
Departure Headway, Hd	8.054	7.219	7.811	7.811	7.009	6.893	6.54	6.298
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	443	494	462	462	515	521	548	569
Service Time	5.853	5.018	5.511	5.511	4.709	4.668	4.316	4.074
HCM Lane V/C Ratio	0.251	0.368	0.167	0.167	0.13	0.461	0.633	0.61
HCM Control Delay	13.5	14.2	12.1	12.1	10.8	15.5	19.9	18.4
HCM Lane LOS	B	B	B	B	B	C	C	C
HCM 95th Percentile Queue	1	1.7	0.6	0.6	0.4	2.6	5.1	4.6

Intersection	
Intersection Delay (sec/veh)	9.3
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	105	65	60	225	55	60
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	10	5	5	27	5	5
Movement Flow Rate	118	73	67	253	62	67
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	8.7	9.6	9.3
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	23%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	77%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	37	78	52	52	65	60	112	112
Left Turning Volume	0	0	52	52	0	0	112	112
Through Volume	0	60	0	0	65	0	0	0
Right Turning Volume	37	18	0	0	0	60	0	0
Lane Flow Rate	41	88	59	59	73	67	126	126
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.073	0.134	0.094	0.093	0.099	0.11	0.202	0.186
Departure Headway, Hd	6.386	5.469	5.736	5.65	4.861	5.874	5.747	5.285
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	557	650	621	631	731	607	621	675
Service Time	4.164	3.247	3.505	3.419	2.63	3.641	3.514	3.053
HCM Lane V/C Ratio	0.074	0.135	0.095	0.094	0.1	0.11	0.203	0.187
HCM Control Delay	9.7	9.1	9.1	9	8.2	9.4	10	9.3
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.2	0.5	0.3	0.3	0.3	0.4	0.8	0.7

Intersection	
Intersection Delay (sec/veh)	9.2
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	140	60	40	180	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	10	5	5	32	5	5
Movement Flow Rate	157	67	45	202	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	8.8	9.4	9.3
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	70	70	60	40	90	90
Left Turning Volume	0	0	70	70	0	0	90	90
Through Volume	0	65	0	0	60	0	0	0
Right Turning Volume	40	20	0	0	0	40	0	0
Lane Flow Rate	45	96	79	79	67	45	101	101
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.079	0.143	0.123	0.121	0.089	0.075	0.166	0.151
Departure Headway, Hd	6.302	5.386	5.631	5.545	4.755	5.968	5.926	5.379
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	565	661	633	643	748	597	602	662
Service Time	4.076	3.16	3.399	3.313	2.523	3.737	3.695	3.148
HCM Lane V/C Ratio	0.08	0.145	0.125	0.123	0.09	0.075	0.168	0.153
HCM Control Delay	9.6	9.1	9.2	9.1	8	9.2	9.9	9.1
HCM Lane LOS	A	A	A	A	A	A	A	A
HCM 95th Percentile Queue	0.3	0.5	0.4	0.4	0.3	0.2	0.6	0.5

Intersection	
Intersection Delay (sec/veh)	10.7
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	265	80	60	185	70	60
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	5	0	0	31	0	0
Movement Flow Rate	353	107	80	247	93	80
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	10.7	10.8	10.6
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	47	83	132	132	80	60	92	92
Left Turning Volume	0	0	132	132	0	0	92	92
Through Volume	0	60	0	0	80	0	0	0
Right Turning Volume	47	23	0	0	0	60	0	0
Lane Flow Rate	62	111	177	177	107	80	123	123
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.123	0.194	0.295	0.291	0.155	0.147	0.228	0.21
Departure Headway, Hd	7.14	6.276	6.018	5.933	5.226	6.627	6.654	6.122
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	502	571	597	606	686	542	540	586
Service Time	4.882	4.017	3.754	3.668	2.961	4.365	4.392	3.859
HCM Lane V/C Ratio	0.124	0.194	0.296	0.292	0.156	0.148	0.228	0.21
HCM Control Delay	10.9	10.5	11.3	11.1	8.9	10.5	11.4	10.5
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.4	0.7	1.3	1.2	0.6	0.5	0.9	0.8

Intersection	
Intersection Delay (sec/veh)	19.2
Intersection LOS	C

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	125	55	195	565	135	105
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	34	5	5	14	5	5
Movement Flow Rate	167	73	260	753	180	140
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	12.7	21.9	15.3
HCM LOS	B	C	C

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	30%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	70%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	90	150	62	62	55	195	282	282
Left Turning Volume	0	0	62	62	0	0	282	282
Through Volume	0	105	0	0	55	0	0	0
Right Turning Volume	90	45	0	0	0	195	0	0
Lane Flow Rate	120	200	83	83	73	260	377	377
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.282	0.422	0.201	0.189	0.15	0.514	0.707	0.682
Departure Headway, Hd	8.446	7.604	8.663	8.158	7.354	7.229	6.875	6.633
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	427	476	416	442	489	502	531	550
Service Time	6.162	5.319	6.382	5.877	5.073	4.929	4.575	4.333
HCM Lane V/C Ratio	0.281	0.42	0.2	0.188	0.149	0.518	0.71	0.685
HCM Control Delay	14.5	15.8	13.6	12.8	11.4	17.3	24.5	22.4
HCM Lane LOS	B	C	B	B	B	C	C	C
HCM 95th Percentile Queue	1.2	2.2	0.8	0.7	0.5	3.2	7.2	6.4

Intersection	
Intersection Delay (sec/veh)	9.6
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	115	70	65	245	60	65
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	39	5	5	27	5	5
Movement Flow Rate	129	79	73	275	67	73
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.1	9.9	9.6
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	40	85	57	57	70	65	122	122
Left Turning Volume	0	0	57	57	0	0	122	122
Through Volume	0	65	0	0	70	0	0	0
Right Turning Volume	40	20	0	0	0	65	0	0
Lane Flow Rate	45	96	65	65	79	73	138	138
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.081	0.149	0.114	0.103	0.108	0.121	0.223	0.206
Departure Headway, Hd	6.514	5.598	6.332	5.75	4.96	5.965	5.838	5.377
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	546	634	562	618	715	597	611	662
Service Time	4.305	3.389	4.116	3.534	2.743	3.742	3.616	3.154
HCM Lane V/C Ratio	0.082	0.151	0.116	0.105	0.11	0.122	0.226	0.208
HCM Control Delay	9.9	9.4	9.9	9.2	8.4	9.6	10.3	9.6
HCM Lane LOS	A	A	A	A	A	A	B	A
HCM 95th Percentile Queue	0.3	0.5	0.4	0.3	0.4	0.4	0.9	0.8

Intersection	
Intersection Delay (sec/veh)	9.5
Intersection LOS	A

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	155	65	45	195	65	70
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	34	5	5	32	5	5
Movement Flow Rate	174	73	51	219	73	79
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	9.2	9.7	9.5
HCM LOS	A	A	A

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	24%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	76%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	43	92	77	77	65	45	97	97
Left Turning Volume	0	0	77	77	0	0	97	97
Through Volume	0	70	0	0	65	0	0	0
Right Turning Volume	43	22	0	0	0	45	0	0
Lane Flow Rate	49	103	87	87	73	51	110	110
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.087	0.158	0.148	0.136	0.098	0.085	0.183	0.167
Departure Headway, Hd	6.433	5.519	6.133	5.637	4.847	6.069	6.028	5.48
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	553	644	581	631	732	586	590	649
Service Time	4.222	3.307	3.914	3.418	2.627	3.85	3.809	3.261
HCM Lane V/C Ratio	0.089	0.16	0.15	0.138	0.1	0.087	0.186	0.169
HCM Control Delay	9.8	9.4	10	9.3	8.2	9.4	10.2	9.4
HCM Lane LOS	A	A	A	A	A	A	B	A
HCM 95th Percentile Queue	0.3	0.6	0.5	0.5	0.3	0.3	0.7	0.6

Intersection	
Intersection Delay (sec/veh)	11.3
Intersection LOS	B

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Volume (vph)	290	85	65	200	75	65
Peak Hour Factor	0.75	0.75	0.75	0.75	0.75	0.75
Heavy Vehicles(%)	20	0	0	31	0	0
Movement Flow Rate	387	113	87	267	100	87
Number of Lanes	2	1	1	2	2	0

Approach	EB	WB	NB
Opposing Approach	WB	EB	
Opposing Lanes	3	3	0
Conflicting Approach Left		NB	EB
Conflicting Lanes Left	0	2	3
Conflicting Approach Right	NB		WB
Conflicting Lanes Right	2	0	3
HCM Control Delay	11.4	11.3	11.1
HCM LOS	B	B	B

Lane	NBLn1	NBLn2	EBLn1	EBLn2	EBLn3	WBLn1	WBLn2	WBLn3
Volume Left (%)	100%	28%	0%	0%	0%	100%	0%	0%
Volume Thru (%)	0%	0%	100%	100%	0%	0%	100%	100%
Volume Right (%)	0%	72%	0%	0%	100%	0%	0%	0%
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Stop	Stop
Traffic Volume by Lane	50	90	145	145	85	65	100	100
Left Turning Volume	0	0	145	145	0	0	100	100
Through Volume	0	65	0	0	85	0	0	0
Right Turning Volume	50	25	0	0	0	65	0	0
Lane Flow Rate	67	120	193	193	113	87	133	133
Geometry Group	8	8	8	8	8	8	8	8
Degree of Utilization, X	0.136	0.216	0.345	0.326	0.169	0.164	0.253	0.233
Departure Headway, Hd	7.351	6.483	6.418	6.074	5.367	6.804	6.832	6.299
Convergence(Y/N)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Capacity	487	552	561	592	668	527	525	569
Service Time	5.104	4.236	4.162	3.818	3.111	4.552	4.579	4.046
HCM Lane V/C Ratio	0.138	0.217	0.344	0.326	0.169	0.165	0.253	0.234
HCM Control Delay	11.3	11	12.5	11.7	9.2	10.9	11.9	11
HCM Lane LOS	B	B	B	B	A	B	B	B
HCM 95th Percentile Queue	0.5	0.8	1.6	1.5	0.6	0.6	1	0.9

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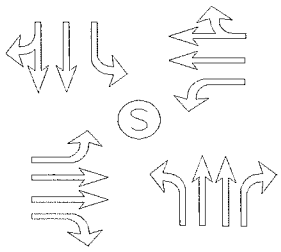
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
5
ROUTE
1B, 1F

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	105	5%		105	10	115
EB RIGHT	40	5%	**55**	95	10	105
WB LEFT	555	5%		555	50	605
WB THRU	425	5%		425	40	465
WB RIGHT	45	10%		45	5	50
WINDSOR AVE						
NB LEFT	70	5%	**55**	125	10	135
NB THRU	605	5%		605	55	660
NB RIGHT	455	5%		455	40	495
SB LEFT	55	5%		55	5	60
SB THRU	590	5%		590	55	645
SB RIGHT	35	5%		35	5	40
TOTALS	**3000**		**110**	**3110**	**290**	**3400**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
5
ROUTE
1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	105	5%		105	10	115
EB RIGHT	40	5%	**55**	95	10	105
WB LEFT	555	5%		555	50	605
WB THRU	425	5%		425	40	465
WB RIGHT	45	10%		45	5	50
WINDSOR AVE						
NB LEFT	70	5%		70	5	75
NB THRU	605	5%		605	55	660
NB RIGHT	455	5%		455	40	495
SB LEFT	55	5%		55	5	60
SB THRU	590	5%		590	55	645
SB RIGHT	35	5%		35	5	40
TOTALS	**3000**		**55**	**3055**	**285**	**3340**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	105	5%		105	10	115
EB RIGHT	40	5%		40	5	45
WB LEFT	555	5%		555	50	605
WB THRU	425	5%		425	40	465
WB RIGHT	45	10%		45	5	50
WINDSOR AVE						
NB LEFT	70	5%	**55**	125	10	135
NB THRU	605	5%		605	55	660
NB RIGHT	455	5%		455	40	495
SB LEFT	55	5%		55	5	60
SB THRU	590	5%		590	55	645
SB RIGHT	35	5%		35	5	40
TOTALS	**3000**		**55**	**3055**	**285**	**3340**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	25	5%		25	5	30
EB THRU	140	5%		140	15	155
EB RIGHT	15	5%	**55**	70	5	75
WB LEFT	300	5%		300	25	325
WB THRU	160	5%		160	15	175
WB RIGHT	35	15%		35	5	40
WINDSOR AVE						
NB LEFT	30	5%	**55**	85	5	90
NB THRU	290	5%		290	25	315
NB RIGHT	365	5%		365	35	400
SB LEFT	40	5%		40	5	45
SB THRU	300	5%		300	25	325
SB RIGHT	10	10%		10	5	15
TOTALS	**1710**		**110**	**1820**	**170**	**1990**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	25	5%		25	5	30
EB THRU	140	5%		140	15	155
EB RIGHT	15	5%	**55**	70	5	75
WB LEFT	300	5%		300	25	325
WB THRU	160	5%		160	15	175
WB RIGHT	35	15%		35	5	40
WINDSOR AVE						
NB LEFT	30	5%		30	5	35
NB THRU	290	5%		290	25	315
NB RIGHT	365	5%		365	35	400
SB LEFT	40	5%		40	5	45
SB THRU	300	5%		300	25	325
SB RIGHT	10	10%		10	5	15
TOTALS	**1710**		**55**	**1765**	**170**	**1935**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	25	5%		25	5	30
EB THRU	140	5%		140	15	155
EB RIGHT	15	5%		15	5	20
WB LEFT	300	5%		300	25	325
WB THRU	160	5%		160	15	175
WB RIGHT	35	15%		35	5	40
WINDSOR AVE						
NB LEFT	30	5%	**55**	85	5	90
NB THRU	290	5%		290	25	315
NB RIGHT	365	5%		365	35	400
SB LEFT	40	5%		40	5	45
SB THRU	300	5%		300	25	325
SB RIGHT	10	10%		10	5	15
TOTALS	**1710**		**55**	**1765**	**170**	**1935**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	140	5%		140	15	155
EB RIGHT	30	5%	**55**	85	5	90
WB LEFT	350	5%		350	30	380
WB THRU	110	5%		110	10	120
WB RIGHT	30	15%		30	5	35
WINDSOR AVE						
NB LEFT	20	5%	**55**	75	5	80
NB THRU	355	5%		355	30	385
NB RIGHT	435	5%		435	40	475
SB LEFT	40	5%		40	5	45
SB THRU	340	5%		340	30	370
SB RIGHT	20	10%		20	5	25
TOTALS	**1890**		**110**	**2000**	**185**	**2185**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	140	5%		140	15	155
EB RIGHT	30	5%	**55**	85	5	90
WB LEFT	350	5%		350	30	380
WB THRU	110	5%		110	10	120
WB RIGHT	30	15%		30	5	35
WINDSOR AVE						
NB LEFT	20	5%		20	5	25
NB THRU	355	5%		355	30	385
NB RIGHT	435	5%		435	40	475
SB LEFT	40	5%		40	5	45
SB THRU	340	5%		340	30	370
SB RIGHT	20	10%		20	5	25
TOTALS	**1890**		**55**	**1945**	**185**	**2130**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	20	5%		20	5	25
EB THRU	140	5%		140	15	155
EB RIGHT	30	5%		30	5	35
WB LEFT	350	5%		350	30	380
WB THRU	110	5%		110	10	120
WB RIGHT	30	15%		30	5	35
WINDSOR AVE						
NB LEFT	20	5%	**55**	75	5	80
NB THRU	355	5%		355	30	385
NB RIGHT	435	5%		435	40	475
SB LEFT	40	5%		40	5	45
SB THRU	340	5%		340	30	370
SB RIGHT	20	10%		20	5	25
TOTALS	**1890**		**55**	**1945**	**185**	**2130**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
5
ROUTE
1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	40	5%		40	5	45
EB THRU	240	5%		240	20	260
EB RIGHT	25	5%	**55**	80	5	85
WB LEFT	440	5%		440	40	480
WB THRU	155	5%		155	15	170
WB RIGHT	50	5%		50	5	55
WINDSOR AVE						
NB LEFT	25	5%	**55**	80	5	85
NB THRU	495	5%		495	45	540
NB RIGHT	570	5%		570	50	620
SB LEFT	60	5%		60	5	65
SB THRU	525	5%		525	45	570
SB RIGHT	5	5%		5	5	10
TOTALS	**2630**		**110**	**2740**	**245**	**2985**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	40	5%		40	5	45
EB THRU	240	5%		240	20	260
EB RIGHT	25	5%	**55**	80	5	85
WB LEFT	440	5%		440	40	480
WB THRU	155	5%		155	15	170
WB RIGHT	50	5%		50	5	55
WINDSOR AVE						
NB LEFT	25	5%		25	5	30
NB THRU	495	5%		495	45	540
NB RIGHT	570	5%		570	50	620
SB LEFT	60	5%		60	5	65
SB THRU	525	5%		525	45	570
SB RIGHT	5	5%		5	5	10
TOTALS	**2630**		**55**	**2685**	**245**	**2930**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OAK GROVE DRIVE						
EB LEFT	40	5%		40	5	45
EB THRU	240	5%		240	20	260
EB RIGHT	25	5%		25	5	30
WB LEFT	440	5%		440	40	480
WB THRU	155	5%		155	15	170
WB RIGHT	50	5%		50	5	55
WINDSOR AVE						
NB LEFT	25	5%	**55**	80	5	85
NB THRU	495	5%		495	45	540
NB RIGHT	570	5%		570	50	620
SB LEFT	60	5%		60	5	65
SB THRU	525	5%		525	45	570
SB RIGHT	5	5%		5	5	10
TOTALS	**2630**		**55**	**2685**	**245**	**2930**

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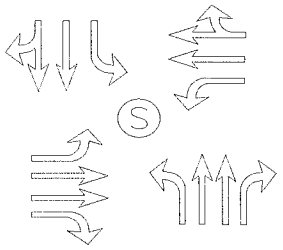
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	1 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	18	1	3	20	**0**	20	5	25
EB THRU	100	5	15	115	**0**	115	10	125
EB RIGHT	41	1	3	45	**165**	210	20	230
WB LEFT	549	8	24	575	**0**	575	50	625
WB THRU	420	6	18	440	**0**	440	40	480
WB RIGHT	41	5	15	55	**0**	55	5	60
WINDSOR AVE								
NB LEFT	68	2	6	75	**140**	215	20	235
NB THRU	599	4	12	610	**0**	610	55	665
NB RIGHT	431	22	66	495	**0**	495	45	540
SB LEFT	53	1	3	55	**0**	55	5	60
SB THRU	587	4	12	600	**0**	600	55	655
SB RIGHT	34	0	0	35	**0**	35	5	40
TOTALS	**2941**				**305**	**3425**	**315**	**3740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	2 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	18	1	3	20	**0**	20	5	25
EB THRU	100	5	15	115	**0**	115	10	125
EB RIGHT	41	1	3	45	**165**	210	20	230
WB LEFT	549	8	24	575	**0**	575	50	625
WB THRU	420	6	18	440	**0**	440	40	480
WB RIGHT	41	5	15	55	**0**	55	5	60
WINDSOR AVE								
NB LEFT	68	2	6	75	**0**	75	5	80
NB THRU	599	4	12	610	**0**	610	55	665
NB RIGHT	431	22	66	495	**0**	495	45	540
SB LEFT	53	1	3	55	**0**	55	5	60
SB THRU	587	4	12	600	**0**	600	55	655
SB RIGHT	34	0	0	35	**0**	35	5	40
TOTALS	**2941**				**165**	**3285**	**300**	**3585**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	3 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	18	1	3	20	**0**	20	5	25
EB THRU	100	5	15	115	**0**	115	10	125
EB RIGHT	41	1	3	45	**0**	45	5	50
WB LEFT	549	8	24	575	**0**	575	50	625
WB THRU	420	6	18	440	**0**	440	40	480
WB RIGHT	41	5	15	55	**0**	55	5	60
WINDSOR AVE								
NB LEFT	68	2	6	75	**140**	215	20	235
NB THRU	599	4	12	610	**0**	610	55	665
NB RIGHT	431	22	66	495	**0**	495	45	540
SB LEFT	53	1	3	55	**0**	55	5	60
SB THRU	587	4	12	600	**0**	600	55	655
SB RIGHT	34	0	0	35	**0**	35	5	40
TOTALS	**2941**				**140**	**3260**	**300**	**3560**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	4 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	27	0	0	25	**0**	25	5	30
EB THRU	134	5	15	150	**0**	150	15	165
EB RIGHT	14	1	3	15	**165**	180	15	195
WB LEFT	284	15	45	330	**0**	330	30	360
WB THRU	158	3	9	165	**0**	165	15	180
WB RIGHT	29	5	15	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	31	0	0	30	**140**	170	15	185
NB THRU	290	5	15	305	**0**	305	25	330
NB RIGHT	365	5	15	380	**0**	380	35	415
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	300	4	12	310	**0**	310	30	340
SB RIGHT	10	1	3	15	**0**	15	5	20
TOTALS	**1682**				**305**	**2115**	**200**	**2315**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	5 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	27	0	0	25	**0**	25	5	30
EB THRU	134	5	15	150	**0**	150	15	165
EB RIGHT	14	1	3	15	**165**	180	15	195
WB LEFT	284	15	45	330	**0**	330	30	360
WB THRU	158	3	9	165	**0**	165	15	180
WB RIGHT	29	5	15	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	31	0	0	30	**0**	30	5	35
NB THRU	290	5	15	305	**0**	305	25	330
NB RIGHT	365	5	15	380	**0**	380	35	415
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	300	4	12	310	**0**	310	30	340
SB RIGHT	10	1	3	15	**0**	15	5	20
TOTALS	**1682**				**165**	**1975**	**190**	**2165**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	6 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	27	0	0	25	**0**	25	5	30
EB THRU	134	5	15	150	**0**	150	15	165
EB RIGHT	14	1	3	15	**0**	15	5	20
WB LEFT	284	15	45	330	**0**	330	30	360
WB THRU	158	3	9	165	**0**	165	15	180
WB RIGHT	29	5	15	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	31	0	0	30	**140**	170	15	185
NB THRU	290	5	15	305	**0**	305	25	330
NB RIGHT	365	5	15	380	**0**	380	35	415
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	300	4	12	310	**0**	310	30	340
SB RIGHT	10	1	3	15	**0**	15	5	20
TOTALS	**1682**				**140**	**1950**	**190**	**2140**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	7 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	20	0	0	20	**0**	20	5	25
EB THRU	140	7	21	160	**0**	160	15	175
EB RIGHT	30	2	6	35	**165**	200	20	220
WB LEFT	350	18	53	405	**0**	405	35	440
WB THRU	110	6	17	125	**0**	125	10	135
WB RIGHT	30	5	14	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	20	1	3	25	**140**	165	15	180
NB THRU	355	18	53	410	**0**	410	35	445
NB RIGHT	435	22	65	500	**0**	500	45	545
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	340	17	51	390	**0**	390	35	425
SB RIGHT	20	2	6	25	**0**	25	5	30
TOTALS	**1890**				**305**	**2485**	**230**	**2715**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	8 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
5
ROUTE
1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	20	0	0	20	**0**	20	5	25
EB THRU	140	7	21	160	**0**	160	15	175
EB RIGHT	30	2	6	35	**165**	200	20	220
WB LEFT	350	18	53	405	**0**	405	35	440
WB THRU	110	6	17	125	**0**	125	10	135
WB RIGHT	30	5	14	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	20	1	3	25	**0**	25	5	30
NB THRU	355	18	53	410	**0**	410	35	445
NB RIGHT	435	22	65	500	**0**	500	45	545
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	340	17	51	390	**0**	390	35	425
SB RIGHT	20	2	6	25	**0**	25	5	30
TOTALS	**1890**				**165**	**2345**	**220**	**2565**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	9 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
5
ROUTE
1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	20	0	0	20	**0**	20	5	25
EB THRU	140	7	21	160	**0**	160	15	175
EB RIGHT	30	2	6	35	**0**	35	5	40
WB LEFT	350	18	53	405	**0**	405	35	440
WB THRU	110	6	17	125	**0**	125	10	135
WB RIGHT	30	5	14	45	**0**	45	5	50
WINDSOR AVE								
NB LEFT	20	1	3	25	**140**	165	15	180
NB THRU	355	18	53	410	**0**	410	35	445
NB RIGHT	435	22	65	500	**0**	500	45	545
SB LEFT	40	0	0	40	**0**	40	5	45
SB THRU	340	17	51	390	**0**	390	35	425
SB RIGHT	20	2	6	25	**0**	25	5	30
TOTALS	**1890**				**140**	**2320**	**215**	**2535**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	10 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1B, 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	42	0	0	40	**0**	40	5	45
EB THRU	235	5	15	250	**0**	250	25	275
EB RIGHT	24	0	0	25	**165**	190	15	205
WB LEFT	439	2	6	445	**0**	445	40	485
WB THRU	149	8	24	175	**0**	175	15	190
WB RIGHT	48	1	3	50	**0**	50	5	55
WINDSOR AVE								
NB LEFT	25	0	0	25	**140**	165	15	180
NB THRU	497	0	0	495	**0**	495	45	540
NB RIGHT	567	2	6	575	**0**	575	50	625
SB LEFT	61	0	0	60	**0**	60	5	65
SB THRU	524	1	3	525	**0**	525	45	570
SB RIGHT	0	0	0	5	**0**	5	5	10
TOTALS	**2611**				**305**	**2975**	**270**	**3245**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	11 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1C, 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	42	0	0	40	**0**	40	5	45
EB THRU	235	5	15	250	**0**	250	25	275
EB RIGHT	24	0	0	25	**165**	190	15	205
WB LEFT	439	2	6	445	**0**	445	40	485
WB THRU	149	8	24	175	**0**	175	15	190
WB RIGHT	48	1	3	50	**0**	50	5	55
WINDSOR AVE								
NB LEFT	25	0	0	25	**0**	25	5	30
NB THRU	497	0	0	495	**0**	495	45	540
NB RIGHT	567	2	6	575	**0**	575	50	625
SB LEFT	61	0	0	60	**0**	60	5	65
SB THRU	524	1	3	525	**0**	525	45	570
SB RIGHT	0	0	0	5	**0**	5	5	10
TOTALS	**2611**				**165**	**2835**	**260**	**3095**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	9-Sep-13	VV.110264.0000	12 OF 12

E/W STREET : OAK GROVE DRIVE
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 5
ROUTE 1D, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OAK GROVE DRIVE								
EB LEFT	42	0	0	40	**0**	40	5	45
EB THRU	235	5	15	250	**0**	250	25	275
EB RIGHT	24	0	0	25	**0**	25	5	30
WB LEFT	439	2	6	445	**0**	445	40	485
WB THRU	149	8	24	175	**0**	175	15	190
WB RIGHT	48	1	3	50	**0**	50	5	55
WINDSOR AVE								
NB LEFT	25	0	0	25	**140**	165	15	180
NB THRU	497	0	0	495	**0**	495	45	540
NB RIGHT	567	2	6	575	**0**	575	50	625
SB LEFT	61	0	0	60	**0**	60	5	65
SB THRU	524	1	3	525	**0**	525	45	570
SB RIGHT	0	0	0	5	**0**	5	5	10
TOTALS	**2611**				**140**	**2810**	**260**	**3070**

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 07:00AM-08:00AM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
21	605	48	Total
1	121	13	1st
3	141	12	2nd
7	164	12	3rd
10	179	11	4th

	1st	2nd	3rd	4th	Total
Rt	7	8	12	10	37
Thru	44	91	96	178	409
Lt	87	107	134	111	439

Total	1st	2nd	3rd	4th	
12	1	2	4	5	Lt
111	21	31	30	29	Thru
45	10	8	16	11	Rt

	Lt	Thru	Rt
1st	10	98	44
2nd	12	103	55
3rd	23	123	91
4th	20	113	103
Total	65	437	293

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 08:00AM-09:00AM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
32	430	54	Total
4	101	12	1st
13	147	19	2nd
9	109	8	3rd
6	73	15	4th

	1st	2nd	3rd	4th	Total
Rt	14	10	15	9	48
Thru	40	112	49	116	317
Lt	116	196	130	138	580

Total	1st	2nd	3rd	4th	
23	7	3	6	7	Lt
114	24	22	25	43	Thru
34	9	6	7	12	Rt

	Lt	Thru	Rt
1st	15	151	117
2nd	12	216	142
3rd	9	149	84
4th	18	132	103
Total	54	648	446

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR — PASADENA
EAST-WEST STREET : OAK GROVE — 05-31-11
BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
1	119	13	0	1	0	0	1	0	0	0	0	135
3	141	10	0	0	1	0	0	1	0	0	0	156
7	162	12	0	1	0	0	0	0	0	1	0	183
10	179	11	0	0	0	0	0	0	0	0	0	200
4	100	11	0	1	1	0	0	0	0	0	0	117
13	146	19	0	1	0	0	0	0	0	0	0	179
9	106	8	0	2 4	0	0	0 0	0	0	1 1	0	126
6	73	15	0	0	0	0	0	0	0	0	0	94
						TT= 4+0+1= 5						
53	1026	99	0	6	2	0	1	1	0	2	0	1190
						SOUTH LEG						
42	98	10	2	0	0	0	0	0	0	0	0	152
53	103	12	2	0	0	0	0	0	0	0	0	170
86	122	21	3	1	1	1	0	1	1	0	0	237
100	113	20	3	0	0	0	0	0	0	0	0	236
106	149	15	11	1	0	0	0	0	0	1	0	283
139	215	12	3	1	0	0	0	0	0	0	0	370
78	148	8	5	1	0	1	0	1	0	0	0	242
101	132	18	2	0	0	0	0	0	0	0	0	253
						TT=24+2+2=28						
705	1080	116	31	4	1	2	0	2	1	1	0	1943
						EAST LEG						
6	43	86	1	1	1	0	0	0	0	0	0	138
7	89	104	1	2	2	0	0	1	0	0	0	206
10	95	134	2	1	0	0	0	0	0	0	0	242
8	177	110	2	1	1	0	0	0	0	0	0	299
14	37	113	0	3	2	0	0	1	0	0	0	170
9	111	192	1	1	4	0	0	0	0	0	0	318
14	45	128	1	4 18	0	0	0 1	2	0	0 0	0	194
9	116	137	0	0	0	0	0	0	0	0	1	263
						TT=18+1+0= 19						
77	7131	004	8	13	10	0	0	4	0	0	1	1830
						WEST LEG						
9	20	1	1	1	0	0	0	0	0	0	0	32
6	29	1	1	2	0	0	0	1	1	0	0	41
16	28	3	0	2	1	0	0	0	0	0	0	50
10	28	5	1	1	0	0	0	0	0	0	0	45
9	23	7	0	1	0	0	0	0	0	0	0	40
6	21	3	0	1	0	0	0	0	0	0	0	31
7	21	6	0	4 6	0	0	0 0	0	0	0 0	0	38
12	41	7	0	2	0	0	0	0	0	0	0	62
						TT=6+0+0= 6						
75	211	33	3	14	1	0	0	1	1	0	0	339

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: OAK GROVE
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 01:00PM

NORTH LEG (SB)

TOTAL: 352

TT = 5
TT% = 5/352 = 0.85 %
≈ 1%

	Rt	Thru	Lt	
	10 12	300 299	40 41	Total
	2	72	12	1st
	3	76	12	2nd
	1	75	4	3rd
	6	76	13	4th

TT = 23
TT% = 23/494 = 4.66 %
≈ 5%

EAST LEG TOTAL: (WB) 494

	1st	2nd	3rd	4th	Total
Rt	4	12	12	6	35 34
Thru	44	43	41	33	160 161
Lt	83	58	77	81	300 299

	Total	1st	2nd	3rd	4th
Lt	25 27	6	12	2	7
Thru	140 139	42	42	25	30
Rt	15 15	5	3	3	4

WEST LEG TOTAL: (EB) 181

TT = 6
TT% = 6/181 = 3.31 %
≈ 3%

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.81
EAST LEG = 0.94
WEST LEG = 0.79

ALL LEGS = 0.91

TT = 10
TT% = 10/684 = 1.46 %
≈ 1%

	Lt	Thru	Rt
1st	11	54	100
2nd	9	89	112
3rd	8	72	75
4th	3	75	76
Total	30 31	290	305 363

TOTAL: 684

SOUTH LEG (NB)

HOUR TOTAL: 1,711

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 12:00PM-01:00PM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt
Total	7	282	34
1st	2	49	8
2nd	0	75	8
3rd	5	99	12
4th	0	59	6

	1st	2nd	3rd	4th	Total
Rt	4	10	3	5	22
Thru	12	18	14	8	52
Lt	75	90	62	72	299

	Total	1st	2nd	3rd	4th
Lt	19	7	7	4	1
Thru	106	28	29	18	31
Rt	21	5	6	4	6

	Lt	Thru	Rt
1st	4	53	75
2nd	7	53	56
3rd	6	103	101
4th	7	73	84
Total	24	282	316

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 01:00PM-02:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
12	299	41	Total
2	72	12	1st
3	76	12	2nd
1	75	4	3rd
6	76	13	4th

	1st	2nd	3rd	4th	Total
Rt	4	12	12	6	34
Thru	44	43	41	33	161
Lt	83	58	77	81	299

Total	1st	2nd	3rd	4th	
27	6	12	2	7	Lt
139	42	42	25	30	Thru
15	5	3	3	4	Rt

	Lt	Thru	Rt
1st	11	54	100
2nd	9	89	112
3rd	8	72	75
4th	3	75	76
Total	31	290	363

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR PASADENA
EAST-WEST STREET : OAK GROVE 05-31-11
BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
2	49	8	0	0	0	0	0	0	0	0	0	59
0	72	8	0	2	0	0	1	0	0	0	0	83
5	99	12	0	0	0	0	0	0	0	0	0	116
0	59	6	0	0	0	0	0	0	0	0	0	65
2	69	12	0	2	0	0	1	0	0	0	0	86
3	76	12	0	0	0	0	0	0	0	0	0	91
0	74	4	1	0	0	0	0	0	0	1	0	80
6	76	13	0	0	0	0	0	0	0	0	0	95
				3		TT = 3+1+1 = 5				1		
18	574	75	1	4	0	0	2	0	0	1	0	675
					NB SOUTH LEG							
73	52	4	1	1	0	1	0	0	0	0	0	132
55	52	6	1	1	1	0	0	0	0	0	0	116
100	102	6	1	0	0	0	1	0	0	0	0	210
81	70	7	3	1	0	0	1	0	0	1	0	164
100	54	11	0	0	0	0	0	0	0	0	0	165
110	87	9	2	2	0	0	0	0	0	0	0	210
72	70	8	2	1	0	1	1	0	0	0	0	155
76	74	3	0	1	0	0	0	0	0	0	0	154
				8		TT = 8+2+0 = 10		2		0		
667	561	54	10	7	1	2	3	0	0	1	0	1306
					WB EAST LEG							
3	12	72	0	0	2	1	0	1	0	0	0	91
10	16	87	0	2	2	0	0	1	0	0	0	118
3	14	62	0	0	0	0	0	0	0	0	0	79
5	8	69	0	0	3	0	0	0	0	0	0	85
3	43	80	1	1	3	0	0	0	0	0	0	131
12	42	57	0	1	1	0	0	0	0	0	0	113
11	40	67	1	1	10	0	0	0	0	0	0	130
3	33	80	3	0	1	0	0	0	0	0	0	120
				23		TT = 23+0+0 = 23		0		0		
50	208	574	5	5	22	1	0	2	0	0	0	867
					EB WEST LEG							
5	27	7	0	1	0	0	0	0	0	0	0	40
6	28	7	0	1	0	0	0	0	0	0	0	42
4	18	4	0	0	0	0	0	0	0	0	0	26
5	29	1	1	2	0	0	0	0	0	0	0	38
5	39	6	0	3	0	0	0	0	0	0	0	53
3	41	12	0	0	0	0	1	0	0	0	0	57
2	24	2	1	1	0	0	0	0	0	0	0	30
4	30	7	0	0	0	0	0	0	0	0	0	41
				5		TT = 5+1+0 = 6		1		0		
34	236	46	2	8	0	0	1	0	0	0	0	327

Prepared by Newport Traffic Studies

(5)

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: OAK GROVE
JURISDICTION: LA CANADA

DATE: 04-10-12

PEAK HOUR: 03:00PM

NORTH LEG (SB)

TOTAL: 397

Rt	Thru	Lt	
17	342	38	Total
7	62	9	1st
4	89	12	2nd
1	102	8	3rd
5	89	9	4th

EAST LEG (WB) TOTAL: 491

	1st	2nd	3rd	4th	Total
Rt	5	9	7	9	30
Thru	25	25	31	28	109
Lt	92	91	83	86	352

Total	1st	2nd	3rd	4th	
21	6	2	6	7	Lt
138	39	34	38	27	Thru
28	8	7	5	8	Rt

WEST LEG (EB) TOTAL: 187

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.86
EAST LEG = 0.98
WEST LEG = 0.88

ALL LEGS = 0.93

	Lt	Thru	Rt
1st	3	71	93
2nd	6	96	118
3rd	4	89	93
4th	6	98	132
Total	19	354	436

SOUTH LEG (NB) TOTAL: 809

HOUR TOTAL: 1,884

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 02:00PM-03:00PM DATE: 04-10-12

NORTH LEG

Rt	Thru	Lt	
12	373	25	Total
4	85	6	1st
2	73	7	2nd
5	92	5	3rd
1	123	7	4th

	1st	2nd	3rd	4th	Total
Rt	14	6	13	8	41
Thru	30	29	18	26	103
Lt	77	77	98	87	339

Total	1st	2nd	3rd	4th	
24	7	5	6	6	Lt
82	18	22	23	19	Thru
27	3	8	10	6	Rt

	Lt	Thru	Rt
1st	3	72	79
2nd	3	68	77
3rd	8	64	93
4th	5	81	100
Total	19	285	349

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 03:00PM-04:00PM DATE: 04-10-12

NORTH LEG

Rt	Thru	Lt	
17	342	38	Total
7	62	9	1st
4	89	12	2nd
1	102	8	3rd
5	89	9	4th

	1st	2nd	3rd	4th	Total
Rt	5	9	7	9	30
Thru	25	25	31	28	109
Lt	92	91	83	86	352

Total	1st	2nd	3rd	4th	
21	6	2	6	7	Lt
138	39	34	38	27	Thru
28	8	7	5	8	Rt

	Lt	Thru	Rt
1st	3	71	93
2nd	6	96	118
3rd	4	89	93
4th	6	98	132
Total	19	354	436

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: OAK GROVE
JURISDICTION: PASADENA

DATE: 05-31-11

PEAK HOUR: 04:45PM

NORTH LEG (SB)

TOTAL: 586

TT = 1

TT% = 1/586 = 0.17% ≈ 1%

	Rt	Thru	Lt
Total	5	525	60 61
1st	0	136	24
2nd	0	115	6
3rd	0	109	21
4th	0	165	10

TT = 10

TT% = 10/647 = 1.55% ≈ 2%

EAST LEG TOTAL: (WB) 647

	1st	2nd	3rd	4th	Total
Rt	8	12	15	14	50 49
Thru	42	24	56	35	155 157
Lt	85	141	102	113	440 441

	Total	1st	2nd	3rd	4th
Lt	40 42	6	6	18	12
Thru	240	60	63	66	51
Rt	25 24	9	3	3	9

WEST LEG TOTAL: (EB) 306

TT = 5

TT% = 5/306 = 1.63% ≈ 2%

PEAK HOUR FACTORS

NORTH LEG = 0.84
SOUTH LEG = 0.92
EAST LEG = 0.91
WEST LEG = 0.88

ALL LEGS = 0.96

	Lt	Thru	Rt
1st	11	122	127
2nd	2	119	137
3rd	6	119	173
4th	6	137	132
Total	25	497 495	569 570

TT = 2

TT% = 2/1091 = 0.18% ≈ 1%

TOTAL: 1,091

SOUTH LEG (NB)

HOUR TOTAL: 2,630

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 04:00PM-05:00PM DATE: 05-31-11

NORTH LEG

	Rt	Thru	Lt
Total	1	461	69
1st	1	92	18
2nd	0	114	16
3rd	0	119	11
4th	0	136	24

	1st	2nd	3rd	4th	Total
Rt	20	12	11	8	51
Thru	57	42	31	42	172
Lt	54	83	114	85	336

	Total	1st	2nd	3rd	4th
Lt	22	9	5	2	6
Thru	232	56	59	57	60
Rt	18	3	2	4	9

	Lt	Thru	Rt
1st	10	76	101
2nd	1	78	116
3rd	9	87	126
4th	11	122	127
Total	31	363	470

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: OAK GROVE

TIME: 05:00PM-06:00PM DATE: 05-31-11

NORTH LEG

Rt	Thru	Lt	
3	534	49	Total
0	115	6	1st
0	109	21	2nd
0	165	10	3rd
3	145	12	4th

	1st	2nd	3rd	4th	Total
Rt	12	15	14	18	59
Thru	24	56	35	45	160
Lt	141	102	113	78	434

Total	1st	2nd	3rd	4th	
42	6	18	12	6	Lt
225	63	66	51	45	Thru
21	3	3	9	6	Rt

	Lt	Thru	Rt
1st	2	119	137
2nd	6	119	173
3rd	6	137	132
4th	3	101	168
Total	17	476	610

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR PASADENA

EAST-WEST STREET : OAK GROVE 05-31-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
1	92	18	0	0	0	0	0	0	0	0	0	111
0	114	16	0	0	0	0	0	0	0	0	0	130
0	119	10	0	0	1	0	0	0	0	0	0	130
0	136	24	0	0	0	0	0	0	0	0	0	160
0	115	6	0	0	0	0	0	0	0	0	0	121
0	108	21	0	1	0	0	0	0	0	0	0	130
0	165	10	0	0	0	0	0	0	0	0	0	175
3	145	12	0	0 1	0	0	0 0	0	0	0 0	0	160
						TT= 1+0+0 = 1						
4	994	117	0	1	1	0	0	0	0	0	0	1117
					NB SOUTH LEG							
95	76	9	6	0	0	0	0	0	0	0	1	187
112	78	1	4	0	0	0	0	0	0	0	0	195
120	87	9	5	0	0	0	0	0	1	0	0	222
126	122	11	1	0	0	0	0	0	0	0	0	260
137	119	2	0	0	0	0	0	0	0	0	0	258
172	119	6	1	0	0	0	0	0	0	0	0	298
132	137	6	0	0	0	0	0	0	0	0	0	275
168	101	3	0	0 2	0	0	0 0	0	0	0 0	0	272
						TT= 2+0+0 = 2						
1062	839	47	17	0	0	0	0	0	1	0	1	1967
					WB EAST LEG							
19	52	51	1	5	3	0	0	0	0	0	0	131
11	41	83	1	1	0	0	0	0	0	0	0	137
10	29	113	1	2	1	0	0	0	0	0	0	156
7	38	85	1	4	0	0	0	0	0	0	0	135
12	23	141	0	1	0	0	0	0	0	0	0	177
15	55	101	0	1	0	0	0	0	0	0	1	173
14	33	112	0	2	1	0	0	0	0	0	0	162
18	44	77	0	1 9	1	0	0 0	0	0	0 1	0	141
						TT= 9+0+1 = 10						
106	315	763	4	17	6	0	0	0	0	0	1	1212
					EB WEST LEG							
3	53	9	0	3	0	0	0	0	0	0	0	68
2	59	5	0	0	0	0	0	0	0	0	0	66
4	57	2	0	0	0	0	0	0	0	0	0	63
9	59	6	0	1	0	0	0	0	0	0	0	75
3	61	6	0	2	0	0	0	0	0	0	0	72
3	65	18	0	1	0	0	0	0	0	0	0	87
9	50	12	0	1	0	0	0	0	0	0	0	72
6	44	6	0	1 5	0	0	0 0	0	0 0	0	0	57
						TT= 5+0+0 = 5						
39	448	64	0	9	0	0	0	0	0	0	0	560

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	105	40	555	425	45	70	605	455	55	590	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3373		1719	3438	1538	1719	3418	
Flt Permitted	0.95	1.00	1.00	0.44	1.00		0.95	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1719	3438	1538	805	3373		1719	3438	1538	404	3418	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	125	48	661	506	54	83	720	542	65	702	42
RTOR Reduction (vph)	0	0	43	0	11	0	0	0	186	0	5	0
Lane Group Flow (vph)	24	125	5	661	549	0	83	720	356	65	739	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	10%	5%	5%	5%	5%	5%	0%
Turn Type	Prot	NA	Perm	pm+pt	NA		Prot	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4	8					2	6		
Actuated Green, G (s)	1.8	7.8	7.8	34.5	28.7		3.7	21.5	44.2	23.8	20.8	
Effective Green, g (s)	1.8	7.8	7.8	34.5	28.7		3.7	21.5	44.2	23.8	20.8	
Actuated g/C Ratio	0.03	0.11	0.11	0.49	0.40		0.05	0.30	0.62	0.34	0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	44	378	169	683	1363		90	1041	1044	191	1001	
v/s Ratio Prot	0.01	0.04		c0.31	0.16		c0.05	0.21	0.11	0.01	c0.22	
v/s Ratio Perm			0.00	c0.16					0.12	0.10		
v/c Ratio	0.55	0.33	0.03	0.97	0.40		0.92	0.69	0.34	0.34	0.74	
Uniform Delay, d1	34.2	29.2	28.2	15.5	15.1		33.5	21.8	6.4	16.9	22.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	13.1	0.5	0.1	26.3	0.2		69.4	3.8	0.2	1.1	4.9	
Delay (s)	47.3	29.7	28.3	41.8	15.2		102.9	25.6	6.6	17.9	27.5	
Level of Service	D	C	C	D	B		F	C	A	B	C	
Approach Delay (s)		31.5			29.6			22.7			26.7	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	71.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	140	15	300	160	35	30	290	365	40	300	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1538	1719	3291		1805	3438	1538	1805	3416	
Flt Permitted	0.62	1.00	1.00	0.44	1.00		0.55	1.00	1.00	0.56	1.00	
Satd. Flow (perm)	1174	3438	1538	802	3291		1039	3438	1538	1061	3416	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	154	16	330	176	38	33	319	401	44	330	11
RTOR Reduction (vph)	0	0	13	0	26	0	0	0	204	0	3	0
Lane Group Flow (vph)	27	154	3	330	188	0	33	319	197	44	338	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	15%	0%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.1	8.4	8.4	20.6	15.9		18.0	16.6	24.8	18.0	16.6	
Effective Green, g (s)	9.1	8.4	8.4	20.6	15.9		18.0	16.6	24.8	18.0	16.6	
Actuated g/C Ratio	0.18	0.17	0.17	0.41	0.31		0.36	0.33	0.49	0.36	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	220	571	255	475	1034		391	1128	875	398	1121	
v/s Ratio Prot	0.00	0.04		c0.11	0.06		0.00	0.09	0.04	c0.00	c0.10	
v/s Ratio Perm	0.02		0.00	c0.17			0.03		0.09	0.04		
v/c Ratio	0.12	0.27	0.01	0.69	0.18		0.08	0.28	0.22	0.11	0.30	
Uniform Delay, d1	17.3	18.4	17.6	11.2	12.6		10.7	12.6	7.4	10.8	12.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.0	4.4	0.1		0.1	0.6	0.1	0.1	0.7	
Delay (s)	17.5	18.7	17.6	15.6	12.7		10.8	13.2	7.5	10.9	13.4	
Level of Service	B	B	B	B	B		B	B	A	B	B	
Approach Delay (s)		18.4			14.5			10.1			13.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	50.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	140	30	350	110	30	20	355	435	40	340	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1538	1719	3262		1805	3438	1538	1805	3400	
Flt Permitted	0.66	1.00	1.00	0.44	1.00		0.52	1.00	1.00	0.50	1.00	
Satd. Flow (perm)	1248	3438	1538	798	3262		993	3438	1538	945	3400	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	151	32	376	118	32	22	382	468	43	366	22
RTOR Reduction (vph)	0	0	27	0	22	0	0	0	234	0	6	0
Lane Group Flow (vph)	22	151	5	376	128	0	22	382	234	43	382	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	15%	0%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	8.9	8.2	8.2	20.5	15.8		17.9	17.2	25.5	19.3	17.9	
Effective Green, g (s)	8.9	8.2	8.2	20.5	15.8		17.9	17.2	25.5	19.3	17.9	
Actuated g/C Ratio	0.17	0.16	0.16	0.40	0.31		0.35	0.34	0.50	0.38	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	225	552	247	470	1009		359	1157	888	380	1191	
v/s Ratio Prot	0.00	0.04		c0.13	0.04		0.00	0.11	0.04	c0.00	c0.11	
v/s Ratio Perm	0.02		0.00	c0.19			0.02		0.11	0.04		
v/c Ratio	0.10	0.27	0.02	0.80	0.13		0.06	0.33	0.26	0.11	0.32	
Uniform Delay, d1	17.6	18.8	18.1	12.1	12.7		10.9	12.7	7.4	10.1	12.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	9.4	0.1		0.1	0.8	0.2	0.1	0.7	
Delay (s)	17.8	19.1	18.1	21.5	12.7		11.0	13.4	7.5	10.3	12.9	
Level of Service	B	B	B	C	B		B	B	A	B	B	
Approach Delay (s)		18.8			19.0			10.2			12.6	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	51.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	240	25	440	155	50	25	495	570	60	525	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1615	1719	3312		1805	3610	1538	1805	3435	
Flt Permitted	0.62	1.00	1.00	0.44	1.00		0.41	1.00	1.00	0.36	1.00	
Satd. Flow (perm)	1175	3438	1615	805	3312		774	3610	1538	683	3435	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	250	26	458	161	52	26	516	594	62	547	5
RTOR Reduction (vph)	0	0	21	0	35	0	0	0	212	0	1	0
Lane Group Flow (vph)	42	250	5	458	178	0	26	516	382	62	551	0
Heavy Vehicles (%)	0%	5%	0%	5%	5%	5%	0%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.1	11.7	11.7	23.8	18.4		18.4	17.7	25.8	21.4	19.2	
Effective Green, g (s)	13.1	11.7	11.7	23.8	18.4		18.4	17.7	25.8	21.4	19.2	
Actuated g/C Ratio	0.24	0.21	0.21	0.43	0.33		0.33	0.32	0.46	0.38	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	292	722	339	477	1094		269	1147	823	307	1184	
v/s Ratio Prot	0.00	0.07		c0.14	0.05		0.00	0.14	0.07	c0.01	c0.16	
v/s Ratio Perm	0.03		0.00	c0.27			0.03		0.18	0.07		
v/c Ratio	0.14	0.35	0.02	0.96	0.16		0.10	0.45	0.46	0.20	0.47	
Uniform Delay, d1	16.7	18.7	17.4	14.2	13.2		12.7	15.1	10.2	11.1	14.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	31.1	0.1		0.2	1.3	0.4	0.3	1.3	
Delay (s)	16.9	19.0	17.5	45.3	13.3		12.9	16.4	10.6	11.4	15.6	
Level of Service	B	B	B	D	B		B	B	B	B	B	
Approach Delay (s)		18.6			35.1			13.3			15.1	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	55.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	105	95	555	425	45	125	605	455	55	590	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1022	1719	3373		1245	3438	1538	1719	3418	
Flt Permitted	0.44	1.00	1.00	0.49	1.00		0.14	1.00	1.00	0.30	1.00	
Satd. Flow (perm)	800	3438	1022	888	3373		188	3438	1538	537	3418	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	125	113	661	506	54	149	720	542	65	702	42
RTOR Reduction (vph)	0	0	58	0	9	0	0	0	163	0	4	0
Lane Group Flow (vph)	24	125	55	661	551	0	149	720	379	65	740	0
Heavy Vehicles (%)	5%	5%	58%	5%	5%	10%	45%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.4	10.8	19.8	40.8	35.2		36.9	29.7	55.7	27.1	23.9	
Effective Green, g (s)	12.4	10.8	19.8	40.8	35.2		36.9	29.7	55.7	27.1	23.9	
Actuated g/C Ratio	0.14	0.13	0.23	0.48	0.41		0.43	0.35	0.65	0.32	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	133	433	284	675	1385		192	1191	1071	214	953	
v/s Ratio Prot	0.00	0.04	0.02	c0.30	0.16		c0.08	0.21	0.11	0.01	0.22	
v/s Ratio Perm	0.02		0.03	c0.17			c0.25		0.14	0.08		
v/c Ratio	0.18	0.29	0.19	0.98	0.40		0.78	0.60	0.35	0.30	0.78	
Uniform Delay, d1	31.8	34.0	26.5	19.7	17.8		18.3	23.1	6.8	21.0	28.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.3	29.1	0.2		17.6	2.3	0.2	0.8	6.2	
Delay (s)	32.4	34.3	26.9	48.8	18.0		35.9	25.4	7.0	21.8	34.6	
Level of Service	C	C	C	D	B		D	C	A	C	C	
Approach Delay (s)		30.9			34.7			19.5			33.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	85.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	140	70	300	160	35	85	290	365	40	300	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	907	1719	3291		1107	3438	1538	1805	3416	
Flt Permitted	0.62	1.00	1.00	0.44	1.00		0.50	1.00	1.00	0.56	1.00	
Satd. Flow (perm)	1174	3438	907	796	3291		586	3438	1538	1061	3416	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	154	77	330	176	38	93	319	401	44	330	11
RTOR Reduction (vph)	0	0	55	0	27	0	0	0	192	0	3	0
Lane Group Flow (vph)	27	154	22	330	187	0	93	319	209	44	338	0
Heavy Vehicles (%)	0%	5%	78%	5%	5%	15%	63%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pt+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	4 5	3	8		5	2	3	1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	8.9	8.2	15.2	20.4	15.7		22.7	19.7	27.9	19.5	18.1	
Effective Green, g (s)	8.9	8.2	15.2	20.4	15.7		22.7	19.7	27.9	19.5	18.1	
Actuated g/C Ratio	0.17	0.15	0.28	0.38	0.29		0.42	0.37	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	204	527	258	445	966		278	1266	917	406	1156	
v/s Ratio Prot	0.00	0.04	0.02	c0.11	0.06		c0.02	0.09	0.03	0.00	0.10	
v/s Ratio Perm	0.02			c0.17			c0.12		0.10	0.04		
v/c Ratio	0.13	0.29	0.08	0.74	0.19		0.33	0.25	0.23	0.11	0.29	
Uniform Delay, d1	18.9	20.1	14.0	12.9	14.2		9.7	11.8	7.0	11.1	13.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.1	6.5	0.1		0.7	0.5	0.1	0.1	0.6	
Delay (s)	19.2	20.4	14.2	19.4	14.3		10.4	12.2	7.1	11.2	13.6	
Level of Service	B	C	B	B	B		B	B	A	B	B	
Approach Delay (s)		18.4			17.4			9.5			13.4	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	140	85	350	110	30	75	355	435	40	340	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	985	1719	3262		1056	3438	1538	1805	3400	
Flt Permitted	0.66	1.00	1.00	0.44	1.00		0.47	1.00	1.00	0.53	1.00	
Satd. Flow (perm)	1248	3438	985	798	3262		520	3438	1538	998	3400	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	151	91	376	118	32	81	382	468	43	366	22
RTOR Reduction (vph)	0	0	72	0	23	0	0	0	224	0	7	0
Lane Group Flow (vph)	22	151	19	376	127	0	81	382	244	43	381	0
Heavy Vehicles (%)	0%	5%	64%	5%	5%	15%	71%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	8.9	8.2	11.2	20.5	15.8		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	8.9	8.2	11.2	20.5	15.8		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.21	0.38	0.29		0.42	0.37	0.52	0.37	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	214	526	279	448	962		249	1257	915	388	1148	
v/s Ratio Prot	0.00	0.04	0.00	c0.13	0.04		c0.02	0.11	0.04	0.00	0.11	
v/s Ratio Perm	0.02		0.02	c0.19			c0.12		0.12	0.04		
v/c Ratio	0.10	0.29	0.07	0.84	0.13		0.33	0.30	0.27	0.11	0.33	
Uniform Delay, d1	18.9	20.1	17.0	13.7	13.9		9.8	12.1	7.2	11.0	13.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.1	13.0	0.1		0.8	0.6	0.2	0.1	0.8	
Delay (s)	19.1	20.4	17.1	26.7	13.9		10.5	12.8	7.3	11.2	14.0	
Level of Service	B	C	B	C	B		B	B	A	B	B	
Approach Delay (s)		19.2			23.0			9.8			13.7	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	240	80	440	155	50	80	495	570	60	525	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	967	1719	3312		1081	3610	1538	1805	3438	
Flt Permitted	0.62	1.00	1.00	0.45	1.00		0.36	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	1175	3438	967	807	3312		407	3610	1538	727	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	250	83	458	161	52	83	516	594	62	547	0
RTOR Reduction (vph)	0	0	65	0	34	0	0	0	220	0	0	0
Lane Group Flow (vph)	42	250	18	458	179	0	83	516	374	62	547	0
Heavy Vehicles (%)	0%	5%	67%	5%	5%	5%	67%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.2	11.8	11.8	23.9	18.5		18.4	16.2	24.3	18.4	16.2	
Effective Green, g (s)	13.2	11.8	11.8	23.9	18.5		18.4	16.2	24.3	18.4	16.2	
Actuated g/C Ratio	0.24	0.22	0.22	0.44	0.34		0.34	0.30	0.45	0.34	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	302	747	210	491	1128		165	1077	802	290	1026	
v/s Ratio Prot	0.00	0.07		c0.14	0.05		c0.02	0.14	0.07	0.01	c0.16	
v/s Ratio Perm	0.03		0.02	c0.27			0.15		0.17	0.06		
v/c Ratio	0.14	0.33	0.09	0.93	0.16		0.50	0.48	0.47	0.21	0.53	
Uniform Delay, d1	15.9	17.9	16.9	13.1	12.5		13.7	15.6	10.5	12.4	15.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.2	24.8	0.1		2.4	1.5	0.4	0.4	2.0	
Delay (s)	16.1	18.2	17.1	37.9	12.5		16.1	17.1	10.9	12.7	17.9	
Level of Service	B	B	B	D	B		B	B	B	B	B	
Approach Delay (s)		17.7			29.9			14.0			17.4	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	115	105	605	465	50	135	660	495	60	645	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1022	1719	3372		1245	3438	1538	1719	3417	
Flt Permitted	0.42	1.00	1.00	0.49	1.00		0.14	1.00	1.00	0.25	1.00	
Satd. Flow (perm)	759	3438	1022	885	3372		188	3438	1538	453	3417	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	137	125	720	554	60	161	786	589	71	768	48
RTOR Reduction (vph)	0	0	45	0	9	0	0	0	148	0	5	0
Lane Group Flow (vph)	24	137	80	720	605	0	161	786	441	71	811	0
Heavy Vehicles (%)	5%	5%	58%	5%	5%	10%	45%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.7	11.1	20.1	41.1	35.5		36.9	29.7	55.7	27.1	23.9	
Effective Green, g (s)	12.7	11.1	20.1	41.1	35.5		36.9	29.7	55.7	27.1	23.9	
Actuated g/C Ratio	0.15	0.13	0.23	0.48	0.41		0.43	0.35	0.65	0.32	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	130	444	286	675	1392		191	1187	1068	190	950	
v/s Ratio Prot	0.00	0.04	0.03	c0.32	0.18		c0.09	0.23	0.12	0.01	0.24	
v/s Ratio Perm	0.02		0.05	c0.19			c0.27		0.16	0.10		
v/c Ratio	0.18	0.31	0.28	1.07	0.43		0.84	0.66	0.41	0.37	0.85	
Uniform Delay, d1	31.7	34.0	27.0	20.1	18.1		19.1	23.9	7.3	21.4	29.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.5	53.8	0.2		27.2	2.9	0.3	1.2	9.6	
Delay (s)	32.4	34.4	27.5	73.9	18.3		46.2	26.8	7.5	22.6	39.0	
Level of Service	C	C	C	E	B		D	C	A	C	D	
Approach Delay (s)		31.2			48.3			21.5			37.7	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	34.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	155	75	325	175	40	95	315	400	45	325	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	907	1719	3284		1107	3438	1538	1805	3418	
Flt Permitted	0.60	1.00	1.00	0.44	1.00		0.48	1.00	1.00	0.54	1.00	
Satd. Flow (perm)	1149	3438	907	805	3284		559	3438	1538	1034	3418	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	170	82	357	192	44	104	346	440	49	357	11
RTOR Reduction (vph)	0	0	69	0	31	0	0	0	213	0	3	0
Lane Group Flow (vph)	27	170	13	357	205	0	104	346	227	49	365	0
Heavy Vehicles (%)	0%	5%	78%	5%	5%	15%	63%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.6	8.9	8.9	21.2	16.5		22.7	19.7	28.0	19.5	18.1	
Effective Green, g (s)	9.6	8.9	8.9	21.2	16.5		22.7	19.7	28.0	19.5	18.1	
Actuated g/C Ratio	0.18	0.16	0.16	0.39	0.30		0.42	0.36	0.52	0.36	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	212	564	149	454	998		264	1247	906	391	1139	
v/s Ratio Prot	0.00	0.05		c0.12	0.06		c0.02	0.10	0.04	0.00	0.11	
v/s Ratio Perm	0.02		0.01	c0.19			c0.14		0.11	0.04		
v/c Ratio	0.13	0.30	0.09	0.79	0.21		0.39	0.28	0.25	0.13	0.32	
Uniform Delay, d1	18.7	20.0	19.3	13.1	14.0		10.3	12.3	7.3	11.5	13.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.3	8.7	0.1		1.0	0.6	0.1	0.1	0.7	
Delay (s)	19.0	20.3	19.5	21.8	14.1		11.3	12.8	7.5	11.6	14.3	
Level of Service	B	C	B	C	B		B	B	A	B	B	
Approach Delay (s)		19.9			18.8			10.0			13.9	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	155	95	380	120	35	80	385	475	45	370	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	985	1719	3250		1056	3438	1538	1805	3403	
Flt Permitted	0.65	1.00	1.00	0.44	1.00		0.44	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	1228	3438	985	789	3250		491	3438	1538	968	3403	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	167	102	409	129	38	86	414	511	48	398	22
RTOR Reduction (vph)	0	0	81	0	27	0	0	0	246	0	6	0
Lane Group Flow (vph)	22	167	21	409	140	0	86	414	265	48	414	0
Heavy Vehicles (%)	0%	5%	64%	5%	5%	15%	71%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.21	0.38	0.30		0.42	0.36	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	213	531	281	446	962		238	1255	914	377	1147	
v/s Ratio Prot	0.00	0.05	0.00	c0.14	0.04		c0.02	0.12	0.04	0.00	0.12	
v/s Ratio Perm	0.02		0.02	c0.21			c0.13		0.13	0.04		
v/c Ratio	0.10	0.31	0.08	0.92	0.15		0.36	0.33	0.29	0.13	0.36	
Uniform Delay, d1	18.8	20.2	17.0	14.5	13.9		9.9	12.3	7.3	11.1	13.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.1	23.5	0.1		0.9	0.7	0.2	0.2	0.9	
Delay (s)	19.0	20.5	17.1	37.9	14.0		10.8	13.0	7.5	11.3	14.3	
Level of Service	B	C	B	D	B		B	B	A	B	B	
Approach Delay (s)		19.2			31.0			10.0			14.0	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	260	85	480	170	55	85	540	620	65	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	967	1719	3312		1081	3610	1538	1805	3438	
Flt Permitted	0.61	1.00	1.00	0.44	1.00		0.31	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	1151	3438	967	792	3312		349	3610	1538	703	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	47	271	89	500	177	57	89	562	646	68	594	0
RTOR Reduction (vph)	0	0	48	0	38	0	0	0	196	0	0	0
Lane Group Flow (vph)	47	271	41	500	196	0	89	562	450	68	594	0
Heavy Vehicles (%)	0%	5%	67%	5%	5%	5%	67%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Effective Green, g (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Actuated g/C Ratio	0.24	0.21	0.27	0.43	0.33		0.37	0.32	0.46	0.34	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	293	731	328	474	1094		170	1141	818	286	1038	
v/s Ratio Prot	0.00	0.08	0.01	c0.15	0.06		c0.03	0.16	c0.08	0.01	0.17	
v/s Ratio Perm	0.03		0.04	c0.30			0.17		0.21	0.07		
v/c Ratio	0.16	0.37	0.12	1.05	0.18		0.52	0.49	0.55	0.24	0.57	
Uniform Delay, d1	16.6	18.8	15.5	14.7	13.3		12.4	15.5	10.9	12.6	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.2	56.6	0.1		2.9	1.5	0.8	0.4	2.3	
Delay (s)	16.9	19.2	15.7	71.3	13.4		15.3	17.0	11.7	13.1	18.8	
Level of Service	B	B	B	E	B		B	B	B	B	B	
Approach Delay (s)		18.1			52.8			14.2			18.2	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM Average Control Delay	24.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	105	95	555	425	45	70	605	455	55	590	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1022	1719	3373		1719	3438	1538	1719	3418	
Flt Permitted	0.44	1.00	1.00	0.49	1.00		0.20	1.00	1.00	0.20	1.00	
Satd. Flow (perm)	800	3438	1022	893	3373		358	3438	1538	358	3418	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	125	113	661	506	54	83	720	542	65	702	42
RTOR Reduction (vph)	0	0	96	0	10	0	0	0	200	0	5	0
Lane Group Flow (vph)	24	125	17	661	550	0	83	720	342	65	739	0
Heavy Vehicles (%)	5%	5%	58%	5%	5%	10%	5%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.5	11.0	11.0	37.9	32.4		23.3	20.2	43.1	23.3	20.2	
Effective Green, g (s)	12.5	11.0	11.0	37.9	32.4		23.3	20.2	43.1	23.3	20.2	
Actuated g/C Ratio	0.17	0.15	0.15	0.52	0.44		0.32	0.28	0.59	0.32	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	155	517	154	721	1493		172	949	990	172	943	
v/s Ratio Prot	0.00	0.04		c0.29	0.16		c0.02	0.21	0.11	0.02	c0.22	
v/s Ratio Perm	0.02		0.02	c0.19			0.13		0.11	0.10		
v/c Ratio	0.15	0.24	0.11	0.92	0.37		0.48	0.76	0.35	0.38	0.78	
Uniform Delay, d1	25.5	27.4	26.9	14.1	13.6		18.8	24.3	7.8	18.4	24.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.5	0.2	0.3	16.4	0.2		2.1	5.7	0.2	1.4	6.5	
Delay (s)	26.0	27.7	27.2	30.4	13.7		20.9	29.9	8.0	19.8	31.0	
Level of Service	C	C	C	C	B		C	C	A	B	C	
Approach Delay (s)		27.3			22.8			20.5			30.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	73.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	140	70	300	160	35	30	290	365	40	300	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	907	1719	3291		1805	3438	1538	1805	3416	
Flt Permitted	0.95	1.00	1.00	0.45	1.00		0.55	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	1805	3438	907	811	3291		1039	3438	1538	893	3416	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	154	77	330	176	38	33	319	401	44	330	11
RTOR Reduction (vph)	0	0	65	0	27	0	0	0	189	0	4	0
Lane Group Flow (vph)	27	154	12	330	187	0	33	319	212	44	337	0
Heavy Vehicles (%)	0%	5%	78%	5%	5%	15%	0%	5%	5%	0%	5%	10%
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8			2	3	1	6	
Permitted Phases			4	8			2		2	6		
Actuated Green, G (s)	0.7	8.7	8.7	20.8	16.1		21.3	21.3	29.4	26.8	26.8	
Effective Green, g (s)	0.7	8.7	8.7	20.8	16.1		21.3	21.3	29.4	26.8	26.8	
Actuated g/C Ratio	0.01	0.16	0.16	0.37	0.29		0.38	0.38	0.53	0.48	0.48	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	23	538	142	436	953		398	1317	924	455	1647	
v/s Ratio Prot	0.01	0.04		c0.11	0.06			0.09	c0.03	0.00	c0.10	
v/s Ratio Perm			0.01	c0.17			0.03		0.10	0.04		
v/c Ratio	1.17	0.29	0.08	0.76	0.20		0.08	0.24	0.23	0.10	0.20	
Uniform Delay, d1	27.4	20.7	20.0	13.7	14.9		10.9	11.7	7.0	7.8	8.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	246.2	0.3	0.3	7.3	0.1		0.4	0.4	0.1	0.1	0.3	
Delay (s)	273.6	21.0	20.3	21.1	15.0		11.3	12.1	7.2	7.9	8.6	
Level of Service	F	C	C	C	B		B	B	A	A	A	
Approach Delay (s)		47.2			18.7			9.4			8.5	
Approach LOS		D			B			A			A	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	45.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	140	85	350	110	30	20	355	435	40	340	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	985	1719	3262		1805	3438	1538	1805	3400	
Flt Permitted	0.95	1.00	1.00	0.45	1.00		0.52	1.00	1.00	0.44	1.00	
Satd. Flow (perm)	1805	3438	985	813	3262		993	3438	1538	828	3400	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	151	91	376	118	32	22	382	468	43	366	22
RTOR Reduction (vph)	0	0	77	0	23	0	0	0	221	0	6	0
Lane Group Flow (vph)	22	151	14	376	127	0	22	382	247	43	382	0
Heavy Vehicles (%)	0%	5%	64%	5%	5%	15%	0%	5%	5%	0%	5%	10%
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8			2	3	1	6	
Permitted Phases			4	8			2		2	6		
Actuated Green, G (s)	0.7	8.7	8.7	20.8	16.1		21.3	21.3	29.4	26.8	26.8	
Effective Green, g (s)	0.7	8.7	8.7	20.8	16.1		21.3	21.3	29.4	26.8	26.8	
Actuated g/C Ratio	0.01	0.16	0.16	0.37	0.29		0.38	0.38	0.53	0.48	0.48	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	23	538	154	436	945		380	1317	924	425	1639	
v/s Ratio Prot	0.01	0.04		c0.13	0.04			c0.11	0.04	0.00	c0.11	
v/s Ratio Perm			0.01	c0.20			0.02		0.12	0.05		
v/c Ratio	0.96	0.28	0.09	0.86	0.13		0.06	0.29	0.27	0.10	0.23	
Uniform Delay, d1	27.4	20.7	20.1	14.8	14.6		10.8	11.9	7.2	7.8	8.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	166.5	0.3	0.3	16.0	0.1		0.3	0.6	0.2	0.1	0.3	
Delay (s)	194.0	21.0	20.3	30.8	14.7		11.1	12.5	7.3	7.9	8.7	
Level of Service	F	C	C	C	B		B	B	A	A	A	
Approach Delay (s)		35.2			26.2			9.7			8.7	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	55.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	50.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	240	80	440	155	50	25	495	570	60	525	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	967	1719	3312		1805	3610	1538	1805	3435	
Flt Permitted	0.95	1.00	1.00	0.44	1.00		0.37	1.00	1.00	0.40	1.00	
Satd. Flow (perm)	1805	3438	967	799	3312		711	3610	1538	764	3435	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	250	83	458	161	52	26	516	594	62	547	5
RTOR Reduction (vph)	0	0	64	0	31	0	0	0	168	0	1	0
Lane Group Flow (vph)	42	250	19	458	182	0	26	516	426	62	551	0
Heavy Vehicles (%)	0%	5%	67%	5%	5%	5%	0%	0%	5%	0%	5%	0%
Turn Type	Prot	NA	Perm	pm+pt	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	7	4		3	8			2	3		6	
Permitted Phases			4	8			2		2	6		
Actuated Green, G (s)	1.9	11.4	11.4	26.1	20.2		16.0	16.0	26.7	16.0	16.0	
Effective Green, g (s)	1.9	11.4	11.4	26.1	20.2		16.0	16.0	26.7	16.0	16.0	
Actuated g/C Ratio	0.04	0.23	0.23	0.52	0.40		0.32	0.32	0.53	0.32	0.32	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	68	782	220	613	1335		227	1153	942	244	1097	
v/s Ratio Prot	0.02	0.07		c0.16	0.05			0.14	c0.10		c0.16	
v/s Ratio Perm			0.02	c0.23			0.04		0.18	0.08		
v/c Ratio	0.62	0.32	0.09	0.75	0.14		0.11	0.45	0.45	0.25	0.50	
Uniform Delay, d1	23.7	16.1	15.2	8.1	9.4		12.0	13.5	7.2	12.6	13.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.5	0.2	0.2	5.0	0.0		1.0	1.3	0.3	2.5	1.6	
Delay (s)	39.3	16.4	15.4	13.1	9.5		13.1	14.8	7.5	15.1	15.5	
Level of Service	D	B	B	B	A		B	B	A	B	B	
Approach Delay (s)		18.7			11.9			11.0			15.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	50.1	Sum of lost time (s)	4.0
Intersection Capacity Utilization	62.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	115	105	605	465	50	75	660	495	60	645	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1022	1719	3372		1245	3438	1538	1719	3417	
Flt Permitted	0.42	1.00	1.00	0.49	1.00		0.15	1.00	1.00	0.18	1.00	
Satd. Flow (perm)	759	3438	1022	885	3372		196	3438	1538	335	3417	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	137	125	720	554	60	89	786	589	71	768	48
RTOR Reduction (vph)	0	0	60	0	9	0	0	0	143	0	5	0
Lane Group Flow (vph)	24	137	65	720	605	0	89	786	446	71	811	0
Heavy Vehicles (%)	5%	5%	58%	5%	5%	10%	45%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.7	11.1	16.1	44.1	38.5		31.7	26.7	55.7	28.1	24.9	
Effective Green, g (s)	12.7	11.1	16.1	44.1	38.5		31.7	26.7	55.7	28.1	24.9	
Actuated g/C Ratio	0.15	0.13	0.19	0.51	0.45		0.37	0.31	0.65	0.33	0.29	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	130	444	239	735	1510		133	1067	1068	161	989	
v/s Ratio Prot	0.00	0.04	0.02	c0.33	0.18		c0.04	0.23	0.14	0.02	c0.24	
v/s Ratio Perm	0.02		0.05	c0.17			0.21		0.15	0.13		
v/c Ratio	0.18	0.31	0.27	0.98	0.40		0.67	0.74	0.42	0.44	0.82	
Uniform Delay, d1	31.7	34.0	29.9	18.0	16.0		20.5	26.5	7.3	21.3	28.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.6	27.8	0.2		12.1	4.5	0.3	1.9	7.6	
Delay (s)	32.4	34.4	30.5	45.8	16.2		32.5	31.1	7.6	23.2	36.0	
Level of Service	C	C	C	D	B		C	C	A	C	D	
Approach Delay (s)		32.5			32.2			21.7			35.0	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	155	75	325	175	40	35	315	400	45	325	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	907	1719	3284		1107	3438	1538	1805	3418	
Flt Permitted	0.60	1.00	1.00	0.44	1.00		0.48	1.00	1.00	0.54	1.00	
Satd. Flow (perm)	1149	3438	907	790	3284		564	3438	1538	1034	3418	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	170	82	357	192	44	38	346	440	49	357	11
RTOR Reduction (vph)	0	0	65	0	31	0	0	0	212	0	3	0
Lane Group Flow (vph)	27	170	17	357	205	0	38	346	228	49	365	0
Heavy Vehicles (%)	0%	5%	78%	5%	5%	15%	63%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.1	8.4	11.4	20.7	16.0		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	9.1	8.4	11.4	20.7	16.0		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.16	0.21	0.38	0.30		0.42	0.36	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	203	537	260	447	977		267	1253	912	398	1150	
v/s Ratio Prot	0.00	0.05	0.00	c0.12	0.06		c0.01	0.10	0.04	0.00	c0.11	
v/s Ratio Perm	0.02		0.02	c0.18			0.05		0.11	0.04		
v/c Ratio	0.13	0.32	0.07	0.80	0.21		0.14	0.28	0.25	0.12	0.32	
Uniform Delay, d1	18.9	20.2	16.9	13.2	14.2		9.4	12.1	7.2	11.2	13.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.1	9.6	0.1		0.2	0.5	0.1	0.1	0.7	
Delay (s)	19.2	20.5	17.1	22.8	14.3		9.6	12.6	7.3	11.3	14.0	
Level of Service	B	C	B	C	B		A	B	A	B	B	
Approach Delay (s)		19.4			19.4			9.7			13.7	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	155	95	380	120	35	20	385	475	45	370	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	985	1719	3250		1056	3438	1538	1805	3403	
Flt Permitted	0.65	1.00	1.00	0.44	1.00		0.44	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	1228	3438	985	789	3250		491	3438	1538	968	3403	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	167	102	409	129	38	22	414	511	48	398	22
RTOR Reduction (vph)	0	0	81	0	27	0	0	0	246	0	6	0
Lane Group Flow (vph)	22	167	21	409	140	0	22	414	265	48	414	0
Heavy Vehicles (%)	0%	5%	64%	5%	5%	15%	71%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.21	0.38	0.30		0.42	0.36	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	213	531	281	446	962		238	1255	914	377	1147	
v/s Ratio Prot	0.00	0.05	c0.00	c0.14	0.04		0.01	0.12	0.04	0.00	c0.12	
v/s Ratio Perm	0.02		0.02	c0.21			0.03		0.13	0.04		
v/c Ratio	0.10	0.31	0.08	0.92	0.15		0.09	0.33	0.29	0.13	0.36	
Uniform Delay, d1	18.8	20.2	17.0	14.5	13.9		9.3	12.3	7.3	11.1	13.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.1	23.5	0.1		0.2	0.7	0.2	0.2	0.9	
Delay (s)	19.0	20.5	17.1	37.9	14.0		9.4	13.0	7.5	11.3	14.3	
Level of Service	B	C	B	D	B		A	B	A	B	B	
Approach Delay (s)		19.2			31.0			9.9			14.0	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	260	85	480	170	55	25	540	620	65	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	967	1719	3312		1081	3610	1538	1805	3438	
Flt Permitted	0.61	1.00	1.00	0.44	1.00		0.31	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	1151	3438	967	792	3312		349	3610	1538	703	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	47	271	89	500	177	57	26	562	646	68	594	0
RTOR Reduction (vph)	0	0	48	0	38	0	0	0	196	0	0	0
Lane Group Flow (vph)	47	271	41	500	196	0	26	562	450	68	594	0
Heavy Vehicles (%)	0%	5%	67%	5%	5%	5%	67%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Effective Green, g (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Actuated g/C Ratio	0.24	0.21	0.27	0.43	0.33		0.37	0.32	0.46	0.34	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	293	731	328	474	1094		170	1141	818	286	1038	
v/s Ratio Prot	0.00	0.08	c0.01	c0.15	0.06		0.01	0.16	c0.08	0.01	0.17	
v/s Ratio Perm	0.03		0.04	c0.30			0.05		0.21	0.07		
v/c Ratio	0.16	0.37	0.12	1.05	0.18		0.15	0.49	0.55	0.24	0.57	
Uniform Delay, d1	16.6	18.8	15.5	14.7	13.3		11.6	15.5	10.9	12.6	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.2	56.6	0.1		0.4	1.5	0.8	0.4	2.3	
Delay (s)	16.9	19.2	15.7	71.3	13.4		12.0	17.0	11.7	13.1	18.8	
Level of Service	B	B	B	E	B		B	B	B	B	B	
Approach Delay (s)		18.1			52.8			14.1			18.2	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	105	40	555	425	45	125	605	455	55	590	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3373		1245	3438	1538	1719	3418	
Flt Permitted	0.44	1.00	1.00	0.49	1.00		0.14	1.00	1.00	0.30	1.00	
Satd. Flow (perm)	800	3438	1538	888	3373		188	3438	1538	537	3418	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	125	48	661	506	54	149	720	542	65	702	42
RTOR Reduction (vph)	0	0	37	0	9	0	0	0	163	0	4	0
Lane Group Flow (vph)	24	125	11	661	551	0	149	720	379	65	740	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	10%	45%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.4	10.8	19.8	40.8	35.2		36.9	29.7	55.7	27.1	23.9	
Effective Green, g (s)	12.4	10.8	19.8	40.8	35.2		36.9	29.7	55.7	27.1	23.9	
Actuated g/C Ratio	0.14	0.13	0.23	0.48	0.41		0.43	0.35	0.65	0.32	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	133	433	427	675	1385		192	1191	1071	214	953	
v/s Ratio Prot	0.00	0.04	0.00	c0.30	0.16		c0.08	0.21	0.11	0.01	0.22	
v/s Ratio Perm	0.02		0.00	c0.17			c0.25		0.14	0.08		
v/c Ratio	0.18	0.29	0.03	0.98	0.40		0.78	0.60	0.35	0.30	0.78	
Uniform Delay, d1	31.8	34.0	25.5	19.7	17.8		18.3	23.1	6.8	21.0	28.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.0	29.1	0.2		17.6	2.3	0.2	0.8	6.2	
Delay (s)	32.4	34.3	25.5	48.8	18.0		35.9	25.4	7.0	21.8	34.6	
Level of Service	C	C	C	D	B		D	C	A	C	C	
Approach Delay (s)		32.0			34.7			19.5			33.6	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	85.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	140	15	300	160	35	85	290	365	40	300	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1538	1719	3291		1107	3438	1538	1805	3416	
Flt Permitted	0.62	1.00	1.00	0.44	1.00		0.50	1.00	1.00	0.56	1.00	
Satd. Flow (perm)	1174	3438	1538	796	3291		588	3438	1538	1061	3416	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	154	16	330	176	38	93	319	401	44	330	11
RTOR Reduction (vph)	0	0	14	0	27	0	0	0	193	0	3	0
Lane Group Flow (vph)	27	154	2	330	187	0	93	319	208	44	338	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	15%	63%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	8.9	8.2	8.2	20.4	15.7		22.6	19.6	27.8	19.6	18.1	
Effective Green, g (s)	8.9	8.2	8.2	20.4	15.7		22.6	19.6	27.8	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.15	0.38	0.29		0.42	0.37	0.52	0.37	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	204	527	236	445	966		277	1260	914	410	1156	
v/s Ratio Prot	0.00	0.04		c0.11	0.06		c0.02	0.09	0.03	0.00	0.10	
v/s Ratio Perm	0.02		0.00	c0.17			c0.12		0.10	0.04		
v/c Ratio	0.13	0.29	0.01	0.74	0.19		0.34	0.25	0.23	0.11	0.29	
Uniform Delay, d1	18.9	20.1	19.2	12.9	14.2		9.8	11.8	7.0	11.0	13.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.0	6.5	0.1		0.7	0.5	0.1	0.1	0.6	
Delay (s)	19.2	20.4	19.2	19.4	14.3		10.5	12.3	7.1	11.1	13.6	
Level of Service	B	C	B	B	B		B	B	A	B	B	
Approach Delay (s)		20.1			17.4			9.6			13.4	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	140	30	350	110	30	75	355	435	40	340	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1538	1719	3262		1031	3438	1538	1805	3400	
Flt Permitted	0.66	1.00	1.00	0.44	1.00		0.47	1.00	1.00	0.53	1.00	
Satd. Flow (perm)	1248	3438	1538	798	3262		508	3438	1538	998	3400	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	151	32	376	118	32	81	382	468	43	366	22
RTOR Reduction (vph)	0	0	25	0	23	0	0	0	224	0	7	0
Lane Group Flow (vph)	22	151	7	376	127	0	81	382	244	43	381	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	15%	75%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	8.9	8.2	11.2	20.5	15.8		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	8.9	8.2	11.2	20.5	15.8		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.21	0.38	0.29		0.42	0.37	0.52	0.37	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	214	526	436	448	962		243	1257	915	388	1148	
v/s Ratio Prot	0.00	0.04	0.00	c0.13	0.04		c0.02	0.11	0.04	0.00	0.11	
v/s Ratio Perm	0.02		0.00	c0.19			c0.12		0.12	0.04		
v/c Ratio	0.10	0.29	0.02	0.84	0.13		0.33	0.30	0.27	0.11	0.33	
Uniform Delay, d1	18.9	20.1	16.8	13.7	13.9		9.8	12.1	7.2	11.0	13.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	13.0	0.1		0.8	0.6	0.2	0.1	0.8	
Delay (s)	19.1	20.4	16.8	26.7	13.9		10.6	12.8	7.3	11.2	14.0	
Level of Service	B	C	B	C	B		B	B	A	B	B	
Approach Delay (s)		19.7			23.0			9.8			13.7	
Approach LOS		B			C			A			B	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	53.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	240	25	440	155	50	80	495	570	60	525	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	1615	1719	3312		1081	3610	1538	1805	3435	
Flt Permitted	0.62	1.00	1.00	0.45	1.00		0.35	1.00	1.00	0.38	1.00	
Satd. Flow (perm)	1175	3438	1615	807	3312		403	3610	1538	727	3435	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	250	26	458	161	52	83	516	594	62	547	5
RTOR Reduction (vph)	0	0	20	0	34	0	0	0	220	0	1	0
Lane Group Flow (vph)	42	250	6	458	179	0	83	516	374	62	551	0
Heavy Vehicles (%)	0%	5%	0%	5%	5%	5%	67%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.2	11.8	11.8	23.9	18.5		18.4	16.2	24.3	18.4	16.2	
Effective Green, g (s)	13.2	11.8	11.8	23.9	18.5		18.4	16.2	24.3	18.4	16.2	
Actuated g/C Ratio	0.24	0.22	0.22	0.44	0.34		0.34	0.30	0.45	0.34	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	302	747	351	491	1128		164	1077	802	290	1025	
v/s Ratio Prot	0.00	0.07		c0.14	0.05		c0.02	0.14	0.07	0.01	c0.16	
v/s Ratio Perm	0.03		0.00	c0.27			0.15		0.17	0.06		
v/c Ratio	0.14	0.33	0.02	0.93	0.16		0.51	0.48	0.47	0.21	0.54	
Uniform Delay, d1	15.9	17.9	16.7	13.1	12.5		13.8	15.6	10.5	12.4	15.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	24.8	0.1		2.4	1.5	0.4	0.4	2.0	
Delay (s)	16.1	18.2	16.7	37.9	12.5		16.2	17.1	10.9	12.7	17.9	
Level of Service	B	B	B	D	B		B	B	B	B	B	
Approach Delay (s)		17.8			29.9			14.0			17.4	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	115	45	605	465	50	135	660	495	60	645	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3438	1022	1719	3372		1245	3438	1538	1719	3417	
Flt Permitted	0.42	1.00	1.00	0.49	1.00		0.14	1.00	1.00	0.25	1.00	
Satd. Flow (perm)	759	3438	1022	885	3372		188	3438	1538	453	3417	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	24	137	54	720	554	60	161	786	589	71	768	48
RTOR Reduction (vph)	0	0	41	0	9	0	0	0	148	0	5	0
Lane Group Flow (vph)	24	137	13	720	605	0	161	786	441	71	811	0
Heavy Vehicles (%)	5%	5%	58%	5%	5%	10%	45%	5%	5%	5%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	12.7	11.1	20.1	41.1	35.5		36.9	29.7	55.7	27.1	23.9	
Effective Green, g (s)	12.7	11.1	20.1	41.1	35.5		36.9	29.7	55.7	27.1	23.9	
Actuated g/C Ratio	0.15	0.13	0.23	0.48	0.41		0.43	0.35	0.65	0.32	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	130	444	286	675	1392		191	1187	1068	190	950	
v/s Ratio Prot	0.00	0.04	0.00	c0.32	0.18		c0.09	0.23	0.12	0.01	0.24	
v/s Ratio Perm	0.02		0.01	c0.19			c0.27		0.16	0.10		
v/c Ratio	0.18	0.31	0.04	1.07	0.43		0.84	0.66	0.41	0.37	0.85	
Uniform Delay, d1	31.7	34.0	25.5	20.1	18.1		19.1	23.9	7.3	21.4	29.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.4	0.1	53.8	0.2		27.2	2.9	0.3	1.2	9.6	
Delay (s)	32.4	34.4	25.6	73.9	18.3		46.2	26.8	7.5	22.6	39.0	
Level of Service	C	C	C	E	B		D	C	A	C	D	
Approach Delay (s)		31.9			48.3			21.5			37.7	
Approach LOS		C			D			C			D	

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	86.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	155	15	325	175	40	95	315	400	45	325	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	907	1719	3284		1107	3438	1538	1805	3418	
Flt Permitted	0.60	1.00	1.00	0.44	1.00		0.48	1.00	1.00	0.54	1.00	
Satd. Flow (perm)	1149	3438	907	790	3284		564	3438	1538	1034	3418	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	170	16	357	192	44	104	346	440	49	357	11
RTOR Reduction (vph)	0	0	13	0	31	0	0	0	212	0	3	0
Lane Group Flow (vph)	27	170	3	357	205	0	104	346	228	49	365	0
Heavy Vehicles (%)	0%	5%	78%	5%	5%	15%	63%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.1	8.4	11.4	20.7	16.0		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	9.1	8.4	11.4	20.7	16.0		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.16	0.21	0.38	0.30		0.42	0.36	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	203	537	260	447	977		267	1253	912	398	1150	
v/s Ratio Prot	0.00	0.05	0.00	c0.12	0.06		c0.02	0.10	0.04	0.00	0.11	
v/s Ratio Perm	0.02		0.00	c0.18			c0.14		0.11	0.04		
v/c Ratio	0.13	0.32	0.01	0.80	0.21		0.39	0.28	0.25	0.12	0.32	
Uniform Delay, d1	18.9	20.2	16.8	13.2	14.2		10.1	12.1	7.2	11.2	13.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.0	9.6	0.1		0.9	0.5	0.1	0.1	0.7	
Delay (s)	19.2	20.5	16.8	22.8	14.3		11.1	12.6	7.3	11.3	14.0	
Level of Service	B	C	B	C	B		B	B	A	B	B	
Approach Delay (s)		20.0			19.4			9.8			13.7	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	53.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	155	35	380	120	35	80	385	475	45	370	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	985	1719	3250		1056	3438	1538	1805	3403	
Flt Permitted	0.65	1.00	1.00	0.44	1.00		0.44	1.00	1.00	0.51	1.00	
Satd. Flow (perm)	1228	3438	985	789	3250		491	3438	1538	968	3403	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	167	38	409	129	38	86	414	511	48	398	22
RTOR Reduction (vph)	0	0	30	0	27	0	0	0	246	0	6	0
Lane Group Flow (vph)	22	167	8	409	140	0	86	414	265	48	414	0
Heavy Vehicles (%)	0%	5%	64%	5%	5%	15%	71%	5%	5%	0%	5%	10%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Effective Green, g (s)	9.0	8.3	11.3	20.6	15.9		22.6	19.6	27.9	19.6	18.1	
Actuated g/C Ratio	0.17	0.15	0.21	0.38	0.30		0.42	0.36	0.52	0.36	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	213	531	281	446	962		238	1255	914	377	1147	
v/s Ratio Prot	0.00	0.05	0.00	c0.14	0.04		c0.02	0.12	0.04	0.00	0.12	
v/s Ratio Perm	0.02		0.01	c0.21			c0.13		0.13	0.04		
v/c Ratio	0.10	0.31	0.03	0.92	0.15		0.36	0.33	0.29	0.13	0.36	
Uniform Delay, d1	18.8	20.2	16.8	14.5	13.9		9.9	12.3	7.3	11.1	13.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0	23.5	0.1		0.9	0.7	0.2	0.2	0.9	
Delay (s)	19.0	20.5	16.9	37.9	14.0		10.8	13.0	7.5	11.3	14.3	
Level of Service	B	C	B	D	B		B	B	A	B	B	
Approach Delay (s)		19.8			31.0			10.0			14.0	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
5: Windsor Ave & Oak Grove Dr/Woodbury Rd/Woodbury Rd

3/25/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	260	25	480	170	55	85	540	620	65	570	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3438	967	1719	3312		1081	3610	1538	1805	3438	
Flt Permitted	0.61	1.00	1.00	0.44	1.00		0.31	1.00	1.00	0.37	1.00	
Satd. Flow (perm)	1151	3438	967	792	3312		349	3610	1538	703	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	47	271	26	500	177	57	89	562	646	68	594	0
RTOR Reduction (vph)	0	0	19	0	38	0	0	0	196	0	0	0
Lane Group Flow (vph)	47	271	7	500	196	0	89	562	450	68	594	0
Heavy Vehicles (%)	0%	5%	67%	5%	5%	5%	67%	0%	5%	0%	5%	0%
Turn Type	pm+pt	NA	pm+ov	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4	5	3	8		5	2	3	1	6	
Permitted Phases	4		4	8			2		2	6		
Actuated Green, G (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Effective Green, g (s)	13.4	11.9	15.0	24.0	18.5		20.8	17.7	25.8	19.2	16.9	
Actuated g/C Ratio	0.24	0.21	0.27	0.43	0.33		0.37	0.32	0.46	0.34	0.30	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	293	731	328	474	1094		170	1141	818	286	1038	
v/s Ratio Prot	0.00	0.08	0.00	c0.15	0.06		c0.03	0.16	c0.08	0.01	0.17	
v/s Ratio Perm	0.03		0.01	c0.30			0.17		0.21	0.07		
v/c Ratio	0.16	0.37	0.02	1.05	0.18		0.52	0.49	0.55	0.24	0.57	
Uniform Delay, d1	16.6	18.8	15.1	14.7	13.3		12.4	15.5	10.9	12.6	16.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.0	56.6	0.1		2.9	1.5	0.8	0.4	2.3	
Delay (s)	16.9	19.2	15.1	71.3	13.4		15.3	17.0	11.7	13.1	18.8	
Level of Service	B	B	B	E	B		B	B	B	B	B	
Approach Delay (s)		18.6			52.8			14.2			18.2	
Approach LOS		B			D			B			B	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	56.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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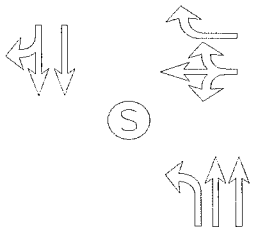
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%	**55**	625	55	680
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%		555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%	**55**	640	60	700
SB RIGHT	530	5%		530	50	580
TOTALS	**2290**		**110**	**2400**	**230**	**2630**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%		570	50	620
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%		555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%	**55**	640	60	700
SB RIGHT	530	5%		530	50	580
TOTALS	**2290**		**55**	**2345**	**225**	**2570**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	3 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%	**55**	625	55	680
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%		555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%		585	55	640
SB RIGHT	530	5%		530	50	580
TOTALS	**2290**		**55**	**2345**	**225**	**2570**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	4 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%		570	50	620
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%	**55**	610	55	665
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%		585	55	640
SB RIGHT	530	5%	**55**	585	55	640
TOTALS	**2290**		**110**	**2400**	**230**	**2630**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	5 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%		570	50	620
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%		555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%		585	55	640
SB RIGHT	530	5%	**55**	585	55	640
TOTALS	**2290**		**55**	**2345**	**225**	**2570**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	6 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	570	5%		570	50	620
WINDSOR AVE						
NB LEFT	40	5%		40	5	45
NB THRU	555	5%	**55**	610	55	665
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	585	5%		585	55	640
SB RIGHT	530	5%		530	50	580
TOTALS	**2290**		**55**	**2345**	**225**	**2570**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	7 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%	**55**	330	30	360
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%		420	40	460
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%	**55**	425	40	465
SB RIGHT	280	5%		280	25	305
TOTALS	**1415**		**110**	**1525**	**150**	**1675**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	8 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%		275	25	300
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%		420	40	460
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%	**55**	425	40	465
SB RIGHT	280	5%		280	25	305
TOTALS	**1415**		**55**	**1470**	**145**	**1615**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	9 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%	**55**	330	30	360
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%		420	40	460
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%		370	35	405
SB RIGHT	280	5%		280	25	305
TOTALS	**1415**		**55**	**1470**	**145**	**1615**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	10 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%		275	25	300
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%	**55**	475	45	520
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%		370	35	405
SB RIGHT	280	5%	**55**	335	30	365
TOTALS	**1415**		**110**	**1525**	**150**	**1675**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	11 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%		275	25	300
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%		420	40	460
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%		370	35	405
SB RIGHT	280	5%	**55**	335	30	365
TOTALS	**1415**		**55**	**1470**	**145**	**1615**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	12 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	275	5%		275	25	300
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	420	5%	**55**	475	45	520
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	370	5%		370	35	405
SB RIGHT	280	5%		280	25	305
TOTALS	**1415**		**55**	**1470**	**145**	**1615**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	13 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%	**55**	390	35	425
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%		500	45	545
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%	**55**	490	45	535
SB RIGHT	275	5%		275	25	300
TOTALS	**1615**		**110**	**1725**	**165**	**1890**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	14 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%		335	30	365
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%		500	45	545
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%	**55**	490	45	535
SB RIGHT	275	5%		275	25	300
TOTALS	**1615**		**55**	**1670**	**160**	**1830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	15 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%	**55**	390	35	425
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%		500	45	545
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%		435	40	475
SB RIGHT	275	5%		275	25	300
TOTALS	**1615**		**55**	**1670**	**160**	**1830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	16 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%		335	30	365
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%	**55**	555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%		435	40	475
SB RIGHT	275	5%	**55**	330	30	360
TOTALS	**1615**		**110**	**1725**	**165**	**1890**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	17 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%		335	30	365
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%		500	45	545
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%		435	40	475
SB RIGHT	275	5%	55	330	30	360
TOTALS	**1615**		**55**	**1670**	**160**	**1830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	18 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	20	5%		20	5	25
WB THRU	5	5%		5	5	10
WB RIGHT	335	5%		335	30	365
WINDSOR AVE						
NB LEFT	45	5%		45	5	50
NB THRU	500	5%	**55**	555	50	605
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%		435	40	475
SB RIGHT	275	5%		275	25	300
TOTALS	**1615**		**55**	**1670**	**160**	**1830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	19 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%	**55**	460	40	500
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%		690	60	750
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%	**55**	605	55	660
SB RIGHT	445	5%		445	40	485
TOTALS	**2220**		**110**	**2330**	**215**	**2545**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	20 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%		405	35	440
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%		690	60	750
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%	**55**	605	55	660
SB RIGHT	445	5%		445	40	485
TOTALS	**2220**		**55**	**2275**	**210**	**2485**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	21 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%	**55**	460	40	500
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%		690	60	750
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%		550	50	600
SB RIGHT	445	5%		445	40	485
TOTALS	**2220**		**55**	**2275**	**210**	**2485**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	22 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%		405	35	440
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%	**55**	745	65	810
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%		550	50	600
SB RIGHT	445	5%	**55**	500	45	545
TOTALS	**2220**		**110**	**2330**	**215**	**2545**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	23 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%		405	35	440
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%		690	60	750
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%		550	50	600
SB RIGHT	445	5%	55	500	45	545
TOTALS	**2220**		**55**	**2275**	**210**	**2485**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	24 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	25	5%		25	5	30
WB THRU	5	5%		5	5	10
WB RIGHT	405	5%		405	35	440
WINDSOR AVE						
NB LEFT	100	5%		100	10	110
NB THRU	690	5%	**55**	745	65	810
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	550	5%		550	50	600
SB RIGHT	445	5%		445	40	485
TOTALS	**2220**		**55**	**2275**	**210**	**2485**

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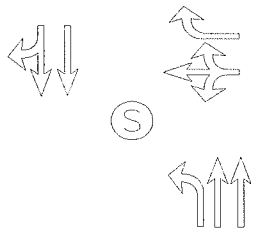
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**140**	720	65	785
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**0**	580	50	630
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**165**	760	70	830
SB RIGHT	528	2	6	535	**0**	535	50	585
TOTALS	**2265**				**305**	**2645**	**250**	**2895**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**0**	580	50	630
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**0**	580	50	630
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**165**	760	70	830
SB RIGHT	528	2	6	535	**0**	535	50	585
TOTALS	**2265**				**165**	**2505**	**235**	**2740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**140**	720	65	785
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**0**	580	50	630
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**0**	595	55	650
SB RIGHT	528	2	6	535	**0**	535	50	585
TOTALS	**2265**				**140**	**2480**	**235**	**2715**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**0**	580	50	630
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**140**	720	65	785
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**0**	595	55	650
SB RIGHT	528	2	6	535	**165**	700	65	765
TOTALS	**2265**				**305**	**2645**	**250**	**2895**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**0**	580	50	630
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**0**	580	50	630
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**0**	595	55	650
SB RIGHT	528	2	6	535	**165**	700	65	765
TOTALS	**2265**				**165**	**2505**	**235**	**2740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	7	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	569	3	9	580	**0**	580	50	630
WINDSOR AVE								
NB LEFT	41	0	0	40	**0**	40	5	45
NB THRU	541	13	39	580	**140**	720	65	785
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	579	5	15	595	**0**	595	55	650
SB RIGHT	528	2	6	535	**0**	535	50	585
TOTALS	**2265**				**140**	**2480**	**235**	**2715**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	7 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**140**	420	40	460
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**0**	425	40	465
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**165**	545	50	595
SB RIGHT	268	11	33	300	**0**	300	25	325
TOTALS	**1385**				**305**	**1760**	**170**	**1930**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	8 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**0**	280	25	305
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**0**	425	40	465
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**165**	545	50	595
SB RIGHT	268	11	33	300	**0**	300	25	325
TOTALS	**1385**				**165**	**1620**	**155**	**1775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	9 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**140**	420	40	460
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**0**	425	40	465
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**0**	380	35	415
SB RIGHT	268	11	33	300	**0**	300	25	325
TOTALS	**1385**				**140**	**1595**	**155**	**1750**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	10 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**0**	280	25	305
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**140**	565	50	615
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**0**	380	35	415
SB RIGHT	268	11	33	300	**165**	465	40	505
TOTALS	**1385**				**305**	**1760**	**165**	**1925**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	11 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**0**	280	25	305
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**0**	425	40	465
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**0**	380	35	415
SB RIGHT	268	11	33	300	**165**	465	40	505
TOTALS	**1385**				**165**	**1620**	**155**	**1775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	12 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	271	3	9	280	**0**	280	25	305
WINDSOR AVE								
NB LEFT	43	1	3	45	**0**	45	5	50
NB THRU	417	2	6	425	**140**	565	50	615
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	366	4	12	380	**0**	380	35	415
SB RIGHT	268	11	33	300	**0**	300	25	325
TOTALS	**1385**				**140**	**1595**	**150**	**1745**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	13 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**140**	525	45	570
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**0**	575	50	625
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**165**	665	60	725
SB RIGHT	275	14	41	315	**0**	315	30	345
TOTALS	**1615**				**305**	**2155**	**200**	**2355**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	14 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**0**	385	35	420
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**0**	575	50	625
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**165**	665	60	725
SB RIGHT	275	14	41	315	**0**	315	30	345
TOTALS	**1615**				**165**	**2015**	**190**	**2205**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	15 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**140**	525	45	570
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**0**	575	50	625
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**0**	500	45	545
SB RIGHT	275	14	41	315	**0**	315	30	345
TOTALS	**1615**				**140**	**1990**	**185**	**2175**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	16 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**0**	385	35	420
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**140**	715	65	780
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**0**	500	45	545
SB RIGHT	275	14	41	315	**165**	480	45	525
TOTALS	**1615**				**305**	**2155**	**205**	**2360**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	17 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**0**	385	35	420
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**0**	575	50	625
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**0**	500	45	545
SB RIGHT	275	14	41	315	**165**	480	45	525
TOTALS	**1615**				**165**	**2015**	**190**	**2205**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	18 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	20	0	0	20	**0**	20	5	25
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	335	17	50	385	**0**	385	35	420
WINDSOR AVE								
NB LEFT	45	2	7	50	**0**	50	5	55
NB THRU	500	25	75	575	**140**	715	65	780
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	435	22	65	500	**0**	500	45	545
SB RIGHT	275	14	41	315	**0**	315	30	345
TOTALS	**1615**				**140**	**1990**	**190**	**2180**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	19 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**140**	550	50	600
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**0**	690	60	750
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**165**	715	65	780
SB RIGHT	442	4	12	455	**0**	455	40	495
TOTALS	**2213**				**305**	**2540**	**235**	**2775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	20 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**0**	410	35	445
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**0**	690	60	750
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**165**	715	65	780
SB RIGHT	442	4	12	455	**0**	455	40	495
TOTALS	**2213**				**165**	**2400**	**220**	**2620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	21 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**140**	550	50	600
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**0**	690	60	750
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**0**	550	50	600
SB RIGHT	442	4	12	455	**0**	455	40	495
TOTALS	**2213**				**140**	**2375**	**220**	**2595**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	22 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1F

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**0**	410	35	445
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**140**	830	75	905
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**0**	550	50	600
SB RIGHT	442	4	12	455	**165**	620	55	675
TOTALS	**2213**				**305**	**2540**	**235**	**2775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	23 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**0**	410	35	445
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**0**	690	60	750
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**0**	550	50	600
SB RIGHT	442	4	12	455	**165**	620	55	675
TOTALS	**2213**				**165**	**2400**	**220**	**2620**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	24 OF 24

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 6
ROUTE 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	26	0	0	25	**0**	25	5	30
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	405	2	6	410	**0**	410	35	445
WINDSOR AVE								
NB LEFT	98	0	0	100	**0**	100	10	110
NB THRU	689	1	3	690	**140**	830	75	905
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	550	0	0	550	**0**	550	50	600
SB RIGHT	442	4	12	455	**0**	455	40	495
TOTALS	**2213**				**140**	**2375**	**220**	**2595**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 07:30AM

Windsor Ave (WB)
NORTH LEG

TOTAL: 1,114

TT = 7
TT% = 7/1114 = 0.63% ≈ 1%

Rt	Thru	Lt	
530	584 585		Total
135	159		1st
130	155		2nd
128	130		3rd
137	140		4th

TT = 3
TT% = 3/579 = 0.52% ≈ 1%

WB 210 Fwy
EAST LEG TOTAL: 579

	1st	2nd	3rd	4th	Total
Rt	136	140	141	155	572 570
Thru	0	0	0	0	5
Lt	0	1	2	4	5 7

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.95
SOUTH LEG = 0.76
EAST LEG = 0.91
WEST LEG =

ALL LEGS = 0.95

	Lt	Thru	Rt
1st	9	109	
2nd	11	102	
3rd	13	182	
4th	8	161	
Total	40 41	555 554	

TT = 13
TT% = 13/595 = 2.18% ≈ 2%

TOTAL: 595

SOUTH LEG
Windsor Ave (EB)

HOUR TOTAL: 2,288

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 07:00AM-08:00AM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt
Total	479	599	
1st	96	138	
2nd	118	147	
3rd	135	159	
4th	130	155	

	1st	2nd	3rd	4th	Total
Rt	91	102	136	140	469
Thru	0	0	0	0	0
Lt	2	1	0	1	4

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	9	72	
2nd	14	85	
3rd	9	109	
4th	11	102	
Total	43	368	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 08:00AM-09:00AM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt
Total	475	538	
1st	128	130	
2nd	137	140	
3rd	86	129	
4th	124	139	

	1st	2nd	3rd	4th	Total
Rt	141	155	143	105	544
Thru	0	0	2	0	2
Lt	2	4	3	3	12

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	13	182	
2nd	8	161	
3rd	10	133	
4th	19	159	
Total	50	635	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR — PASADENA

EAST-WEST STREET : I-210 WB RAMPS — 06-01-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
96	137	0	0	0	0	0	1	0	0	0	0	234
118	147	0	0	0	0	0	0	0	0	0	0	265
135	158	0	0	1	0	0	0	0	0	0	0	294
129	152	0	0	1	0	0	2	0	1	0	0	285
127	129	0	0	1	0	0	0	0	1	0	0	258
137	140	0	0	0	0	0	0	0	0	0	0	277
85	129	0	0	0 3	0	0	0 2	0	1	0 2	0	215
122	139	0	0	0	0	0	0	0	2	0	0	263
						TT=3+2+2=7						
949	1131	0	0	3	0	0	3	0	5	0	0	2091
						EB SOUTH LEG						
0	70	9	0	2	0	0	0	0	0	0	0	81
0	82	14	0	3	0	0	0	0	0	0	0	99
0	107	9	0	2	0	0	0	0	0	0	0	118
0	97	11	0	4	0	0	1	0	0	0	0	113
0	178	13	0	4	0	0	0	0	0	0	0	195
0	159	8	0	2	0	0	0	0	0	0	0	169
0	130	10	0	2 12	0	0	1 1	0	0	0 0	0	143
0	159	19	0	0	0	0	0	0	0	0	0	178
						TT=12+1+0=13						
0	982	93	0	19	0	0	2	0	0	0	0	1096
						NB EAST LEG						
91	0	2	0	0	0	0	0	0	0	0	0	93
101	0	1	1	0	0	0	0	0	0	0	0	103
136	0	0	0	0	0	0	0	0	0	0	0	136
139	0	1	1	0	0	0	0	0	0	0	0	141
140	0	2	1	0	0	0	0	0	0	0	0	143
154	0	4	1	0	0	0	0	0	0	0	0	159
143	2	3	0	0 3	0	0	0 0	0	0	0 0	0	148
105	0	3	0	0	0	0	0	0	0	0	0	108
						TT=3+0+0=3						
1009	2	16	4	0	0	0	0	0	0	0	0	1031
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 12:30PM

Windsor Ave (WB)
NORTH LEG

TOTAL: 649

TT = 15

$TT\% = \frac{15}{649} = 2.31\% \approx 2\%$

	Rt	Thru	Lt	Total
	279 (260)	370		
1st	64	94		
2nd	70	88		
3rd	70	89		
4th	75	99		

TT = 3

$TT\% = \frac{3}{294} = 1.02\% \approx 1\%$

WB 210 FWY
EAST LEG TOTAL: 294

	1st	2nd	3rd	4th	Total
Rt	68	79	72	55	274 (295)
Thru	0	0	0	0	5
Lt	8	3	3	6	20

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.89
EAST LEG = 0.90
WEST LEG =

ALL LEGS = 0.97

	Lt	Thru	Rt
1st	14	116	
2nd	9	104	
3rd	9	105	
4th	12	94	
Total	44 (45)	419 (420)	

TT = 3

$TT\% = \frac{3}{463} = 0.65\% \approx 1\%$

TOTAL: 463

SOUTH LEG
Windsor Ave (EB)

HOUR TOTAL: 1,406

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 12:00PM-01:00PM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt
Total	249	336	
1st	50	77	
2nd	65	77	
3rd	64	94	
4th	70	88	

	1st	2nd	3rd	4th	Total
Rt	51	64	68	79	262
Thru	0	0	0	0	0
Lt	15	5	8	3	31

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	8	91	
2nd	11	80	
3rd	14	116	
4th	9	104	
Total	42	391	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 01:00PM-02:00PM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt
Total	271	357	
1st	70	89	
2nd	75	99	
3rd	49	77	
4th	77	92	

	1st	2nd	3rd	4th	Total
Rt	72	55	58	65	250
Thru	0	0	0	0	0
Lt	3	6	3	4	16

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	9	105	
2nd	12	94	
3rd	8	105	
4th	7	90	
Total	36	394	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR — PASADENA
EAST-WEST STREET : I-210 WB RAMPS — 06-01-11
BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
50	75	0	0	1	0	0	1	0	0	0	0	127
65	77	0	0	0	0	0	0	0	0	0	0	142
64	94	0	0	0	0	0	0	0	0	0	0	158
67	86	0	1	1	0	1	1	0	1	0	0	158
62	89	0	4	0	0	4	0	0	0	0	0	159
75	97	0	0	1	0	0	1	0	0	0	0	174
47	75	0	1	1 7	0	1	1 7	0	0	0 1	0	126
77	89	0	0	1	0	0	1	0	0	1	0	169
						TT=7+7+1 = 15						
507	682	0	6	5	0	6	5	0	1	1	0	1213
						EB SOUTH LEG						
0	91	8	0	0	0	0	0	0	0	0	0	99
0	80	11	0	0	0	0	0	0	0	0	0	91
0	115	13	0	0	0	0	1	1	0	0	0	130
0	103	9	0	1	0	0	0	0	0	0	0	113
0	105	9	0	0	0	0	0	0	0	0	0	114
0	94	12	0	0	0	0	0	0	0	0	0	106
0	104	8	0	0 1	0	0	1 2	0	0	0 0	0	113
0	87	7	0	1	0	0	2	0	0	0	0	97
						TT=1+2+0 = 3						
0	779	77	0	2	0	0	4	1	0	0	0	863
						NB EAST LEG						
50	0	15	1	0	0	0	0	0	0	0	0	66
64	0	5	0	0	0	0	0	0	0	0	0	69
67	0	8	0	0	0	1	0	0	0	0	0	76
79	0	3	0	0	0	0	0	0	0	0	0	82
71	0	3	1	0	0	0	0	0	0	0	0	75
54	0	6	0	0	0	0	0	0	1	0	0	61
58	0	3	0	0 1	0	0	0 1	0	0	0 1	0	61
64	0	4	1	0	0	0	0	0	0	0	0	69
						TT=1+1+1 = 3						
507	0	47	3	0	0	1	0	0	1	0	0	559
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

(6)

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR/ ARROYO
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA CANADA

DATE: 04-12-12

PEAK HOUR: 03:00PM

NORTH LEG (SB)

TOTAL: 709

	Rt	Thru	Lt
Total	274	435	
1st	72	107	
2nd	65	101	
3rd	76	115	
4th	61	112	

EAST LEG (WB) TOTAL: 355

	1st	2nd	3rd	4th	Total
Rt	72	85	92	86	335
Thru					
Lt	8	3	7	2	20

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.96
EAST LEG = 0.90
WEST LEG =

ALL LEGS = 0.93

	Lt	Thru	Rt
1st	15	127	
2nd	11	115	
3rd	10	132	
4th	10	124	
Total	46	498	

TOTAL: 544

SOUTH LEG (NB)

HOUR TOTAL: 1,608

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR/ ARROYO

EAST-WEST STREET: I-210 WB RAMPS

TIME: 02:00PM-03:00PM DATE: 04-12-12

NORTH LEG

	Rt	Thru	Lt
Total	259	468	
1st	48	119	
2nd	62	108	
3rd	86	119	
4th	63	122	

	1st	2nd	3rd	4th	Total
Rt	69	72	73	81	295
Thru					
Lt	1	4	3	4	12

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	5	96	
2nd	18	90	
3rd	13	126	
4th	5	87	
Total	41	399	

Prepared by NEWPORT TRAFFIC STUDIES

(6)

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR/ ARROYO

EAST-WEST STREET: I-210 WB RAMPS

TIME: 03:00PM-04:00PM DATE: 04-12-12

NORTH LEG

Rt	Thru	Lt	
274	435		Total
72	107		1st
65	101		2nd
76	115		3rd
61	112		4th

	1st	2nd	3rd	4th	Total
Rt	72	85	92	86	335
Thru					
Lt	8	3	7	2	20

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	15	127	
2nd	11	115	
3rd	10	132	
4th	10	124	
Total	46	498	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 05:00PM

Windsor Ave (WB)
NORTH LEG

TOTAL: 996

TT = 4
TT% = 4/996 = 0.40% ≈ 1%

	Rt	Thru	Lt	
	446 445	550		Total
	116	131		1st
	114	120		2nd
	119	140		3rd
	97	159		4th

TT = 2
TT% = 2/436 = 0.46% ≈ 1%

WB 210 Fwy
EAST LEG TOTAL: 436

	1st	2nd	3rd	4th	Total
Rt	103	102	100	102	407 405
Thru	0	0	3	0	3 5
Lt	5	4	9	8	26 25

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.96
SOUTH LEG = 0.87
EAST LEG = 0.97
WEST LEG =

ALL LEGS = 0.96

	Lt	Thru	Rt
1st	22	204	
2nd	21	152	
3rd	28	170	
4th	27	164	
Total	100 98	690	

TT = 1
TT% = 1/788 = 0.13% ≈ 1%

TOTAL: 788

SOUTH LEG
Windsor Ave (EB)

HOUR TOTAL: 2,220

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 04:00PM-05:00PM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt
Total	361	467	
1st	85	123	
2nd	75	100	
3rd	93	120	
4th	108	124	

	1st	2nd	3rd	4th	Total
Rt	76	77	96	81	330
Thru	0	0	0	1	1
Lt	3	7	3	9	22

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	15	126	
2nd	12	129	
3rd	17	137	
4th	19	161	
Total	63	553	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 WB RAMPS

TIME: 05:00PM-06:00PM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt
Total	446	550	
1st	116	131	
2nd	114	120	
3rd	119	140	
4th	97	159	

	1st	2nd	3rd	4th	Total
Rt	103	102	100	102	407
Thru	0	0	3	0	3
Lt	5	4	9	8	26

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	22	204	
2nd	21	152	
3rd	28	170	
4th	27	164	
Total	98	690	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR — PASADENA
EAST-WEST STREET : I-210 WB RAMPS — 06-01-11
BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
85	123	0	0	0	0	0	0	0	0	0	0	208
74	100	0	0	0	0	0	0	0	1	0	0	175
92	120	0	0	0	0	1	0	0	0	0	0	213
106	123	0	1	1	0	1	0	0	0	0	0	232
115	131	0	0	0	0	1	0	0	0	0	0	247
113	120	0	0	0	0	1	0	0	0	0	0	234
118	140	0	0	0	0	0	0	0	1	0	0	259
96	159	0	0	0 (0)	0	0	0 (2)	0	1	0 (2)	0	256
						TT=0+2+2=4						
799	1016	0	1	1	0	4	0	0	3	0	0	1824
						EB SOUTH LEG						
0	126	15	0	0	0	0	0	0	0	0	0	141
0	128	12	0	1	0	0	0	0	0	0	0	141
0	137	17	0	0	0	0	0	0	0	0	0	154
0	161	19	0	0	0	0	0	0	0	0	0	180
0	204	22	0	0	0	0	0	0	0	0	0	226
0	151	21	0	0	0	0	1	0	0	0	0	173
0	170	28	0	0	0	0	0	0	0	0	0	198
0	164	27	0	0 (0)	0	0	0 (1)	0	0	0 (0)	0	191
						TT=0+1+0=1						
0	1241	161	0	1	0	0	1	0	0	0	0	1404
						NB EAST LEG						
71	0	3	5	0	0	0	0	0	0	0	0	79
76	0	7	1	0	0	0	0	0	0	0	0	84
92	0	3	4	0	0	0	0	0	0	0	0	99
81	1	9	0	0	0	0	0	0	0	0	0	91
101	0	5	1	0	0	1	0	0	0	0	0	108
102	0	4	0	0	0	0	0	0	0	0	0	106
100	3	9	0	0	0	0	0	0	0	0	0	112
102	0	8	0	0 (1)	0	0	0 (1)	0	0	0 (0)	0	110
						TT=1+1+0=2						
725	4	48	11	0	0	1	0	0	0	0	0	789
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	570	40	555	0	0	585	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1471	1461	1805	3438			3193	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1471	1461	452	3438			3193	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	600	42	584	0	0	616	558
RTOR Reduction (vph)	0	0	0	0	113	113	0	0	0	0	290	0
Lane Group Flow (vph)	0	0	0	0	191	193	42	584	0	0	884	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.2	10.2	16.8	16.8			16.8	
Effective Green, g (s)					10.2	10.2	16.8	16.8			16.8	
Actuated g/C Ratio					0.29	0.29	0.48	0.48			0.48	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					429	426	217	1650			1533	
v/s Ratio Prot								0.17			c0.28	
v/s Ratio Perm					0.13	c0.13	0.09					
v/c Ratio					0.44	0.45	0.19	0.35			0.58	
Uniform Delay, d1					10.1	10.1	5.2	5.7			6.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.8	2.0	0.6			1.6	
Delay (s)					10.8	10.9	7.2	6.3			8.1	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			10.9			6.4			8.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	420	0	0	370	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3438			3216	
Flt Permitted					0.99	1.00	0.40	1.00			1.00	
Satd. Flow (perm)					1506	1461	718	3438			3216	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	433	0	0	381	289
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	121	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	433	0	0	549	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	418	2003			1874	
v/s Ratio Prot								0.13			c0.17	
v/s Ratio Perm					0.03	0.02	0.06					
v/c Ratio					0.18	0.10	0.11	0.22			0.29	
Uniform Delay, d1					11.7	11.5	3.1	3.3			3.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.5	0.2			0.4	
Delay (s)					12.0	11.7	3.6	3.6			3.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.6			3.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	335	45	500	0	0	435	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1498	1461	1719	3438			3238	
Flt Permitted					0.99	1.00	0.36	1.00			1.00	
Satd. Flow (perm)					1498	1461	650	3438			3238	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	360	48	538	0	0	468	296
RTOR Reduction (vph)	0	0	0	0	137	151	0	0	0	0	128	0
Lane Group Flow (vph)	0	0	0	0	59	40	48	538	0	0	636	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.4	6.4	18.9	18.9			18.9	
Effective Green, g (s)					6.4	6.4	18.9	18.9			18.9	
Actuated g/C Ratio					0.19	0.19	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					288	281	369	1951			1838	
v/s Ratio Prot								0.16			c0.20	
v/s Ratio Perm					0.04	0.03	0.07					
v/c Ratio					0.21	0.14	0.13	0.28			0.35	
Uniform Delay, d1					11.3	11.2	3.4	3.7			3.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.2	0.7	0.4			0.5	
Delay (s)					11.7	11.4	4.1	4.0			4.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.5			4.0			4.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	690	0	0	550	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3438			3294	
Flt Permitted					0.99	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1497	1461	476	3438			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	719	0	0	573	464
RTOR Reduction (vph)	0	0	0	0	165	171	0	0	0	0	154	0
Lane Group Flow (vph)	0	0	0	0	64	53	104	719	0	0	883	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.2	8.2	32.5	32.5			32.5	
Effective Green, g (s)					8.2	8.2	32.5	32.5			32.5	
Actuated g/C Ratio					0.17	0.17	0.67	0.67			0.67	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					252	246	318	2294			2198	
v/s Ratio Prot								0.21			c0.27	
v/s Ratio Perm					0.04	0.04	0.22					
v/c Ratio					0.26	0.21	0.33	0.31			0.40	
Uniform Delay, d1					17.6	17.5	3.4	3.4			3.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.5	0.4	2.7	0.4			0.5	
Delay (s)					18.1	17.9	6.2	3.8			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.0			4.1			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	625	40	555	0	0	640	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1369	1358	1805	3438			3092	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1369	1358	463	3438			3092	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	658	42	584	0	0	674	558
RTOR Reduction (vph)	0	0	0	0	109	109	0	0	0	0	302	0
Lane Group Flow (vph)	0	0	0	0	223	227	42	584	0	0	930	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	13%	0%	5%	0%	0%	12%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.3	11.3	16.4	16.4			16.4	
Effective Green, g (s)					11.3	11.3	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					433	430	213	1579			1420	
v/s Ratio Prot								0.17			c0.30	
v/s Ratio Perm					0.16	c0.17	0.09					
v/c Ratio					0.51	0.53	0.20	0.37			0.66	
Uniform Delay, d1					10.0	10.0	5.7	6.3			7.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.2	2.1	0.7			2.4	
Delay (s)					11.0	11.2	7.8	7.0			9.8	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.1			7.0			9.8	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	330	45	420	0	0	425	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1499	1344	1719	3438			3041	
Flt Permitted					0.99	1.00	0.38	1.00			1.00	
Satd. Flow (perm)					1499	1344	679	3438			3041	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	340	46	433	0	0	438	289
RTOR Reduction (vph)	0	0	0	0	129	146	0	0	0	0	125	0
Lane Group Flow (vph)	0	0	0	0	57	34	46	433	0	0	602	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	16%	5%
Bus Blockages (#/hr)	0	0	0	0	0	20	0	0	0	0	0	0
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.4	6.4	19.0	19.0			19.0	
Effective Green, g (s)					6.4	6.4	19.0	19.0			19.0	
Actuated g/C Ratio					0.19	0.19	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					287	258	386	1956			1730	
v/s Ratio Prot								0.13			c0.20	
v/s Ratio Perm					0.04	0.03	0.07					
v/c Ratio					0.20	0.13	0.12	0.22			0.35	
Uniform Delay, d1					11.3	11.2	3.3	3.6			3.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.6	0.3			0.6	
Delay (s)					11.7	11.4	4.0	3.8			4.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.6			3.8			4.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	390	45	500	0	0	490	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.95	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1356	1311	1719	3438			3066	
Flt Permitted					1.00	1.00	0.32	1.00			1.00	
Satd. Flow (perm)					1356	1311	580	3438			3066	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	419	48	538	0	0	527	296
RTOR Reduction (vph)	0	0	0	0	143	143	0	0	0	0	137	0
Lane Group Flow (vph)	0	0	0	0	81	79	48	538	0	0	686	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%	5%	5%	0%	0%	15%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.3	8.3	18.8	18.8			18.8	
Effective Green, g (s)					8.3	8.3	18.8	18.8			18.8	
Actuated g/C Ratio					0.24	0.24	0.54	0.54			0.54	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					321	310	311	1841			1642	
v/s Ratio Prot								0.16			c0.22	
v/s Ratio Perm					0.06	c0.06	0.08					
v/c Ratio					0.25	0.26	0.15	0.29			0.42	
Uniform Delay, d1					10.9	10.9	4.1	4.5			4.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.4	1.1	0.4			0.8	
Delay (s)					11.3	11.3	5.2	4.9			5.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.3			4.9			5.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	460	100	690	0	0	605	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1493	1461	1805	3438			3310	
Flt Permitted					0.99	1.00	0.23	1.00			1.00	
Satd. Flow (perm)					1493	1461	433	3438			3310	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	479	104	719	0	0	630	464
RTOR Reduction (vph)	0	0	0	0	168	168	0	0	0	0	162	0
Lane Group Flow (vph)	0	0	0	0	88	86	104	719	0	0	932	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.1	9.1	31.9	31.9			31.9	
Effective Green, g (s)					9.1	9.1	31.9	31.9			31.9	
Actuated g/C Ratio					0.19	0.19	0.65	0.65			0.65	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					277	271	282	2238			2155	
v/s Ratio Prot								0.21			c0.28	
v/s Ratio Perm					0.06	0.06	0.24					
v/c Ratio					0.32	0.32	0.37	0.32			0.43	
Uniform Delay, d1					17.3	17.3	3.9	3.8			4.2	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.7	3.7	0.4			0.6	
Delay (s)					17.9	17.9	7.6	4.2			4.8	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			17.9			4.6			4.8	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	49.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	680	45	605	0	0	700	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1368	1358	1805	3438			3092	
Flt Permitted					1.00	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1368	1358	469	3438			3092	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	716	47	637	0	0	737	611
RTOR Reduction (vph)	0	0	0	0	89	89	0	0	0	0	337	0
Lane Group Flow (vph)	0	0	0	0	272	276	47	637	0	0	1011	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	13%	0%	5%	0%	0%	12%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.9	11.9	16.2	16.2			16.2	
Effective Green, g (s)					11.9	11.9	16.2	16.2			16.2	
Actuated g/C Ratio					0.33	0.33	0.45	0.45			0.45	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					451	448	210	1543			1388	
v/s Ratio Prot								0.19			c0.33	
v/s Ratio Perm					0.20	c0.20	0.10					
v/c Ratio					0.60	0.62	0.22	0.41			0.73	
Uniform Delay, d1					10.1	10.2	6.1	6.7			8.1	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					2.3	2.5	2.5	0.8			3.4	
Delay (s)					12.4	12.7	8.6	7.5			11.5	
Level of Service					B	B	A	A			B	
Approach Delay (s)		0.0			12.5			7.6			11.5	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	390	45	500	0	0	490	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.95	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1356	1311	1719	3438			3066	
Flt Permitted					1.00	1.00	0.32	1.00			1.00	
Satd. Flow (perm)					1356	1311	580	3438			3066	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	419	48	538	0	0	527	296
RTOR Reduction (vph)	0	0	0	0	143	143	0	0	0	0	137	0
Lane Group Flow (vph)	0	0	0	0	81	79	48	538	0	0	686	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%	5%	5%	0%	0%	15%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.3	8.3	18.8	18.8			18.8	
Effective Green, g (s)					8.3	8.3	18.8	18.8			18.8	
Actuated g/C Ratio					0.24	0.24	0.54	0.54			0.54	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					321	310	311	1841			1642	
v/s Ratio Prot								0.16			c0.22	
v/s Ratio Perm					0.06	c0.06	0.08					
v/c Ratio					0.25	0.26	0.15	0.29			0.42	
Uniform Delay, d1					10.9	10.9	4.1	4.5			4.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.4	1.1	0.4			0.8	
Delay (s)					11.3	11.3	5.2	4.9			5.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.3			4.9			5.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	690	0	0	550	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3438			3294	
Flt Permitted					0.99	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1497	1461	476	3438			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	719	0	0	573	464
RTOR Reduction (vph)	0	0	0	0	165	171	0	0	0	0	154	0
Lane Group Flow (vph)	0	0	0	0	64	53	104	719	0	0	883	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.2	8.2	32.5	32.5			32.5	
Effective Green, g (s)					8.2	8.2	32.5	32.5			32.5	
Actuated g/C Ratio					0.17	0.17	0.67	0.67			0.67	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					252	246	318	2294			2198	
v/s Ratio Prot								0.21			c0.27	
v/s Ratio Perm					0.04	0.04	0.22					
v/c Ratio					0.26	0.21	0.33	0.31			0.40	
Uniform Delay, d1					17.6	17.5	3.4	3.4			3.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.5	0.4	2.7	0.4			0.5	
Delay (s)					18.1	17.9	6.2	3.8			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.0			4.1			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	500	110	750	0	0	660	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1491	1461	1805	3438			3311	
Flt Permitted					1.00	1.00	0.19	1.00			1.00	
Satd. Flow (perm)					1491	1461	368	3438			3311	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	521	115	781	0	0	688	505
RTOR Reduction (vph)	0	0	0	0	141	141	0	0	0	0	184	0
Lane Group Flow (vph)	0	0	0	0	135	135	115	781	0	0	1009	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.1	10.1	31.5	31.5			31.5	
Effective Green, g (s)					10.1	10.1	31.5	31.5			31.5	
Actuated g/C Ratio					0.20	0.20	0.64	0.64			0.64	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					304	298	234	2183			2103	
v/s Ratio Prot								0.23			0.30	
v/s Ratio Perm					0.09	c0.09	c0.31					
v/c Ratio					0.44	0.45	0.49	0.36			0.48	
Uniform Delay, d1					17.3	17.3	4.8	4.3			4.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.1	7.2	0.5			0.8	
Delay (s)					18.3	18.4	12.0	4.7			5.5	
Level of Service					B	B	B	A			A	
Approach Delay (s)		0.0			18.4			5.7			5.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

7/22/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	570	40	555	0	0	640	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1471	1461	1805	3438			3092	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1471	1461	452	3438			3092	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	600	42	584	0	0	674	558
RTOR Reduction (vph)	0	0	0	0	113	113	0	0	0	0	290	0
Lane Group Flow (vph)	0	0	0	0	191	193	42	584	0	0	942	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	12%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.2	10.2	16.8	16.8			16.8	
Effective Green, g (s)					10.2	10.2	16.8	16.8			16.8	
Actuated g/C Ratio					0.29	0.29	0.48	0.48			0.48	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					429	426	217	1650			1484	
v/s Ratio Prot								0.17			c0.30	
v/s Ratio Perm					0.13	c0.13	0.09					
v/c Ratio					0.44	0.45	0.19	0.35			0.63	
Uniform Delay, d1					10.1	10.1	5.2	5.7			6.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.8	2.0	0.6			2.1	
Delay (s)					10.8	10.9	7.2	6.3			8.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			10.9			6.4			8.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	420	0	0	425	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3438			3041	
Flt Permitted					0.99	1.00	0.38	1.00			1.00	
Satd. Flow (perm)					1506	1461	679	3438			3041	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	433	0	0	438	289
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	121	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	433	0	0	606	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	16%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	396	2003			1772	
v/s Ratio Prot								0.13			c0.20	
v/s Ratio Perm					0.03	0.02	0.07					
v/c Ratio					0.18	0.10	0.12	0.22			0.34	
Uniform Delay, d1					11.7	11.5	3.1	3.3			3.6	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.6	0.2			0.5	
Delay (s)					12.0	11.7	3.7	3.6			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.6			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	335	45	500	0	0	490	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.95	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1498	1461	1719	3438			3066	
Flt Permitted					0.99	1.00	0.33	1.00			1.00	
Satd. Flow (perm)					1498	1461	600	3438			3066	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	360	48	538	0	0	527	296
RTOR Reduction (vph)	0	0	0	0	137	151	0	0	0	0	128	0
Lane Group Flow (vph)	0	0	0	0	59	40	48	538	0	0	695	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	15%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.4	6.4	18.9	18.9			18.9	
Effective Green, g (s)					6.4	6.4	18.9	18.9			18.9	
Actuated g/C Ratio					0.19	0.19	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					288	281	341	1951			1740	
v/s Ratio Prot								0.16			c0.23	
v/s Ratio Perm					0.04	0.03	0.08					
v/c Ratio					0.21	0.14	0.14	0.28			0.40	
Uniform Delay, d1					11.3	11.2	3.4	3.7			4.0	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.2	0.9	0.4			0.7	
Delay (s)					11.7	11.4	4.2	4.0			4.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.5			4.1			4.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	690	0	0	605	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3438			3167	
Flt Permitted					0.99	1.00	0.23	1.00			1.00	
Satd. Flow (perm)					1497	1461	441	3438			3167	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	719	0	0	630	464
RTOR Reduction (vph)	0	0	0	0	165	171	0	0	0	0	154	0
Lane Group Flow (vph)	0	0	0	0	64	53	104	719	0	0	940	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	8%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.2	8.2	32.5	32.5			32.5	
Effective Green, g (s)					8.2	8.2	32.5	32.5			32.5	
Actuated g/C Ratio					0.17	0.17	0.67	0.67			0.67	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					252	246	294	2294			2114	
v/s Ratio Prot								0.21			c0.30	
v/s Ratio Perm					0.04	0.04	0.24					
v/c Ratio					0.26	0.21	0.35	0.31			0.44	
Uniform Delay, d1					17.6	17.5	3.5	3.4			3.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.5	0.4	3.3	0.4			0.7	
Delay (s)					18.1	17.9	6.8	3.8			4.5	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.0			4.2			4.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	620	45	605	0	0	700	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1369	1358	1805	3438			3092	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1369	1358	463	3438			3092	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	653	47	637	0	0	737	611
RTOR Reduction (vph)	0	0	0	0	90	90	0	0	0	0	332	0
Lane Group Flow (vph)	0	0	0	0	240	243	47	637	0	0	1016	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	13%	0%	5%	0%	0%	12%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.5	11.5	16.4	16.4			16.4	
Effective Green, g (s)					11.5	11.5	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					439	435	212	1571			1413	
v/s Ratio Prot								0.19			c0.33	
v/s Ratio Perm					0.18	c0.18	0.10					
v/c Ratio					0.55	0.56	0.22	0.41			0.72	
Uniform Delay, d1					10.0	10.1	5.9	6.5			7.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.4	1.6	2.4	0.8			3.2	
Delay (s)					11.4	11.6	8.3	7.3			11.1	
Level of Service					B	B	A	A			B	
Approach Delay (s)		0.0			11.5			7.3			11.1	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	35.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	300	50	460	0	0	465	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1503	1344	1719	3438			3041	
Flt Permitted					0.99	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1503	1344	628	3438			3041	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	309	52	474	0	0	479	314
RTOR Reduction (vph)	0	0	0	0	116	136	0	0	0	0	133	0
Lane Group Flow (vph)	0	0	0	0	52	31	52	474	0	0	660	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	16%	5%
Bus Blockages (#/hr)	0	0	0	0	0	20	0	0	0	0	0	0
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.1	6.1	19.2	19.2			19.2	
Effective Green, g (s)					6.1	6.1	19.2	19.2			19.2	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					275	246	362	1982			1753	
v/s Ratio Prot								0.14			c0.22	
v/s Ratio Perm					0.03	0.02	0.08					
v/c Ratio					0.19	0.12	0.14	0.24			0.38	
Uniform Delay, d1					11.5	11.4	3.3	3.5			3.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.8	0.3			0.6	
Delay (s)					11.8	11.6	4.1	3.7			4.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.7			3.8			4.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	365	50	545	0	0	535	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.95	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1359	1311	1719	3438			3066	
Flt Permitted					0.99	1.00	0.29	1.00			1.00	
Satd. Flow (perm)					1359	1311	533	3438			3066	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	392	54	586	0	0	575	323
RTOR Reduction (vph)	0	0	0	0	126	126	0	0	0	0	143	0
Lane Group Flow (vph)	0	0	0	0	85	82	54	586	0	0	756	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%	5%	5%	0%	0%	15%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					7.0	7.0	19.0	19.0			19.0	
Effective Green, g (s)					7.0	7.0	19.0	19.0			19.0	
Actuated g/C Ratio					0.21	0.21	0.56	0.56			0.56	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					280	270	298	1921			1713	
v/s Ratio Prot								0.17			c0.25	
v/s Ratio Perm					0.06	0.06	0.10					
v/c Ratio					0.30	0.30	0.18	0.31			0.44	
Uniform Delay, d1					11.4	11.4	3.7	4.0			4.4	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.6	0.6	1.3	0.4			0.8	
Delay (s)					12.0	12.1	5.0	4.4			5.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			12.1			4.5			5.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	34.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	440	110	750	0	0	660	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1495	1461	1805	3438			3311	
Flt Permitted					0.99	1.00	0.20	1.00			1.00	
Satd. Flow (perm)					1495	1461	376	3438			3311	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	458	115	781	0	0	688	505
RTOR Reduction (vph)	0	0	0	0	144	144	0	0	0	0	176	0
Lane Group Flow (vph)	0	0	0	0	102	99	115	781	0	0	1017	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.2	9.2	32.1	32.1			32.1	
Effective Green, g (s)					9.2	9.2	32.1	32.1			32.1	
Actuated g/C Ratio					0.19	0.19	0.65	0.65			0.65	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					279	273	245	2239			2156	
v/s Ratio Prot								0.23			c0.31	
v/s Ratio Perm					0.07	0.07	0.31					
v/c Ratio					0.37	0.36	0.47	0.35			0.47	
Uniform Delay, d1					17.5	17.5	4.3	3.9			4.3	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.8	0.8	6.3	0.4			0.7	
Delay (s)					18.3	18.3	10.7	4.3			5.1	
Level of Service					B	B	B	A			A	
Approach Delay (s)		0.0			18.3			5.1			5.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	625	40	555	0	0	585	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1369	1358	1805	3438			3193	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1369	1358	463	3438			3193	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	658	42	584	0	0	616	558
RTOR Reduction (vph)	0	0	0	0	109	109	0	0	0	0	302	0
Lane Group Flow (vph)	0	0	0	0	223	227	42	584	0	0	872	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	13%	0%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.3	11.3	16.4	16.4			16.4	
Effective Green, g (s)					11.3	11.3	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					433	430	213	1579			1467	
v/s Ratio Prot								0.17			c0.27	
v/s Ratio Perm					0.16	c0.17	0.09					
v/c Ratio					0.51	0.53	0.20	0.37			0.59	
Uniform Delay, d1					10.0	10.0	5.7	6.3			7.2	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.2	2.1	0.7			1.8	
Delay (s)					11.0	11.2	7.8	7.0			9.0	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.1			7.0			9.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	330	45	420	0	0	370	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1334	1279	1719	3438			3216	
Flt Permitted					0.99	1.00	0.40	1.00			1.00	
Satd. Flow (perm)					1334	1279	718	3438			3216	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	340	46	433	0	0	381	289
RTOR Reduction (vph)	0	0	0	0	129	145	0	0	0	0	126	0
Lane Group Flow (vph)	0	0	0	0	57	35	46	433	0	0	544	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	20%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.6	6.6	19.0	19.0			19.0	
Effective Green, g (s)					6.6	6.6	19.0	19.0			19.0	
Actuated g/C Ratio					0.20	0.20	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					262	251	406	1944			1819	
v/s Ratio Prot								0.13			c0.17	
v/s Ratio Perm					0.04	0.03	0.06					
v/c Ratio					0.22	0.14	0.11	0.22			0.30	
Uniform Delay, d1					11.3	11.2	3.4	3.6			3.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.3	0.6	0.3			0.4	
Delay (s)					11.8	11.4	4.0	3.9			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.6			3.9			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	33.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	390	45	500	0	0	435	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1356	1311	1719	3438			3238	
Flt Permitted					1.00	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1356	1311	631	3438			3238	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	419	48	538	0	0	468	296
RTOR Reduction (vph)	0	0	0	0	143	143	0	0	0	0	137	0
Lane Group Flow (vph)	0	0	0	0	81	79	48	538	0	0	627	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.3	8.3	18.8	18.8			18.8	
Effective Green, g (s)					8.3	8.3	18.8	18.8			18.8	
Actuated g/C Ratio					0.24	0.24	0.54	0.54			0.54	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					321	310	338	1841			1734	
v/s Ratio Prot								0.16			c0.19	
v/s Ratio Perm					0.06	c0.06	0.08					
v/c Ratio					0.25	0.26	0.14	0.29			0.36	
Uniform Delay, d1					10.9	10.9	4.1	4.5			4.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.4	0.9	0.4			0.6	
Delay (s)					11.3	11.3	5.0	4.9			5.3	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.3			4.9			5.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	460	100	690	0	0	550	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1378	1334	1805	3438			3294	
Flt Permitted					0.99	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1378	1334	467	3438			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	479	104	719	0	0	573	464
RTOR Reduction (vph)	0	0	0	0	167	167	0	0	0	0	163	0
Lane Group Flow (vph)	0	0	0	0	89	87	104	719	0	0	874	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	15%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.3	9.3	31.9	31.9			31.9	
Effective Green, g (s)					9.3	9.3	31.9	31.9			31.9	
Actuated g/C Ratio					0.19	0.19	0.65	0.65			0.65	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					260	252	303	2229			2136	
v/s Ratio Prot								0.21			c0.27	
v/s Ratio Perm					0.06	c0.07	0.22					
v/c Ratio					0.34	0.34	0.34	0.32			0.41	
Uniform Delay, d1					17.3	17.3	3.9	3.8			4.1	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.8	0.8	3.1	0.4			0.6	
Delay (s)					18.1	18.1	7.0	4.2			4.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.1			4.6			4.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	680	45	605	0	0	640	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1368	1358	1805	3438			3085	
Flt Permitted					1.00	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1368	1358	469	3438			3085	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	716	47	637	0	0	674	611
RTOR Reduction (vph)	0	0	0	0	89	89	0	0	0	0	337	0
Lane Group Flow (vph)	0	0	0	0	272	276	47	637	0	0	948	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	13%	0%	5%	0%	0%	12%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.9	11.9	16.2	16.2			16.2	
Effective Green, g (s)					11.9	11.9	16.2	16.2			16.2	
Actuated g/C Ratio					0.33	0.33	0.45	0.45			0.45	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					451	448	210	1543			1384	
v/s Ratio Prot								0.19			c0.31	
v/s Ratio Perm					0.20	c0.20	0.10					
v/c Ratio					0.60	0.62	0.22	0.41			0.69	
Uniform Delay, d1					10.1	10.2	6.1	6.7			7.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					2.3	2.5	2.5	0.8			2.8	
Delay (s)					12.4	12.7	8.6	7.5			10.7	
Level of Service					B	B	A	A			B	
Approach Delay (s)		0.0			12.5			7.6			10.7	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	360	50	460	0	0	405	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1496	1344	1719	3438			3035	
Flt Permitted					0.99	1.00	0.37	1.00			1.00	
Satd. Flow (perm)					1496	1344	676	3438			3035	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	371	52	474	0	0	418	314
RTOR Reduction (vph)	0	0	0	0	141	159	0	0	0	0	136	0
Lane Group Flow (vph)	0	0	0	0	59	38	52	474	0	0	596	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	16%	5%
Bus Blockages (#/hr)	0	0	0	0	0	20	0	0	0	0	0	0
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.4	6.4	18.9	18.9			18.9	
Effective Green, g (s)					6.4	6.4	18.9	18.9			18.9	
Actuated g/C Ratio					0.19	0.19	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					288	258	384	1951			1723	
v/s Ratio Prot								0.14			c0.20	
v/s Ratio Perm					0.04	0.03	0.08					
v/c Ratio					0.21	0.15	0.14	0.24			0.35	
Uniform Delay, d1					11.3	11.2	3.4	3.6			3.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.3	0.7	0.3			0.6	
Delay (s)					11.7	11.4	4.1	3.9			4.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.6			3.9			4.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	425	50	545	0	0	475	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1353	1311	1719	3438			3060	
Flt Permitted					1.00	1.00	0.31	1.00			1.00	
Satd. Flow (perm)					1353	1311	558	3438			3060	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	457	54	586	0	0	511	323
RTOR Reduction (vph)	0	0	0	0	117	117	0	0	0	0	157	0
Lane Group Flow (vph)	0	0	0	0	125	125	54	586	0	0	677	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	17%	5%	5%	0%	0%	15%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.4	9.4	18.5	18.5			18.5	
Effective Green, g (s)					9.4	9.4	18.5	18.5			18.5	
Actuated g/C Ratio					0.26	0.26	0.52	0.52			0.52	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					354	343	288	1772			1577	
v/s Ratio Prot								0.17			c0.22	
v/s Ratio Perm					0.09	c0.10	0.10					
v/c Ratio					0.35	0.36	0.19	0.33			0.43	
Uniform Delay, d1					10.8	10.8	4.7	5.1			5.4	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.6	0.7	1.4	0.5			0.9	
Delay (s)					11.4	11.5	6.1	5.6			6.3	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.4			5.6			6.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	35.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	500	110	750	0	0	600	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1491	1461	1805	3438			3294	
Flt Permitted					1.00	1.00	0.21	1.00			1.00	
Satd. Flow (perm)					1491	1461	403	3438			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	521	115	781	0	0	625	505
RTOR Reduction (vph)	0	0	0	0	141	141	0	0	0	0	184	0
Lane Group Flow (vph)	0	0	0	0	135	135	115	781	0	0	946	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.1	10.1	31.5	31.5			31.5	
Effective Green, g (s)					10.1	10.1	31.5	31.5			31.5	
Actuated g/C Ratio					0.20	0.20	0.64	0.64			0.64	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					304	298	256	2183			2092	
v/s Ratio Prot								0.23			c0.29	
v/s Ratio Perm					0.09	c0.09	0.29					
v/c Ratio					0.44	0.45	0.45	0.36			0.45	
Uniform Delay, d1					17.3	17.3	4.6	4.3			4.6	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.1	5.6	0.5			0.7	
Delay (s)					18.3	18.4	10.2	4.7			5.3	
Level of Service					B	B	B	A			A	
Approach Delay (s)		0.0			18.4			5.4			5.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	570	40	610	0	0	585	585
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1471	1461	1805	3195			3180	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1471	1461	452	3195			3180	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	600	42	642	0	0	616	616
RTOR Reduction (vph)	0	0	0	0	92	92	0	0	0	0	324	0
Lane Group Flow (vph)	0	0	0	0	212	214	42	642	0	0	908	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	13%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.6	10.6	16.8	16.8			16.8	
Effective Green, g (s)					10.6	10.6	16.8	16.8			16.8	
Actuated g/C Ratio					0.30	0.30	0.47	0.47			0.47	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					440	437	215	1516			1509	
v/s Ratio Prot								0.20			c0.29	
v/s Ratio Perm					0.14	c0.15	0.09					
v/c Ratio					0.48	0.49	0.20	0.42			0.60	
Uniform Delay, d1					10.2	10.2	5.4	6.1			6.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.8	0.9	2.0	0.9			1.8	
Delay (s)					11.0	11.0	7.4	7.0			8.6	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.0			7.0			8.6	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	475	0	0	370	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3139			3193	
Flt Permitted					0.99	1.00	0.38	1.00			1.00	
Satd. Flow (perm)					1506	1461	680	3139			3193	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	490	0	0	381	345
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	144	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	490	0	0	582	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	396	1829			1860	
v/s Ratio Prot								0.16			c0.18	
v/s Ratio Perm					0.03	0.02	0.07					
v/c Ratio					0.18	0.10	0.12	0.27			0.31	
Uniform Delay, d1					11.7	11.5	3.1	3.4			3.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.6	0.4			0.4	
Delay (s)					12.0	11.7	3.7	3.8			4.0	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.8			4.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	335	45	555	0	0	435	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1498	1461	1719	3167			3216	
Flt Permitted					0.99	1.00	0.33	1.00			1.00	
Satd. Flow (perm)					1498	1461	598	3167			3216	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	360	48	597	0	0	468	355
RTOR Reduction (vph)	0	0	0	0	123	123	0	0	0	0	155	0
Lane Group Flow (vph)	0	0	0	0	73	68	48	597	0	0	668	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	14%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.6	6.6	18.9	18.9			18.9	
Effective Green, g (s)					6.6	6.6	18.9	18.9			18.9	
Actuated g/C Ratio					0.20	0.20	0.56	0.56			0.56	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					295	288	337	1787			1814	
v/s Ratio Prot								0.19			c0.21	
v/s Ratio Perm					0.05	0.05	0.08					
v/c Ratio					0.25	0.24	0.14	0.33			0.37	
Uniform Delay, d1					11.4	11.3	3.5	3.9			4.0	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.4	0.9	0.5			0.6	
Delay (s)					11.8	11.8	4.3	4.4			4.6	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			4.4			4.6	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	33.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	745	0	0	550	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3252			3274	
Flt Permitted					0.99	1.00	0.23	1.00			1.00	
Satd. Flow (perm)					1497	1461	438	3252			3274	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	776	0	0	573	521
RTOR Reduction (vph)	0	0	0	0	148	148	0	0	0	0	176	0
Lane Group Flow (vph)	0	0	0	0	81	76	104	776	0	0	918	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	11%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.6	8.6	32.5	32.5			32.5	
Effective Green, g (s)					8.6	8.6	32.5	32.5			32.5	
Actuated g/C Ratio					0.18	0.18	0.66	0.66			0.66	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					262	256	290	2153			2167	
v/s Ratio Prot								0.24			c0.28	
v/s Ratio Perm					0.05	0.05	0.24					
v/c Ratio					0.31	0.30	0.36	0.36			0.42	
Uniform Delay, d1					17.7	17.6	3.7	3.7			3.9	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.7	3.4	0.5			0.6	
Delay (s)					18.3	18.3	7.1	4.2			4.5	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.3			4.5			4.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	49.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	620	45	665	0	0	640	635
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1470	1461	1805	3195			3181	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1470	1461	463	3195			3181	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	653	47	700	0	0	674	668
RTOR Reduction (vph)	0	0	0	0	73	73	0	0	0	0	364	0
Lane Group Flow (vph)	0	0	0	0	257	260	47	700	0	0	978	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	13%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.6	11.6	16.4	16.4			16.4	
Effective Green, g (s)					11.6	11.6	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					474	471	211	1456			1449	
v/s Ratio Prot								0.22			c0.31	
v/s Ratio Perm					0.17	c0.18	0.10					
v/c Ratio					0.54	0.55	0.22	0.48			0.68	
Uniform Delay, d1					10.0	10.1	5.9	6.8			7.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.3	1.4	2.4	1.1			2.5	
Delay (s)					11.3	11.5	8.4	8.0			10.2	
Level of Service					B	B	A	A			B	
Approach Delay (s)		0.0			11.4			8.0			10.2	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	36.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	300	50	520	0	0	405	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1503	1461	1719	3139			3194	
Flt Permitted					0.99	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1503	1461	627	3139			3194	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	309	52	536	0	0	418	376
RTOR Reduction (vph)	0	0	0	0	116	136	0	0	0	0	159	0
Lane Group Flow (vph)	0	0	0	0	52	31	52	536	0	0	635	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.1	6.1	19.2	19.2			19.2	
Effective Green, g (s)					6.1	6.1	19.2	19.2			19.2	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					275	268	362	1810			1842	
v/s Ratio Prot								0.17			c0.20	
v/s Ratio Perm					0.03	0.02	0.08					
v/c Ratio					0.19	0.11	0.14	0.30			0.34	
Uniform Delay, d1					11.5	11.3	3.3	3.6			3.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.8	0.4			0.5	
Delay (s)					11.8	11.5	4.1	4.0			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.7			4.0			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	475	0	0	370	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3139			3216	
Flt Permitted					0.99	1.00	0.40	1.00			1.00	
Satd. Flow (perm)					1506	1461	718	3139			3216	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	490	0	0	381	289
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	121	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	490	0	0	549	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	418	1829			1874	
v/s Ratio Prot								0.16			c0.17	
v/s Ratio Perm					0.03	0.02	0.06					
v/c Ratio					0.18	0.10	0.11	0.27			0.29	
Uniform Delay, d1					11.7	11.5	3.1	3.4			3.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.5	0.4			0.4	
Delay (s)					12.0	11.7	3.6	3.8			3.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.8			3.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	440	110	810	0	0	600	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1495	1461	1805	3252			3274	
Flt Permitted					0.99	1.00	0.20	1.00			1.00	
Satd. Flow (perm)					1495	1461	372	3252			3274	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	458	115	844	0	0	625	568
RTOR Reduction (vph)	0	0	0	0	122	122	0	0	0	0	202	0
Lane Group Flow (vph)	0	0	0	0	124	121	115	844	0	0	991	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	11%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.7	9.7	32.1	32.1			32.1	
Effective Green, g (s)					9.7	9.7	32.1	32.1			32.1	
Actuated g/C Ratio					0.19	0.19	0.64	0.64			0.64	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					291	285	240	2096			2110	
v/s Ratio Prot								0.26			0.30	
v/s Ratio Perm					0.08	0.08	c0.31					
v/c Ratio					0.42	0.42	0.48	0.40			0.47	
Uniform Delay, d1					17.6	17.6	4.6	4.2			4.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.0	6.7	0.6			0.8	
Delay (s)					18.6	18.6	11.3	4.8			5.3	
Level of Service					B	B	B	A			A	
Approach Delay (s)		0.0			18.6			5.6			5.3	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	570	40	555	0	0	585	585
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1471	1461	1805	3438			3064	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1471	1461	452	3438			3064	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	600	42	584	0	0	616	616
RTOR Reduction (vph)	0	0	0	0	113	113	0	0	0	0	320	0
Lane Group Flow (vph)	0	0	0	0	191	193	42	584	0	0	912	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	5%	13%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.2	10.2	16.8	16.8			16.8	
Effective Green, g (s)					10.2	10.2	16.8	16.8			16.8	
Actuated g/C Ratio					0.29	0.29	0.48	0.48			0.48	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					429	426	217	1650			1471	
v/s Ratio Prot								0.17			c0.30	
v/s Ratio Perm					0.13	c0.13	0.09					
v/c Ratio					0.44	0.45	0.19	0.35			0.62	
Uniform Delay, d1					10.1	10.1	5.2	5.7			6.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.8	2.0	0.6			2.0	
Delay (s)					10.8	10.9	7.2	6.3			8.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			10.9			6.4			8.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	420	0	0	370	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3438			3003	
Flt Permitted					0.99	1.00	0.38	1.00			1.00	
Satd. Flow (perm)					1506	1461	680	3438			3003	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	433	0	0	381	345
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	144	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	433	0	0	582	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	5%	19%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	396	2003			1749	
v/s Ratio Prot								0.13			c0.19	
v/s Ratio Perm					0.03	0.02	0.07					
v/c Ratio					0.18	0.10	0.12	0.22			0.33	
Uniform Delay, d1					11.7	11.5	3.1	3.3			3.6	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.6	0.2			0.5	
Delay (s)					12.0	11.7	3.7	3.6			4.1	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.6			4.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	335	45	500	0	0	435	330
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1498	1461	1719	3438			3029	
Flt Permitted					0.99	1.00	0.33	1.00			1.00	
Satd. Flow (perm)					1498	1461	600	3438			3029	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	360	48	538	0	0	468	355
RTOR Reduction (vph)	0	0	0	0	137	151	0	0	0	0	154	0
Lane Group Flow (vph)	0	0	0	0	59	40	48	538	0	0	669	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	5%	0%	0%	5%	20%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.4	6.4	18.9	18.9			18.9	
Effective Green, g (s)					6.4	6.4	18.9	18.9			18.9	
Actuated g/C Ratio					0.19	0.19	0.57	0.57			0.57	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					288	281	341	1951			1719	
v/s Ratio Prot								0.16			c0.22	
v/s Ratio Perm					0.04	0.03	0.08					
v/c Ratio					0.21	0.14	0.14	0.28			0.39	
Uniform Delay, d1					11.3	11.2	3.4	3.7			4.0	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.2	0.9	0.4			0.7	
Delay (s)					11.7	11.4	4.2	4.0			4.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.5			4.1			4.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	690	0	0	550	500
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3438			3129	
Flt Permitted					0.99	1.00	0.23	1.00			1.00	
Satd. Flow (perm)					1497	1461	441	3438			3129	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	719	0	0	573	521
RTOR Reduction (vph)	0	0	0	0	165	171	0	0	0	0	173	0
Lane Group Flow (vph)	0	0	0	0	64	53	104	719	0	0	921	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	5%	0%	0%	0%	15%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.2	8.2	32.5	32.5			32.5	
Effective Green, g (s)					8.2	8.2	32.5	32.5			32.5	
Actuated g/C Ratio					0.17	0.17	0.67	0.67			0.67	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					252	246	294	2294			2088	
v/s Ratio Prot								0.21			c0.29	
v/s Ratio Perm					0.04	0.04	0.24					
v/c Ratio					0.26	0.21	0.35	0.31			0.44	
Uniform Delay, d1					17.6	17.5	3.5	3.4			3.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.5	0.4	3.3	0.4			0.7	
Delay (s)					18.1	17.9	6.8	3.8			4.5	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.0			4.2			4.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	620	45	605	0	0	640	635
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1470	1461	1805	3195			3181	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1470	1461	463	3195			3181	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	653	47	637	0	0	674	668
RTOR Reduction (vph)	0	0	0	0	91	91	0	0	0	0	361	0
Lane Group Flow (vph)	0	0	0	0	239	242	47	637	0	0	981	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	13%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.3	11.3	16.4	16.4			16.4	
Effective Green, g (s)					11.3	11.3	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					465	462	213	1468			1461	
v/s Ratio Prot								0.20			c0.31	
v/s Ratio Perm					0.16	c0.17	0.10					
v/c Ratio					0.51	0.52	0.22	0.43			0.67	
Uniform Delay, d1					10.0	10.0	5.8	6.5			7.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.1	2.4	0.9			2.5	
Delay (s)					10.9	11.1	8.2	7.5			10.0	
Level of Service					B	B	A	A			B	
Approach Delay (s)		0.0			11.0			7.5			10.0	
Approach LOS		A			B			A			B	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	35.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	300	50	460	0	0	405	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1503	1461	1719	3139			3194	
Flt Permitted					0.99	1.00	0.35	1.00			1.00	
Satd. Flow (perm)					1503	1461	627	3139			3194	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	309	52	474	0	0	418	376
RTOR Reduction (vph)	0	0	0	0	116	136	0	0	0	0	159	0
Lane Group Flow (vph)	0	0	0	0	52	31	52	474	0	0	635	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.1	6.1	19.2	19.2			19.2	
Effective Green, g (s)					6.1	6.1	19.2	19.2			19.2	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					275	268	362	1810			1842	
v/s Ratio Prot								0.15			c0.20	
v/s Ratio Perm					0.03	0.02	0.08					
v/c Ratio					0.19	0.11	0.14	0.26			0.34	
Uniform Delay, d1					11.5	11.3	3.3	3.5			3.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.8	0.4			0.5	
Delay (s)					11.8	11.5	4.1	3.9			4.2	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.7			3.9			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	365	50	545	0	0	475	360
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1496	1461	1719	3167			3216	
Flt Permitted					0.99	1.00	0.30	1.00			1.00	
Satd. Flow (perm)					1496	1461	535	3167			3216	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	392	54	586	0	0	511	387
RTOR Reduction (vph)	0	0	0	0	127	127	0	0	0	0	170	0
Lane Group Flow (vph)	0	0	0	0	84	81	54	586	0	0	728	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	14%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.8	6.8	18.9	18.9			18.9	
Effective Green, g (s)					6.8	6.8	18.9	18.9			18.9	
Actuated g/C Ratio					0.20	0.20	0.56	0.56			0.56	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					302	295	300	1776			1804	
v/s Ratio Prot								0.19			c0.23	
v/s Ratio Perm					0.06	0.06	0.10					
v/c Ratio					0.28	0.27	0.18	0.33			0.40	
Uniform Delay, d1					11.4	11.4	3.6	4.0			4.2	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.5	0.5	1.3	0.5			0.7	
Delay (s)					11.9	11.9	4.9	4.5			4.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.9			4.5			4.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	33.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	440	110	750	0	0	600	545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1495	1461	1805	3252			3274	
Flt Permitted					0.99	1.00	0.20	1.00			1.00	
Satd. Flow (perm)					1495	1461	376	3252			3274	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	458	115	781	0	0	625	568
RTOR Reduction (vph)	0	0	0	0	144	144	0	0	0	0	198	0
Lane Group Flow (vph)	0	0	0	0	102	99	115	781	0	0	995	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	11%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.2	9.2	32.1	32.1			32.1	
Effective Green, g (s)					9.2	9.2	32.1	32.1			32.1	
Actuated g/C Ratio					0.19	0.19	0.65	0.65			0.65	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					279	273	245	2117			2132	
v/s Ratio Prot								0.24			0.30	
v/s Ratio Perm					0.07	0.07	c0.31					
v/c Ratio					0.37	0.36	0.47	0.37			0.47	
Uniform Delay, d1					17.5	17.5	4.3	3.9			4.3	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.8	0.8	6.3	0.5			0.7	
Delay (s)					18.3	18.3	10.7	4.4			5.0	
Level of Service					B	B	B	A			A	
Approach Delay (s)		0.0			18.3			5.2			5.0	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	570	40	610	0	0	585	530
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1471	1461	1805	3195			3193	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1471	1461	452	3195			3193	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	600	42	642	0	0	616	558
RTOR Reduction (vph)	0	0	0	0	92	92	0	0	0	0	293	0
Lane Group Flow (vph)	0	0	0	0	212	214	42	642	0	0	881	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	13%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					10.6	10.6	16.8	16.8			16.8	
Effective Green, g (s)					10.6	10.6	16.8	16.8			16.8	
Actuated g/C Ratio					0.30	0.30	0.47	0.47			0.47	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					440	437	215	1516			1515	
v/s Ratio Prot								0.20			c0.28	
v/s Ratio Perm					0.14	c0.15	0.09					
v/c Ratio					0.48	0.49	0.20	0.42			0.58	
Uniform Delay, d1					10.2	10.2	5.4	6.1			6.7	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.8	0.9	2.0	0.9			1.6	
Delay (s)					11.0	11.0	7.4	7.0			8.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.0			7.0			8.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	275	45	475	0	0	370	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1506	1461	1719	3139			3216	
Flt Permitted					0.99	1.00	0.40	1.00			1.00	
Satd. Flow (perm)					1506	1461	718	3139			3216	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	284	46	490	0	0	381	289
RTOR Reduction (vph)	0	0	0	0	108	126	0	0	0	0	121	0
Lane Group Flow (vph)	0	0	0	0	49	27	46	490	0	0	549	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					5.9	5.9	19.4	19.4			19.4	
Effective Green, g (s)					5.9	5.9	19.4	19.4			19.4	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					267	259	418	1829			1874	
v/s Ratio Prot								0.16			c0.17	
v/s Ratio Perm					0.03	0.02	0.06					
v/c Ratio					0.18	0.10	0.11	0.27			0.29	
Uniform Delay, d1					11.7	11.5	3.1	3.4			3.5	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	0.5	0.4			0.4	
Delay (s)					12.0	11.7	3.6	3.8			3.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			3.8			3.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	335	45	555	0	0	435	275
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1498	1461	1719	3167			3238	
Flt Permitted					0.99	1.00	0.36	1.00			1.00	
Satd. Flow (perm)					1498	1461	648	3167			3238	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	360	48	597	0	0	468	296
RTOR Reduction (vph)	0	0	0	0	123	123	0	0	0	0	129	0
Lane Group Flow (vph)	0	0	0	0	73	68	48	597	0	0	635	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	14%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.6	6.6	18.9	18.9			18.9	
Effective Green, g (s)					6.6	6.6	18.9	18.9			18.9	
Actuated g/C Ratio					0.20	0.20	0.56	0.56			0.56	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					295	288	366	1787			1827	
v/s Ratio Prot								0.19			c0.20	
v/s Ratio Perm					0.05	0.05	0.07					
v/c Ratio					0.25	0.24	0.13	0.33			0.35	
Uniform Delay, d1					11.4	11.3	3.4	3.9			4.0	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.4	0.4	0.7	0.5			0.5	
Delay (s)					11.8	11.8	4.2	4.4			4.5	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.8			4.4			4.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	33.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	405	100	745	0	0	550	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1497	1461	1805	3252			3294	
Flt Permitted					0.99	1.00	0.25	1.00			1.00	
Satd. Flow (perm)					1497	1461	473	3252			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	422	104	776	0	0	573	464
RTOR Reduction (vph)	0	0	0	0	148	148	0	0	0	0	157	0
Lane Group Flow (vph)	0	0	0	0	81	76	104	776	0	0	880	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	11%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					8.6	8.6	32.5	32.5			32.5	
Effective Green, g (s)					8.6	8.6	32.5	32.5			32.5	
Actuated g/C Ratio					0.18	0.18	0.66	0.66			0.66	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					262	256	313	2153			2180	
v/s Ratio Prot								0.24			c0.27	
v/s Ratio Perm					0.05	0.05	0.22					
v/c Ratio					0.31	0.30	0.33	0.36			0.40	
Uniform Delay, d1					17.7	17.6	3.6	3.7			3.8	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.7	2.8	0.5			0.6	
Delay (s)					18.3	18.3	6.4	4.2			4.4	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.3			4.4			4.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	49.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	5	5	620	45	665	0	0	640	580
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.85	0.85	1.00	1.00			0.93	
Flt Protected					1.00	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1470	1461	1805	3195			3193	
Flt Permitted					1.00	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1470	1461	463	3195			3193	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	5	5	653	47	700	0	0	674	611
RTOR Reduction (vph)	0	0	0	0	73	73	0	0	0	0	333	0
Lane Group Flow (vph)	0	0	0	0	257	260	47	700	0	0	952	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	13%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					11.6	11.6	16.4	16.4			16.4	
Effective Green, g (s)					11.6	11.6	16.4	16.4			16.4	
Actuated g/C Ratio					0.32	0.32	0.46	0.46			0.46	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					474	471	211	1456			1455	
v/s Ratio Prot								0.22			c0.30	
v/s Ratio Perm					0.17	c0.18	0.10					
v/c Ratio					0.54	0.55	0.22	0.48			0.65	
Uniform Delay, d1					10.0	10.1	5.9	6.8			7.6	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.3	1.4	2.4	1.1			2.3	
Delay (s)					11.3	11.5	8.4	8.0			9.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.4			8.0			9.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	36.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	300	50	520	0	0	405	605
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.91	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1503	1461	1719	3139			3129	
Flt Permitted					0.99	1.00	0.24	1.00			1.00	
Satd. Flow (perm)					1503	1461	441	3139			3129	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	0	0	0	21	5	309	52	536	0	0	418	624
RTOR Reduction (vph)	0	0	0	0	116	136	0	0	0	0	264	0
Lane Group Flow (vph)	0	0	0	0	52	31	52	536	0	0	778	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	15%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					6.1	6.1	19.2	19.2			19.2	
Effective Green, g (s)					6.1	6.1	19.2	19.2			19.2	
Actuated g/C Ratio					0.18	0.18	0.58	0.58			0.58	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					275	268	254	1810			1804	
v/s Ratio Prot								0.17			c0.25	
v/s Ratio Perm					0.03	0.02	0.12					
v/c Ratio					0.19	0.11	0.20	0.30			0.43	
Uniform Delay, d1					11.5	11.3	3.4	3.6			4.0	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.3	0.2	1.8	0.4			0.8	
Delay (s)					11.8	11.5	5.2	4.0			4.7	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			11.7			4.1			4.7	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	33.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	20	5	365	50	605	0	0	475	300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.94	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1496	1461	1719	3167			3238	
Flt Permitted					0.99	1.00	0.32	1.00			1.00	
Satd. Flow (perm)					1496	1461	582	3167			3238	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	0	0	0	22	5	392	54	651	0	0	511	323
RTOR Reduction (vph)	0	0	0	0	100	100	0	0	0	0	144	0
Lane Group Flow (vph)	0	0	0	0	111	108	54	651	0	0	690	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	5%	14%	0%	0%	5%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					7.2	7.2	19.0	19.0			19.0	
Effective Green, g (s)					7.2	7.2	19.0	19.0			19.0	
Actuated g/C Ratio					0.21	0.21	0.56	0.56			0.56	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					315	308	323	1759			1799	
v/s Ratio Prot								0.21			c0.21	
v/s Ratio Perm					0.07	0.07	0.09					
v/c Ratio					0.35	0.35	0.17	0.37			0.38	
Uniform Delay, d1					11.5	11.5	3.7	4.3			4.3	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					0.7	0.7	1.1	0.6			0.6	
Delay (s)					12.2	12.2	4.8	4.9			4.9	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			12.2			4.9			4.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	34.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
6: Windsor Ave & WB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	0	0	0	25	5	440	110	810	0	0	600	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.0	4.0	4.0	4.0			4.0	
Lane Util. Factor					0.95	0.95	1.00	0.95			0.95	
Frt					0.87	0.85	1.00	1.00			0.93	
Flt Protected					0.99	1.00	0.95	1.00			1.00	
Satd. Flow (prot)					1495	1461	1805	3252			3294	
Flt Permitted					0.99	1.00	0.21	1.00			1.00	
Satd. Flow (perm)					1495	1461	408	3252			3294	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	0	0	0	26	5	458	115	844	0	0	625	505
RTOR Reduction (vph)	0	0	0	0	122	122	0	0	0	0	179	0
Lane Group Flow (vph)	0	0	0	0	124	121	115	844	0	0	951	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	5%	0%	11%	0%	0%	0%	5%
Turn Type				Perm	NA	Perm	Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8		8	2					
Actuated Green, G (s)					9.7	9.7	32.1	32.1			32.1	
Effective Green, g (s)					9.7	9.7	32.1	32.1			32.1	
Actuated g/C Ratio					0.19	0.19	0.64	0.64			0.64	
Clearance Time (s)					4.0	4.0	4.0	4.0			4.0	
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	
Lane Grp Cap (vph)					291	285	263	2096			2123	
v/s Ratio Prot								0.26			c0.29	
v/s Ratio Perm					0.08	0.08	0.28					
v/c Ratio					0.42	0.42	0.44	0.40			0.45	
Uniform Delay, d1					17.6	17.6	4.4	4.2			4.4	
Progression Factor					1.00	1.00	1.00	1.00			1.00	
Incremental Delay, d2					1.0	1.0	5.2	0.6			0.7	
Delay (s)					18.6	18.6	9.6	4.8			5.1	
Level of Service					B	B	A	A			A	
Approach Delay (s)		0.0			18.6			5.4			5.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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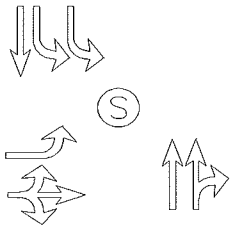
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
7
ROUTE
1B, 1C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	550	5%		550	50	600
EB THRU	5	5%		5	5	10
EB RIGHT	105	5%		105	10	115
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	130	5%		130	10	140
NB RIGHT	20	5%		20	5	25
SB LEFT	415	5%	**55**	470	40	510
SB THRU	190	5%		190	15	205
SB RIGHT	0	0%		0	0	0
TOTALS	**1415**		**55**	**1470**	**135**	**1605**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Jul-11	VV.110264.0000	2 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	550	5%	**55**	605	55	660
EB THRU	5	5%		5	5	10
EB RIGHT	105	5%		105	10	115
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	130	5%		130	10	140
NB RIGHT	20	5%		20	5	25
SB LEFT	415	5%		415	35	450
SB THRU	190	5%		190	15	205
SB RIGHT	0	0%		0	0	0
TOTALS	**1415**		**55**	**1470**	**135**	**1605**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	28-Jun-12	VV.110264.0000	3 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	320	5%		320	30	350
EB THRU	5	5%		5	5	10
EB RIGHT	55	5%		55	5	60
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	145	5%		145	15	160
NB RIGHT	15	5%		15	5	20
SB LEFT	295	5%	**55**	350	30	380
SB THRU	100	5%		100	10	110
SB RIGHT	0	0%		0	0	0
TOTALS	**935**		**55**	**990**	**100**	**1090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Jul-11	VV.110264.0000	4 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	320	5%	**55**	375	35	410
EB THRU	5	5%		5	5	10
EB RIGHT	55	5%		55	5	60
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	145	5%		145	15	160
NB RIGHT	15	5%		15	5	20
SB LEFT	295	5%		295	25	320
SB THRU	100	5%		100	10	110
SB RIGHT	0	0%		0	0	0
TOTALS	**935**		**55**	**990**	**100**	**1090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Jul-11	VV.110264.0000	5 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	370	5%		370	35	405
EB THRU	5	5%		5	5	10
EB RIGHT	50	5%		50	5	55
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	160	5%		160	15	175
NB RIGHT	15	5%		15	5	20
SB LEFT	280	5%	**55**	335	30	365
SB THRU	160	5%		160	15	175
SB RIGHT	0	0%		0	0	0
TOTALS	**1040**		**55**	**1095**	**110**	**1205**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Jul-11	VV.110264.0000	6 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	370	12%	**55**	425	40	465
EB THRU	5	5%		5	5	10
EB RIGHT	50	5%		50	5	55
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	160	5%		160	15	175
NB RIGHT	15	5%		15	5	20
SB LEFT	280	5%		280	25	305
SB THRU	160	5%		160	15	175
SB RIGHT	0	0%		0	0	0
TOTALS	**1040**		**55**	**1095**	**110**	**1205**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	28-Jun-12	VV.110264.0000	7 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	595	5%		595	55	650
EB THRU	5	5%		5	5	10
EB RIGHT	105	5%		105	10	115
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	195	5%		195	20	215
NB RIGHT	15	5%		15	5	20
SB LEFT	415	5%	**55**	470	40	510
SB THRU	165	5%		165	15	180
SB RIGHT	0	0%		0	0	0
TOTALS	**1495**		**55**	**1550**	**150**	**1700**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Jul-11	VV.110264.0000	8 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	595	5%	**55**	650	60	710
EB THRU	5	5%		5	5	10
EB RIGHT	105	5%		105	10	115
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WINDSOR AVE						
NB LEFT	0	0%		0	0	0
NB THRU	195	5%		195	20	215
NB RIGHT	15	5%		15	5	20
SB LEFT	415	5%		415	35	450
SB THRU	165	5%		165	15	180
SB RIGHT	0	0%		0	0	0
TOTALS	**1495**		**55**	**1550**	**150**	**1700**

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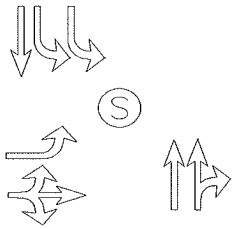
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	550	0	0	550	**0**	550	50	600
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	104	0	0	105	**0**	105	10	115
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	129	0	0	130	**0**	130	10	140
NB RIGHT	22	0	0	20	**0**	20	5	25
SB LEFT	413	2	6	420	**165**	585	55	640
SB THRU	187	4	12	200	**0**	200	20	220
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1405**				**165**	**1595**	**155**	**1750**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	550	0	0	550	**140**	690	60	750
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	104	0	0	105	**0**	105	10	115
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	129	0	0	130	**0**	130	10	140
NB RIGHT	22	0	0	20	**0**	20	5	25
SB LEFT	413	2	6	420	**0**	420	40	460
SB THRU	187	4	12	200	**0**	200	20	220
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1405**				**140**	**1570**	**150**	**1720**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	319	0	0	320	**0**	320	30	350
EB THRU	2	0	0	5	**0**	5	5	10
EB RIGHT	53	0	0	55	**0**	55	5	60
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	145	1	3	150	**0**	150	15	165
NB RIGHT	15	1	3	20	**0**	20	5	25
SB LEFT	290	3	9	300	**165**	465	40	505
SB THRU	97	3	9	105	**0**	105	10	115
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**921**				**165**	**1120**	**110**	**1230**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	319	0	0	320	**140**	460	40	500
EB THRU	2	0	0	5	**0**	5	5	10
EB RIGHT	53	0	0	55	**0**	55	5	60
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	145	1	3	150	**0**	150	15	165
NB RIGHT	15	1	3	20	**0**	20	5	25
SB LEFT	290	3	9	300	**0**	300	25	325
SB THRU	97	3	9	105	**0**	105	10	115
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**921**				**140**	**1095**	**105**	**1200**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : 2 PM - 4 PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	370	0	0	370	**0**	370	35	405
EB THRU	5	0	0	5	**0**	5	5	10
EB RIGHT	50	0	0	50	**0**	50	5	55
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	160	8	24	185	**0**	185	15	200
NB RIGHT	15	1	2	15	**0**	15	5	20
SB LEFT	280	14	42	320	**165**	485	45	530
SB THRU	160	8	24	185	**0**	185	15	200
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1040**				**165**	**1295**	**125**	**1420**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	370	0	0	370	**140**	510	45	555
EB THRU	5	0	0	5	**0**	5	5	10
EB RIGHT	50	0	0	50	**0**	50	5	55
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	160	8	24	185	**0**	185	15	200
NB RIGHT	15	1	2	15	**0**	15	5	20
SB LEFT	280	14	42	320	**0**	320	30	350
SB THRU	160	8	24	185	**0**	185	15	200
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1040**				**140**	**1270**	**120**	**1390**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	7 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1B, 1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	594	0	0	595	**0**	595	55	650
EB THRU	2	0	0	5	**0**	5	5	10
EB RIGHT	105	0	0	105	**0**	105	10	115
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	194	0	0	195	**0**	195	20	215
NB RIGHT	16	0	0	15	**0**	15	5	20
SB LEFT	414	0	0	415	**165**	580	50	630
SB THRU	165	0	0	165	**0**	165	15	180
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1490**				**165**	**1660**	**160**	**1820**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	8 OF 8

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : WINDSOR AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 7
ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	594	0	0	595	**140**	735	65	800
EB THRU	2	0	0	5	**0**	5	5	10
EB RIGHT	105	0	0	105	**0**	105	10	115
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WINDSOR AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	194	0	0	195	**0**	195	20	215
NB RIGHT	16	0	0	15	**0**	15	5	20
SB LEFT	414	0	0	415	**0**	415	35	450
SB THRU	165	0	0	165	**0**	165	15	180
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1490**				**140**	**1635**	**155**	**1790**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 07:45AM

Windsor Ave (WB)
NORTH LEG

TOTAL: 606

TT = 5

$TT\% = \frac{5}{606} = 0.82\% \approx 1\%$

	Rt	Thru	Lt	
		~~191~~ 190	415	Total
		57	124	1st
		42	101	2nd
		42	95	3rd
		50	95	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	550	137	158	122	133
Thru	5	0	0	0	0
Rt	~~104~~ 105	31	21	29	23

WEST LEG TOTAL: 654

EB 210 Fwy

TT = 0

$TT\% = \frac{0}{654} = 0\% \approx 1\%$

	Lt	Thru	Rt
1st		28	2
2nd		39	8
3rd		32	9
4th		30	3
Total		~~129~~ 130	22 20

SOUTH LEG
Windsor Ave (EB)

TOTAL: 151

TT = 0

$TT\% = \frac{0}{151} = 0\% \approx 1\%$

PEAK HOUR FACTORS

NORTH LEG = 0.84
SOUTH LEG = 0.80
EAST LEG =
WEST LEG = 0.91

ALL LEGS = 0.93

HOUR TOTAL: 1,411

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt	
		137	463	Total
		19	83	1st
		27	123	2nd
		34	133	3rd
		57	124	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
292	21	41	93	137	Lt
0	0	0	0	0	Thru
73	8	13	21	31	Rt

	Lt	Thru	Rt
1st		25	2
2nd		23	4
3rd		38	9
4th		28	2
Total		114	17

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt	
		174	371	Total
		42	101	1st
		42	95	2nd
		50	95	3rd
		40	80	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
540	158	122	133	127	Lt
1	0	0	0	1	Thru
103	21	29	23	30	Rt

	Lt	Thru	Rt
1st		39	8
2nd		32	9
3rd		30	3
4th		44	3
Total		145	23

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR PASADENA
EAST-WEST STREET : I-210 EB RAMPS 06-01-11
BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
0	19	82	0	0	0	0	0	0	0	0	1	102
0	26	122	0	0	0	0	0	1	0	1	0	150
0	34	133	0	0	0	0	0	0	0	0	0	167
0	54	124	0	1	0	0	2	0	0	0	0	181
0	41	100	0	0	1	0	1	0	0	0	0	143
0	42	95	0	0	0	0	0	0	0	0	0	137
0	50	94	0	0	0	0	0	0	0	0	1	145
0	40	80	0	0 2	0	0	0 3	0	0	0 0	0	120
						TT= 2+3+0=5						
0	306	830	0	1	1	0	3	1	0	1	2	1145
						EB SOUTH LEG						
2	25	0	0	0	0	0	0	0	0	0	0	27
4	23	0	0	0	0	0	0	0	0	0	0	27
9	38	0	0	0	0	0	0	0	0	0	0	47
2	28	0	0	0	0	0	0	0	0	0	0	30
8	39	0	0	0	0	0	0	0	0	0	0	47
9	32	0	0	0	0	0	0	0	0	0	0	41
3	30	0	0	0	0	0	0	0	0	0	0	33
3	44	0	0	0 0	0	0	0 0	0	0	0 0	0	47
						TT= 0+0+0=0						
40	259	0	0	0	0	0	0	0	0	0	0	299
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SB WEST LEG						
8	0	21	0	0	0	0	0	0	0	0	0	29
13	0	41	0	0	0	0	0	0	0	0	0	54
21	0	93	0	0	0	0	0	0	0	0	0	114
31	0	137	0	0	0	0	0	0	0	0	0	168
21	0	158	0	0	0	0	0	0	0	0	0	179
29	0	122	0	0	0	0	0	0	0	0	0	151
23	0	133	0	0	0	0	0	0	0	0	0	156
30	1	127	0	0 0	0	0	0 0	0	0	0 0	0	158
						TT= 0+0+0=0						
176	1	832	0	0	0	0	0	0	0	0	0	1009

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 12:15PM

Windsor Ave (WB)
NORTH LEG

TOTAL: 393

TT = 6

TT% = 6/393 = 1.53% ≈ 2%

	Rt	Thru	Lt	
		100	293 295	Total
		30	66	1st
		28	71	2nd
		21	82	3rd
		21	74	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th	
	319 320	74	89	78	78	Lt
	5 2	0	1	0	1	Thru
	55 53	12	13	11	17	Rt

WEST LEG TOTAL: 374
EB 210 Fwy

TT = 0

TT% = 0/374 = 0% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.95
SOUTH LEG = 0.84
EAST LEG =
WEST LEG = 0.91

ALL LEGS = 0.97

TT = 2

TT% = 2/162 = 1.23% ≈ 1%

	Lt	Thru	Rt
1st		42	6
2nd		31	6
3rd		35	1
4th		38	3
Total		146 145	16 15

TOTAL: 162

SOUTH LEG
Windsor Ave (EB)

HOUR TOTAL: 929

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt	
		81	297	Total
		21	74	1st
		23	82	2nd
		17	64	3rd
		20	77	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
312	78	73	89	72	Lt
1	1	0	0	0	Thru
52	17	14	11	10	Rt

	Lt	Thru	Rt
1st		38	3
2nd		24	4
3rd		28	3
4th		27	3
Total		117	13

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt	
		100	267	Total
		21	48	1st
		30	66	2nd
		28	71	3rd
		21	82	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
327	86	74	89	78	Lt
2	1	0	1	0	Thru
48	12	12	13	11	Rt

	Lt	Thru	Rt
1st		19	3
2nd		42	6
3rd		31	6
4th		35	1
Total		127	16

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR PASADENA

EAST-WEST STREET : I-210 EB RAMPS 06-01-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
0	20	48	0	1	0	0	0	0	0	0	0	69
0	30	64	0	0	1	0	0	1	0	0	0	96
0	28	71	0	0	0	0	0	0	0	0	0	99
0	19	82	0	2	0	0	0	0	0	0	0	103
0	20	73	0	1	1	0	0	0	0	0	0	95
0	23	80	0	0	5 1	0	0	1 1	0	0	0 0	105
0	17	62	0	0	2	0	0	0	0	0	0	81
0	20	75	0	0	1	0	0	0	0	0	1	97
						TT= 5+1+0 = 6						
0	177	555	0	4	6	0	0	2	0	0	1	745
						EB SOUTH LEG						
3	19	0	0	0	0	0	0	0	0	0	0	22
6	42	0	0	0	0	0	0	0	0	0	0	48
5	31	0	1	0	0	0	0	0	0	0	0	37
1	34	0	0	1	0	0	0	0	0	0	0	36
3	38	0	0	0	0	0	0	0	0	0	0	41
4	24	0	0	0 2	0	0	0 0	0	0	0 0	0	28
3	27	0	0	1	0	0	0	0	0	0	0	31
3	27	0	0	0	0	0	0	0	0	0	0	30
						TT= 2+0+0 = 2						
28	242	0	1	2	0	0	0	0	0	0	0	273
						SB EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
12	1	86	0	0	0	0	0	0	0	0	0	99
12	0	74	0	0	0	0	0	0	0	0	0	86
13	1	89	0	0	0	0	0	0	0	0	0	103
11	0	78	0	0	0	0	0	0	0	0	0	89
17	1	78	0	0	0	0	0	0	0	0	0	96
14	0	73	0	0	0	0	0	0	0	0	0	87
11	0	89	0	0	0	0	0	0	0	0	0	100
10	0	72	0	0	0	0	0	0	0	0	0	82
						TT= 0+0+0 = 0						
100	3	639	0	0	0	0	0	0	0	0	0	742

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR/ ARROYO
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA CANADA

DATE: 04-10-12

PEAK HOUR: 03:00PM

NORTH LEG (SB)

TOTAL: 443

	Rt	Thru	Lt
Total		162	281
1st		37	77
2nd		42	63
3rd		44	71
4th		39	70

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	369	100	80	96	93
Thru					
Rt	50	8	11	16	15

WEST LEG TOTAL: 419
(EB)

PEAK HOUR FACTORS

NORTH LEG = 0.96
SOUTH LEG = 0.94
EAST LEG =
WEST LEG = 0.94

ALL LEGS = 0.95

	Lt	Thru	Rt
1st		36	6
2nd		44	3
3rd		41	5
4th		40	1
Total		161	15

TOTAL: 176

SOUTH LEG (NB)

HOUR TOTAL: 1,038

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR/ ARROYO

EAST-WEST STREET: I-210 EB RAMPS

TIME: 02:00PM-03:00PM DATE: 04-10-12

NORTH LEG

	Rt	Thru	Lt
Total		91	382
1st		23	96
2nd		18	92
3rd		27	93
4th		23	101

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	320	61	80	111	68
Thru					
Rt	41	9	14	10	8

	Lt	Thru	Rt
1st		36	2
2nd		27	5
3rd		22	3
4th		28	3
Total		113	13

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR/ ARROYO

EAST-WEST STREET: I-210 EB RAMPS

TIME: 03:00PM-04:00PM DATE: 04-10-12

NORTH LEG

	Rt	Thru	Lt	
		162	281	Total
		37	77	1st
		42	63	2nd
		44	71	3rd
		39	70	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
369	100	80	96	93	Lt
					Thru
50	8	11	16	15	Rt

	Lt	Thru	Rt
1st		36	6
2nd		44	3
3rd		41	5
4th		40	1
Total		161	15

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WINDSOR
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: PASADENA

DATE: 06-01-11

PEAK HOUR: 05:00PM

Windsor Ave (WB)
NORTH LEG

TOTAL: 579

TT = 0
TT% = 0/579 = 0% ≈ 1%

	Rt	Thru	Lt	
		165	414 415	Total
		42	106	1st
		28	90	2nd
		40	109	3rd
		55	109	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th	
	594 595	161	136	154	143	Lt
	5 2	0	0	0	2	Thru
	105	17	30	28	30	Rt

WEST LEG TOTAL: 701
EB 210 Fwy

TT = 2
TT% = 2/701 = 0.28% ≈ 1%

	Lt	Thru	Rt
1st		55	1
2nd		33	6
3rd		39	4
4th		67	5
Total		194 195	16 15

SOUTH LEG
Windsor Ave (EB)

TOTAL: 210

TT = 0
TT% = 0/210 = 0% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.73
EAST LEG =
WEST LEG = 0.96

ALL LEGS = 0.91

HOUR TOTAL: 1,490

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt	
		158	332	Total
		38	85	1st
		41	67	2nd
		33	83	3rd
		46	97	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
453	105	98	119	131	Lt
6	0	5	0	1	Thru
74	22	18	14	20	Rt

	Lt	Thru	Rt
1st		37	2
2nd		30	4
3rd		41	1
4th		48	7
Total		156	14

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WINDSOR

EAST-WEST STREET: I-210 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt	
		165	414	Total
		42	106	1st
		28	90	2nd
		40	109	3rd
		55	109	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
594	161	136	154	143	Lt
2	0	0	0	2	Thru
105	17	30	28	30	Rt

	Lt	Thru	Rt
1st		55	1
2nd		33	6
3rd		39	4
4th		67	5
Total		194	16

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WINDSOR
EAST-WEST STREET : I-210 EB RAMPS
BEGINNING TIME : 04:00PM

PASADENA
06-01-11

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						WB NORTH LEG						
0	38	85	0	0	0	0	0	0	0	0	0	123
0	41	67	0	0	0	0	0	0	0	0	0	108
0	33	82	0	0	1	0	0	0	0	0	0	116
0	46	97	0	0	0	0	0	0	0	0	0	143
0	42	106	0	0	0	0	0	0	0	0	0	148
0	28	90	0	0	0	0	0	0	0	0	0	118
0	40	109	0	0	0	0	0	0	0	0	0	149
0	55	109	0	0	0	0	0	0	0	0	0	164
						TT=0+0+0=0						
0	323	745	0	0	1	0	0	0	0	0	0	1069
						EB SOUTH LEG						
2	37	0	0	0	0	0	0	0	0	0	0	39
4	30	0	0	0	0	0	0	0	0	0	0	34
1	41	0	0	0	0	0	0	0	0	0	0	42
7	48	0	0	0	0	0	0	0	0	0	0	55
1	55	0	0	0	0	0	0	0	0	0	0	56
6	33	0	0	0	0	0	0	0	0	0	0	39
4	39	0	0	0	0	0	0	0	0	0	0	43
5	67	0	0	0	0	0	0	0	0	0	0	72
						TT=0+0+0=0						
30	350	0	0	0	0	0	0	0	0	0	0	380
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SB WEST LEG						
22	0	105	0	0	0	0	0	0	0	0	0	127
18	4	97	0	1	1	0	0	0	0	0	0	121
14	0	119	0	0	0	0	0	0	0	0	0	133
20	1	130	0	0	1	0	0	0	0	0	0	152
17	0	161	0	0	2 0	0	0	0 0	0	0	0 0	178
30	0	136	0	0	0	0	0	0	0	0	0	166
28	0	154	0	0	0	0	0	0	0	0	0	182
30	2	143	0	0	0	0	0	0	0	0	0	175
						TT=2+0+0=2						
179	71	045	0	1	2	0	0	0	0	0	0	1234

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	5	105	0	0	0	0	130	20	415	190	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.98		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1662						3536		3335	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1662						3536		3335	1810	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	591	5	113	0	0	0	0	140	22	446	204	0
RTOR Reduction (vph)	0	32	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	361	316	0	0	0	0	0	147	0	446	204	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	14.6	14.6						17.3		9.8	31.1	
Effective Green, g (s)	14.6	14.6						17.3		9.8	31.1	
Actuated g/C Ratio	0.27	0.27						0.32		0.18	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	466	452						1139		609	1048	
v/s Ratio Prot								0.04		c0.13	c0.11	
v/s Ratio Perm	c0.21	0.19										
v/c Ratio	0.77	0.70						0.13		0.73	0.19	
Uniform Delay, d1	18.0	17.6						12.9		20.7	5.4	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	7.9	4.7						0.2		4.5	0.4	
Delay (s)	25.9	22.3						13.1		25.2	5.8	
Level of Service	C	C						B		C	A	
Approach Delay (s)		24.1			0.0			13.1			19.1	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	320	5	55	0	0	0	0	145	15	295	100	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1669						3391		3335	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1669						3391		3335	1810	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	330	5	57	0	0	0	0	149	15	304	103	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	198	161	0	0	0	0	0	154	0	304	103	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	10.7	10.7						16.1		6.0	26.1	
Effective Green, g (s)	10.7	10.7						16.1		6.0	26.1	
Actuated g/C Ratio	0.24	0.24						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	410	399						1219		447	1054	
v/s Ratio Prot								c0.05		c0.09	0.06	
v/s Ratio Perm	c0.12	0.10										
v/c Ratio	0.48	0.40						0.13		0.68	0.10	
Uniform Delay, d1	14.7	14.4						9.6		18.5	4.1	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.2		4.2	0.2	
Delay (s)	15.6	15.0						9.8		22.7	4.3	
Level of Service	B	B						A		C	A	
Approach Delay (s)		15.3			0.0			9.8			18.1	
Approach LOS		B			A			A			B	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	33.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	5	50	0	0	0	0	160	15	280	160	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1678						3393		3335	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1678						3393		3335	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	389	5	53	0	0	0	0	168	16	295	168	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	226	196	0	0	0	0	0	174	0	295	168	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	11.2	11.2						16.1		6.0	26.1	
Effective Green, g (s)	11.2	11.2						16.1		6.0	26.1	
Actuated g/C Ratio	0.25	0.25						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	424	415						1206		442	1043	
v/s Ratio Prot								0.05		c0.09	c0.09	
v/s Ratio Perm	c0.13	0.12										
v/c Ratio	0.53	0.47						0.14		0.67	0.16	
Uniform Delay, d1	14.8	14.5						9.9		18.7	4.5	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.9						0.3		3.8	0.3	
Delay (s)	16.1	15.4						10.2		22.5	4.8	
Level of Service	B	B						B		C	A	
Approach Delay (s)		15.7			0.0			10.2			16.1	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	14.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	45.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	595	5	105	0	0	0	0	195	15	415	165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1666						3572		3502	1900	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1666						3572		3502	1900	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	654	5	115	0	0	0	0	214	16	456	181	0
RTOR Reduction (vph)	0	27	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	392	355	0	0	0	0	0	221	0	456	181	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	17.3	17.3						17.5		10.6	32.1	
Effective Green, g (s)	17.3	17.3						17.5		10.6	32.1	
Actuated g/C Ratio	0.30	0.30						0.30		0.18	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	517	502						1089		647	1063	
v/s Ratio Prot								c0.06		c0.13	0.10	
v/s Ratio Perm	c0.23	0.21										
v/c Ratio	0.76	0.71						0.20		0.70	0.17	
Uniform Delay, d1	18.2	17.8						14.8		21.9	6.2	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	6.3	4.5						0.4		3.5	0.3	
Delay (s)	24.5	22.3						15.2		25.4	6.5	
Level of Service	C	C						B		C	A	
Approach Delay (s)		23.4			0.0			15.2			20.1	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/13/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	550	5	105	0	0	0	0	130	20	470	190	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.98		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1662						3536		3045	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1662						3536		3045	1810	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	591	5	113	0	0	0	0	140	22	505	204	0
RTOR Reduction (vph)	0	32	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	361	316	0	0	0	0	0	147	0	505	204	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	15%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	14.6	14.6						17.1		10.0	31.1	
Effective Green, g (s)	14.6	14.6						17.1		10.0	31.1	
Actuated g/C Ratio	0.27	0.27						0.32		0.19	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	466	452						1126		567	1048	
v/s Ratio Prot								0.04		c0.17	c0.11	
v/s Ratio Perm	c0.21	0.19										
v/c Ratio	0.77	0.70						0.13		0.89	0.19	
Uniform Delay, d1	18.0	17.6						13.0		21.3	5.4	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	7.9	4.7						0.2		16.1	0.4	
Delay (s)	25.9	22.3						13.3		37.4	5.8	
Level of Service	C	C						B		D	A	
Approach Delay (s)		24.1			0.0			13.3			28.3	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	24.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	53.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	320	5	55	0	0	0	0	145	15	350	100	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1669						3391		2943	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1669						3391		2943	1810	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	330	5	57	0	0	0	0	149	15	361	103	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	198	161	0	0	0	0	0	154	0	361	103	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	19%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	10.7	10.7						16.1		6.0	26.1	
Effective Green, g (s)	10.7	10.7						16.1		6.0	26.1	
Actuated g/C Ratio	0.24	0.24						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	410	399						1219		394	1054	
v/s Ratio Prot								c0.05		c0.12	0.06	
v/s Ratio Perm	c0.12	0.10										
v/c Ratio	0.48	0.40						0.13		0.92	0.10	
Uniform Delay, d1	14.7	14.4						9.6		19.2	4.1	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.2		25.5	0.2	
Delay (s)	15.6	15.0						9.8		44.7	4.3	
Level of Service	B	B						A		D	A	
Approach Delay (s)		15.3			0.0			9.8			35.7	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	370	5	50	0	0	0	0	160	15	335	160	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1678						3393		2943	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1678						3393		2943	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	389	5	53	0	0	0	0	168	16	353	168	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	226	196	0	0	0	0	0	174	0	353	168	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	19%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	11.2	11.2						16.1		6.0	26.1	
Effective Green, g (s)	11.2	11.2						16.1		6.0	26.1	
Actuated g/C Ratio	0.25	0.25						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	424	415						1206		390	1043	
v/s Ratio Prot								0.05		c0.12	c0.09	
v/s Ratio Perm	c0.13	0.12										
v/c Ratio	0.53	0.47						0.14		0.91	0.16	
Uniform Delay, d1	14.8	14.5						9.9		19.4	4.5	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.3	0.9						0.3		23.8	0.3	
Delay (s)	16.1	15.4						10.2		43.1	4.8	
Level of Service	B	B						B		D	A	
Approach Delay (s)		15.7			0.0			10.2			30.8	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	45.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	595	5	105	0	0	0	0	195	15	470	165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1666						3572		3155	1900	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1666						3572		3155	1900	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	654	5	115	0	0	0	0	214	16	516	181	0
RTOR Reduction (vph)	0	27	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	392	355	0	0	0	0	0	221	0	516	181	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	17.3	17.3						17.1		11.0	32.1	
Effective Green, g (s)	17.3	17.3						17.1		11.0	32.1	
Actuated g/C Ratio	0.30	0.30						0.30		0.19	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	517	502						1064		605	1063	
v/s Ratio Prot								c0.06		c0.16	0.10	
v/s Ratio Perm	c0.23	0.21										
v/c Ratio	0.76	0.71						0.21		0.85	0.17	
Uniform Delay, d1	18.2	17.8						15.1		22.4	6.2	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	6.3	4.5						0.4		11.2	0.3	
Delay (s)	24.5	22.3						15.5		33.6	6.5	
Level of Service	C	C						B		C	A	
Approach Delay (s)		23.4			0.0			15.5			26.6	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	320	5	55	0	0	0	0	145	15	350	100	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1669						3391		2943	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1669						3391		2943	1810	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	330	5	57	0	0	0	0	149	15	361	103	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	198	161	0	0	0	0	0	154	0	361	103	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	19%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	10.7	10.7						16.1		6.0	26.1	
Effective Green, g (s)	10.7	10.7						16.1		6.0	26.1	
Actuated g/C Ratio	0.24	0.24						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	410	399						1219		394	1054	
v/s Ratio Prot								c0.05		c0.12	0.06	
v/s Ratio Perm	c0.12	0.10										
v/c Ratio	0.48	0.40						0.13		0.92	0.10	
Uniform Delay, d1	14.7	14.4						9.6		19.2	4.1	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.2		25.5	0.2	
Delay (s)	15.6	15.0						9.8		44.7	4.3	
Level of Service	B	B						A		D	A	
Approach Delay (s)		15.3			0.0			9.8			35.7	
Approach LOS		B			A			A			D	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	44.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	5	60	0	0	0	0	160	15	380	110	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1669						3395		2943	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1669						3395		2943	1810	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	361	5	62	0	0	0	0	165	15	392	113	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	217	178	0	0	0	0	0	170	0	392	113	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	19%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	11.0	11.0						16.1		6.0	26.1	
Effective Green, g (s)	11.0	11.0						16.1		6.0	26.1	
Actuated g/C Ratio	0.24	0.24						0.36		0.13	0.58	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	418	407						1212		392	1047	
v/s Ratio Prot								c0.05		c0.13	0.06	
v/s Ratio Perm	c0.13	0.11										
v/c Ratio	0.52	0.44						0.14		1.00	0.11	
Uniform Delay, d1	14.8	14.4						9.8		19.6	4.3	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.8						0.2		45.5	0.2	
Delay (s)	15.9	15.2						10.1		65.0	4.5	
Level of Service	B	B						B		E	A	
Approach Delay (s)		15.5			0.0			10.1			51.5	
Approach LOS		B			A			B			D	

Intersection Summary			
HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	45.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	405	5	55	0	0	0	0	175	15	365	175	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1678						3397		2943	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1678						3397		2943	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	426	5	58	0	0	0	0	184	16	384	184	0
RTOR Reduction (vph)	0	25	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	247	217	0	0	0	0	0	190	0	384	184	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	5%	5%	19%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	11.8	11.8						16.1		6.0	26.1	
Effective Green, g (s)	11.8	11.8						16.1		6.0	26.1	
Actuated g/C Ratio	0.26	0.26						0.35		0.13	0.57	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	441	431						1192		385	1029	
v/s Ratio Prot								0.06		c0.13	c0.10	
v/s Ratio Perm	c0.14	0.13										
v/c Ratio	0.56	0.50						0.16		1.00	0.18	
Uniform Delay, d1	14.8	14.6						10.2		19.9	4.8	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.9						0.3		44.9	0.4	
Delay (s)	16.4	15.5						10.5		64.8	5.1	
Level of Service	B	B						B		E	A	
Approach Delay (s)		16.0			0.0			10.5			45.5	
Approach LOS		B			A			B			D	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	45.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	650	5	115	0	0	0	0	215	15	510	180	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1715	1666						3576		3155	1900	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1715	1666						3576		3155	1900	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	714	5	126	0	0	0	0	236	16	560	198	0
RTOR Reduction (vph)	0	27	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	428	390	0	0	0	0	0	244	0	560	198	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	11%	0%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	18.1	18.1						17.1		11.0	32.1	
Effective Green, g (s)	18.1	18.1						17.1		11.0	32.1	
Actuated g/C Ratio	0.31	0.31						0.29		0.19	0.55	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	533	518						1051		596	1048	
v/s Ratio Prot								c0.07		c0.18	0.10	
v/s Ratio Perm	c0.25	0.23										
v/c Ratio	0.80	0.75						0.23		0.94	0.19	
Uniform Delay, d1	18.4	18.0						15.6		23.3	6.5	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	8.5	6.1						0.5		22.7	0.4	
Delay (s)	27.0	24.2						16.1		46.0	6.9	
Level of Service	C	C						B		D	A	
Approach Delay (s)		25.6			0.0			16.1			35.8	
Approach LOS		C			A			B			D	

Intersection Summary			
HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	605	5	105	0	0	0	0	130	20	415	190	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.98		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1588	1580						3536		3335	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1588	1580						3536		3335	1810	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	651	5	113	0	0	0	0	140	22	446	204	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	391	350	0	0	0	0	0	147	0	446	204	0
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	15.4	15.4						17.2		9.8	31.0	
Effective Green, g (s)	15.4	15.4						17.2		9.8	31.0	
Actuated g/C Ratio	0.28	0.28						0.32		0.18	0.57	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	450	447						1118		601	1031	
v/s Ratio Prot								0.04		c0.13	c0.11	
v/s Ratio Perm	c0.25	0.22										
v/c Ratio	0.87	0.78						0.13		0.74	0.20	
Uniform Delay, d1	18.5	18.0						13.3		21.1	5.7	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	16.1	8.7						0.2		4.9	0.4	
Delay (s)	34.7	26.7						13.5		26.0	6.1	
Level of Service	C	C						B		C	A	
Approach Delay (s)		30.7			0.0			13.5			19.8	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	5	55	0	0	0	0	145	15	295	100	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1504	1522						3391		3335	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1504	1522						3391		3335	1810	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	387	5	57	0	0	0	0	149	15	304	103	0
RTOR Reduction (vph)	0	27	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	228	194	0	0	0	0	0	154	0	304	103	0
Heavy Vehicles (%)	14%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	11.9	11.9						16.1		6.0	26.1	
Effective Green, g (s)	11.9	11.9						16.1		6.0	26.1	
Actuated g/C Ratio	0.26	0.26						0.35		0.13	0.57	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	389	394						1187		435	1027	
v/s Ratio Prot								c0.05		c0.09	0.06	
v/s Ratio Perm	c0.15	0.13										
v/c Ratio	0.59	0.49						0.13		0.70	0.10	
Uniform Delay, d1	14.9	14.5						10.2		19.1	4.6	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.3	1.0						0.2		4.9	0.2	
Delay (s)	17.2	15.4						10.4		24.0	4.8	
Level of Service	B	B						B		C	A	
Approach Delay (s)		16.3			0.0			10.4			19.1	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	46.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	425	5	50	0	0	0	0	160	15	280	160	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.97						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1531	1541						3393		3335	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1531	1541						3393		3335	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	447	5	53	0	0	0	0	168	16	295	168	0
RTOR Reduction (vph)	0	20	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	255	230	0	0	0	0	0	174	0	295	168	0
Heavy Vehicles (%)	12%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	12.5	12.5						16.1		6.0	26.1	
Effective Green, g (s)	12.5	12.5						16.1		6.0	26.1	
Actuated g/C Ratio	0.27	0.27						0.35		0.13	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	411	413						1172		429	1014	
v/s Ratio Prot								0.05		c0.09	c0.09	
v/s Ratio Perm	c0.17	0.15										
v/c Ratio	0.62	0.56						0.15		0.69	0.17	
Uniform Delay, d1	15.0	14.7						10.5		19.4	5.0	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.9	1.6						0.3		4.5	0.4	
Delay (s)	17.9	16.3						10.8		23.9	5.3	
Level of Service	B	B						B		C	A	
Approach Delay (s)		17.1			0.0			10.8			17.2	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	46.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	650	5	105	0	0	0	0	195	15	415	165	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1588	1581						3572		3502	1900	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1588	1581						3572		3502	1900	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	714	5	115	0	0	0	0	214	16	456	181	0
RTOR Reduction (vph)	0	24	0	0	0	0	0	9	0	0	0	0
Lane Group Flow (vph)	421	389	0	0	0	0	0	221	0	456	181	0
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	18.5	18.5						17.5		10.6	32.1	
Effective Green, g (s)	18.5	18.5						17.5		10.6	32.1	
Actuated g/C Ratio	0.32	0.32						0.30		0.18	0.55	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	501	499						1067		633	1041	
v/s Ratio Prot								c0.06		c0.13	0.10	
v/s Ratio Perm	c0.27	0.25										
v/c Ratio	0.84	0.78						0.21		0.72	0.17	
Uniform Delay, d1	18.7	18.2						15.4		22.6	6.6	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	12.0	7.6						0.4		4.0	0.4	
Delay (s)	30.7	25.8						15.8		26.6	7.0	
Level of Service	C	C						B		C	A	
Approach Delay (s)		28.3			0.0			15.8			21.1	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	23.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	660	5	115	0	0	0	0	140	20	450	205	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.95						0.98		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1588	1580						3541		3335	1810	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1588	1580						3541		3335	1810	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	710	5	124	0	0	0	0	151	22	484	220	0
RTOR Reduction (vph)	0	28	0	0	0	0	0	15	0	0	0	0
Lane Group Flow (vph)	426	385	0	0	0	0	0	158	0	484	220	0
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	0%	0%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	15.9	15.9						17.0		10.0	31.0	
Effective Green, g (s)	15.9	15.9						17.0		10.0	31.0	
Actuated g/C Ratio	0.29	0.29						0.31		0.18	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	460	458						1096		607	1022	
v/s Ratio Prot								0.04		c0.15	c0.12	
v/s Ratio Perm	c0.27	0.24										
v/c Ratio	0.93	0.84						0.14		0.80	0.22	
Uniform Delay, d1	18.9	18.3						13.7		21.5	5.9	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	24.6	12.7						0.3		7.2	0.5	
Delay (s)	43.5	31.0						14.0		28.7	6.4	
Level of Service	D	C						B		C	A	
Approach Delay (s)		37.4			0.0			14.0			21.7	
Approach LOS		D			A			B			C	

Intersection Summary			
HCM Average Control Delay	28.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	54.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	425	5	50	0	0	0	0	160	15	280	160	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.97						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1531	1541						3393		3335	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1531	1541						3393		3335	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	447	5	53	0	0	0	0	168	16	295	168	0
RTOR Reduction (vph)	0	20	0	0	0	0	0	10	0	0	0	0
Lane Group Flow (vph)	255	230	0	0	0	0	0	174	0	295	168	0
Heavy Vehicles (%)	12%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	12.5	12.5						16.1		6.0	26.1	
Effective Green, g (s)	12.5	12.5						16.1		6.0	26.1	
Actuated g/C Ratio	0.27	0.27						0.35		0.13	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	411	413						1172		429	1014	
v/s Ratio Prot								0.05		c0.09	c0.09	
v/s Ratio Perm	c0.17	0.15										
v/c Ratio	0.62	0.56						0.15		0.69	0.17	
Uniform Delay, d1	15.0	14.7						10.5		19.4	5.0	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.9	1.6						0.3		4.5	0.4	
Delay (s)	17.9	16.3						10.8		23.9	5.3	
Level of Service	B	B						B		C	A	
Approach Delay (s)		17.1			0.0			10.8			17.2	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	16.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	46.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	465	5	55	0	0	0	0	175	15	305	175	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.97						0.99		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1531	1541						3397		3335	1810	
Flt Permitted	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (perm)	1531	1541						3397		3335	1810	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	489	5	58	0	0	0	0	184	16	321	184	0
RTOR Reduction (vph)	0	21	0	0	0	0	0	11	0	0	0	0
Lane Group Flow (vph)	279	252	0	0	0	0	0	189	0	321	184	0
Heavy Vehicles (%)	12%	0%	0%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	13.0	13.0						16.1		6.0	26.1	
Effective Green, g (s)	13.0	13.0						16.1		6.0	26.1	
Actuated g/C Ratio	0.28	0.28						0.34		0.13	0.55	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	423	425						1161		425	1003	
v/s Ratio Prot								0.06		c0.10	c0.10	
v/s Ratio Perm	c0.18	0.16										
v/c Ratio	0.66	0.59						0.16		0.76	0.18	
Uniform Delay, d1	15.1	14.8						10.8		19.8	5.2	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	3.7	2.2						0.3		7.5	0.4	
Delay (s)	18.8	17.0						11.1		27.3	5.6	
Level of Service	B	B						B		C	A	
Approach Delay (s)		17.9			0.0			11.1			19.4	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
7: Windsor Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	710	5	115	0	0	0	0	215	15	450	180	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		0.97	1.00	
Frt	1.00	0.96						0.99		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1588	1580						3576		3502	1900	
Flt Permitted	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (perm)	1588	1580						3576		3502	1900	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	780	5	126	0	0	0	0	236	16	495	198	0
RTOR Reduction (vph)	0	24	0	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	460	427	0	0	0	0	0	244	0	495	198	0
Heavy Vehicles (%)	8%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA						NA		Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4											
Actuated Green, G (s)	19.3	19.3						17.2		10.8	32.0	
Effective Green, g (s)	19.3	19.3						17.2		10.8	32.0	
Actuated g/C Ratio	0.33	0.33						0.29		0.18	0.54	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	517	514						1037		638	1025	
v/s Ratio Prot								c0.07		c0.14	0.10	
v/s Ratio Perm	c0.29	0.27										
v/c Ratio	0.89	0.83						0.24		0.78	0.19	
Uniform Delay, d1	19.0	18.5						16.0		23.1	7.0	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	16.9	11.0						0.5		5.9	0.4	
Delay (s)	35.9	29.5						16.6		29.0	7.4	
Level of Service	D	C						B		C	A	
Approach Delay (s)		32.7			0.0			16.6			22.8	
Approach LOS		C			A			B			C	

Intersection Summary			
HCM Average Control Delay	26.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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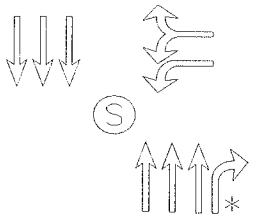
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
8
ROUTE
2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	175	5%		175	15	190
WB THRU	0	0%		0	0	0
WB RIGHT	100	10%		100	10	110
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	845	10%		845	75	920
NB RIGHT	585	10%	**50**	635	55	690
SB LEFT	0	0%		0	0	0
SB THRU	470	10%		470	40	510
SB RIGHT	610	10%		610	55	665
TOTALS	**2785**		**50**	**2835**	**250**	**3085**

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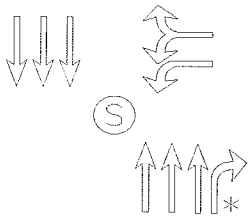
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	175	5%		175	15	190
WB THRU	0	0%		0	0	0
WB RIGHT	100	10%		100	10	110
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	845	10%	**50**	895	80	975
NB RIGHT	585	10%		585	55	640
SB LEFT	0	0%		0	0	0
SB THRU	470	10%		470	40	510
SB RIGHT	610	10%	**50**	660	60	720
TOTALS	**2785**		**100**	**2885**	**260**	**3145**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	255	10%		255	25	280
WB THRU	0	0%		0	0	0
WB RIGHT	110	5%		110	10	120
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	865	5%		865	80	945
NB RIGHT	420	10%	**50**	470	40	510
SB LEFT	0	0%		0	0	0
SB THRU	595	5%		595	55	650
SB RIGHT	545	5%		545	50	595
TOTALS	**2790**		**50**	**2840**	**260**	**3100**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	255	10%		255	25	280
WB THRU	0	0%		0	0	0
WB RIGHT	110	5%		110	10	120
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	865	5%	**50**	915	80	995
NB RIGHT	420	10%		420	40	460
SB LEFT	0	0%		0	0	0
SB THRU	595	5%		595	55	650
SB RIGHT	545	5%	**50**	595	55	650
TOTALS	**2790**		**100**	**2890**	**265**	**3155**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	145	5%		145	15	160
WB THRU	0	0%		0	0	0
WB RIGHT	145	5%		145	15	160
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	755	5%		755	70	825
NB RIGHT	475	5%	**50**	525	45	570
SB LEFT	0	0%		0	0	0
SB THRU	895	5%		895	80	975
SB RIGHT	475	5%		475	45	520
TOTALS	**2890**		**50**	**2940**	**270**	**3210**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY WB RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	145	5%		145	15	160
WB THRU	0	0%		0	0	0
WB RIGHT	145	5%		145	15	160
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	755	5%	**50**	805	70	875
NB RIGHT	475	5%		475	45	520
SB LEFT	0	0%		0	0	0
SB THRU	895	5%		895	80	975
SB RIGHT	475	5%	**50**	525	45	570
TOTALS	**2890**		**100**	**2990**	**270**	**3260**

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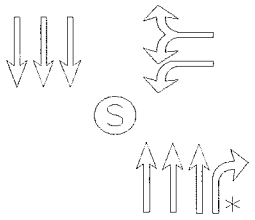
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	165	10	30	195	**0**	195	20	215
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	88	12	36	125	**0**	125	10	135
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	778	66	198	975	**0**	975	90	1065
NB RIGHT	538	48	144	680	**150**	830	75	905
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	432	39	117	550	**0**	550	50	600
SB RIGHT	550	58	174	725	**0**	725	65	790
TOTALS	**2551**				**150**	**3400**	**310**	**3710**

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Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	165	10	30	195	**0**	195	20	215
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	88	12	36	125	**0**	125	10	135
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	778	66	198	975	**150**	1125	100	1225
NB RIGHT	538	48	144	680	**0**	680	60	740
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	432	39	117	550	**0**	550	50	600
SB RIGHT	550	58	174	725	**150**	875	80	955
TOTALS	**2551**				**300**	**3550**	**320**	**3870**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	228	29	87	315	**0**	315	30	345
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	107	4	12	120	**0**	120	10	130
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	825	41	123	950	**0**	950	85	1035
NB RIGHT	370	50	150	520	**150**	670	60	730
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	572	24	72	645	**0**	645	60	705
SB RIGHT	504	39	117	620	**0**	620	55	675
TOTALS	**2606**				**150**	**3320**	**300**	**3620**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	228	29	87	315	**0**	315	30	345
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	107	4	12	120	**0**	120	10	130
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	825	41	123	950	**150**	1100	100	1200
NB RIGHT	370	50	150	520	**0**	520	45	565
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	572	24	72	645	**0**	645	60	705
SB RIGHT	504	39	117	620	**150**	770	70	840
TOTALS	**2606**				**300**	**3470**	**315**	**3785**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	137	10	30	165	**0**	165	15	180
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	141	5	15	155	**0**	155	15	170
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	740	14	42	780	**0**	780	70	850
NB RIGHT	461	16	48	510	**150**	660	60	720
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	884	9	27	910	**0**	910	80	990
SB RIGHT	463	10	30	495	**0**	495	45	540
TOTALS	**2826**				**150**	**3165**	**285**	**3450**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : I-210 FWY WB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 8
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY WB RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	137	10	30	165	**0**	165	15	180
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	141	5	15	155	**0**	155	15	170
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	740	14	42	780	**150**	930	85	1015
NB RIGHT	461	16	48	510	**0**	510	45	555
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	884	9	27	910	**0**	910	80	990
SB RIGHT	463	10	30	495	**150**	645	60	705
TOTALS	**2826**				**300**	**3315**	**300**	**3615**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 07:00AM

NORTH LEG SB

TOTAL: 1,079

TT= 97

TT% = 97/1079 = 8.99% ≈ 9%

	Rt	Thru	Lt
Total	608 (610)	471 (470)	
1st	181	105	
2nd	185	95	
3rd	144	132	
4th	98	139	

TT= 22

TT% = 22/275 = 8%

WB 210 Fwy

EAST LEG TOTAL: 275

	1st	2nd	3rd	4th	Total
Rt	30	17	36	17	100
Thru	0	0	0	0	
Lt	27	41	59	48	175

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.96
EAST LEG = 0.72
WEST LEG =

ALL LEGS = 0.94

	Lt	Thru	Rt
1st		172	149
2nd		200	167
3rd		229	141
4th		243	129
Total		844 (845)	586 (585)

TT= 114

TT% = 114/1430 = 7.97% ≈ 8%

TOTAL: 1,430

SOUTH LEG NB

HOUR TOTAL: 2,784

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 07:00AM-08:00AM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total	608	471	
1st	181	105	
2nd	185	95	
3rd	144	132	
4th	98	139	

	1st	2nd	3rd	4th	Total
Rt	30	17	36	17	100
Thru	0	0	0	0	0
Lt	27	41	59	48	175

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		172	149
2nd		200	167
3rd		229	141
4th		243	129
Total		844	586

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 08:00AM-09:00AM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total	401	388	
1st	105	105	
2nd	108	100	
3rd	91	91	
4th	97	92	

	1st	2nd	3rd	4th	Total
Rt	42	41	33	32	148
Thru	0	0	0	3	3
Lt	50	79	68	72	269

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		213	104
2nd		180	122
3rd		189	96
4th		178	116
Total		760	438

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 WB RAMPS — 06-02-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
169	98	0	0	0	0	0	2	0	12	5	0	286
167	86	0	0	1	0	7	6	0	11	2	0	280
128	120	0	0	1	0	4	3	0	12	8	0	276
86	128	0	0	1	0	2	5	0	10	5	0	237
91	105	0	0	0	0	10	0	0	4	0	0	210
96	91	0	0	1	0	6	4	0	6	4	0	208
82	84	0	0	0	0	3	2	0	6	5	0	182
87	83	0	0	1	0	2	4	0	8	4	0	189
						TT=3+29+65=97						
906	795	0	0	5	0	34	26	0	69	33	0	1868
						NB SOUTH LEG						
137	152	0	0	0	0	3	5	0	9	15	0	321
157	180	0	0	1	0	2	6	0	8	13	0	367
131	213	0	0	0	0	3	7	0	7	9	0	370
113	233	0	0	0	0	1	4	0	15	6	0	372
84	210	0	0	0	1	1	0	31	19	3	82	317
103	172	0	0	0	0	5	5	0	14	3	0	302
81	178	0	0	0	0	4	2	0	11	9	0	285
100	167	0	1	0	0	2	1	0	13	10	0	294
						TT=1+31+82=114						
906	1505	0	1	1	0	21	30	0	96	68	0	2628
						WB EAST LEG						
30	0	27	0	0	0	0	0	0	0	0	0	57
13	0	39	1	0	0	0	0	0	3	0	2	58
32	0	54	0	0	0	3	0	3	1	0	2	95
13	0	45	0	0	0	3	0	2	1	0	1	65
36	0	44	0	0	1	6	0	11	0	0	10	92
39	0	76	0	0	0	1	0	1	1	0	2	120
27	0	62	0	0	0	3	0	1	3	0	5	101
22	3	65	0	0	0	5	0	5	5	0	2	107
						TT=1+11+10=22						
212	3	412	1	0	0	21	0	16	14	0	16	695
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 12:45PM

NORTH LEG (SB)

TOTAL: 1,139

TT = 63

TT = 63/1139 = 5.53% ≈ 6%

	Rt	Thru	Lt
Total	543 (545)	596 (595)	
1st	136	144	
2nd	118	153	
3rd	153	133	
4th	136	166	

TT = 33

TT% = 33/368 = 8.97% ≈ 9%

WB 210 Fwy

EAST LEG TOTAL: 368

	1st	2nd	3rd	4th	Total
Rt	32	34	25	20	111 (110)
Thru	0	0	0	0	
Lt	66	57	56	78	257 (255)

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.97
EAST LEG = 0.94
WEST LEG =

ALL LEGS = 0.98

	Lt	Thru	Rt
1st		237	96
2nd		202	122
3rd		225	102
4th		202	100
Total		866 (865)	420

SOUTH LEG (NB)

TT = 91

TT% = 91/1286 = 7.08% ≈ 7%

TOTAL: 1,286

HOUR TOTAL: 2,793

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 12:00PM-01:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total	537	508	
1st	141	115	
2nd	134	103	
3rd	126	146	
4th	136	144	

	1st	2nd	3rd	4th	Total
Rt	36	39	17	32	124
Thru	0	0	0	0	0
Lt	47	56	66	66	235

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		242	134
2nd		235	115
3rd		199	99
4th		237	96
Total		913	444

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 01:00PM-02:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total	552	581	
1st	118	153	
2nd	153	133	
3rd	136	166	
4th	145	129	

	1st	2nd	3rd	4th	Total
Rt	34	25	20	31	110
Thru	0	0	0	0	0
Lt	57	56	78	53	244

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		202	122
2nd		225	102
3rd		202	100
4th		229	87
Total		858	411

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 WB RAMPS — 06-02-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
131	112	0	0	0	0	3	0	0	7	3	0	256
118	101	0	0	0	0	2	2	0	14	0	0	237
111	142	0	0	0	0	2	0	0	13	4	0	272
126	136	0	0	1	0	2	2	0	8	5	0	280
105	146	0	0	0	0	4	5	0	9	2	0	271
144	129	0	0	1	0	0	1	0	9	2	0	286
129	161	0	0	0	0	0	2	0	7	3	0	302
132	126	0	0	1 2	0	5	1 16	0	8	1 45	0	274
						TT = 2+16+45 = 63						
996	1053	0	0	3	0	18	13	0	75	20	0	2178
						NB SOUTH LEG						
114	229	0	0	0	0	2	3	0	18	10	0	376
99	216	0	0	0	0	3	7	0	13	12	0	350
83	185	0	0	1	0	1	2	0	15	11	0	298
91	224	0	0	0	0	0	3	0	5	10	0	333
104	195	0	0	0	0	1	3	0	17	4	0	324
91	211	0	0	0	0	4	4	0	7	10	0	327
84	195	0	0	0	0	0	0	0	16	7	0	302
81	216	0	0	1 0	0	0	5 15	0	6	7 76	0	316
						TT = 0+15+76 = 91						
747	1671	0	0	2	0	11	27	0	97	71	0	2626
						WB EAST LEG						
33	0	42	0	0	0	1	0	0	2	0	5	83
38	0	52	0	0	0	1	0	3	0	0	1	95
13	0	58	0	0	0	1	0	3	3	0	5	83
31	0	61	0	0	0	1	0	0	0	0	5	98
33	0	45	0	0	0	0	0	0	1	0	12	91
23	0	50	0	0	0	0	0	1	2	0	5	81
20	0	72	0	0	0	0	0	2	0	0	4	98
29	0	48	0	0 0	0	1	0 4	3	1	0 29	2	84
						TT = 0+4+29 = 33						
220	0	428	0	0	0	5	0	12	9	0	39	713
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 1,366

TT = 19

TT% = 19/1366 = 1.39% ≈ 1%

	Rt	Thru	Lt
Total	475	891 890	
1st	142	225	
2nd	107	232	
3rd	115	222	
4th	111	212	

TT = 15

TT% = 15/293 = 5.12% ≈ 5%

WB 210 Fwy

EAST LEG TOTAL: 293

	1st	2nd	3rd	4th	Total
Rt	30	35	32	49	146 145
Thru	0	0	0	0	
Lt	38	39	45	25	147 145

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.85
EAST LEG = 0.95
WEST LEG =

ALL LEGS = 0.91

	Lt	Thru	Rt
1st		172	188
2nd		199	61
3rd		191	131
4th		192	97
Total		754 755	477 475

SOUTH LEG (NB)

TT = 30

TT% = 30/1231 = 2.44% ≈ 2%

TOTAL: 1,231

HOUR TOTAL: 2,890

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 04:00PM-05:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total	419	726	
1st	104	209	
2nd	82	179	
3rd	117	173	
4th	116	165	

	1st	2nd	3rd	4th	Total
Rt	33	26	47	36	142
Thru	0	1	0	0	1
Lt	53	39	57	45	194

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		164	136
2nd		194	122
3rd		184	163
4th		181	129
Total		723	550

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 WB RAMPS

TIME: 05:00PM-06:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total	475	891	
1st	142	225	
2nd	107	232	
3rd	115	222	
4th	111	212	

	1st	2nd	3rd	4th	Total
Rt	30	35	32	49	146
Thru	0	0	0	0	0
Lt	38	39	45	25	147

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		172	188
2nd		199	61
3rd		191	131
4th		192	97
Total		754	477

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 WB RAMPS — 06-02-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
97	207	0	0	1	0	2	0	0	5	1	0	313
80	172	0	0	1	0	2	4	0	0	2	0	261
111	171	0	0	0	0	3	2	0	3	0	0	290
111	161	0	0	1	0	0	2	0	5	1	0	281
139	223	0	0	0	0	0	1	0	3	1	0	367
104	231	0	0	0	0	1	1	0	2	0	0	339
111	219	0	0	1	0	0	1	0	4	1	0	337
109	211	0	0	1	0	0	0	0	2	0	0	323
				2			4			13		
						TT=2+4+13=19						
862	1595	0	0	5	0	8	11	0	24	6	0	2511
						SOUTH LEG						
124	160	0	0	1	0	1	1	0	11	2	0	300
116	190	0	0	1	0	0	2	0	6	1	0	316
158	181	0	0	0	0	2	0	0	3	3	0	347
124	177	0	0	1	0	1	3	0	4	0	0	310
182	169	0	0	0	0	1	1	0	5	2	0	360
58	196	0	0	1	0	0	0	0	3	2	0	260
128	188	0	0	0	0	0	1	0	3	2	0	322
93	187	0	0	1	0	0	0	0	4	4	0	289
				2			3			25		
						TT=2+3+25=30						
983	1448	0	0	5	0	5	8	0	39	16	0	2504
						EAST LEG						
32	0	48	0	0	0	1	0	4	0	0	1	86
26	1	35	0	0	0	0	0	1	0	0	3	66
46	0	53	0	0	0	0	0	1	1	0	3	104
33	0	42	0	0	0	0	0	0	3	0	3	81
30	0	37	0	0	0	0	0	0	0	0	1	68
35	0	36	0	0	0	0	0	2	0	0	1	74
31	0	42	0	0	0	0	0	0	1	0	3	77
45	0	22	0	0	0	2	0	3	2	0	0	74
				0			7			8		
						TT=0+7+8=15						
278	1	315	0	0	0	3	0	11	7	0	15	630
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

8/10/2012

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	175	100	845	585	0	1080
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.94			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3162		4426			4715
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3162		4426			4715
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	186	106	899	622	0	1149
RTOR Reduction (vph)	42	0	237	0	0	0
Lane Group Flow (vph)	250	0	1284	0	0	1149
Heavy Vehicles (%)	5%	10%	10%	10%	10%	10%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.0		19.1			19.1
Effective Green, g (s)	8.0		19.1			19.1
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	721		2408			2566
v/s Ratio Prot			c0.29			0.24
v/s Ratio Perm	c0.08					
v/c Ratio	0.35		0.53			0.45
Uniform Delay, d1	11.4		5.1			4.8
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		0.8			0.6
Delay (s)	11.7		6.0			5.4
Level of Service	B		A			A
Approach Delay (s)	11.7		6.0			5.4
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

8/10/2012

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	255	110	865	420	0	1140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.95			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3134		4626			4940
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3134		4626			4940
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	260	112	883	429	0	1163
RTOR Reduction (vph)	43	0	178	0	0	0
Lane Group Flow (vph)	329	0	1134	0	0	1163
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.7		17.6			17.6
Effective Green, g (s)	8.7		17.6			17.6
Actuated g/C Ratio	0.25		0.51			0.51
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	795		2374			2535
v/s Ratio Prot			c0.25			0.24
v/s Ratio Perm	c0.11					
v/c Ratio	0.41		0.48			0.46
Uniform Delay, d1	10.7		5.4			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.4		0.7			0.6
Delay (s)	11.0		6.1			5.9
Level of Service	B		A			A
Approach Delay (s)	11.0		6.1			5.9
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	34.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

8/10/2012

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	145	145	755	475	0	1370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.93		0.94			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	3168		4654			4940
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	3168		4654			4940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	159	159	830	522	0	1505
RTOR Reduction (vph)	52	0	217	0	0	0
Lane Group Flow (vph)	266	0	1135	0	0	1505
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.1		18.9			18.9
Effective Green, g (s)	8.1		18.9			18.9
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	733		2513			2668
v/s Ratio Prot			0.24			c0.30
v/s Ratio Perm	c0.08					
v/c Ratio	0.36		0.45			0.56
Uniform Delay, d1	11.3		4.9			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		0.6			0.9
Delay (s)	11.6		5.5			6.2
Level of Service	B		A			A
Approach Delay (s)	11.6		5.5			6.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

8/11/2012

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	175	100	845	635	0	1080
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.94			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3162		4262			4715
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3162		4262			4715
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	186	106	899	676	0	1149
RTOR Reduction (vph)	42	0	258	0	0	0
Lane Group Flow (vph)	250	0	1317	0	0	1149
Heavy Vehicles (%)	5%	10%	10%	19%	10%	10%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.0		19.1			19.1
Effective Green, g (s)	8.0		19.1			19.1
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	721		2319			2566
v/s Ratio Prot			c0.31			0.24
v/s Ratio Perm	c0.08					
v/c Ratio	0.35		0.57			0.45
Uniform Delay, d1	11.4		5.3			4.8
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.0			0.6
Delay (s)	11.7		6.3			5.4
Level of Service	B		A			A
Approach Delay (s)	11.7		6.3			5.4
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

8/11/2012

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	255	110	865	470	0	1140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.95			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3134		4427			4940
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3134		4427			4940
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	260	112	883	480	0	1163
RTOR Reduction (vph)	43	0	199	0	0	0
Lane Group Flow (vph)	329	0	1164	0	0	1163
Heavy Vehicles (%)	10%	5%	5%	22%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.7		17.6			17.6
Effective Green, g (s)	8.7		17.6			17.6
Actuated g/C Ratio	0.25		0.51			0.51
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	795		2272			2535
v/s Ratio Prot			c0.26			0.24
v/s Ratio Perm	c0.11					
v/c Ratio	0.41		0.51			0.46
Uniform Delay, d1	10.7		5.5			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.4		0.8			0.6
Delay (s)	11.0		6.3			5.9
Level of Service	B		A			A
Approach Delay (s)	11.0		6.3			5.9
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	34.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

8/11/2012

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	145	145	755	525	0	1370
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.93		0.94			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	3168		4445			4940
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	3168		4445			4940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	159	159	830	577	0	1505
RTOR Reduction (vph)	52	0	240	0	0	0
Lane Group Flow (vph)	266	0	1167	0	0	1505
Heavy Vehicles (%)	5%	5%	5%	16%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.1		18.9			18.9
Effective Green, g (s)	8.1		18.9			18.9
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	733		2400			2668
v/s Ratio Prot			0.26			c0.30
v/s Ratio Perm	c0.08					
v/c Ratio	0.36		0.49			0.56
Uniform Delay, d1	11.3		5.0			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		0.7			0.9
Delay (s)	11.6		5.7			6.2
Level of Service	B		A			A
Approach Delay (s)	11.6		5.7			6.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

8/14/2012

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	190	110	920	690	0	1175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.94		0.94			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3160		4263			4715
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3160		4263			4715
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	202	117	979	734	0	1250
RTOR Reduction (vph)	30	0	263	0	0	0
Lane Group Flow (vph)	289	0	1450	0	0	1250
Heavy Vehicles (%)	5%	10%	10%	19%	10%	10%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.5		18.9			18.9
Effective Green, g (s)	8.5		18.9			18.9
Actuated g/C Ratio	0.24		0.53			0.53
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	759		2276			2517
v/s Ratio Prot			c0.34			0.27
v/s Ratio Perm	c0.09					
v/c Ratio	0.38		0.64			0.50
Uniform Delay, d1	11.2		5.8			5.2
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.4			0.7
Delay (s)	11.6		7.2			5.9
Level of Service	B		A			A
Approach Delay (s)	11.6		7.2			5.9
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

8/14/2012

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	280	120	945	510	0	1245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.96		0.95			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3135		4429			4940
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3135		4429			4940
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	286	122	964	520	0	1270
RTOR Reduction (vph)	31	0	204	0	0	0
Lane Group Flow (vph)	377	0	1280	0	0	1270
Heavy Vehicles (%)	10%	5%	5%	22%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	9.2		17.1			17.1
Effective Green, g (s)	9.2		17.1			17.1
Actuated g/C Ratio	0.27		0.50			0.50
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	841		2208			2463
v/s Ratio Prot			c0.29			0.26
v/s Ratio Perm	c0.12					
v/c Ratio	0.45		0.58			0.52
Uniform Delay, d1	10.4		6.1			5.8
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.4		1.1			0.8
Delay (s)	10.8		7.2			6.6
Level of Service	B		A			A
Approach Delay (s)	10.8		7.2			6.6
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	34.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

8/14/2012

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	160	160	825	570	0	1495
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.93		0.94			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	3168		4447			4940
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	3168		4447			4940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	176	176	907	626	0	1643
RTOR Reduction (vph)	39	0	249	0	0	0
Lane Group Flow (vph)	313	0	1284	0	0	1643
Heavy Vehicles (%)	5%	5%	5%	16%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.5		17.9			17.9
Effective Green, g (s)	8.5		17.9			17.9
Actuated g/C Ratio	0.25		0.52			0.52
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	783		2314			2571
v/s Ratio Prot			0.29			c0.33
v/s Ratio Perm	c0.10					
v/c Ratio	0.40		0.55			0.64
Uniform Delay, d1	10.8		5.6			5.9
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.0			1.2
Delay (s)	11.2		6.5			7.2
Level of Service	B		A			A
Approach Delay (s)	11.2		6.5			7.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	34.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

9/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	175	100	895	585	0	1130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.94			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3162		4297			4715
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3162		4297			4715
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	186	106	952	622	0	1202
RTOR Reduction (vph)	35	0	225	0	0	0
Lane Group Flow (vph)	257	0	1349	0	0	1202
Heavy Vehicles (%)	5%	10%	10%	19%	10%	10%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.1		19.1			19.1
Effective Green, g (s)	8.1		19.1			19.1
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	728		2332			2558
v/s Ratio Prot			c0.31			0.25
v/s Ratio Perm	c0.08					
v/c Ratio	0.35		0.58			0.47
Uniform Delay, d1	11.4		5.4			4.9
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.1			0.6
Delay (s)	11.7		6.4			5.6
Level of Service	B		A			A
Approach Delay (s)	11.7		6.4			5.6
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

9/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	225	110	915	420	0	1190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.95		0.95			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3129		4479			4940
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3129		4479			4940
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	230	112	934	429	0	1214
RTOR Reduction (vph)	35	0	165	0	0	0
Lane Group Flow (vph)	307	0	1198	0	0	1214
Heavy Vehicles (%)	10%	5%	5%	22%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.5		18.2			18.2
Effective Green, g (s)	8.5		18.2			18.2
Actuated g/C Ratio	0.24		0.52			0.52
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	766		2349			2591
v/s Ratio Prot			c0.27			0.25
v/s Ratio Perm	c0.10					
v/c Ratio	0.40		0.51			0.47
Uniform Delay, d1	11.0		5.4			5.2
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		0.8			0.6
Delay (s)	11.3		6.2			5.8
Level of Service	B		A			A
Approach Delay (s)	11.3		6.2			5.8
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

9/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	145	145	805	475	0	1420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.93		0.94			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	3168		4491			4940
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	3168		4491			4940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	159	159	885	522	0	1560
RTOR Reduction (vph)	43	0	204	0	0	0
Lane Group Flow (vph)	275	0	1203	0	0	1560
Heavy Vehicles (%)	5%	5%	5%	16%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.2		18.9			18.9
Effective Green, g (s)	8.2		18.9			18.9
Actuated g/C Ratio	0.23		0.54			0.54
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	740		2418			2660
v/s Ratio Prot			0.27			c0.32
v/s Ratio Perm	c0.09					
v/c Ratio	0.37		0.50			0.59
Uniform Delay, d1	11.3		5.1			5.5
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		0.7			1.0
Delay (s)	11.6		5.8			6.4
Level of Service	B		A			A
Approach Delay (s)	11.6		5.8			6.4
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

9/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	190	110	975	640	0	1230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.94		0.94			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3160		4296			4715
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3160		4296			4715
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	202	117	1037	681	0	1309
RTOR Reduction (vph)	25	0	230	0	0	0
Lane Group Flow (vph)	294	0	1488	0	0	1309
Heavy Vehicles (%)	5%	10%	10%	19%	10%	10%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.5		18.9			18.9
Effective Green, g (s)	8.5		18.9			18.9
Actuated g/C Ratio	0.24		0.53			0.53
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	759		2294			2517
v/s Ratio Prot			c0.35			0.28
v/s Ratio Perm	c0.09					
v/c Ratio	0.39		0.65			0.52
Uniform Delay, d1	11.3		5.9			5.3
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.4			0.8
Delay (s)	11.6		7.3			6.1
Level of Service	B		A			A
Approach Delay (s)	11.6		7.3			6.1
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

9/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	280	120	995	460	0	1300
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.96		0.95			1.00
Flt Protected	0.97		1.00			1.00
Satd. Flow (prot)	3135		4477			4940
Flt Permitted	0.97		1.00			1.00
Satd. Flow (perm)	3135		4477			4940
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	286	122	1015	469	0	1327
RTOR Reduction (vph)	26	0	174	0	0	0
Lane Group Flow (vph)	382	0	1310	0	0	1327
Heavy Vehicles (%)	10%	5%	5%	22%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	9.2		17.1			17.1
Effective Green, g (s)	9.2		17.1			17.1
Actuated g/C Ratio	0.27		0.50			0.50
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	841		2232			2463
v/s Ratio Prot			c0.29			0.27
v/s Ratio Perm	c0.12					
v/c Ratio	0.45		0.59			0.54
Uniform Delay, d1	10.5		6.1			5.9
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.4		1.1			0.9
Delay (s)	10.8		7.2			6.7
Level of Service	B		A			A
Approach Delay (s)	10.8		7.2			6.7
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	34.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
8: Irwindale Ave & WB 210 Fwy

9/23/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	160	160	875	520	0	1545
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0
Lane Util. Factor	0.97		0.91			0.91
Frt	0.93		0.94			1.00
Flt Protected	0.98		1.00			1.00
Satd. Flow (prot)	3168		4489			4940
Flt Permitted	0.98		1.00			1.00
Satd. Flow (perm)	3168		4489			4940
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	176	176	962	571	0	1698
RTOR Reduction (vph)	32	0	215	0	0	0
Lane Group Flow (vph)	320	0	1318	0	0	1698
Heavy Vehicles (%)	5%	5%	5%	16%	5%	5%
Turn Type	NA		NA			NA
Protected Phases			2			6
Permitted Phases	8					
Actuated Green, G (s)	8.6		17.9			17.9
Effective Green, g (s)	8.6		17.9			17.9
Actuated g/C Ratio	0.25		0.52			0.52
Clearance Time (s)	4.0		4.0			4.0
Vehicle Extension (s)	3.0		3.0			3.0
Lane Grp Cap (vph)	790		2329			2563
v/s Ratio Prot			0.29			c0.34
v/s Ratio Perm	c0.10					
v/c Ratio	0.40		0.57			0.66
Uniform Delay, d1	10.8		5.7			6.1
Progression Factor	1.00		1.00			1.00
Incremental Delay, d2	0.3		1.0			1.4
Delay (s)	11.2		6.7			7.5
Level of Service	B		A			A
Approach Delay (s)	11.2		6.7			7.5
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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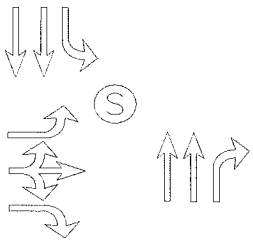
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
9
ROUTE
2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	470	10%		470	40	510
EB THRU	5	5%		5	5	10
EB RIGHT	645	5%	**50**	695	65	760
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	895	5%	**50**	945	85	1030
NB RIGHT	195	5%		195	20	215
SB LEFT	175	10%		175	15	190
SB THRU	545	10%		545	50	595
SB RIGHT	0	0%		0	0	0
TOTALS	**2930**		**100**	**3030**	**280**	**3310**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	470	10%		470	40	510
EB THRU	5	5%		5	5	10
EB RIGHT	645	5%	**50**	695	65	760
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	895	5%		895	80	975
NB RIGHT	195	5%		195	20	215
SB LEFT	175	10%		175	15	190
SB THRU	545	10%		545	50	595
SB RIGHT	0	0%		0	0	0
TOTALS	**2930**		**50**	**2980**	**275**	**3255**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	470	10%	**50**	520	45	565
EB THRU	5	5%		5	5	10
EB RIGHT	645	5%		645	60	705
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	895	5%		895	80	975
NB RIGHT	195	5%		195	20	215
SB LEFT	175	10%		175	15	190
SB THRU	545	10%		545	50	595
SB RIGHT	0	0%		0	0	0
TOTALS	**2930**		**50**	**2980**	**275**	**3255**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	590	10%		590	55	645
EB THRU	5	5%		5	5	10
EB RIGHT	365	10%	**50**	415	35	450
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	690	5%	**50**	740	65	805
NB RIGHT	240	10%		240	20	260
SB LEFT	200	5%		200	20	220
SB THRU	670	10%		670	60	730
SB RIGHT	0	0%		0	0	0
TOTALS	**2760**		**100**	**2860**	**260**	**3120**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	590	10%		590	55	645
EB THRU	5	5%		5	5	10
EB RIGHT	365	10%	**50**	415	35	450
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	690	5%		690	60	750
NB RIGHT	240	10%		240	20	260
SB LEFT	200	5%		200	20	220
SB THRU	670	10%		670	60	730
SB RIGHT	0	0%		0	0	0
TOTALS	**2760**		**50**	**2810**	**255**	**3065**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
9
ROUTE
9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

I-210 FWY EB RAMPS

EB LEFT	590	10%	**50**	640	60	700
EB THRU	5	5%		5	5	10
EB RIGHT	365	10%		365	35	400
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

IRWINDALE AVE

NB LEFT	0	0%		0	0	0
NB THRU	690	5%		690	60	750
NB RIGHT	240	10%		240	20	260
SB LEFT	200	5%		200	20	220
SB THRU	670	10%		670	60	730
SB RIGHT	0	0%		0	0	0
TOTALS	**2760**		**50**	**2810**	**260**	**3070**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
9
ROUTE
2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	375	5%		375	35	410
EB THRU	5	5%		5	5	10
EB RIGHT	385	5%	**50**	435	40	475
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	960	5%	**50**	1010	90	1100
NB RIGHT	385	5%		385	35	420
SB LEFT	300	5%		300	25	325
SB THRU	740	5%		740	65	805
SB RIGHT	0	0%		0	0	0
TOTALS	**3150**		**100**	**3250**	**295**	**3545**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	375	5%		375	35	410
EB THRU	5	5%		5	5	10
EB RIGHT	385	5%	**50**	435	40	475
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
IRWINDALE AVE						
NB LEFT	0	0%		0	0	0
NB THRU	960	5%		960	85	1045
NB RIGHT	385	5%		385	35	420
SB LEFT	300	5%		300	25	325
SB THRU	740	5%		740	65	805
SB RIGHT	0	0%		0	0	0
TOTALS	**3150**		**50**	**3200**	**290**	**3490**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	23-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

I-210 FWY EB RAMPS

EB LEFT	375	5%	**50**	425	40	465
EB THRU	5	5%		5	5	10
EB RIGHT	385	5%		385	35	420
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

IRWINDALE AVE

NB LEFT	0	0%		0	0	0
NB THRU	960	5%		960	85	1045
NB RIGHT	385	5%		385	35	420
SB LEFT	300	5%		300	25	325
SB THRU	740	5%		740	65	805
SB RIGHT	0	0%		0	0	0
TOTALS	**3150**		**50**	**3200**	**290**	**3490**

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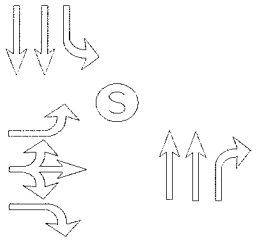
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
9
ROUTE
2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	434	36	108	540	**0**	540	50	590
EB THRU	3	0	0	5	**0**	5	5	10
EB RIGHT	597	48	144	740	**150**	890	80	970
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	859	36	108	965	**150**	1115	100	1215
NB RIGHT	184	10	30	215	**0**	215	20	235
SB LEFT	155	22	66	220	**0**	220	20	240
SB THRU	484	59	177	660	**0**	660	60	720
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2716**				**300**	**3645**	**335**	**3980**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	434	36	108	540	**0**	540	50	590
EB THRU	3	0	0	5	**0**	5	5	10
EB RIGHT	597	48	144	740	**150**	890	80	970
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	859	36	108	965	**0**	965	85	1050
NB RIGHT	184	10	30	215	**0**	215	20	235
SB LEFT	155	22	66	220	**0**	220	20	240
SB THRU	484	59	177	660	**0**	660	60	720
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2716**				**150**	**3495**	**320**	**3815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	434	36	108	540	**150**	690	60	750
EB THRU	3	0	0	5	**0**	5	5	10
EB RIGHT	597	48	144	740	**0**	740	65	805
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	859	36	108	965	**0**	965	85	1050
NB RIGHT	184	10	30	215	**0**	215	20	235
SB LEFT	155	22	66	220	**0**	220	20	240
SB THRU	484	59	177	660	**0**	660	60	720
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2716**				**150**	**3495**	**315**	**3810**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
9
ROUTE
2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	538	52	156	695	**0**	695	65	760
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	327	40	120	445	**150**	595	55	650
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	648	42	126	775	**150**	925	85	1010
NB RIGHT	215	25	75	290	**0**	290	25	315
SB LEFT	194	6	18	210	**0**	210	20	230
SB THRU	597	71	213	810	**0**	810	75	885
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2519**				**300**	**3530**	**330**	**3860**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	538	52	156	695	**0**	695	65	760
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	327	40	120	445	**150**	595	55	650
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	648	42	126	775	**0**	775	70	845
NB RIGHT	215	25	75	290	**0**	290	25	315
SB LEFT	194	6	18	210	**0**	210	20	230
SB THRU	597	71	213	810	**0**	810	75	885
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2519**				**150**	**3380**	**315**	**3695**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
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E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	538	52	156	695	**150**	845	75	920
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	327	40	120	445	**0**	445	40	485
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	648	42	126	775	**0**	775	70	845
NB RIGHT	215	25	75	290	**0**	290	25	315
SB LEFT	194	6	18	210	**0**	210	20	230
SB THRU	597	71	213	810	**0**	810	75	885
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**2519**				**150**	**3380**	**310**	**3690**

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TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	368	6	18	385	**0**	385	35	420
EB THRU	5	0	0	5	**0**	5	5	10
EB RIGHT	380	4	12	390	**150**	540	50	590
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	945	13	39	985	**150**	1135	100	1235
NB RIGHT	382	4	12	395	**0**	395	35	430
SB LEFT	295	6	18	315	**0**	315	30	345
SB THRU	717	21	63	780	**0**	780	70	850
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**3092**				**300**	**3555**	**325**	**3880**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	23-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	368	6	18	385	**0**	385	35	420
EB THRU	5	0	0	5	**0**	5	5	10
EB RIGHT	380	4	12	390	**150**	540	50	590
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	945	13	39	985	**0**	985	90	1075
NB RIGHT	382	4	12	395	**0**	395	35	430
SB LEFT	295	6	18	315	**0**	315	30	345
SB THRU	717	21	63	780	**0**	780	70	850
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**3092**				**150**	**3405**	**315**	**3720**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 9
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	368	6	18	385	**150**	535	50	585
EB THRU	5	0	0	5	**0**	5	5	10
EB RIGHT	380	4	12	390	**0**	390	35	425
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
IRWINDALE AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	945	13	39	985	**0**	985	90	1075
NB RIGHT	382	4	12	395	**0**	395	35	430
SB LEFT	295	6	18	315	**0**	315	30	345
SB THRU	717	21	63	780	**0**	780	70	850
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**3092**				**150**	**3405**	**315**	**3720**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 07:30AM

NORTH LEG (SB)

TOTAL: 720

TT = 81

$TT\% = \frac{81}{720} = 11.25\%$
$\approx 11\%$

	Rt	Thru	Lt	
		543 545	177 175	Total
		127	54	1st
		131	59	2nd
		123	29	3rd
		162	35	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	470	118	123	113	116
Thru	5 3	0	0	1	2
Rt	645	137	184	162	162

WEST LEG TOTAL: 1,118

EB 210 Fwy

TT = 84

$TT\% = \frac{84}{1118} = 7.51\%$
$\approx 8\%$

	Lt	Thru	Rt
1st		254	48
2nd		251	49
3rd		203	52
4th		187	45
Total		895	194 193

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.90
EAST LEG =
WEST LEG = 0.91

ALL LEGS = 0.92

TT = 46

$TT\% = \frac{46}{1089} = 4.22\%$
$\approx 4\%$

TOTAL: 1,089

HOUR TOTAL: 2,927

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total		455	182
1st		101	32
2nd		96	37
3rd		127	54
4th		131	59

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	431	82	108	118	123
Thru	0	0	0	0	0
Rt	567	100	146	137	184

	Lt	Thru	Rt
1st		240	45
2nd		260	36
3rd		254	48
4th		251	49
Total		1005	178

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total		514	143
1st		123	29
2nd		162	35
3rd		112	37
4th		117	42

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	439	113	116	116	94
Thru	4	1	2	0	1
Rt	576	162	162	137	115

	Lt	Thru	Rt
1st		203	52
2nd		187	45
3rd		169	61
4th		199	55
Total		758	213

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 EB RAMPS — 06-02-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
0	91	25	0	0	0	0	0	0	0	10	7	133
0	86	37	0	0	0	0	0	0	0	10	0	133
0	111	48	0	0	0	0	6	0	0	10	6	181
0	120	52	0	0	0	0	6	0	0	5	7	190
0	106	26	0	0	0	0	8	0	0	9	3	152
0	147	29	0	0	0	0	6	0	0	9	6	197
0	108	37	0	0	0	0	1	0	0	3	0	149
0	111	40	0	0	0	0	1	0	0	5	2	159
						TT=0+26+55=81						
0	880	294	0	0	0	0	28	0	0	61	31	1294
						NB SOUTH LEG						
45	239	0	0	0	0	0	0	0	0	1	0	285
35	251	0	0	1	0	1	3	0	0	5	0	296
47	240	0	0	0	0	1	5	0	0	9	0	302
46	241	0	0	1	0	3	2	0	0	7	0	300
48	195	0	0	0	0	4	5	0	0	3	0	255
43	183	0	0	0	0	2	2	0	0	2	0	232
61	169	0	0	0	0	0	0	0	0	0	0	230
55	199	0	0	0	0	0	0	0	0	0	0	254
						TT=1+24+21=46						
380	1717	0	0	2	0	11	17	0	0	27	0	2154
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
87	0	69	0	0	0	3	0	2	10	0	11	182
131	0	87	0	0	0	5	0	5	10	0	16	254
124	0	116	0	0	0	3	0	1	10	0	1	255
171	0	113	0	0	0	2	0	2	11	0	8	307
149	1	107	0	0	0	3	0	2	10	0	4	276
153	2	98	0	0	0	2	0	7	7	0	11	280
130	0	114	0	0	0	0	0	0	7	0	2	253
108	1	89	0	0	0	0	0	0	7	0	5	210
						TT=0+22+62=84						
1053	4	793	0	0	0	18	0	19	72	0	58	2017

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 12:45PM

NORTH LEG (SB)

TOTAL: 868

TT = 78

$TT\% = \frac{78}{868} = 8.99\%$
$\approx 9\%$

	Rt	Thru	Lt	
		668 670	200	Total
		174	50	1st
		154	56	2nd
		147	42	3rd
		193	52	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	590	159	150	154	127
Thru	5	0	0	0	0
Rt	367 365	96	99	91	81

WEST LEG TOTAL: 957
EB 210 FWY

TT = 92

$TT\% = \frac{92}{957} = 9.61\%$
$\approx 10\%$

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.96
EAST LEG =
WEST LEG = 0.94

ALL LEGS = 0.96

TT = 67

$TT\% = \frac{67}{930} = 7.2\%$
$\approx 7\%$

	Lt	Thru	Rt
1st		166	71
2nd		175	49
3rd		174	53
4th		175	67
Total		690	240

TOTAL: 930

SOUTH LEG (NB)

HOUR TOTAL: 2,755

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total		590	159
1st		131	32
2nd		133	43
3rd		152	34
4th		174	50

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	577	146	124	148	159
Thru	1	0	0	1	0
Rt	348	77	80	95	96

	Lt	Thru	Rt
1st		233	72
2nd		217	92
3rd		151	57
4th		166	71
Total		767	292

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total		635	188
1st		154	56
2nd		147	42
3rd		193	52
4th		141	38

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	579	150	154	127	148
Thru	0	0	0	0	0
Rt	348	99	91	81	77

	Lt	Thru	Rt
1st		175	49
2nd		174	53
3rd		175	67
4th		166	90
Total		690	259

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 EB RAMPS — 06-02-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
0	111	30	0	1	0	0	4	0	0	15	2	163
0	117	37	0	0	0	0	1	0	0	15	6	176
0	133	30	0	1	0	0	2	0	0	16	4	186
0	157	50	0	0	0	0	1	0	0	16	0	224
0	129	50	0	0	0	0	10	1	0	15	5	210
0	133	42	0	0	0	0	2	0	0	12	0	189
0	178	52	0	0	0	0	0	0	0	15	0	245
0	129	38	0	1	0 0	0	3	14 0	0	8	63 0	179
						TT= 1+14+63=78						
0	1087	329	0	3	0	0	23	1	0	112	17	1572
						NB SOUTH LEG						
65	230	0	0	0	0	6	1	0	1	2	0	305
84	211	0	0	0	0	3	3	0	5	3	0	309
46	135	0	0	0	0	2	6	0	9	10	0	208
66	152	0	0	1	0	0	4	0	5	9	0	237
38	165	0	0	1	0	5	3	0	6	6	0	224
50	161	0	0	0	0	0	5	0	3	8	0	227
61	170	0	0	0	0	3	2	0	3	3	0	242
90	165	0	0	1	2 0	0	0	22 0	0	0	43 0	256
						TT=2+22+43=67						
500	1389	0	0	3	0	19	24	0	32	41	0	2008
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
62	0	122	0	0	0	11	0	9	4	0	15	223
56	0	103	0	0	0	16	0	1	8	0	20	204
80	1	130	0	0	0	8	0	3	7	0	15	244
87	0	145	0	0	0	7	0	5	2	0	9	255
89	0	138	0	0	0	9	0	2	1	0	10	249
82	0	141	0	0	0	4	0	1	5	0	12	245
69	0	114	0	0	0	7	0	3	5	0	10	208
71	0	140	0	0	0 0	4	0	38 1	2	0	54 7	225
						TT=0+38+54=92						
596	1	1033	0	0	0	66	0	25	34	0	98	1853

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 1,039

TT = 27

TT% = 27/1039 = 2.60%
≈ 3%

	Rt	Thru	Lt	
		738 740	301 300	Total
		190	73	1st
		193	78	2nd
		193	74	3rd
		162	76	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
374 375	67	94	100	113	Lt
5	2	2	1	0	Thru
384 385	77	99	83	125	Rt

WEST LEG TOTAL: 763

EB 210 Fwy

TT = 10

TT% = 10/763 = 1.31%
≈ 1%

	Lt	Thru	Rt
1st		294	134
2nd		266	103
3rd		222	75
4th		176	74
Total		958 960	386 385

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.96
SOUTH LEG = 0.79
EAST LEG =
WEST LEG = 0.80

ALL LEGS = 0.94

TT = 17

TT% = 17/1344 = 1.26%
≈ 1%

TOTAL: 1,344

HOUR TOTAL: 3,146

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total		636	282
1st		196	66
2nd		148	70
3rd		156	74
4th		136	72

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	340	94	95	78	73
Thru	5	1	1	1	2
Rt	346	89	87	83	87

	Lt	Thru	Rt
1st		204	107
2nd		221	90
3rd		272	114
4th		238	80
Total		935	391

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: I-210 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total		738	301
1st		190	73
2nd		193	78
3rd		193	74
4th		162	76

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	374	67	94	100	113
Thru	5	2	2	1	0
Rt	384	77	99	83	125

	Lt	Thru	Rt
1st		294	134
2nd		266	103
3rd		222	75
4th		176	74
Total		958	386

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : I-210 EB RAMPS — 06-02-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
0	185	66	0	1	0	0	1	0	0	9	0	262
0	140	69	0	1	0	0	1	1	0	6	0	218
0	151	74	0	0	0	0	1	0	0	4	0	230
0	130	69	0	1	0	0	2	1	0	3	2	208
0	183	70	0	0	0	0	0	1	0	7	2	263
0	187	76	0	1	0	0	2	2	0	3	0	271
0	190	74	0	0	0	0	0	0	0	3	0	267
0	157	75	0	1	0	0	0	0	0	4	1	238
				2			5			20		
						TT=2+5+20=27						
0	1323	573	0	5	0	0	7	5	0	39	5	1957
						NB SOUTH LEG						
106	202	0	0	1	0	0	1	0	1	0	0	311
88	214	0	0	0	0	0	3	0	2	4	0	311
113	266	0	0	1	0	1	1	0	0	4	0	386
79	231	0	0	1	0	0	2	0	1	4	0	318
134	292	0	0	0	0	0	2	0	0	0	0	428
103	263	0	0	0	0	0	2	0	0	1	0	369
71	219	0	0	1	0	1	1	0	3	1	0	297
74	171	0	0	1	0	0	0	0	0	4	0	250
				2			6			9		
						TT=2+6+9=17						
768	1858	0	0	5	0	2	12	0	7	18	0	2670
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
88	1	89	0	0	0	1	0	2	0	0	3	184
83	1	93	0	0	0	1	0	1	3	0	1	183
80	1	76	0	0	0	0	0	0	3	0	2	162
87	2	69	0	0	0	0	0	4	0	0	0	162
74	2	67	0	0	0	1	0	0	2	0	0	146
98	2	94	0	0	0	0	0	0	1	0	0	195
83	1	97	0	0	0	0	0	1	0	0	2	184
125	0	110	0	0	0	0	0	0	0	0	3	238
				0			2			8		
						TT=0+2+8=10						
718	10	695	0	0	0	3	0	8	9	0	11	1454

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	5	645	0	0	0	0	895	195	175	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1427	1461					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1427	1461					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	5	701	0	0	0	0	973	212	190	592	0
RTOR Reduction (vph)	0	186	186	0	0	0	0	0	137	0	0	0
Lane Group Flow (vph)	424	214	207	0	0	0	0	973	75	190	592	0
Heavy Vehicles (%)	10%	0%	5%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	18.3	18.3	18.3					21.0	21.0	8.0	33.0	
Effective Green, g (s)	18.3	18.3	18.3					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.35	0.35	0.13	0.56	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	481	440	451					1218	545	221	1826	
v/s Ratio Prot								c0.28		c0.12	0.18	
v/s Ratio Perm	c0.27	0.15	0.14						0.05			
v/c Ratio	0.88	0.49	0.46					0.80	0.14	0.86	0.32	
Uniform Delay, d1	19.5	16.7	16.5					17.2	13.0	25.1	7.1	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.0	0.8	0.7					5.5	0.5	26.7	0.5	
Delay (s)	36.5	17.5	17.3					22.8	13.5	51.8	7.6	
Level of Service	D	B	B					C	B	D	A	
Approach Delay (s)		24.1			0.0			21.1			18.3	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Route 3

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	590	5	365	0	0	0	0	690	240	200	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.97	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1469	1395					3438	1468	1719	3282	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1469	1395					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	615	5	380	0	0	0	0	719	250	208	698	0
RTOR Reduction (vph)	0	17	156	0	0	0	0	0	165	0	0	0
Lane Group Flow (vph)	344	327	156	0	0	0	0	719	85	208	698	0
Heavy Vehicles (%)	10%	0%	10%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.9	14.9	14.9					18.4	18.4	8.7	31.1	
Effective Green, g (s)	14.9	14.9	14.9					18.4	18.4	8.7	31.1	
Actuated g/C Ratio	0.28	0.28	0.28					0.34	0.34	0.16	0.58	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	430	405	385					1171	500	277	1890	
v/s Ratio Prot								c0.21		c0.12	0.21	
v/s Ratio Perm	0.22	0.22	0.11						0.06			
v/c Ratio	0.80	0.81	0.40					0.61	0.17	0.75	0.37	
Uniform Delay, d1	18.2	18.2	15.9					14.8	12.5	21.6	6.2	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.2	11.3	0.7					2.4	0.7	10.9	0.6	
Delay (s)	28.4	29.5	16.6					17.3	13.2	32.5	6.7	
Level of Service	C	C	B					B	B	C	A	
Approach Delay (s)		25.1			0.0			16.2			12.6	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	54.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	5	385	0	0	0	0	960	385	300	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.92	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1478	1461					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1478	1461					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	399	5	410	0	0	0	0	1021	410	319	787	0
RTOR Reduction (vph)	0	78	149	0	0	0	0	0	268	0	0	0
Lane Group Flow (vph)	283	195	109	0	0	0	0	1021	142	319	787	0
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.1	14.1	14.1					20.1	20.1	12.0	36.1	
Effective Green, g (s)	14.1	14.1	14.1					20.1	20.1	12.0	36.1	
Actuated g/C Ratio	0.24	0.24	0.24					0.35	0.35	0.21	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	396	358	354					1187	531	354	2133	
v/s Ratio Prot								c0.30		c0.19	0.23	
v/s Ratio Perm	c0.17	0.13	0.07						0.09			
v/c Ratio	0.71	0.54	0.31					0.86	0.27	0.90	0.37	
Uniform Delay, d1	20.2	19.2	18.1					17.7	13.7	22.5	5.4	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.0	1.7	0.5					8.2	1.2	24.9	0.5	
Delay (s)	26.2	20.9	18.6					26.0	15.0	47.5	5.9	
Level of Service	C	C	B					C	B	D	A	
Approach Delay (s)		22.0			0.0			22.8			17.9	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	5	695	0	0	0	0	895	195	175	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1349	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1349	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	5	755	0	0	0	0	973	212	190	592	0
RTOR Reduction (vph)	0	184	184	0	0	0	0	0	138	0	0	0
Lane Group Flow (vph)	439	233	231	0	0	0	0	973	74	190	592	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Effective Green, g (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.35	0.35	0.13	0.55	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	490	424	431					1207	540	220	1811	
v/s Ratio Prot								c0.28		c0.12	0.18	
v/s Ratio Perm	c0.28	0.17	0.17						0.05			
v/c Ratio	0.90	0.55	0.53					0.81	0.14	0.86	0.33	
Uniform Delay, d1	19.6	17.0	16.9					17.6	13.2	25.4	7.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.6	1.5	1.3					5.8	0.5	27.7	0.5	
Delay (s)	38.2	18.4	18.2					23.4	13.8	53.1	7.8	
Level of Service	D	B	B					C	B	D	A	
Approach Delay (s)		25.2			0.0			21.7			18.8	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	590	5	415	0	0	0	0	690	240	200	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.96	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1417	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1417	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	615	5	432	0	0	0	0	719	250	208	698	0
RTOR Reduction (vph)	0	26	155	0	0	0	0	0	166	0	0	0
Lane Group Flow (vph)	363	330	178	0	0	0	0	719	84	208	698	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	15.3	15.3	15.3					18.3	18.3	8.8	31.1	
Effective Green, g (s)	15.3	15.3	15.3					18.3	18.3	8.8	31.1	
Actuated g/C Ratio	0.28	0.28	0.28					0.34	0.34	0.16	0.57	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	438	399	357					1157	494	278	1876	
v/s Ratio Prot								c0.21		c0.12	0.21	
v/s Ratio Perm	0.23	0.23	0.14						0.06			
v/c Ratio	0.83	0.83	0.50					0.62	0.17	0.75	0.37	
Uniform Delay, d1	18.3	18.3	16.3					15.1	12.7	21.7	6.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	13.2	1.1					2.5	0.7	10.5	0.6	
Delay (s)	30.5	31.5	17.4					17.7	13.5	32.2	6.9	
Level of Service	C	C	B					B	B	C	A	
Approach Delay (s)		26.7			0.0			16.6			12.7	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	5	435	0	0	0	0	960	385	300	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1372	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1372	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	399	5	463	0	0	0	0	1021	410	319	787	0
RTOR Reduction (vph)	0	108	148	0	0	0	0	0	269	0	0	0
Lane Group Flow (vph)	299	182	130	0	0	0	0	1021	141	319	787	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Effective Green, g (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Actuated g/C Ratio	0.25	0.25	0.25					0.34	0.34	0.20	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	404	339	327					1179	528	352	2118	
v/s Ratio Prot								c0.30		c0.19	0.23	
v/s Ratio Perm	c0.18	0.13	0.10						0.09			
v/c Ratio	0.74	0.54	0.40					0.87	0.27	0.91	0.37	
Uniform Delay, d1	20.3	19.1	18.4					18.0	13.9	22.8	5.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.1	1.6	0.8					8.6	1.2	25.8	0.5	
Delay (s)	27.4	20.8	19.2					26.6	15.2	48.5	6.1	
Level of Service	C	C	B					C	B	D	A	
Approach Delay (s)		22.6			0.0			23.3			18.3	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	5	760	0	0	0	0	975	215	190	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1346	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1346	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	554	5	826	0	0	0	0	1060	234	207	647	0
RTOR Reduction (vph)	0	161	161	0	0	0	0	0	152	0	0	0
Lane Group Flow (vph)	482	296	285	0	0	0	0	1060	82	207	647	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	19.0	19.0	19.0					21.0	21.0	8.0	33.0	
Effective Green, g (s)	19.0	19.0	19.0					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.32	0.32	0.32					0.35	0.35	0.13	0.55	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	494	426	434					1203	538	219	1805	
v/s Ratio Prot								c0.31		c0.13	0.20	
v/s Ratio Perm	c0.31	0.22	0.21						0.05			
v/c Ratio	0.98	0.70	0.66					0.88	0.15	0.95	0.36	
Uniform Delay, d1	20.3	18.0	17.7					18.3	13.4	25.8	7.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.9	4.9	3.6					9.4	0.6	45.2	0.6	
Delay (s)	54.2	22.9	21.3					27.8	14.0	71.0	8.1	
Level of Service	D	C	C					C	B	E	A	
Approach Delay (s)		33.3			0.0			25.3			23.4	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	645	5	450	0	0	0	0	750	260	220	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.96	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1417	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1417	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	672	5	469	0	0	0	0	781	271	229	760	0
RTOR Reduction (vph)	0	25	133	0	0	0	0	0	182	0	0	0
Lane Group Flow (vph)	396	364	228	0	0	0	0	781	89	229	760	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	15.7	15.7	15.7					18.0	18.0	9.0	31.0	
Effective Green, g (s)	15.7	15.7	15.7					18.0	18.0	9.0	31.0	
Actuated g/C Ratio	0.29	0.29	0.29					0.33	0.33	0.16	0.57	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	447	407	364					1131	483	283	1860	
v/s Ratio Prot								c0.23		c0.13	0.23	
v/s Ratio Perm	0.25	0.26	0.18						0.06			
v/c Ratio	0.89	0.89	0.63					0.69	0.18	0.81	0.41	
Uniform Delay, d1	18.6	18.7	17.0					15.9	13.1	22.0	6.7	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.6	21.3	3.4					3.5	0.8	15.5	0.7	
Delay (s)	37.2	40.0	20.3					19.4	13.9	37.6	7.3	
Level of Service	D	D	C					B	B	D	A	
Approach Delay (s)		32.8			0.0			18.0			14.3	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	5	475	0	0	0	0	1045	420	325	805	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1372	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1372	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	436	5	505	0	0	0	0	1112	447	346	856	0
RTOR Reduction (vph)	0	108	125	0	0	0	0	0	295	0	0	0
Lane Group Flow (vph)	327	208	178	0	0	0	0	1112	152	346	856	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.9	14.9	14.9					20.0	20.0	12.0	36.0	
Effective Green, g (s)	14.9	14.9	14.9					20.0	20.0	12.0	36.0	
Actuated g/C Ratio	0.25	0.25	0.25					0.34	0.34	0.20	0.61	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	413	347	335					1167	522	350	2101	
v/s Ratio Prot								c0.32		c0.20	0.25	
v/s Ratio Perm	c0.20	0.15	0.13						0.10			
v/c Ratio	0.79	0.60	0.53					0.95	0.29	0.99	0.41	
Uniform Delay, d1	20.6	19.4	19.0					19.0	14.3	23.4	5.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.0	2.8	1.6					17.2	1.4	44.6	0.6	
Delay (s)	30.5	22.1	20.6					36.2	15.7	67.9	6.5	
Level of Service	C	C	C					D	B	E	A	
Approach Delay (s)		24.6			0.0			30.3			24.2	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	58.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	5	645	0	0	0	0	895	195	175	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1427	1461					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1427	1461					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	5	701	0	0	0	0	973	212	190	592	0
RTOR Reduction (vph)	0	186	186	0	0	0	0	0	137	0	0	0
Lane Group Flow (vph)	424	214	207	0	0	0	0	973	75	190	592	0
Heavy Vehicles (%)	10%	0%	5%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	18.3	18.3	18.3					21.0	21.0	8.0	33.0	
Effective Green, g (s)	18.3	18.3	18.3					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.35	0.35	0.13	0.56	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	481	440	451					1218	545	221	1826	
v/s Ratio Prot								c0.28		c0.12	0.18	
v/s Ratio Perm	c0.27	0.15	0.14						0.05			
v/c Ratio	0.88	0.49	0.46					0.80	0.14	0.86	0.32	
Uniform Delay, d1	19.5	16.7	16.5					17.2	13.0	25.1	7.1	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.0	0.8	0.7					5.5	0.5	26.7	0.5	
Delay (s)	36.5	17.5	17.3					22.8	13.5	51.8	7.6	
Level of Service	D	B	B					C	B	D	A	
Approach Delay (s)		24.1			0.0			21.1			18.3	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	59.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	590	5	365	0	0	0	0	690	240	200	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.97	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1469	1395					3438	1468	1719	3282	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1469	1395					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	615	5	380	0	0	0	0	719	250	208	698	0
RTOR Reduction (vph)	0	17	156	0	0	0	0	0	165	0	0	0
Lane Group Flow (vph)	344	327	156	0	0	0	0	719	85	208	698	0
Heavy Vehicles (%)	10%	0%	10%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.9	14.9	14.9					18.4	18.4	8.7	31.1	
Effective Green, g (s)	14.9	14.9	14.9					18.4	18.4	8.7	31.1	
Actuated g/C Ratio	0.28	0.28	0.28					0.34	0.34	0.16	0.58	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	430	405	385					1171	500	277	1890	
v/s Ratio Prot								c0.21		c0.12	0.21	
v/s Ratio Perm	0.22	0.22	0.11						0.06			
v/c Ratio	0.80	0.81	0.40					0.61	0.17	0.75	0.37	
Uniform Delay, d1	18.2	18.2	15.9					14.8	12.5	21.6	6.2	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.2	11.3	0.7					2.4	0.7	10.9	0.6	
Delay (s)	28.4	29.5	16.6					17.3	13.2	32.5	6.7	
Level of Service	C	C	B					B	B	C	A	
Approach Delay (s)		25.1			0.0			16.2			12.6	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	18.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	54.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	5	385	0	0	0	0	960	385	300	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.92	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1478	1461					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1478	1461					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	399	5	410	0	0	0	0	1021	410	319	787	0
RTOR Reduction (vph)	0	78	149	0	0	0	0	0	268	0	0	0
Lane Group Flow (vph)	283	195	109	0	0	0	0	1021	142	319	787	0
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.1	14.1	14.1					20.1	20.1	12.0	36.1	
Effective Green, g (s)	14.1	14.1	14.1					20.1	20.1	12.0	36.1	
Actuated g/C Ratio	0.24	0.24	0.24					0.35	0.35	0.21	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	396	358	354					1187	531	354	2133	
v/s Ratio Prot								c0.30		c0.19	0.23	
v/s Ratio Perm	c0.17	0.13	0.07						0.09			
v/c Ratio	0.71	0.54	0.31					0.86	0.27	0.90	0.37	
Uniform Delay, d1	20.2	19.2	18.1					17.7	13.7	22.5	5.4	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.0	1.7	0.5					8.2	1.2	24.9	0.5	
Delay (s)	26.2	20.9	18.6					26.0	15.0	47.5	5.9	
Level of Service	C	C	B					C	B	D	A	
Approach Delay (s)		22.0			0.0			22.8			17.9	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	58.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	470	5	695	0	0	0	0	895	195	175	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1349	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1349	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	511	5	755	0	0	0	0	973	212	190	592	0
RTOR Reduction (vph)	0	184	184	0	0	0	0	0	138	0	0	0
Lane Group Flow (vph)	439	233	231	0	0	0	0	973	74	190	592	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Effective Green, g (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.35	0.35	0.13	0.55	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	490	424	431					1207	540	220	1811	
v/s Ratio Prot								c0.28		c0.12	0.18	
v/s Ratio Perm	c0.28	0.17	0.17						0.05			
v/c Ratio	0.90	0.55	0.53					0.81	0.14	0.86	0.33	
Uniform Delay, d1	19.6	17.0	16.9					17.6	13.2	25.4	7.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.6	1.5	1.3					5.8	0.5	27.7	0.5	
Delay (s)	38.2	18.4	18.2					23.4	13.8	53.1	7.8	
Level of Service	D	B	B					C	B	D	A	
Approach Delay (s)		25.2			0.0			21.7			18.8	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	590	5	415	0	0	0	0	690	240	200	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.96	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1417	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1417	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	615	5	432	0	0	0	0	719	250	208	698	0
RTOR Reduction (vph)	0	26	155	0	0	0	0	0	166	0	0	0
Lane Group Flow (vph)	363	330	178	0	0	0	0	719	84	208	698	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	15.3	15.3	15.3					18.3	18.3	8.8	31.1	
Effective Green, g (s)	15.3	15.3	15.3					18.3	18.3	8.8	31.1	
Actuated g/C Ratio	0.28	0.28	0.28					0.34	0.34	0.16	0.57	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	438	399	357					1157	494	278	1876	
v/s Ratio Prot								c0.21		c0.12	0.21	
v/s Ratio Perm	0.23	0.23	0.14						0.06			
v/c Ratio	0.83	0.83	0.50					0.62	0.17	0.75	0.37	
Uniform Delay, d1	18.3	18.3	16.3					15.1	12.7	21.7	6.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	12.2	13.2	1.1					2.5	0.7	10.5	0.6	
Delay (s)	30.5	31.5	17.4					17.7	13.5	32.2	6.9	
Level of Service	C	C	B					B	B	C	A	
Approach Delay (s)		26.7			0.0			16.6			12.7	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	19.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	54.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	375	5	435	0	0	0	0	960	385	300	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1372	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1372	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	399	5	463	0	0	0	0	1021	410	319	787	0
RTOR Reduction (vph)	0	108	148	0	0	0	0	0	269	0	0	0
Lane Group Flow (vph)	299	182	130	0	0	0	0	1021	141	319	787	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Effective Green, g (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Actuated g/C Ratio	0.25	0.25	0.25					0.34	0.34	0.20	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	404	339	327					1179	528	352	2118	
v/s Ratio Prot								c0.30		c0.19	0.23	
v/s Ratio Perm	c0.18	0.13	0.10						0.09			
v/c Ratio	0.74	0.54	0.40					0.87	0.27	0.91	0.37	
Uniform Delay, d1	20.3	19.1	18.4					18.0	13.9	22.8	5.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.1	1.6	0.8					8.6	1.2	25.8	0.5	
Delay (s)	27.4	20.8	19.2					26.6	15.2	48.5	6.1	
Level of Service	C	C	B					C	B	D	A	
Approach Delay (s)		22.6			0.0			23.3			18.3	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	510	5	760	0	0	0	0	975	215	190	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.88	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1346	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1346	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	554	5	826	0	0	0	0	1060	234	207	647	0
RTOR Reduction (vph)	0	161	161	0	0	0	0	0	152	0	0	0
Lane Group Flow (vph)	482	296	285	0	0	0	0	1060	82	207	647	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	19.0	19.0	19.0					21.0	21.0	8.0	33.0	
Effective Green, g (s)	19.0	19.0	19.0					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.32	0.32	0.32					0.35	0.35	0.13	0.55	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	494	426	434					1203	538	219	1805	
v/s Ratio Prot								c0.31		c0.13	0.20	
v/s Ratio Perm	c0.31	0.22	0.21						0.05			
v/c Ratio	0.98	0.70	0.66					0.88	0.15	0.95	0.36	
Uniform Delay, d1	20.3	18.0	17.7					18.3	13.4	25.8	7.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	33.9	4.9	3.6					9.4	0.6	45.2	0.6	
Delay (s)	54.2	22.9	21.3					27.8	14.0	71.0	8.1	
Level of Service	D	C	C					C	B	E	A	
Approach Delay (s)		33.3			0.0			25.3			23.4	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	645	5	450	0	0	0	0	750	260	220	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.96	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1417	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1417	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	672	5	469	0	0	0	0	781	271	229	760	0
RTOR Reduction (vph)	0	25	133	0	0	0	0	0	182	0	0	0
Lane Group Flow (vph)	396	364	228	0	0	0	0	781	89	229	760	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	15.7	15.7	15.7					18.0	18.0	9.0	31.0	
Effective Green, g (s)	15.7	15.7	15.7					18.0	18.0	9.0	31.0	
Actuated g/C Ratio	0.29	0.29	0.29					0.33	0.33	0.16	0.57	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	447	407	364					1131	483	283	1860	
v/s Ratio Prot								c0.23		c0.13	0.23	
v/s Ratio Perm	0.25	0.26	0.18						0.06			
v/c Ratio	0.89	0.89	0.63					0.69	0.18	0.81	0.41	
Uniform Delay, d1	18.6	18.7	17.0					15.9	13.1	22.0	6.7	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.6	21.3	3.4					3.5	0.8	15.5	0.7	
Delay (s)	37.2	40.0	20.3					19.4	13.9	37.6	7.3	
Level of Service	D	D	C					B	B	D	A	
Approach Delay (s)		32.8			0.0			18.0			14.3	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	22.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	410	5	475	0	0	0	0	1045	420	325	805	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1372	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1372	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	436	5	505	0	0	0	0	1112	447	346	856	0
RTOR Reduction (vph)	0	108	125	0	0	0	0	0	295	0	0	0
Lane Group Flow (vph)	327	208	178	0	0	0	0	1112	152	346	856	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.9	14.9	14.9					20.0	20.0	12.0	36.0	
Effective Green, g (s)	14.9	14.9	14.9					20.0	20.0	12.0	36.0	
Actuated g/C Ratio	0.25	0.25	0.25					0.34	0.34	0.20	0.61	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	413	347	335					1167	522	350	2101	
v/s Ratio Prot								c0.32		c0.20	0.25	
v/s Ratio Perm	c0.20	0.15	0.13						0.10			
v/c Ratio	0.79	0.60	0.53					0.95	0.29	0.99	0.41	
Uniform Delay, d1	20.6	19.4	19.0					19.0	14.3	23.4	5.9	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.0	2.8	1.6					17.2	1.4	44.6	0.6	
Delay (s)	30.5	22.1	20.6					36.2	15.7	67.9	6.5	
Level of Service	C	C	C					D	B	E	A	
Approach Delay (s)		24.6			0.0			30.3			24.2	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	58.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

9/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	520	5	645	0	0	0	0	895	195	175	545	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1372	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1372	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	565	5	701	0	0	0	0	973	212	190	592	0
RTOR Reduction (vph)	0	137	184	0	0	0	0	0	138	0	0	0
Lane Group Flow (vph)	441	286	223	0	0	0	0	973	74	190	592	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Effective Green, g (s)	18.8	18.8	18.8					21.0	21.0	8.0	33.0	
Actuated g/C Ratio	0.31	0.31	0.31					0.35	0.35	0.13	0.55	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	490	431	431					1207	540	220	1811	
v/s Ratio Prot								c0.28		c0.12	0.18	
v/s Ratio Perm	c0.28	0.21	0.16						0.05			
v/c Ratio	0.90	0.66	0.52					0.81	0.14	0.86	0.33	
Uniform Delay, d1	19.6	17.8	16.8					17.6	13.2	25.4	7.3	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.4	3.8	1.0					5.8	0.5	27.7	0.5	
Delay (s)	39.0	21.6	17.8					23.4	13.8	53.1	7.8	
Level of Service	D	C	B					C	B	D	A	
Approach Delay (s)		26.4			0.0			21.7			18.8	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	22.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	59.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	65.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

9/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	640	5	365	0	0	0	0	690	240	200	670	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.98	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1459	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1459	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	667	5	380	0	0	0	0	719	250	208	698	0
RTOR Reduction (vph)	0	11	144	0	0	0	0	0	170	0	0	0
Lane Group Flow (vph)	360	350	187	0	0	0	0	719	80	208	698	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	16.0	16.0	16.0					17.3	17.3	8.7	30.0	
Effective Green, g (s)	16.0	16.0	16.0					17.3	17.3	8.7	30.0	
Actuated g/C Ratio	0.30	0.30	0.30					0.32	0.32	0.16	0.56	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	462	432	376					1101	470	277	1823	
v/s Ratio Prot								c0.21		c0.12	0.21	
v/s Ratio Perm	0.23	0.24	0.15						0.05			
v/c Ratio	0.78	0.81	0.50					0.65	0.17	0.75	0.38	
Uniform Delay, d1	17.4	17.6	15.7					15.8	13.2	21.6	6.8	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	8.1	11.0	1.0					3.0	0.8	10.9	0.6	
Delay (s)	25.5	28.6	16.7					18.8	14.0	32.5	7.4	
Level of Service	C	C	B					B	B	C	A	
Approach Delay (s)		23.8			0.0			17.5			13.2	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	54.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

9/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	425	5	385	0	0	0	0	960	385	300	740	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.93	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1426	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.97	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1426	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	452	5	410	0	0	0	0	1021	410	319	787	0
RTOR Reduction (vph)	0	52	148	0	0	0	0	0	269	0	0	0
Lane Group Flow (vph)	298	242	127	0	0	0	0	1021	141	319	787	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Effective Green, g (s)	14.5	14.5	14.5					20.1	20.1	12.0	36.1	
Actuated g/C Ratio	0.25	0.25	0.25					0.34	0.34	0.20	0.62	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	404	353	327					1179	528	352	2118	
v/s Ratio Prot								c0.30		c0.19	0.23	
v/s Ratio Perm	c0.18	0.17	0.10						0.09			
v/c Ratio	0.74	0.69	0.39					0.87	0.27	0.91	0.37	
Uniform Delay, d1	20.3	20.0	18.4					18.0	13.9	22.8	5.6	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.9	5.4	0.8					8.6	1.2	25.8	0.5	
Delay (s)	27.2	25.4	19.1					26.6	15.2	48.5	6.1	
Level of Service	C	C	B					C	B	D	A	
Approach Delay (s)		24.0			0.0			23.3			18.3	
Approach LOS		C			A			C			B	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

9/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	565	10	705	0	0	0	0	975	215	190	595	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.90	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1374	1370					3438	1538	1641	3282	
Flt Permitted	0.95	0.99	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1374	1370					3438	1538	1641	3282	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	614	11	766	0	0	0	0	1060	234	207	647	0
RTOR Reduction (vph)	0	119	152	0	0	0	0	0	154	0	0	0
Lane Group Flow (vph)	485	343	292	0	0	0	0	1060	80	207	647	0
Heavy Vehicles (%)	10%	0%	12%	0%	0%	0%	0%	5%	5%	10%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	23.8	23.8	23.8					24.0	24.0	10.0	38.0	
Effective Green, g (s)	23.8	23.8	23.8					24.0	24.0	10.0	38.0	
Actuated g/C Ratio	0.34	0.34	0.34					0.34	0.34	0.14	0.54	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	532	468	467					1182	529	235	1787	
v/s Ratio Prot								c0.31		c0.13	0.20	
v/s Ratio Perm	c0.31	0.25	0.21						0.05			
v/c Ratio	0.91	0.73	0.63					0.90	0.15	0.88	0.36	
Uniform Delay, d1	22.0	20.2	19.3					21.7	15.9	29.3	9.0	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.9	5.9	2.6					10.7	0.6	29.5	0.6	
Delay (s)	41.9	26.1	21.9					32.5	16.5	58.8	9.6	
Level of Service	D	C	C					C	B	E	A	
Approach Delay (s)		30.3			0.0			29.6			21.5	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	27.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	69.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

9/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	700	10	400	0	0	0	0	750	260	220	730	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.98	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1559	1458	1268					3438	1468	1719	3282	
Flt Permitted	0.95	0.96	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1559	1458	1268					3438	1468	1719	3282	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	729	10	417	0	0	0	0	781	271	229	760	0
RTOR Reduction (vph)	0	11	132	0	0	0	0	0	182	0	0	0
Lane Group Flow (vph)	401	385	227	0	0	0	0	781	89	229	760	0
Heavy Vehicles (%)	10%	0%	21%	0%	0%	0%	0%	5%	10%	5%	10%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	16.0	16.0	16.0					18.0	18.0	9.0	31.0	
Effective Green, g (s)	16.0	16.0	16.0					18.0	18.0	9.0	31.0	
Actuated g/C Ratio	0.29	0.29	0.29					0.33	0.33	0.16	0.56	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	454	424	369					1125	480	281	1850	
v/s Ratio Prot								c0.23		c0.13	0.23	
v/s Ratio Perm	0.26	0.26	0.18						0.06			
v/c Ratio	0.88	0.91	0.62					0.69	0.18	0.81	0.41	
Uniform Delay, d1	18.6	18.8	16.8					16.1	13.2	22.2	6.8	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	18.0	22.6	3.0					3.5	0.8	16.4	0.7	
Delay (s)	36.7	41.4	19.9					19.6	14.1	38.6	7.5	
Level of Service	D	D	B					B	B	D	A	
Approach Delay (s)		33.1			0.0			18.2			14.7	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	22.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	66.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: Irwindale Ave & EB 210 Fwy

9/23/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	465	10	420	0	0	0	0	1045	420	325	805	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	0.91	0.95					0.95	1.00	1.00	0.95	
Frt	1.00	0.93	0.85					1.00	0.85	1.00	1.00	
Flt Protected	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1633	1427	1323					3438	1538	1719	3438	
Flt Permitted	0.95	0.98	1.00					1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1633	1427	1323					3438	1538	1719	3438	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	495	11	447	0	0	0	0	1112	447	346	856	0
RTOR Reduction (vph)	0	44	153	0	0	0	0	0	278	0	0	0
Lane Group Flow (vph)	332	278	146	0	0	0	0	1112	169	346	856	0
Heavy Vehicles (%)	5%	5%	16%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA	Perm					NA	Perm	Prot	NA	
Protected Phases		4						2		1	6	
Permitted Phases	4		4						2			
Actuated Green, G (s)	15.7	15.7	15.7					26.4	26.4	15.6	46.0	
Effective Green, g (s)	15.7	15.7	15.7					26.4	26.4	15.6	46.0	
Actuated g/C Ratio	0.23	0.23	0.23					0.38	0.38	0.22	0.66	
Clearance Time (s)	4.0	4.0	4.0					4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0					3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	368	321	298					1302	583	385	2269	
v/s Ratio Prot								c0.32		c0.20	0.25	
v/s Ratio Perm	c0.20	0.19	0.11						0.11			
v/c Ratio	0.90	0.87	0.49					0.85	0.29	0.90	0.38	
Uniform Delay, d1	26.3	26.0	23.5					19.9	15.1	26.3	5.4	
Progression Factor	1.00	1.00	1.00					1.00	1.00	1.00	1.00	
Incremental Delay, d2	24.4	20.8	1.3					7.3	1.3	22.8	0.5	
Delay (s)	50.6	46.8	24.8					27.2	16.4	49.1	5.8	
Level of Service	D	D	C					C	B	D	A	
Approach Delay (s)		41.2			0.0			24.1			18.3	
Approach LOS		D			A			C			B	

Intersection Summary			
HCM Average Control Delay	26.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	69.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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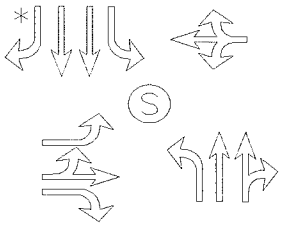
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
10
ROUTE
2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	80	40%		80	5	85
EB THRU	5	5%		5	5	10
EB RIGHT	20	35%		20	5	25
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	10	10%		10	5	15
IRWINDALE AVE						
NB LEFT	45	5%		45	5	50
NB THRU	1000	10%	**50**	1050	95	1145
NB RIGHT	5	40%		5	5	10
SB LEFT	5	25%		5	5	10
SB THRU	1055	10%	**50**	1105	100	1205
SB RIGHT	125	20%		125	10	135
TOTALS	**2360**		**100**	**2460**	**250**	**2710**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	80	40%		80	5	85
EB THRU	5	5%		5	5	10
EB RIGHT	20	35%		20	5	25
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	10	10%		10	5	15
IRWINDALE AVE						
NB LEFT	45	5%		45	5	50
NB THRU	1000	10%		1000	90	1090
NB RIGHT	5	40%		5	5	10
SB LEFT	5	25%		5	5	10
SB THRU	1055	10%	**50**	1105	100	1205
SB RIGHT	125	20%		125	10	135
TOTALS	**2360**		**50**	**2410**	**245**	**2655**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
10
ROUTE
2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	135	30%		135	10	145
EB THRU	10	5%		10	5	15
EB RIGHT	95	20%		95	10	105
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	20%		15	5	20
IRWINDALE AVE						
NB LEFT	90	15%		90	10	100
NB THRU	975	10%	**50**	1025	90	1115
NB RIGHT	25	5%		25	5	30
SB LEFT	20	5%		20	5	25
SB THRU	750	15%	**50**	800	70	870
SB RIGHT	170	35%		170	15	185
TOTALS	**2305**		**100**	**2405**	**235**	**2640**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	135	30%		135	10	145
EB THRU	10	5%		10	5	15
EB RIGHT	95	20%		95	10	105
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	20%		15	5	20
IRWINDALE AVE						
NB LEFT	90	15%		90	10	100
NB THRU	975	10%		975	90	1065
NB RIGHT	25	5%		25	0	25
SB LEFT	20	5%		20	0	20
SB THRU	750	15%	**50**	800	70	870
SB RIGHT	170	35%		170	15	185
TOTALS	**2305**		**50**	**2355**	**225**	**2580**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	190	10%		190	15	205
EB THRU	5	5%		5	5	10
EB RIGHT	35	15%		35	5	40
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	15%		15	5	20
IRWINDALE AVE						
NB LEFT	30	5%		30	5	35
NB THRU	1305	5%	**50**	1355	120	1475
NB RIGHT	15	40%		15	5	20
SB LEFT	15	10%		15	5	20
SB THRU	970	5%	**50**	1020	90	1110
SB RIGHT	40	40%		40	5	45
TOTALS	**2640**		**100**	**2740**	**270**	**3010**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	190	10%		190	15	205
EB THRU	5	5%		5	5	10
EB RIGHT	35	15%		35	5	40
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	15%		15	5	20
IRWINDALE AVE						
NB LEFT	30	5%		30	5	35
NB THRU	1305	5%		1305	115	1420
NB RIGHT	15	40%		15	5	20
SB LEFT	15	10%		15	5	20
SB THRU	970	5%	**50**	1020	90	1110
SB RIGHT	40	40%		40	5	45
TOTALS	**2640**		**50**	**2690**	**265**	**2955**

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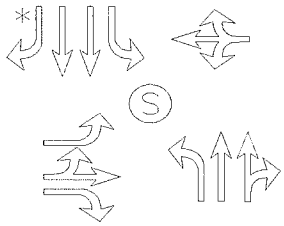
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
10
ROUTE
2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	80	40%		80	5	85
EB THRU	5	5%		5	5	10
EB RIGHT	20	35%		20	5	25
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	10	10%		10	5	15
IRWINDALE AVE						
NB LEFT	45	5%		45	5	50
NB THRU	1000	10%	**50**	1050	95	1145
NB RIGHT	5	40%		5	5	10
SB LEFT	5	25%		5	5	10
SB THRU	1055	10%	**50**	1105	100	1205
SB RIGHT	125	20%		125	10	135
TOTALS	**2360**		**100**	**2460**	**250**	**2710**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	80	40%		80	5	85
EB THRU	5	5%		5	5	10
EB RIGHT	20	35%		20	5	25
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	10	10%		10	5	15
IRWINDALE AVE						
NB LEFT	45	5%		45	5	50
NB THRU	1000	10%		1000	90	1090
NB RIGHT	5	40%		5	5	10
SB LEFT	5	25%		5	5	10
SB THRU	1055	10%	**50**	1105	100	1205
SB RIGHT	125	20%		125	10	135
TOTALS	**2360**		**50**	**2410**	**245**	**2655**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
10
ROUTE
2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	135	30%		135	10	145
EB THRU	10	5%		10	5	15
EB RIGHT	95	20%		95	10	105
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	20%		15	5	20
IRWINDALE AVE						
NB LEFT	90	15%		90	10	100
NB THRU	975	10%	**50**	1025	90	1115
NB RIGHT	25	5%		25	5	30
SB LEFT	20	5%		20	5	25
SB THRU	750	15%	**50**	800	70	870
SB RIGHT	170	35%		170	15	185
TOTALS	**2305**		**100**	**2405**	**235**	**2640**

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E/W STREET : FIRST STREET
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CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
10
ROUTE
2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	135	30%		135	10	145
EB THRU	10	5%		10	5	15
EB RIGHT	95	20%		95	10	105
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	20%		15	5	20
IRWINDALE AVE						
NB LEFT	90	15%		90	10	100
NB THRU	975	10%		975	90	1065
NB RIGHT	25	5%		25	0	25
SB LEFT	20	5%		20	0	20
SB THRU	750	15%	**50**	800	70	870
SB RIGHT	170	35%		170	15	185
TOTALS	**2305**		**50**	**2355**	**225**	**2580**

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E/W STREET : FIRST STREET
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CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
10
ROUTE
2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	190	10%		190	15	205
EB THRU	5	5%		5	5	10
EB RIGHT	35	15%		35	5	40
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	15%		15	5	20
IRWINDALE AVE						
NB LEFT	30	5%		30	5	35
NB THRU	1305	5%	**50**	1355	120	1475
NB RIGHT	15	40%		15	5	20
SB LEFT	15	10%		15	5	20
SB THRU	970	5%	**50**	1020	90	1110
SB RIGHT	40	40%		40	5	45
TOTALS	**2640**		**100**	**2740**	**270**	**3010**

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E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	190	10%		190	15	205
EB THRU	5	5%		5	5	10
EB RIGHT	35	15%		35	5	40
WB LEFT	15	5%		15	5	20
WB THRU	5	5%		5	5	10
WB RIGHT	15	15%		15	5	20
IRWINDALE AVE						
NB LEFT	30	5%		30	5	35
NB THRU	1305	5%		1305	115	1420
NB RIGHT	15	40%		15	5	20
SB LEFT	15	10%		15	5	20
SB THRU	970	5%	**50**	1020	90	1110
SB RIGHT	40	40%		40	5	45
TOTALS	**2640**		**50**	**2690**	**265**	**2955**

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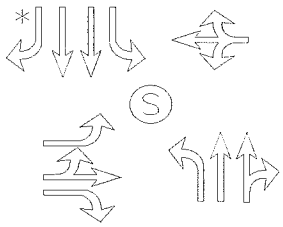
E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
10
ROUTE
2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	48	30	90	140	**0**	140	15	155
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	12	6	18	30	**0**	30	5	35
WB LEFT	2	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	8	1	3	10	**0**	10	5	15
IRWINDALE AVE								
NB LEFT	41	3	9	50	**0**	50	5	55
NB THRU	893	106	318	1210	**150**	1360	120	1480
NB RIGHT	3	2	6	10	**0**	10	5	15
SB LEFT	3	1	3	5	**0**	5	5	10
SB THRU	974	81	243	1215	**150**	1365	125	1490
SB RIGHT	100	24	72	170	**0**	170	15	185
TOTALS	**2084**				**300**	**3155**	**315**	**3470**

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TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	48	30	90	140	**0**	140	15	155
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	12	6	18	30	**0**	30	5	35
WB LEFT	2	0	0	5	**0**	5	5	10
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	8	1	3	10	**0**	10	5	15
IRWINDALE AVE								
NB LEFT	41	3	9	50	**0**	50	5	55
NB THRU	893	106	318	1210	**0**	1210	110	1320
NB RIGHT	3	2	6	10	**0**	10	5	15
SB LEFT	3	1	3	5	**0**	5	5	10
SB THRU	974	81	243	1215	**150**	1365	125	1490
SB RIGHT	100	24	72	170	**0**	170	15	185
TOTALS	**2084**				**150**	**3005**	**305**	**3310**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
10
ROUTE
2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	94	43	129	225	**0**	225	20	245
EB THRU	10	0	0	10	**0**	10	5	15
EB RIGHT	77	18	54	130	**0**	130	10	140
WB LEFT	14	0	0	15	**0**	15	5	20
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	13	3	9	20	**0**	20	5	25
IRWINDALE AVE								
NB LEFT	78	14	42	120	**0**	120	10	130
NB THRU	875	102	306	1180	**150**	1330	120	1450
NB RIGHT	24	0	0	25	**0**	25	5	30
SB LEFT	21	1	3	25	**0**	25	5	30
SB THRU	656	95	285	940	**150**	1090	100	1190
SB RIGHT	111	57	171	280	**0**	280	25	305
TOTALS	**1976**				**300**	**3275**	**315**	**3590**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	94	43	129	225	**0**	225	20	245
EB THRU	10	0	0	10	**0**	10	5	15
EB RIGHT	77	18	54	130	**0**	130	10	140
WB LEFT	14	0	0	15	**0**	15	5	20
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	13	3	9	20	**0**	20	5	25
IRWINDALE AVE								
NB LEFT	78	14	42	120	**0**	120	10	130
NB THRU	875	102	306	1180	**0**	1180	105	1285
NB RIGHT	24	0	0	25	**0**	25	0	25
SB LEFT	21	1	3	25	**0**	25	0	25
SB THRU	656	95	285	940	**150**	1090	100	1190
SB RIGHT	111	57	171	280	**0**	280	25	305
TOTALS	**1976**				**150**	**3125**	**290**	**3415**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	168	22	66	235	**0**	235	20	255
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	29	5	15	45	**0**	45	5	50
WB LEFT	15	0	0	15	**0**	15	5	20
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	12	2	6	20	**0**	20	5	25
IRWINDALE AVE								
NB LEFT	28	2	6	35	**0**	35	5	40
NB THRU	1266	41	123	1390	**150**	1540	140	1680
NB RIGHT	9	6	18	25	**0**	25	5	30
SB LEFT	15	2	6	20	**0**	20	5	25
SB THRU	918	53	159	1075	**150**	1225	110	1335
SB RIGHT	26	16	48	75	**0**	75	5	80
TOTALS	**2486**				**300**	**3245**	**315**	**3560**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
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Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : FIRST STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 10
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	168	22	66	235	**0**	235	20	255
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	29	5	15	45	**0**	45	5	50
WB LEFT	15	0	0	15	**0**	15	5	20
WB THRU	0	0	0	5	**0**	5	5	10
WB RIGHT	12	2	6	20	**0**	20	5	25
IRWINDALE AVE								
NB LEFT	28	2	6	35	**0**	35	5	40
NB THRU	1266	41	123	1390	**0**	1390	125	1515
NB RIGHT	9	6	18	25	**0**	25	5	30
SB LEFT	15	2	6	20	**0**	20	5	25
SB THRU	918	53	159	1075	**150**	1225	110	1335
SB RIGHT	26	16	48	75	**0**	75	5	80
TOTALS	**2486**				**150**	**3095**	**300**	**3395**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 07:30AM

NORTH LEG SB

TOTAL: 1,183

TT = 105

$TT\% = \frac{105}{1183} = 8.88\%$

$\approx 9\%$

Rt	Thru	Lt	
124 185	1055	4 5	Total
34	229	0	1st
34	277	1	2nd
37	243	3	3rd
19	306	0	4th

TT = 1

$TT\% = \frac{1}{11} = 9.09\%$

$\approx 9\%$

EAST LEG TOTAL: WB 11

	1st	2nd	3rd	4th	Total
Rt	2	1	6	0	10 9
Thru	0	0	0	0	5
Lt	0	0	1	1	5 2

Total	1st	2nd	3rd	4th	
78 80	30	17	19	12	Lt
5	0	0	0	0	Thru
18 20	4	7	3	4	Rt

WEST LEG TOTAL: EB 96

TT = 36

$TT\% = \frac{36}{96} = 37.5\%$

$\approx 38\%$

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.88
EAST LEG = 0.39
WEST LEG = 0.71

ALL LEGS = 0.92

TT = 111

$TTT\% = \frac{111}{1048} = 10.6\%$

$\approx 11\%$

	Lt	Thru	Rt
1st	8	268	1
2nd	15	279	3
3rd	10	231	0
4th	11	221	1
Total	44 45	999 1000	5

TOTAL: 1,048

SOUTH LEG NB

HOUR TOTAL: 2,338

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 07:00AM-08:00AM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
139	874	1	Total
35	161	0	1st
36	207	0	2nd
34	229	0	3rd
34	277	1	4th

	1st	2nd	3rd	4th	Total
Rt	1	0	2	1	4
Thru	0	0	0	0	0
Lt	0	0	0	0	0

Total	1st	2nd	3rd	4th	
79	17	15	30	17	Lt
0	0	0	0	0	Thru
21	5	5	4	7	Rt

	Lt	Thru	Rt
1st	5	263	0
2nd	5	288	0
3rd	8	268	1
4th	15	279	3
Total	33	1098	4

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 08:00AM-09:00AM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
119	966	6	Total
37	243	3	1st
19	306	0	2nd
27	223	1	3rd
36	194	2	4th

	1st	2nd	3rd	4th	Total
Rt	6	0	0	0	6
Thru	0	0	0	0	0
Lt	1	1	2	0	4

Total	1st	2nd	3rd	4th	
55	19	12	13	11	Lt
0	0	0	0	0	Thru
16	3	4	5	4	Rt

	Lt	Thru	Rt
1st	10	231	0
2nd	11	221	1
3rd	13	213	0
4th	16	241	1
Total	50	906	2

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : 1ST — 06-01-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
22	149	0	3	3	0	1	1	0	9	8	0	196
33	192	0	2	9	0	0	1	0	1	5	0	243
31	210	0	3	5	0	0	0	0	0	14	0	263
26	258	0	1	6	1	1	2	0	6	11	0	312
29	219	3	2	5	0	2	2	0	4	17	0	283
14	287	0	0	7	0	3	2	0	2	10	0	325
23	204	1	1	7 29	0	0	2 12	0	3	10 64	0	251
26	166	2	1	11	0	0	2	0	9	15	0	232
						TT=29+12+64=105						
204	1685	6	13	53	1	7	12	0	34	90	0	2105
						NB SOUTH LEG						
0	247	5	0	9	0	0	1	0	0	6	0	268
0	265	5	0	10	0	0	2	0	0	11	0	293
1	239	8	0	9	0	0	7	0	0	13	0	277
2	254	13	0	9	2	1	2	0	0	14	0	297
0	209	10	0	4	0	0	1	0	0	17	0	241
0	191	10	1	11	1	0	4	0	0	15	0	233
0	192	10	0	6 37	1	0	5 15	1	0	10 59	1	226
1	220	15	0	8	0	0	5	0	0	8	1	258
						TT=37+15+59=111						
4	1817	76	1	66	4	1	27	1	0	94	2	2093
						WB EAST LEG						
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	2
0	0	0	1	0	0	0	0	0	0	0	0	1
6	0	1	0	0	0	0	0	0	0	0	0	7
0	0	1	0	0	0	0	0	0	0	0	0	1
0	0	2	0	0 1	0	0	0 0	0	0	0 0	0	2
0	0	0	0	0	0	0	0	0	0	0	0	0
						TT=1+0+0=1						
9	0	4	1	0	0	0	0	0	0	0	0	14
						EB WEST LEG						
3	0	9	1	0	4	0	0	2	1	0	2	22
3	0	10	2	0	2	0	0	0	0	0	3	20
3	0	19	0	0	5	0	0	0	1	0	6	34
5	0	10	0	0	1	0	0	0	2	0	6	24
1	0	10	2	0	3	0	0	0	0	0	6	22
3	0	9	0	0	0	0	0	0	1	0	3	16
0	0	6	2	0 11	2	0	0 0	1	3	0 25	4	18
3	0	5	1	0	3	0	0	0	0	0	3	15
						TT=11+0+25=36						
21	0	78	8	0	20	0	0	3	8	0	33	171

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 12:00PM

NORTH LEG (SB)

TOTAL: 941

TT = 153

TT% = 153/941 = 16.26% ≈ 16%

Rt	Thru	Lt	
168 170	751 750	22 20	Total
46	155	7	1st
50	163	3	2nd
46	188	12	3rd
26	245	0	4th

TT = 3

TT% = 3/33 = 9.09% ≈ 9%

EAST LEG TOTAL: (WB) 33

	1st	2nd	3rd	4th	Total
Rt	3	3	9	1	15 16
Thru	0	0	3	0	5 3
Lt	3	3	8	0	15 14

	Total	1st	2nd	3rd	4th
Lt	137 135	40	43	22	32
Thru	10	0	0	10	0
Rt	95	14	38	39	4

WEST LEG TOTAL: (EB) 242

TT = 61

TT% = 61/242 = 25.2% ≈ 25%

	Lt	Thru	Rt
1st	8	262	1
2nd	40	267	12
3rd	33	179	11
4th	11	269	0
Total	92 90	977 975	24 25

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG = 0.86
EAST LEG = 0.41
WEST LEG = 0.75

ALL LEGS = 0.93

TT = 116

TT% = 116/1093 = 10.61% ≈ 11%

TOTAL: 1,093

HOUR TOTAL: 2,309

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 12:00PM-01:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
168	751	22	Total
46	155	7	1st
50	163	3	2nd
46	188	12	3rd
26	245	0	4th

	1st	2nd	3rd	4th	Total
Rt	3	3	9	1	16
Thru	0	0	3	0	3
Lt	3	3	8	0	14

Total	1st	2nd	3rd	4th	
137	40	43	22	32	Lt
10	0	0	10	0	Thru
95	14	38	39	4	Rt

	Lt	Thru	Rt
1st	8	262	1
2nd	40	267	12
3rd	33	179	11
4th	11	269	0
Total	92	977	24

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 01:00PM-02:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
115	866	2	Total
26	227	0	1st
31	207	0	2nd
24	248	2	3rd
34	184	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	1	2	3
Thru	0	1	0	0	1
Lt	1	0	3	1	5

Total	1st	2nd	3rd	4th	
101	29	29	23	20	Lt
4	1	2	0	1	Thru
35	5	11	10	9	Rt

	Lt	Thru	Rt
1st	11	197	1
2nd	14	198	0
3rd	22	212	0
4th	16	234	5
Total	63	841	6

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : 1ST — 06-01-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB	NORTH LEG						
28	131	7	4	10	0	0	3	0	14	11	0	208
40	140	2	5	5	0	2	4	0	3	14	1	216
32	165	12	5	9	0	3	5	0	6	9	0	246
11	220	0	5	7	0	3	8	0	7	10	0	271
14	203	0	3	4	50 0	3	7	28 0	6	13	75 0	253
15	184	0	4	7	0	2	3	0	10	13	0	238
14	227	2	0	8	0	4	3	0	6	10	0	274
27	160	0	0	11	0	2	4	0	5	9	0	218
						TT=50+28+75=153						
181	1430	23	26	61	0	19	37	0	57	89	1	1924
					NB	SOUTH LEG						
1	236	6	0	6	0	0	6	0	0	14	2	271
12	243	35	0	9	2	0	6	0	0	9	3	319
11	150	28	0	13	0	0	7	0	0	9	5	223
0	246	9	0	7	1	0	4	0	0	12	1	280
1	174	7	0	7	38 0	0	3	23 0	0	13	55 4	209
0	172	8	0	9	2	0	4	0	0	13	4	212
0	190	20	0	7	1	0	6	0	0	9	1	234
4	208	12	0	11	2	0	6	0	1	9	2	255
						TT=38+23+55=116						
29	1619	125	0	69	8	0	42	0	1	88	22	2003
					WB	EAST LEG						
3	0	3	0	0	0	0	0	0	0	0	0	6
1	0	3	2	0	0	0	0	0	0	0	0	6
9	3	8	0	0	0	0	0	0	0	0	0	20
0	0	0	1	0	0	0	0	0	0	0	0	1
0	0	1	0	0	3 0	0	0	0 0	0	0	0 0	1
0	1	0	0	0	0	0	0	0	0	0	0	1
0	0	3	1	0	0	0	0	0	0	0	0	4
0	0	1	2	0	0	0	0	0	0	0	0	3
						TT=3+0+0=3						
13	4	19	6	0	0	0	0	0	0	0	0	42
					EB	WEST LEG						
11	0	29	1	0	4	0	0	2	2	0	5	54
31	0	34	2	0	2	2	0	1	3	0	6	81
34	10	9	1	0	2	2	0	4	2	0	7	71
1	0	22	2	0	4	0	0	2	1	0	4	36
1	1	12	1	0	18 6	0	0	13 3	3	0	30 8	35
6	2	17	3	0	3	0	0	2	2	0	7	42
7	0	13	2	0	1	0	0	1	1	0	8	33
6	1	10	3	0	5	0	0	2	0	0	3	30
						TT=18+13+30=61						
97	14	146	15	0	27	4	0	17	14	0	48	382

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
3: First St & Irwindale Ave Midday

7/18/2011

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	10	95	15	5	15	90	975	25	20	750	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1444	2497			1607		1626	3240		1556	3112	1392
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1444	2497			1607		1626	3240		1556	3112	1392
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	145	11	102	16	5	16	97	1048	27	22	806	183
RTOR Reduction (vph)	0	82	0	0	13	0	0	2	0	0	0	113
Lane Group Flow (vph)	145	31	0	0	24	0	97	1073	0	22	806	70
Heavy Vehicles (%)	25%	25%	25%	9%	9%	9%	11%	11%	11%	16%	16%	16%
Turn Type	Split			Split			Prot			Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	16.0	16.0			16.0		7.0	28.0		4.0	25.0	25.0
Effective Green, g (s)	16.0	16.0			16.0		7.0	28.0		4.0	25.0	25.0
Actuated g/C Ratio	0.20	0.20			0.20		0.09	0.35		0.05	0.31	0.31
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Grp Cap (vph)	289	499			321		142	1134		78	973	435
v/s Ratio Prot	c0.10	0.01			c0.02		c0.06	c0.33		0.01	0.26	
v/s Ratio Perm												0.05
v/c Ratio	0.50	0.06			0.08		0.68	0.95		0.28	0.83	0.16
Uniform Delay, d1	28.5	25.9			26.0		35.4	25.3		36.6	25.5	19.9
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.1	0.2			0.5		23.5	16.6		8.8	8.1	0.8
Delay (s)	34.6	26.2			26.4		58.9	41.8		45.4	33.6	20.7
Level of Service	C	C			C		E	D		D	C	C
Approach Delay (s)		30.9			26.4			43.3			31.5	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	36.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 04:30PM

NORTH LEG (SB)

TOTAL: 1,030

TT = 70

$TT\% = \frac{70}{1030} = 6.80\% \approx 7\%$

Rt	Thru	Lt	
42 (40)	971 (970)	17 (15)	Total
19	219	4	1st
14	211	1	2nd
7	255	10	3rd
2	286	2	4th

TT = 2

$TT\% = \frac{2}{29} = 6.9\% \approx 7\%$

EAST LEG TOTAL: (WB) 29

	1st	2nd	3rd	4th	Total
Rt	2	2	5	5	14 (15)
Thru	0	0	0	0	(5)
Lt	3	4	4	4	15

	Total	1st	2nd	3rd	4th
Lt	190	50	34	62	44
Thru	(5)	0	0	0	0
Rt	34 (35)	7	11	15	1

WEST LEG TOTAL: (EB) 224

TT = 27

$TT\% = \frac{27}{224} = 12.05\% \approx 12\%$

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.91
EAST LEG = 0.81
WEST LEG = 0.73

ALL LEGS = 0.90

	Lt	Thru	Rt
1st	10	337	7
2nd	8	285	4
3rd	3	365	3
4th	9	320	1
Total	30	1307 (1305)	15

TT = 49

$TT\% = \frac{49}{1352} = 3.62\% \approx 4\%$

TOTAL: 1,352

SOUTH LEG (NB)

HOUR TOTAL: 2,635

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 04:00PM-05:00PM DATE: 06-01-11

NORTH LEG

	Rt	Thru	Lt
Total	83	863	39
1st	16	263	5
2nd	34	170	29
3rd	19	219	4
4th	14	211	1

	1st	2nd	3rd	4th	Total
Rt	3	4	2	2	11
Thru	1	0	0	0	1
Lt	1	3	3	4	11

	Total	1st	2nd	3rd	4th
Lt	196	53	59	50	34
Thru	0	0	0	0	0
Rt	44	11	15	7	11

	Lt	Thru	Rt
1st	9	253	7
2nd	27	249	2
3rd	10	337	7
4th	8	285	4
Total	54	1124	20

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: 1ST

TIME: 05:00PM-06:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
19	1081	24	Total
7	255	10	1st
2	286	2	2nd
5	266	7	3rd
5	274	5	4th

	1st	2nd	3rd	4th	Total
Rt	5	5	6	1	17
Thru	0	0	0	1	1
Lt	4	4	5	12	25

Total	1st	2nd	3rd	4th	
188	62	44	55	27	Lt
0	0	0	0	0	Thru
22	15	1	0	6	Rt

PEDS BY LEG

North	South	East	West	
0	0	0	0	1st
0	0	0	0	2nd
0	0	0	0	3rd
0	0	0	0	4th
59				Total

	Lt	Thru	Rt
1st	3	365	3
2nd	9	320	1
3rd	12	233	1
4th	2	224	2
Total	26	1142	7

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE IRWINDALE

EAST-WEST STREET : 1ST 06-01-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
7	246	4	2	12	0	3	4	0	4	1	1	284
24	161	29	2	5	0	5	0	0	3	4	0	233
12	206	2	1	4	1	3	4	0	3	5	1	242
11	191	1	1	10	0	2	4	0	0	6	0	226
3	245	10	0	4	0	0	0	0	4	6	0	272
0	276	2	1	4	0	0	2	0	1	4	0	290
0	262	7	2	3 26	0	0	1 15	0	3	0 30	0	278
0	264	5	2	7	0	0	2	0	3	1	0	284
						TT=26+15+30=70						
57	1851	60	11	49	1	13	17	0	21	27	2	2109
						NB SOUTH LEG						
7	235	5	0	5	1	0	5	3	0	8	0	269
1	239	24	0	3	1	0	5	2	1	2	0	278
4	317	8	0	11	1	0	4	0	3	5	1	354
3	275	8	0	7	0	0	1	0	1	2	0	297
1	359	3	0	3	0	0	0	0	2	3	0	371
1	315	9	0	5	0	0	0	0	0	0	0	330
0	227	11	0	2 27	0	0	1 5	0	1	3 17	1	246
2	214	0	0	6	0	0	1	0	0	3	2	228
						TT=27+5+17=49						
19	2181	68	0	42	3	0	17	5	8	26	4	2373
						WB EAST LEG						
3	1	1	0	0	0	0	0	0	0	0	0	5
4	0	3	0	0	0	0	0	0	0	0	0	7
1	0	3	1	0	0	0	0	0	0	0	0	5
2	0	4	0	0	0	0	0	0	0	0	0	6
5	0	4	0	0	0	0	0	0	0	0	0	9
4	0	4	0	0	0	1	0	0	0	0	0	9
6	0	5	0	0 1	0	0	0 1	0	0	0 0	0	11
1	1	12	0	0	0	0	0	0	0	0	0	14
						TT=1+1+0=2						
26	2	36	1	0	0	1	0	0	0	0	0	66
						EB WEST LEG						
7	0	49	2	0	1	1	0	0	1	0	3	64
12	0	54	1	0	2	0	0	0	2	0	3	74
4	0	43	3	0	2	0	0	0	0	0	5	57
11	0	25	0	0	2	0	0	1	0	0	6	45
14	0	59	0	0	1	1	0	0	0	0	2	77
0	0	41	1	0	0	0	0	0	0	0	3	45
0	0	48	0	0 9	1	0	0 2	1	0	0 16	5	55
6	0	20	0	0	3	0	0	1	0	0	3	33
						TT=9+2+16=27						
54	0	339	7	0	12	2	0	3	3	0	30	450

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	20	5	5	10	45	1000	5	5	1055	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88			0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1289	2466			1621		1719	3275		1444	3282	1346
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1289	2466			1621		1719	3275		1444	3282	1346
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	5	22	5	5	11	49	1087	5	5	1147	136
RTOR Reduction (vph)	0	19	0	0	11	0	0	0	0	0	0	38
Lane Group Flow (vph)	87	8	0	0	10	0	49	1092	0	5	1147	98
Heavy Vehicles (%)	40%	0%	35%	0%	10%	10%	5%	10%	40%	25%	10%	20%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Effective Green, g (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Actuated g/C Ratio	0.12	0.12			0.02		0.04	0.60		0.01	0.57	0.57
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	157	301			30		62	1963		14	1880	771
v/s Ratio Prot	c0.07	0.00			c0.01		c0.03	0.33		0.00	c0.35	
v/s Ratio Perm												0.07
v/c Ratio	0.55	0.03			0.34		0.79	0.56		0.36	0.61	0.13
Uniform Delay, d1	26.4	24.7			31.0		30.6	7.7		31.5	9.0	6.3
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.2	0.0			6.7		48.2	1.1		14.9	1.5	0.3
Delay (s)	30.6	24.7			37.6		78.8	8.8		46.4	10.4	6.6
Level of Service	C	C			D		E	A		D	B	A
Approach Delay (s)		29.2			37.6			11.8			10.2	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Route 2

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	10	95	15	5	15	90	975	25	20	750	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1388	2644			1612		1570	3277		1719	3139	1196
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1388	2644			1612		1570	3277		1719	3139	1196
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	145	11	102	16	5	16	97	1048	27	22	806	183
RTOR Reduction (vph)	0	85	0	0	15	0	0	1	0	0	0	88
Lane Group Flow (vph)	145	28	0	0	22	0	97	1074	0	22	806	95
Heavy Vehicles (%)	30%	0%	20%	0%	0%	20%	15%	10%	0%	5%	15%	35%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Effective Green, g (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Actuated g/C Ratio	0.17	0.17			0.04		0.08	0.53		0.02	0.47	0.47
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	237	451			65		132	1732		36	1461	557
v/s Ratio Prot	c0.10	0.01			c0.01		c0.06	c0.33		0.01	0.26	
v/s Ratio Perm												0.08
v/c Ratio	0.61	0.06			0.33		0.73	0.62		0.61	0.55	0.17
Uniform Delay, d1	25.7	23.2			31.2		29.9	11.0		32.4	12.8	10.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1			3.0		19.0	1.7		27.0	1.5	0.7
Delay (s)	30.3	23.3			34.2		48.9	12.7		59.4	14.3	11.0
Level of Service	C	C			C		D	B		E	B	B
Approach Delay (s)		27.2			34.2			15.7			14.7	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	5	35	15	5	15	30	1305	15	15	970	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	2779			1649		1719	3419		1641	3438	1154
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1641	2779			1649		1719	3419		1641	3438	1154
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	211	6	39	17	6	17	33	1450	17	17	1078	44
RTOR Reduction (vph)	0	32	0	0	16	0	0	1	0	0	0	14
Lane Group Flow (vph)	211	13	0	0	24	0	33	1466	0	17	1078	30
Heavy Vehicles (%)	10%	0%	15%	0%	0%	15%	5%	5%	40%	10%	5%	40%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Effective Green, g (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Actuated g/C Ratio	0.17	0.17			0.05		0.03	0.57		0.01	0.54	0.54
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	283	479			89		60	1932		14	1852	622
v/s Ratio Prot	c0.13	0.00			c0.01		c0.02	c0.43		0.01	0.31	
v/s Ratio Perm												0.03
v/c Ratio	0.75	0.03			0.27		0.55	0.76		1.21	0.58	0.05
Uniform Delay, d1	31.4	27.5			36.3		38.0	13.3		39.6	12.4	8.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.2	0.0			1.6		10.5	2.9		317.6	1.3	0.1
Delay (s)	41.6	27.5			38.0		48.4	16.1		357.3	13.7	8.9
Level of Service	D	C			D		D	B		F	B	A
Approach Delay (s)		39.2			38.0			16.8			18.7	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	19.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	20	5	5	10	45	1050	5	5	1105	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88			0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1289	2466			1621		1719	3161		1444	3167	1346
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1289	2466			1621		1719	3161		1444	3167	1346
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	5	22	5	5	11	49	1141	5	5	1201	136
RTOR Reduction (vph)	0	19	0	0	11	0	0	0	0	0	0	37
Lane Group Flow (vph)	87	8	0	0	10	0	49	1146	0	5	1201	99
Heavy Vehicles (%)	40%	0%	35%	0%	10%	10%	5%	14%	40%	25%	14%	20%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Effective Green, g (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Actuated g/C Ratio	0.12	0.12			0.02		0.04	0.60		0.01	0.57	0.57
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	157	301			30		62	1895		14	1814	771
v/s Ratio Prot	c0.07	0.00			c0.01		c0.03	0.36		0.00	c0.38	
v/s Ratio Perm												0.07
v/c Ratio	0.55	0.03			0.34		0.79	0.60		0.36	0.66	0.13
Uniform Delay, d1	26.4	24.7			31.0		30.6	8.0		31.5	9.4	6.3
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.2	0.0			6.7		48.2	1.4		14.9	1.9	0.3
Delay (s)	30.6	24.7			37.6		78.8	9.5		46.4	11.3	6.6
Level of Service	C	C			D		E	A		D	B	A
Approach Delay (s)		29.2			37.6			12.3			11.0	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	10	95	15	5	15	90	1025	25	20	800	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1388	2644			1612		1570	3165		1719	3008	1196
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1388	2644			1612		1570	3165		1719	3008	1196
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	145	11	102	16	5	16	97	1102	27	22	860	183
RTOR Reduction (vph)	0	85	0	0	15	0	0	1	0	0	0	82
Lane Group Flow (vph)	145	28	0	0	22	0	97	1128	0	22	860	101
Heavy Vehicles (%)	30%	0%	20%	0%	0%	20%	15%	14%	0%	5%	20%	35%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Effective Green, g (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Actuated g/C Ratio	0.17	0.17			0.04		0.08	0.53		0.02	0.47	0.47
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	237	451			65		132	1673		36	1400	557
v/s Ratio Prot	c0.10	0.01			c0.01		c0.06	c0.36		0.01	0.29	
v/s Ratio Perm												0.08
v/c Ratio	0.61	0.06			0.33		0.73	0.67		0.61	0.61	0.18
Uniform Delay, d1	25.7	23.2			31.2		29.9	11.5		32.4	13.4	10.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1			3.0		19.0	2.2		27.0	2.0	0.7
Delay (s)	30.3	23.3			34.2		48.9	13.7		59.4	15.4	11.1
Level of Service	C	C			C		D	B		E	B	B
Approach Delay (s)		27.2			34.2			16.5			15.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	5	35	15	5	15	30	1355	15	15	1020	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	2779			1649		1719	2574		1641	3282	1154
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1641	2779			1649		1719	2574		1641	3282	1154
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	211	6	39	17	6	17	33	1506	17	17	1133	44
RTOR Reduction (vph)	0	32	0	0	16	0	0	0	0	0	0	13
Lane Group Flow (vph)	211	13	0	0	24	0	33	1523	0	17	1133	31
Heavy Vehicles (%)	10%	0%	15%	0%	0%	15%	5%	40%	40%	10%	10%	40%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Effective Green, g (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Actuated g/C Ratio	0.17	0.17			0.05		0.03	0.57		0.01	0.54	0.54
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	283	479			89		60	1454		14	1768	622
v/s Ratio Prot	c0.13	0.00			c0.01		c0.02	c0.59		0.01	0.35	
v/s Ratio Perm												0.03
v/c Ratio	0.75	0.03			0.27		0.55	1.05		1.21	0.64	0.05
Uniform Delay, d1	31.4	27.5			36.3		38.0	17.4		39.6	13.0	8.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.2	0.0			1.6		10.5	37.0		317.6	1.8	0.1
Delay (s)	41.6	27.5			38.0		48.4	54.4		357.3	14.8	8.9
Level of Service	D	C			D		D	D		F	B	A
Approach Delay (s)		39.2			38.0			54.3			19.5	
Approach LOS		D			D			D			B	

Intersection Summary			
HCM Average Control Delay	39.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	5	20	5	0	10	50	1145	5	5	1205	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88			0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1289	2466			1588		1719	3162		1444	3167	1346
Flt Permitted	0.77	1.00			1.00		0.14	1.00		0.18	1.00	1.00
Satd. Flow (perm)	1044	2466			1613		261	3162		269	3167	1346
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	5	22	5	0	11	54	1245	5	5	1310	147
RTOR Reduction (vph)	0	18	0	0	11	0	0	0	0	0	0	32
Lane Group Flow (vph)	92	9	0	0	5	0	54	1250	0	5	1310	115
Heavy Vehicles (%)	40%	0%	35%	0%	10%	10%	5%	14%	40%	25%	14%	20%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	13.9	13.9			1.2		50.6	48.3		47.4	46.7	46.7
Effective Green, g (s)	13.9	13.9			1.2		50.6	48.3		47.4	46.7	46.7
Actuated g/C Ratio	0.19	0.19			0.02		0.68	0.64		0.63	0.62	0.62
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	222	458			26		221	2039		181	1975	839
v/s Ratio Prot	c0.05	0.00					c0.01	0.40		0.00	c0.41	
v/s Ratio Perm	c0.03				0.00		0.16			0.02		0.09
v/c Ratio	0.41	0.02			0.20		0.24	0.61		0.03	0.66	0.14
Uniform Delay, d1	26.8	24.9			36.4		5.8	7.8		5.7	9.1	5.8
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.3	0.0			3.7		0.6	1.4		0.1	1.8	0.3
Delay (s)	28.0	24.9			40.1		6.4	9.2		5.8	10.8	6.1
Level of Service	C	C			D		A	A		A	B	A
Approach Delay (s)		27.3			40.1			9.1			10.3	
Approach LOS		C			D			A			B	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	74.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	10	105	15	5	15	100	1115	25	20	870	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1388	2636			1612		1570	3165		1719	3008	1196
Flt Permitted	0.68	1.00			1.00		0.21	1.00		0.15	1.00	1.00
Satd. Flow (perm)	987	2636			1647		347	3165		276	3008	1196
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	156	11	113	16	5	16	108	1199	27	22	935	199
RTOR Reduction (vph)	0	82	0	0	15	0	0	1	0	0	0	66
Lane Group Flow (vph)	156	42	0	0	22	0	108	1225	0	22	935	133
Heavy Vehicles (%)	30%	0%	20%	0%	0%	20%	15%	14%	0%	5%	20%	35%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	18.1	18.1			2.6		37.9	34.8		33.1	32.4	43.9
Effective Green, g (s)	18.1	18.1			2.6		37.9	34.8		33.1	32.4	43.9
Actuated g/C Ratio	0.28	0.28			0.04		0.58	0.53		0.50	0.49	0.67
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	343	727			65		258	1679		155	1486	873
v/s Ratio Prot	c0.08	0.02					c0.02	c0.39		0.00	0.31	0.03
v/s Ratio Perm	c0.05				0.01		0.22			0.07		0.08
v/c Ratio	0.45	0.06			0.33		0.42	0.73		0.14	0.63	0.15
Uniform Delay, d1	19.4	17.5			30.7		7.4	11.8		9.1	12.2	4.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.0	0.0			3.0		1.1	2.8		0.4	2.0	0.1
Delay (s)	20.4	17.5			33.7		8.5	14.6		9.5	14.2	4.1
Level of Service	C	B			C		A	B		A	B	A
Approach Delay (s)		19.1			33.7			14.1			12.4	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	65.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	5	40	15	5	15	35	1475	15	15	1110	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	2768			1649		1719	2575		1641	3282	1154
Flt Permitted	0.60	1.00			0.84		0.18	1.00		0.10	1.00	1.00
Satd. Flow (perm)	1036	2768			1411		319	2575		167	3282	1154
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	228	6	44	17	6	17	39	1639	17	17	1233	50
RTOR Reduction (vph)	0	35	0	0	16	0	0	0	0	0	0	10
Lane Group Flow (vph)	228	15	0	0	24	0	39	1656	0	17	1233	40
Heavy Vehicles (%)	10%	0%	15%	0%	0%	15%	5%	40%	40%	10%	10%	40%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	26.1	26.1			6.4		96.3	93.2		93.3	91.7	107.4
Effective Green, g (s)	26.1	26.1			6.4		96.3	93.2		93.3	91.7	107.4
Actuated g/C Ratio	0.20	0.20			0.05		0.72	0.70		0.70	0.69	0.81
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	275	544			68		264	1806		135	2265	967
v/s Ratio Prot	c0.10	0.01					c0.00	c0.64		0.00	0.38	0.00
v/s Ratio Perm	c0.06				0.02		0.10			0.09		0.03
v/c Ratio	0.83	0.03			0.35		0.15	0.92		0.13	0.54	0.04
Uniform Delay, d1	50.5	43.1			61.2		6.9	16.6		10.0	10.2	2.5
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	18.3	0.0			3.1		0.3	8.9		0.4	0.9	0.0
Delay (s)	68.7	43.2			64.3		7.2	25.5		10.5	11.2	2.5
Level of Service	E	D			E		A	C		B	B	A
Approach Delay (s)		64.1			64.3			25.1			10.8	
Approach LOS		E			E			C			B	

Intersection Summary			
HCM Average Control Delay	23.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	132.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	20	5	5	10	45	1000	5	5	1105	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88			0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1289	2466			1621		1719	3275		1444	3167	1346
Flt Permitted	0.95	1.00			0.99		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1289	2466			1621		1719	3275		1444	3167	1346
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	5	22	5	5	11	49	1087	5	5	1201	136
RTOR Reduction (vph)	0	19	0	0	11	0	0	0	0	0	0	37
Lane Group Flow (vph)	87	8	0	0	10	0	49	1092	0	5	1201	99
Heavy Vehicles (%)	40%	0%	35%	0%	10%	10%	5%	10%	40%	25%	14%	20%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Effective Green, g (s)	7.8	7.8			1.2		2.3	38.3		0.6	36.6	36.6
Actuated g/C Ratio	0.12	0.12			0.02		0.04	0.60		0.01	0.57	0.57
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	157	301			30		62	1963		14	1814	771
v/s Ratio Prot	c0.07	0.00			c0.01		c0.03	0.33		0.00	c0.38	
v/s Ratio Perm												0.07
v/c Ratio	0.55	0.03			0.34		0.79	0.56		0.36	0.66	0.13
Uniform Delay, d1	26.4	24.7			31.0		30.6	7.7		31.5	9.4	6.3
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.2	0.0			6.7		48.2	1.1		14.9	1.9	0.3
Delay (s)	30.6	24.7			37.6		78.8	8.8		46.4	11.3	6.6
Level of Service	C	C			D		E	A		D	B	A
Approach Delay (s)		29.2			37.6			11.8			11.0	
Approach LOS		C			D			B			B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	63.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	10	95	15	5	15	90	975	25	20	800	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1388	2644			1612		1570	3277		1719	3008	1196
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1388	2644			1612		1570	3277		1719	3008	1196
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	145	11	102	16	5	16	97	1048	27	22	860	183
RTOR Reduction (vph)	0	85	0	0	15	0	0	1	0	0	0	82
Lane Group Flow (vph)	145	28	0	0	22	0	97	1074	0	22	860	101
Heavy Vehicles (%)	30%	0%	20%	0%	0%	20%	15%	10%	0%	5%	20%	35%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Effective Green, g (s)	11.4	11.4			2.7		5.6	35.3		1.4	31.1	31.1
Actuated g/C Ratio	0.17	0.17			0.04		0.08	0.53		0.02	0.47	0.47
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	237	451			65		132	1732		36	1400	557
v/s Ratio Prot	c0.10	0.01			c0.01		c0.06	c0.33		0.01	0.29	
v/s Ratio Perm												0.08
v/c Ratio	0.61	0.06			0.33		0.73	0.62		0.61	0.61	0.18
Uniform Delay, d1	25.7	23.2			31.2		29.9	11.0		32.4	13.4	10.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.6	0.1			3.0		19.0	1.7		27.0	2.0	0.7
Delay (s)	30.3	23.3			34.2		48.9	12.7		59.4	15.4	11.1
Level of Service	C	C			C		D	B		E	B	B
Approach Delay (s)		27.2			34.2			15.7			15.6	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	66.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	5	35	15	5	15	30	1305	15	15	1020	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	2779			1649		1719	3419		1641	3282	1154
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1641	2779			1649		1719	3419		1641	3282	1154
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	211	6	39	17	6	17	33	1450	17	17	1133	44
RTOR Reduction (vph)	0	32	0	0	16	0	0	1	0	0	0	13
Lane Group Flow (vph)	211	13	0	0	24	0	33	1466	0	17	1133	31
Heavy Vehicles (%)	10%	0%	15%	0%	0%	15%	5%	5%	40%	10%	10%	40%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Effective Green, g (s)	13.8	13.8			4.3		2.8	45.2		0.7	43.1	43.1
Actuated g/C Ratio	0.17	0.17			0.05		0.03	0.57		0.01	0.54	0.54
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	283	479			89		60	1932		14	1768	622
v/s Ratio Prot	c0.13	0.00			c0.01		c0.02	c0.43		0.01	0.35	
v/s Ratio Perm												0.03
v/c Ratio	0.75	0.03			0.27		0.55	0.76		1.21	0.64	0.05
Uniform Delay, d1	31.4	27.5			36.3		38.0	13.3		39.6	13.0	8.7
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.2	0.0			1.6		10.5	2.9		317.6	1.8	0.1
Delay (s)	41.6	27.5			38.0		48.4	16.1		357.3	14.8	8.9
Level of Service	D	C			D		D	B		F	B	A
Approach Delay (s)		39.2			38.0			16.8			19.5	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	5	20	5	0	10	50	1090	5	5	1205	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.88			0.91		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1289	2466			1588		1719	3162		1444	3167	1346
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1289	2466			1588		1719	3162		1444	3167	1346
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	92	5	22	5	0	11	54	1185	5	5	1310	147
RTOR Reduction (vph)	0	19	0	0	11	0	0	0	0	0	0	37
Lane Group Flow (vph)	92	8	0	0	5	0	54	1190	0	5	1310	110
Heavy Vehicles (%)	40%	0%	35%	0%	10%	10%	5%	14%	40%	25%	14%	20%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	8.0	8.0			1.2		2.3	38.3		0.7	36.7	36.7
Effective Green, g (s)	8.0	8.0			1.2		2.3	38.3		0.7	36.7	36.7
Actuated g/C Ratio	0.12	0.12			0.02		0.04	0.60		0.01	0.57	0.57
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	161	307			30		62	1886		16	1810	769
v/s Ratio Prot	c0.07	0.00			c0.00		c0.03	0.38		0.00	c0.41	
v/s Ratio Perm												0.08
v/c Ratio	0.57	0.03			0.17		0.87	0.63		0.31	0.72	0.14
Uniform Delay, d1	26.5	24.7			31.0		30.8	8.4		31.5	10.0	6.4
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	4.8	0.0			2.8		70.2	1.6		10.9	2.6	0.4
Delay (s)	31.3	24.7			33.8		101.0	10.0		42.4	12.6	6.8
Level of Service	C	C			C		F	A		D	B	A
Approach Delay (s)		29.8			33.8			13.9			12.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	64.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	10	105	15	5	15	100	1065	25	20	870	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.86			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1388	2636			1612		1570	3165		1719	3008	1196
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1388	2636			1612		1570	3165		1719	3008	1196
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	156	11	113	16	5	16	108	1145	27	22	935	199
RTOR Reduction (vph)	0	93	0	0	15	0	0	1	0	0	0	86
Lane Group Flow (vph)	156	31	0	0	22	0	108	1171	0	22	935	113
Heavy Vehicles (%)	30%	0%	20%	0%	0%	20%	15%	14%	0%	5%	20%	35%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	11.7	11.7			2.7		7.1	35.3		1.4	29.6	29.6
Effective Green, g (s)	11.7	11.7			2.7		7.1	35.3		1.4	29.6	29.6
Actuated g/C Ratio	0.17	0.17			0.04		0.11	0.53		0.02	0.44	0.44
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	242	460			65		166	1665		36	1327	528
v/s Ratio Prot	c0.11	0.01			c0.01		c0.07	c0.37		0.01	0.31	
v/s Ratio Perm												0.09
v/c Ratio	0.64	0.07			0.33		0.65	0.70		0.61	0.70	0.21
Uniform Delay, d1	25.8	23.1			31.3		28.8	12.0		32.6	15.2	11.6
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.8	0.1			3.0		8.8	2.5		27.0	3.2	0.9
Delay (s)	31.5	23.2			34.3		37.6	14.5		59.5	18.4	12.5
Level of Service	C	C			C		D	B		E	B	B
Approach Delay (s)		27.9			34.3			16.4			18.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	67.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
10: Irwindale Ave & First St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	5	40	15	5	15	35	1420	15	15	1110	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95			1.00		1.00	0.95		1.00	0.95	1.00
Frt	1.00	0.87			0.94		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1641	2768			1649		1719	2574		1641	3282	1154
Flt Permitted	0.95	1.00			0.98		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1641	2768			1649		1719	2574		1641	3282	1154
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	228	6	44	17	6	17	39	1578	17	17	1233	50
RTOR Reduction (vph)	0	36	0	0	16	0	0	0	0	0	0	14
Lane Group Flow (vph)	228	14	0	0	24	0	39	1595	0	17	1233	36
Heavy Vehicles (%)	10%	0%	15%	0%	0%	15%	5%	40%	40%	10%	10%	40%
Turn Type	Split	NA		Split	NA		Prot	NA		Prot	NA	Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases												6
Actuated Green, G (s)	14.2	14.2			4.3		2.8	44.8		0.7	42.7	42.7
Effective Green, g (s)	14.2	14.2			4.3		2.8	44.8		0.7	42.7	42.7
Actuated g/C Ratio	0.18	0.18			0.05		0.03	0.56		0.01	0.53	0.53
Clearance Time (s)	4.0	4.0			4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0			3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	291	491			89		60	1441		14	1752	616
v/s Ratio Prot	c0.14	0.00			c0.01		c0.02	c0.62		0.01	0.38	
v/s Ratio Perm												0.03
v/c Ratio	0.78	0.03			0.27		0.65	1.11		1.21	0.70	0.06
Uniform Delay, d1	31.4	27.2			36.3		38.1	17.6		39.6	13.9	9.0
Progression Factor	1.00	1.00			1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	12.9	0.0			1.6		22.4	58.6		317.6	2.4	0.2
Delay (s)	44.3	27.2			38.0		60.5	76.2		357.3	16.3	9.2
Level of Service	D	C			D		E	E		F	B	A
Approach Delay (s)		41.2			38.0			75.8			20.5	
Approach LOS		D			D			E			C	

Intersection Summary			
HCM Average Control Delay	50.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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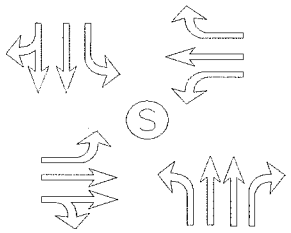
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	10	35%		10	5	15
EB RIGHT	10	25%		10	5	15
WB LEFT	495	5%		495	45	540
WB THRU	65	5%		65	5	70
WB RIGHT	580	10%	**50**	630	55	685
IRWINDALE AVE						
NB LEFT	10	20%		10	5	15
NB THRU	515	10%		515	45	560
NB RIGHT	55	10%		55	5	60
SB LEFT	185	25%	**50**	235	20	255
SB THRU	780	5%		780	70	850
SB RIGHT	5	5%		5	5	10
TOTALS	**2715**		**100**	**2815**	**270**	**3085**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	10	35%		10	5	15
EB RIGHT	10	25%		10	5	15
WB LEFT	495	5%		495	45	540
WB THRU	65	5%		65	5	70
WB RIGHT	580	10%		580	50	630
IRWINDALE AVE						
NB LEFT	10	20%		10	5	15
NB THRU	515	10%		515	45	560
NB RIGHT	55	10%		55	5	60
SB LEFT	185	25%	**50**	235	20	255
SB THRU	780	5%		780	70	850
SB RIGHT	5	5%		5	5	10
TOTALS	**2715**		**50**	**2765**	**265**	**3030**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	25	20%		25	5	30
EB RIGHT	35	5%		35	5	40
WB LEFT	130	5%		130	10	140
WB THRU	20	10%		20	5	25
WB RIGHT	200	20%	**50**	250	25	275
IRWINDALE AVE						
NB LEFT	15	5%		15	5	20
NB THRU	770	10%		770	70	840
NB RIGHT	90	5%		90	10	100
SB LEFT	165	30%	**50**	215	20	235
SB THRU	750	10%		750	70	820
SB RIGHT	5	5%		5	5	10
TOTALS	**2210**		**100**	**2310**	**235**	**2545**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	25	20%		25	5	30
EB RIGHT	35	5%		35	5	40
WB LEFT	130	5%		130	10	140
WB THRU	20	10%		20	5	25
WB RIGHT	200	20%		200	20	220
IRWINDALE AVE						
NB LEFT	15	5%		15	5	20
NB THRU	770	10%		770	70	840
NB RIGHT	90	5%		90	10	100
SB LEFT	165	30%	**50**	215	20	235
SB THRU	750	10%		750	70	820
SB RIGHT	5	5%		5	5	10
TOTALS	**2210**		**50**	**2260**	**230**	**2490**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	70	5%		70	5	75
EB RIGHT	30	5%		30	5	35
WB LEFT	130	5%		130	10	140
WB THRU	10	10%		10	5	15
WB RIGHT	175	5%	**50**	225	20	245
IRWINDALE AVE						
NB LEFT	10	40%		10	5	15
NB THRU	1170	5%		1170	105	1275
NB RIGHT	330	10%		330	30	360
SB LEFT	310	10%	**50**	360	30	390
SB THRU	700	5%		700	65	765
SB RIGHT	5	30%		5	5	10
TOTALS	**2945**		**100**	**3045**	**290**	**3335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	70	5%		70	5	75
EB RIGHT	30	5%		30	5	35
WB LEFT	130	5%		130	10	140
WB THRU	10	10%		10	5	15
WB RIGHT	175	5%		175	15	190
IRWINDALE AVE						
NB LEFT	10	40%		10	5	15
NB THRU	1170	5%		1170	105	1275
NB RIGHT	330	10%		330	30	360
SB LEFT	310	10%	**50**	360	30	390
SB THRU	700	5%		700	65	765
SB RIGHT	5	30%		5	5	10
TOTALS	**2945**		**50**	**2995**	**285**	**3280**

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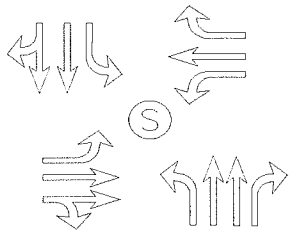
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	2	0	0	5	**0**	5	5	10
EB THRU	6	3	9	15	**0**	15	5	20
EB RIGHT	9	3	9	20	**0**	20	5	25
WB LEFT	476	19	57	535	**0**	535	50	585
WB THRU	61	3	9	70	**0**	70	5	75
WB RIGHT	518	61	183	700	**150**	850	75	925
IRWINDALE AVE								
NB LEFT	9	2	6	15	**0**	15	5	20
NB THRU	476	39	117	595	**0**	595	55	650
NB RIGHT	51	5	15	65	**0**	65	5	70
SB LEFT	136	50	150	285	**150**	435	40	475
SB THRU	749	33	99	850	**0**	850	75	925
SB RIGHT	4	0	0	5	**0**	5	5	10
TOTALS	**2497**				**300**	**3460**	**330**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	2	0	0	5	**0**	5	5	10
EB THRU	6	3	9	15	**0**	15	5	20
EB RIGHT	9	3	9	20	**0**	20	5	25
WB LEFT	476	19	57	535	**0**	535	50	585
WB THRU	61	3	9	70	**0**	70	5	75
WB RIGHT	518	61	183	700	**0**	700	65	765
IRWINDALE AVE								
NB LEFT	9	2	6	15	**0**	15	5	20
NB THRU	476	39	117	595	**0**	595	55	650
NB RIGHT	51	5	15	65	**0**	65	5	70
SB LEFT	136	50	150	285	**150**	435	40	475
SB THRU	749	33	99	850	**0**	850	75	925
SB RIGHT	4	0	0	5	**0**	5	5	10
TOTALS	**2497**				**150**	**3310**	**320**	**3630**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	1	0	0	5	**0**	5	5	10
EB THRU	18	5	15	35	**0**	35	5	40
EB RIGHT	32	1	3	35	**0**	35	5	40
WB LEFT	125	7	21	145	**0**	145	15	160
WB THRU	20	2	6	25	**0**	25	5	30
WB RIGHT	156	44	132	290	**150**	440	40	480
IRWINDALE AVE								
NB LEFT	15	1	3	20	**0**	20	5	25
NB THRU	712	59	177	890	**0**	890	80	970
NB RIGHT	89	3	9	100	**0**	100	10	110
SB LEFT	111	52	156	265	**150**	415	35	450
SB THRU	690	61	183	875	**0**	875	80	955
SB RIGHT	7	0	0	5	**0**	5	5	10
TOTALS	**1976**				**300**	**2990**	**290**	**3280**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	1	0	0	5	**0**	5	5	10
EB THRU	18	5	15	35	**0**	35	5	40
EB RIGHT	32	1	3	35	**0**	35	5	40
WB LEFT	125	7	21	145	**0**	145	15	160
WB THRU	20	2	6	25	**0**	25	5	30
WB RIGHT	156	44	132	290	**0**	290	25	315
IRWINDALE AVE								
NB LEFT	15	1	3	20	**0**	20	5	25
NB THRU	712	59	177	890	**0**	890	80	970
NB RIGHT	89	3	9	100	**0**	100	10	110
SB LEFT	111	52	156	265	**150**	415	35	450
SB THRU	690	61	183	875	**0**	875	80	955
SB RIGHT	7	0	0	5	**0**	5	5	10
TOTALS	**1976**				**150**	**2840**	**275**	**3115**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	4	0	0	5	**0**	5	5	10
EB THRU	72	0	0	70	**0**	70	5	75
EB RIGHT	31	1	3	35	**0**	35	5	40
WB LEFT	124	7	21	145	**0**	145	15	160
WB THRU	8	1	3	10	**0**	10	5	15
WB RIGHT	163	11	33	195	**150**	345	30	375
IRWINDALE AVE								
NB LEFT	5	3	9	15	**0**	15	5	20
NB THRU	1134	38	114	1250	**0**	1250	115	1365
NB RIGHT	291	38	114	405	**0**	405	35	440
SB LEFT	282	26	78	360	**150**	510	45	555
SB THRU	655	44	132	785	**0**	785	70	855
SB RIGHT	5	2	6	10	**0**	10	5	15
TOTALS	**2774**				**300**	**3585**	**340**	**3925**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : GLADSTONE STREET
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 11
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	4	0	0	5	**0**	5	5	10
EB THRU	72	0	0	70	**0**	70	5	75
EB RIGHT	31	1	3	35	**0**	35	5	40
WB LEFT	124	7	21	145	**0**	145	15	160
WB THRU	8	1	3	10	**0**	10	5	15
WB RIGHT	163	11	33	195	**0**	195	20	215
IRWINDALE AVE								
NB LEFT	5	3	9	15	**0**	15	5	20
NB THRU	1134	38	114	1250	**0**	1250	115	1365
NB RIGHT	291	38	114	405	**0**	405	35	440
SB LEFT	282	26	78	360	**150**	510	45	555
SB THRU	655	44	132	785	**0**	785	70	855
SB RIGHT	5	2	6	10	**0**	10	5	15
TOTALS	**2774**				**150**	**3435**	**330**	**3765**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 07:15AM

NORTH LEG (SB)

TOTAL: 972

TT = 83

$TT\% = \frac{83}{972} = 8.54\% \approx 9\%$

5 4	782 (788)	186 (185)	Total
1	170	41	1st
0	185	44	2nd
1	233	49	3rd
2	194	52	4th
Rt	Thru	Lt	

$TT = \frac{83}{1138} = 7.29\% \approx 7\%$

EAST LEG TOTAL: (WB) 1,138

Rt	154	131	181	113	579 (580)
Thru	9	13	21	21	64 (65)
Lt	138	118	135	104	495
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
5 2	0	0	1	1	Lt
10 9	3	2	1	3	Thru
10 12	3	2	3	4	Rt

WEST LEG TOTAL: (EB) 23

TT = 6

$TT\% = \frac{6}{23} = 26.09\% \approx 26\%$

	Lt	Thru	Rt
1st	1	138	9
2nd	6	149	12
3rd	1	119	15
4th	3	109	20
Total	10 11	515	55 56

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.87
EAST LEG = 0.84
WEST LEG = 0.72

ALL LEGS = 0.89

TT = 46

$TT\% = \frac{46}{582} = 7.9\% \approx 8\%$

TOTAL: 582

HOUR TOTAL: 2,715

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 07:00AM-08:00AM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
2	737	150	Total
0	149	16	1st
1	170	41	2nd
0	185	44	3rd
1	233	49	4th

	1st	2nd	3rd	4th	Total
Rt	137	154	131	181	603
Thru	18	9	13	21	61
Lt	134	138	118	135	525

Total	1st	2nd	3rd	4th	
1	0	0	0	1	Lt
6	0	3	2	1	Thru
11	3	3	2	3	Rt

	Lt	Thru	Rt
1st	4	133	8
2nd	1	138	9
3rd	6	149	12
4th	1	119	15
Total	12	539	44

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 08:00AM-09:00AM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
4	829	150	Total
2	194	52	1st
0	284	24	2nd
1	192	36	3rd
1	159	38	4th

	1st	2nd	3rd	4th	Total
Rt	113	135	99	76	423
Thru	21	9	6	5	41
Lt	104	29	26	58	217

Total	1st	2nd	3rd	4th	
2	1	0	1	0	Lt
4	3	1	0	0	Thru
7	4	0	2	1	Rt

	Lt	Thru	Rt
1st	3	109	20
2nd	1	97	12
3rd	1	127	15
4th	0	186	9
Total	5	519	56

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-01-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
0	138	12	0	3	0	0	1	0	0	7	4	165
1	163	33	0	6	4	0	0	2	0	1	2	212
0	182	31	0	1	3	0	0	0	0	2	10	229
1	226	36	0	5	3	0	0	1	0	2	9	283
2	178	36	0	9	3	0	2	3	0	5	10	248
0	274	11	0	5 34	4	0	1 8	0	0	4 41	9	308
0	179	25	1	8	3	0	0	2	0	5	6	229
1	145	25	0	10	2	0	1	1	0	3	10	198
						TT= 34+8+41 = 83						
5	1485	209	1	47	22	0	5	9	0	29	60	1872
					NB SOUTH LEG							
6	123	4	2	8	0	0	0	0	0	2	0	145
9	130	1	0	6	0	0	0	0	0	2	0	148
9	139	4	0	4	2	0	2	0	3	4	0	167
14	112	1	1	6	0	0	0	0	0	1	0	135
19	95	3	1	7	0	0	0	0	0	7	0	132
10	88	1	1	5 27	0	1	0 2	0	0	4 17	0	110
15	117	1	0	7	0	0	1	0	0	2	0	143
9	167	0	0	11	0	0	2	0	0	6	0	195
						TT= 27+2+17=46						
91	971	15	5	54	2	1	5	0	3	28	0	1175
					WB EAST LEG							
130	18	127	2	0	1	1	0	0	4	0	6	289
141	8	131	5	0	4	3	0	1	5	1	2	301
118	12	115	4	0	1	2	0	0	7	1	2	262
162	20	129	5	0	2	1	1	1	13	0	3	337
97	21	101	4	0	0	1	0	1	11	0	2	238
124	9	26	3	0 25	2	1	0 11	0	7	0 47	1	173
87	6	21	2	0	4	5	0	0	5	0	1	131
69	5	52	4	0	4	0	0	0	3	0	2	139
						TT= 25+11+47=83						
928	99	702	29	0	18	14	1	3	55	2	19	1870
					EB WEST LEG							
3	0	0	0	0	0	0	0	0	0	0	0	3
3	1	0	0	0	0	0	1	0	0	1	0	6
0	2	0	2	0	0	0	0	0	0	0	0	4
3	1	1	0	0	0	0	0	0	0	0	0	5
3	2	1	1	0	0	0	0	0	0	1	0	8
0	1	0	0	0 3	0	0	0 1	0	0	0 2	0	1
2	0	1	0	0	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	0	0	0	0	1
						TT= 3+1+2 = 6						
15	7	3	3	0	0	0	1	0	0	2	0	31

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 12:15PM

NORTH LEG (SB)

TOTAL: 921

TT= 113

TT% = 113/921 = 12.27% ≈ 12%

	Rt	Thru	Lt	
	5 7	750 751	165 163	Total
	0	164	40	1st
	3	190	42	2nd
	3	206	40	3rd
	1	191	41	4th

TT= 53

TT% = 53/354 = 14.97% ≈ 15%

EAST LEG TOTAL: (WB) 354

	1st	2nd	3rd	4th	Total
Rt	55	47	55	43	200
Thru	4	5	9	4	20 22
Lt	39	32	23	38	130 132

	Total	1st	2nd	3rd	4th	
	5 1	0	0	1	0	Lt
	25 23	6	3	6	8	Thru
	35 33	5	13	10	5	Rt

WEST LEG TOTAL: (EB) 57

TT= 6

TT% = 6/57 = 10.53% ≈ 11%

	Lt	Thru	Rt	
1st	2	260	20	
2nd	5	176	27	
3rd	6	167	19	
4th	3	168	26	
Total	15 16	770 771	90 92	TOTAL: 879

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.78
EAST LEG = 0.90
WEST LEG = 0.84

ALL LEGS = 0.93

TT= 63

TT% = 63/879 = 7.17% ≈ 7%

HOUR TOTAL: 2,211

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 12:00PM-01:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
8	691	161	Total
2	131	39	1st
0	164	40	2nd
3	190	42	3rd
3	206	40	4th

	1st	2nd	3rd	4th	Total
Rt	45	55	47	55	202
Thru	3	4	5	9	21
Lt	33	39	32	23	127

Total	1st	2nd	3rd	4th	
1	0	0	0	1	Lt
20	5	6	3	6	Thru
35	7	5	13	10	Rt

	Lt	Thru	Rt
1st	4	229	29
2nd	2	260	20
3rd	5	176	27
4th	6	167	19
Total	17	832	95

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 01:00PM-02:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
9	751	147	Total
1	191	41	1st
1	180	37	2nd
2	227	33	3rd
5	153	36	4th

	1st	2nd	3rd	4th	Total
Rt	43	54	43	72	212
Thru	4	5	8	8	25
Lt	38	39	38	30	145

Total	1st	2nd	3rd	4th	
1	0	0	1	0	Lt
18	8	4	6	0	Thru
26	5	9	5	7	Rt

	Lt	Thru	Rt
1st	3	168	26
2nd	3	158	22
3rd	6	196	20
4th	2	183	30
Total	14	705	98

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-01-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
2	121	32	0	7	3	0	1	1	0	2	3	172
0	146	26	0	7	2	0	4	2	0	7	10	204
3	176	29	0	5	3	0	4	0	0	5	10	235
3	190	28	0	9	3	0	1	0	0	6	9	249
1	178	28	0	7	3	0	1	1	0	5	9	233
1	166	25	0	8 39	2	0	2 13	2	0	4 61	8	218
2	205	18	0	17	5	0	1	3	0	4	7	262
5	149	32	0	3	2	0	0	0	0	1	2	194
						TT=39+13+61=113						
17	1331	218	0	63	23	0	14	9	0	34	58	1767
						NB SOUTH LEG						
25	215	4	1	6	0	2	1	0	1	7	0	262
19	243	2	0	14	0	1	0	0	0	3	0	282
27	158	5	0	9	0	0	2	0	0	7	0	208
17	155	5	0	7	1	1	1	0	1	4	0	192
26	156	3	0	4	0	0	1	0	0	7	0	197
20	138	3	1	8 35	0	0	3 6	0	1	9 22	0	183
17	177	6	2	9	0	1	1	0	0	9	0	222
28	179	2	1	2	0	0	1	0	1	1	0	215
						TT=35+6+22=63						
179	1421	30	5	59	1	5	10	0	4	47	0	1761
						WB EAST LEG						
29	3	31	5	0	2	4	0	0	7	0	0	81
41	3	37	5	1	1	2	0	1	7	0	0	98
40	4	32	0	0	0	2	1	0	5	0	0	84
39	9	23	4	0	0	0	0	0	12	0	0	87
36	4	33	2	0	2	0	0	1	5	0	2	85
41	5	34	2	0 15	2	1	0 7	3	10	0 31	0	98
34	8	35	3	0	1	1	0	2	5	0	0	89
70	7	29	0	1	0	0	0	1	2	0	0	110
						TT=15+7+31=53						
330	43	254	21	2	8	10	1	8	53	0	2	732
						EB WEST LEG						
7	5	0	0	0	0	0	0	0	0	0	0	12
5	4	0	0	2	0	0	0	0	0	0	0	11
13	2	0	0	1	0	0	0	0	0	0	0	16
10	5	1	0	0	0	0	0	0	0	1	0	17
4	7	0	0	1	0	0	0	0	1	0	0	13
7	3	0	2	1 4	0	0	0 0	0	0	0 2	0	13
4	6	0	1	0	0	0	0	1	0	0	0	12
7	0	0	0	0	0	0	0	0	0	0	0	7
						TT=4+0+2=6						
57	32	1	3	5	0	0	0	1	1	1	0	101

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-01-11

PEAK HOUR: 04:30PM

NORTH LEG (SB)

TOTAL: 1,014

TT = 72

$TT\% = \frac{72}{1014} = 7.1\%$
$\approx 7\%$

	Rt	Thru	Lt	
	7 (5)	699 (700)	308 (310)	Total
	2	155	74	1st
	1	151	74	2nd
	2	181	86	3rd
	2	212	74	4th

TT = 19

$TT\% = \frac{19}{314} = 6.05\%$
$\approx 6\%$

EAST LEG TOTAL: (WB) 314

	1st	2nd	3rd	4th	Total
Rt	45	25	56	48	174 (175)
Thru	4	3	1	1	9 (10)
Lt	43	34	23	31	131 (130)

	Total	1st	2nd	3rd	4th	
	4 (5)	1	0	1	2	Lt
	72 (70)	22	12	27	11	Thru
	32 (30)	9	9	9	5	Rt

WEST LEG TOTAL: (EB) 108

TT = 1

$TT\% = \frac{1}{108} = 0.93\%$
$\approx 1\%$

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.95
EAST LEG = 0.85
WEST LEG = 0.73

ALL LEGS = 0.94

	Lt	Thru	Rt
1st	1	308	81
2nd	4	274	71
3rd	1	310	85
4th	2	280	92
Total	8 (10)	1172 (1170)	329 (330)

SOUTH LEG (NB)

TT = 79

$TT\% = \frac{79}{1509} = 5.24\%$
$\approx 5\%$

TOTAL: 1,509

HOUR TOTAL: 2,945

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 04:00PM-05:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
4	643	274	Total
1	213	58	1st
0	124	68	2nd
2	155	74	3rd
1	151	74	4th

	1st	2nd	3rd	4th	Total
Rt	54	46	45	25	170
Thru	1	1	4	3	9
Lt	28	21	43	34	126

Total	1st	2nd	3rd	4th	
4	1	2	1	0	Lt
53	6	13	22	12	Thru
30	5	7	9	9	Rt

	Lt	Thru	Rt
1st	3	219	58
2nd	5	229	61
3rd	1	308	81
4th	4	274	71
Total	13	1030	271

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE

EAST-WEST STREET: GLADSTONE

TIME: 05:00PM-06:00PM DATE: 06-01-11

NORTH LEG

Rt	Thru	Lt	
7	772	344	Total
2	181	86	1st
2	212	74	2nd
1	172	94	3rd
2	207	90	4th

	1st	2nd	3rd	4th	Total
Rt	56	48	52	51	207
Thru	1	1	1	2	5
Lt	23	31	36	58	148

Total	1st	2nd	3rd	4th	
5	1	2	0	2	Lt
48	27	11	10	0	Thru
23	9	5	7	2	Rt

	Lt	Thru	Rt
1st	1	310	85
2nd	2	280	92
3rd	1	198	87
4th	9	180	99
Total	13	968	363

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE — IRWINDALE

EAST-WEST STREET : GLADSTONE — 06-01-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
1	187	53	0	22	1	0	3	2	0	1	2	272
0	105	62	0	14	5	0	0	0	0	5	1	192
1	144	65	0	7	5	0	2	2	1	2	2	231
1	136	67	0	12	2	0	2	3	0	1	2	226
2	171	81	0	4	4	0	1	1	0	5	0	269
1	204	69	0	4	5	0	1	0	1	3	0	288
1	170	92	0	0 43	2	0	1 12	0	0	1 17	0	267
2	203	88	0	4	2	0	0	0	0	0	0	299
						TT=43+12+17=72						
9	1320	577	0	67	26	0	10	8	2	18	7	2044
						NB SOUTH LEG						
48	199	3	1	6	0	8	5	0	1	9	0	280
51	219	4	1	4	0	8	1	0	1	5	1	295
74	295	0	0	5	1	7	1	0	0	7	0	390
64	265	2	1	6	1	6	0	1	0	3	0	349
71	298	1	7	8	0	6	0	0	1	4	0	396
82	276	2	1	4	0	8	0	0	1	0	0	374
82	196	1	0	1 34	0	5	0 29	0	0	1 16	0	286
98	179	8	0	0	1	1	0	0	0	1	0	288
						TT=34+29+16=79						
570	1927	21	11	34	3	49	7	1	4	30	1	2658
						WB EAST LEG						
49	1	27	4	0	1	0	0	0	1	0	0	83
42	1	17	3	0	2	0	0	1	1	0	1	68
40	3	40	3	0	1	2	1	1	0	0	1	92
23	3	31	1	0	0	1	0	1	0	0	2	62
56	1	22	0	0	0	0	0	1	0	0	0	80
44	1	31	4	0	0	0	0	0	0	0	0	80
50	1	34	0	0 9	0	1	0 7	0	1	0 3	2	89
48	2	58	2	0	0	0	0	0	1	0	0	111
						TT=9+7+3=19						
352	13	260	17	0	4	4	1	4	4	0	6	665
						EB WEST LEG						
4	5	0	1	1	1	0	0	0	0	0	0	12
7	12	2	0	0	0	0	1	0	0	0	0	22
9	22	1	0	0	0	0	0	0	0	0	0	32
8	12	0	1	0	0	0	0	0	0	0	0	21
9	27	1	0	0	0	0	0	0	0	0	0	37
5	11	2	0	0	0	0	0	0	0	0	0	18
7	10	0	0	0 1	0	0	0 0	0	0	0 0	0	17
2	0	1	0	0	0	0	0	0	0	0	1	4
						TT=1+0+0=1						
51	99	7	2	1	1	0	1	0	0	0	1	163

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	10	10	495	65	580	10	515	55	185	780	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2569		1719	1810	1468	1504	3282	1468	1444	3436	
Flt Permitted	0.64	1.00		0.74	1.00	1.00	0.26	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1218	2569		1343	1810	1468	404	3282	1468	340	3436	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	11	11	556	73	652	11	579	62	208	876	6
RTOR Reduction (vph)	0	6	0	0	0	93	0	0	45	0	1	0
Lane Group Flow (vph)	6	16	0	556	73	559	11	579	17	208	881	0
Heavy Vehicles (%)	0%	35%	25%	5%	5%	10%	20%	10%	10%	25%	5%	0%
Turn Type	pm+pt	NA		Perm	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases	7	4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	42.1	42.1		37.4	37.4	48.3	24.0	23.3	23.3	38.2	33.5	
Effective Green, g (s)	42.1	42.1		37.4	37.4	48.3	24.0	23.3	23.3	38.2	33.5	
Actuated g/C Ratio	0.48	0.48		0.42	0.42	0.55	0.27	0.26	0.26	0.43	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	585	1225		569	767	869	119	866	387	283	1304	
v/s Ratio Prot	0.00	c0.01			0.04	c0.08	0.00	0.18		c0.09	0.26	
v/s Ratio Perm	0.00			c0.41		0.30	0.02		0.01	c0.23		
v/c Ratio	0.01	0.01		0.98	0.10	0.64	0.09	0.67	0.04	0.73	0.68	
Uniform Delay, d1	12.2	12.2		25.0	15.3	14.0	23.7	29.0	24.2	18.1	22.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		31.6	0.1	1.6	0.3	4.1	0.2	9.5	2.8	
Delay (s)	12.2	12.2		56.6	15.3	15.6	24.1	33.1	24.4	27.6	25.7	
Level of Service	B	B		E	B	B	C	C	C	C	C	
Approach Delay (s)		12.2			33.4			32.1			26.1	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	88.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	25	35	130	20	200	15	770	90	165	750	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2961		1719	1727	1346	1719	3282	1538	1388	3281	
Flt Permitted	0.74	1.00		0.71	1.00	1.00	0.35	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	1412	2961		1289	1727	1346	625	3282	1538	331	3281	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	27	38	140	22	215	16	828	97	177	806	5
RTOR Reduction (vph)	0	31	0	0	0	31	0	0	53	0	0	0
Lane Group Flow (vph)	5	34	0	140	22	184	16	828	44	177	811	0
Heavy Vehicles (%)	0%	20%	5%	5%	10%	20%	5%	10%	5%	30%	10%	0%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.1	11.1		11.1	11.1	23.2	26.6	25.9	25.9	38.0	33.3	
Effective Green, g (s)	11.1	11.1		11.1	11.1	23.2	26.6	25.9	25.9	38.0	33.3	
Actuated g/C Ratio	0.19	0.19		0.19	0.19	0.41	0.47	0.45	0.45	0.67	0.58	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	274	576		251	336	547	305	1489	698	370	1913	
v/s Ratio Prot		0.01			0.01	c0.14	0.00	c0.25		c0.07	0.25	
v/s Ratio Perm	0.00			c0.11			0.02		0.03	0.25		
v/c Ratio	0.02	0.06		0.56	0.07	0.34	0.05	0.56	0.06	0.48	0.42	
Uniform Delay, d1	18.6	18.7		20.8	18.8	11.7	8.2	11.4	8.8	5.0	6.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		2.7	0.1	0.4	0.1	1.5	0.2	1.0	0.7	
Delay (s)	18.6	18.8		23.5	18.9	12.0	8.3	12.9	8.9	6.0	7.3	
Level of Service	B	B		C	B	B	A	B	A	A	A	
Approach Delay (s)		18.8			16.7			12.4			7.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	57.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	70	30	130	10	175	10	1170	330	310	700	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3395		1719	1727	1538	1289	3438	1468	1641	3429	
Flt Permitted	0.75	1.00		0.41	1.00	1.00	0.37	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1426	3395		746	1727	1538	498	3438	1468	175	3429	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	74	32	138	11	186	11	1245	351	330	745	5
RTOR Reduction (vph)	0	30	0	0	0	10	0	0	128	0	0	0
Lane Group Flow (vph)	5	76	0	138	11	176	11	1245	223	330	750	0
Heavy Vehicles (%)	0%	0%	5%	5%	10%	5%	40%	5%	10%	10%	5%	30%
Turn Type	Perm	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases		4		3	8	1	5	2	3	1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	5.7	5.7		14.1	14.1	26.1	36.3	35.5	39.9	51.5	46.7	
Effective Green, g (s)	5.7	5.7		14.1	14.1	26.1	36.3	35.5	39.9	51.5	46.7	
Actuated g/C Ratio	0.08	0.08		0.19	0.19	0.35	0.49	0.48	0.54	0.70	0.63	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	110	263		201	331	629	254	1658	876	361	2176	
v/s Ratio Prot		0.02		c0.04	0.01	0.05	0.00	0.36	0.02	c0.15	0.22	
v/s Ratio Perm	0.00			c0.09		0.07	0.02		0.14	c0.49		
v/c Ratio	0.05	0.29		0.69	0.03	0.28	0.04	0.75	0.25	0.91	0.34	
Uniform Delay, d1	31.4	32.0		26.8	24.2	17.0	9.5	15.5	8.9	19.8	6.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.6		9.3	0.0	0.2	0.1	3.2	0.2	26.8	0.4	
Delay (s)	31.6	32.7		36.2	24.2	17.3	9.6	18.6	9.1	46.6	6.7	
Level of Service	C	C		D	C	B	A	B	A	D	A	
Approach Delay (s)		32.6			25.3			16.5			18.9	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	18.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	73.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	10	10	495	65	630	10	515	55	235	780	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2569		1719	1810	1380	1504	3282	1468	1280	3436	
Flt Permitted	0.71	1.00		0.74	1.00	1.00	0.32	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1348	2569		1343	1810	1380	510	3282	1468	301	3436	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	11	11	556	73	708	11	579	62	264	876	6
RTOR Reduction (vph)	0	6	0	0	0	14	0	0	46	0	1	0
Lane Group Flow (vph)	6	16	0	556	73	694	11	579	16	264	881	0
Heavy Vehicles (%)	0%	35%	25%	5%	5%	17%	20%	10%	10%	41%	5%	0%
Turn Type	Perm	NA		Perm	NA	pm+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	1	5	2		1	6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	33.8	33.8		33.8	33.8	48.2	22.1	21.3	21.3	39.7	34.9	
Effective Green, g (s)	33.8	33.8		33.8	33.8	48.2	22.1	21.3	21.3	39.7	34.9	
Actuated g/C Ratio	0.41	0.41		0.41	0.41	0.59	0.27	0.26	0.26	0.49	0.43	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	559	1065		557	751	884	148	858	384	320	1471	
v/s Ratio Prot		0.01			0.04	c0.14	0.00	0.18		c0.15	0.26	
v/s Ratio Perm	0.00			c0.41		0.36	0.02		0.01	c0.26		
v/c Ratio	0.01	0.01		1.00	0.10	0.79	0.07	0.67	0.04	0.82	0.60	
Uniform Delay, d1	14.0	14.0		23.8	14.5	12.7	21.8	27.0	22.5	15.2	17.9	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		37.4	0.1	4.6	0.2	4.2	0.2	15.7	1.8	
Delay (s)	14.0	14.0		61.2	14.6	17.3	22.0	31.2	22.7	30.9	19.7	
Level of Service	B	B		E	B	B	C	C	C	C	B	
Approach Delay (s)		14.0			35.4			30.3			22.3	
Approach LOS		B			D			C			C	

Intersection Summary			
HCM Average Control Delay	29.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	81.5	Sum of lost time (s)	4.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	25	35	130	20	250	15	770	90	215	750	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2961		1719	1727	1106	1719	3282	1538	1236	3281	
Flt Permitted	0.74	1.00		0.71	1.00	1.00	0.35	1.00	1.00	0.20	1.00	
Satd. Flow (perm)	1412	2961		1289	1727	1106	625	3282	1538	265	3281	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	27	38	140	22	269	16	828	97	231	806	5
RTOR Reduction (vph)	0	30	0	0	0	21	0	0	58	0	0	0
Lane Group Flow (vph)	5	35	0	140	22	248	16	828	39	231	811	0
Heavy Vehicles (%)	0%	20%	5%	5%	10%	46%	5%	10%	5%	46%	10%	0%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.4	12.4		12.4	12.4	26.6	24.2	23.5	23.5	37.7	33.0	
Effective Green, g (s)	12.4	12.4		12.4	12.4	26.6	24.2	23.5	23.5	37.7	33.0	
Actuated g/C Ratio	0.21	0.21		0.21	0.21	0.46	0.42	0.40	0.40	0.65	0.57	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	301	632		275	369	506	274	1327	622	342	1864	
v/s Ratio Prot		0.01			0.01	c0.22	0.00	0.25		c0.12	0.25	
v/s Ratio Perm	0.00			0.11			0.02		0.03	c0.32		
v/c Ratio	0.02	0.06		0.51	0.06	0.49	0.06	0.62	0.06	0.68	0.43	
Uniform Delay, d1	18.0	18.2		20.2	18.2	11.0	10.0	13.8	10.6	6.6	7.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		1.5	0.1	0.8	0.1	2.2	0.2	5.2	0.7	
Delay (s)	18.1	18.2		21.6	18.3	11.8	10.1	16.0	10.8	11.8	7.9	
Level of Service	B	B		C	B	B	B	B	B	B	A	
Approach Delay (s)		18.2			15.3			15.4			8.8	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	4.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	70	30	130	10	225	10	1170	330	360	700	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3395		1719	1727	1282	1289	3438	1468	1467	3429	
Flt Permitted	0.75	1.00		0.69	1.00	1.00	0.37	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1426	3395		1240	1727	1282	498	3438	1468	153	3429	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	74	32	138	11	239	11	1245	351	383	745	5
RTOR Reduction (vph)	0	27	0	0	0	10	0	0	129	0	0	0
Lane Group Flow (vph)	5	79	0	138	11	229	11	1245	222	383	750	0
Heavy Vehicles (%)	0%	0%	5%	5%	10%	26%	40%	5%	10%	23%	5%	30%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	13.1	13.1		13.1	13.1	34.9	37.2	36.4	36.4	58.2	53.4	
Effective Green, g (s)	13.1	13.1		13.1	13.1	34.9	37.2	36.4	36.4	58.2	53.4	
Actuated g/C Ratio	0.17	0.17		0.17	0.17	0.44	0.47	0.46	0.46	0.73	0.67	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	236	561		205	285	564	242	1578	674	407	2309	
v/s Ratio Prot		0.02			0.01	0.18	0.00	0.36		c0.21	0.22	
v/s Ratio Perm	0.00			c0.11			0.02		0.15	c0.48		
v/c Ratio	0.02	0.14		0.67	0.04	0.41	0.05	0.79	0.33	0.94	0.32	
Uniform Delay, d1	27.7	28.3		31.1	27.8	15.1	11.3	18.2	13.7	22.5	5.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.1		8.4	0.1	0.5	0.1	4.1	1.3	30.0	0.4	
Delay (s)	27.8	28.4		39.5	27.9	15.6	11.3	22.3	15.0	52.5	5.8	
Level of Service	C	C		D	C	B	B	C	B	D	A	
Approach Delay (s)		28.4			24.5			20.6			21.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	79.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	10	10	540	70	685	10	560	60	255	850	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2569		1719	1810	1380	1504	3282	1468	1280	3436	
Flt Permitted	1.00	1.00		0.58	1.00	1.00	0.28	1.00	1.00	0.20	1.00	
Satd. Flow (perm)	1900	2569		1049	1810	1380	443	3282	1468	268	3436	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	11	11	607	79	770	11	629	67	287	955	6
RTOR Reduction (vph)	0	11	0	0	0	100	0	0	28	0	1	0
Lane Group Flow (vph)	6	11	0	607	79	670	11	629	39	287	960	0
Heavy Vehicles (%)	0%	35%	25%	5%	5%	17%	20%	10%	10%	41%	5%	0%
Turn Type	pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases	7	4		3	8	8 1	5	2	3	1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	3.6	2.9		29.7	25.0	41.1	20.1	19.4	42.2	35.5	30.8	
Effective Green, g (s)	3.6	2.9		29.7	25.0	41.1	20.1	19.4	42.2	35.5	30.8	
Actuated g/C Ratio	0.05	0.04		0.41	0.34	0.56	0.27	0.27	0.58	0.48	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	93	102		634	618	775	132	870	927	297	1446	
v/s Ratio Prot	0.00	0.00		c0.30	0.04	c0.49	0.00	0.19	0.01	c0.16	0.28	
v/s Ratio Perm	0.00			0.09			0.02		0.01	c0.31		
v/c Ratio	0.06	0.11		0.96	0.13	0.86	0.08	0.72	0.04	0.97	0.66	
Uniform Delay, d1	33.2	33.9		20.2	16.6	13.7	19.4	24.5	6.7	15.6	17.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.5		25.3	0.1	9.9	0.3	5.2	0.0	42.7	2.4	
Delay (s)	33.5	34.4		45.5	16.7	23.6	19.7	29.6	6.7	58.3	19.5	
Level of Service	C	C		D	B	C	B	C	A	E	B	
Approach Delay (s)		34.2			32.3			27.3			28.4	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	29.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	73.2	Sum of lost time (s)	4.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	25	40	140	20	275	15	840	100	235	820	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2958		1719	1727	1106	1719	3282	1538	1236	3281	
Flt Permitted	0.74	1.00		0.51	1.00	1.00	0.32	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	1412	2958		916	1727	1106	580	3282	1538	223	3281	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	27	43	151	22	296	16	903	108	253	882	5
RTOR Reduction (vph)	0	38	0	0	0	108	0	0	51	0	0	0
Lane Group Flow (vph)	5	32	0	151	22	188	16	903	57	253	887	0
Heavy Vehicles (%)	0%	20%	5%	5%	10%	46%	5%	10%	5%	46%	10%	0%
Turn Type	pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases	7	4		3	8	8 1	5	2	2 3	1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.7	8.0		15.1	11.2	26.3	27.4	26.7	34.6	41.8	37.1	
Effective Green, g (s)	8.7	8.0		15.1	11.2	26.3	27.4	26.7	34.6	41.8	37.1	
Actuated g/C Ratio	0.13	0.12		0.23	0.17	0.40	0.42	0.41	0.53	0.64	0.56	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	360		258	294	443	254	1334	810	313	1853	
v/s Ratio Prot	0.00	0.01		c0.03	0.01	c0.17	0.00	0.28	0.04	c0.14	0.27	
v/s Ratio Perm	0.00			c0.10			0.03			c0.38		
v/c Ratio	0.03	0.09		0.59	0.07	0.42	0.06	0.68	0.07	0.81	0.48	
Uniform Delay, d1	24.8	25.6		22.0	22.9	14.2	11.3	16.0	7.6	10.9	8.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.1		3.4	0.1	0.7	0.1	2.8	0.0	14.2	0.9	
Delay (s)	24.9	25.7		25.4	23.0	14.9	11.4	18.7	7.7	25.0	9.4	
Level of Service	C	C		C	C	B	B	B	A	C	A	
Approach Delay (s)		25.7			18.7			17.5			12.9	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	75	35	140	10	245	10	1275	360	390	765	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3385		1719	1727	1282	1289	3438	1468	1467	3430	
Flt Permitted	0.75	1.00		0.49	1.00	1.00	0.34	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	1426	3385		879	1727	1282	465	3438	1468	146	3430	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	80	37	149	11	261	11	1356	383	415	814	5
RTOR Reduction (vph)	0	33	0	0	0	68	0	0	111	0	0	0
Lane Group Flow (vph)	5	84	0	149	11	193	11	1356	272	415	819	0
Heavy Vehicles (%)	0%	0%	5%	5%	10%	26%	40%	5%	10%	23%	5%	30%
Turn Type	pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases	7	4		3	8	8 1	5	2	2 3	1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.3	9.6		17.9	13.4	36.5	39.1	38.4	46.9	61.5	56.8	
Effective Green, g (s)	10.3	9.6		17.9	13.4	36.5	39.1	38.4	46.9	61.5	56.8	
Actuated g/C Ratio	0.12	0.11		0.20	0.15	0.42	0.45	0.44	0.54	0.70	0.65	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	171	371		223	264	534	214	1507	786	391	2224	
v/s Ratio Prot	0.00	0.02		c0.03	0.01	0.15	0.00	0.39	c0.19	c0.23	0.24	
v/s Ratio Perm	0.00			c0.10			0.02			c0.52		
v/c Ratio	0.03	0.23		0.67	0.04	0.36	0.05	0.90	0.35	1.06	0.37	
Uniform Delay, d1	34.2	35.6		31.7	31.6	17.6	13.5	22.8	11.6	26.9	7.1	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.3		7.4	0.1	0.4	0.1	8.9	0.3	62.7	0.5	
Delay (s)	34.3	35.9		39.0	31.7	18.0	13.6	31.8	11.9	89.6	7.6	
Level of Service	C	D		D	C	B	B	C	B	F	A	
Approach Delay (s)		35.9			25.8			27.3			35.2	
Approach LOS		D			C			C			D	

Intersection Summary			
HCM Average Control Delay	30.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	87.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	10	10	495	65	580	10	515	55	235	780	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2569		1719	1810	1468	1504	3282	1468	1280	3436	
Flt Permitted	0.71	1.00		0.74	1.00	1.00	0.31	1.00	1.00	0.24	1.00	
Satd. Flow (perm)	1348	2569		1343	1810	1468	498	3282	1468	318	3436	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	11	11	556	73	652	11	579	62	264	876	6
RTOR Reduction (vph)	0	6	0	0	0	16	0	0	45	0	1	0
Lane Group Flow (vph)	6	16	0	556	73	636	11	579	17	264	881	0
Heavy Vehicles (%)	0%	35%	25%	5%	5%	10%	20%	10%	10%	41%	5%	0%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	32.4	32.4		32.4	32.4	48.4	22.0	21.2	21.2	37.2	32.4	
Effective Green, g (s)	32.4	32.4		32.4	32.4	48.4	22.0	21.2	21.2	37.2	32.4	
Actuated g/C Ratio	0.42	0.42		0.42	0.42	0.62	0.28	0.27	0.27	0.48	0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	563	1073		561	756	916	152	897	401	301	1435	
v/s Ratio Prot		0.01			0.04	c0.43	0.00	0.18		c0.14	0.26	
v/s Ratio Perm	0.00			c0.41			0.02		0.01	c0.28		
v/c Ratio	0.01	0.01		0.99	0.10	0.69	0.07	0.65	0.04	0.88	0.61	
Uniform Delay, d1	13.2	13.2		22.5	13.7	9.7	20.1	24.9	20.7	14.8	17.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		35.6	0.1	2.3	0.2	3.6	0.2	23.7	2.0	
Delay (s)	13.2	13.2		58.0	13.8	12.0	20.3	28.5	20.9	38.5	19.7	
Level of Service	B	B		E	B	B	C	C	C	D	B	
Approach Delay (s)		13.2			32.1			27.6			24.0	
Approach LOS		B			C			C			C	

Intersection Summary			
HCM Average Control Delay	28.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	77.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	25	35	130	20	200	15	770	90	215	750	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2961		1719	1727	1346	1719	3282	1538	1236	3281	
Flt Permitted	0.74	1.00		0.71	1.00	1.00	0.35	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	1412	2961		1289	1727	1346	625	3282	1538	272	3281	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	27	38	140	22	215	16	828	97	231	806	5
RTOR Reduction (vph)	0	31	0	0	0	21	0	0	57	0	0	0
Lane Group Flow (vph)	5	34	0	140	22	194	16	828	40	231	811	0
Heavy Vehicles (%)	0%	20%	5%	5%	10%	20%	5%	10%	5%	46%	10%	0%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.1	11.1		11.1	11.1	25.2	24.2	23.5	23.5	37.6	32.9	
Effective Green, g (s)	11.1	11.1		11.1	11.1	25.2	24.2	23.5	23.5	37.6	32.9	
Actuated g/C Ratio	0.20	0.20		0.20	0.20	0.44	0.43	0.41	0.41	0.66	0.58	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	276	580		252	338	598	280	1360	637	352	1904	
v/s Ratio Prot		0.01			0.01	c0.14	0.00	0.25		c0.12	0.25	
v/s Ratio Perm	0.00			c0.11			0.02		0.03	c0.32		
v/c Ratio	0.02	0.06		0.56	0.07	0.32	0.06	0.61	0.06	0.66	0.43	
Uniform Delay, d1	18.4	18.6		20.6	18.6	10.2	9.4	13.0	10.0	6.0	6.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0		2.6	0.1	0.3	0.1	2.0	0.2	4.4	0.7	
Delay (s)	18.4	18.6		23.2	18.7	10.5	9.5	15.0	10.2	10.4	7.3	
Level of Service	B	B		C	B	B	A	B	B	B	A	
Approach Delay (s)		18.6			15.7			14.4			8.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	4.0
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	70	30	130	10	175	10	1170	330	360	700	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3395		1719	1727	1538	1289	3438	1468	1467	3429	
Flt Permitted	0.75	1.00		0.69	1.00	1.00	0.37	1.00	1.00	0.10	1.00	
Satd. Flow (perm)	1426	3395		1240	1727	1538	498	3438	1468	153	3429	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	74	32	138	11	186	11	1245	351	383	745	5
RTOR Reduction (vph)	0	27	0	0	0	10	0	0	128	0	0	0
Lane Group Flow (vph)	5	79	0	138	11	176	11	1245	223	383	750	0
Heavy Vehicles (%)	0%	0%	5%	5%	10%	5%	40%	5%	10%	23%	5%	30%
Turn Type	Perm	NA		Perm	NA	pt+ov	pm+pt	NA	Perm	pm+pt	NA	
Protected Phases		4			8	8 1	5	2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.7	12.7		12.7	12.7	34.4	37.3	36.5	36.5	58.2	53.4	
Effective Green, g (s)	12.7	12.7		12.7	12.7	34.4	37.3	36.5	36.5	58.2	53.4	
Actuated g/C Ratio	0.16	0.16		0.16	0.16	0.44	0.47	0.46	0.46	0.74	0.68	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	230	546		200	278	671	243	1590	679	408	2321	
v/s Ratio Prot		0.02			0.01	0.11	0.00	0.36		c0.21	0.22	
v/s Ratio Perm	0.00			c0.11			0.02		0.15	c0.48		
v/c Ratio	0.02	0.14		0.69	0.04	0.26	0.05	0.78	0.33	0.94	0.32	
Uniform Delay, d1	27.9	28.4		31.2	28.0	14.2	11.2	17.9	13.4	22.4	5.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.1		9.8	0.1	0.2	0.1	3.9	1.3	29.2	0.4	
Delay (s)	27.9	28.6		41.0	28.0	14.4	11.3	21.8	14.7	51.6	5.6	
Level of Service	C	C		D	C	B	B	C	B	D	A	
Approach Delay (s)		28.5			25.8			20.2			21.2	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	21.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	10	10	540	70	630	10	560	60	255	850	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.92		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2569		1719	1810	1380	1504	3282	1468	1280	3436	
Flt Permitted	0.71	1.00		0.44	1.00	1.00	0.29	1.00	1.00	0.21	1.00	
Satd. Flow (perm)	1341	2569		800	1810	1380	455	3282	1468	285	3436	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	6	11	11	607	79	708	11	629	67	287	955	6
RTOR Reduction (vph)	0	10	0	0	0	13	0	0	28	0	1	0
Lane Group Flow (vph)	6	12	0	607	79	695	11	629	39	287	960	0
Heavy Vehicles (%)	0%	35%	25%	5%	5%	17%	20%	10%	10%	41%	5%	0%
Turn Type	Perm	NA		pm+pt	NA	pt+ov	pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases		4		3	8	8 1	5	2	3	1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	5.9	5.9		36.7	36.7	55.8	26.2	25.5	52.3	44.6	39.9	
Effective Green, g (s)	5.9	5.9		36.7	36.7	55.8	26.2	25.5	52.3	44.6	39.9	
Actuated g/C Ratio	0.07	0.07		0.41	0.41	0.62	0.29	0.29	0.59	0.50	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	89	170		605	744	862	142	937	926	311	1535	
v/s Ratio Prot		0.00		c0.30	0.04	c0.50	0.00	0.19	0.01	c0.16	0.28	
v/s Ratio Perm	0.00			c0.11			0.02		0.01	c0.30		
v/c Ratio	0.07	0.07		1.00	0.11	0.81	0.08	0.67	0.04	0.92	0.63	
Uniform Delay, d1	39.1	39.1		24.3	16.2	12.7	22.5	28.2	7.9	16.9	19.0	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.3	0.2		37.4	0.1	5.6	0.2	3.8	0.0	31.6	1.9	
Delay (s)	39.4	39.3		61.8	16.3	18.2	22.7	32.0	7.9	48.5	20.9	
Level of Service	D	D		E	B	B	C	C	A	D	C	
Approach Delay (s)		39.3			37.1			29.6			27.3	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	31.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	89.3	Sum of lost time (s)	4.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	25	40	140	20	220	15	840	100	235	820	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.91		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	2958		1719	1727	1106	1719	3282	1538	1236	3281	
Flt Permitted	0.74	1.00		0.44	1.00	1.00	0.32	1.00	1.00	0.17	1.00	
Satd. Flow (perm)	1412	2958		799	1727	1106	580	3282	1538	226	3281	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	5	27	43	151	22	237	16	903	108	253	882	5
RTOR Reduction (vph)	0	39	0	0	0	14	0	0	50	0	0	0
Lane Group Flow (vph)	5	31	0	151	22	223	16	903	58	253	887	0
Heavy Vehicles (%)	0%	20%	5%	5%	10%	46%	5%	10%	5%	46%	10%	0%
Turn Type	Perm	NA		pm+pt	NA	pt+ov	pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases		4		3	8	8 1	5	2	2 3	1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	6.6	6.6		15.1	15.1	30.2	27.1	26.4	34.9	41.5	36.8	
Effective Green, g (s)	6.6	6.6		15.1	15.1	30.2	27.1	26.4	34.9	41.5	36.8	
Actuated g/C Ratio	0.10	0.10		0.23	0.23	0.47	0.42	0.41	0.54	0.64	0.57	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	144	302		251	404	517	256	1341	831	319	1869	
v/s Ratio Prot		0.01		c0.04	0.01	c0.20	0.00	0.28	0.04	c0.14	0.27	
v/s Ratio Perm	0.00			c0.10			0.03			c0.37		
v/c Ratio	0.03	0.10		0.60	0.05	0.43	0.06	0.67	0.07	0.79	0.47	
Uniform Delay, d1	26.1	26.3		21.1	19.2	11.5	11.0	15.6	7.1	10.3	8.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.1	0.2		4.0	0.1	0.6	0.1	2.7	0.0	12.7	0.9	
Delay (s)	26.2	26.5		25.2	19.3	12.1	11.1	18.3	7.1	23.0	9.1	
Level of Service	C	C		C	B	B	B	B	A	C	A	
Approach Delay (s)		26.5			17.3			17.0			12.2	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	64.6	Sum of lost time (s)	4.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
11: Irwindale Ave & Gladstone St

3/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	75	35	140	10	190	10	1275	360	390	765	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1805	3385		1719	1727	1282	1289	3438	1468	1467	3430	
Flt Permitted	0.75	1.00		0.42	1.00	1.00	0.34	1.00	1.00	0.09	1.00	
Satd. Flow (perm)	1426	3385		759	1727	1282	465	3438	1468	146	3430	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	80	37	149	11	202	11	1356	383	415	814	5
RTOR Reduction (vph)	0	34	0	0	0	5	0	0	105	0	0	0
Lane Group Flow (vph)	5	83	0	149	11	197	11	1356	278	415	819	0
Heavy Vehicles (%)	0%	0%	5%	5%	10%	26%	40%	5%	10%	23%	5%	30%
Turn Type	Perm	NA		pm+pt	NA	pt+ov	pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases		4		3	8	8 1	5	2	2 3	1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	6.5	6.5		15.4	15.4	38.4	39.2	38.4	47.3	61.4	56.6	
Effective Green, g (s)	6.5	6.5		15.4	15.4	38.4	39.2	38.4	47.3	61.4	56.6	
Actuated g/C Ratio	0.08	0.08		0.18	0.18	0.45	0.46	0.45	0.56	0.72	0.67	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	109	259		193	314	581	223	1557	819	402	2289	
v/s Ratio Prot		0.02		c0.04	0.01	0.15	0.00	0.39	0.19	c0.23	0.24	
v/s Ratio Perm	0.00			c0.10			0.02			c0.52		
v/c Ratio	0.05	0.32		0.77	0.04	0.34	0.05	0.87	0.34	1.03	0.36	
Uniform Delay, d1	36.3	37.1		32.2	28.6	15.0	12.4	21.0	10.2	25.9	6.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.2	0.7		17.2	0.0	0.3	0.1	7.0	0.2	53.5	0.4	
Delay (s)	36.5	37.8		49.5	28.6	15.3	12.5	27.9	10.5	79.3	6.6	
Level of Service	D	D		D	C	B	B	C	B	E	A	
Approach Delay (s)		37.7			29.8			24.0			31.1	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	84.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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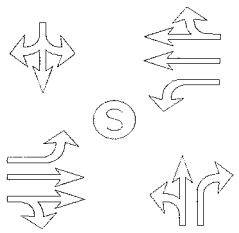
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	15	75%		15	5	20
EB THRU	105	5%		105	10	115
EB RIGHT	115	25%	**50**	165	15	180
WB LEFT	250	5%		250	25	275
WB THRU	760	5%		760	70	830
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	310	5%	**50**	360	30	390
NB THRU	10	90%		10	5	15
NB RIGHT	165	5%		165	15	180
SB LEFT	5	0%		5	5	10
SB THRU	15	15%		15	5	20
SB RIGHT	20	70%		20	5	25
TOTALS	**1775**		**100**	**1875**	**195**	**2070**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	15	75%		15	5	20
EB THRU	105	5%		105	10	115
EB RIGHT	115	25%	**50**	165	15	180
WB LEFT	250	5%		250	25	275
WB THRU	760	5%		760	70	830
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	310	5%		310	30	340
NB THRU	10	90%		10	5	15
NB RIGHT	165	5%		165	15	180
SB LEFT	5	0%		5	5	10
SB THRU	15	15%		15	5	20
SB RIGHT	20	70%		20	5	25
TOTALS	**1775**		**50**	**1825**	**195**	**2020**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	15	75%	**50**	65	5	70
EB THRU	105	5%		105	10	115
EB RIGHT	115	25%		115	10	125
WB LEFT	250	5%		250	25	275
WB THRU	760	5%		760	70	830
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	310	5%		310	30	340
NB THRU	10			10	5	15
NB RIGHT	165	5%		165	15	180
SB LEFT	5	0%		5	5	10
SB THRU	15	15%		15	5	20
SB RIGHT	20	70%		20	5	25
TOTALS	**1775**		**50**	**1825**	**190**	**2015**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	10	70%		10	5	15
EB THRU	170	5%		170	15	185
EB RIGHT	105	49%	**50**	155	15	170
WB LEFT	115	0%		115	10	125
WB THRU	195	5%		195	20	215
WB RIGHT	5	0%		5	5	10
VINCENT AVE						
NB LEFT	140	37%	**50**	190	15	205
NB THRU	5	100%		5	5	10
NB RIGHT	170	5%		170	15	185
SB LEFT	10	20%		10	5	15
SB THRU	5	0%		5	5	10
SB RIGHT	10	65%		10	5	15
TOTALS	**940**		**100**	**1040**	**120**	**1160**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	10	70%		10	5	15
EB THRU	170	5%		170	15	185
EB RIGHT	105	49%	**50**	155	15	170
WB LEFT	115	0%		115	10	125
WB THRU	195	5%		195	20	215
WB RIGHT	5	0%		5	5	10
VINCENT AVE						
NB LEFT	140	15%		140	15	155
NB THRU	5	100%		5	5	10
NB RIGHT	170	5%		170	15	185
SB LEFT	10	20%		10	5	15
SB THRU	5	0%		5	5	10
SB RIGHT	10	65%		10	5	15
TOTALS	**940**		**50**	**990**	**120**	**1110**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	10	95%	**50**	60	5	65
EB THRU	170	5%		170	15	185
EB RIGHT	105	25%		105	10	115
WB LEFT	115	0%		115	10	125
WB THRU	195	5%		195	20	215
WB RIGHT	5	0%		5	5	10
VINCENT AVE						
NB LEFT	140	15%		140	15	155
NB THRU	5	100%		5	5	10
NB RIGHT	170	5%		170	15	185
SB LEFT	10	20%		10	5	15
SB THRU	5	0%		5	5	10
SB RIGHT	10	94%	**50**	60	5	65
TOTALS	**940**		**100**	**1040**	**115**	**1155**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	585	5%		585	55	640
EB RIGHT	150	33%	**50**	200	20	220
WB LEFT	150	5%		150	15	165
WB THRU	240	5%		240	20	260
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	90	56%	**50**	140	15	155
NB THRU	5	0%		5	5	10
NB RIGHT	355	5%		355	30	385
SB LEFT	5	0%		5	5	10
SB THRU	5	0%		5	5	10
SB RIGHT	5	35%		5	5	10
TOTALS	**1600**		**100**	**1700**	**185**	**1885**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	5%		5	5	10
EB THRU	585	5%		585	55	640
EB RIGHT	150	33%	**50**	200	20	220
WB LEFT	150	5%		150	15	165
WB THRU	240	5%		240	20	260
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	90	0%		90	10	100
NB THRU	5	0%		5	5	10
NB RIGHT	355	5%		355	30	385
SB LEFT	5	0%		5	5	10
SB THRU	5	0%		5	5	10
SB RIGHT	5	35%		5	5	10
TOTALS	**1600**		**50**	**1650**	**180**	**1830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	10-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	5	100%	**50**	55	5	60
EB THRU	585	5%		585	55	640
EB RIGHT	150	10%		150	15	165
WB LEFT	150	5%		150	15	165
WB THRU	240	5%		240	20	260
WB RIGHT	5	5%		5	5	10
VINCENT AVE						
NB LEFT	90	0%		90	10	100
NB THRU	5	0%		5	5	10
NB RIGHT	355	5%		355	30	385
SB LEFT	5	0%		5	5	10
SB THRU	5	0%		5	5	10
SB RIGHT	5	94%	**50**	55	5	60
TOTALS	**1600**		**100**	**1700**	**175**	**1875**

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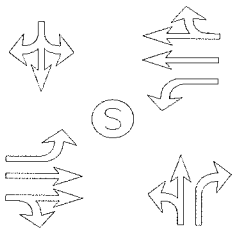
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	10	30	35	**0**	35	5	40
EB THRU	101	5	15	115	**0**	115	10	125
EB RIGHT	88	29	87	175	**150**	325	30	355
WB LEFT	247	2	6	255	**0**	255	25	280
WB THRU	759	2	6	765	**0**	765	70	835
WB RIGHT	0	0	0	0	**0**	0	0	0
VINCENT AVE								
NB LEFT	310	2	6	315	**150**	465	40	505
NB THRU	1	7	21	20	**0**	20	5	25
NB RIGHT	154	12	36	190	**0**	190	15	205
SB LEFT	6	0	0	5	**0**	5	5	10
SB THRU	14	2	6	20	**0**	20	5	25
SB RIGHT	6	15	45	50	**0**	50	5	55
TOTALS	**1689**				**300**	**2245**	**215**	**2460**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	10	30	35	**0**	35	5	40
EB THRU	101	5	15	115	**0**	115	10	125
EB RIGHT	88	29	87	175	**150**	325	30	355
WB LEFT	247	2	6	255	**0**	255	25	280
WB THRU	759	2	6	765	**0**	765	70	835
WB RIGHT	0	0	0	0	**0**	0	0	0
VINCENT AVE								
NB LEFT	310	2	6	315	**0**	315	30	345
NB THRU	1	7	21	20	**0**	20	5	25
NB RIGHT	154	12	36	190	**0**	190	15	205
SB LEFT	6	0	0	5	**0**	5	5	10
SB THRU	14	2	6	20	**0**	20	5	25
SB RIGHT	6	15	45	50	**0**	50	5	55
TOTALS	**1689**				**150**	**2095**	**205**	**2300**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	10	30	35	**150**	185	15	200
EB THRU	101	5	15	115	**0**	115	10	125
EB RIGHT	88	29	87	175	**0**	175	15	190
WB LEFT	247	2	6	255	**0**	255	25	280
WB THRU	759	2	6	765	**0**	765	70	835
WB RIGHT	0	0	0	0	**0**	0	0	0
VINCENT AVE								
NB LEFT	310	2	6	315	**0**	315	30	345
NB THRU	1	7	21	20	**0**	20	5	25
NB RIGHT	154	12	36	190	**0**	190	15	205
SB LEFT	6	0	0	5	**0**	5	5	10
SB THRU	14	2	6	20	**0**	20	5	25
SB RIGHT	6	15	45	50	**0**	50	5	55
TOTALS	**1689**				**150**	**2095**	**200**	**2295**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	7	21	25	**0**	25	5	30
EB THRU	161	7	21	180	**0**	180	15	195
EB RIGHT	79	24	72	150	**150**	300	25	325
WB LEFT	117	0	0	115	**0**	115	10	125
WB THRU	190	5	15	205	**0**	205	20	225
WB RIGHT	2	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	122	19	57	180	**150**	330	30	360
NB THRU	0	1	3	5	**0**	5	5	10
NB RIGHT	168	2	6	175	**0**	175	15	190
SB LEFT	7	2	6	15	**0**	15	5	20
SB THRU	4	0	0	5	**0**	5	5	10
SB RIGHT	3	5	15	20	**0**	20	5	25
TOTALS	**856**				**300**	**1380**	**145**	**1525**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	7	21	25	**0**	25	5	30
EB THRU	161	7	21	180	**0**	180	15	195
EB RIGHT	79	24	72	150	**150**	300	25	325
WB LEFT	117	0	0	115	**0**	115	10	125
WB THRU	190	5	15	205	**0**	205	20	225
WB RIGHT	2	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	122	19	57	180	**0**	180	15	195
NB THRU	0	1	3	5	**0**	5	5	10
NB RIGHT	168	2	6	175	**0**	175	15	190
SB LEFT	7	2	6	15	**0**	15	5	20
SB THRU	4	0	0	5	**0**	5	5	10
SB RIGHT	3	5	15	20	**0**	20	5	25
TOTALS	**856**				**150**	**1230**	**130**	**1360**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	3	7	21	25	**150**	175	15	190
EB THRU	161	7	21	180	**0**	180	15	195
EB RIGHT	79	24	72	150	**0**	150	15	165
WB LEFT	117	0	0	115	**0**	115	10	125
WB THRU	190	5	15	205	**0**	205	20	225
WB RIGHT	2	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	122	19	57	180	**0**	180	15	195
NB THRU	0	1	3	5	**0**	5	5	10
NB RIGHT	168	2	6	175	**0**	175	15	190
SB LEFT	7	2	6	15	**0**	15	5	20
SB THRU	4	0	0	5	**0**	5	5	10
SB RIGHT	3	5	15	20	**150**	170	15	185
TOTALS	**856**				**300**	**1380**	**140**	**1520**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	581	2	6	585	**0**	585	55	640
EB RIGHT	135	17	51	185	**150**	335	30	365
WB LEFT	148	0	0	150	**0**	150	15	165
WB THRU	241	1	3	245	**0**	245	20	265
WB RIGHT	1	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	92	0	0	90	**150**	240	20	260
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	356	1	3	360	**0**	360	30	390
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	2	1	3	5	**0**	5	5	10
TOTALS	**1557**				**300**	**1930**	**185**	**2115**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	581	2	6	585	**0**	585	55	640
EB RIGHT	135	17	51	185	**150**	335	30	365
WB LEFT	148	0	0	150	**0**	150	15	165
WB THRU	241	1	3	245	**0**	245	20	265
WB RIGHT	1	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	92	0	0	90	**0**	90	10	100
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	356	1	3	360	**0**	360	30	390
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	2	1	3	5	**0**	5	5	10
TOTALS	**1557**				**150**	**1780**	**175**	**1955**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : GLADSTONE STREET
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 12
ROUTE 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	0	0	0	0	**150**	150	15	165
EB THRU	581	2	6	585	**0**	585	55	640
EB RIGHT	135	17	51	185	**0**	185	15	200
WB LEFT	148	0	0	150	**0**	150	15	165
WB THRU	241	1	3	245	**0**	245	20	265
WB RIGHT	1	0	0	5	**0**	5	5	10
VINCENT AVE								
NB LEFT	92	0	0	90	**0**	90	10	100
NB THRU	1	0	0	5	**0**	5	5	10
NB RIGHT	356	1	3	360	**0**	360	30	390
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	2	1	3	5	**150**	155	15	170
TOTALS	**1557**				**300**	**1930**	**185**	**2115**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 07:15AM

NORTH LEG (SB)

TOTAL: 43

TT = 17

$TT\% = \frac{17}{43} = 39.53\%$

$\approx 40\%$

	Rt	Thru	Lt	Total
	21 (20)	16 (15)	6 (5)	
1st	2	12	4	
2nd	3	2	0	
3rd	9	0	1	
4th	7	2	1	

TT = 4

$TT\% = \frac{4}{1010} = 0.40\%$

$\approx 1\%$

EAST LEG TOTAL: (WB) 1,010

	1st	2nd	3rd	4th	Total
Rt	0	0	0	0	5
Thru	225	206	188	142	761 (760)
Lt	53	59	66	71	249 (250)

	Total	1st	2nd	3rd	4th
Lt	13 (15)	3	4	3	3
Thru	106 (105)	21	18	31	36
Rt	117 (115)	25	24	31	37

WEST LEG TOTAL: (EB) 236

TT = 44

$TT\% = \frac{44}{236} = 18.64\%$

$\approx 19\%$

	Lt	Thru	Rt
1st	73	2	32
2nd	77	1	43
3rd	90	2	46
4th	72	3	45
Total	312 (310)	8 (10)	166 (165)

SOUTH LEG (NB)

TOTAL: 486

TT = 21

$TT = \frac{21}{486} = 4.32\%$

$\approx 4\%$

PEAK HOUR FACTORS

NORTH LEG = 0.60
SOUTH LEG = 0.88
EAST LEG = 0.91
WEST LEG = 0.78

ALL LEGS = 0.95

HOUR TOTAL: 1,775

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 07:00AM-08:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
16	15	6	Total
2	1	1	1st
2	12	4	2nd
3	2	0	3rd
9	0	1	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	0	0	0
Thru	208	225	206	188	827
Lt	37	53	59	66	215

Total	1st	2nd	3rd	4th	
14	4	3	4	3	Lt
85	15	21	18	31	Thru
97	17	25	24	31	Rt

	Lt	Thru	Rt
1st	45	2	21
2nd	73	2	32
3rd	77	1	43
4th	90	2	46
Total	285	7	142

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 08:00AM-09:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
35	6	5	Total
7	2	1	1st
16	0	1	2nd
8	1	2	3rd
4	3	1	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	0	0	0
Thru	142	116	95	70	423
Lt	71	50	39	30	190

Total	1st	2nd	3rd	4th	
17	3	7	2	5	Lt
114	36	32	20	26	Thru
88	37	16	22	13	Rt

	Lt	Thru	Rt
1st	72	3	45
2nd	72	0	31
3rd	57	0	21
4th	39	2	31
Total	240	5	128

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT IRWINDALE

EAST-WEST STREET : GLADSTONE 06-08-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
1	0	1	0	0	0	0	1	0	1	0	0	4
1	12	4	0	0	0	0	0	0	1	0	0	18
3	1	0	0	0	0	0	0	0	0	1	0	5
1	0	1	0	0	0	0	0	0	8	0	0	10
1	1	1	0	0	0	0	1	0	6	0	0	10
1	0	1	0	0	0 0	0	0	1 0	15	0	16 0	17
0	1	2	0	0	0	0	0	0	8	0	0	11
2	1	1	0	0	0	1	1	0	1	1	0	8
						TT = 0+1+16 = 17						
10	16	11	0	0	0	1	3	0	40	2	0	83
						NB SOUTH LEG						
19	0	44	0	0	0	0	1	0	2	1	1	68
29	0	72	0	0	0	0	0	1	3	2	0	107
40	0	76	0	0	0	1	1	0	2	0	1	121
42	1	90	0	0	0	0	0	0	4	1	0	138
43	0	72	0	0	0	1	0	0	1	3	0	120
28	0	72	0	0	0 0	0	0	4 0	3	0	17 0	103
18	0	56	0	0	0	2	0	0	1	0	1	78
28	0	39	0	0	0	0	0	0	3	2	0	72
						TT = 0+4+17 = 21						
247	1	521	0	0	0	4	2	1	19	9	3	807
						WB EAST LEG						
0	208	37	0	0	0	0	0	0	0	0	0	245
0	224	53	0	0	0	0	0	0	0	1	0	278
0	206	58	0	0	0	0	0	0	0	0	1	265
0	188	66	0	0	0	0	0	0	0	0	0	254
0	141	70	0	0	0	0	0	0	0	1	1	213
0	115	49	0	0	0 0	0	0	0 0	0	1	4 1	166
0	94	39	0	0	0	0	1	0	0	0	0	134
0	69	30	0	0	0	0	0	0	0	1	0	100
						TT = 0+0+4 = 4						
0	1245	402	0	0	0	0	1	0	0	4	3	1655
						EB WEST LEG						
17	12	0	0	0	0	0	0	1	0	3	3	36
25	19	2	0	0	0	0	0	0	0	2	1	49
17	17	0	0	0	0	0	0	0	7	1	4	46
24	30	1	0	0	0	0	0	0	7	1	2	65
22	35	0	0	0	0	0	0	0	15	1	3	76
7	32	2	0	0	0 0	0	0	0 0	9	0	44 5	55
19	19	0	0	0	0	0	0	0	3	1	2	44
12	26	1	0	0	0	0	0	0	1	0	4	44
						TT = 0+0+44 = 44						
143	190	6	0	0	0	0	0	1	42	9	24	415

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 01:00PM

NORTH LEG (SB)

TOTAL: 21

TT = 7

TT% = 7/21 = 33.33%
≈ 33%

Rt	Thru	Lt	
10 8	5 4	10 9	Total
2	1	5	1st
1	1	3	2nd
2	1	1	3rd
3	1	0	4th

TT = 5

TT% = 5/314 = 1.59%
≈ 2%

EAST LEG TOTAL: (WB) 314

	1st	2nd	3rd	4th	Total
Rt	0	0	1	1	5 2
Thru	41	50	51	53	195
Lt	15	33	24	45	115 117

Total	1st	2nd	3rd	4th	
10	2	3	1	4	Lt
170 168	35	40	50	43	Thru
105 103	32	21	25	25	Rt

WEST LEG TOTAL: (EB) 281

TT = 38

TT% = 38/281 = 13.52%
≈ 14%

	Lt	Thru	Rt
1st	36	0	54
2nd	40	0	43
3rd	27	1	39
4th	38	0	34
Total	140 141	5 1	170

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.66
SOUTH LEG = 0.87
EAST LEG = 0.79
WEST LEG = 0.92

ALL LEGS = 0.94

TT = 22

TT% = 22/312 = 7.05%
≈ 7%

TOTAL: 312

HOUR TOTAL: 928

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 12:00PM-01:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
9	4	6	Total
4	1	2	1st
4	0	1	2nd
1	1	1	3rd
0	2	2	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	0	0	0
Thru	47	41	58	59	205
Lt	25	30	22	29	106

Total	1st	2nd	3rd	4th	
13	6	2	2	3	Lt
168	42	45	45	36	Thru
115	37	27	23	28	Rt

	Lt	Thru	Rt
1st	29	0	47
2nd	38	2	34
3rd	31	1	46
4th	30	0	34
Total	128	3	161

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 01:00PM-02:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
8	4	9	Total
2	1	5	1st
1	1	3	2nd
2	1	1	3rd
3	1	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	1	1	2
Thru	41	50	51	53	195
Lt	15	33	24	45	117

Total	1st	2nd	3rd	4th	
10	2	3	1	4	Lt
168	35	40	50	43	Thru
103	32	21	25	25	Rt

	Lt	Thru	Rt
1st	36	0	54
2nd	40	0	43
3rd	27	1	39
4th	38	0	34
Total	141	1	170

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT IRWINDALE

EAST-WEST STREET : GLADSTONE 06-08-11

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
0	1	0	0	0	0	1	0	0	3	0	2	7
1	0	0	0	0	0	0	0	1	3	0	0	5
1	0	1	0	0	0	0	0	0	0	1	0	3
0	2	1	0	0	0	0	0	0	0	0	1	4
1	1	3	0	0	0	0	0	1	1	0	1	8
1	1	3	0	0	0	0	0	0	0	0	0	5
1	1	1	0	0	0	0	0	0	1	0	0	4
0	1	0	0	0	0	1	0	0	2	0	0	4
				0				2			5	
						TT=0+2+5=7						
5	7	9	0	0	0	2	0	2	10	1	4	40
						NB SOUTH LEG						
47	0	21	0	0	0	0	0	0	0	0	8	76
34	1	31	0	0	0	0	1	0	0	0	7	74
46	1	24	0	0	0	0	0	1	0	0	6	78
33	0	26	0	0	0	1	0	0	0	0	4	64
54	0	24	0	0	0	0	0	0	0	0	12	90
42	0	40	0	0	0	1	0	0	0	0	0	83
38	0	25	0	0	0	0	1	0	1	0	2	67
34	0	33	0	0	0	0	0	1	0	0	4	72
				0				3			19	
						TT=0+3+19=22						
328	2	224	0	0	0	2	2	2	1	0	43	604
						WB EAST LEG						
0	45	25	0	0	0	0	0	0	0	2	0	72
0	41	29	0	0	0	0	0	1	0	0	0	71
0	56	21	0	0	0	0	0	0	0	2	1	80
0	59	29	0	0	0	0	0	0	0	0	0	88
0	39	15	0	0	0	0	0	0	0	2	0	56
0	50	33	0	0	0	0	0	0	0	0	0	83
1	49	24	0	0	0	0	0	0	0	2	0	76
1	52	45	0	0	0	0	0	0	0	1	0	99
				0				0			5	
						TT=0+0+5=5						
2	391	221	0	0	0	0	0	1	0	9	1	625
						EB WEST LEG						
27	42	4	0	0	0	3	0	0	7	0	2	85
17	42	0	0	0	0	1	1	0	9	2	2	74
17	44	0	0	0	0	0	0	0	6	1	2	70
16	36	2	0	0	0	4	0	0	8	0	1	67
25	35	2	0	0	0	0	0	0	7	0	0	69
15	37	1	0	0	0	0	0	0	6	3	2	64
21	47	0	0	0	0	0	0	0	4	3	1	76
18	42	0	0	0	0	1	0	1	6	1	3	72
				0				2			36	
						TT=0+2+36=38						
156	325	9	0	0	0	9	1	1	53	10	13	577

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 3

TT = 1

TT% = $\frac{1}{3}$ = 33.33%
≈ 33%

	Rt	Thru	Lt	
	5 3	5	5	Total
	1	0	0	1st
	0	0	0	2nd
	0	0	0	3rd
	2	0	0	4th

TT = 1

TT% = $\frac{1}{391}$ = 0.26%
≈ 1%

EAST LEG TOTAL: (WB) 391

	1st	2nd	3rd	4th	Total
Rt	0	0	1	0	5 1
Thru	52	64	66	60	242 240
Lt	34	33	31	50	148 150

	Total	1st	2nd	3rd	4th	
	5	0	0	0	0	Lt
	583 585	167	167	136	113	Thru
	152 150	48	43	31	30	Rt

WEST LEG TOTAL: (EB) 735

TT = 19

TT% = $\frac{19}{735}$ = 2.59%
≈ 3%

	Lt	Thru	Rt
1st	24	0	92
2nd	27	0	88
3rd	16	1	79
4th	25	0	98
Total	90 92	5 1	357 355

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.38
SOUTH LEG = 0.91
EAST LEG = 0.89
WEST LEG = 0.85

ALL LEGS = 0.94

TT = $\frac{1}{450}$ = 0.22%
≈ 1%

TOTAL: 450

HOUR TOTAL: 1,579

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 04:00PM-05:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
9	3	5	Total
0	2	0	1st
3	0	3	2nd
4	0	0	3rd
2	1	2	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	0	0	0
Thru	33	46	38	42	159
Lt	43	36	27	26	132

Total	1st	2nd	3rd	4th	
4	1	0	0	3	Lt
484	92	109	146	137	Thru
143	42	39	29	33	Rt

	Lt	Thru	Rt
1st	31	0	114
2nd	34	0	103
3rd	22	1	85
4th	27	0	102
Total	114	1	404

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: GLADSTONE

TIME: 05:00PM-06:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
3	0	0	Total
1	0	0	1st
0	0	0	2nd
0	0	0	3rd
2	0	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	1	0	1
Thru	52	64	66	60	242
Lt	34	33	31	50	148

Total	1st	2nd	3rd	4th	
0	0	0	0	0	Lt
583	167	167	136	113	Thru
152	48	43	31	30	Rt

	Lt	Thru	Rt
1st	24	0	92
2nd	27	0	88
3rd	16	1	79
4th	25	0	98
Total	92	1	357

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT IRWINDALE

EAST-WEST STREET : GLADSTONE 06-08-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
0	1	0	0	0	0	0	0	0	0	1	0	2
0	0	1	0	0	1	3	0	1	0	0	0	6
3	0	0	0	0	0	0	0	0	1	0	0	4
1	1	2	0	0	0	1	0	0	0	0	0	5
0	0	0	0	0	0	0	0	0	1	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	2
						TT= 0+0+1 = 1						
6	2	3	0	0	1	4	0	1	2	1	0	20
						NB SOUTH LEG						
112	0	30	0	0	0	0	0	0	2	0	1	145
103	0	34	0	0	0	0	0	0	0	0	0	137
85	1	22	0	0	0	0	0	0	0	0	0	108
101	0	26	0	0	0	0	0	0	1	0	1	129
92	0	24	0	0	0	0	0	0	0	0	0	116
88	0	27	0	0	0	0	0	0	0	0	0	115
79	1	16	0	0	0	0	0	0	0	0	0	96
97	0	25	0	0	0	0	0	0	1	0	0	123
						TT= 0+0+1						
757	2	204	0	0	0	0	0	0	4	0	2	969
						WB EAST LEG						
0	32	41	0	0	0	0	1	0	0	0	2	76
0	46	36	0	0	0	0	0	0	0	0	0	82
0	37	26	0	0	0	0	0	0	0	1	1	65
0	40	25	0	0	0	0	1	0	0	1	1	68
0	51	34	0	0	0	0	0	0	0	1	0	86
0	64	33	0	0	0	0	0	0	0	0	0	97
1	66	31	0	0	0	0	0	0	0	0	0	98
0	60	50	0	0	0	0	0	0	0	0	0	110
						TT= 0+0+1 = 1						
1	396	276	0	0	0	0	2	0	0	3	4	682
						EB WEST LEG						
34	91	0	0	0	0	6	1	0	2	0	1	135
29	106	0	0	0	0	10	3	0	0	0	0	148
24	145	0	0	0	0	4	0	0	1	1	0	175
28	133	2	0	0	0	5	2	0	0	2	1	173
40	166	0	0	0	0	8	0	0	0	1	0	215
42	167	0	0	0	0	1	0	0	0	0	0	210
29	136	0	0	0	0	2	0	0	0	0	0	167
24	112	0	0	0	0	6	0	0	0	1	0	143
						TT= 0+17+2 = 19						
250	1056	2	0	0	0	42	6	0	3	5	2	1366

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	105	115	250	760	5	310	10	165	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.92		1.00	1.00		1.00	0.86			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1031	2883		1719	3436		1719	1483			1252	
Flt Permitted	0.27	1.00		0.61	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	297	2883		1099	3436		1320	1483			1224	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	111	121	263	800	5	326	11	174	5	16	21
RTOR Reduction (vph)	0	75	0	0	1	0	0	102	0	0	12	0
Lane Group Flow (vph)	16	157	0	263	804	0	326	83	0	0	30	0
Heavy Vehicles (%)	75%	5%	25%	5%	5%	0%	5%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Effective Green, g (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.42	0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	1088		415	1296		549	617			509	
v/s Ratio Prot		0.05			0.23			0.06				
v/s Ratio Perm	0.05			c0.24			c0.25				0.02	
v/c Ratio	0.14	0.14		0.63	0.62		0.59	0.14			0.06	
Uniform Delay, d1	7.9	7.9		9.9	9.8		8.8	7.0			6.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.1		3.2	0.9		4.7	0.5			0.2	
Delay (s)	8.5	8.0		13.0	10.7		13.4	7.4			7.0	
Level of Service	A	A		B	B		B	A			A	
Approach Delay (s)		8.0			11.3			11.3			7.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	170	105	115	195	5	140	5	170	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.85			0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1062	3021		1805	3430		1570	1541			1307	
Flt Permitted	0.62	1.00		0.57	1.00		0.74	1.00			0.91	
Satd. Flow (perm)	692	3021		1088	3430		1222	1541			1214	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	181	112	122	207	5	149	5	181	11	5	11
RTOR Reduction (vph)	0	82	0	0	4	0	0	90	0	0	5	0
Lane Group Flow (vph)	11	211	0	122	208	0	149	96	0	0	22	0
Heavy Vehicles (%)	70%	5%	25%	0%	5%	0%	15%	15%	5%	20%	0%	65%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.5	9.5		9.5	9.5		17.8	17.8			17.8	
Effective Green, g (s)	9.5	9.5		9.5	9.5		17.8	17.8			17.8	
Actuated g/C Ratio	0.27	0.27		0.27	0.27		0.50	0.50			0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	186	813		293	923		616	777			612	
v/s Ratio Prot		0.07			0.06			0.06				
v/s Ratio Perm	0.02			c0.11			c0.12				0.02	
v/c Ratio	0.06	0.26		0.42	0.23		0.24	0.12			0.04	
Uniform Delay, d1	9.6	10.1		10.6	10.0		4.9	4.6			4.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.2		1.0	0.1		0.9	0.3			0.1	
Delay (s)	9.7	10.3		11.6	10.2		5.9	5.0			4.5	
Level of Service	A	B		B	B		A	A			A	
Approach Delay (s)		10.3			10.7			5.4			4.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	35.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	585	150	150	240	5	90	5	355	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1805	3300		1805	3431		1805	1543			1598	
Flt Permitted	0.59	1.00		0.28	1.00		0.75	1.00			0.91	
Satd. Flow (perm)	1123	3300		537	3431		1421	1543			1471	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	622	160	160	255	5	96	5	378	5	5	5
RTOR Reduction (vph)	0	54	0	0	3	0	0	127	0	0	3	0
Lane Group Flow (vph)	5	728	0	160	257	0	96	256	0	0	12	0
Heavy Vehicles (%)	0%	5%	10%	0%	5%	0%	0%	0%	5%	0%	0%	35%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Effective Green, g (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.41	0.41			0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	451	1326		216	1379		581	631			602	
v/s Ratio Prot		0.22			0.07			c0.17				
v/s Ratio Perm	0.00			c0.30			0.07				0.01	
v/c Ratio	0.01	0.55		0.74	0.19		0.17	0.41			0.02	
Uniform Delay, d1	7.6	9.7		10.8	8.2		7.9	8.9			7.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.5		12.8	0.1		0.6	1.9			0.1	
Delay (s)	7.6	10.2		23.6	8.2		8.5	10.8			7.5	
Level of Service	A	B		C	A		A	B			A	
Approach Delay (s)		10.2			14.1			10.3			7.5	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	105	165	250	760	5	360	10	165	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.91		1.00	1.00		1.00	0.86			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1031	2499		1719	3436		1530	1483			1252	
Flt Permitted	0.27	1.00		0.58	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	297	2499		1044	3436		1175	1483			1224	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	111	174	263	800	5	379	11	174	5	16	21
RTOR Reduction (vph)	0	108	0	0	1	0	0	102	0	0	12	0
Lane Group Flow (vph)	16	177	0	263	804	0	379	83	0	0	30	0
Heavy Vehicles (%)	75%	5%	48%	5%	5%	0%	18%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Effective Green, g (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.42	0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	943		394	1296		489	617			509	
v/s Ratio Prot		0.07			0.23			0.06				
v/s Ratio Perm	0.05			c0.25			c0.32				0.02	
v/c Ratio	0.14	0.19		0.67	0.62		0.78	0.14			0.06	
Uniform Delay, d1	7.9	8.1		10.0	9.8		9.7	7.0			6.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.1		4.2	0.9		11.4	0.5			0.2	
Delay (s)	8.5	8.2		14.3	10.7		21.1	7.4			7.0	
Level of Service	A	A		B	B		C	A			A	
Approach Delay (s)		8.2			11.6			16.6			7.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	170	155	115	195	5	190	5	170	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.85			0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1062	2661		1805	3430		1318	1541			1307	
Flt Permitted	0.62	1.00		0.54	1.00		0.74	1.00			0.91	
Satd. Flow (perm)	692	2661		1034	3430		1026	1541			1212	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	181	165	122	207	5	202	5	181	11	5	11
RTOR Reduction (vph)	0	119	0	0	4	0	0	92	0	0	6	0
Lane Group Flow (vph)	11	227	0	122	208	0	202	94	0	0	21	0
Heavy Vehicles (%)	70%	5%	49%	0%	5%	0%	37%	15%	5%	20%	0%	65%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.6	9.6		9.6	9.6		17.1	17.1			17.1	
Effective Green, g (s)	9.6	9.6		9.6	9.6		17.1	17.1			17.1	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.49	0.49			0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	191	736		286	949		506	759			597	
v/s Ratio Prot		0.09			0.06			0.06				
v/s Ratio Perm	0.02			c0.12			c0.20				0.02	
v/c Ratio	0.06	0.31		0.43	0.22		0.40	0.12			0.04	
Uniform Delay, d1	9.2	9.9		10.3	9.7		5.6	4.8			4.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.2		1.0	0.1		2.3	0.3			0.1	
Delay (s)	9.4	10.2		11.3	9.8		7.9	5.1			4.7	
Level of Service	A	B		B	A		A	A			A	
Approach Delay (s)		10.1			10.3			6.6			4.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	585	200	150	240	5	140	5	355	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1805	3096		1805	3431		1157	1543			1598	
Flt Permitted	0.59	1.00		0.26	1.00		0.75	1.00			0.90	
Satd. Flow (perm)	1123	3096		493	3431		911	1543			1470	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	622	213	160	255	5	149	5	378	5	5	5
RTOR Reduction (vph)	0	79	0	0	3	0	0	129	0	0	3	0
Lane Group Flow (vph)	5	756	0	160	257	0	149	254	0	0	12	0
Heavy Vehicles (%)	0%	5%	33%	0%	5%	0%	56%	0%	5%	0%	0%	35%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.1	18.1		18.1	18.1		17.3	17.3			17.3	
Effective Green, g (s)	18.1	18.1		18.1	18.1		17.3	17.3			17.3	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40			0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	468	1291		206	1431		363	615			586	
v/s Ratio Prot		0.24			0.07			c0.16				
v/s Ratio Perm	0.00			c0.32			0.16				0.01	
v/c Ratio	0.01	0.59		0.78	0.18		0.41	0.41			0.02	
Uniform Delay, d1	7.4	9.8		10.9	8.0		9.4	9.4			7.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.7		16.6	0.1		3.4	2.0			0.1	
Delay (s)	7.4	10.4		27.5	8.0		12.8	11.4			8.0	
Level of Service	A	B		C	A		B	B			A	
Approach Delay (s)		10.4			15.5			11.8			8.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	43.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	115	180	275	830	5	390	10	180	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.91		1.00	1.00		1.00	0.86			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1031	2500		1719	3436		1530	1487			1252	
Flt Permitted	0.27	1.00		0.56	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	290	2500		1019	3436		1175	1487			1223	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	121	189	289	874	5	411	11	189	5	16	21
RTOR Reduction (vph)	0	116	0	0	1	0	0	111	0	0	12	0
Lane Group Flow (vph)	16	194	0	289	878	0	411	89	0	0	30	0
Heavy Vehicles (%)	75%	5%	48%	5%	5%	0%	18%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.0	15.0		15.0	15.0		16.0	16.0			16.0	
Effective Green, g (s)	15.0	15.0		15.0	15.0		16.0	16.0			16.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.41	0.41			0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	962		392	1322		482	610			502	
v/s Ratio Prot		0.08			0.26			0.06				
v/s Ratio Perm	0.06			c0.28			c0.35				0.02	
v/c Ratio	0.14	0.20		0.74	0.66		0.85	0.15			0.06	
Uniform Delay, d1	7.8	8.0		10.3	9.9		10.4	7.2			7.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.1		7.1	1.3		17.2	0.5			0.2	
Delay (s)	8.4	8.1		17.4	11.2		27.6	7.7			7.2	
Level of Service	A	A		B	B		C	A			A	
Approach Delay (s)		8.1			12.7			21.1			7.2	
Approach LOS		A			B			C			A	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	185	170	125	215	5	205	5	185	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.85			0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1062	2658		1805	3431		1318	1541			1307	
Flt Permitted	0.61	1.00		0.53	1.00		0.74	1.00			0.90	
Satd. Flow (perm)	677	2658		1002	3431		1026	1541			1206	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	197	181	133	229	5	218	5	197	11	5	11
RTOR Reduction (vph)	0	128	0	0	4	0	0	103	0	0	6	0
Lane Group Flow (vph)	11	250	0	133	230	0	218	99	0	0	21	0
Heavy Vehicles (%)	70%	5%	49%	0%	5%	0%	37%	15%	5%	20%	0%	65%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.1	10.1		10.1	10.1		16.5	16.5			16.5	
Effective Green, g (s)	10.1	10.1		10.1	10.1		16.5	16.5			16.5	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.48	0.48			0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	198	776		292	1002		489	735			575	
v/s Ratio Prot		0.09			0.07			0.06				
v/s Ratio Perm	0.02			c0.13			c0.21				0.02	
v/c Ratio	0.06	0.32		0.46	0.23		0.45	0.13			0.04	
Uniform Delay, d1	8.8	9.6		10.0	9.3		6.0	5.1			4.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.2		1.1	0.1		2.9	0.4			0.1	
Delay (s)	8.9	9.8		11.1	9.4		8.9	5.4			4.9	
Level of Service	A	A		B	A		A	A			A	
Approach Delay (s)		9.8			10.0			7.3			4.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	640	220	165	260	5	155	5	385	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1805	3095		1805	3432		1157	1542			1598	
Flt Permitted	0.58	1.00		0.23	1.00		0.75	1.00			0.90	
Satd. Flow (perm)	1100	3095		442	3432		911	1542			1461	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	681	234	176	277	5	165	5	410	5	5	5
RTOR Reduction (vph)	0	75	0	0	3	0	0	114	0	0	3	0
Lane Group Flow (vph)	5	840	0	176	279	0	165	301	0	0	12	0
Heavy Vehicles (%)	0%	5%	33%	0%	5%	0%	56%	0%	5%	0%	0%	35%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.6	20.6		20.6	20.6		17.3	17.3			17.3	
Effective Green, g (s)	20.6	20.6		20.6	20.6		17.3	17.3			17.3	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.38	0.38			0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	494	1389		198	1540		343	581			551	
v/s Ratio Prot		0.27			0.08			c0.20				
v/s Ratio Perm	0.00			c0.40			0.18				0.01	
v/c Ratio	0.01	0.60		0.89	0.18		0.48	0.52			0.02	
Uniform Delay, d1	7.0	9.6		11.6	7.6		10.9	11.1			9.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.8		34.7	0.1		4.8	3.3			0.1	
Delay (s)	7.0	10.3		46.3	7.6		15.7	14.4			9.1	
Level of Service	A	B		D	A		B	B			A	
Approach Delay (s)		10.3			22.5			14.7			9.1	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	45.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	105	165	250	760	5	310	10	165	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.91		1.00	1.00		1.00	0.86			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1031	2499		1719	3436		1719	1483			1252	
Flt Permitted	0.27	1.00		0.58	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	297	2499		1044	3436		1320	1483			1224	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	111	174	263	800	5	326	11	174	5	16	21
RTOR Reduction (vph)	0	108	0	0	1	0	0	102	0	0	12	0
Lane Group Flow (vph)	16	177	0	263	804	0	326	83	0	0	30	0
Heavy Vehicles (%)	75%	5%	48%	5%	5%	0%	5%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Effective Green, g (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.42	0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	943		394	1296		549	617			509	
v/s Ratio Prot		0.07			0.23			0.06				
v/s Ratio Perm	0.05			c0.25			c0.25				0.02	
v/c Ratio	0.14	0.19		0.67	0.62		0.59	0.14			0.06	
Uniform Delay, d1	7.9	8.1		10.0	9.8		8.8	7.0			6.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.1		4.2	0.9		4.7	0.5			0.2	
Delay (s)	8.5	8.2		14.3	10.7		13.4	7.4			7.0	
Level of Service	A	A		B	B		B	A			A	
Approach Delay (s)		8.2			11.6			11.3			7.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	10.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	170	155	115	195	5	140	5	170	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.85			0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1062	2661		1805	3430		1570	1541			1307	
Flt Permitted	0.62	1.00		0.54	1.00		0.74	1.00			0.91	
Satd. Flow (perm)	692	2661		1034	3430		1222	1541			1212	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	181	165	122	207	5	149	5	181	11	5	11
RTOR Reduction (vph)	0	119	0	0	4	0	0	92	0	0	6	0
Lane Group Flow (vph)	11	227	0	122	208	0	149	94	0	0	21	0
Heavy Vehicles (%)	70%	5%	49%	0%	5%	0%	15%	15%	5%	20%	0%	65%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.6	9.6		9.6	9.6		17.1	17.1			17.1	
Effective Green, g (s)	9.6	9.6		9.6	9.6		17.1	17.1			17.1	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.49	0.49			0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	191	736		286	949		602	759			597	
v/s Ratio Prot		0.09			0.06			0.06				
v/s Ratio Perm	0.02			c0.12			c0.12				0.02	
v/c Ratio	0.06	0.31		0.43	0.22		0.25	0.12			0.04	
Uniform Delay, d1	9.2	9.9		10.3	9.7		5.1	4.8			4.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.2		1.0	0.1		1.0	0.3			0.1	
Delay (s)	9.4	10.2		11.3	9.8		6.1	5.1			4.7	
Level of Service	A	B		B	A		A	A			A	
Approach Delay (s)		10.1			10.3			5.5			4.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	585	200	150	240	5	90	5	355	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1805	3096		1805	3431		1805	1543			1598	
Flt Permitted	0.59	1.00		0.26	1.00		0.75	1.00			0.90	
Satd. Flow (perm)	1123	3096		493	3431		1421	1543			1470	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	622	213	160	255	5	96	5	378	5	5	5
RTOR Reduction (vph)	0	79	0	0	3	0	0	129	0	0	3	0
Lane Group Flow (vph)	5	756	0	160	257	0	96	254	0	0	12	0
Heavy Vehicles (%)	0%	5%	33%	0%	5%	0%	0%	0%	5%	0%	0%	35%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	18.1	18.1		18.1	18.1		17.3	17.3			17.3	
Effective Green, g (s)	18.1	18.1		18.1	18.1		17.3	17.3			17.3	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40			0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	468	1291		206	1431		566	615			586	
v/s Ratio Prot		0.24			0.07			c0.16				
v/s Ratio Perm	0.00			c0.32			0.07				0.01	
v/c Ratio	0.01	0.59		0.78	0.18		0.17	0.41			0.02	
Uniform Delay, d1	7.4	9.8		10.9	8.0		8.4	9.4			7.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.7		16.6	0.1		0.6	2.0			0.1	
Delay (s)	7.4	10.4		27.5	8.0		9.1	11.4			8.0	
Level of Service	A	B		C	A		A	B			A	
Approach Delay (s)		10.4			15.5			11.0			8.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	43.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	115	180	275	830	5	340	10	180	5	15	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.91		1.00	1.00		1.00	0.86			0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	1031	2500		1719	3436		1530	1487			1252	
Flt Permitted	0.27	1.00		0.56	1.00		0.73	1.00			0.97	
Satd. Flow (perm)	290	2500		1019	3436		1175	1487			1223	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	121	189	289	874	5	358	11	189	5	16	21
RTOR Reduction (vph)	0	116	0	0	1	0	0	111	0	0	12	0
Lane Group Flow (vph)	16	194	0	289	878	0	358	89	0	0	30	0
Heavy Vehicles (%)	75%	5%	48%	5%	5%	0%	18%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.0	15.0		15.0	15.0		16.0	16.0			16.0	
Effective Green, g (s)	15.0	15.0		15.0	15.0		16.0	16.0			16.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.41	0.41			0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	112	962		392	1322		482	610			502	
v/s Ratio Prot		0.08			0.26			0.06				
v/s Ratio Perm	0.06			c0.28			c0.30				0.02	
v/c Ratio	0.14	0.20		0.74	0.66		0.74	0.15			0.06	
Uniform Delay, d1	7.8	8.0		10.3	9.9		9.8	7.2			7.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.1		7.1	1.3		9.9	0.5			0.2	
Delay (s)	8.4	8.1		17.4	11.2		19.7	7.7			7.2	
Level of Service	A	A		B	B		B	A			A	
Approach Delay (s)		8.1			12.7			15.4			7.2	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	185	170	125	215	5	155	5	185	10	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.93		1.00	1.00		1.00	0.85			0.94	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1062	2658		1805	3431		1318	1541			1307	
Flt Permitted	0.61	1.00		0.53	1.00		0.74	1.00			0.90	
Satd. Flow (perm)	677	2658		1002	3431		1026	1541			1206	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	11	197	181	133	229	5	165	5	197	11	5	11
RTOR Reduction (vph)	0	128	0	0	4	0	0	103	0	0	6	0
Lane Group Flow (vph)	11	250	0	133	230	0	165	99	0	0	21	0
Heavy Vehicles (%)	70%	5%	49%	0%	5%	0%	37%	15%	5%	20%	0%	65%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.1	10.1		10.1	10.1		16.5	16.5			16.5	
Effective Green, g (s)	10.1	10.1		10.1	10.1		16.5	16.5			16.5	
Actuated g/C Ratio	0.29	0.29		0.29	0.29		0.48	0.48			0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	198	776		292	1002		489	735			575	
v/s Ratio Prot		0.09			0.07			0.06				
v/s Ratio Perm	0.02			c0.13			c0.16				0.02	
v/c Ratio	0.06	0.32		0.46	0.23		0.34	0.13			0.04	
Uniform Delay, d1	8.8	9.6		10.0	9.3		5.6	5.1			4.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.1	0.2		1.1	0.1		1.9	0.4			0.1	
Delay (s)	8.9	9.8		11.1	9.4		7.5	5.4			4.9	
Level of Service	A	A		B	A		A	A			A	
Approach Delay (s)		9.8			10.0			6.4			4.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	640	220	165	260	5	100	5	385	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.96		1.00	1.00		1.00	0.85			0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.98	
Satd. Flow (prot)	1805	3095		1805	3432		1157	1542			1598	
Flt Permitted	0.58	1.00		0.23	1.00		0.75	1.00			0.90	
Satd. Flow (perm)	1100	3095		442	3432		911	1542			1461	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	681	234	176	277	5	106	5	410	5	5	5
RTOR Reduction (vph)	0	75	0	0	3	0	0	114	0	0	3	0
Lane Group Flow (vph)	5	840	0	176	279	0	106	301	0	0	12	0
Heavy Vehicles (%)	0%	5%	33%	0%	5%	0%	56%	0%	5%	0%	0%	35%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.6	20.6		20.6	20.6		17.3	17.3			17.3	
Effective Green, g (s)	20.6	20.6		20.6	20.6		17.3	17.3			17.3	
Actuated g/C Ratio	0.45	0.45		0.45	0.45		0.38	0.38			0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	494	1389		198	1540		343	581			551	
v/s Ratio Prot		0.27			0.08			c0.20				
v/s Ratio Perm	0.00			c0.40			0.12				0.01	
v/c Ratio	0.01	0.60		0.89	0.18		0.31	0.52			0.02	
Uniform Delay, d1	7.0	9.6		11.6	7.6		10.1	11.1			9.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.0	0.8		34.7	0.1		2.3	3.3			0.1	
Delay (s)	7.0	10.3		46.3	7.6		12.4	14.4			9.1	
Level of Service	A	B		D	A		B	B			A	
Approach Delay (s)		10.3			22.5			14.0			9.1	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	45.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	105	115	250	760	5	310	10	165	5	15	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.92		1.00	1.00		1.00	0.86			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	930	2883		1719	3436		1719	1483			1080	
Flt Permitted	0.27	1.00		0.61	1.00		0.70	1.00			0.99	
Satd. Flow (perm)	268	2883		1099	3436		1258	1483			1069	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	111	121	263	800	5	326	11	174	5	16	74
RTOR Reduction (vph)	0	75	0	0	1	0	0	102	0	0	43	0
Lane Group Flow (vph)	68	157	0	263	804	0	326	83	0	0	52	0
Heavy Vehicles (%)	94%	5%	25%	5%	5%	0%	5%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Effective Green, g (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.42	0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	101	1088		415	1296		523	617			445	
v/s Ratio Prot		0.05			0.23			0.06				
v/s Ratio Perm	c0.25			0.24			c0.26				0.05	
v/c Ratio	0.67	0.14		0.63	0.62		0.62	0.14			0.12	
Uniform Delay, d1	10.1	7.9		9.9	9.8		8.9	7.0			6.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	16.3	0.1		3.2	0.9		5.5	0.5			0.5	
Delay (s)	26.3	8.0		13.0	10.7		14.4	7.4			7.5	
Level of Service	C	A		B	B		B	A			A	
Approach Delay (s)		12.2			11.3			11.9			7.5	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	170	105	115	195	5	140	5	170	10	5	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	926	3021		1805	3430		1570	1541			946	
Flt Permitted	0.62	1.00		0.57	1.00		0.70	1.00			0.96	
Satd. Flow (perm)	603	3021		1088	3430		1165	1541			919	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	181	112	122	207	5	149	5	181	11	5	64
RTOR Reduction (vph)	0	81	0	0	4	0	0	91	0	0	32	0
Lane Group Flow (vph)	64	212	0	122	208	0	149	96	0	0	48	0
Heavy Vehicles (%)	95%	5%	25%	0%	5%	0%	15%	15%	5%	20%	0%	94%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	9.9	9.9		9.9	9.9		17.9	17.9			17.9	
Effective Green, g (s)	9.9	9.9		9.9	9.9		17.9	17.9			17.9	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.50	0.50			0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	167	835		301	949		583	771			460	
v/s Ratio Prot		0.07			0.06			0.06				
v/s Ratio Perm	0.11			c0.11			c0.13				0.05	
v/c Ratio	0.38	0.25		0.41	0.22		0.26	0.12			0.10	
Uniform Delay, d1	10.5	10.1		10.6	10.0		5.1	4.8			4.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.5	0.2		0.9	0.1		1.1	0.3			0.5	
Delay (s)	11.9	10.2		11.4	10.1		6.2	5.1			5.2	
Level of Service	B	B		B	B		A	A			A	
Approach Delay (s)		10.5			10.6			5.6			5.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	585	150	150	240	5	90	5	355	5	5	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.85			0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	902	3300		1805	3431		1805	1543			928	
Flt Permitted	0.59	1.00		0.28	1.00		0.71	1.00			0.97	
Satd. Flow (perm)	562	3300		537	3431		1353	1543			908	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	59	622	160	160	255	5	96	5	378	5	5	59
RTOR Reduction (vph)	0	54	0	0	3	0	0	127	0	0	35	0
Lane Group Flow (vph)	59	728	0	160	257	0	96	256	0	0	34	0
Heavy Vehicles (%)	100%	5%	10%	0%	5%	0%	0%	0%	5%	0%	0%	94%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Effective Green, g (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.41	0.41			0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	226	1326		216	1379		553	631			371	
v/s Ratio Prot		0.22			0.07			c0.17				
v/s Ratio Perm	0.11			c0.30			0.07				0.04	
v/c Ratio	0.26	0.55		0.74	0.19		0.17	0.41			0.09	
Uniform Delay, d1	8.5	9.7		10.8	8.2		8.0	8.9			7.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.6	0.5		12.8	0.1		0.7	1.9			0.5	
Delay (s)	9.1	10.2		23.6	8.2		8.6	10.8			8.2	
Level of Service	A	B		C	A		A	B			A	
Approach Delay (s)		10.1			14.1			10.4			8.2	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	105	115	250	760	5	310	10	165	5	15	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.92		1.00	1.00		1.00	0.86			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	930	2883		1719	3436		1719	1483			1074	
Flt Permitted	0.27	1.00		0.61	1.00		0.69	1.00			0.99	
Satd. Flow (perm)	268	2883		1099	3436		1253	1483			1063	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	111	121	263	800	5	326	11	174	5	16	79
RTOR Reduction (vph)	0	75	0	0	1	0	0	102	0	0	44	0
Lane Group Flow (vph)	74	157	0	263	804	0	326	83	0	0	56	0
Heavy Vehicles (%)	94%	5%	25%	5%	5%	0%	5%	90%	5%	0%	15%	70%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Effective Green, g (s)	14.6	14.6		14.6	14.6		16.1	16.1			16.1	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.42	0.42			0.42	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	101	1088		415	1296		521	617			442	
v/s Ratio Prot		0.05			0.23			0.06				
v/s Ratio Perm	c0.28			0.24			c0.26				0.05	
v/c Ratio	0.73	0.14		0.63	0.62		0.63	0.14			0.13	
Uniform Delay, d1	10.4	7.9		9.9	9.8		8.9	7.0			7.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	23.7	0.1		3.2	0.9		5.6	0.5			0.6	
Delay (s)	34.1	8.0		13.0	10.7		14.5	7.4			7.5	
Level of Service	C	A		B	B		B	A			A	
Approach Delay (s)		14.3			11.3			12.0			7.5	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	170	105	115	195	5	140	5	170	10	5	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.94		1.00	1.00		1.00	0.85			0.89	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			0.99	
Satd. Flow (prot)	926	3021		1805	3430		1570	1541			940	
Flt Permitted	0.62	1.00		0.57	1.00		0.70	1.00			0.97	
Satd. Flow (perm)	603	3021		1088	3430		1160	1541			914	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	69	181	112	122	207	5	149	5	181	11	5	69
RTOR Reduction (vph)	0	81	0	0	4	0	0	91	0	0	35	0
Lane Group Flow (vph)	69	212	0	122	208	0	149	95	0	0	50	0
Heavy Vehicles (%)	95%	5%	25%	0%	5%	0%	15%	15%	5%	20%	0%	94%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	10.0	10.0		10.0	10.0		17.9	17.9			17.9	
Effective Green, g (s)	10.0	10.0		10.0	10.0		17.9	17.9			17.9	
Actuated g/C Ratio	0.28	0.28		0.28	0.28		0.50	0.50			0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	168	842		303	955		578	768			456	
v/s Ratio Prot		0.07			0.06			0.06				
v/s Ratio Perm	c0.11			0.11			c0.13				0.06	
v/c Ratio	0.41	0.25		0.40	0.22		0.26	0.12			0.11	
Uniform Delay, d1	10.5	10.0		10.5	9.9		5.2	4.8			4.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	1.6	0.2		0.9	0.1		1.1	0.3			0.5	
Delay (s)	12.2	10.2		11.4	10.1		6.3	5.1			5.3	
Level of Service	B	B		B	B		A	A			A	
Approach Delay (s)		10.6			10.6			5.6			5.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	35.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
12: Vincent Ave & Gladstone St

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	585	150	150	240	5	90	5	355	5	5	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00			1.00	
Frt	1.00	0.97		1.00	1.00		1.00	0.85			0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00			1.00	
Satd. Flow (prot)	902	3300		1805	3431		1805	1543			923	
Flt Permitted	0.59	1.00		0.28	1.00		0.71	1.00			0.98	
Satd. Flow (perm)	562	3300		537	3431		1347	1543			903	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	64	622	160	160	255	5	96	5	378	5	5	64
RTOR Reduction (vph)	0	54	0	0	3	0	0	127	0	0	38	0
Lane Group Flow (vph)	64	728	0	160	257	0	96	256	0	0	36	0
Heavy Vehicles (%)	100%	5%	10%	0%	5%	0%	0%	0%	5%	0%	0%	94%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Effective Green, g (s)	17.0	17.0		17.0	17.0		17.3	17.3			17.3	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.41	0.41			0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)	226	1326		216	1379		551	631			369	
v/s Ratio Prot		0.22			0.07			c0.17				
v/s Ratio Perm	0.11			c0.30			0.07				0.04	
v/c Ratio	0.28	0.55		0.74	0.19		0.17	0.41			0.10	
Uniform Delay, d1	8.5	9.7		10.8	8.2		8.0	8.9			7.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2	0.7	0.5		12.8	0.1		0.7	1.9			0.5	
Delay (s)	9.2	10.2		23.6	8.2		8.6	10.8			8.2	
Level of Service	A	B		C	A		A	B			A	
Approach Delay (s)		10.1			14.1			10.4			8.2	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	42.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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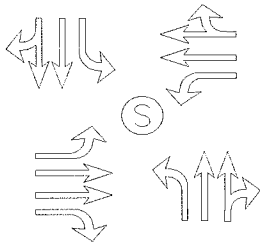
E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	55	5%		55	5	60
EB THRU	530	5%		530	50	580
EB RIGHT	80	5%		80	5	85
WB LEFT	120	5%		120	10	130
WB THRU	1215	5%		1215	110	1325
WB RIGHT	90	5%		90	10	100
VINCENT AVE						
NB LEFT	170	5%		170	15	185
NB THRU	315	5%	**50**	365	35	400
NB RIGHT	85	5%		85	5	90
SB LEFT	30	5%		30	5	35
SB THRU	265	10%	**50**	315	30	345
SB RIGHT	70	10%		70	5	75
TOTALS	**3025**		**100**	**3125**	**285**	**3410**

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E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	55	5%		55	5	60
EB THRU	530	5%		530	50	580
EB RIGHT	80	5%		80	5	85
WB LEFT	120	5%		120	10	130
WB THRU	1215	5%		1215	110	1325
WB RIGHT	90	5%		90	10	100
VINCENT AVE						
NB LEFT	170	5%		170	15	185
NB THRU	315	5%		315	30	345
NB RIGHT	85	5%	**50**	135	10	145
SB LEFT	30	5%		30	5	35
SB THRU	265	10%	**50**	315	30	345
SB RIGHT	70	10%		70	5	75
TOTALS	**3025**		**100**	**3125**	**285**	**3410**

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E/W STREET : ARROW HWY
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CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	80	5%		80	5	85
EB THRU	655	5%		655	60	715
EB RIGHT	90	10%		90	10	100
WB LEFT	100	5%		100	10	110
WB THRU	575	5%		575	50	625
WB RIGHT	45	5%		45	5	50
VINCENT AVE						
NB LEFT	75	10%		75	5	80
NB THRU	175	15%	**50**	225	20	245
NB RIGHT	115	5%		115	10	125
SB LEFT	25	5%		25	5	30
SB THRU	155	20%	**50**	205	20	225
SB RIGHT	60	5%		60	5	65
TOTALS	**2150**		**100**	**2250**	**205**	**2455**

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INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	80	5%		80	5	85
EB THRU	655	5%		655	60	715
EB RIGHT	90	10%		90	10	100
WB LEFT	100	5%		100	10	110
WB THRU	575	5%		575	50	625
WB RIGHT	45	5%		45	5	50
VINCENT AVE						
NB LEFT	75	10%		75	5	80
NB THRU	175	15%		175	15	190
NB RIGHT	115	5%	**50**	165	15	180
SB LEFT	25	5%		25	5	30
SB THRU	155	20%	**50**	205	20	225
SB RIGHT	60	5%		60	5	65
TOTALS	**2150**		**100**	**2250**	**205**	**2455**

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E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	135	5%		135	10	145
EB THRU	1395	5%		1395	125	1520
EB RIGHT	210	5%		210	20	230
WB LEFT	110	5%		110	10	120
WB THRU	525	5%		525	45	570
WB RIGHT	75	5%		75	5	80
VINCENT AVE						
NB LEFT	40	5%		40	5	45
NB THRU	235	5%	**50**	285	25	310
NB RIGHT	105	5%		105	10	115
SB LEFT	45	5%		45	5	50
SB THRU	205	5%	**50**	255	25	280
SB RIGHT	55	5%		55	5	60
TOTALS	**3135**		**100**	**3235**	**290**	**3525**

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E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	135	5%		135	10	145
EB THRU	1395	5%		1395	125	1520
EB RIGHT	210	5%		210	20	230
WB LEFT	110	5%		110	10	120
WB THRU	525	5%		525	45	570
WB RIGHT	75	5%		75	5	80
VINCENT AVE						
NB LEFT	40	5%		40	5	45
NB THRU	235	5%		235	20	255
NB RIGHT	105	5%	**50**	155	15	170
SB LEFT	45	5%		45	5	50
SB THRU	205	5%	**50**	255	25	280
SB RIGHT	55	5%		55	5	60
TOTALS	**3135**		**100**	**3235**	**290**	**3525**

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E/W STREET : ARROW HWY
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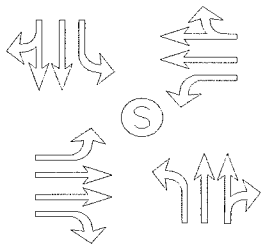
INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	52	3	9	60	**0**	60	5	65
EB THRU	528	4	12	540	**0**	540	50	590
EB RIGHT	79	2	6	85	**0**	85	5	90
WB LEFT	120	2	6	125	**0**	125	10	135
WB THRU	1206	9	27	1235	**0**	1235	110	1345
WB RIGHT	89	0	0	90	**0**	90	10	100
VINCENT AVE								
NB LEFT	170	2	6	175	**0**	175	15	190
NB THRU	300	17	51	350	**150**	500	45	545
NB RIGHT	84	0	0	85	**0**	85	5	90
SB LEFT	28	0	0	30	**0**	30	5	35
SB THRU	244	22	66	310	**150**	460	40	500
SB RIGHT	61	8	24	85	**0**	85	5	90
TOTALS	**2961**				**300**	**3470**	**305**	**3775**

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N/S STREET : VINCENT AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	52	3	9	60	**0**	60	5	65
EB THRU	528	4	12	540	**0**	540	50	590
EB RIGHT	79	2	6	85	**0**	85	5	90
WB LEFT	120	2	6	125	**0**	125	10	135
WB THRU	1206	9	27	1235	**0**	1235	110	1345
WB RIGHT	89	0	0	90	**0**	90	10	100
VINCENT AVE								
NB LEFT	170	2	6	175	**0**	175	15	190
NB THRU	300	17	51	350	**0**	350	30	380
NB RIGHT	84	0	0	85	**150**	235	20	255
SB LEFT	28	0	0	30	**0**	30	5	35
SB THRU	244	22	66	310	**150**	460	40	500
SB RIGHT	61	8	24	85	**0**	85	5	90
TOTALS	**2961**				**300**	**3470**	**305**	**3775**

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N/S STREET : VINCENT AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	74	5	15	90	**0**	90	10	100
EB THRU	647	7	21	670	**0**	670	60	730
EB RIGHT	83	7	21	105	**0**	105	10	115
WB LEFT	97	1	3	100	**0**	100	10	110
WB THRU	572	4	12	585	**0**	585	55	640
WB RIGHT	46	0	0	45	**0**	45	5	50
VINCENT AVE								
NB LEFT	69	8	24	95	**0**	95	10	105
NB THRU	149	27	81	230	**150**	380	35	415
NB RIGHT	114	1	3	115	**0**	115	10	125
SB LEFT	25	0	0	25	**0**	25	5	30
SB THRU	126	27	81	205	**150**	355	30	385
SB RIGHT	58	3	9	65	**0**	65	5	70
TOTALS	**2060**				**300**	**2630**	**245**	**2875**

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CONDITION : MID-DAY PEAK HOUR

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PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	74	5	15	90	**0**	90	10	100
EB THRU	647	7	21	670	**0**	670	60	730
EB RIGHT	83	7	21	105	**0**	105	10	115
WB LEFT	97	1	3	100	**0**	100	10	110
WB THRU	572	4	12	585	**0**	585	55	640
WB RIGHT	46	0	0	45	**0**	45	5	50
VINCENT AVE								
NB LEFT	69	8	24	95	**0**	95	10	105
NB THRU	149	27	81	230	**0**	230	20	250
NB RIGHT	114	1	3	115	**150**	265	25	290
SB LEFT	25	0	0	25	**0**	25	5	30
SB THRU	126	27	81	205	**150**	355	30	385
SB RIGHT	58	3	9	65	**0**	65	5	70
TOTALS	**2060**				**300**	**2630**	**245**	**2875**

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N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

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PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	133	1	3	135	**0**	135	10	145
EB THRU	1392	4	12	1405	**0**	1405	125	1530
EB RIGHT	210	0	0	210	**0**	210	20	230
WB LEFT	110	0	0	110	**0**	110	10	120
WB THRU	525	2	6	530	**0**	530	50	580
WB RIGHT	73	0	0	75	**0**	75	5	80
VINCENT AVE								
NB LEFT	40	0	0	40	**0**	40	5	45
NB THRU	234	3	9	245	**150**	395	35	430
NB RIGHT	106	1	3	110	**0**	110	10	120
SB LEFT	46	0	0	45	**0**	45	5	50
SB THRU	204	0	0	205	**150**	355	30	385
SB RIGHT	53	0	0	55	**0**	55	5	60
TOTALS	**3126**				**300**	**3465**	**310**	**3775**

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : ARROW HWY
N/S STREET : VINCENT AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 13
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	133	1	3	135	**0**	135	10	145
EB THRU	1392	4	12	1405	**0**	1405	125	1530
EB RIGHT	210	0	0	210	**0**	210	20	230
WB LEFT	110	0	0	110	**0**	110	10	120
WB THRU	525	2	6	530	**0**	530	50	580
WB RIGHT	73	0	0	75	**0**	75	5	80
VINCENT AVE								
NB LEFT	40	0	0	40	**0**	40	5	45
NB THRU	234	3	9	245	**0**	245	20	265
NB RIGHT	106	1	3	110	**150**	260	25	285
SB LEFT	46	0	0	45	**0**	45	5	50
SB THRU	204	0	0	205	**150**	355	30	385
SB RIGHT	53	0	0	55	**0**	55	5	60
TOTALS	**3126**				**300**	**3465**	**310**	**3775**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 07:15AM

NORTH LEG (SB)

TOTAL: 363

TT = 30

$TT\% = \frac{30}{363} = 8.26\% \approx 8\%$

	Rt	Thru	Lt	Total
	69 (70)	266 (265)	28 (30)	
1st	21	55	3	
2nd	11	79	2	
3rd	25	59	11	
4th	12	73	12	

TT = 11

$TT\% = \frac{11}{1426} = 0.77\% \approx 1\%$

EAST LEG TOTAL: (WB) 1,426

	1st	2nd	3rd	4th	Total
Rt	14	21	36	18	89 (90)
Thru	293	307	346	269	1215
Lt	33	24	40	25	122 (120)

	Total	1st	2nd	3rd	4th
Lt	55	9	18	21	7
Thru	532 (530)	120	134	158	120
Rt	81 (80)	12	15	23	31

WEST LEG TOTAL: (EB) 668

TT = 9

$TT\% = \frac{9}{668} = 1.35\% \approx 1\%$

	Lt	Thru	Rt
1st	48	74	9
2nd	44	81	25
3rd	44	85	34
4th	36	77	16
Total	172 (170)	317 (315)	84 (85)

SOUTH LEG (NB)

TOTAL: 573

TT = 19

$TT\% = \frac{19}{573} = 3.32\% \approx 3\%$

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.88
EAST LEG = 0.84
WEST LEG = 0.83

ALL LEGS = 0.86

HOUR TOTAL: 3,030

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 07:00AM-08:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
87	230	17	Total
30	37	1	1st
21	55	3	2nd
11	79	2	3rd
25	59	11	4th

	1st	2nd	3rd	4th	Total
Rt	12	14	21	36	83
Thru	308	293	307	346	1254
Lt	14	33	24	40	111

Total	1st	2nd	3rd	4th	
63	15	9	18	21	Lt
531	119	120	134	158	Thru
64	14	12	15	23	Rt

	Lt	Thru	Rt
1st	56	65	11
2nd	48	74	9
3rd	44	81	25
4th	44	85	34
Total	192	305	79

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 08:00AM-09:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
64	199	27	Total
12	73	12	1st
21	45	1	2nd
19	53	3	3rd
12	28	11	4th

	1st	2nd	3rd	4th	Total
Rt	18	28	20	28	94
Thru	269	261	264	188	982
Lt	25	37	25	22	109

Total	1st	2nd	3rd	4th	
59	7	13	14	25	Lt
451	120	105	101	125	Thru
83	31	12	20	20	Rt

	Lt	Thru	Rt
1st	36	77	16
2nd	30	66	17
3rd	22	51	22
4th	27	39	30
Total	115	233	85

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-08-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
26	36	1	0	1	0	1	0	0	3	0	0	68
18	55	3	0	0	0	0	0	0	3	0	0	79
10	74	2	0	0	0	1	0	0	0	5	0	92
24	52	11	0	0	0	0	0	0	1	7	0	95
9	63	12	0	0	0	0	0	0	3	10	0	97
21	35	1	0	0	0	0	0	1	0	10	0	67
17	48	3	0	0	0	0	0	0	2	5	0	75
11	28	11	0	0	0	0	0	0	1	0	0	51
						TT=0+1+29=30						
136	391	44	0	1	0	2	0	0	13	37	0	624
						NB SOUTH LEG						
11	65	56	0	0	0	0	0	0	0	0	0	132
9	74	48	0	0	0	0	0	0	0	0	0	131
25	81	44	0	0	0	0	0	0	0	0	0	150
34	75	44	0	0	0	0	0	0	0	10	0	163
16	70	34	0	0	0	0	0	0	0	7	2	129
14	55	29	0	0	1	0	0	0	3	11	0	113
22	41	22	0	0	0	0	0	0	0	10	0	95
29	36	26	0	0	0	0	0	0	1	3	1	96
						TT=0+0+19=19						
160	497	303	0	0	1	0	0	0	4	41	3	1009
						WB EAST LEG						
11	306	14	0	0	0	0	0	0	1	2	0	334
14	292	32	0	0	0	0	0	1	0	1	0	340
21	303	24	0	1	0	0	0	0	0	3	0	352
36	343	39	0	0	0	0	0	0	0	3	1	422
18	268	25	0	1	0	0	0	0	0	0	0	312
28	258	37	0	0	0	0	1	0	0	2	0	326
20	261	25	0	1	0	0	0	0	0	2	0	309
27	186	22	0	1	0	1	0	0	0	1	0	238
						TT=2+1+8=11						
175	2217	218	0	4	0	1	1	1	1	14	1	2633
						EB WEST LEG						
14	118	12	0	1	0	0	0	3	0	0	0	148
12	120	9	0	0	0	0	0	0	0	0	0	141
15	133	17	0	1	0	0	0	0	0	0	1	167
23	157	21	0	1	0	0	0	0	0	0	0	202
29	118	5	0	1	0	0	0	2	2	1	0	158
10	103	13	0	0	0	0	1	0	2	1	0	130
20	98	13	0	1	0	0	2	0	0	0	1	135
19	123	23	0	0	0	0	2	2	1	0	0	170
						TT=3+2+4=9						
142	970	113	0	5	0	0	5	7	5	2	2	1251

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 12:00PM

NORTH LEG (SB)

TOTAL: 239

TT = 30

$TT\% = \frac{30}{239} = 12.55\% \approx 13\%$

	Rt	Thru	Lt	
	61 (60)	153 (155)	25	Total
	16	43	8	1st
	21	41	5	2nd
	16	26	5	3rd
	8	43	7	4th

TT = 5

$TT\% = \frac{5}{720} = 0.69\% \approx 1\%$

EAST LEG TOTAL: (WB) 720

	1st	2nd	3rd	4th	Total
Rt	21	10	9	6	46 (45)
Thru	129	164	124	159	576 (575)
Lt	24	15	31	28	98 (100)

	Total	1st	2nd	3rd	4th
Lt	79 (80)	15	24	24	16
Thru	654 (655)	213	154	127	160
Rt	90	20	19	23	28

WEST LEG TOTAL: (EB) 823

TT = 17

$TT\% = \frac{17}{823} = 2.07\% \approx 2\%$

	Lt	Thru	Rt
1st	12	41	35
2nd	22	42	26
3rd	25	49	23
4th	18	44	31
Total	77 (75)	176 (175)	115

TOTAL: 368

TT = 36

$TT\% = \frac{36}{368} = 9.78\% \approx 10\%$

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.95
EAST LEG = 0.93
WEST LEG = 0.83

ALL LEGS = 0.93

HOUR TOTAL: 2,150

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 12:00PM-01:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
61	153	25	Total
16	43	8	1st
21	41	5	2nd
16	26	5	3rd
8	43	7	4th

	1st	2nd	3rd	4th	Total
Rt	21	10	9	6	46
Thru	129	164	124	159	576
Lt	24	15	31	28	98

Total	1st	2nd	3rd	4th	
79	15	24	24	16	Lt
654	213	154	127	160	Thru
90	20	19	23	28	Rt

	Lt	Thru	Rt
1st	12	41	35
2nd	22	42	26
3rd	25	49	23
4th	18	44	31
Total	77	176	115

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 01:00PM-02:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
61	159	25	Total
15	45	8	1st
16	33	11	2nd
17	42	3	3rd
13	39	3	4th

	1st	2nd	3rd	4th	Total
Rt	22	9	24	23	78
Thru	111	114	132	122	479
Lt	20	21	23	20	84

Total	1st	2nd	3rd	4th	
74	19	16	15	24	Lt
658	150	157	184	167	Thru
125	22	22	28	53	Rt

	Lt	Thru	Rt
1st	20	51	22
2nd	27	40	30
3rd	26	43	38
4th	39	41	21
Total	112	175	111

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT IRWINDALE

EAST-WEST STREET : ARROW HWY 06-08-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
16	34	8	0	0	0	0	0	0	0	9	0	67
19	36	5	0	0	0	0	0	0	2	5	0	67
16	20	5	0	1	0	0	0	0	0	5	0	47
7	36	7	0	0	0	0	0	0	1	7	0	58
14	40	8	0	0	1 0	1	0	0 0	0	5	29 0	68
15	30	11	0	0	0	1	0	0	0	3	0	60
16	39	3	0	0	0	0	0	0	1	3	0	62
12	33	3	0	0	0	1	0	0	0	6	0	55
						TT= 1+0+29=30						
115	268	50	0	1	0	3	0	0	4	43	0	484
					NB SOUTH LEG							
35	32	11	0	0	0	0	1	1	0	8	0	88
26	34	20	0	0	0	0	0	1	0	8	1	90
23	43	20	0	0	0	0	1	1	0	5	4	97
30	40	18	0	0	0	0	0	0	1	4	0	93
22	41	19	0	0	0 0	0	0	5 0	0	10	31 1	93
29	39	23	0	0	0	1	0	0	0	1	4	97
38	40	24	0	0	0	0	0	0	0	3	2	107
20	38	35	0	0	0	1	0	0	0	3	4	101
						TT= 0+5+31=36						
223	307	170	0	0	0	2	2	3	1	42	16	766
					WB EAST LEG							
21	128	24	0	0	0	0	1	0	0	0	0	174
10	161	15	0	1	0	0	1	0	0	1	0	189
9	124	31	0	0	0	0	0	0	0	0	0	164
6	159	27	0	0	0	0	0	0	0	0	1	193
22	110	20	0	0	1 0	0	1	2 0	0	0	2 0	153
9	113	21	0	0	0	0	1	0	0	0	0	144
23	128	23	0	2	0	1	2	0	0	0	0	179
21	119	20	0	0	0	1	3	0	1	0	0	165
						TT= 1+2+2=5						
121	1042	181	0	3	0	2	9	0	1	1	1	1361
					EB WEST LEG							
18	211	13	0	1	0	0	1	1	2	0	1	248
18	151	23	0	1	0	0	1	1	1	1	0	197
21	125	24	0	1	0	0	1	0	2	0	0	174
26	160	14	0	0	0	1	0	2	1	0	0	204
22	149	17	0	0	3 0	0	1	6 2	0	0	8 0	191
20	151	15	0	1	0	0	2	1	2	3	0	195
27	183	15	0	1	0	0	0	0	1	0	0	227
51	165	22	0	0	0	0	0	0	2	2	2	244
						TT= 3+6+8=17						
203	1295	143	0	5	0	1	6	7	11	6	3	1680

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: VINCENT
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 303

TT = 0

TT% = 0/303 = 0% ≈ 1%

Rt	Thru	Lt	
53 (55)	204 (205)	46 (45)	Total
15	55	15	1st
13	53	9	2nd
14	45	6	3rd
11	51	16	4th

TT = 2

TT% = 2/710 = 0.28% ≈ 1%

EAST LEG TOTAL: (WB) 710

	1st	2nd	3rd	4th	Total
Rt	15	26	11	21	73 (75)
Thru	126	141	132	128	527 (525)
Lt	21	32	32	25	110

Total	1st	2nd	3rd	4th	
134 (135)	36	29	28	41	Lt
1396 (1395)	353	347	355	341	Thru
210	43	56	47	64	Rt

WEST LEG TOTAL: (EB) 1,740

TT = 5

TT% = 5/1740 = 0.29% ≈ 1%

	Lt	Thru	Rt
1st	8	55	27
2nd	5	71	32
3rd	12	51	20
4th	15	60	28
Total	40	237 (235)	107 (105)

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.89
EAST LEG = 0.89
WEST LEG = 0.98

ALL LEGS = 0.96

TT = 4

TT% = 4/384 = 1.04% ≈ 1%

TOTAL: 384

HOUR TOTAL: 3,137

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 04:00PM-05:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
63	183	33	Total
14	51	10	1st
20	54	4	2nd
17	33	10	3rd
12	45	9	4th

	1st	2nd	3rd	4th	Total
Rt	20	11	25	20	76
Thru	110	119	130	91	450
Lt	18	24	37	36	115

Total	1st	2nd	3rd	4th	
177	57	54	35	31	Lt
1271	288	249	374	360	Thru
164	40	34	47	43	Rt

	Lt	Thru	Rt
1st	11	64	21
2nd	16	78	28
3rd	12	74	23
4th	9	46	24
Total	48	262	96

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: VINCENT

EAST-WEST STREET: ARROW HWY

TIME: 05:00PM-06:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
53	204	46	Total
15	55	15	1st
13	53	9	2nd
14	45	6	3rd
11	51	16	4th

	1st	2nd	3rd	4th	Total
Rt	15	26	11	21	73
Thru	126	141	132	128	527
Lt	21	32	32	25	110

Total	1st	2nd	3rd	4th	
134	36	29	28	41	Lt
1396	353	347	355	341	Thru
210	43	56	47	64	Rt

	Lt	Thru	Rt
1st	8	55	27
2nd	5	71	32
3rd	12	51	20
4th	15	60	28
Total	40	237	107

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : VINCENT IRWINDALE

EAST-WEST STREET : ARROW HWY 06-08-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
12	51	10	0	0	0	1	0	0	1	0	0	75
18	54	4	0	0	0	0	0	0	2	0	0	78
16	33	10	0	0	0	0	0	0	1	0	0	60
12	44	9	0	0	0	0	0	0	0	1	0	66
15	55	15	0	0	0	0	0	0	0	0	0	85
13	53	9	0	0	0	0	0	0	0	0	0	75
14	45	6	0	0	0	0	0	0	0	0	0	65
11	51	16	0	0	0	0	0	0	0	0	0	78
				0		TT=0+0+0=0						
111	386	79	0	0	0	1	0	0	4	1	0	582
						NB SOUTH LEG						
21	64	11	0	0	0	0	0	0	0	0	0	96
28	77	16	0	0	0	0	1	0	0	0	0	122
23	68	11	0	0	0	0	5	1	0	1	0	109
24	46	9	0	0	0	0	0	0	0	0	0	79
26	55	8	0	0	0	0	0	0	1	0	0	90
32	69	5	0	0	0	0	2	0	0	0	0	108
20	51	12	0	0	0	0	0	0	0	0	0	83
28	59	15	0	0	0	0	1	0	0	0	0	103
				0			3			1		
						TT=0+3+1=4						
202	489	87	0	0	0	0	9	1	1	1	0	790
						WB EAST LEG						
20	109	18	0	0	0	0	1	0	0	0	0	148
11	114	23	0	2	0	0	0	0	0	3	1	154
25	130	37	0	0	0	0	0	0	0	0	0	192
20	91	36	0	0	0	0	0	0	0	0	0	147
15	125	21	0	1	0	0	0	0	0	0	0	162
26	141	32	0	0	0	0	0	0	0	0	0	199
11	131	32	0	1	0	0	0	0	0	0	0	175
21	128	25	0	0	0	0	0	0	0	0	0	174
				2			0			0		
						TT=2+0+0=2						
149	969	224	0	4	0	0	1	0	0	3	1	1351
						EB WEST LEG						
40	287	54	0	0	0	0	0	1	0	1	2	385
34	249	52	0	0	0	0	0	2	0	0	0	337
47	373	33	0	0	0	0	1	1	0	0	1	456
43	357	30	0	1	0	0	1	1	0	1	0	434
43	353	35	0	0	0	0	0	1	0	0	0	432
56	346	29	0	1	0	0	0	0	0	0	0	432
47	354	28	0	0	0	0	1	0	0	0	0	430
64	339	41	0	1	0	0	0	0	0	1	0	446
				2		TT=2+2+1=5	2			1		
374	2658	302	0	3	0	0	3	6	0	3	3	3352

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	530	80	120	1215	90	170	315	85	30	265	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3414		1719	3362		1805	3179	
Flt Permitted	0.14	1.00	1.00	0.39	1.00		0.50	1.00		0.44	1.00	
Satd. Flow (perm)	256	3438	1538	712	3414		910	3362		834	3179	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	64	616	93	140	1413	105	198	366	99	35	308	81
RTOR Reduction (vph)	0	0	45	0	10	0	0	44	0	0	19	0
Lane Group Flow (vph)	64	616	48	140	1508	0	198	421	0	35	370	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	5%	5%	0%	0%	10%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	133	1792	802	371	1779		302	1114		276	1054	
v/s Ratio Prot		0.18			c0.44			0.13			0.12	
v/s Ratio Perm	0.25		0.03	0.20			c0.22			0.04		
v/c Ratio	0.48	0.34	0.06	0.38	0.85		0.66	0.38		0.13	0.35	
Uniform Delay, d1	8.3	7.6	6.4	7.7	11.2		15.5	13.9		12.7	13.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	0.1	0.0	0.6	4.0		10.6	1.0		0.9	0.9	
Delay (s)	11.0	7.7	6.5	8.4	15.1		26.1	14.8		13.6	14.6	
Level of Service	B	A	A	A	B		C	B		B	B	
Approach Delay (s)		7.8			14.5			18.2			14.6	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	655	90	100	575	45	75	175	115	25	155	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1468	1719	3413		1641	3058		1805	2986	
Flt Permitted	0.34	1.00	1.00	0.32	1.00		0.61	1.00		0.56	1.00	
Satd. Flow (perm)	624	3438	1468	580	3413		1049	3058		1068	2986	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	704	97	108	618	48	81	188	124	27	167	65
RTOR Reduction (vph)	0	0	62	0	15	0	0	61	0	0	37	0
Lane Group Flow (vph)	86	704	35	108	651	0	81	251	0	27	195	0
Heavy Vehicles (%)	5%	5%	10%	5%	5%	0%	10%	15%	5%	0%	20%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Effective Green, g (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36		0.43	0.43		0.43	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	225	1240	530	209	1231		448	1306		456	1275	
v/s Ratio Prot		c0.20			0.19			c0.08			0.07	
v/s Ratio Perm	0.14		0.02	0.19			0.08			0.03		
v/c Ratio	0.38	0.57	0.07	0.52	0.53		0.18	0.19		0.06	0.15	
Uniform Delay, d1	8.9	9.7	7.9	9.5	9.5		6.7	6.7		6.3	6.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.6	0.1	2.2	0.4		0.9	0.3		0.2	0.3	
Delay (s)	10.0	10.3	7.9	11.6	9.9		7.6	7.1		6.6	6.9	
Level of Service	B	B	A	B	A		A	A		A	A	
Approach Delay (s)		10.0			10.2			7.2			6.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	1395	210	110	525	75	40	235	105	45	205	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1615	1805	3394		1805	3279		1805	3496	
Flt Permitted	0.40	1.00	1.00	0.11	1.00		0.58	1.00		0.50	1.00	
Satd. Flow (perm)	721	3438	1615	213	3394		1111	3279		956	3496	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	141	1453	219	115	547	78	42	245	109	47	214	57
RTOR Reduction (vph)	0	0	88	0	19	0	0	37	0	0	36	0
Lane Group Flow (vph)	141	1453	131	115	606	0	42	317	0	47	235	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	0%	5%	5%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Effective Green, g (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	432	2061	968	128	2034		298	879		256	938	
v/s Ratio Prot		0.42			0.18			c0.10			0.07	
v/s Ratio Perm	0.20		0.08	c0.54			0.04			0.05		
v/c Ratio	0.33	0.70	0.14	0.90	0.30		0.14	0.36		0.18	0.25	
Uniform Delay, d1	6.0	8.4	5.3	10.5	5.9		16.8	17.9		17.0	17.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.1	0.1	49.3	0.1		1.0	1.2		1.6	0.6	
Delay (s)	6.5	9.5	5.3	59.8	6.0		17.8	19.1		18.6	18.0	
Level of Service	A	A	A	E	A		B	B		B	B	
Approach Delay (s)		8.8			14.3			18.9			18.1	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	12.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	530	80	120	1215	90	170	365	85	30	315	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3414		1719	3061		1805	2891	
Flt Permitted	0.14	1.00	1.00	0.39	1.00		0.45	1.00		0.39	1.00	
Satd. Flow (perm)	256	3438	1538	712	3414		821	3061		747	2891	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	64	616	93	140	1413	105	198	424	99	35	366	81
RTOR Reduction (vph)	0	0	45	0	10	0	0	37	0	0	19	0
Lane Group Flow (vph)	64	616	48	140	1508	0	198	486	0	35	428	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	5%	18%	0%	0%	24%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	133	1792	802	371	1779		272	1015		248	958	
v/s Ratio Prot		0.18			c0.44			0.16			0.15	
v/s Ratio Perm	0.25		0.03	0.20			c0.24			0.05		
v/c Ratio	0.48	0.34	0.06	0.38	0.85		0.73	0.48		0.14	0.45	
Uniform Delay, d1	8.3	7.6	6.4	7.7	11.2		16.0	14.4		12.7	14.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	0.1	0.0	0.6	4.0		15.7	1.6		1.2	1.5	
Delay (s)	11.0	7.7	6.5	8.4	15.1		31.7	16.0		13.9	15.7	
Level of Service	B	A	A	A	B		C	B		B	B	
Approach Delay (s)		7.8			14.5			20.3			15.6	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	655	90	100	575	45	75	225	115	25	205	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1468	1719	3413		1641	2759		1805	2641	
Flt Permitted	0.34	1.00	1.00	0.32	1.00		0.58	1.00		0.53	1.00	
Satd. Flow (perm)	624	3438	1468	580	3413		997	2759		1014	2641	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	704	97	108	618	48	81	242	124	27	220	65
RTOR Reduction (vph)	0	0	62	0	15	0	0	61	0	0	37	0
Lane Group Flow (vph)	86	704	35	108	651	0	81	305	0	27	248	0
Heavy Vehicles (%)	5%	5%	10%	5%	5%	0%	10%	34%	5%	0%	40%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Effective Green, g (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36		0.43	0.43		0.43	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	225	1240	530	209	1231		426	1178		433	1128	
v/s Ratio Prot		c0.20			0.19			c0.11			0.09	
v/s Ratio Perm	0.14		0.02	0.19			0.08			0.03		
v/c Ratio	0.38	0.57	0.07	0.52	0.53		0.19	0.26		0.06	0.22	
Uniform Delay, d1	8.9	9.7	7.9	9.5	9.5		6.7	7.0		6.4	6.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.6	0.1	2.2	0.4		1.0	0.5		0.3	0.4	
Delay (s)	10.0	10.3	7.9	11.6	9.9		7.7	7.5		6.6	7.3	
Level of Service	B	B	A	B	A		A	A		A	A	
Approach Delay (s)		10.0			10.2			7.5			7.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	1395	210	110	525	75	40	285	105	45	255	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1615	1805	3394		1805	2950		1805	3017	
Flt Permitted	0.40	1.00	1.00	0.11	1.00		0.54	1.00		0.45	1.00	
Satd. Flow (perm)	721	3438	1615	213	3394		1017	2950		858	3017	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	141	1453	219	115	547	78	42	297	109	47	266	57
RTOR Reduction (vph)	0	0	88	0	19	0	0	37	0	0	27	0
Lane Group Flow (vph)	141	1453	131	115	606	0	42	369	0	47	296	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	0%	22%	5%	0%	20%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Effective Green, g (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	432	2061	968	128	2034		273	791		230	809	
v/s Ratio Prot		0.42			0.18			c0.13			0.10	
v/s Ratio Perm	0.20		0.08	c0.54			0.04			0.05		
v/c Ratio	0.33	0.70	0.14	0.90	0.30		0.15	0.47		0.20	0.37	
Uniform Delay, d1	6.0	8.4	5.3	10.5	5.9		16.9	18.5		17.1	17.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.1	0.1	49.3	0.1		1.2	2.0		2.0	1.3	
Delay (s)	6.5	9.5	5.3	59.8	6.0		18.1	20.5		19.1	19.2	
Level of Service	A	A	A	E	A		B	C		B	B	
Approach Delay (s)		8.8			14.3			20.2			19.2	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	580	85	130	1325	100	185	400	95	35	345	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3413		1719	3061		1805	2892	
Flt Permitted	0.14	1.00	1.00	0.36	1.00		0.42	1.00		0.35	1.00	
Satd. Flow (perm)	250	3438	1538	657	3413		755	3061		668	2892	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	70	674	99	151	1541	116	215	465	110	41	401	87
RTOR Reduction (vph)	0	0	47	0	10	0	0	37	0	0	13	0
Lane Group Flow (vph)	70	674	52	151	1647	0	215	538	0	41	475	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	5%	18%	0%	0%	24%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	29.0	29.0	29.0	29.0	29.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)	29.0	29.0	29.0	29.0	29.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1813	811	346	1800		247	1002		219	946	
v/s Ratio Prot		0.20			c0.48			0.18			0.16	
v/s Ratio Perm	0.28		0.03	0.23			c0.28			0.06		
v/c Ratio	0.53	0.37	0.06	0.44	0.92		0.87	0.54		0.19	0.50	
Uniform Delay, d1	8.5	7.6	6.4	8.0	11.9		17.4	15.1		13.3	14.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	0.1	0.0	0.9	7.7		31.7	2.1		1.9	1.9	
Delay (s)	12.6	7.8	6.4	8.9	19.6		49.1	17.2		15.1	16.8	
Level of Service	B	A	A	A	B		D	B		B	B	
Approach Delay (s)		8.0			18.7			25.9			16.7	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	715	100	110	625	50	80	245	125	25	225	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1468	1719	3412		1641	2759		1805	2640	
Flt Permitted	0.31	1.00	1.00	0.29	1.00		0.56	1.00		0.52	1.00	
Satd. Flow (perm)	559	3438	1468	517	3412		971	2759		984	2640	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	769	108	118	672	54	86	263	134	27	242	70
RTOR Reduction (vph)	0	0	68	0	16	0	0	49	0	0	40	0
Lane Group Flow (vph)	91	769	40	118	710	0	86	348	0	27	272	0
Heavy Vehicles (%)	5%	5%	10%	5%	5%	0%	10%	34%	5%	0%	40%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	14.0	14.0	14.0	14.0	14.0		16.1	16.1		16.1	16.1	
Effective Green, g (s)	14.0	14.0	14.0	14.0	14.0		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.42	0.42		0.42	0.42	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	205	1263	539	190	1254		410	1166		416	1116	
v/s Ratio Prot		0.22			0.21			c0.13			0.10	
v/s Ratio Perm	0.16		0.03	c0.23			0.09			0.03		
v/c Ratio	0.44	0.61	0.07	0.62	0.57		0.21	0.30		0.06	0.24	
Uniform Delay, d1	9.1	9.8	7.8	9.9	9.6		7.0	7.3		6.5	7.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.8	0.1	6.2	0.6		1.2	0.7		0.3	0.5	
Delay (s)	10.6	10.7	7.9	16.0	10.2		8.1	7.9		6.8	7.6	
Level of Service	B	B	A	B	B		A	A		A	A	
Approach Delay (s)		10.3			11.0			8.0			7.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	38.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	1520	230	120	570	80	45	310	115	50	280	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1615	1805	3395		1805	2950		1805	3017	
Flt Permitted	0.38	1.00	1.00	0.10	1.00		0.48	1.00		0.39	1.00	
Satd. Flow (perm)	680	3438	1615	185	3395		920	2950		747	3017	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	151	1583	240	125	594	83	47	323	120	52	292	62
RTOR Reduction (vph)	0	0	86	0	17	0	0	28	0	0	28	0
Lane Group Flow (vph)	151	1583	154	125	660	0	47	415	0	52	326	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	0%	22%	5%	0%	20%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	41.0	41.0	41.0	41.0	41.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.63		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	429	2169	1019	117	2141		226	726		184	743	
v/s Ratio Prot		0.46			0.19			c0.14			0.11	
v/s Ratio Perm	0.22		0.10	c0.67			0.05			0.07		
v/c Ratio	0.35	0.73	0.15	1.07	0.31		0.21	0.57		0.28	0.44	
Uniform Delay, d1	5.7	8.2	4.9	12.0	5.5		19.5	21.5		19.9	20.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.3	0.1	102.8	0.1		2.1	3.3		3.8	1.9	
Delay (s)	6.2	9.5	5.0	114.8	5.6		21.5	24.7		23.7	22.6	
Level of Service	A	A	A	F	A		C	C		C	C	
Approach Delay (s)		8.7			22.6			24.4			22.7	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	530	80	120	1215	90	170	315	135	30	315	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3414		1719	3008		1805	2891	
Flt Permitted	0.14	1.00	1.00	0.39	1.00		0.45	1.00		0.39	1.00	
Satd. Flow (perm)	256	3438	1538	712	3414		821	3008		747	2891	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	64	616	93	140	1413	105	198	366	157	35	366	81
RTOR Reduction (vph)	0	0	45	0	10	0	0	86	0	0	19	0
Lane Group Flow (vph)	64	616	48	140	1508	0	198	437	0	35	428	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	5%	5%	37%	0%	24%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Effective Green, g (s)	28.3	28.3	28.3	28.3	28.3		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	133	1792	802	371	1779		272	997		248	958	
v/s Ratio Prot		0.18			c0.44			0.15			0.15	
v/s Ratio Perm	0.25		0.03	0.20			c0.24			0.05		
v/c Ratio	0.48	0.34	0.06	0.38	0.85		0.73	0.44		0.14	0.45	
Uniform Delay, d1	8.3	7.6	6.4	7.7	11.2		16.0	14.2		12.7	14.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.7	0.1	0.0	0.6	4.0		15.7	1.4		1.2	1.5	
Delay (s)	11.0	7.7	6.5	8.4	15.1		31.7	15.6		13.9	15.7	
Level of Service	B	A	A	A	B		C	B		B	B	
Approach Delay (s)		7.8			14.5			20.0			15.6	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	54.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	655	90	100	575	45	75	175	165	25	205	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1468	1719	3413		1641	2695		1805	2641	
Flt Permitted	0.34	1.00	1.00	0.32	1.00		0.58	1.00		0.53	1.00	
Satd. Flow (perm)	624	3438	1468	580	3413		997	2695		1015	2641	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	704	97	108	618	48	81	188	177	27	220	65
RTOR Reduction (vph)	0	0	62	0	15	0	0	61	0	0	37	0
Lane Group Flow (vph)	86	704	35	108	651	0	81	304	0	27	248	0
Heavy Vehicles (%)	5%	5%	10%	5%	5%	0%	10%	15%	34%	0%	40%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Effective Green, g (s)	13.6	13.6	13.6	13.6	13.6		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.36	0.36	0.36	0.36	0.36		0.43	0.43		0.43	0.43	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	225	1240	530	209	1231		426	1151		433	1128	
v/s Ratio Prot		c0.20			0.19			c0.11			0.09	
v/s Ratio Perm	0.14		0.02	0.19			0.08			0.03		
v/c Ratio	0.38	0.57	0.07	0.52	0.53		0.19	0.26		0.06	0.22	
Uniform Delay, d1	8.9	9.7	7.9	9.5	9.5		6.7	7.0		6.4	6.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.1	0.6	0.1	2.2	0.4		1.0	0.6		0.3	0.4	
Delay (s)	10.0	10.3	7.9	11.6	9.9		7.7	7.5		6.6	7.3	
Level of Service	B	B	A	B	A		A	A		A	A	
Approach Delay (s)		10.0			10.2			7.6			7.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	135	1395	210	110	525	75	40	235	155	45	255	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1615	1805	3394		1805	2895		1805	3017	
Flt Permitted	0.40	1.00	1.00	0.11	1.00		0.54	1.00		0.45	1.00	
Satd. Flow (perm)	721	3438	1615	213	3394		1017	2895		858	3017	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	141	1453	219	115	547	78	42	245	161	47	266	57
RTOR Reduction (vph)	0	0	88	0	19	0	0	37	0	0	27	0
Lane Group Flow (vph)	141	1453	131	115	606	0	42	369	0	47	296	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	0%	5%	36%	0%	20%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Effective Green, g (s)	36.2	36.2	36.2	36.2	36.2		16.2	16.2		16.2	16.2	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	432	2061	968	128	2034		273	776		230	809	
v/s Ratio Prot		0.42			0.18			c0.13			0.10	
v/s Ratio Perm	0.20		0.08	c0.54			0.04			0.05		
v/c Ratio	0.33	0.70	0.14	0.90	0.30		0.15	0.48		0.20	0.37	
Uniform Delay, d1	6.0	8.4	5.3	10.5	5.9		16.9	18.5		17.1	17.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	1.1	0.1	49.3	0.1		1.2	2.1		2.0	1.3	
Delay (s)	6.5	9.5	5.3	59.8	6.0		18.1	20.6		19.1	19.2	
Level of Service	A	A	A	E	A		B	C		B	B	
Approach Delay (s)		8.8			14.3			20.4			19.2	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	580	85	130	1325	100	185	345	145	35	345	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1719	3413		1719	3062		1805	2892	
Flt Permitted	0.14	1.00	1.00	0.36	1.00		0.42	1.00		0.36	1.00	
Satd. Flow (perm)	250	3438	1538	657	3413		755	3062		675	2892	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	70	674	99	151	1541	116	215	401	169	41	401	87
RTOR Reduction (vph)	0	0	47	0	10	0	0	85	0	0	13	0
Lane Group Flow (vph)	70	674	52	151	1647	0	215	485	0	41	475	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	5%	18%	0%	0%	24%	10%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	29.0	29.0	29.0	29.0	29.0		18.0	18.0		18.0	18.0	
Effective Green, g (s)	29.0	29.0	29.0	29.0	29.0		18.0	18.0		18.0	18.0	
Actuated g/C Ratio	0.53	0.53	0.53	0.53	0.53		0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1813	811	346	1800		247	1002		221	946	
v/s Ratio Prot		0.20			c0.48			0.16			0.16	
v/s Ratio Perm	0.28		0.03	0.23			c0.28			0.06		
v/c Ratio	0.53	0.37	0.06	0.44	0.92		0.87	0.48		0.19	0.50	
Uniform Delay, d1	8.5	7.6	6.4	8.0	11.9		17.4	14.8		13.2	14.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	0.1	0.0	0.9	7.7		31.7	1.7		1.8	1.9	
Delay (s)	12.6	7.8	6.4	8.9	19.6		49.1	16.5		15.1	16.8	
Level of Service	B	A	A	A	B		D	B		B	B	
Approach Delay (s)		8.0			18.7			25.4			16.7	
Approach LOS		A			B			C			B	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	715	100	110	625	50	80	190	180	25	225	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1468	1719	3412		1641	2792		1805	2640	
Flt Permitted	0.31	1.00	1.00	0.29	1.00		0.56	1.00		0.52	1.00	
Satd. Flow (perm)	559	3438	1468	517	3412		971	2792		983	2640	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	769	108	118	672	54	86	204	194	27	242	70
RTOR Reduction (vph)	0	0	68	0	16	0	0	49	0	0	40	0
Lane Group Flow (vph)	91	769	40	118	710	0	86	349	0	27	272	0
Heavy Vehicles (%)	5%	5%	10%	5%	5%	0%	10%	34%	5%	0%	40%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	14.0	14.0	14.0	14.0	14.0		16.1	16.1		16.1	16.1	
Effective Green, g (s)	14.0	14.0	14.0	14.0	14.0		16.1	16.1		16.1	16.1	
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37		0.42	0.42		0.42	0.42	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	205	1263	539	190	1254		410	1180		415	1116	
v/s Ratio Prot		0.22			0.21			c0.12			0.10	
v/s Ratio Perm	0.16		0.03	c0.23			0.09			0.03		
v/c Ratio	0.44	0.61	0.07	0.62	0.57		0.21	0.30		0.07	0.24	
Uniform Delay, d1	9.1	9.8	7.8	9.9	9.6		7.0	7.3		6.5	7.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.8	0.1	6.2	0.6		1.2	0.6		0.3	0.5	
Delay (s)	10.6	10.7	7.9	16.0	10.2		8.1	7.9		6.8	7.6	
Level of Service	B	B	A	B	B		A	A		A	A	
Approach Delay (s)		10.3			11.0			7.9			7.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	38.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
13: Vincent Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	1520	230	120	570	80	45	255	170	50	280	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1615	1805	3395		1805	2946		1805	3017	
Flt Permitted	0.38	1.00	1.00	0.10	1.00		0.48	1.00		0.39	1.00	
Satd. Flow (perm)	680	3438	1615	185	3395		920	2946		747	3017	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	151	1583	240	125	594	83	47	266	177	52	292	62
RTOR Reduction (vph)	0	0	86	0	17	0	0	28	0	0	28	0
Lane Group Flow (vph)	151	1583	154	125	660	0	47	415	0	52	326	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	0%	22%	5%	0%	20%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	41.0	41.0	41.0	41.0	41.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.63	0.63	0.63	0.63	0.63		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	429	2169	1019	117	2141		226	725		184	743	
v/s Ratio Prot		0.46			0.19			c0.14			0.11	
v/s Ratio Perm	0.22		0.10	c0.67			0.05			0.07		
v/c Ratio	0.35	0.73	0.15	1.07	0.31		0.21	0.57		0.28	0.44	
Uniform Delay, d1	5.7	8.2	4.9	12.0	5.5		19.5	21.5		19.9	20.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.3	0.1	102.8	0.1		2.1	3.3		3.8	1.9	
Delay (s)	6.2	9.5	5.0	114.8	5.6		21.5	24.8		23.7	22.6	
Level of Service	A	A	A	F	A		C	C		C	C	
Approach Delay (s)		8.7			22.6			24.5			22.7	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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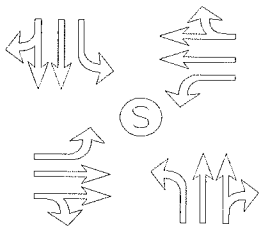
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
14
ROUTE
2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

ARROW HWY

EB LEFT	75	5%		75	5	80
EB THRU	515	5%	**50**	565	50	615
EB RIGHT	90	5%		90	10	100
WB LEFT	115	5%		115	10	125
WB THRU	1205	5%		1205	110	1315
WB RIGHT	30	5%		30	5	35

LARK ELLEN AVE

NB LEFT	165	5%		165	15	180
NB THRU	330	5%		330	30	360
NB RIGHT	170	5%		170	15	185
SB LEFT	110	5%		110	10	120
SB THRU	330	5%		330	30	360
SB RIGHT	70	5%		70	5	75
TOTALS	**3205**		**50**	**3255**	**295**	**3550**

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	75	10%		75	5	80
EB THRU	675	5%	**50**	725	65	790
EB RIGHT	60	5%		60	5	65
WB LEFT	110	5%		110	10	120
WB THRU	540	5%		540	50	590
WB RIGHT	30	5%		30	5	35
LARK ELLEN AVE						
NB LEFT	65	5%		65	5	70
NB THRU	190	5%		190	15	205
NB RIGHT	110	5%		110	10	120
SB LEFT	70	5%		70	5	75
SB THRU	210	5%		210	20	230
SB RIGHT	25	15%		25	5	30
TOTALS	**2160**		**50**	**2210**	**200**	**2410**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	115	5%		115	10	125
EB THRU	1345	5%	**50**	1395	125	1520
EB RIGHT	115	5%		115	10	125
WB LEFT	85	5%		85	5	90
WB THRU	595	5%		595	55	650
WB RIGHT	35	5%		35	5	40
LARK ELLEN AVE						
NB LEFT	75	5%		75	5	80
NB THRU	325	5%		325	30	355
NB RIGHT	115	5%		115	10	125
SB LEFT	100	5%		100	10	110
SB THRU	330	5%		330	30	360
SB RIGHT	55	5%		55	5	60
TOTALS	**3290**		**50**	**3340**	**300**	**3640**

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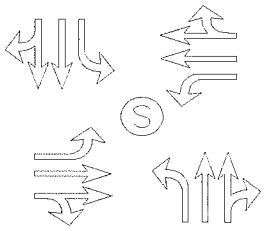
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	72	3	9	80	**0**	80	5	85
EB THRU	480	33	99	580	**150**	730	65	795
EB RIGHT	89	3	9	100	**0**	100	10	110
WB LEFT	117	0	0	115	**0**	115	10	125
WB THRU	1157	46	138	1295	**0**	1295	115	1410
WB RIGHT	32	0	0	30	**0**	30	5	35
LARK ELLEN AVE								
NB LEFT	166	1	3	170	**0**	170	15	185
NB THRU	323	7	21	345	**0**	345	30	375
NB RIGHT	170	1	3	175	**0**	175	15	190
SB LEFT	105	3	9	115	**0**	115	10	125
SB THRU	325	5	15	340	**0**	340	30	370
SB RIGHT	66	3	9	75	**0**	75	5	80
TOTALS	**3102**				**150**	**3570**	**315**	**3885**

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	69	6	18	85	**0**	85	5	90
EB THRU	633	42	126	760	**150**	910	80	990
EB RIGHT	55	3	9	65	**0**	65	5	70
WB LEFT	108	1	3	110	**0**	110	10	120
WB THRU	500	39	117	615	**0**	615	55	670
WB RIGHT	30	0	0	30	**0**	30	5	35
LARK ELLEN AVE								
NB LEFT	66	1	3	70	**0**	70	5	75
NB THRU	179	12	36	215	**0**	215	20	235
NB RIGHT	108	1	3	110	**0**	110	10	120
SB LEFT	70	1	3	75	**0**	75	5	80
SB THRU	206	4	12	220	**0**	220	20	240
SB RIGHT	21	3	9	30	**0**	30	5	35
TOTALS	**2045**				**150**	**2535**	**225**	**2760**

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Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ARROW HWY
N/S STREET : LARK ELLEN AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 14
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	115	1	3	120	**0**	120	10	130
EB THRU	1323	21	63	1385	**150**	1535	140	1675
EB RIGHT	114	0	0	115	**0**	115	10	125
WB LEFT	87	0	0	85	**0**	85	5	90
WB THRU	585	8	24	610	**0**	610	55	665
WB RIGHT	34	0	0	35	**0**	35	5	40
LARK ELLEN AVE								
NB LEFT	75	1	3	80	**0**	80	5	85
NB THRU	323	0	0	325	**0**	325	30	355
NB RIGHT	112	1	3	115	**0**	115	10	125
SB LEFT	99	1	3	100	**0**	100	10	110
SB THRU	331	0	0	330	**0**	330	30	360
SB RIGHT	52	1	3	55	**0**	55	5	60
TOTALS	**3250**				**150**	**3505**	**315**	**3820**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LARK ELLEN
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 07:30AM

NORTH LEG (SB)

TOTAL: 507

TT = 11
TT% = 11/507 = 2.17% ≈ 2%

	Rt	Thru	Lt	
	69 (70)	330	108 (110)	Total
	18	98	28	1st
	10	90	42	2nd
	24	72	28	3rd
	17	70	10	4th

TT = 46
TT% = 46/1352 = 3.4% ≈ 3%

EAST LEG TOTAL: (WB) 1,352

	1st	2nd	3rd	4th	Total
Rt	7	18	7	0	32 (30)
Thru	300	359	284	260	1203 (1205)
Lt	25	44	34	14	115 (117)

	Total	1st	2nd	3rd	4th
Lt	75	24	32	11	8
Thru	513 (515)	124	163	110	116
Rt	92 (90)	29	27	26	10

WEST LEG TOTAL: (EB) 680

TT = 39
TT% = 39/680 = 5.74% ≈ 6%

	Lt	Thru	Rt
1st	27	66	40
2nd	48	96	51
3rd	56	88	42
4th	36	80	38
Total	167 (165)	330	171 (170)

SOUTH LEG (NB)

TOTAL: 668

TT = 9
TT = 9/668 = 1.35% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.86
EAST LEG = 0.80
WEST LEG = 0.77

ALL LEGS = 0.82

HOUR TOTAL: 3,207

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LARK ELLEN IRWINDALE

EAST-WEST STREET : ARROW HWY 06-02-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
11	38	9	1	2	2	0	0	0	0	0	0	63
16	35	19	1	2	0	0	0	0	0	0	0	73
18	98	28	0	0	0	0	0	0	0	0	0	144
10	88	40	0	2	1	0	0	1	0	0	0	142
22	69	27	2	0	0	0	2	0	0	1	1	124
16	70	10	1	0	0	0	0	0	0	0	0	97
15	38	12	2	0	6 0	0	0	3 0	0	0	2 0	67
16	33	19	1	3	0	0	0	0	0	0	0	72
						TT=6+3+2=11						
124	469	164	8	9	3	0	2	1	0	1	1	782
					NB SOUTH LEG							
7	61	21	0	1	1	0	0	0	0	0	0	91
21	70	17	0	2	2	0	1	1	0	0	0	114
39	63	26	1	2	1	0	1	0	0	0	0	133
51	96	48	0	0	0	0	0	0	0	0	0	195
42	86	56	0	2	0	0	0	0	0	0	0	186
38	78	36	0	2	0	0	0	0	0	0	0	154
18	39	17	0	0	8 0	0	1	1 0	0	0	0 0	75
22	73	16	0	0	0	0	0	0	0	0	0	111
						TT=8+1+0=9						
238	566	237	1	9	4	0	3	1	0	0	0	1059
					WB EAST LEG							
4	296	12	0	7	0	0	0	0	0	7	0	326
2	297	11	0	12	0	0	0	0	0	2	0	324
7	288	25	0	4	0	0	3	0	0	5	0	332
18	352	44	0	5	0	0	2	0	0	0	0	421
7	275	34	0	6	0	0	2	0	0	1	0	325
0	242	14	0	9	0	0	5	0	0	4	0	274
5	214	25	0	6	24 1	0	2	12 0	0	4	10 0	257
7	210	17	0	11	0	0	3	0	0	2	0	250
						TT=24+12+10=46						
50	2174	182	0	60	1	0	17	0	0	25	0	2509
					EB WEST LEG							
1	99	0	0	11	8	0	2	0	0	4	0	125
9	84	8	1	6	7	0	0	0	0	2	0	117
27	114	24	1	5	0	0	0	0	1	5	0	177
27	156	32	0	5	0	0	0	0	0	2	0	222
25	103	9	1	5	2	0	1	0	0	1	0	147
10	107	7	0	6	1	0	1	0	0	2	0	134
11	95	18	0	7	26 0	0	1	2 0	0	1	11 0	133
15	128	11	0	7	1	0	1	0	0	0	0	163
						TT=26+2+11=39						
125	886	109	3	52	19	0	6	0	1	17	0	1218

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 07:00AM-08:00AM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
57	265	100	Total
12	40	11	1st
17	37	19	2nd
18	98	28	3rd
10	90	42	4th

	1st	2nd	3rd	4th	Total
Rt	4	2	7	18	31
Thru	310	311	300	359	1280
Lt	12	11	25	44	92

Total	1st	2nd	3rd	4th	
79	8	15	24	32	Lt
495	116	92	124	163	Thru
67	1	10	29	27	Rt

	Lt	Thru	Rt
1st	22	62	7
2nd	20	73	21
3rd	27	66	40
4th	48	96	51
Total	117	297	119

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 08:00AM-09:00AM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
75	216	69	Total
24	72	28	1st
17	70	10	2nd
17	38	12	3rd
17	36	19	4th

	1st	2nd	3rd	4th	Total
Rt	7	0	5	7	19
Thru	284	260	226	226	996
Lt	34	14	26	17	91

Total	1st	2nd	3rd	4th	
49	11	8	18	12	Lt
466	110	116	104	136	Thru
62	26	10	11	15	Rt

	Lt	Thru	Rt
1st	56	88	42
2nd	36	80	38
3rd	17	40	18
4th	16	73	22
Total	125	281	120

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LARK ELLEN
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 01:00PM

NORTH LEG (SB)

TOTAL: 305

TT = 8
TT% = 8/305 = 2.62%
≈ 3%

	Rt	Thru	Lt	
Total	25 24	210	70 71	
1st	10	48	13	
2nd	6	45	17	
3rd	3	59	17	
4th	5	58	24	

TT = 39
TT% = 39/678 = 5.75%
≈ 6%

EAST LEG TOTAL: (WB) 678

	1st	2nd	3rd	4th	Total
Rt	7	10	7	6	30
Thru	127	167	101	144	590 539
Lt	32	32	23	22	110 109

	Total	1st	2nd	3rd	4th
Lt	75	10	22	24	19
Thru	675	160	157	146	212
Rt	60 58	17	14	9	18

WEST LEG TOTAL: (EB) 808

TT = 51
TT% = 51/808 = 6.31%
≈ 6%

SOUTH LEG (NB)

	Lt	Thru	Rt
1st	9	47	17
2nd	19	47	24
3rd	11	45	29
4th	28	52	39
Total	65 67	190 191	110 109

TOTAL: 367

TT = 14
TT% = 14/367 = 3.81%
≈ 4%

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.77
EAST LEG = 0.81
WEST LEG = 0.81

ALL LEGS = 0.86

HOUR TOTAL: 2,158

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 12:00PM-01:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
58	165	84	Total
11	32	22	1st
15	37	18	2nd
19	48	26	3rd
13	48	18	4th

	1st	2nd	3rd	4th	Total
Rt	3	3	5	4	15
Thru	146	170	143	177	636
Lt	13	23	16	25	77

Total	1st	2nd	3rd	4th	
77	16	21	18	22	Lt
624	156	177	144	147	Thru
48	11	12	14	11	Rt

	Lt	Thru	Rt
1st	18	45	22
2nd	18	40	20
3rd	11	52	27
4th	9	45	19
Total	56	182	88

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 01:00PM-02:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total	24	210	71
1st	10	48	13
2nd	6	45	17
3rd	3	59	17
4th	5	58	24

	1st	2nd	3rd	4th	Total
Rt	7	10	7	6	30
Thru	127	167	101	144	539
Lt	32	32	23	22	109

	Total	1st	2nd	3rd	4th
Lt	75	10	22	24	19
Thru	675	160	157	146	212
Rt	58	17	14	9	18

	Lt	Thru	Rt
1st	9	47	17
2nd	19	47	24
3rd	11	45	29
4th	28	52	39
Total	67	191	109

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LARK ELLEN — IRWINDALE

EAST-WEST STREET : ARROW HWY — 06-02-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
11	31	21	0	0	1	0	1	0	0	0	0	65
14	36	17	1	0	1	0	1	0	0	0	0	70
19	46	25	0	2	0	0	0	0	0	0	1	93
12	46	17	1	2	1	0	0	0	0	0	0	79
8	47	13	2	1	0	0	0	0	0	0	0	71
6	45	17	0	0	0	0	0	0	0	0	0	68
3	57	17	0	2	0	0	0	0	0	0	0	79
4	57	23	0	0	0	1	0	1	0	1	0	87
				5		TT=5+2+1=8	2				1	
77	365	150	4	7	3	1	2	1	0	1	1	612
						NB SOUTH LEG						
22	45	18	0	0	0	0	0	0	0	0	0	85
20	40	18	0	0	0	0	0	0	0	0	0	78
26	49	11	1	2	0	0	0	0	0	1	0	90
19	45	9	0	0	0	0	0	0	0	0	0	73
16	43	9	1	3	0	0	1	0	0	0	0	73
24	44	19	0	3	0	0	0	0	0	0	0	90
29	41	11	0	4	0	0	0	0	0	0	0	85
39	51	27	0	1	1	0	0	0	0	0	0	119
				13		TT=13+1+0=14	1				0	
195	358	122	2	13	1	0	1	0	0	1	0	693
						WB EAST LEG						
3	136	13	0	5	0	0	4	0	0	1	0	162
3	163	23	0	6	0	0	1	0	0	0	0	196
5	135	16	0	6	0	0	1	0	0	1	0	164
4	168	25	0	7	0	0	0	0	0	2	0	206
7	120	32	0	5	0	0	2	0	0	0	0	166
10	161	32	0	3	0	0	1	0	0	2	0	209
7	91	22	0	7	1	0	2	0	0	1	0	131
6	128	22	0	9	0	0	3	0	0	4	0	172
				24		TT=24+8+7=39	8				7	
45	1102	185	0	48	1	0	14	0	0	11	0	1406
						EB WEST LEG						
11	152	16	0	3	0	0	1	0	0	0	0	183
12	172	21	0	5	0	0	0	0	0	0	0	210
13	141	17	1	3	1	0	0	0	0	0	0	176
11	138	21	0	4	0	0	2	1	0	3	0	180
16	156	10	1	3	0	0	0	0	0	1	0	187
12	143	21	2	10	1	0	1	0	0	3	0	193
9	129	22	0	15	2	0	0	0	0	2	0	179
18	205	16	0	4	2	0	1	1	0	2	0	249
				40		TT=40+3+8=51	3				8	
102	1236	144	4	47	6	0	5	2	0	11	0	1557

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LARK ELLEN
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 484

TT = 2
TT% = 2/484 = 0.41%
≈ 1%

Rt	Thru	Lt	
53 (55)	331 (330)	100	Total
10	77	28	1st
16	75	28	2nd
13	80	18	3rd
14	99	26	4th

TT = 8
TT% = 8/714 = 1.12%
≈ 1%

EAST LEG TOTAL: (WB) 714

	1st	2nd	3rd	4th	Total
Rt	6	9	7	12	34 (35)
Thru	166	132	160	135	593 (595)
Lt	28	19	19	21	87 (85)

Total	1st	2nd	3rd	4th	
116 (115)	24	36	35	21	Lt
1344 (1345)	374	279	325	366	Thru
114 (115)	23	36	28	27	Rt

WEST LEG TOTAL: 1,574 (EB)

TT = 22
TT% = 22/1574 = 1.40%
≈ 1%

	Lt	Thru	Rt
1st	14	84	28
2nd	18	64	26
3rd	20	85	29
4th	24	90	30
Total	76 (75)	323 (325)	113 (115)

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG = 0.89
EAST LEG = 0.89
WEST LEG = 0.93

ALL LEGS = 0.95

TT = 2
TT% = 2/512 = 0.39%
≈ 1%

TOTAL: 512

HOUR TOTAL: 3,284

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 04:00PM-05:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
31	202	92	Total
7	30	14	1st
9	62	15	2nd
5	47	26	3rd
10	63	37	4th

	1st	2nd	3rd	4th	Total
Rt	3	3	4	3	13
Thru	141	136	160	140	577
Lt	15	32	23	23	93

Total	1st	2nd	3rd	4th	
82	18	24	13	27	Lt
1248	283	263	366	336	Thru
77	17	18	24	18	Rt

	Lt	Thru	Rt
1st	13	39	16
2nd	15	53	28
3rd	9	40	20
4th	13	72	23
Total	50	204	87

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LARK ELLEN

EAST-WEST STREET: ARROW HWY

TIME: 05:00PM-06:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
53	331	100	Total
10	77	28	1st
16	75	28	2nd
13	80	18	3rd
14	99	26	4th

	1st	2nd	3rd	4th	Total
Rt	6	9	7	12	34
Thru	166	132	160	135	593
Lt	28	19	19	21	87

Total	1st	2nd	3rd	4th	
116	24	36	35	21	Lt
1344	374	279	325	366	Thru
114	23	36	28	27	Rt

	Lt	Thru	Rt
1st	14	84	28
2nd	18	64	26
3rd	20	85	29
4th	24	90	30
Total	76	323	113

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LARK ELLEN IRWINDALE

EAST-WEST STREET : ARROW HWY 06-02-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
5	30	13	2	0	1	0	0	0	0	0	0	51
9	60	15	0	2	0	0	0	0	0	0	0	86
5	46	26	0	1	0	0	0	0	0	0	0	78
10	63	37	0	0	0	0	0	0	0	0	0	110
10	77	27	0	0	1	0	0	0	0	0	0	115
15	75	28	1	0	0	0	0	0	0	0	0	119
13	80	18	0	0	0	0	0	0	0	0	0	111
14	99	26	0	0	0	0	0	0	0	0	0	139
				2		TT= 2+0+0=		2				
81	530	190	3	3	2	0	0	0	0	0	0	809
						NB SOUTH LEG						
16	38	12	0	1	1	0	0	0	0	0	0	68
28	50	15	0	2	0	0	1	0	0	0	0	96
20	39	8	0	0	1	0	0	0	0	1	0	69
23	72	13	0	0	0	0	0	0	0	0	0	108
28	84	14	0	0	0	0	0	0	0	0	0	126
26	64	18	0	0	0	0	0	0	0	0	0	108
28	85	19	1	0	1	0	0	0	0	0	0	134
30	90	24	0	0	0	0	0	0	0	0	0	144
				2		TT= 2+0+0 =		2				
199	522	123	1	3	3	0	1	0	0	1	0	853
						WB EAST LEG						
3	135	15	0	4	0	0	1	0	0	1	0	159
2	131	31	0	4	0	0	1	1	1	0	0	171
4	145	23	0	11	0	0	0	0	0	4	0	187
3	136	23	0	1	0	0	2	0	0	1	0	166
6	163	28	0	2	0	0	0	0	0	1	0	200
9	129	19	0	2	0	0	0	0	0	1	0	160
7	158	19	0	2	0	0	0	0	0	0	0	186
12	135	21	0	0	0	0	0	0	0	0	0	168
				6		TT= 6+0+2 =		8				
46	1132	179	0	26	0	0	4	1	1	8	0	1397
						EB WEST LEG						
17	268	18	0	9	0	0	1	0	0	5	0	318
18	258	23	0	3	0	0	0	1	0	2	0	305
24	360	13	0	4	0	0	0	0	0	2	0	403
18	329	27	0	7	0	0	0	0	0	0	0	381
23	371	24	0	2	0	0	1	0	0	0	0	421
36	278	35	0	1	1	0	0	0	0	0	0	351
28	317	35	0	7	0	0	1	0	0	0	0	388
27	357	21	0	6	0	0	0	0	0	3	0	414
				17		TT= 17+2+3 =		22				
191	2538	196	0	39	1	0	3	1	0	12	0	2981

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	515	90	115	1205	30	165	330	170	110	330	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3361		1805	3429		1719	3263		1719	3348	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3361		1805	3429		1719	3263		1719	3348	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	91	628	110	140	1470	37	201	402	207	134	402	85
RTOR Reduction (vph)	0	15	0	0	2	0	0	73	0	0	20	0
Lane Group Flow (vph)	91	723	0	140	1505	0	201	536	0	134	467	0
Heavy Vehicles (%)	5%	5%	5%	0%	5%	0%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.0	32.4		11.6	39.0		11.0	21.1		8.9	19.0	
Effective Green, g (s)	5.0	32.4		11.6	39.0		11.0	21.1		8.9	19.0	
Actuated g/C Ratio	0.06	0.36		0.13	0.43		0.12	0.23		0.10	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	1210		233	1486		210	765		170	707	
v/s Ratio Prot	c0.05	0.21		0.08	c0.44		c0.12	c0.16		0.08	0.14	
v/s Ratio Perm												
v/c Ratio	0.95	0.60		0.60	1.01		0.96	0.70		0.79	0.66	
Uniform Delay, d1	42.4	23.5		37.0	25.5		39.3	31.6		39.6	32.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	74.1	0.8		4.3	26.6		49.4	5.3		21.0	4.8	
Delay (s)	116.5	24.3		41.3	52.1		88.7	36.9		60.7	37.4	
Level of Service	F	C		D	D		F	D		E	D	
Approach Delay (s)		34.4			51.2			49.7			42.4	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	45.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	675	60	110	540	30	65	190	110	70	210	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3396		1719	3419		1719	3249		1719	3349	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3396		1719	3419		1719	3249		1719	3349	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	87	785	70	128	628	35	76	221	128	81	244	29
RTOR Reduction (vph)	0	11	0	0	6	0	0	89	0	0	15	0
Lane Group Flow (vph)	87	844	0	128	657	0	76	260	0	81	258	0
Heavy Vehicles (%)	10%	5%	5%	5%	5%	0%	5%	5%	5%	5%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.4	16.4		4.4	16.4		3.0	17.6		3.0	17.6	
Effective Green, g (s)	4.4	16.4		4.4	16.4		3.0	17.6		3.0	17.6	
Actuated g/C Ratio	0.08	0.29		0.08	0.29		0.05	0.31		0.05	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	126	970		132	977		90	996		90	1027	
v/s Ratio Prot	0.05	c0.25		c0.07	0.19		0.04	c0.08		c0.05	0.08	
v/s Ratio Perm												
v/c Ratio	0.69	0.87		0.97	0.67		0.84	0.26		0.90	0.25	
Uniform Delay, d1	25.8	19.5		26.4	18.1		27.0	15.0		27.1	15.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.1	8.6		68.1	1.8		47.9	0.6		63.0	0.6	
Delay (s)	40.9	28.1		94.6	20.0		74.9	15.6		90.1	15.5	
Level of Service	D	C		F	B		E	B		F	B	
Approach Delay (s)		29.3			32.0			26.2			32.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	1345	115	85	595	35	75	325	115	100	330	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3410		1805	3418		1719	3424		1719	3507	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3410		1805	3418		1719	3424		1719	3507	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	1416	121	89	626	37	79	342	121	105	347	58
RTOR Reduction (vph)	0	7	0	0	5	0	0	38	0	0	15	0
Lane Group Flow (vph)	121	1530	0	89	658	0	79	425	0	105	390	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	5%	0%	5%	5%	0%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	9.1	42.0		4.6	37.5		5.4	19.1		7.0	20.7	
Effective Green, g (s)	9.1	42.0		4.6	37.5		5.4	19.1		7.0	20.7	
Actuated g/C Ratio	0.10	0.47		0.05	0.42		0.06	0.22		0.08	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	176	1615		94	1445		105	737		136	818	
v/s Ratio Prot	c0.07	c0.45		c0.05	0.19		0.05	c0.12		c0.06	0.11	
v/s Ratio Perm												
v/c Ratio	0.69	0.95		0.95	0.46		0.75	0.58		0.77	0.48	
Uniform Delay, d1	38.4	22.3		41.9	18.3		41.0	31.2		40.1	29.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.6	12.0		74.7	0.2		25.8	3.3		23.3	2.0	
Delay (s)	49.1	34.3		116.7	18.5		66.8	34.4		63.4	31.3	
Level of Service	D	C		F	B		E	C		E	C	
Approach Delay (s)		35.4			30.1			39.2			37.9	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	35.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	565	90	115	1205	30	165	330	170	110	330	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3160		1805	3429		1719	3263		1719	3348	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3160		1805	3429		1719	3263		1719	3348	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	91	689	110	140	1470	37	201	402	207	134	402	85
RTOR Reduction (vph)	0	13	0	0	2	0	0	73	0	0	20	0
Lane Group Flow (vph)	91	786	0	140	1505	0	201	536	0	134	467	0
Heavy Vehicles (%)	5%	13%	5%	0%	5%	0%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.0	32.4		11.6	39.0		11.0	21.1		8.9	19.0	
Effective Green, g (s)	5.0	32.4		11.6	39.0		11.0	21.1		8.9	19.0	
Actuated g/C Ratio	0.06	0.36		0.13	0.43		0.12	0.23		0.10	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	1138		233	1486		210	765		170	707	
v/s Ratio Prot	c0.05	0.25		0.08	c0.44		c0.12	c0.16		0.08	0.14	
v/s Ratio Perm												
v/c Ratio	0.95	0.69		0.60	1.01		0.96	0.70		0.79	0.66	
Uniform Delay, d1	42.4	24.5		37.0	25.5		39.3	31.6		39.6	32.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	74.1	1.8		4.3	26.6		49.4	5.3		21.0	4.8	
Delay (s)	116.5	26.4		41.3	52.1		88.7	36.9		60.7	37.4	
Level of Service	F	C		D	D		F	D		E	D	
Approach Delay (s)		35.6			51.2			49.7			42.4	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	725	60	110	540	30	65	190	110	70	210	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.94		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3201		1719	3419		1719	3249		1719	3349	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3201		1719	3419		1719	3249		1719	3349	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	87	843	70	128	628	35	76	221	128	81	244	29
RTOR Reduction (vph)	0	10	0	0	6	0	0	90	0	0	15	0
Lane Group Flow (vph)	87	903	0	128	657	0	76	259	0	81	258	0
Heavy Vehicles (%)	10%	12%	5%	5%	5%	0%	5%	5%	5%	5%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.5	17.3		4.5	17.3		3.0	17.3		3.0	17.3	
Effective Green, g (s)	4.5	17.3		4.5	17.3		3.0	17.3		3.0	17.3	
Actuated g/C Ratio	0.08	0.30		0.08	0.30		0.05	0.30		0.05	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	127	953		133	1018		89	967		89	997	
v/s Ratio Prot	0.05	c0.28		c0.07	0.19		0.04	c0.08		c0.05	0.08	
v/s Ratio Perm												
v/c Ratio	0.69	0.95		0.96	0.65		0.85	0.27		0.91	0.26	
Uniform Delay, d1	26.1	20.0		26.7	17.7		27.3	15.6		27.4	15.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.2	17.7		66.1	1.4		50.7	0.7		66.4	0.6	
Delay (s)	40.3	37.6		92.8	19.1		78.1	16.2		93.8	16.2	
Level of Service	D	D		F	B		E	B		F	B	
Approach Delay (s)		37.9			31.1			27.3			33.9	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	33.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	54.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	1395	115	85	595	35	75	325	115	100	330	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3323		1805	3418		1719	3424		1719	3507	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3323		1805	3418		1719	3424		1719	3507	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	121	1468	121	89	626	37	79	342	121	105	347	58
RTOR Reduction (vph)	0	7	0	0	5	0	0	39	0	0	15	0
Lane Group Flow (vph)	121	1582	0	89	658	0	79	424	0	105	390	0
Heavy Vehicles (%)	5%	8%	0%	0%	5%	0%	5%	0%	5%	5%	0%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	9.2	43.1		4.7	38.6		5.5	19.0		7.0	20.5	
Effective Green, g (s)	9.2	43.1		4.7	38.6		5.5	19.0		7.0	20.5	
Actuated g/C Ratio	0.10	0.48		0.05	0.43		0.06	0.21		0.08	0.23	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	176	1595		94	1469		105	724		134	801	
v/s Ratio Prot	c0.07	c0.48		c0.05	0.19		0.05	c0.12		c0.06	0.11	
v/s Ratio Perm												
v/c Ratio	0.69	0.99		0.95	0.45		0.75	0.59		0.78	0.49	
Uniform Delay, d1	38.9	23.2		42.4	18.1		41.5	31.9		40.7	30.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.6	20.5		74.7	0.2		25.8	3.5		25.2	2.1	
Delay (s)	49.5	43.7		117.2	18.3		67.3	35.3		65.8	32.2	
Level of Service	D	D		F	B		E	D		E	C	
Approach Delay (s)		44.1			30.0			40.0			39.1	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	39.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	89.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	78.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	615	100	125	1315	35	180	360	185	120	360	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	1.00		1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3159		1805	3429		1719	3263		1719	3350	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3159		1805	3429		1719	3263		1719	3350	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	98	750	122	152	1604	43	220	439	226	146	439	91
RTOR Reduction (vph)	0	14	0	0	2	0	0	73	0	0	20	0
Lane Group Flow (vph)	98	858	0	152	1645	0	220	592	0	146	510	0
Heavy Vehicles (%)	5%	13%	5%	0%	5%	0%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	5.0	32.1		11.9	39.0		11.0	21.0		9.0	19.0	
Effective Green, g (s)	5.0	32.1		11.9	39.0		11.0	21.0		9.0	19.0	
Actuated g/C Ratio	0.06	0.36		0.13	0.43		0.12	0.23		0.10	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	1127		239	1486		210	761		172	707	
v/s Ratio Prot	c0.06	0.27		0.08	c0.48		c0.13	c0.18		0.08	0.15	
v/s Ratio Perm												
v/c Ratio	1.02	0.76		0.64	1.11		1.05	0.78		0.85	0.72	
Uniform Delay, d1	42.5	25.6		37.0	25.5		39.5	32.3		39.8	33.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	97.6	3.1		5.5	58.4		75.2	7.7		30.3	6.3	
Delay (s)	140.1	28.7		42.4	83.9		114.7	40.0		70.1	39.3	
Level of Service	F	C		D	F		F	D		E	D	
Approach Delay (s)		39.9			80.4			58.6			46.0	
Approach LOS		D			F			E			D	

Intersection Summary			
HCM Average Control Delay	61.5	HCM Level of Service	E
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	790	65	120	590	35	70	205	120	75	230	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3202		1719	3418		1719	3247		1719	3356	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3202		1719	3418		1719	3247		1719	3356	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	93	919	76	140	686	41	81	238	140	87	267	29
RTOR Reduction (vph)	0	10	0	0	7	0	0	100	0	0	14	0
Lane Group Flow (vph)	93	985	0	140	720	0	81	278	0	87	282	0
Heavy Vehicles (%)	10%	12%	5%	5%	5%	0%	5%	5%	5%	5%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	4.7	18.0		6.0	19.3		3.1	17.1		3.1	17.1	
Effective Green, g (s)	4.7	18.0		6.0	19.3		3.1	17.1		3.1	17.1	
Actuated g/C Ratio	0.08	0.30		0.10	0.32		0.05	0.28		0.05	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	128	957		171	1096		89	922		89	953	
v/s Ratio Prot	0.06	c0.31		c0.08	0.21		0.05	c0.09		c0.05	0.08	
v/s Ratio Perm												
v/c Ratio	0.73	1.03		0.82	0.66		0.91	0.30		0.98	0.30	
Uniform Delay, d1	27.1	21.1		26.6	17.6		28.4	16.9		28.5	16.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	18.5	36.9		25.3	1.4		66.4	0.8		87.1	0.8	
Delay (s)	45.6	58.0		51.8	19.0		94.8	17.7		115.6	17.6	
Level of Service	D	E		D	B		F	B		F	B	
Approach Delay (s)		56.9			24.3			31.3			39.9	
Approach LOS		E			C			C			D	

Intersection Summary			
HCM Average Control Delay	40.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
14: Lark Ellen Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	1520	125	95	650	40	80	355	125	110	360	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3323		1805	3418		1719	3424		1719	3508	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3323		1805	3418		1719	3424		1719	3508	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	132	1600	132	100	684	42	84	374	132	116	379	63
RTOR Reduction (vph)	0	7	0	0	5	0	0	39	0	0	15	0
Lane Group Flow (vph)	132	1725	0	100	721	0	84	467	0	116	427	0
Heavy Vehicles (%)	5%	8%	0%	0%	5%	0%	5%	0%	5%	5%	0%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases												
Actuated Green, G (s)	11.1	43.0		6.0	37.9		5.6	18.8		7.0	20.2	
Effective Green, g (s)	11.1	43.0		6.0	37.9		5.6	18.8		7.0	20.2	
Actuated g/C Ratio	0.12	0.47		0.07	0.42		0.06	0.21		0.08	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	210	1574		119	1427		106	709		133	780	
v/s Ratio Prot	0.08	c0.52		c0.06	0.21		0.05	c0.14		c0.07	0.12	
v/s Ratio Perm												
v/c Ratio	0.63	1.10		0.84	0.51		0.79	0.66		0.87	0.55	
Uniform Delay, d1	37.9	23.9		41.9	19.5		42.0	33.1		41.5	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	53.7		38.5	0.3		32.1	4.8		42.2	2.8	
Delay (s)	43.7	77.6		80.5	19.8		74.2	37.8		83.6	34.0	
Level of Service	D	E		F	B		E	D		F	C	
Approach Delay (s)		75.2			27.2			43.0			44.3	
Approach LOS		E			C			D			D	

Intersection Summary			
HCM Average Control Delay	55.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	84.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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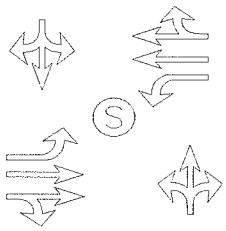
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
N/S STREET : ENID AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	15	5%		15	5	20
EB THRU	640	5%	**50**	690	60	750
EB RIGHT	110	5%		110	10	120
WB LEFT	170	5%		170	15	185
WB THRU	1300	5%		1300	115	1415
WB RIGHT	20	5%		20	5	25
ENID AVE						
NB LEFT	95	5%		95	10	105
NB THRU	110	5%		110	10	120
NB RIGHT	155	5%		155	15	170
SB LEFT	30	5%		30	5	35
SB THRU	145	5%		145	15	160
SB RIGHT	60	5%		60	5	65
TOTALS	**2850**		**50**	**2900**	**270**	**3170**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : ENID AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	25	5%		25	5	30
EB THRU	810	5%	**50**	860	75	935
EB RIGHT	20	5%		20	5	25
WB LEFT	45	5%		45	5	50
WB THRU	635	5%		635	55	690
WB RIGHT	25	5%		25	5	30
ENID AVE						
NB LEFT	25	5%		25	5	30
NB THRU	20	5%		20	5	25
NB RIGHT	55	5%		55	5	60
SB LEFT	25	5%		25	5	30
SB THRU	20	5%		20	5	25
SB RIGHT	25	5%		25	5	30
TOTALS	**1730**		**50**	**1780**	**180**	**1960**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ARROW HWY
N/S STREET : ENID AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	85	5%		85	5	90
EB THRU	1425	5%	**50**	1475	135	1610
EB RIGHT	60	5%		60	5	65
WB LEFT	50	5%		50	5	55
WB THRU	630	5%		630	55	685
WB RIGHT	30	5%		30	5	35
ENID AVE						
NB LEFT	35	5%		35	5	40
NB THRU	40	5%		40	5	45
NB RIGHT	55	5%		55	5	60
SB LEFT	25	5%		25	5	30
SB THRU	35	5%		35	5	40
SB RIGHT	30	5%		30	5	35
TOTALS	**2500**		**50**	**2550**	**240**	**2790**

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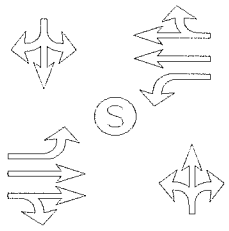
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
N/S STREET : ENID AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	13	1	3	15	**0**	15	5	20
EB THRU	601	41	123	725	**150**	875	80	955
EB RIGHT	112	0	0	110	**0**	110	10	120
WB LEFT	171	1	3	175	**0**	175	15	190
WB THRU	1254	44	132	1385	**0**	1385	125	1510
WB RIGHT	21	0	0	20	**0**	20	5	25
ENID AVE								
NB LEFT	95	0	0	95	**0**	95	10	105
NB THRU	111	1	3	115	**0**	115	10	125
NB RIGHT	155	1	3	160	**0**	160	15	175
SB LEFT	28	0	0	30	**0**	30	5	35
SB THRU	144	0	0	145	**0**	145	15	160
SB RIGHT	59	1	3	60	**0**	60	5	65
TOTALS	**2764**				**150**	**3185**	**300**	**3485**

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Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : ENID AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	25	1	3	30	**0**	30	5	35
EB THRU	750	58	174	925	**150**	1075	95	1170
EB RIGHT	20	0	0	20	**0**	20	5	25
WB LEFT	47	0	0	45	**0**	45	5	50
WB THRU	607	30	90	695	**0**	695	65	760
WB RIGHT	26	1	3	30	**0**	30	5	35
ENID AVE								
NB LEFT	27	0	0	25	**0**	25	5	30
NB THRU	18	1	3	20	**0**	20	5	25
NB RIGHT	55	0	0	55	**0**	55	5	60
SB LEFT	23	0	0	25	**0**	25	5	30
SB THRU	18	1	3	20	**0**	20	5	25
SB RIGHT	25	0	0	25	**0**	25	5	30
TOTALS	**1641**				**150**	**2065**	**210**	**2275**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	10-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ARROW HWY
N/S STREET : ENID AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 15
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	84	0	0	85	**0**	85	5	90
EB THRU	1402	22	66	1470	**150**	1620	145	1765
EB RIGHT	59	0	0	60	**0**	60	5	65
WB LEFT	47	1	3	50	**0**	50	5	55
WB THRU	625	7	21	645	**0**	645	60	705
WB RIGHT	31	1	3	35	**0**	35	5	40
ENID AVE								
NB LEFT	34	0	0	35	**0**	35	5	40
NB THRU	39	0	0	40	**0**	40	5	45
NB RIGHT	54	0	0	55	**0**	55	5	60
SB LEFT	24	1	3	25	**0**	25	5	30
SB THRU	34	0	0	35	**0**	35	5	40
SB RIGHT	30	1	3	35	**0**	35	5	40
TOTALS	**2463**				**150**	**2720**	**255**	**2975**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ENID
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 07:15AM

NORTH LEG (SB)

TOTAL: 232

TT = 1

TT% = 1/232 = 0.43% ≈ 1%

	Rt	Thru	Lt	Total
	60	144 145	28 30	
1st	12	10	8	
2nd	12	54	7	
3rd	25	64	7	
4th	11	16	6	

TT = 45

TT% = 45/1491 = 3.02% ≈ 3%

EAST LEG TOTAL: (WB) 1,491

	1st	2nd	3rd	4th	Total
Rt	0	6	10	5	20 21
Thru	292	296	365	345	1300 1298
Lt	19	65	70	18	190 172

	Total	1st	2nd	3rd	4th
Lt	15 14	1	3	5	5
Thru	640 642	114	158	188	182
Rt	110 112	11	28	49	24

WEST LEG TOTAL: (EB) 768

TT = 30/768

TT% = 3.91% ≈ 4%

	Lt	Thru	Rt
1st	20	9	15
2nd	21	42	57
3rd	27	47	66
4th	27	14	18
Total	95	110 112	155 156

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.60
SOUTH LEG = 0.65
EAST LEG = 0.84
WEST LEG = 0.79

ALL LEGS = 0.77

TT = 2

TT% = 2/363 = 0.55% ≈ 1%

TOTAL: 363

HOUR TOTAL: 2,854

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 07:00AM-08:00AM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
58	155	28	Total
9	27	6	1st
12	10	8	2nd
12	54	7	3rd
25	64	7	4th

	1st	2nd	3rd	4th	Total
Rt	2	0	6	10	18
Thru	295	292	296	365	1248
Lt	9	19	65	70	163

Total	1st	2nd	3rd	4th	
11	2	1	3	5	Lt
583	123	114	158	188	Thru
99	11	11	28	49	Rt

	Lt	Thru	Rt
1st	23	18	27
2nd	20	9	15
3rd	21	42	57
4th	27	47	66
Total	91	116	165

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 08:00AM-09:00AM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
43	33	16	Total
11	16	6	1st
9	3	3	2nd
10	4	2	3rd
13	10	5	4th

	1st	2nd	3rd	4th	Total
Rt	5	1	2	8	16
Thru	345	255	205	205	1010
Lt	18	12	17	8	55

Total	1st	2nd	3rd	4th	
25	5	5	10	5	Lt
570	182	141	108	139	Thru
52	24	7	12	9	Rt

	Lt	Thru	Rt
1st	27	14	18
2nd	12	1	6
3rd	3	3	16
4th	13	4	13
Total	55	22	53

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ENID IRWINDALE

EAST-WEST STREET : ARROW HWY 06-02-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
9	27	5	0	0	1	0	0	0	0	0	0	42
12	10	8	0	0	0	0	0	0	0	0	0	30
12	54	7	0	0	0	0	0	0	0	0	0	73
24	64	7	1	0	0	0	0	0	0	0	0	96
11	16	6	0	0	0	0	0	0	0	0	0	33
7	3	2	0	0 1	1	2	0 0	0	0	0 0	0	15
10	4	1	0	0	1	0	0	0	0	0	0	16
13	10	5	0	0	0	0	0	0	0	0	0	28
						TT= 1+0+0 = 1						
98	188	41	1	0	3	2	0	0	0	0	0	333
					NB SOUTH LEG							
27	17	23	0	1	0	0	0	0	0	0	0	68
15	9	20	0	0	0	0	0	0	0	0	0	44
57	41	21	0	1	0	0	0	0	0	0	0	120
66	47	27	0	0	0	0	0	0	0	0	0	140
17	14	27	1	0	0	0	0	0	0	0	0	59
6	1	12	0	0 2	0	0	0 0	0	0	0 0	0	19
16	3	3	0	0	0	0	0	0	0	0	0	22
13	4	13	0	0	0	0	0	0	0	0	0	30
						TT=2+0+0 = 2						
217	136	146	1	2	0	0	0	0	0	0	0	502
					WB EAST LEG							
2	281	8	0	8	1	0	0	0	0	6	0	306
0	277	19	0	12	0	0	0	0	0	3	0	311
6	287	64	0	3	1	0	2	0	0	4	0	367
10	359	70	0	4	0	0	2	0	0	0	0	445
5	331	18	0	9	0	0	2	0	0	3	0	368
1	242	11	0	8 29	1	0	3 6	0	0	2 10	0	268
2	199	16	0	4	0	0	0	1	0	2	0	224
8	191	8	0	10	0	0	3	0	0	1	0	221
						TT= 29+6+10 = 45						
34	2167	214	0	58	3	0	12	1	0	21	0	2510
					EB WEST LEG							
11	106	2	0	11	0	0	3	0	0	3	0	136
11	105	1	0	7	0	0	1	0	0	1	0	126
28	144	3	0	6	0	0	2	0	0	6	0	189
49	180	4	0	5	1	0	0	0	0	3	0	242
24	172	5	0	6	0	0	2	0	0	2	0	211
7	128	5	0	9 13	0	0	2 5	0	0	2 12	0	153
12	92	10	0	9	0	0	3	0	0	4	0	130
9	125	5	0	12	0	0	2	0	0	0	0	153
						TT= 13+5+12 = 30						
151	1052	35	0	65	1	0	15	0	0	21	0	1340

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ENID
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 01:00PM

NORTH LEG (SB)

TOTAL: 67

TT = 1

TT% = 1/67 = 1.5% ≈ 2%

	Rt	Thru	Lt	Total
	25	20 19	25 23	
1st	4	3	6	
2nd	5	1	3	
3rd	9	8	8	
4th	7	7	6	

TT = 31

TT% = 31/711 = 4.36% ≈ 4%

EAST LEG TOTAL: (WB) 711

	1st	2nd	3rd	4th	Total
Rt	9	4	5	9	25 27
Thru	130	206	126	175	635 637
Lt	13	12	10	12	45 47

	Total	1st	2nd	3rd	4th
Lt	25 26	5	9	6	6
Thru	810 808	180	186	207	235
Rt	20	5	2	7	6

WEST LEG TOTAL: (EB) 854

TT = 59

TT% = 59/854 = 6.91% ≈ 7%

SOUTH LEG (NB)

	Lt	Thru	Rt
1st	3	4	6
2nd	3	2	9
3rd	3	4	13
4th	18	9	27
Total	25 27	20 19	55

TOTAL: 101

TT = 1

TT% = 1/101 = 0.99% ≈ 1%

PEAK HOUR FACTORS

NORTH LEG = 0.67
SOUTH LEG = 0.47
EAST LEG = 0.80
WEST LEG = 0.86

ALL LEGS = 0.84

HOUR TOTAL: 1,733

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 12:00PM-01:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total	37	7	22
1st	11	1	8
2nd	2	0	3
3rd	9	1	3
4th	15	5	8

	1st	2nd	3rd	4th	Total
Rt	8	4	5	4	21
Thru	150	191	153	190	684
Lt	12	13	9	11	45

	Total	1st	2nd	3rd	4th
Lt	32	9	13	7	3
Thru	736	179	199	184	174
Rt	28	12	3	6	7

	Lt	Thru	Rt
1st	1	4	24
2nd	3	0	5
3rd	2	3	11
4th	1	3	17
Total	7	10	57

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 01:00PM-02:00PM DATE: 06-02-11

NORTH LEG

Rt	Thru	Lt	
25	19	23	Total
4	3	6	1st
5	1	3	2nd
9	8	8	3rd
7	7	6	4th

	1st	2nd	3rd	4th	Total
Rt	9	4	5	9	27
Thru	130	206	126	175	637
Lt	13	12	10	12	47

Total	1st	2nd	3rd	4th	
26	5	9	6	6	Lt
808	180	186	207	235	Thru
20	5	2	7	6	Rt

	Lt	Thru	Rt
1st	3	4	6
2nd	3	2	9
3rd	3	4	13
4th	18	9	27
Total	27	19	55

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ENID IRWINDALE

EAST-WEST STREET : ARROW HWY 06-02-11

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
11	1	8	0	0	0	0	0	0	0	0	0	20
2	0	3	0	0	0	0	0	0	0	0	0	5
9	1	3	0	0	0	0	0	0	0	0	0	13
15	4	8	0	1	0	0	0	0	0	0	0	28
4	3	6	0	0	0	0	0	0	0	0	0	13
5	1	3	0	0	0	0	0	0	0	0	0	9
9	8	8	0	0	0	0	0	0	0	0	0	25
7	6	6	0	1	0	0	0	0	0	0	0	20
				1		TT=1+0+0=1		0			0	
62	24	45	0	2	0	0	0	0	0	0	0	133
						NB SOUTH LEG						
23	4	1	0	0	0	1	0	0	0	0	0	29
5	0	3	0	0	0	0	0	0	0	0	0	8
11	3	2	0	0	0	0	0	0	0	0	0	16
17	3	1	0	0	0	0	0	0	0	0	0	21
6	3	3	0	1	0	0	0	0	0	0	0	13
9	2	3	0	0	0	0	0	0	0	0	0	14
13	4	3	0	0	0	0	0	0	0	0	0	20
27	9	18	0	0	0	0	0	0	0	0	0	54
				1		TT=1+0+0=1		0			0	
111	28	34	0	1	0	1	0	0	0	0	0	175
						WB EAST LEG						
8	141	10	0	5	2	0	3	0	0	1	0	170
4	184	13	0	7	0	0	0	0	0	0	0	208
5	148	9	0	4	0	0	0	0	0	1	0	167
4	184	11	0	4	0	0	0	0	0	2	0	205
9	128	13	0	2	0	0	0	0	0	0	0	152
4	200	12	0	6	0	0	0	0	0	0	0	222
5	121	10	0	5	0	0	0	0	0	0	0	141
8	158	12	0	8	0	1	5	0	0	4	0	196
				21		TT=21+6+4=31		6			4	
47	1264	90	0	41	2	1	8	0	0	8	0	1461
						EB WEST LEG						
11	174	9	1	4	0	0	1	0	0	0	0	200
3	190	13	0	7	0	0	2	0	0	0	0	215
6	181	7	0	3	0	0	0	0	0	0	0	197
7	162	3	0	6	0	0	2	0	0	4	0	184
5	169	4	0	9	1	0	1	0	0	1	0	190
2	170	9	0	9	0	0	1	0	0	6	0	197
7	186	6	0	15	0	0	3	0	0	3	0	220
6	225	6	0	6	0	0	2	0	0	2	0	247
				40		TT=40+7+12=59		7			12	
47	1457	57	1	59	1	0	12	0	0	16	0	1650

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ENID
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-02-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 90

TT = 2

TT% = 2/90 = 2.22% ≈ 2%

	Rt	Thru	Lt	Total
	30 31	35 34	25	
1st	5	7	3	
2nd	2	8	7	
3rd	6	9	11	
4th	18	10	4	

TT = 9

TT% = 9/712

TT% = 1.26% ≈ 1%

EAST LEG TOTAL: (WB) 712

	1st	2nd	3rd	4th	Total
Rt	4	7	7	14	30 32
Thru	160	165	143	164	634 632
Lt	21	12	9	6	50 48

	Total	1st	2nd	3rd	4th
Lt	85 84	12	15	18	39
Thru	1425	362	342	330	391
Rt	60 59	12	17	15	15

WEST LEG TOTAL: 1,568 (EB)

TT = 22

TT% = 22/1568 = 1.4% ≈ 1%

	Lt	Thru	Rt
1st	15	8	25
2nd	6	8	7
3rd	5	9	11
4th	8	14	11
Total	35 34	40 39	55 54

SOUTH LEG (NB)

TT = 0

TT% = 0/127 = 0% ≈ 1%

TOTAL: 127

PEAK HOUR FACTORS

NORTH LEG = 0.70
SOUTH LEG = 0.66
EAST LEG = 0.96
WEST LEG = 0.88

ALL LEGS = 0.90

HOUR TOTAL: 2,497

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 04:00PM-05:00PM DATE: 06-02-11

NORTH LEG

	Rt	Thru	Lt
Total	29	15	18
1st	8	2	0
2nd	7	5	4
3rd	9	3	10
4th	5	5	4

	1st	2nd	3rd	4th	Total
Rt	7	6	6	6	25
Thru	149	137	167	169	622
Lt	10	24	17	24	75

	Total	1st	2nd	3rd	4th
Lt	32	5	10	12	5
Thru	1221	266	306	312	337
Rt	45	8	15	13	9

	Lt	Thru	Rt
1st	6	3	16
2nd	13	7	21
3rd	10	7	11
4th	9	8	18
Total	38	25	66

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ENID

EAST-WEST STREET: ARROW HWY

TIME: 05:00PM-06:00PM DATE: 06-02-11

NORTH LEG

31	34	25	Total
5	7	3	1st
2	8	7	2nd
6	9	11	3rd
18	10	4	4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt	4	7	7	14	32
Thru	160	165	143	164	632
Lt	21	12	9	6	48

Total	1st	2nd	3rd	4th	
84	12	15	18	39	Lt
1425	362	342	330	391	Thru
59	12	17	15	15	Rt

	Lt	Thru	Rt
1st	15	8	25
2nd	6	8	7
3rd	5	9	11
4th	8	14	11
Total	34	39	54

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ENID IRWINDALE

EAST-WEST STREET : ARROW HWY 06-02-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
8	2	0	0	0	0	0	0	0	0	0	0	10
7	5	4	0	0	0	0	0	0	0	0	0	16
8	3	10	0	0	0	0	0	0	1	0	0	22
5	5	4	0	0	0	0	0	0	0	0	0	14
5	7	3	0	0	0	0	0	0	0	0	0	15
2	8	6	0	0	1	0	0	0	0	0	0	17
5	9	11	1	0	0	0	0	0	0	0	0	26
18	10	4	0	0	0	0	0	0	0	0	0	32
				2			0			0		
						TT=2+0+0=2						
58	49	42	1	0	1	0	0	0	1	0	0	152
						NB SOUTH LEG						
15	3	6	1	0	0	0	0	0	0	0	0	25
21	7	13	0	0	0	0	0	0	0	0	0	41
11	7	10	0	0	0	0	0	0	0	0	0	28
18	8	9	0	0	0	0	0	0	0	0	0	35
25	8	15	0	0	0	0	0	0	0	0	0	48
7	8	6	0	0	0	0	0	0	0	0	0	21
11	9	5	0	0	0	0	0	0	0	0	0	25
11	14	8	0	0	0	0	0	0	0	0	0	33
				0			0			0		
						TT=0+0+0=0						
119	64	72	1	0	0	0	0	0	0	0	0	256
						WB EAST LEG						
7	139	10	0	7	0	0	1	0	0	2	0	166
6	135	24	0	2	0	0	0	0	0	0	0	167
6	160	17	0	5	0	0	0	0	0	2	0	190
6	167	24	0	0	0	0	2	0	0	0	0	199
4	158	20	0	2	0	0	0	0	0	0	1	185
6	164	12	1	1	0	0	0	0	0	0	0	184
7	139	9	0	4	0	0	0	0	0	0	0	159
14	164	6	0	0	0	0	0	0	0	0	0	184
				8			0			1		
						TT=8+0+1=9						
56	1226	122	1	21	0	0	3	0	0	4	1	1434
						EB WEST LEG						
7	247	5	1	11	0	0	2	0	0	6	0	279
15	303	10	0	1	0	0	1	0	0	1	0	331
13	302	12	0	5	0	0	3	0	0	2	0	337
9	325	5	0	9	0	0	2	0	0	1	0	351
12	357	12	0	3	0	0	0	0	0	2	0	386
17	336	15	0	3	0	0	1	0	0	2	0	374
15	321	18	0	9	0	0	0	0	0	0	0	363
15	389	39	0	1	0	0	0	0	0	1	0	445
				16			1			5		
						TT=16+1+5=22						
103	2580	116	1	42	0	0	9	0	0	15	0	2866

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	640	110	170	1300	20	95	110	155	30	145	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.98		1.00	1.00			0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3386		1719	3433			1704		1715	1701	
Flt Permitted	0.14	1.00		0.23	1.00			0.74		0.40	0.99	
Satd. Flow (perm)	250	3386		416	3433			1277		719	1691	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	19	831	143	221	1688	26	123	143	201	39	188	78
RTOR Reduction (vph)	0	26	0	0	2	0	0	50	0	0	9	0
Lane Group Flow (vph)	19	948	0	221	1712	0	0	417	0	35	261	0
Heavy Vehicles (%)	5%	5%	0%	5%	5%	0%	0%	5%	5%	0%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Effective Green, g (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1785		219	1810			418		235	553	
v/s Ratio Prot		0.28			0.50							
v/s Ratio Perm	0.08			c0.53				c0.33		0.05	0.15	
v/c Ratio	0.14	0.53		1.01	0.95			1.00		0.15	0.47	
Uniform Delay, d1	6.7	8.5		13.0	12.3			18.5		13.1	14.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.3		63.2	10.9			43.6		1.3	2.9	
Delay (s)	7.2	8.8		76.2	23.1			62.0		14.4	17.6	
Level of Service	A	A		E	C			E		B	B	
Approach Delay (s)		8.8			29.2			62.0			17.2	
Approach LOS		A			C			E			B	

Intersection Summary			
HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	810	20	45	635	25	25	20	55	25	20	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.99			0.93		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3430		1805	3418			1721		1715	1624	
Flt Permitted	0.28	1.00		0.26	1.00			0.94		0.68	0.99	
Satd. Flow (perm)	508	3430		500	3418			1633		1228	1612	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	30	964	24	54	756	30	30	24	65	30	24	30
RTOR Reduction (vph)	0	4	0	0	7	0	0	25	0	0	18	0
Lane Group Flow (vph)	30	984	0	54	779	0	0	94	0	27	39	0
Heavy Vehicles (%)	5%	5%	0%	0%	5%	5%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.2	15.2		15.2	15.2			16.0		16.0	16.0	
Effective Green, g (s)	15.2	15.2		15.2	15.2			16.0		16.0	16.0	
Actuated g/C Ratio	0.39	0.39		0.39	0.39			0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	197	1330		194	1325			667		501	658	
v/s Ratio Prot		c0.29			0.23							
v/s Ratio Perm	0.06			0.11				c0.06		0.02	0.02	
v/c Ratio	0.15	0.74		0.28	0.59			0.14		0.05	0.06	
Uniform Delay, d1	7.8	10.3		8.2	9.5			7.3		7.0	7.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	2.2		0.8	0.7			0.4		0.2	0.2	
Delay (s)	8.2	12.5		9.0	10.2			7.7		7.2	7.2	
Level of Service	A	B		A	B			A		A	A	
Approach Delay (s)		12.4			10.1			7.7			7.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	39.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1425	60	50	630	30	35	40	55	25	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.99		1.00	0.99			0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1805	3424		1719	3415			1767		1633	1643	
Flt Permitted	0.34	1.00		0.12	1.00			0.92		0.69	0.99	
Satd. Flow (perm)	650	3424		214	3415			1640		1180	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	1583	67	56	700	33	39	44	61	28	39	33
RTOR Reduction (vph)	0	5	0	0	6	0	0	20	0	0	23	0
Lane Group Flow (vph)	94	1645	0	56	727	0	0	124	0	25	52	0
Heavy Vehicles (%)	0%	5%	0%	5%	5%	5%	0%	0%	0%	5%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.8	33.8		33.8	33.8			17.0		17.0	17.0	
Effective Green, g (s)	33.8	33.8		33.8	33.8			17.0		17.0	17.0	
Actuated g/C Ratio	0.57	0.57		0.57	0.57			0.29		0.29	0.29	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	374	1968		123	1963			474		341	472	
v/s Ratio Prot		c0.48			0.21							
v/s Ratio Perm	0.14			0.26				c0.08		0.02	0.03	
v/c Ratio	0.25	0.84		0.46	0.37			0.26		0.07	0.11	
Uniform Delay, d1	6.2	10.2		7.2	6.8			16.1		15.2	15.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	3.2		2.7	0.1			1.3		0.4	0.5	
Delay (s)	6.6	13.5		9.9	6.9			17.4		15.6	15.8	
Level of Service	A	B		A	A			B		B	B	
Approach Delay (s)		13.1			7.1			17.4			15.8	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	58.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	690	110	170	1300	20	95	110	155	30	145	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.98		1.00	1.00			0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3204		1719	3433			1704		1715	1701	
Flt Permitted	0.14	1.00		0.21	1.00			0.74		0.40	0.99	
Satd. Flow (perm)	250	3204		373	3433			1277		719	1691	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	19	896	143	221	1688	26	123	143	201	39	188	78
RTOR Reduction (vph)	0	23	0	0	2	0	0	50	0	0	9	0
Lane Group Flow (vph)	19	1016	0	221	1712	0	0	417	0	35	261	0
Heavy Vehicles (%)	5%	12%	0%	5%	5%	0%	0%	5%	5%	0%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Effective Green, g (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1689		197	1810			418		235	553	
v/s Ratio Prot		0.32			0.50							
v/s Ratio Perm	0.08			c0.59				c0.33		0.05	0.15	
v/c Ratio	0.14	0.60		1.12	0.95			1.00		0.15	0.47	
Uniform Delay, d1	6.7	9.0		13.0	12.3			18.5		13.1	14.7	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.6		100.7	10.9			43.6		1.3	2.9	
Delay (s)	7.2	9.6		113.7	23.1			62.0		14.4	17.6	
Level of Service	A	A		F	C			E		B	B	
Approach Delay (s)		9.6			33.5			62.0			17.2	
Approach LOS		A			C			E			B	

Intersection Summary			
HCM Average Control Delay	29.0	HCM Level of Service	C
HCM Volume to Capacity ratio	1.08		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	860	20	45	635	25	25	20	55	25	20	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.99			0.93		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3248		1805	3418			1721		1715	1624	
Flt Permitted	0.28	1.00		0.25	1.00			0.94		0.68	0.99	
Satd. Flow (perm)	512	3248		484	3418			1633		1228	1612	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	30	1024	24	54	756	30	30	24	65	30	24	30
RTOR Reduction (vph)	0	4	0	0	7	0	0	20	0	0	18	0
Lane Group Flow (vph)	30	1044	0	54	779	0	0	99	0	27	39	0
Heavy Vehicles (%)	5%	11%	0%	0%	5%	5%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.7	15.7		15.7	15.7			16.0		16.0	16.0	
Effective Green, g (s)	15.7	15.7		15.7	15.7			16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	202	1284		191	1352			658		495	650	
v/s Ratio Prot		c0.32			0.23							
v/s Ratio Perm	0.06			0.11				c0.06		0.02	0.02	
v/c Ratio	0.15	0.81		0.28	0.58			0.15		0.05	0.06	
Uniform Delay, d1	7.7	10.7		8.2	9.4			7.5		7.2	7.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	4.0		0.8	0.6			0.5		0.2	0.2	
Delay (s)	8.0	14.7		9.0	10.0			8.0		7.4	7.4	
Level of Service	A	B		A	A			A		A	A	
Approach Delay (s)		14.6			9.9			8.0			7.4	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	39.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	1475	60	50	630	30	35	40	55	25	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.99		1.00	0.99			0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1805	3333		1719	3415			1767		1633	1643	
Flt Permitted	0.34	1.00		0.12	1.00			0.92		0.68	0.99	
Satd. Flow (perm)	651	3333		210	3415			1640		1176	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	1639	67	56	700	33	39	44	61	28	39	33
RTOR Reduction (vph)	0	5	0	0	5	0	0	17	0	0	24	0
Lane Group Flow (vph)	94	1701	0	56	728	0	0	127	0	25	51	0
Heavy Vehicles (%)	0%	8%	0%	5%	5%	5%	0%	0%	0%	5%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	34.4	34.4		34.4	34.4			17.0		17.0	17.0	
Effective Green, g (s)	34.4	34.4		34.4	34.4			17.0		17.0	17.0	
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.29		0.29	0.29	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	377	1930		122	1978			469		337	467	
v/s Ratio Prot		c0.51			0.21							
v/s Ratio Perm	0.14			0.27				c0.08		0.02	0.03	
v/c Ratio	0.25	0.88		0.46	0.37			0.27		0.07	0.11	
Uniform Delay, d1	6.1	10.7		7.2	6.7			16.4		15.5	15.6	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.3	5.1		2.7	0.1			1.4		0.4	0.5	
Delay (s)	6.5	15.9		9.9	6.8			17.8		15.9	16.1	
Level of Service	A	B		A	A			B		B	B	
Approach Delay (s)		15.4			7.0			17.8			16.0	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	59.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	750	120	185	1415	20	105	120	170	35	160	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.98		1.00	1.00			0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3204		1719	3433			1703		1715	1703	
Flt Permitted	0.14	1.00		0.18	1.00			0.67		0.37	0.99	
Satd. Flow (perm)	250	3204		317	3433			1158		675	1692	
Peak-hour factor, PHF	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Adj. Flow (vph)	19	974	156	240	1838	26	136	156	221	45	208	84
RTOR Reduction (vph)	0	23	0	0	2	0	0	50	0	0	6	0
Lane Group Flow (vph)	19	1107	0	240	1862	0	0	463	0	40	291	0
Heavy Vehicles (%)	5%	12%	0%	5%	5%	0%	0%	5%	5%	0%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Effective Green, g (s)	29.0	29.0		29.0	29.0			18.0		18.0	18.0	
Actuated g/C Ratio	0.53	0.53		0.53	0.53			0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	132	1689		167	1810			379		221	554	
v/s Ratio Prot		0.35			0.54							
v/s Ratio Perm	0.08			c0.76				c0.40		0.06	0.17	
v/c Ratio	0.14	0.66		1.44	1.03			1.22		0.18	0.53	
Uniform Delay, d1	6.7	9.4		13.0	13.0			18.5		13.2	15.0	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.9		227.4	28.9			121.5		1.8	3.5	
Delay (s)	7.2	10.3		240.4	41.9			140.0		15.0	18.6	
Level of Service	A	B		F	D			F		B	B	
Approach Delay (s)		10.3			64.5			140.0			18.1	
Approach LOS		B			E			F			B	

Intersection Summary			
HCM Average Control Delay	55.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.35		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.7%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	895	20	45	660	25	25	20	55	25	20	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	1.00		1.00	0.99			0.93		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1719	3249		1805	3419			1721		1715	1624	
Flt Permitted	0.27	1.00		0.25	1.00			0.94		0.68	0.99	
Satd. Flow (perm)	484	3249		481	3419			1633		1228	1612	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	30	1065	24	54	786	30	30	24	65	30	24	30
RTOR Reduction (vph)	0	4	0	0	7	0	0	18	0	0	18	0
Lane Group Flow (vph)	30	1085	0	54	809	0	0	101	0	27	39	0
Heavy Vehicles (%)	5%	11%	0%	0%	5%	5%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.8	15.8		15.8	15.8			16.0		16.0	16.0	
Effective Green, g (s)	15.8	15.8		15.8	15.8			16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40			0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1290		191	1357			656		494	648	
v/s Ratio Prot		c0.33			0.24							
v/s Ratio Perm	0.06			0.11				c0.06		0.02	0.02	
v/c Ratio	0.16	0.84		0.28	0.60			0.15		0.05	0.06	
Uniform Delay, d1	7.7	10.9		8.2	9.5			7.6		7.3	7.3	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	5.1		0.8	0.7			0.5		0.2	0.2	
Delay (s)	8.1	16.0		9.0	10.2			8.1		7.5	7.5	
Level of Service	A	B		A	B			A		A	A	
Approach Delay (s)		15.8			10.1			8.1			7.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	12.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	39.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
15: Enid Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	1535	60	50	655	30	35	40	55	25	35	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00		0.95	0.95	
Frt	1.00	0.99		1.00	0.99			0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00			0.99		0.95	1.00	
Satd. Flow (prot)	1805	3333		1719	3416			1767		1633	1643	
Flt Permitted	0.33	1.00		0.11	1.00			0.92		0.68	0.99	
Satd. Flow (perm)	628	3333		207	3416			1639		1172	1633	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	100	1706	67	56	728	33	39	44	61	28	39	33
RTOR Reduction (vph)	0	5	0	0	5	0	0	14	0	0	24	0
Lane Group Flow (vph)	100	1768	0	56	756	0	0	130	0	25	51	0
Heavy Vehicles (%)	0%	8%	0%	5%	5%	5%	0%	0%	0%	5%	0%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.0	35.0		35.0	35.0			17.0		17.0	17.0	
Effective Green, g (s)	35.0	35.0		35.0	35.0			17.0		17.0	17.0	
Actuated g/C Ratio	0.58	0.58		0.58	0.58			0.28		0.28	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)	366	1944		121	1993			464		332	463	
v/s Ratio Prot		c0.53			0.22							
v/s Ratio Perm	0.16			0.27				c0.08		0.02	0.03	
v/c Ratio	0.27	0.91		0.46	0.38			0.28		0.08	0.11	
Uniform Delay, d1	6.2	11.1		7.1	6.7			16.7		15.7	15.9	
Progression Factor	1.00	1.00		1.00	1.00			1.00		1.00	1.00	
Incremental Delay, d2	0.4	6.7		2.8	0.1			1.5		0.4	0.5	
Delay (s)	6.6	17.8		9.9	6.8			18.2		16.2	16.4	
Level of Service	A	B		A	A			B		B	B	
Approach Delay (s)		17.2			7.0			18.2			16.3	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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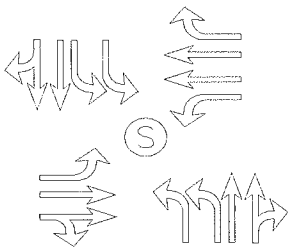
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	150	5%	**50**	200	20	220
EB THRU	510	10%		510	45	555
EB RIGHT	80	5%		80	5	85
WB LEFT	70	5%		70	5	75
WB THRU	895	5%		895	80	975
WB RIGHT	105	5%		105	10	115
AZUSA AVE						
NB LEFT	225	5%		225	20	245
NB THRU	520	5%		520	45	565
NB RIGHT	45	5%		45	5	50
SB LEFT	95	5%		95	10	105
SB THRU	490	5%		490	45	535
SB RIGHT	205	5%		205	20	225
TOTALS	**3390**		**50**	**3440**	**310**	**3750**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	145	5%	**50**	195	20	215
EB THRU	495	5%		495	45	540
EB RIGHT	120	5%		120	10	130
WB LEFT	190	10%		190	15	205
WB THRU	395	5%		395	35	430
WB RIGHT	115	5%		115	10	125
AZUSA AVE						
NB LEFT	200	5%		200	20	220
NB THRU	670	5%		670	60	730
NB RIGHT	135	5%		135	10	145
SB LEFT	125	5%		125	10	135
SB THRU	760	5%		760	70	830
SB RIGHT	100	5%		100	10	110
TOTALS	**3450**		**50**	**3500**	**315**	**3815**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ARROW HWY						
EB LEFT	215	5%	**50**	265	25	290
EB THRU	1130	5%		1130	100	1230
EB RIGHT	135	5%		135	10	145
WB LEFT	125	5%		125	10	135
WB THRU	460	5%		460	40	500
WB RIGHT	95	5%		95	10	105
AZUSA AVE						
NB LEFT	160	5%		160	15	175
NB THRU	465	5%		465	40	505
NB RIGHT	230	5%		230	20	250
SB LEFT	260	5%		260	25	285
SB THRU	635	5%		635	55	690
SB RIGHT	85	5%		85	5	90
TOTALS	**3995**		**50**	**4045**	**355**	**4400**

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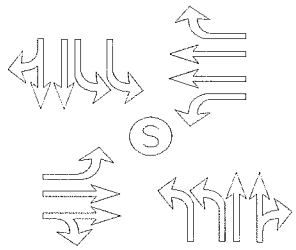
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	150	2	6	155	**150**	305	25	330
EB THRU	471	41	123	595	**0**	595	55	650
EB RIGHT	79	0	0	80	**0**	80	5	85
WB LEFT	66	2	6	70	**0**	70	5	75
WB THRU	873	22	66	940	**0**	940	85	1025
WB RIGHT	105	2	6	110	**0**	110	10	120
AZUSA AVE								
NB LEFT	215	8	24	240	**0**	240	20	260
NB THRU	506	16	48	555	**0**	555	50	605
NB RIGHT	46	0	0	45	**0**	45	5	50
SB LEFT	94	1	3	95	**0**	95	10	105
SB THRU	474	16	48	520	**0**	520	45	565
SB RIGHT	204	3	9	215	**0**	215	20	235
TOTALS	**3283**				**150**	**3770**	**335**	**4105**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	143	4	12	155	**150**	305	25	330
EB THRU	482	13	39	520	**0**	520	45	565
EB RIGHT	117	5	15	130	**0**	130	10	140
WB LEFT	168	20	60	230	**0**	230	20	250
WB THRU	384	12	36	420	**0**	420	40	460
WB RIGHT	112	3	9	120	**0**	120	10	130
AZUSA AVE								
NB LEFT	194	5	15	210	**0**	210	20	230
NB THRU	654	16	48	700	**0**	700	65	765
NB RIGHT	128	6	18	145	**0**	145	15	160
SB LEFT	123	3	9	130	**0**	130	10	140
SB THRU	750	12	36	785	**0**	785	70	855
SB RIGHT	96	2	6	100	**0**	100	10	110
TOTALS	**3351**				**150**	**3795**	**340**	**4135**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ARROW HWY
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 16
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ARROW HWY								
EB LEFT	212	3	9	220	**150**	370	35	405
EB THRU	1122	7	21	1145	**0**	1145	105	1250
EB RIGHT	133	2	6	140	**0**	140	15	155
WB LEFT	125	1	3	130	**0**	130	10	140
WB THRU	450	9	27	475	**0**	475	45	520
WB RIGHT	94	1	3	95	**0**	95	10	105
AZUSA AVE								
NB LEFT	162	0	0	160	**0**	160	15	175
NB THRU	457	6	18	475	**0**	475	45	520
NB RIGHT	224	4	12	235	**0**	235	20	255
SB LEFT	258	4	12	270	**0**	270	25	295
SB THRU	629	8	24	655	**0**	655	60	715
SB RIGHT	86	0	0	85	**0**	85	5	90
TOTALS	**3952**				**150**	**4235**	**390**	**4625**

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 07:00AM-08:00AM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
195	420	79	Total
32	73	14	1st
37	57	19	2nd
61	111	16	3rd
65	179	30	4th

	1st	2nd	3rd	4th	Total
Rt	13	21	29	41	104
Thru	222	251	256	233	962
Lt	13	19	16	22	70

Total	1st	2nd	3rd	4th	
136	18	24	33	61	Lt
501	92	113	138	158	Thru
74	15	16	17	26	Rt

	Lt	Thru	Rt
1st	49	116	4
2nd	49	107	15
3rd	57	147	13
4th	52	125	10
Total	207	495	42

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 08:00AM-09:00AM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
145	418	104	Total
44	143	30	1st
27	100	28	2nd
38	87	24	3rd
36	88	22	4th

	1st	2nd	3rd	4th	Total
Rt	16	17	24	22	79
Thru	155	190	177	163	685
Lt	11	15	15	30	71

Total	1st	2nd	3rd	4th	
133	34	29	38	32	Lt
402	103	115	78	106	Thru
68	20	16	12	20	Rt

	Lt	Thru	Rt
1st	65	143	8
2nd	43	114	11
3rd	41	112	17
4th	38	98	15
Total	187	467	51

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : ARROW HWY 06-09-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						SB NORTH LEG						
31	69	12	1	2	2	0	1	0	0	1	0	119
36	54	18	1	3	1	0	0	0	0	0	0	113
61	108	16	0	3	0	0	0	0	0	0	0	188
64	171	30	1	5	0	0	1	0	0	2	0	274
43	141	30	1	2	0	0	0	0	0	0	0	217
26	97	28	0	2 17	0	1	0 1	0	0	1 2	0	155
38	85	23	0	2	0	0	0	0	0	0	1	149
34	84	19	2	3	2	0	1	1	0	0	0	146
						TT=17+1+2=20						
333	809	176	6	22	5	1	3	1	0	4	1	1361
						NB SOUTH LEG						
3	114	48	1	2	0	0	0	0	0	0	1	169
15	104	48	0	2	1	0	0	0	0	1	0	171
13	145	56	0	2	1	0	0	0	0	0	0	217
10	120	49	0	5	3	0	0	0	0	0	0	187
8	137	62	0	6	2	0	0	1	0	0	0	216
11	111	42	0	1 22	0	0	0 1	0	0	2 1	1	168
15	105	39	1	7	2	1	0	0	0	0	0	170
14	96	37	0	2	1	0	0	0	1	0	0	151
						TT=22+1+1=24						
89	932	381	2	27	10	1	0	1	1	3	2	1449
						WB EAST LEG						
12	219	13	1	1	0	0	2	0	0	0	0	248
21	247	19	0	1	0	0	0	0	0	3	0	291
29	249	15	0	2	1	0	3	0	0	2	0	301
40	225	22	0	4	0	1	3	0	0	1	0	296
15	152	10	0	2	1	1	0	0	0	1	0	182
14	179	14	1	6 11	0	2	3 8	0	0	2 7	1	222
24	163	15	0	9	0	0	3	0	0	2	0	216
21	157	30	1	4	0	0	1	0	0	1	0	215
						TT=11+8+7=26						
176	1591	138	3	29	2	4	15	0	0	12	1	1971
						EB WEST LEG						
14	84	16	1	6	2	0	1	0	0	1	0	125
16	102	24	0	7	0	0	0	0	0	4	0	153
17	128	32	0	6	1	0	1	0	0	3	0	188
26	154	61	0	3	0	0	1	0	0	0	0	245
20	87	33	0	13	1	0	1	0	0	2	0	157
15	107	28	1	6 31	1	0	2 3	0	0	0 9	0	160
11	69	35	1	8	3	0	1	0	0	0	0	128
16	102	31	3	4	1	0	0	0	1	0	0	158
						TT=31+3+9=43						
135	833	260	6	53	9	0	7	0	1	10	0	1314

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-09-11

PEAK HOUR: 12:15PM

NORTH LEG (SB)

TOTAL: 986

TT= 17

TT% = 17/986 = 1.72% ≈ 2%

	Rt	Thru	Lt	Total
	98 (100)	762 (760)	126 (125)	
1st	29	211	30	
2nd	24	158	33	
3rd	20	204	34	
4th	25	189	29	

TT= 35

TT% = 35/699 = 5.01% ≈ 5%

EAST LEG TOTAL: (WB) 699

	1st	2nd	3rd	4th	Total
Rt	29	20	31	35	115
Thru	114	88	98	96	396 (395)
Lt	46	50	41	51	188 (190)

	Total	1st	2nd	3rd	4th
Lt	147 (145)	48	35	32	32
Thru	495	144	119	118	114
Rt	122 (120)	34	27	26	35

WEST LEG TOTAL: (EB) 764

TT= 22

TT% = 22/764 = 2.88% ≈ 3%

	Lt	Thru	Rt
1st	49	233	31
2nd	47	158	31
3rd	49	120	24
4th	54	159	48
Total	199 (200)	670	134 (135)

SOUTH LEG (NB)

TT= 27

TT% = 27/1003 = 2.69% ≈ 3%

TOTAL: 1,003

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.80
EAST LEG = 0.92
WEST LEG = 0.85

ALL LEGS = 0.86

HOUR TOTAL: 3,452

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 12:00PM-01:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
103	708	134	Total
30	135	37	1st
29	211	30	2nd
24	158	33	3rd
20	204	34	4th

	1st	2nd	3rd	4th	Total
Rt	30	29	20	31	110
Thru	123	114	88	98	423
Lt	51	46	50	41	188

Total	1st	2nd	3rd	4th	
159	44	48	35	32	Lt
511	130	144	119	118	Thru
124	37	34	27	26	Rt

	Lt	Thru	Rt
1st	70	98	38
2nd	49	233	31
3rd	47	158	31
4th	49	120	24
Total	215	609	124

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 01:00PM-02:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
135	644	140	Total
25	189	29	1st
40	134	37	2nd
34	164	38	3rd
36	157	36	4th

	1st	2nd	3rd	4th	Total
Rt	35	28	32	30	125
Thru	96	114	129	98	437
Lt	51	52	46	56	205

Total	1st	2nd	3rd	4th	
157	32	35	35	55	Lt
550	114	131	152	153	Thru
136	35	39	33	29	Rt

	Lt	Thru	Rt
1st	54	159	48
2nd	39	128	41
3rd	54	142	39
4th	50	120	37
Total	197	549	165

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : ARROW HWY 06-09-11

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
29	130	35	1	5	1	0	0	1	0	0	0	202
27	209	30	1	2	0	0	0	0	1	0	0	270
24	157	33	0	1	0	0	0	0	0	0	0	215
20	199	32	0	3	2	0	0	0	0	2	0	258
25	185	28	0	3	1	0	1	0	0	0	0	243
40	125	36	0	8	1	0	0	0	0	1	0	211
31	159	37	3	3	1	0	1	0	0	1	0	236
36	152	33	0	5	3	0	0	0	0	0	0	229
				13			1			3		
						TT=13+1+3=17						
232	1316	264	5	30	9	0	2	1	1	4	0	1864
						NB SOUTH LEG						
36	94	69	2	3	1	0	1	0	0	0	0	206
30	230	46	1	1	1	0	2	0	0	0	2	313
31	156	47	0	2	0	0	0	0	0	0	0	236
24	117	48	0	3	1	0	0	0	0	0	0	193
43	151	53	3	5	0	0	1	0	2	2	1	261
38	125	38	3	3	1	0	0	0	0	0	0	208
37	132	51	2	8	3	0	1	0	0	1	0	235
37	116	47	0	0	2	0	2	1	0	2	0	207
				17			3			7		
						TT=17+3+7=27						
276	1121	399	11	25	9	0	7	1	2	5	3	1859
						WB EAST LEG						
29	123	47	1	0	3	0	0	1	0	0	0	204
27	110	41	1	1	4	0	2	0	1	1	1	189
20	87	47	0	1	3	0	0	0	0	0	0	158
30	95	35	1	1	6	0	0	0	0	2	0	170
35	92	45	0	0	6	0	2	0	0	2	0	182
27	110	47	1	2	5	0	1	0	0	1	0	194
29	128	41	3	1	5	0	0	0	0	0	0	207
26	95	52	2	0	4	2	2	0	0	1	0	184
				24			4			7		
						TT=24+4+7=35						
223	840	355	9	6	36	2	7	1	1	7	1	1488
						EB WEST LEG						
37	124	44	0	5	0	0	0	0	0	1	0	211
33	139	47	1	3	1	0	1	0	0	1	0	226
27	117	34	0	2	1	0	0	0	0	0	0	181
24	115	30	1	3	2	0	0	0	1	0	0	176
33	111	32	0	3	0	0	0	0	2	0	0	181
38	123	34	1	6	1	0	1	0	0	1	0	205
31	142	32	2	8	1	0	0	0	0	2	2	220
26	141	54	3	10	1	0	2	0	0	0	0	237
				17			1			4		
						TT=17+1+4=22						
249	1012	307	8	40	7	0	4	0	3	5	2	1637

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: ARROW HWY
JURISDICTION: IRWINDALE

DATE: 06-09-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 985

TT = 11

$TT\% = \frac{11}{985} = 1.12\%$

$\approx 1\%$

	Rt	Thru	Lt	
	86 (85)	637 (635)	262 (260)	Total
	26	157	57	1st
	23	166	72	2nd
	20	159	70	3rd
	17	155	63	4th

TT = 11

$TT\% = \frac{11}{680} = 1.62\%$

$\approx 2\%$

EAST LEG TOTAL: (WB) 680

	1st	2nd	3rd	4th	Total
Rt	28	27	22	18	95
Thru	110	123	119	107	459 (460)
Lt	27	45	33	21	126 (125)

	Total	1st	2nd	3rd	4th
Lt	215	48	63	54	50
Thru	1129 (1130)	300	248	260	321
Rt	135	40	36	31	28

WEST LEG TOTAL: 1,479 (EB)

TT = 12

$TT\% = \frac{12}{1479} = 0.81\%$

$\approx 1\%$

	Lt	Thru	Rt
1st	38	103	53
2nd	46	126	66
3rd	44	128	60
4th	34	106	49
Total	162 (160)	463 (465)	228 (230)

SOUTH LEG (NB)

TOTAL: 853

TT = 10

$TT\% = \frac{10}{853} = 1.17\%$

$\approx 1\%$

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.90
EAST LEG = 0.87
WEST LEG = 0.93

ALL LEGS = 0.96

HOUR TOTAL: 3,997

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 04:00PM-05:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
100	618	176	Total
14	152	31	1st
25	171	45	2nd
32	145	46	3rd
29	150	54	4th

	1st	2nd	3rd	4th	Total
Rt	30	37	35	22	124
Thru	119	117	98	100	434
Lt	41	51	26	28	146

Total	1st	2nd	3rd	4th	
220	50	63	49	58	Lt
920	204	229	237	250	Thru
146	32	31	40	43	Rt

	Lt	Thru	Rt
1st	51	156	43
2nd	30	145	53
3rd	50	160	46
4th	37	122	51
Total	168	583	193

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: ARROW HWY

TIME: 05:00PM-06:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
86	637	262	Total
26	157	57	1st
23	166	72	2nd
20	159	70	3rd
17	155	63	4th

	1st	2nd	3rd	4th	Total
Rt	28	27	22	18	95
Thru	110	123	119	107	459
Lt	27	45	33	21	126

Total	1st	2nd	3rd	4th	
215	48	63	54	50	Lt
1129	300	248	260	321	Thru
135	40	36	31	28	Rt

	Lt	Thru	Rt
1st	38	103	53
2nd	46	126	66
3rd	44	128	60
4th	34	106	49
Total	162	463	228

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : ARROW HWY 06-09-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
13	148	31	1	4	0	0	0	0	0	0	0	197
25	169	43	0	2	2	0	0	0	0	0	0	241
32	142	46	0	1	0	0	0	0	0	2	0	223
29	146	54	0	2	0	0	1	0	0	1	0	233
26	153	54	0	3	3	0	0	0	0	1	0	240
23	165	72	0	1	0	0	0	0	0	0	0	261
20	157	70	0	2	0	0	0	0	0	0	0	249
17	154	62	0	1	1	0	0	0	0	0	0	235
				11		TT=11+0+0=11				1		
185	1234	432	1	16	6	0	1	0	0	4	0	1879
					NB SOUTH LEG							
42	153	49	1	3	1	0	0	0	0	0	1	250
52	140	30	1	3	0	0	1	0	0	1	0	228
46	154	49	0	4	0	0	2	1	0	0	0	256
50	120	37	1	1	0	0	1	0	0	0	0	210
53	99	38	0	4	0	0	0	0	0	0	0	194
64	125	46	2	1	0	0	0	0	0	0	0	238
59	127	44	1	1	0	0	0	0	0	0	0	232
48	106	34	1	0	0	0	0	0	0	0	0	189
				10		TT=10+0+0=10						
414	1024	327	7	17	1	0	4	1	0	1	1	1797
					WB EAST LEG							
30	117	41	0	1	0	0	0	0	0	1	0	190
36	111	50	1	5	0	0	0	0	0	1	1	205
34	94	26	1	2	0	0	2	0	0	0	0	159
21	97	28	1	2	0	0	1	0	0	0	0	150
28	107	26	0	3	1	0	0	0	0	0	0	165
26	121	45	0	2	0	1	0	0	0	0	0	195
22	117	33	0	1	0	0	0	0	0	1	0	174
18	105	21	0	2	0	0	0	0	0	0	0	146
				9		TT=9+1+1=11	1			1		
215	869	270	3	18	1	1	3	0	0	3	1	1384
					EB WEST LEG							
31	196	49	1	5	1	0	2	0	0	1	0	286
29	226	62	1	1	0	0	2	1	1	0	0	323
40	233	47	0	4	1	0	0	0	0	0	1	326
40	246	56	2	4	1	1	0	1	0	0	0	351
39	298	46	0	1	0	1	0	1	0	1	1	388
35	245	62	1	2	0	0	0	1	0	1	0	347
31	259	54	0	1	0	0	0	0	0	0	0	345
28	320	50	0	1	0	0	0	0	0	0	0	399
				6		TT=6+3+3=12		3		3		
273	2023	426	5	19	3	2	4	4	1	3	2	2765

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	510	80	70	895	105	225	520	45	95	490	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3255		1719	3438	1538	3335	3410		3335	3283	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3255		1719	3438	1538	3335	3410		3335	3283	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	176	600	94	82	1053	124	265	612	53	112	576	247
RTOR Reduction (vph)	0	16	0	0	0	62	0	8	0	0	63	0
Lane Group Flow (vph)	176	678	0	82	1053	62	265	657	0	112	760	0
Heavy Vehicles (%)	5%	10%	0%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	8.0	25.9		6.9	24.8	24.8	7.0	24.6		3.2	20.8	
Effective Green, g (s)	8.0	25.9		6.9	24.8	24.8	7.0	24.6		3.2	20.8	
Actuated g/C Ratio	0.10	0.34		0.09	0.32	0.32	0.09	0.32		0.04	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	180	1101		155	1113	498	305	1095		139	891	
v/s Ratio Prot	c0.10	0.21		0.05	c0.31		c0.08	c0.19		0.03	c0.23	
v/s Ratio Perm						0.04						
v/c Ratio	0.98	0.62		0.53	0.95	0.12	0.87	0.60		0.81	0.85	
Uniform Delay, d1	34.2	21.2		33.3	25.2	18.2	34.3	21.9		36.4	26.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.9	1.0		3.2	15.6	0.1	22.1	2.4		27.7	10.1	
Delay (s)	94.1	22.2		36.5	40.9	18.4	56.4	24.3		64.1	36.6	
Level of Service	F	C		D	D	B	E	C		E	D	
Approach Delay (s)		36.8			38.4			33.4			39.9	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	37.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	495	120	190	395	115	200	670	135	125	760	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3337		1641	3438	1538	3335	3352		3335	3378	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3337		1641	3438	1538	3335	3352		3335	3378	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	169	576	140	221	459	134	233	779	157	145	884	116
RTOR Reduction (vph)	0	30	0	0	0	103	0	24	0	0	14	0
Lane Group Flow (vph)	169	686	0	221	459	31	233	912	0	145	986	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	9.6	16.0		10.0	16.4	16.4	6.0	23.0		5.0	22.0	
Effective Green, g (s)	9.6	16.0		10.0	16.4	16.4	6.0	23.0		5.0	22.0	
Actuated g/C Ratio	0.14	0.23		0.14	0.23	0.23	0.09	0.33		0.07	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	236	763		234	805	360	286	1101		238	1062	
v/s Ratio Prot	0.10	c0.21		c0.13	0.13		c0.07	0.27		0.04	c0.29	
v/s Ratio Perm						0.02						
v/c Ratio	0.72	0.90		0.94	0.57	0.09	0.81	0.83		0.61	0.93	
Uniform Delay, d1	28.9	26.2		29.7	23.7	20.9	31.5	21.7		31.6	23.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.9	13.4		43.3	1.0	0.1	16.1	7.2		4.4	15.0	
Delay (s)	38.8	39.6		73.0	24.7	21.1	47.6	28.9		35.9	38.2	
Level of Service	D	D		E	C	C	D	C		D	D	
Approach Delay (s)		39.4			37.2			32.6			37.9	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	1130	135	125	460	95	160	465	230	260	635	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3383		1719	3438	1538	3502	3267		3335	3396	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3383		1719	3438	1538	3502	3267		3335	3396	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	224	1177	141	130	479	99	167	484	240	271	661	89
RTOR Reduction (vph)	0	12	0	0	0	72	0	82	0	0	14	0
Lane Group Flow (vph)	224	1306	0	130	479	27	167	642	0	271	736	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%	5%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	14.2	29.0		6.0	20.8	20.8	4.0	17.0		7.0	20.0	
Effective Green, g (s)	14.2	29.0		6.0	20.8	20.8	4.0	17.0		7.0	20.0	
Actuated g/C Ratio	0.19	0.39		0.08	0.28	0.28	0.05	0.23		0.09	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	325	1308		138	953	427	187	741		311	906	
v/s Ratio Prot	0.13	c0.39		c0.08	0.14		0.05	0.20		c0.08	c0.22	
v/s Ratio Perm						0.02						
v/c Ratio	0.69	1.00		0.94	0.50	0.06	0.89	0.87		0.87	0.81	
Uniform Delay, d1	28.3	23.0		34.3	22.8	19.9	35.3	27.9		33.6	25.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.0	24.3		58.8	0.4	0.1	37.3	13.0		22.4	7.9	
Delay (s)	34.3	47.3		93.2	23.2	20.0	72.6	40.9		55.9	33.6	
Level of Service	C	D		F	C	C	E	D		E	C	
Approach Delay (s)		45.4			35.6			46.8			39.5	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	42.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	510	80	70	895	105	225	520	45	95	490	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1399	3255		1719	3438	1538	3335	3410		3335	3283	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	3255		1719	3438	1538	3335	3410		3335	3283	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	235	600	94	82	1053	124	265	612	53	112	576	247
RTOR Reduction (vph)	0	16	0	0	0	62	0	8	0	0	63	0
Lane Group Flow (vph)	235	678	0	82	1053	62	265	657	0	112	760	0
Heavy Vehicles (%)	29%	10%	0%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	8.0	25.9		6.9	24.8	24.8	7.0	24.6		3.2	20.8	
Effective Green, g (s)	8.0	25.9		6.9	24.8	24.8	7.0	24.6		3.2	20.8	
Actuated g/C Ratio	0.10	0.34		0.09	0.32	0.32	0.09	0.32		0.04	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	146	1101		155	1113	498	305	1095		139	891	
v/s Ratio Prot	c0.17	0.21		0.05	c0.31		c0.08	c0.19		0.03	c0.23	
v/s Ratio Perm						0.04						
v/c Ratio	1.61	0.62		0.53	0.95	0.12	0.87	0.60		0.81	0.85	
Uniform Delay, d1	34.3	21.2		33.3	25.2	18.2	34.3	21.9		36.4	26.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	303.7	1.0		3.2	15.6	0.1	22.1	2.4		27.7	10.1	
Delay (s)	338.0	22.2		36.5	40.9	18.4	56.4	24.3		64.1	36.6	
Level of Service	F	C		D	D	B	E	C		E	D	
Approach Delay (s)		102.1			38.4			33.4			39.9	
Approach LOS		F			D			C			D	

Intersection Summary			
HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	76.6	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	495	120	190	395	115	200	670	135	125	760	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1399	3337		1641	3438	1538	3335	3352		3335	3378	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	3337		1641	3438	1538	3335	3352		3335	3378	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	227	576	140	221	459	134	233	779	157	145	884	116
RTOR Reduction (vph)	0	30	0	0	0	103	0	24	0	0	14	0
Lane Group Flow (vph)	227	686	0	221	459	31	233	912	0	145	986	0
Heavy Vehicles (%)	29%	5%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	10.0	16.0		10.0	16.0	16.0	6.0	23.0		5.0	22.0	
Effective Green, g (s)	10.0	16.0		10.0	16.0	16.0	6.0	23.0		5.0	22.0	
Actuated g/C Ratio	0.14	0.23		0.14	0.23	0.23	0.09	0.33		0.07	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	200	763		234	786	352	286	1101		238	1062	
v/s Ratio Prot	c0.16	c0.21		0.13	0.13		c0.07	0.27		0.04	c0.29	
v/s Ratio Perm						0.02						
v/c Ratio	1.14	0.90		0.94	0.58	0.09	0.81	0.83		0.61	0.93	
Uniform Delay, d1	30.0	26.2		29.7	24.0	21.3	31.5	21.7		31.6	23.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	104.7	13.4		43.3	1.1	0.1	16.1	7.2		4.4	15.0	
Delay (s)	134.7	39.6		73.0	25.1	21.4	47.6	28.9		35.9	38.2	
Level of Service	F	D		E	C	C	D	C		D	D	
Approach Delay (s)		62.5			37.5			32.6			37.9	
Approach LOS		E			D			C			D	

Intersection Summary			
HCM Average Control Delay	42.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	265	1130	135	125	460	95	160	465	230	260	635	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1467	3383		1719	3438	1538	3502	3267		3335	3396	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1467	3383		1719	3438	1538	3502	3267		3335	3396	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	276	1177	141	130	479	99	167	484	240	271	661	89
RTOR Reduction (vph)	0	12	0	0	0	74	0	82	0	0	14	0
Lane Group Flow (vph)	276	1306	0	130	479	25	167	642	0	271	736	0
Heavy Vehicles (%)	23%	5%	5%	5%	5%	5%	0%	5%	5%	5%	5%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	16.3	29.0		6.0	18.7	18.7	4.0	17.0		7.0	20.0	
Effective Green, g (s)	16.3	29.0		6.0	18.7	18.7	4.0	17.0		7.0	20.0	
Actuated g/C Ratio	0.22	0.39		0.08	0.25	0.25	0.05	0.23		0.09	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	319	1308		138	857	383	187	741		311	906	
v/s Ratio Prot	c0.19	c0.39		0.08	0.14		0.05	0.20		c0.08	c0.22	
v/s Ratio Perm						0.02						
v/c Ratio	0.87	1.00		0.94	0.56	0.06	0.89	0.87		0.87	0.81	
Uniform Delay, d1	28.3	23.0		34.3	24.6	21.5	35.3	27.9		33.6	25.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.9	24.3		58.8	0.8	0.1	37.3	13.0		22.4	7.9	
Delay (s)	49.2	47.3		93.2	25.3	21.5	72.6	40.9		55.9	33.6	
Level of Service	D	D		F	C	C	E	D		E	C	
Approach Delay (s)		47.6			37.3			46.8			39.5	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	43.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.4%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	555	85	75	975	115	245	565	50	105	535	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1399	3256		1719	3438	1538	3335	3409		3335	3285	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	3256		1719	3438	1538	3335	3409		3335	3285	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	259	653	100	88	1147	135	288	665	59	124	629	265
RTOR Reduction (vph)	0	15	0	0	0	62	0	9	0	0	62	0
Lane Group Flow (vph)	259	738	0	88	1147	73	288	715	0	124	832	0
Heavy Vehicles (%)	29%	10%	0%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	8.0	25.9		6.9	24.8	24.8	7.0	23.0		4.0	20.0	
Effective Green, g (s)	8.0	25.9		6.9	24.8	24.8	7.0	23.0		4.0	20.0	
Actuated g/C Ratio	0.11	0.34		0.09	0.33	0.33	0.09	0.30		0.05	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	148	1113		156	1125	503	308	1034		176	867	
v/s Ratio Prot	c0.19	0.23		0.05	c0.33		c0.09	c0.21		0.04	c0.25	
v/s Ratio Perm						0.05						
v/c Ratio	1.75	0.66		0.56	1.02	0.15	0.94	0.69		0.70	0.96	
Uniform Delay, d1	33.9	21.2		33.0	25.5	18.0	34.2	23.3		35.3	27.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	363.8	1.5		4.6	31.8	0.1	34.4	3.8		12.1	22.2	
Delay (s)	397.7	22.7		37.6	57.3	18.1	68.5	27.1		47.4	49.7	
Level of Service	F	C		D	E	B	E	C		D	D	
Approach Delay (s)		118.7			52.2			38.9			49.5	
Approach LOS		F			D			D			D	

Intersection Summary			
HCM Average Control Delay	63.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	215	540	130	205	430	125	220	730	145	135	830	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1399	3338		1641	3438	1538	3335	3352		3335	3378	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1399	3338		1641	3438	1538	3335	3352		3335	3378	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	250	628	151	238	500	145	256	849	169	157	965	128
RTOR Reduction (vph)	0	30	0	0	0	112	0	24	0	0	15	0
Lane Group Flow (vph)	250	749	0	238	500	33	256	994	0	157	1078	0
Heavy Vehicles (%)	29%	5%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	12.0	17.0		11.0	16.0	16.0	5.0	22.0		4.0	21.0	
Effective Green, g (s)	12.0	17.0		11.0	16.0	16.0	5.0	22.0		4.0	21.0	
Actuated g/C Ratio	0.17	0.24		0.16	0.23	0.23	0.07	0.31		0.06	0.30	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	240	811		258	786	352	238	1053		191	1013	
v/s Ratio Prot	c0.18	c0.22		0.15	0.15		c0.08	0.30		0.05	c0.32	
v/s Ratio Perm						0.02						
v/c Ratio	1.04	0.92		0.92	0.64	0.09	1.08	0.94		0.82	1.06	
Uniform Delay, d1	29.0	25.9		29.1	24.4	21.3	32.5	23.4		32.6	24.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	69.4	15.9		35.8	1.7	0.1	79.9	17.1		23.9	47.1	
Delay (s)	98.4	41.8		64.8	26.1	21.4	112.4	40.5		56.5	71.6	
Level of Service	F	D		E	C	C	F	D		E	E	
Approach Delay (s)		55.5			35.8			55.0			69.7	
Approach LOS		E			D			D			E	

Intersection Summary			
HCM Average Control Delay	55.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
16: Azusa Ave & Arrow Hwy

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	1230	145	135	500	105	175	505	250	285	690	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	0.97	0.95		0.97	0.95	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1467	3384		1719	3438	1538	3502	3268		3335	3395	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1467	3384		1719	3438	1538	3502	3268		3335	3395	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	302	1281	151	141	521	109	182	526	260	297	719	99
RTOR Reduction (vph)	0	12	0	0	0	83	0	81	0	0	15	0
Lane Group Flow (vph)	302	1420	0	141	521	26	182	705	0	297	803	0
Heavy Vehicles (%)	23%	5%	5%	5%	5%	5%	0%	5%	5%	5%	5%	0%
Turn Type	Prot	NA		Prot	NA	Perm	Prot	NA		Prot	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases						8						
Actuated Green, G (s)	16.8	29.0		6.0	18.2	18.2	4.0	17.0		7.0	20.0	
Effective Green, g (s)	16.8	29.0		6.0	18.2	18.2	4.0	17.0		7.0	20.0	
Actuated g/C Ratio	0.22	0.39		0.08	0.24	0.24	0.05	0.23		0.09	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	329	1308		138	834	373	187	741		311	905	
v/s Ratio Prot	c0.21	c0.42		0.08	0.15		0.05	0.22		c0.09	c0.24	
v/s Ratio Perm						0.02						
v/c Ratio	0.92	1.09		1.02	0.62	0.07	0.97	0.95		0.95	0.89	
Uniform Delay, d1	28.4	23.0		34.5	25.4	21.9	35.4	28.6		33.8	26.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	29.2	51.5		82.5	1.5	0.1	57.6	23.1		38.8	12.6	
Delay (s)	57.7	74.5		117.0	26.8	22.0	93.1	51.7		72.6	39.0	
Level of Service	E	E		F	C	C	F	D		E	D	
Approach Delay (s)		71.6			42.6			59.4			48.0	
Approach LOS		E			D			E			D	

Intersection Summary			
HCM Average Control Delay	58.4	HCM Level of Service	E
HCM Volume to Capacity ratio	1.04		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.5%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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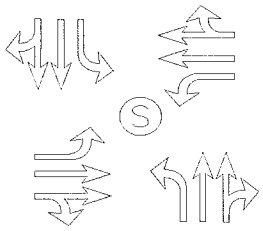
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	145	10%		145	15	160
EB THRU	160	5%		160	15	175
EB RIGHT	25	10%		25	5	30
WB LEFT	155	5%		155	15	170
WB THRU	825	5%		825	75	900
WB RIGHT	60	5%		60	5	65
AZUSA AVE						
NB LEFT	110	5%		110	10	120
NB THRU	660	5%	**50**	710	65	775
NB RIGHT	40	5%		40	5	45
SB LEFT	160	5%		160	15	175
SB THRU	630	5%		630	55	685
SB RIGHT	120	5%		120	10	130
TOTALS	**3090**		**50**	**3140**	**290**	**3430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	150	10%		150	15	165
EB THRU	195	5%		195	20	215
EB RIGHT	35	10%		35	5	40
WB LEFT	200	5%		200	20	220
WB THRU	180	5%		180	15	195
WB RIGHT	85	5%		85	5	90
AZUSA AVE						
NB LEFT	100	5%		100	10	110
NB THRU	740	5%	**50**	790	70	860
NB RIGHT	95	5%		95	10	105
SB LEFT	175	5%		175	15	190
SB THRU	765	5%		765	70	835
SB RIGHT	115	5%		115	10	125
TOTALS	**2835**		**50**	**2885**	**265**	**3150**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
GLADSTONE STREET						
EB LEFT	180	5%		180	15	195
EB THRU	670	5%		670	60	730
EB RIGHT	55	5%		55	5	60
WB LEFT	130	5%		130	10	140
WB THRU	255	5%		255	25	280
WB RIGHT	55	5%		55	5	60
AZUSA AVE						
NB LEFT	55	5%		55	5	60
NB THRU	685	5%	**50**	735	65	800
NB RIGHT	75	5%		75	5	80
SB LEFT	180	5%		180	15	195
SB THRU	825	5%		825	75	900
SB RIGHT	65	5%		65	5	70
TOTALS	**3230**		**50**	**3280**	**290**	**3570**

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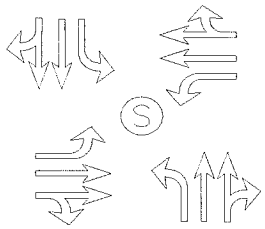
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	128	18	54	180	0	180	15	195
EB THRU	150	10	30	180	0	180	15	195
EB RIGHT	23	3	9	30	0	30	5	35
WB LEFT	155	1	3	160	0	160	15	175
WB THRU	810	14	42	850	0	850	75	925
WB RIGHT	54	4	12	65	0	65	5	70
AZUSA AVE								
NB LEFT	103	5	15	120	0	120	10	130
NB THRU	639	20	60	700	**150**	850	75	925
NB RIGHT	39	2	6	45	0	45	5	50
SB LEFT	147	11	33	180	0	180	15	195
SB THRU	598	33	99	695	0	695	65	760
SB RIGHT	115	6	18	135	0	135	10	145
TOTALS	**2961**				**150**	**3490**	**310**	**3800**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	134	16	48	180	**0**	180	15	195
EB THRU	183	14	42	225	**0**	225	20	245
EB RIGHT	34	3	9	45	**0**	45	5	50
WB LEFT	194	5	15	210	**0**	210	20	230
WB THRU	168	13	39	205	**0**	205	20	225
WB RIGHT	82	3	9	90	**0**	90	10	100
AZUSA AVE								
NB LEFT	97	4	12	110	**0**	110	10	120
NB THRU	712	26	78	790	**150**	940	85	1025
NB RIGHT	92	3	9	100	**0**	100	10	110
SB LEFT	172	5	15	185	**0**	185	15	200
SB THRU	731	32	96	825	**0**	825	75	900
SB RIGHT	110	5	15	125	**0**	125	10	135
TOTALS	**2709**				**150**	**3240**	**295**	**3535**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : GLADSTONE STREET
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 17
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
GLADSTONE STREET								
EB LEFT	176	6	18	195	**0**	195	20	215
EB THRU	661	11	33	695	**0**	695	65	760
EB RIGHT	57	0	0	55	**0**	55	5	60
WB LEFT	132	0	0	130	**0**	130	10	140
WB THRU	250	5	15	265	**0**	265	25	290
WB RIGHT	53	0	0	55	**0**	55	5	60
AZUSA AVE								
NB LEFT	56	1	3	60	**0**	60	5	65
NB THRU	676	11	33	710	**150**	860	75	935
NB RIGHT	75	1	3	80	**0**	80	5	85
SB LEFT	175	5	15	190	**0**	190	15	205
SB THRU	809	16	48	855	**0**	855	75	930
SB RIGHT	62	4	12	75	**0**	75	5	80
TOTALS	**3182**				**150**	**3515**	**310**	**3825**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-09-11

PEAK HOUR: 07:15AM

NORTH LEG (SB)

TOTAL: 910

TT = 50

TT% = 50/910 = 5.50% ≈ 6%

	Rt	Thru	Lt	
	121 (120)	631 (630)	158 (160)	Total
	16	75	28	1st
	22	151	53	2nd
	45	217	38	3rd
	38	188	39	4th

TT = 19

TT% = 19/1038 = 1.83% ≈ 2%

EAST LEG TOTAL: (WB) 1,038

	1st	2nd	3rd	4th	Total
Rt	10	13	16	19	58 (60)
Thru	250	231	198	145	824 (825)
Lt	23	35	60	38	156 (155)

	Total	1st	2nd	3rd	4th
Lt	146 (145)	25	37	49	35
Thru	160	38	38	29	55
Rt	26 (25)	7	4	10	5

WEST LEG TOTAL: (EB) 332

TT = 31

TT% = 31/332 = 9.34% ≈ 9%

	Lt	Thru	Rt
1st	24	131	5
2nd	20	184	9
3rd	37	183	13
4th	27	161	14
Total	108 (110)	659 (660)	41 (40)

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.76
SOUTH LEG = 0.87
EAST LEG = 0.92
WEST LEG = 0.87

ALL LEGS = 0.86

TT = 27

TT% = 27/808 = 3.34% ≈ 3%

TOTAL: 808

HOUR TOTAL: 3,088

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 07:00AM-08:00AM DATE: 06-09-11

NORTH LEG

	Rt	Thru	Lt
Total	130	539	96
1st	11	96	13
2nd	28	75	16
3rd	53	151	22
4th	38	217	45

	1st	2nd	3rd	4th	Total
Rt	17	10	13	16	56
Thru	235	250	231	198	914
Lt	26	23	35	60	144

	Total	1st	2nd	3rd	4th
Lt	49	37	25	21	132
Thru	29	38	38	20	125
Rt	10	4	7	3	24

	Lt	Thru	Rt
1st	8	131	18
2nd	5	131	24
3rd	9	184	20
4th	13	183	37
Total	35	629	99

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 08:00AM-09:00AM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
86	547	133	Total
38	188	39	1st
20	127	32	2nd
20	126	38	3rd
8	106	24	4th

	1st	2nd	3rd	4th	Total
Rt	19	18	16	19	72
Thru	145	164	92	72	473
Lt	38	22	20	25	105

Total	1st	2nd	3rd	4th	
120	35	34	27	24	Lt
158	55	36	35	32	Thru
33	5	9	4	15	Rt

	Lt	Thru	Rt
1st	27	161	14
2nd	22	118	17
3rd	22	136	17
4th	16	121	13
Total	87	536	61

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : GLADSTONE 06-09-11

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
12	91	9	1	2	1	0	2	0	0	1	1	120
14	68	24	0	6	2	0	0	1	2	1	1	119
21	142	50	0	7	2	1	0	0	0	2	1	226
44	206	38	1	8	0	0	1	0	0	2	0	300
36	182	35	1	6	3	0	0	0	1	0	1	265
19	121	26	0	4 36	5	1	1 3	0	0	1 11	1	179
19	122	37	0	3	0	1	1	0	0	0	1	184
5	99	22	2	6	1	0	0	1	1	1	0	138
						TT=36+3+11=50						
170	1031	241	5	42	14	3	5	2	4	8	6	1531
						NB SOUTH LEG						
7	125	18	1	5	0	0	0	0	0	1	0	157
4	124	24	0	5	0	1	1	0	0	1	0	160
9	181	19	0	3	1	0	0	0	0	0	0	213
13	177	34	0	5	2	0	1	1	0	0	0	233
13	157	26	1	4	1	0	0	0	0	0	0	202
17	114	20	0	3 22	2	0	0 4	0	0	1 1	0	157
14	127	20	3	8	2	0	0	0	0	1	0	175
13	116	16	0	5	0	0	0	0	0	0	0	150
						TT=22+4+1=27						
90	1121	177	5	38	8	1	2	1	0	4	0	1447
						WB EAST LEG						
17	231	24	0	4	2	0	0	0	0	0	0	278
9	247	23	0	3	0	0	0	0	1	0	0	283
13	226	34	0	5	1	0	0	0	0	0	0	279
14	196	60	2	1	0	0	1	0	0	0	0	274
18	141	38	1	4	0	0	0	0	0	0	0	202
18	160	21	0	3 17	1	0	1 1	0	0	0 1	0	204
16	88	20	0	4	0	0	0	0	0	0	0	128
15	69	23	3	2	1	0	1	0	1	0	1	116
						TT=17+1+1=19						
120	1358	243	6	26	5	0	3	0	2	0	1	1764
						EB WEST LEG						
3	16	19	0	3	1	0	1	0	0	0	1	44
5	37	24	2	1	1	0	0	0	0	0	0	70
4	36	28	0	2	5	0	0	2	0	0	2	79
10	24	44	0	5	3	0	0	1	0	0	1	88
4	53	32	1	2	1	0	0	1	0	0	1	95
9	35	30	0	1 23	2	0	0 4	1	0	0 4	1	79
2	33	25	2	2	1	0	0	0	0	0	1	66
13	29	23	1	2	0	1	0	0	0	1	1	71
						TT=23+4+4=31						
50	263	225	6	18	14	1	1	5	0	1	8	592

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-09-11

PEAK HOUR: 12:15PM

NORTH LEG (SB)

TOTAL: 1,055

TT = 42

$TT\% = \frac{42}{1055} = 3.98\% \approx 4\%$

Rt	Thru	Lt	
115	763 765	177 175	Total
65	149	55	1st
19	191	39	2nd
14	223	53	3rd
17	200	30	4th

TT = 21

$TT\% = \frac{21}{465} = 4.52\% \approx 5\%$

EAST LEG TOTAL: (WB) 465

	1st	2nd	3rd	4th	Total
Rt	35	15	17	18	85
Thru	39	41	37	64	181 180
Lt	82	27	34	56	199 200

Total	1st	2nd	3rd	4th	
150	50	31	30	39	Lt
197 200	48	43	35	71	Thru
40 37	9	8	12	8	Rt

WEST LEG TOTAL: (EB) 384

TT = 33

$TT\% = \frac{33}{384} = 8.6\% \approx 9\%$

	Lt	Thru	Rt
1st	34	252	30
2nd	17	132	26
3rd	25	179	18
4th	25	175	21
Total	101 100	738 740	95

SOUTH LEG (NB)

TOTAL: 934

TT = 33

$TT\% = \frac{33}{934} = 3.53\% \approx 4\%$

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.74
EAST LEG = 0.75
WEST LEG = 0.81

ALL LEGS = 0.84

HOUR TOTAL: 2,838

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 12:00PM-01:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
113	705	184	Total
15	142	37	1st
65	149	55	2nd
19	191	39	3rd
14	223	53	4th

	1st	2nd	3rd	4th	Total
Rt	17	35	15	17	84
Thru	48	39	41	37	165
Lt	40	82	27	34	183

Total	1st	2nd	3rd	4th	
149	38	50	31	30	Lt
157	31	48	43	35	Thru
36	7	9	8	12	Rt

	Lt	Thru	Rt
1st	7	127	14
2nd	34	252	30
3rd	17	132	26
4th	25	179	18
Total	83	690	88

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 01:00PM-02:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
59	761	164	Total
17	200	30	1st
13	170	44	2nd
19	195	41	3rd
10	196	49	4th

	1st	2nd	3rd	4th	Total
Rt	18	18	21	24	81
Thru	64	45	55	27	191
Lt	56	36	27	26	145

Total	1st	2nd	3rd	4th	
139	39	29	32	39	Lt
235	71	50	54	60	Thru
39	8	6	14	11	Rt

	Lt	Thru	Rt
1st	25	175	21
2nd	25	164	19
3rd	22	139	21
4th	30	189	26
Total	102	667	87

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : GLADSTONE 06-09-11

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
15	134	37	0	6	0	0	1	0	0	1	0	194
64	143	54	1	5	1	0	1	0	0	0	0	269
17	186	35	2	3	4	0	1	0	0	1	0	249
14	214	53	0	7	0	0	0	0	0	2	0	290
15	188	30	1	7	0	0	4	0	1	1	0	247
9	161	44	3	8 31	0	0	1 6	0	1	0 5	0	227
18	187	40	1	6	1	0	2	0	0	0	0	255
10	190	49	0	5	0	0	1	0	0	0	0	255
						TT= 31+6+5 = 42						
162	1403	342	8	47	6	0	11	0	2	5	0	1986
						NB SOUTH LEG						
13	125	7	1	1	0	0	1	0	0	0	0	148
30	247	34	0	4	0	0	1	0	0	0	0	316
26	124	17	0	5	0	0	1	0	0	2	0	175
16	174	25	2	4	0	0	1	0	0	0	0	222
20	167	21	0	6	2	1	1	1	0	1	1	221
17	157	24	2	5 23	1	0	1 6	0	0	1 4	0	208
21	128	21	0	3	1	0	6	0	0	2	0	182
26	180	30	0	4	0	0	3	0	0	2	0	245
						TT=23+6+4 = 33						
169	1302	179	5	32	4	1	15	1	0	8	1	1717
						WB EAST LEG						
16	45	37	1	3	3	0	0	0	0	0	0	105
35	37	82	0	1	0	0	0	0	0	1	0	156
13	38	26	1	3	1	1	0	0	0	0	0	83
16	34	33	0	3	1	0	0	0	1	0	0	88
18	59	53	0	5	3	0	0	0	0	0	0	138
17	43	36	1	2 18	0	0	0 1	0	0	0 2	0	99
21	53	27	0	2	0	0	0	0	0	0	0	103
24	24	26	0	3	0	0	0	0	0	0	0	77
						TT= 18+1+2 = 21						
160	333	320	3	22	8	1	0	0	1	1	0	849
						EB WEST LEG						
7	29	38	0	2	0	0	0	0	0	0	0	76
9	46	49	0	2	1	0	0	0	0	0	0	107
8	37	27	0	5	1	0	1	1	0	0	2	82
11	34	27	1	1	2	0	0	0	0	0	1	77
6	66	31	2	5	6	0	0	1	0	0	1	118
5	48	27	1	2 26	1	0	0 3	0	0	0 4	1	85
13	51	29	1	3	2	0	0	1	0	0	0	100
11	57	33	0	3	2	0	0	1	0	0	3	110
						TT= 26+3+4 = 33						
70	368	261	5	23	15	0	1	4	0	0	8	755

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: GLADSTONE
JURISDICTION: IRWINDALE

DATE: 06-09-11

PEAK HOUR: 04:45PM

NORTH LEG (SB)

TOTAL: 1,071

TT= 25

TT% = 25/1071 = 2.33% ≈ 2%

	Rt	Thru	Lt	
Total	66 (65)	825	180	
1st	12	200	54	
2nd	19	183	36	
3rd	17	224	48	
4th	18	218	42	

TT= 5

TT% = 5/440 = 1.14% ≈ 1%

EAST LEG TOTAL: (WB) 440

	1st	2nd	3rd	4th	Total
Rt	18	14	11	10	53 (55)
Thru	32	89	70	64	255
Lt	33	40	31	28	132 (130)

	Total	1st	2nd	3rd	4th
Lt	182 (180)	40	59	43	40
Thru	672 (670)	166	179	168	159
Rt	57 (55)	18	18	10	11

WEST LEG TOTAL: (EB) 911

TT= 17

TT% = 17/911 = 1.87% ≈ 2%

	Lt	Thru	Rt
1st	25	210	14
2nd	12	142	20
3rd	11	172	25
4th	9	163	17
Total	57 (55)	687 (685)	76 (75)

SOUTH LEG (NB)

TOTAL: 820

TT= 13

TT% = 13/820 = 1.59% ≈ 2%

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.82
EAST LEG = 0.77
WEST LEG = 0.89

ALL LEGS = 0.98

HOUR TOTAL: 3,242

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 04:00PM-05:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
70	722	166	Total
18	161	37	1st
7	232	45	2nd
33	129	30	3rd
12	200	54	4th

	1st	2nd	3rd	4th	Total
Rt	11	7	2	18	38
Thru	36	30	54	32	152
Lt	38	50	29	33	150

Total	1st	2nd	3rd	4th	
185	56	51	38	40	Lt
598	172	133	127	166	Thru
47	11	13	5	18	Rt

	Lt	Thru	Rt
1st	15	151	31
2nd	10	190	24
3rd	39	96	15
4th	25	210	14
Total	89	647	84

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: GLADSTONE

TIME: 05:00PM-06:00PM DATE: 06-09-11

NORTH LEG

Rt	Thru	Lt	
69	822	165	Total
19	183	36	1st
17	224	48	2nd
18	218	42	3rd
15	197	39	4th

	1st	2nd	3rd	4th	Total
Rt	14	11	10	7	42
Thru	89	70	64	52	275
Lt	40	31	28	19	118

Total	1st	2nd	3rd	4th	
180	59	43	40	38	Lt
656	179	168	159	150	Thru
48	18	10	11	9	Rt

	Lt	Thru	Rt
1st	12	142	20
2nd	11	172	25
3rd	9	163	17
4th	6	149	12
Total	38	626	74

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : GLADSTONE 06-09-11

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
18	154	37	0	7	0	0	0	0	0	0	0	216
6	229	45	0	2	0	1	0	0	0	1	0	284
32	126	30	0	3	0	1	0	0	0	0	0	192
10	196	52	1	2	2	1	1	0	0	1	0	266
18	177	35	0	5	1	1	0	0	0	1	0	238
16	220	46	0	3	1	0	0	1	1	1	0	289
18	216	42	0	2	0	0	0	0	0	0	0	278
15	195	38	0	1	17 1	0	1	4 0	0	0	4 0	251
						TT = 17+4+4 = 25						
133	1513	325	1	25	5	4	2	1	1	4	0	2014
					NB SOUTH LEG							
30	149	14	1	2	1	0	0	0	0	0	0	197
24	186	10	0	2	0	0	1	0	0	1	0	224
15	91	39	0	3	0	0	1	0	0	1	0	150
14	206	24	0	2	1	0	1	0	0	1	0	249
19	140	12	1	2	0	0	0	0	0	0	0	174
25	169	11	0	3	0	0	0	0	0	0	0	208
17	161	9	0	2	0	0	0	0	0	0	0	189
12	148	6	0	1	11 0	0	0	1 0	0	0	1 0	167
						TT = 11+1+1 = 13						
156	1250	125	2	17	2	0	3	0	0	3	0	1558
					WB EAST LEG							
11	33	37	0	3	1	0	0	0	0	0	0	85
7	30	50	0	0	0	0	0	0	0	0	0	87
2	52	29	0	2	0	0	0	0	0	0	0	85
18	31	33	0	1	0	0	0	0	0	0	0	83
14	86	40	0	1	0	0	1	0	0	1	0	143
11	69	31	0	1	0	0	0	0	0	0	0	112
10	64	28	0	0	0	0	0	0	0	0	0	102
7	51	19	0	1	3 0	0	0	1 0	0	0	1 0	78
						TT = 3+1+1 = 5						
80	416	267	0	9	1	0	1	0	0	1	0	775
					EB WEST LEG							
10	169	53	1	3	1	0	0	1	0	0	1	239
13	133	48	0	0	3	0	0	0	0	0	0	197
4	125	36	1	2	2	0	0	0	0	0	0	170
18	162	39	0	2	1	0	1	0	0	1	0	224
18	175	58	0	2	1	0	1	0	0	1	0	256
10	166	39	0	2	0	0	0	2	0	0	2	221
11	158	40	0	1	0	0	0	0	0	0	0	210
9	149	38	0	1	9 0	0	0	4 0	0	0	4 0	197
						TT = 9+4+4 = 17						
93	1237	351	2	13	8	0	2	3	0	2	3	1714

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	160	25	155	825	60	110	660	40	160	630	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3347		1719	3403		1719	3438	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3347		1719	3403		1719	3438	1538	1719	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	169	186	29	180	959	70	128	767	47	186	733	140
RTOR Reduction (vph)	0	14	0	0	6	0	0	0	27	0	0	99
Lane Group Flow (vph)	169	201	0	180	1023	0	128	767	20	186	733	41
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	10.9	25.3		13.6	28.0		8.8	24.0	24.0	11.0	26.2	26.2
Effective Green, g (s)	10.9	25.3		13.6	28.0		8.8	24.0	24.0	11.0	26.2	26.2
Actuated g/C Ratio	0.12	0.28		0.15	0.31		0.10	0.27	0.27	0.12	0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	199	942		260	1060		168	918	411	210	1002	448
v/s Ratio Prot	c0.10	0.06		0.10	c0.30		0.07	c0.22		c0.11	0.21	
v/s Ratio Perm									0.01			0.03
v/c Ratio	0.85	0.21		0.69	0.96		0.76	0.84	0.05	0.89	0.73	0.09
Uniform Delay, d1	38.7	24.7		36.2	30.5		39.5	31.1	24.5	38.8	28.7	23.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.1	0.1		7.7	19.5		18.3	8.9	0.2	32.8	4.7	0.4
Delay (s)	65.8	24.8		43.9	50.0		57.8	40.0	24.7	71.6	33.4	23.6
Level of Service	E	C		D	D		E	D	C	E	C	C
Approach Delay (s)		42.8			49.1			41.6			38.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	43.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	195	35	200	180	85	100	740	95	175	765	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3335		1719	3273		1719	3438	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3335		1719	3273		1719	3438	1538	1719	3438	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	179	232	42	238	214	101	119	881	113	208	911	137
RTOR Reduction (vph)	0	20	0	0	74	0	0	0	61	0	0	82
Lane Group Flow (vph)	179	254	0	238	241	0	119	881	52	208	911	55
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.3	11.0		12.0	11.7		6.3	25.8	25.8	11.0	30.5	30.5
Effective Green, g (s)	11.3	11.0		12.0	11.7		6.3	25.8	25.8	11.0	30.5	30.5
Actuated g/C Ratio	0.15	0.15		0.16	0.15		0.08	0.34	0.34	0.15	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	245	484		272	505		143	1170	523	249	1383	619
v/s Ratio Prot	0.11	c0.08		c0.14	0.07		0.07	c0.26		c0.12	0.26	
v/s Ratio Perm									0.03			0.04
v/c Ratio	0.73	0.53		0.88	0.48		0.83	0.75	0.10	0.84	0.66	0.09
Uniform Delay, d1	30.8	30.0		31.2	29.3		34.2	22.2	17.1	31.5	18.4	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	1.0		25.3	0.7		31.9	4.5	0.4	20.8	2.5	0.3
Delay (s)	41.5	31.0		56.5	30.0		66.2	26.7	17.5	52.4	20.9	14.3
Level of Service	D	C		E	C		E	C	B	D	C	B
Approach Delay (s)		35.1			41.4			30.0			25.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	670	55	130	255	55	55	685	75	180	825	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3411		1805	3375		1719	3438	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3411		1805	3375		1719	3438	1538	1719	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	184	684	56	133	260	56	56	699	77	184	842	66
RTOR Reduction (vph)	0	10	0	0	29	0	0	0	55	0	0	41
Lane Group Flow (vph)	184	730	0	133	287	0	56	699	22	184	842	25
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	5%	5%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	8.0	17.6		5.4	15.0		2.3	18.7	18.7	8.0	24.4	24.4
Effective Green, g (s)	8.0	17.6		5.4	15.0		2.3	18.7	18.7	8.0	24.4	24.4
Actuated g/C Ratio	0.12	0.27		0.08	0.23		0.04	0.28	0.28	0.12	0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	914		148	771		60	979	438	209	1277	571
v/s Ratio Prot	c0.11	c0.21		0.07	0.09		0.03	0.20		c0.11	c0.24	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.88	0.80		0.90	0.37		0.93	0.71	0.05	0.88	0.66	0.04
Uniform Delay, d1	28.4	22.4		29.9	21.4		31.6	21.1	17.1	28.4	17.2	13.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.1	4.9		44.8	0.3		91.8	4.4	0.2	32.1	2.7	0.1
Delay (s)	60.5	27.4		74.7	21.7		123.5	25.5	17.3	60.5	19.9	13.3
Level of Service	E	C		E	C		F	C	B	E	B	B
Approach Delay (s)		33.9			37.4			31.4			26.3	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	31.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	160	25	155	825	60	110	710	40	160	630	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3347		1719	3403		1719	3223	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3347		1719	3403		1719	3223	1538	1719	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	169	186	29	180	959	70	128	826	47	186	733	140
RTOR Reduction (vph)	0	14	0	0	6	0	0	0	25	0	0	99
Lane Group Flow (vph)	169	201	0	180	1023	0	128	826	22	186	733	41
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	12%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	10.9	25.3		13.6	28.0		8.8	24.0	24.0	11.0	26.2	26.2
Effective Green, g (s)	10.9	25.3		13.6	28.0		8.8	24.0	24.0	11.0	26.2	26.2
Actuated g/C Ratio	0.12	0.28		0.15	0.31		0.10	0.27	0.27	0.12	0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	199	942		260	1060		168	860	411	210	1002	448
v/s Ratio Prot	c0.10	0.06		0.10	c0.30		0.07	c0.26		c0.11	0.21	
v/s Ratio Perm									0.01			0.03
v/c Ratio	0.85	0.21		0.69	0.96		0.76	0.96	0.05	0.89	0.73	0.09
Uniform Delay, d1	38.7	24.7		36.2	30.5		39.5	32.5	24.5	38.8	28.7	23.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.1	0.1		7.7	19.5		18.3	22.5	0.2	32.8	4.7	0.4
Delay (s)	65.8	24.8		43.9	50.0		57.8	55.0	24.8	71.6	33.4	23.6
Level of Service	E	C		D	D		E	D	C	E	C	C
Approach Delay (s)		42.8			49.1			53.9			38.8	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	89.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	74.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	195	35	200	180	85	100	790	95	175	765	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3335		1719	3273		1719	3252	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3335		1719	3273		1719	3252	1538	1719	3438	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	179	232	42	238	214	101	119	940	113	208	911	137
RTOR Reduction (vph)	0	20	0	0	74	0	0	0	57	0	0	82
Lane Group Flow (vph)	179	254	0	238	241	0	119	940	56	208	911	55
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	11%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.3	11.0		12.0	11.7		6.3	25.8	25.8	11.0	30.5	30.5
Effective Green, g (s)	11.3	11.0		12.0	11.7		6.3	25.8	25.8	11.0	30.5	30.5
Actuated g/C Ratio	0.15	0.15		0.16	0.15		0.08	0.34	0.34	0.15	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	245	484		272	505		143	1107	523	249	1383	619
v/s Ratio Prot	0.11	c0.08		c0.14	0.07		0.07	c0.29		c0.12	0.26	
v/s Ratio Perm									0.04			0.04
v/c Ratio	0.73	0.53		0.88	0.48		0.83	0.85	0.11	0.84	0.66	0.09
Uniform Delay, d1	30.8	30.0		31.2	29.3		34.2	23.2	17.1	31.5	18.4	14.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.7	1.0		25.3	0.7		31.9	8.2	0.4	20.8	2.5	0.3
Delay (s)	41.5	31.0		56.5	30.0		66.2	31.4	17.5	52.4	20.9	14.3
Level of Service	D	C		E	C		E	C	B	D	C	B
Approach Delay (s)		35.1			41.4			33.6			25.4	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	62.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	670	55	130	255	55	55	735	75	180	825	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3411		1805	3375		1719	3252	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3411		1805	3375		1719	3252	1538	1719	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	184	684	56	133	260	56	56	750	77	184	842	66
RTOR Reduction (vph)	0	10	0	0	29	0	0	0	55	0	0	41
Lane Group Flow (vph)	184	730	0	133	287	0	56	750	22	184	842	25
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	5%	11%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	8.0	17.6		5.4	15.0		2.3	18.7	18.7	8.0	24.4	24.4
Effective Green, g (s)	8.0	17.6		5.4	15.0		2.3	18.7	18.7	8.0	24.4	24.4
Actuated g/C Ratio	0.12	0.27		0.08	0.23		0.04	0.28	0.28	0.12	0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	914		148	771		60	926	438	209	1277	571
v/s Ratio Prot	c0.11	c0.21		0.07	0.09		0.03	c0.23		c0.11	0.24	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.88	0.80		0.90	0.37		0.93	0.81	0.05	0.88	0.66	0.04
Uniform Delay, d1	28.4	22.4		29.9	21.4		31.6	21.8	17.1	28.4	17.2	13.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	32.1	4.9		44.8	0.3		91.8	7.6	0.2	32.1	2.7	0.1
Delay (s)	60.5	27.4		74.7	21.7		123.5	29.5	17.3	60.5	19.9	13.3
Level of Service	E	C		E	C		F	C	B	E	B	B
Approach Delay (s)		33.9			37.4			34.4			26.3	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	32.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	71.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	175	25	170	900	65	120	775	45	175	685	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3354		1719	3403		1719	3223	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3354		1719	3403		1719	3223	1538	1719	3438	1538
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	186	203	29	198	1047	76	140	901	52	203	797	151
RTOR Reduction (vph)	0	12	0	0	6	0	0	0	26	0	0	107
Lane Group Flow (vph)	186	220	0	198	1117	0	140	901	26	203	797	44
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	12%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.0	24.9		14.1	28.0		9.0	24.0	24.0	11.0	26.0	26.0
Effective Green, g (s)	11.0	24.9		14.1	28.0		9.0	24.0	24.0	11.0	26.0	26.0
Actuated g/C Ratio	0.12	0.28		0.16	0.31		0.10	0.27	0.27	0.12	0.29	0.29
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	201	928		269	1059		172	859	410	210	993	444
v/s Ratio Prot	c0.11	0.07		0.12	c0.33		0.08	c0.28		c0.12	0.23	
v/s Ratio Perm									0.02			0.03
v/c Ratio	0.93	0.24		0.74	1.05		0.81	1.05	0.06	0.97	0.80	0.10
Uniform Delay, d1	39.1	25.2		36.2	31.0		39.7	33.0	24.6	39.3	29.6	23.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.7	0.1		10.0	43.2		24.6	44.3	0.3	52.0	6.8	0.4
Delay (s)	81.7	25.3		46.2	74.2		64.3	77.3	24.9	91.4	36.5	23.9
Level of Service	F	C		D	E		E	E	C	F	D	C
Approach Delay (s)		50.4			70.0			73.2			44.5	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM Average Control Delay	61.5	HCM Level of Service	E
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	215	40	220	195	95	110	860	105	190	835	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3332		1719	3269		1719	3252	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1641	3332		1719	3269		1719	3252	1538	1719	3438	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	196	256	48	262	232	113	131	1024	125	226	994	149
RTOR Reduction (vph)	0	20	0	0	77	0	0	0	59	0	0	94
Lane Group Flow (vph)	196	284	0	262	268	0	131	1024	66	226	994	55
Heavy Vehicles (%)	10%	5%	10%	5%	5%	5%	5%	11%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	11.6	11.8		12.0	12.2		7.9	25.0	25.0	11.0	28.1	28.1
Effective Green, g (s)	11.6	11.8		12.0	12.2		7.9	25.0	25.0	11.0	28.1	28.1
Actuated g/C Ratio	0.15	0.16		0.16	0.16		0.10	0.33	0.33	0.15	0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	251	519		272	526		179	1073	507	249	1275	570
v/s Ratio Prot	0.12	c0.09		c0.15	0.08		0.08	c0.31		c0.13	c0.29	
v/s Ratio Perm									0.04			0.04
v/c Ratio	0.78	0.55		0.96	0.51		0.73	0.95	0.13	0.91	0.78	0.10
Uniform Delay, d1	30.9	29.5		31.7	29.1		32.9	24.8	17.8	31.9	21.1	15.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	14.5	1.2		44.2	0.8		14.3	18.5	0.5	33.2	4.8	0.3
Delay (s)	45.4	30.7		75.9	29.8		47.2	43.3	18.3	65.1	25.9	15.9
Level of Service	D	C		E	C		D	D	B	E	C	B
Approach Delay (s)		36.5			49.7			41.3			31.3	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	38.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	20.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
17: Azusa Ave & Gladstone St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	195	730	60	140	280	60	60	800	80	195	900	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3411		1805	3376		1719	3252	1538	1719	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3411		1805	3376		1719	3252	1538	1719	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	199	745	61	143	286	61	61	816	82	199	918	71
RTOR Reduction (vph)	0	10	0	0	28	0	0	0	59	0	0	45
Lane Group Flow (vph)	199	796	0	143	319	0	61	816	23	199	918	26
Heavy Vehicles (%)	5%	5%	0%	0%	5%	0%	5%	11%	5%	5%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Actuated Green, G (s)	8.0	17.0		7.0	16.0		2.4	18.6	18.6	8.0	24.2	24.2
Effective Green, g (s)	8.0	17.0		7.0	16.0		2.4	18.6	18.6	8.0	24.2	24.2
Actuated g/C Ratio	0.12	0.26		0.11	0.24		0.04	0.28	0.28	0.12	0.36	0.36
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	206	871		190	811		62	908	430	206	1249	559
v/s Ratio Prot	c0.12	c0.23		0.08	0.09		0.04	c0.25		c0.12	0.27	
v/s Ratio Perm									0.01			0.02
v/c Ratio	0.97	0.91		0.75	0.39		0.98	0.90	0.05	0.97	0.73	0.05
Uniform Delay, d1	29.2	24.1		29.0	21.2		32.1	23.1	17.6	29.2	18.4	13.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	52.5	13.9		15.4	0.3		108.0	13.6	0.2	52.5	3.9	0.2
Delay (s)	81.6	38.0		44.4	21.5		140.1	36.6	17.8	81.6	22.3	13.9
Level of Service	F	D		D	C		F	D	B	F	C	B
Approach Delay (s)		46.6			28.2			41.6			31.7	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM Average Control Delay	38.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	66.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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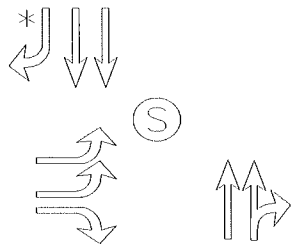
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	250	5%		250	25	275
EB THRU	0	0%		0	0	0
EB RIGHT	235	5%		235	20	255
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
AZUSA AVE						
NB LEFT	0	0%		0	0	0
NB THRU	660	5%	**50**	710	65	775
NB RIGHT	195	10%		195	20	215
SB LEFT	0	0%		0	0	0
SB THRU	740	5%		740	65	805
SB RIGHT	210	10%		210	20	230
TOTALS	**2290**		**50**	**2340**	**215**	**2555**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	280	5%		280	25	305
EB THRU	0	0%		0	0	0
EB RIGHT	260	5%		260	25	285
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
AZUSA AVE						
NB LEFT	0	0%		0	0	0
NB THRU	815	5%	**50**	865	80	945
NB RIGHT	215	5%		215	20	235
SB LEFT	0	0%		0	0	0
SB THRU	720	5%		720	65	785
SB RIGHT	170	10%		170	15	185
TOTALS	**2460**		**50**	**2510**	**230**	**2740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
I-210 FWY EB RAMPS						
EB LEFT	225	5%		225	20	245
EB THRU	0	0%		0	0	0
EB RIGHT	215	5%		215	20	235
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
AZUSA AVE						
NB LEFT	0	0%		0	0	0
NB THRU	640	5%	**50**	690	60	750
NB RIGHT	245	5%		245	20	265
SB LEFT	0	0%		0	0	0
SB THRU	800	5%		800	70	870
SB RIGHT	190	5%		190	15	205
TOTALS	**2315**		**50**	**2365**	**205**	**2570**

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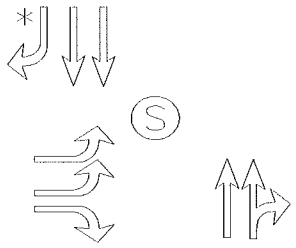
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
18
ROUTE
2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

I-210 FWY EB RAMPS

EB LEFT	243	8	24	265	**0**	265	25	290
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	224	10	30	255	**0**	255	25	280
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0

AZUSA AVE

NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	616	42	126	740	**150**	890	80	970
NB RIGHT	180	15	45	225	**0**	225	20	245
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	701	38	114	815	**0**	815	75	890
SB RIGHT	194	16	48	240	**0**	240	20	260
TOTALS	**2158**				**150**	**2690**	**245**	**2935**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	268	14	42	310	**0**	310	30	340
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	253	9	27	280	**0**	280	25	305
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
AZUSA AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	788	27	81	870	**150**	1020	90	1110
NB RIGHT	199	14	42	240	**0**	240	20	260
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	692	29	87	780	**0**	780	70	850
SB RIGHT	154	17	51	205	**0**	205	20	225
TOTALS	**2354**				**150**	**2835**	**255**	**3090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : I-210 FWY EB RAMPS
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 18
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
I-210 FWY EB RAMPS								
EB LEFT	218	9	27	245	**0**	245	20	265
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	199	15	45	245	**0**	245	20	265
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
AZUSA AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	626	16	48	675	**150**	825	75	900
NB RIGHT	235	12	36	270	**0**	270	25	295
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	777	23	69	845	**0**	845	75	920
SB RIGHT	181	8	24	205	**0**	205	20	225
TOTALS	**2236**				**150**	**2635**	**235**	**2870**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: I-210 EB RAMP
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 07:30AM

NORTH LEG (SB)

TOTAL: 949

TT = 54

TT% = 54/949 = 5.69%
≈ 6%

Rt	Thru	Lt	
210	739 740		Total
58	195		1st
56	236		2nd
63	169		3rd
33	139		4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
251 250	48	88	70	45	Lt
	0	0	0	0	Thru
234 235	30	61	98	45	Rt

WEST LEG TOTAL: (EB) 485

TT = 18

TT% = 18/485 = 3.71%
≈ 4%

	Lt	Thru	Rt
1st		189	49
2nd		194	51
3rd		162	54
4th		113	41
Total		658 660	195

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.87
EAST LEG =
WEST LEG = 0.72

ALL LEGS = 0.83

TT = 67

TT% = 67/853 = 7.85%
≈ 8%

TOTAL: 853

HOUR TOTAL: 2,287

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 07:00AM-08:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
162	612	0	Total
22	93	0	1st
26	88		2nd
58	195		3rd
56	236		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
196	26	34	48	88	Lt
0	0	0	0	0	Thru
151	28	32	30	61	Rt

	Lt	Thru	Rt
1st		148	28
2nd		133	31
3rd		189	49
4th		194	51
Total		664	159

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 08:00AM-09:00AM DATE: 06-08-11

NORTH LEG

	Rt	Thru	Lt
Total	150	519	
1st	63	169	
2nd	33	139	
3rd	22	113	
4th	32	98	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	239	70	45	71	53
Thru	1	0	0	1	0
Rt	260	98	45	74	43

	Lt	Thru	Rt
1st		162	54
2nd		113	41
3rd		155	28
4th		158	19
Total		588	142

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : I-210 EB RAMP 06-08-11

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
20	81	0	0	11	0	1	0	0	1	1	0	115
22	72	0	3	10	0	1	4	0	0	2	0	114
53	186	0	2	5	0	0	3	0	3	1	0	253
51	225	0	1	5	0	2	2	0	2	4	0	292
59	162	0	2	5	0	1	0	0	1	2	0	232
31	128	0	1	11	0	1	0	0	0	0	0	172
17	106	0	4	7 32	0	1	0 9	0	0	0 13	0	135
32	95	0	0	3	0	0	0	0	0	0	0	130
						TT= 32+9+13=54						
285	1055	0	13	57	0	7	9	0	7	10	0	1443
						NB SOUTH LEG						
25	143	0	2	3	0	0	0	0	1	2	0	176
30	123	0	0	7	0	0	2	0	1	1	0	164
45	177	0	0	11	0	0	1	0	4	0	0	238
46	182	0	2	7	0	0	2	0	3	3	0	245
52	153	0	0	7	0	1	2	0	1	0	0	216
37	104	0	3	7	0	1	1	0	0	1	0	154
28	146	0	0	5 37	0	0	2 8	0	0	2 12	0	183
19	155	0	0	3	0	0	0	0	0	0	0	177
						TT= 37+18+12=67						
282	1183	0	7	50	0	2	10	0	10	9	0	1553
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
25	0	22	2	0	3	0	0	1	1	0	0	54
32	0	32	0	0	2	0	0	0	0	0	0	66
30	0	44	0	0	3	0	0	0	0	0	1	78
57	0	85	2	0	1	0	0	0	2	0	2	149
96	0	69	2	0	1	0	0	0	0	0	0	168
41	0	45	3	0	0	0	0	0	1	0	0	90
74	1	70	0	0 12	0	0	0 0	0	0	0 6	1	146
43	0	53	0	0	0	0	0	0	0	0	0	96
						TT= 12+0+6=18						
398	1	420	9	0	10	0	0	1	4	0	4	847

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: I-210 EB RAMP
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 12:30PM

NORTH LEG (SB)

TOTAL: 892

TT = 46

TT% = 46/892 = 5.16% ≈ 5%

	Rt	Thru	Lt
Total	171 (170)	721 (720)	
1st	33	198	
2nd	55	177	
3rd	29	116	
4th	54	230	

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	282 (280)	55	94	87	46
Thru	8 (10)	0	0	8	0
Rt	262 (260)	63	77	76	46

WEST LEG TOTAL: 552

TT = 23

TT% = 23/552 = 4.17% ≈ 4%

	Lt	Thru	Rt
1st		198	50
2nd		186	56
3rd		127	57
4th		304	50
Total		815	213 (215)

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.79
SOUTH LEG = 0.73
EAST LEG =
WEST LEG = 0.81

ALL LEGS = 0.85

TT = 41

TT% = 41/1028 = 3.99% ≈ 4%

TOTAL: 1,028

HOUR TOTAL: 2,472

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 12:00PM-01:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
170	709		Total
47	158		1st
35	176		2nd
33	198		3rd
55	177		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
274	74	51	55	94	Lt
0	0	0	0	0	Thru
246	59	47	63	77	Rt

	Lt	Thru	Rt
1st		223	48
2nd		156	55
3rd		198	50
4th		186	56
Total		763	209

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 01:00PM-02:00PM DATE: 06-08-11

NORTH LEG

	Rt	Thru	Lt
Total	180	762	
1st	29	116	
2nd	54	230	
3rd	54	188	
4th	43	228	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	304	87	46	80	91
Thru	8	8	0	0	0
Rt	253	76	46	66	65

	Lt	Thru	Rt
1st		127	57
2nd		304	50
3rd		129	59
4th		183	55
Total		743	221

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : I-210 EB RAMP 06-08-11

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
45	152	0	2	5	0	0	0	0	0	1	0	205
31	170	0	2	4	0	0	2	0	2	0	0	211
29	191	0	2	4	0	0	1	0	2	2	0	231
53	169	0	2	6	0	0	0	0	0	2	0	232
23	110	0	4	5	0	1	0	0	1	1	0	145
49	222	0	4	5	0	0	2	0	1	1	0	284
49	181	0	3	6	0	1	1	0	1	0	0	242
43	216	0	0	8	0	0	2	0	0	2	0	271
				32			4			10		
						TT= 32+4+10=46						
322	1411	0	19	43	0	2	8	0	7	9	0	1821
						NB SOUTH LEG						
44	212	0	3	7	0	0	4	0	1	0	0	271
50	146	0	3	8	0	1	1	0	1	1	0	211
46	192	0	2	4	0	2	1	0	0	1	0	248
54	184	0	2	2	0	0	0	0	0	0	0	242
52	120	0	3	6	0	1	1	0	1	0	0	184
47	292	0	1	6	0	1	1	0	1	5	0	354
53	123	0	2	5	0	0	0	0	4	1	0	188
50	170	0	4	11	0	0	0	0	1	2	0	238
				26			7			8		
						TT= 26+7+8=41						
396	1439	0	20	49	0	5	8	0	9	10	0	1936
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
57	0	70	1	0	1	0	0	0	1	0	3	133
47	0	47	0	0	3	0	0	0	0	0	1	98
60	0	52	2	0	2	1	0	1	0	0	0	118
75	0	91	2	0	2	0	0	0	0	0	1	171
75	8	82	1	0	5	0	0	0	0	0	0	171
43	0	43	2	0	2	1	0	0	0	0	1	92
63	0	76	2	0	4	1	0	0	0	0	0	146
63	0	88	2	0	3	0	0	0	0	0	0	156
				18			3			2		
						TT= 18+3+2=23						
483	8	549	12	0	22	3	0	1	1	0	6	1085

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: I-210 EB RAMP
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 04:00PM

NORTH LEG (SB)

TOTAL: 989

TT = 31

TT% = 31/989 = 3.13% ≈ 3%

Rt	Thru	Lt	
189 190	800		Total
60	194		1st
51	246		2nd
38	130		3rd
40	230		4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
227 225	60	79	44	44	Lt
	0	0	0	0	Thru
214 213	61	68	39	46	Rt

WEST LEG TOTAL: (EB) 441

TT = 24

TT% = 24/441 = 5.44% ≈ 5%

	Lt	Thru	Rt
1st		180	49
2nd		126	82
3rd		153	37
4th		183	79
Total		642 640	247 245

SOUTH LEG (NB)

TOTAL: 889

TT = 28

TT% = 28/889 = 3.15% ≈ 3%

PEAK HOUR FACTORS

NORTH LEG = 0.83
SOUTH LEG = 0.85
EAST LEG =
WEST LEG = 0.75

ALL LEGS = 0.89

HOUR TOTAL: 2,319

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 04:00PM-05:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
189	800		Total
60	194		1st
51	246		2nd
38	130		3rd
40	230		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
227	60	79	44	44	Lt
0	0	0	0	0	Thru
214	61	68	39	46	Rt

	Lt	Thru	Rt
1st		180	49
2nd		126	82
3rd		153	37
4th		183	79
Total		642	247

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: I-210 EB RAMP

TIME: 05:00PM-06:00PM DATE: 06-08-11

NORTH LEG

	Rt	Thru	Lt
Total	262	795	
1st	93	172	
2nd	54	228	
3rd	54	216	
4th	61	179	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	247	40	70	47	90
Thru	0	0	0	0	0
Rt	255	54	57	68	76

	Lt	Thru	Rt
1st		131	77
2nd		150	70
3rd		50	60
4th		143	53
Total		474	260

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : I-210 EB RAMP 06-08-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
57	185	0	3	4	0	0	2	0	0	3	0	254
50	241	0	1	4	0	0	0	0	0	1	0	297
35	125	0	2	3	0	0	1	0	1	1	0	168
39	226	0	1	3	0	0	0	0	0	1	0	270
90	164	0	3	7 21	0	0	0 3	0	0	1 7	0	265
51	222	0	3	5	0	0	0	0	0	1	0	282
53	212	0	1	3	0	0	0	0	0	1	0	270
57	176	0	2	3	0	1	0	0	1	0	0	240
						TT=21+3+7=31						
432	1551	0	16	32	0	1	3	0	2	9	0	2046
						NB SOUTH LEG						
48	178	0	0	2	0	0	0	0	1	0	0	229
79	120	0	1	5	0	0	1	0	2	0	0	208
33	148	0	2	4	0	0	1	0	2	0	0	190
75	180	0	2	3	0	0	0	0	2	0	0	262
73	123	0	3	7 19	0	0	0 2	0	1	1 7	0	208
68	146	0	1	4	0	0	0	0	1	0	0	220
60	45	0	0	2	0	0	1	0	0	2	0	110
50	136	0	0	5	0	2	2	0	1	0	0	196
						TT=19+2+7=28						
486	1076	0	9	32	0	2	5	0	10	3	0	1623
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EB WEST LEG						
58	0	55	3	0	3	0	0	1	0	0	1	121
65	0	77	2	0	2	1	0	0	0	0	0	147
34	0	43	1	0	0	3	0	1	1	0	0	83
42	0	43	2	0	1	0	0	0	2	0	0	90
49	0	39	3	0 14	1	1	0 6	0	1	0 4	0	94
55	0	69	2	0	1	0	0	0	0	0	0	127
65	0	44	2	0	3	0	0	0	1	0	0	115
75	0	89	0	0	0	0	0	0	1	0	1	166
						TT=14+6+4=24						
443	0	459	15	0	11	5	0	2	6	0	2	943

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
18: Azusa Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	250	235	0	855	740	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3282	3290	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3282	3290	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	301	283	0	1030	892	253
RTOR Reduction (vph)	0	39	0	0	56	0
Lane Group Flow (vph)	301	244	0	1030	1089	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	10.7	10.7		17.1	17.1	
Effective Green, g (s)	10.7	10.7		17.1	17.1	
Actuated g/C Ratio	0.30	0.30		0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	997	460		1568	1571	
v/s Ratio Prot				0.31	c0.33	
v/s Ratio Perm	0.09	c0.16				
v/c Ratio	0.30	0.53		0.66	0.69	
Uniform Delay, d1	9.7	10.5		7.1	7.3	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.2		2.2	2.5	
Delay (s)	9.8	11.6		9.3	9.8	
Level of Service	A	B		A	A	
Approach Delay (s)	10.7			9.3	9.8	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Azusa Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	280	260	0	1030	720	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3438	3309	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3438	3309	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	329	306	0	1212	847	200
RTOR Reduction (vph)	0	71	0	0	40	0
Lane Group Flow (vph)	329	235	0	1212	1007	0
Heavy Vehicles (%)	5%	5%	0%	5%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	11.1	11.1		21.4	21.4	
Effective Green, g (s)	11.1	11.1		21.4	21.4	
Actuated g/C Ratio	0.27	0.27		0.53	0.53	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	914	422		1817	1748	
v/s Ratio Prot				c0.35	0.30	
v/s Ratio Perm	0.10	c0.15				
v/c Ratio	0.36	0.56		0.67	0.58	
Uniform Delay, d1	11.8	12.6		7.0	6.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.6		2.0	1.4	
Delay (s)	12.1	14.2		8.9	7.9	
Level of Service	B	B		A	A	
Approach Delay (s)	13.1			8.9	7.9	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	40.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Azusa Ave & EB 210 Fwy

8/10/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	225	215	0	885	800	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3438	3339	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3438	3339	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	253	242	0	994	899	213
RTOR Reduction (vph)	0	39	0	0	43	0
Lane Group Flow (vph)	253	203	0	994	1069	0
Heavy Vehicles (%)	5%	5%	0%	5%	5%	5%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	10.0	10.0		18.3	18.3	
Effective Green, g (s)	10.0	10.0		18.3	18.3	
Actuated g/C Ratio	0.28	0.28		0.50	0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	919	424		1733	1683	
v/s Ratio Prot				0.29	c0.32	
v/s Ratio Perm	0.08	c0.13				
v/c Ratio	0.28	0.48		0.57	0.64	
Uniform Delay, d1	10.3	11.0		6.3	6.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.9		1.4	1.8	
Delay (s)	10.5	11.8		7.7	8.4	
Level of Service	B	B		A	A	
Approach Delay (s)	11.1			7.7	8.4	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	36.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Azusa Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	250	235	0	905	740	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3223	3290	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3223	3290	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	301	283	0	1090	892	253
RTOR Reduction (vph)	0	39	0	0	56	0
Lane Group Flow (vph)	301	244	0	1090	1089	0
Heavy Vehicles (%)	5%	5%	5%	12%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	10.7	10.7		17.1	17.1	
Effective Green, g (s)	10.7	10.7		17.1	17.1	
Actuated g/C Ratio	0.30	0.30		0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	997	460		1539	1571	
v/s Ratio Prot				c0.34	0.33	
v/s Ratio Perm	0.09	c0.16				
v/c Ratio	0.30	0.53		0.71	0.69	
Uniform Delay, d1	9.7	10.5		7.4	7.3	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.2		2.8	2.5	
Delay (s)	9.8	11.6		10.2	9.8	
Level of Service	A	B		B	A	
Approach Delay (s)	10.7			10.2	9.8	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Azusa Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	280	260	0	1080	720	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3282	3309	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3282	3309	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	329	306	0	1271	847	200
RTOR Reduction (vph)	0	71	0	0	40	0
Lane Group Flow (vph)	329	235	0	1271	1007	0
Heavy Vehicles (%)	5%	5%	0%	10%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	11.1	11.1		21.4	21.4	
Effective Green, g (s)	11.1	11.1		21.4	21.4	
Actuated g/C Ratio	0.27	0.27		0.53	0.53	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	914	422		1734	1748	
v/s Ratio Prot				c0.39	0.30	
v/s Ratio Perm	0.10	c0.15				
v/c Ratio	0.36	0.56		0.73	0.58	
Uniform Delay, d1	11.8	12.6		7.4	6.5	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.6		2.8	1.4	
Delay (s)	12.1	14.2		10.1	7.9	
Level of Service	B	B		B	A	
Approach Delay (s)	13.1			10.1	7.9	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	40.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Azusa Ave & EB 210 Fwy

8/11/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	225	215	0	935	800	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3223	3339	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3223	3339	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	253	242	0	1051	899	213
RTOR Reduction (vph)	0	39	0	0	43	0
Lane Group Flow (vph)	253	203	0	1051	1069	0
Heavy Vehicles (%)	5%	5%	0%	12%	5%	5%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	10.0	10.0		18.3	18.3	
Effective Green, g (s)	10.0	10.0		18.3	18.3	
Actuated g/C Ratio	0.28	0.28		0.50	0.50	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	919	424		1625	1683	
v/s Ratio Prot				c0.33	0.32	
v/s Ratio Perm	0.08	c0.13				
v/c Ratio	0.28	0.48		0.65	0.64	
Uniform Delay, d1	10.3	11.0		6.6	6.6	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.9		2.0	1.8	
Delay (s)	10.5	11.8		8.6	8.4	
Level of Service	B	B		A	A	
Approach Delay (s)	11.1			8.6	8.4	
Approach LOS	B			A	A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	36.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Azusa Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	275	255	0	990	805	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3223	3289	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3223	3289	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	331	307	0	1193	970	277
RTOR Reduction (vph)	0	29	0	0	59	0
Lane Group Flow (vph)	331	278	0	1193	1188	0
Heavy Vehicles (%)	5%	5%	5%	12%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	11.3	11.3		16.7	16.7	
Effective Green, g (s)	11.3	11.3		16.7	16.7	
Actuated g/C Ratio	0.31	0.31		0.46	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	1047	483		1495	1526	
v/s Ratio Prot				c0.37	0.36	
v/s Ratio Perm	0.10	c0.18				
v/c Ratio	0.32	0.58		0.80	0.78	
Uniform Delay, d1	9.4	10.3		8.2	8.1	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.7		4.5	4.0	
Delay (s)	9.6	12.0		12.7	12.1	
Level of Service	A	B		B	B	
Approach Delay (s)	10.7			12.7	12.1	
Approach LOS	B			B	B	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	36.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Azusa Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	305	285	0	1180	785	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3282	3310	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3282	3310	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	359	335	0	1388	924	218
RTOR Reduction (vph)	0	55	0	0	41	0
Lane Group Flow (vph)	359	280	0	1388	1101	0
Heavy Vehicles (%)	5%	5%	0%	10%	5%	10%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	11.9	11.9		21.2	21.2	
Effective Green, g (s)	11.9	11.9		21.2	21.2	
Actuated g/C Ratio	0.29	0.29		0.52	0.52	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	966	445		1693	1707	
v/s Ratio Prot				c0.42	0.33	
v/s Ratio Perm	0.11	c0.18				
v/c Ratio	0.37	0.63		0.82	0.64	
Uniform Delay, d1	11.6	12.7		8.3	7.2	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	2.8		4.6	1.9	
Delay (s)	11.9	15.5		12.9	9.1	
Level of Service	B	B		B	A	
Approach Delay (s)	13.6			12.9	9.1	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	41.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
18: Azusa Ave & EB 210 Fwy

8/14/2012

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	245	235	0	1015	870	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	
Lane Util. Factor	0.97	1.00		0.95	0.95	
Frt	1.00	0.85		1.00	0.97	
Flt Protected	0.95	1.00		1.00	1.00	
Satd. Flow (prot)	3335	1538		3223	3340	
Flt Permitted	0.95	1.00		1.00	1.00	
Satd. Flow (perm)	3335	1538		3223	3340	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	275	264	0	1140	978	230
RTOR Reduction (vph)	0	29	0	0	43	0
Lane Group Flow (vph)	275	235	0	1140	1165	0
Heavy Vehicles (%)	5%	5%	0%	12%	5%	5%
Turn Type	NA	custom		NA	NA	
Protected Phases				2	6	
Permitted Phases	4	4				
Actuated Green, G (s)	10.5	10.5		17.7	17.7	
Effective Green, g (s)	10.5	10.5		17.7	17.7	
Actuated g/C Ratio	0.29	0.29		0.49	0.49	
Clearance Time (s)	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	967	446		1576	1633	
v/s Ratio Prot				c0.35	0.35	
v/s Ratio Perm	0.08	c0.15				
v/c Ratio	0.28	0.53		0.72	0.71	
Uniform Delay, d1	9.9	10.8		7.3	7.3	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.1		2.9	2.7	
Delay (s)	10.1	11.9		10.2	9.9	
Level of Service	B	B		B	A	
Approach Delay (s)	11.0			10.2	9.9	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	36.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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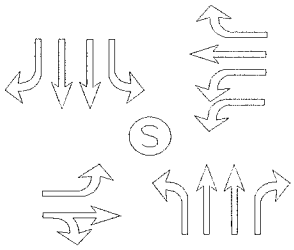
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	120	5%		120	10	130
EB THRU	305	5%		305	25	330
EB RIGHT	125	5%		125	10	135
WB LEFT	485	5%		485	45	530
WB THRU	500	5%		500	45	545
WB RIGHT	320	5%		320	30	350
AZUSA AVE						
NB LEFT	160	5%		160	15	175
NB THRU	375	5%		375	35	410
NB RIGHT	375	5%	**50**	425	40	465
SB LEFT	160	5%		160	15	175
SB THRU	365	15%		365	35	400
SB RIGHT	170	10%		170	15	185
TOTALS	**3460**		**50**	**3510**	**320**	**3830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	45	5%		45	5	50
EB THRU	85	5%		85	5	90
EB RIGHT	30	15%		30	5	35
WB LEFT	270	5%		270	25	295
WB THRU	130	5%		130	10	140
WB RIGHT	155	5%		155	15	170
AZUSA AVE						
NB LEFT	70	5%		70	5	75
NB THRU	655	5%		655	60	715
NB RIGHT	325	5%	**50**	375	35	410
SB LEFT	80	5%		80	5	85
SB THRU	645	5%		645	60	705
SB RIGHT	10	10%		10	5	15
TOTALS	**2500**		**50**	**2550**	**235**	**2785**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	90	5%		90	10	100
EB THRU	185	5%		185	15	200
EB RIGHT	35	5%		35	5	40
WB LEFT	255	5%		255	25	280
WB THRU	205	5%		205	20	225
WB RIGHT	220	5%		220	20	240
AZUSA AVE						
NB LEFT	50	5%		50	5	55
NB THRU	430	5%		430	40	470
NB RIGHT	330	5%	**50**	380	35	415
SB LEFT	120	5%		120	10	130
SB THRU	800	5%		800	70	870
SB RIGHT	20	5%		20	5	25
TOTALS	**2740**		**50**	**2790**	**260**	**3050**

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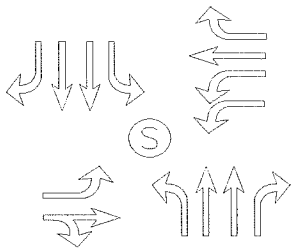
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	119	0	0	120	**0**	120	10	130
EB THRU	305	0	0	305	**0**	305	25	330
EB RIGHT	127	0	0	125	**0**	125	10	135
WB LEFT	474	11	33	505	**0**	505	45	550
WB THRU	497	3	9	505	**0**	505	45	550
WB RIGHT	314	5	15	330	**0**	330	30	360
AZUSA AVE								
NB LEFT	160	1	3	165	**0**	165	15	180
NB THRU	347	26	78	425	**0**	425	40	465
NB RIGHT	360	15	45	405	**150**	555	50	605
SB LEFT	151	8	24	175	**0**	175	15	190
SB THRU	311	54	162	475	**0**	475	45	520
SB RIGHT	152	20	60	210	**0**	210	20	230
TOTALS	**3317**				**150**	**3895**	**350**	**4245**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	44	0	0	45	**0**	45	5	50
EB THRU	84	3	9	95	**0**	95	10	105
EB RIGHT	28	4	12	40	**0**	40	5	45
WB LEFT	260	11	33	295	**0**	295	25	320
WB THRU	127	3	9	135	**0**	135	10	145
WB RIGHT	149	7	21	170	**0**	170	15	185
AZUSA AVE								
NB LEFT	67	1	3	70	**0**	70	5	75
NB THRU	625	28	84	710	**0**	710	65	775
NB RIGHT	315	10	30	345	**150**	495	45	540
SB LEFT	78	0	0	80	**0**	80	5	85
SB THRU	604	43	129	735	**0**	735	65	800
SB RIGHT	8	1	3	10	**0**	10	5	15
TOTALS	**2389**				**150**	**2880**	**260**	**3140**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FIRST STREET
N/S STREET : AZUSA AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 19
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	87	3	9	95	**0**	95	10	105
EB THRU	179	4	12	190	**0**	190	15	205
EB RIGHT	33	1	3	35	**0**	35	5	40
WB LEFT	250	6	18	270	**0**	270	25	295
WB THRU	199	5	15	215	**0**	215	20	235
WB RIGHT	220	2	6	225	**0**	225	20	245
AZUSA AVE								
NB LEFT	52	0	0	50	**0**	50	5	55
NB THRU	418	12	36	455	**0**	455	40	495
NB RIGHT	324	5	15	340	**150**	490	45	535
SB LEFT	121	1	3	125	**0**	125	10	135
SB THRU	788	13	39	825	**0**	825	75	900
SB RIGHT	21	0	0	20	**0**	20	5	25
TOTALS	**2692**				**150**	**2995**	**275**	**3270**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 07:30AM

NORTH LEG (SB)

TOTAL: 696

TT = 82

TT% = 82/696 = 11.78% ≈ 12%

Rt	Thru	Lt	
172 (170)	365	159 (160)	Total
44	159	40	1st
64	83	70	2nd
42	84	34	3rd
22	39	15	4th

TT = 19

TT% = 19/1304 = 1.46% ≈ 1%

EAST LEG TOTAL: (WB) 1,304

	1st	2nd	3rd	4th	Total
Rt	53	90	88	88	319 (320)
Thru	77	142	137	144	500
Lt	83	137	143	122	485

Total	1st	2nd	3rd	4th	
119 (120)	34	31	14	40	Lt
305	55	82	97	71	Thru
127 (125)	19	76	7	25	Rt

WEST LEG TOTAL: (EB) 551

TT = 0

TT% = 0/551 = 0% ≈ 1%

	Lt	Thru	Rt
1st	34	81	120
2nd	35	109	137
3rd	51	129	55
4th	41	54	63
Total	161 (160)	373 (375)	375

SOUTH LEG (NB)

TOTAL: 909

TT = 42

TT% = 42/909 = 4.62% ≈ 5%

PEAK HOUR FACTORS

NORTH LEG = 0.72
SOUTH LEG = 0.81
EAST LEG = 0.88
WEST LEG = 0.73

ALL LEGS = 0.82

HOUR TOTAL: 3,460

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 07:00AM-08:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
134	364	140	Total
11	71	13	1st
15	51	17	2nd
44	159	40	3rd
64	83	70	4th

	1st	2nd	3rd	4th	Total
Rt	20	23	53	90	186
Thru	31	24	77	142	274
Lt	33	44	83	137	297

Total	1st	2nd	3rd	4th	
109	21	23	34	31	Lt
166	12	17	55	82	Thru
121	10	16	19	76	Rt

	Lt	Thru	Rt
1st	14	109	53
2nd	23	69	83
3rd	34	81	120
4th	35	109	137
Total	106	368	393

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 08:00AM-09:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
103	189	95	Total
42	84	34	1st
22	39	15	2nd
26	33	14	3rd
13	33	32	4th

	1st	2nd	3rd	4th	Total
Rt	88	88	25	49	250
Thru	137	144	65	40	386
Lt	143	122	79	71	415

Total	1st	2nd	3rd	4th	
80	14	40	14	12	Lt
217	97	71	19	30	Thru
76	7	25	21	23	Rt

	Lt	Thru	Rt
1st	51	129	55
2nd	41	54	63
3rd	19	159	53
4th	21	124	69
Total	132	466	240

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : 1ST 06-08-11

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
11	64	13	0	7	0	0	0	0	0	0	0	95
12	32	13	0	6	4	0	4	0	3	9	0	83
42	147	36	1	9	3	1	1	1	0	2	0	243
55	64	68	4	8	1	2	2	1	3	9	0	217
38	70	32	2	8	0	0	4	2	2	2	0	160
17	30	15	5	7	0	0	0	0	0	2	0	76
25	25	14	1	7	0	0	0	0	0	1	0	73
13	32	32	0	1	0	0	0	0	0	0	0	78
				48			14			20		
						TT=48+14+20=82						
213	464	223	13	53	8	3	11	4	8	25	0	1025
						NB SOUTH LEG						
51	102	14	1	4	0	0	0	0	1	3	0	176
78	58	23	3	4	0	2	7	0	0	0	0	175
119	77	33	0	4	1	1	0	0	0	0	0	235
128	101	35	7	4	0	0	0	0	2	4	0	281
52	123	51	3	5	0	0	1	0	0	0	0	235
61	46	41	2	7	0	0	1	0	0	0	0	158
48	152	19	3	5	0	0	1	0	2	1	0	231
68	124	20	1	0	1	0	0	0	0	0	0	214
				33			3			6		
						TT=33+3+6=42						
605	783	236	20	33	2	3	10	0	5	8	0	1705
						WB EAST LEG						
18	29	33	2	1	0	0	0	0	0	1	0	84
19	23	40	0	0	2	4	1	1	0	0	1	91
53	76	82	0	0	1	0	0	0	0	1	0	213
89	142	136	0	0	0	0	0	0	1	0	1	369
84	135	140	1	1	2	3	1	0	0	0	1	368
88	144	116	0	0	6	0	0	0	0	0	0	354
22	65	79	2	0	0	1	0	0	0	0	0	169
49	38	71	0	2	0	0	0	0	0	0	0	160
				11			4			4		
						TT=11+4+4=19						
422	652	697	5	4	11	8	2	1	1	2	3	1808
						EB WEST LEG						
8	12	21	0	0	0	0	0	0	2	0	0	43
14	15	19	0	2	0	1	0	2	1	0	2	56
19	55	34	0	0	0	0	0	0	0	0	0	108
76	82	31	0	0	0	0	0	0	0	0	0	189
7	97	14	0	0	0	0	0	0	0	0	0	118
25	71	40	0	0	0	0	0	0	0	0	0	136
21	19	14	0	0	0	0	0	0	0	0	0	54
23	30	12	0	0	0	0	0	0	0	0	0	65
				0			0			0		
						TT=0+0+0=0						
193	381	185	0	2	0	1	0	2	3	0	2	769

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 01:00PM

NORTH LEG (SB)

TOTAL: 734

TT = 44

$TT\% = \frac{44}{734} = 5.99\% \approx 6\%$

Rt	Thru	Lt	
10 9	643 647	80 78	Total
3	71	15	1st
3	168	24	2nd
2	222	27	3rd
1	186	12	4th

TT = 21

$TT\% = \frac{21}{557} = 3.77\% \approx 4\%$

EAST LEG TOTAL: (WB) 557

	1st	2nd	3rd	4th	Total
Rt	42	35	33	46	155 156
Thru	27	28	42	33	130
Lt	67	69	59	76	270 271

Total	1st	2nd	3rd	4th	
45 44	11	12	17	4	Lt
85 87	22	10	30	25	Thru
30 32	4	11	6	11	Rt

WEST LEG TOTAL: (EB) 163

TT = 7

$TT\% = \frac{7}{163} = 4.29\% \approx 4\%$

PEAK HOUR FACTORS

NORTH LEG = 0.73
SOUTH LEG = 0.85
EAST LEG = 0.90
WEST LEG = 0.77

ALL LEGS = 0.89

	Lt	Thru	Rt
1st	15	160	55
2nd	19	156	87
3rd	24	141	81
4th	10	196	102
Total	70 68	655 653	325

TT = 39

$TT\% = \frac{39}{1046} = 3.73\% \approx 4\%$

TOTAL: 1,046

SOUTH LEG (NB)

HOUR TOTAL: 2,500

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 12:00PM-01:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
38	531	90	Total
5	129	19	1st
12	140	9	2nd
10	124	36	3rd
11	138	26	4th

	1st	2nd	3rd	4th	Total
Rt	42	36	42	40	160
Thru	35	39	42	49	165
Lt	71	60	96	88	315

Total	1st	2nd	3rd	4th	
55	17	12	15	11	Lt
54	8	15	14	17	Thru
34	14	6	6	8	Rt

	Lt	Thru	Rt
1st	21	192	80
2nd	12	144	54
3rd	12	169	72
4th	11	183	81
Total	56	688	287

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 01:00PM-02:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
9	647	78	Total
3	71	15	1st
3	168	24	2nd
2	222	27	3rd
1	186	12	4th

	1st	2nd	3rd	4th	Total
Rt	42	35	33	46	156
Thru	27	28	42	33	130
Lt	67	69	59	76	271

Total	1st	2nd	3rd	4th	
44	11	12	17	4	Lt
87	22	10	30	25	Thru
32	4	11	6	11	Rt

	Lt	Thru	Rt
1st	15	160	55
2nd	19	156	87
3rd	24	141	81
4th	10	196	102
Total	68	653	325

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : 1ST 06-08-11

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
5	121	19	0	5	0	0	1	0	0	2	0	153
12	138	9	0	1	0	0	0	0	0	1	0	161
10	123	36	0	0	0	0	1	0	0	0	0	170
11	138	26	0	0	0	0	0	0	0	0	0	175
3	66	15	0	4	0	0	1	0	0	0	0	89
2	158	24	0	10	0	0	0	0	1	0	0	195
2	206	27	0	11	0	0	4	0	0	1	0	251
1	174	12	0	7	0	0	4	0	0	1	0	199
				32			9			3		
						TT= 32+9+3 = 44						
46	1124	168	0	38	0	0	11	0	1	5	0	1393
						NB SOUTH LEG						
77	185	21	0	5	0	3	0	0	0	2	0	293
51	140	12	1	2	0	1	1	0	1	1	0	210
72	169	12	0	0	0	0	0	0	0	0	0	253
81	183	11	0	0	0	0	0	0	0	0	0	275
54	150	15	1	8	0	0	1	0	0	1	0	230
87	148	19	0	4	0	0	0	0	0	4	0	262
80	137	24	1	4	0	0	0	0	0	0	0	246
94	190	9	7	4	1	0	2	0	1	0	0	308
				30			3			6		
						TT= 30+3+6 = 39						
596	1302	123	10	27	1	4	4	0	2	8	0	2077
						WB EAST LEG						
40	35	70	0	0	1	0	0	0	2	0	0	148
36	39	60	0	0	0	0	0	0	0	0	0	135
39	42	95	0	0	0	0	0	0	3	0	1	180
40	49	88	0	0	0	0	0	0	0	0	0	177
39	26	66	1	1	0	1	0	0	1	0	1	136
32	27	65	1	0	3	0	1	1	2	0	0	132
32	42	57	0	0	2	0	0	0	1	0	0	134
46	32	72	0	0	2	0	0	1	0	1	1	155
				10			4			7		
						TT=10+4+7 = 21						
304	292	573	2	1	8	1	1	2	9	1	3	1197
						EB WEST LEG						
13	8	17	1	0	0	0	0	0	0	0	0	39
6	14	12	0	1	0	0	0	0	0	0	0	33
6	14	15	0	0	0	0	0	0	0	0	0	35
8	17	11	0	0	0	0	0	0	0	0	0	36
2	22	11	2	0	0	0	0	0	0	0	0	37
11	8	12	0	1	0	0	1	0	0	0	0	33
5	29	17	1	1	0	0	0	0	0	0	0	53
10	25	4	1	0	0	0	0	0	0	0	0	40
				6			1			0		
						TT= 6+1+0 = 7						
61	137	99	5	3	0	0	1	0	0	0	0	306

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: AZUZA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 04:45PM

NORTH LEG (SB)

TOTAL: 944

TT = 14

TT% = 14/944 = 1.50% ≈ 2%

Rt	Thru	Lt	
21 20	801 800	122 120	Total
3	193	15	1st
6	213	31	2nd
5	216	35	3rd
7	179	41	4th

TT = 13

TT% = 13/682 = 1.91% ≈ 2%

EAST LEG TOTAL: (WB) 682

	1st	2nd	3rd	4th	Total
Rt	60	55	53	54	222 220
Thru	50	51	50	53	204 205
Lt	67	47	56	86	256 255

Total	1st	2nd	3rd	4th	
90	20	24	21	25	Lt
183 185	36	46	44	57	Thru
34 35	8	8	8	10	Rt

WEST LEG TOTAL: (EB) 307

TT = 8

TT% = 8/307 = 2.61% ≈ 3%

	Lt	Thru	Rt
1st	6	137	76
2nd	17	99	58
3rd	15	113	89
4th	14	81	106
Total	52 50	430	329 330

SOUTH LEG (NB)

TOTAL: 811

TT = 17

TT% = 17/811 = 2.10% ≈ 2%

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.93
EAST LEG = 0.88
WEST LEG = 0.83

ALL LEGS = 0.96

HOUR TOTAL: 2,744

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 04:00PM-05:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
19	637	64	Total
5	182	21	1st
2	106	16	2nd
9	156	12	3rd
3	193	15	4th

	1st	2nd	3rd	4th	Total
Rt	50	45	48	60	203
Thru	35	48	24	50	157
Lt	58	65	67	67	257

Total	1st	2nd	3rd	4th	
79	13	16	30	20	Lt
132	33	24	39	36	Thru
45	11	8	18	8	Rt

	Lt	Thru	Rt
1st	17	134	82
2nd	5	135	69
3rd	15	123	60
4th	6	137	76
Total	43	529	287

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: AZUZA

EAST-WEST STREET: 1ST

TIME: 05:00PM-06:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
20	719	121	Total
6	213	31	1st
5	216	35	2nd
7	179	41	3rd
2	111	14	4th

	1st	2nd	3rd	4th	Total
Rt	55	53	54	33	195
Thru	51	50	53	78	232
Lt	47	56	86	111	300

Total	1st	2nd	3rd	4th	
91	24	21	25	21	Lt
193	46	44	57	46	Thru
47	8	8	10	21	Rt

	Lt	Thru	Rt
1st	17	99	58
2nd	15	113	89
3rd	14	81	106
4th	9	152	72
Total	55	445	325

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : AZUZA IRWINDALE

EAST-WEST STREET : 1ST 06-08-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
4	176	20	1	5	1	0	1	0	0	0	0	208
2	100	15	0	5	1	0	0	0	0	1	0	124
8	150	12	1	2	0	0	3	0	0	1	0	177
3	184	14	0	6	1	0	2	0	0	1	0	211
6	210	31	0	2	0	0	0	0	0	1	0	250
5	216	35	0	0	0	0	0	0	0	0	0	256
7	178	41	0	1	0	0	0	0	0	0	0	227
2	109	14	0	2	10 0	0	0	2 0	0	0	2 0	127
						TT = 10+2+2 = 14						
37	1323	182	2	23	3	0	6	0	0	4	0	1580
						NB SOUTH LEG						
81	133	17	1	1	0	0	0	0	0	0	0	233
69	130	5	0	4	0	0	1	0	0	0	0	209
60	120	15	0	2	0	0	1	0	0	0	0	198
76	134	6	0	1	0	0	2	0	0	0	0	219
55	96	17	2	3	0	0	0	0	1	0	0	174
89	109	15	0	4	0	0	0	0	0	0	0	217
104	79	14	2	0	0	0	0	0	0	2	0	201
71	151	8	1	1	12 1	0	0	2 0	0	0	3 0	233
						TT = 12+2+3 = 17						
605	952	97	6	16	1	0	4	0	1	2	0	1684
						WB EAST LEG						
50	35	54	0	0	1	0	0	1	0	0	2	143
43	45	63	1	2	1	0	0	0	1	1	1	158
48	23	66	0	1	0	0	0	0	0	0	1	139
60	47	66	0	2	0	0	0	0	0	1	1	177
53	51	46	0	0	0	0	0	0	2	0	1	153
53	49	54	0	1	2	0	0	0	0	0	0	159
54	52	84	0	1	1	0	0	0	0	0	1	193
33	77	109	0	0	7 2	0	0	0 0	0	1	6 0	222
						TT = 7+0+6 = 13						
394	379	542	1	7	7	0	0	1	3	3	7	1344
						EB WEST LEG						
11	33	13	0	0	0	0	0	0	0	0	0	57
8	24	16	0	0	0	0	0	0	0	0	0	48
18	38	29	0	1	1	0	0	0	0	0	0	87
7	34	18	1	1	0	0	0	1	0	1	1	64
8	45	23	0	1	0	0	0	0	0	0	1	78
8	43	21	0	1	0	0	0	0	0	0	0	73
10	57	25	0	0	0	0	0	0	0	0	0	92
21	46	21	0	0	4 0	0	0	1 0	0	0	3 0	88
						TT = 4+1+3 = 8						
91	320	166	1	4	1	0	0	1	0	1	2	587

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
19: Azusa Ave & First St

8/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	305	125	485	500	320	160	375	375	160	365	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1817		3335	1810	1538	1719	3438	1538	1719	3139	1468
Flt Permitted	0.41	1.00		0.14	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	772	1817		503	1810	1538	1719	3438	1538	1719	3139	1468
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	146	372	152	591	610	390	195	457	457	195	445	207
RTOR Reduction (vph)	0	19	0	0	0	198	0	0	322	0	0	157
Lane Group Flow (vph)	146	505	0	591	610	192	195	457	135	195	445	50
Heavy Vehicles (%)	0%	0%	0%	5%	5%	5%	5%	5%	5%	5%	15%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	23.9	23.9		38.9	38.9	38.9	10.0	18.0	18.0	10.0	18.0	18.0
Effective Green, g (s)	23.9	23.9		38.9	38.9	38.9	10.0	18.0	18.0	10.0	18.0	18.0
Actuated g/C Ratio	0.30	0.30		0.49	0.49	0.49	0.13	0.23	0.23	0.13	0.23	0.23
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	234	550		643	892	758	218	784	351	218	716	335
v/s Ratio Prot		0.28		c0.13	0.34		c0.11	0.13		0.11	c0.14	
v/s Ratio Perm	0.19			c0.32		0.13			0.09			0.03
v/c Ratio	0.62	0.92		0.92	0.68	0.25	0.89	0.58	0.38	0.89	0.62	0.15
Uniform Delay, d1	23.6	26.6		19.0	15.3	11.6	33.9	27.1	25.8	33.9	27.4	24.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.1	20.3		18.2	2.2	0.2	33.7	3.2	3.2	33.7	4.0	0.9
Delay (s)	28.7	46.9		37.2	17.5	11.8	67.7	30.3	28.9	67.7	31.4	25.3
Level of Service	C	D		D	B	B	E	C	C	E	C	C
Approach Delay (s)		42.9			23.4			36.3			38.3	
Approach LOS		D			C			D			D	

Intersection Summary			
HCM Average Control Delay	32.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Azusa Ave & First St

8/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	85	30	270	130	155	70	655	325	80	645	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1696		3335	1810	1538	1719	3438	1538	1805	3438	1468
Flt Permitted	0.66	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1262	1696		1505	1810	1538	1719	3438	1538	1805	3438	1468
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	51	96	34	303	146	174	79	736	365	90	725	11
RTOR Reduction (vph)	0	25	0	0	0	120	0	0	223	0	0	7
Lane Group Flow (vph)	51	105	0	303	146	54	79	736	142	90	725	4
Heavy Vehicles (%)	0%	5%	15%	5%	5%	5%	5%	5%	5%	0%	5%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	7.0	7.0		15.7	15.7	15.7	2.7	19.6	19.6	3.2	20.1	20.1
Effective Green, g (s)	7.0	7.0		15.7	15.7	15.7	2.7	19.6	19.6	3.2	20.1	20.1
Actuated g/C Ratio	0.14	0.14		0.31	0.31	0.31	0.05	0.39	0.39	0.06	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	175	235		638	563	478	92	1334	597	114	1368	584
v/s Ratio Prot		0.06		c0.04	0.08		0.05	c0.21		c0.05	0.21	
v/s Ratio Perm	0.04			c0.10		0.04			0.09			0.00
v/c Ratio	0.29	0.45		0.47	0.26	0.11	0.86	0.55	0.24	0.79	0.53	0.01
Uniform Delay, d1	19.5	20.0		13.4	13.0	12.4	23.7	12.0	10.4	23.3	11.6	9.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.4		0.6	0.2	0.1	50.4	1.6	0.9	29.5	1.5	0.0
Delay (s)	20.5	21.3		13.9	13.3	12.5	74.1	13.7	11.3	52.8	13.1	9.2
Level of Service	C	C		B	B	B	E	B	B	D	B	A
Approach Delay (s)		21.1			13.4			17.0			17.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Azusa Ave & First St

8/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	185	35	255	205	220	50	430	330	120	800	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1767		3335	1810	1538	1805	3438	1538	1719	3438	1538
Flt Permitted	0.62	1.00		0.36	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1129	1767		1269	1810	1538	1805	3438	1538	1719	3438	1538
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	94	193	36	266	214	229	52	448	344	125	833	21
RTOR Reduction (vph)	0	12	0	0	0	148	0	0	228	0	0	13
Lane Group Flow (vph)	94	217	0	266	214	81	52	448	116	125	833	8
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	11.6	11.6		19.7	19.7	19.7	2.2	18.8	18.8	5.3	21.9	21.9
Effective Green, g (s)	11.6	11.6		19.7	19.7	19.7	2.2	18.8	18.8	5.3	21.9	21.9
Actuated g/C Ratio	0.21	0.21		0.35	0.35	0.35	0.04	0.34	0.34	0.09	0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	235	367		600	639	543	71	1158	518	163	1349	604
v/s Ratio Prot		c0.12		c0.03	0.12		0.03	0.13		c0.07	c0.24	
v/s Ratio Perm	0.08			0.12		0.05			0.08			0.01
v/c Ratio	0.40	0.59		0.44	0.33	0.15	0.73	0.39	0.22	0.77	0.62	0.01
Uniform Delay, d1	19.1	20.0		13.1	13.2	12.3	26.5	14.1	13.3	24.6	13.6	10.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	2.6		0.5	0.3	0.1	31.9	1.0	1.0	19.2	2.1	0.0
Delay (s)	20.2	22.5		13.6	13.6	12.5	58.4	15.1	14.3	43.8	15.7	10.4
Level of Service	C	C		B	B	B	E	B	B	D	B	B
Approach Delay (s)		21.8			13.2			17.4			19.2	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Azusa Ave & First St

8/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	305	125	485	500	320	160	375	425	160	365	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1817		3335	1810	1538	1719	3438	1392	1719	3139	1468
Flt Permitted	0.35	1.00		0.14	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	668	1817		503	1810	1538	1719	3438	1392	1719	3139	1468
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	146	372	152	591	610	390	195	457	518	195	445	207
RTOR Reduction (vph)	0	19	0	0	0	208	0	0	288	0	0	154
Lane Group Flow (vph)	146	505	0	591	610	182	195	457	230	195	445	53
Heavy Vehicles (%)	0%	0%	0%	5%	5%	5%	5%	5%	16%	5%	15%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	23.9	23.9		36.9	36.9	36.9	11.4	20.0	20.0	10.0	18.6	18.6
Effective Green, g (s)	23.9	23.9		36.9	36.9	36.9	11.4	20.0	20.0	10.0	18.6	18.6
Actuated g/C Ratio	0.30	0.30		0.47	0.47	0.47	0.14	0.25	0.25	0.13	0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	202	550		558	847	719	248	871	353	218	740	346
v/s Ratio Prot		0.28		c0.12	0.34		c0.11	0.13		0.11	0.14	
v/s Ratio Perm	0.22			c0.37		0.12			c0.17			0.04
v/c Ratio	0.72	0.92		1.06	0.72	0.25	0.79	0.52	0.65	0.89	0.60	0.15
Uniform Delay, d1	24.5	26.6		19.3	16.9	12.7	32.6	25.4	26.3	33.9	26.8	23.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	12.0	20.3		54.7	3.0	0.2	15.1	2.3	9.0	33.7	3.6	0.9
Delay (s)	36.6	46.9		74.0	19.9	12.9	47.6	27.6	35.3	67.7	30.4	24.8
Level of Service	D	D		E	B	B	D	C	D	E	C	C
Approach Delay (s)		44.6			38.3			34.4			37.6	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	38.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.84		
Actuated Cycle Length (s)	78.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Azusa Ave & First St

8/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	85	30	270	130	155	70	655	375	80	645	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1696		3335	1810	1538	1719	3438	1369	1805	3438	1468
Flt Permitted	0.66	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1262	1696		1505	1810	1538	1719	3438	1369	1805	3438	1468
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	51	96	34	303	146	174	79	736	421	90	725	11
RTOR Reduction (vph)	0	25	0	0	0	120	0	0	258	0	0	7
Lane Group Flow (vph)	51	105	0	303	146	54	79	736	163	90	725	4
Heavy Vehicles (%)	0%	5%	15%	5%	5%	5%	5%	5%	18%	0%	5%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	7.0	7.0		15.7	15.7	15.7	2.7	19.6	19.6	3.2	20.1	20.1
Effective Green, g (s)	7.0	7.0		15.7	15.7	15.7	2.7	19.6	19.6	3.2	20.1	20.1
Actuated g/C Ratio	0.14	0.14		0.31	0.31	0.31	0.05	0.39	0.39	0.06	0.40	0.40
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	175	235		638	563	478	92	1334	531	114	1368	584
v/s Ratio Prot		0.06		c0.04	0.08		0.05	c0.21		c0.05	0.21	
v/s Ratio Perm	0.04			c0.10		0.04			0.12			0.00
v/c Ratio	0.29	0.45		0.47	0.26	0.11	0.86	0.55	0.31	0.79	0.53	0.01
Uniform Delay, d1	19.5	20.0		13.4	13.0	12.4	23.7	12.0	10.7	23.3	11.6	9.2
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.4		0.6	0.2	0.1	50.4	1.6	1.5	29.5	1.5	0.0
Delay (s)	20.5	21.3		13.9	13.3	12.5	74.1	13.7	12.2	52.8	13.1	9.2
Level of Service	C	C		B	B	B	E	B	B	D	B	A
Approach Delay (s)		21.1			13.4			17.0			17.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	50.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	49.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Azusa Ave & First St

8/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	185	35	255	205	220	50	430	380	120	800	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1767		3335	1810	1538	1805	3438	1369	1719	3438	1538
Flt Permitted	0.62	1.00		0.36	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1129	1767		1269	1810	1538	1805	3438	1369	1719	3438	1538
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	94	193	36	266	214	229	52	448	396	125	833	21
RTOR Reduction (vph)	0	12	0	0	0	148	0	0	263	0	0	13
Lane Group Flow (vph)	94	217	0	266	214	81	52	448	133	125	833	8
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	18%	5%	5%	5%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	11.6	11.6		19.7	19.7	19.7	2.2	18.8	18.8	5.3	21.9	21.9
Effective Green, g (s)	11.6	11.6		19.7	19.7	19.7	2.2	18.8	18.8	5.3	21.9	21.9
Actuated g/C Ratio	0.21	0.21		0.35	0.35	0.35	0.04	0.34	0.34	0.09	0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	235	367		600	639	543	71	1158	461	163	1349	604
v/s Ratio Prot		c0.12		c0.03	0.12		0.03	0.13		c0.07	c0.24	
v/s Ratio Perm	0.08			0.12		0.05			0.10			0.01
v/c Ratio	0.40	0.59		0.44	0.33	0.15	0.73	0.39	0.29	0.77	0.62	0.01
Uniform Delay, d1	19.1	20.0		13.1	13.2	12.3	26.5	14.1	13.6	24.6	13.6	10.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	2.6		0.5	0.3	0.1	31.9	1.0	1.6	19.2	2.1	0.0
Delay (s)	20.2	22.5		13.6	13.6	12.5	58.4	15.1	15.2	43.8	15.7	10.4
Level of Service	C	C		B	B	B	E	B	B	D	B	B
Approach Delay (s)		21.8			13.2			17.6			19.2	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	55.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Azusa Ave & First St

8/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	330	135	530	545	350	175	410	465	175	400	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1817		3335	1810	1538	1719	3438	1392	1719	3139	1468
Flt Permitted	0.33	1.00		0.11	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	624	1817		401	1810	1538	1719	3438	1392	1719	3139	1468
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	159	402	165	646	665	427	213	500	567	213	488	226
RTOR Reduction (vph)	0	14	0	0	0	214	0	0	308	0	0	147
Lane Group Flow (vph)	159	553	0	646	665	214	213	500	260	213	488	79
Heavy Vehicles (%)	0%	0%	0%	5%	5%	5%	5%	5%	16%	5%	15%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	31.0	31.0		50.0	50.0	50.0	15.1	25.0	25.0	13.0	22.9	22.9
Effective Green, g (s)	31.0	31.0		50.0	50.0	50.0	15.1	25.0	25.0	13.0	22.9	22.9
Actuated g/C Ratio	0.31	0.31		0.50	0.50	0.50	0.15	0.25	0.25	0.13	0.23	0.23
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	193	563		641	905	769	260	860	348	223	719	336
v/s Ratio Prot		0.30		c0.15	0.37		0.12	0.15		c0.12	0.16	
v/s Ratio Perm	0.25			c0.35		0.14			c0.19			0.05
v/c Ratio	0.82	0.98		1.01	0.73	0.28	0.82	0.58	0.75	0.96	0.68	0.23
Uniform Delay, d1	32.0	34.2		29.5	19.8	14.5	41.1	32.9	34.6	43.2	35.2	31.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	23.9	33.0		37.5	3.1	0.2	17.9	2.9	13.6	47.3	5.1	1.6
Delay (s)	55.8	67.2		67.0	22.9	14.7	59.0	35.8	48.1	90.5	40.3	33.0
Level of Service	E	E		E	C	B	E	D	D	F	D	C
Approach Delay (s)		64.7			37.3			45.1			50.1	
Approach LOS		E			D			D			D	

Intersection Summary			
HCM Average Control Delay	46.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Azusa Ave & First St

8/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	95	35	295	140	170	75	715	410	85	705	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1805	1694		3335	1810	1538	1719	3438	1369	1805	3438	1468
Flt Permitted	0.66	1.00		0.43	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1249	1694		1506	1810	1538	1719	3438	1369	1805	3438	1468
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	56	107	39	331	157	191	84	803	461	96	792	11
RTOR Reduction (vph)	0	26	0	0	0	131	0	0	284	0	0	7
Lane Group Flow (vph)	56	120	0	331	157	60	84	803	177	96	792	4
Heavy Vehicles (%)	0%	5%	15%	5%	5%	5%	5%	5%	18%	0%	5%	10%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	7.3	7.3		16.1	16.1	16.1	3.7	19.8	19.8	3.7	19.8	19.8
Effective Green, g (s)	7.3	7.3		16.1	16.1	16.1	3.7	19.8	19.8	3.7	19.8	19.8
Actuated g/C Ratio	0.14	0.14		0.31	0.31	0.31	0.07	0.38	0.38	0.07	0.38	0.38
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	177	240		640	565	480	123	1319	525	129	1319	563
v/s Ratio Prot		0.07		c0.05	0.09		0.05	c0.23		c0.05	0.23	
v/s Ratio Perm	0.04			c0.11		0.04			0.13			0.00
v/c Ratio	0.32	0.50		0.52	0.28	0.12	0.68	0.61	0.34	0.74	0.60	0.01
Uniform Delay, d1	19.9	20.5		13.7	13.4	12.7	23.4	12.8	11.3	23.5	12.7	9.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.0	1.6		0.7	0.3	0.1	14.5	2.1	1.7	20.5	2.0	0.0
Delay (s)	20.9	22.1		14.4	13.6	12.8	37.9	14.9	13.0	44.0	14.8	9.9
Level of Service	C	C		B	B	B	D	B	B	D	B	A
Approach Delay (s)		21.8			13.8			15.7			17.8	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	51.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	53.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
19: Azusa Ave & First St

8/28/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	200	40	280	225	240	55	470	415	130	870	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		0.97	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1764		3335	1810	1538	1805	3438	1369	1719	3438	1538
Flt Permitted	0.61	1.00		0.33	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1109	1764		1176	1810	1538	1805	3438	1369	1719	3438	1538
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	104	208	42	292	234	250	57	490	432	135	906	21
RTOR Reduction (vph)	0	13	0	0	0	161	0	0	287	0	0	13
Lane Group Flow (vph)	104	237	0	292	234	89	57	490	145	135	906	8
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	18%	5%	5%	5%
Turn Type	Perm	NA		pm+pt	NA	Perm	Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4			8		8			2			6
Actuated Green, G (s)	12.0	12.0		20.1	20.1	20.1	2.2	18.8	18.8	5.3	21.9	21.9
Effective Green, g (s)	12.0	12.0		20.1	20.1	20.1	2.2	18.8	18.8	5.3	21.9	21.9
Actuated g/C Ratio	0.21	0.21		0.36	0.36	0.36	0.04	0.33	0.33	0.09	0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	237	377		578	647	550	71	1150	458	162	1340	599
v/s Ratio Prot		c0.13		c0.04	0.13		0.03	0.14		c0.08	c0.26	
v/s Ratio Perm	0.09			0.14		0.06			0.11			0.01
v/c Ratio	0.44	0.63		0.51	0.36	0.16	0.80	0.43	0.32	0.83	0.68	0.01
Uniform Delay, d1	19.2	20.1		13.2	13.3	12.3	26.8	14.5	13.9	25.0	14.2	10.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	3.3		0.7	0.3	0.1	46.2	1.2	1.8	29.1	2.8	0.0
Delay (s)	20.5	23.3		13.9	13.7	12.4	73.0	15.7	15.7	54.1	17.0	10.6
Level of Service	C	C		B	B	B	E	B	B	D	B	B
Approach Delay (s)		22.5			13.4			19.0			21.6	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	18.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	56.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

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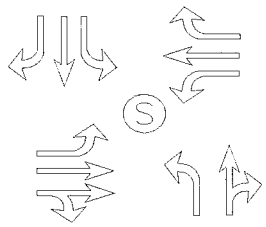
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	15	5%		15	5	20
EB THRU	320	5%		320	30	350
EB RIGHT	420	5%	**50**	470	40	510
WB LEFT	410	5%		410	35	445
WB THRU	640	5%		640	60	700
WB RIGHT	40	5%		40	5	45
ALAMEDA ST/WB I-210 FWY						
NB LEFT	310	5%		310	30	340
NB THRU	50	5%		50	5	55
NB RIGHT	15	5%		15	5	20
SB LEFT	45	5%		45	5	50
SB THRU	35	5%		35	5	40
SB RIGHT	80	5%		80	5	85
TOTALS	**2380**		**50**	**2430**	**230**	**2660**

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	25	5%		25	5	30
EB THRU	210	5%		210	20	230
EB RIGHT	215	5%	**50**	265	25	290
WB LEFT	120	5%		120	10	130
WB THRU	220	5%		220	20	240
WB RIGHT	25	30%		25	5	30
ALAMEDA ST/WB I-210 FWY						
NB LEFT	350	10%		350	30	380
NB THRU	55	5%		55	5	60
NB RIGHT	45	5%		45	5	50
SB LEFT	30	5%		30	5	35
SB THRU	25	5%		25	5	30
SB RIGHT	65	5%		65	5	70
TOTALS	**1385**		**50**	**1435**	**140**	**1575**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FIRST STREET						
EB LEFT	20	5%		20	5	25
EB THRU	395	5%		395	35	430
EB RIGHT	215	5%	**50**	265	25	290
WB LEFT	150	5%		150	15	165
WB THRU	240	5%		240	20	260
WB RIGHT	35	5%		35	5	40
ALAMEDA ST/WB I-210 FWY						
NB LEFT	445	5%		445	40	485
NB THRU	75	5%		75	5	80
NB RIGHT	70	5%		70	5	75
SB LEFT	50	5%		50	5	55
SB THRU	35	5%		35	5	40
SB RIGHT	65	5%		65	5	70
TOTALS	**1795**		**50**	**1845**	**170**	**2015**

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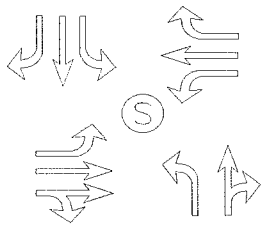
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

FIRST STREET

EB LEFT	13	0	0	15	**0**	15	5	20
EB THRU	308	12	36	345	**0**	345	30	375
EB RIGHT	412	10	30	440	**150**	590	55	645
WB LEFT	402	7	21	425	**0**	425	40	465
WB THRU	626	13	39	665	**0**	665	60	725
WB RIGHT	39	1	3	40	**0**	40	5	45

ALAMEDA ST/WB I-210 FWY

NB LEFT	292	20	60	350	**0**	350	30	380
NB THRU	47	2	6	55	**0**	55	5	60
NB RIGHT	14	0	0	15	**0**	15	5	20
SB LEFT	44	1	3	45	**0**	45	5	50
SB THRU	34	2	6	40	**0**	40	5	45
SB RIGHT	78	1	3	80	**0**	80	5	85
TOTALS	**2309**				**150**	**2665**	**250**	**2915**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	22	1	3	25	**0**	25	5	30
EB THRU	204	4	12	215	**0**	215	20	235
EB RIGHT	202	11	33	235	**150**	385	35	420
WB LEFT	117	3	9	125	**0**	125	10	135
WB THRU	217	5	15	230	**0**	230	20	250
WB RIGHT	16	7	21	35	**0**	35	5	40
ALAMEDA ST/WB I-210 FWY								
NB LEFT	318	33	99	415	**0**	415	35	450
NB THRU	52	3	9	60	**0**	60	5	65
NB RIGHT	47	0	0	45	**0**	45	5	50
SB LEFT	27	1	3	30	**0**	30	5	35
SB THRU	24	0	0	25	**0**	25	5	30
SB RIGHT	67	0	0	65	**0**	65	5	70
TOTALS	**1313**				**150**	**1655**	**155**	**1810**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FIRST STREET
N/S STREET : ALAMEDA ST/WB I-210 FWY
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 20
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FIRST STREET								
EB LEFT	18	0	0	20	**0**	20	5	25
EB THRU	387	6	18	405	**0**	405	35	440
EB RIGHT	212	4	12	225	**150**	375	35	410
WB LEFT	151	1	3	155	**0**	155	15	170
WB THRU	237	3	9	245	**0**	245	20	265
WB RIGHT	37	0	0	35	**0**	35	5	40
ALAMEDA ST/WB I-210 FWY								
NB LEFT	428	16	48	475	**0**	475	45	520
NB THRU	73	0	0	75	**0**	75	5	80
NB RIGHT	70	0	0	70	**0**	70	5	75
SB LEFT	50	0	0	50	**0**	50	5	55
SB THRU	36	1	3	40	**0**	40	5	45
SB RIGHT	63	1	3	65	**0**	65	5	70
TOTALS	**1762**				**150**	**2010**	**185**	**2195**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ALAMEDA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 07:30AM

NORTH LEG (SB)

TOTAL: 160

TT = 4

TT% = 4/160 = 2.5% ≈ 3%

	Rt	Thru	Lt	Total
	79 (80)	36 (35)	45	
1st	30	9	15	
2nd	18	16	17	
3rd	13	6	8	
4th	18	5	5	

TT = 21

TT% = 21/1088 = 1.93% ≈ 2%

EAST LEG TOTAL: (WB) 1,088

	1st	2nd	3rd	4th	Total
Rt	12	12	15	1	40
Thru	161	155	165	158	639 (640)
Lt	158	68	126	57	409 (410)

	Total	1st	2nd	3rd	4th
Lt	13 (15)	3	3	3	4
Thru	320	51	118	103	48
Rt	422 (420)	121	136	95	70

WEST LEG TOTAL: (EB) 755

TT = 22

TT% = 22/755 = 2.91% ≈ 3%

	Lt	Thru	Rt
1st	51	9	3
2nd	61	18	5
3rd	105	13	2
4th	95	9	4
Total	312 (310)	49 (50)	14 (15)

SOUTH LEG (NB)

TOTAL: 375

TT = 22

TT% = 22/375 = 5.87% ≈ 6%

PEAK HOUR FACTORS

NORTH LEG = 0.74
SOUTH LEG = 0.78
EAST LEG = 0.82
WEST LEG = 0.73

ALL LEGS = 0.91

HOUR TOTAL: 2,378

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 07:00AM-08:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
69	68	51	Total
10	20	9	1st
11	23	10	2nd
30	9	15	3rd
18	16	17	4th

	1st	2nd	3rd	4th	Total
Rt	6	9	12	12	39
Thru	93	107	161	155	516
Lt	99	120	158	68	445

Total	1st	2nd	3rd	4th	
10	1	3	3	3	Lt
220	20	31	51	118	Thru
417	71	89	121	136	Rt

	Lt	Thru	Rt
1st	22	5	3
2nd	32	8	2
3rd	51	9	3
4th	61	18	5
Total	166	40	13

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 08:00AM-09:00AM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
64	32	31	Total
13	6	8	1st
18	5	5	2nd
17	9	5	3rd
16	12	13	4th

	1st	2nd	3rd	4th	Total
Rt	15	1	3	6	25
Thru	165	158	135	154	612
Lt	126	57	48	20	251

Total	1st	2nd	3rd	4th	
9	3	4	1	1	Lt
241	103	48	30	60	Thru
302	95	70	60	77	Rt

	Lt	Thru	Rt
1st	105	13	2
2nd	95	9	4
3rd	91	7	2
4th	77	15	3
Total	368	44	11

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ALAMEDA IRWINDALE

EAST-WEST STREET : 1ST 06-08-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
10	20	9	0	0	0	0	0	0	0	0	0	39
11	23	10	0	0	0	0	0	0	0	0	0	44
30	9	14	0	0	1	0	0	0	0	0	0	54
17	15	17	1	1	0	0	0	0	0	0	0	51
13	6	8	0	0	0	0	0	0	0	0	0	27
18	4	5	0	1	0	0	0	0	0	0	0	28
17	9	5	0	0	4 0	0	0	0 0	0	0	0 0	31
16	12	13	0	0	0	0	0	0	0	0	0	41
						TT=4+0+0=4						
132	98	81	1	2	1	0	0	0	0	0	0	315
					NB SOUTH LEG							
3	5	22	0	0	0	0	0	0	0	0	0	30
2	8	27	0	0	3	0	0	0	0	0	2	42
3	9	41	0	0	3	0	0	3	0	0	4	63
5	16	59	0	1	1	0	1	0	0	0	1	84
2	13	101	0	0	1	0	0	0	0	0	3	120
4	9	91	0	0	3	0	0	0	0	0	1	108
2	6	86	0	1	9 4	0	0	4 1	0	0	9 0	100
2	13	74	0	1	2	1	0	1	0	1	0	95
						TT=9+4+9=22						
23	79	501	0	3	17	1	1	5	0	1	11	642
					WB EAST LEG							
6	93	99	0	0	0	0	0	0	0	0	0	198
9	103	118	0	3	0	0	0	1	0	1	1	236
12	157	156	0	4	0	0	0	1	0	0	1	331
11	151	65	1	4	2	0	0	0	0	0	1	235
15	163	125	0	1	1	0	1	0	0	0	0	306
1	155	56	0	3	1	0	0	0	0	0	0	216
3	132	48	0	3 17	0	0	0 2	0	0	0 2	0	186
6	151	18	0	3	0	0	0	0	0	0	2	180
						TT=17+2+2=21						
63	1105	685	1	21	4	0	1	2	0	1	5	1888
					EB WEST LEG							
71	20	1	0	0	0	0	0	0	0	0	0	92
85	29	3	2	2	0	1	0	0	1	0	0	123
119	48	3	1	3	0	1	0	0	0	0	0	175
134	112	3	2	5	0	0	1	0	0	0	0	257
93	102	3	1	1	0	1	0	0	0	0	0	201
66	46	4	4	2	0	0	0	0	0	0	0	122
58	29	1	1	1 19	0	1	0 3	0	0	0 0	0	91
77	58	1	0	2	0	0	0	0	0	0	0	138
						TT=19+3+0=22						
703	444	19	11	16	0	4	1	0	1	0	0	1199

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ALAMEDA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 12:00PM

NORTH LEG (SB)

TOTAL: 119

TT = 1

$TT\% = \frac{1}{119} = 0.84\%$

$\approx 1\%$

	Rt	Thru	Lt	
Total	65 67	25 24	30 28	
1st	22	6	6	
2nd	13	5	10	
3rd	20	8	7	
4th	12	5	5	

TT = 15

$TT\% = \frac{15}{365} = 4.11\%$

$\approx 4\%$

EAST LEG TOTAL: (WB) 365

	1st	2nd	3rd	4th	Total
Rt	8	6	5	4	25 23
Thru	61	49	53	59	220 222
Lt	28	26	32	34	120

	Total	1st	2nd	3rd	4th
Lt	25 23	3	5	7	8
Thru	210 208	50	44	58	56
Rt	215 213	62	49	47	55

WEST LEG TOTAL: (EB) 444

TT = 16

$TT\% = \frac{16}{444} = 3.6\%$

$\approx 4\%$

	Lt	Thru	Rt
1st	85	12	9
2nd	93	14	9
3rd	83	8	13
4th	90	21	16
Total	350 351	55	45 47

SOUTH LEG (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.85
SOUTH LEG = 0.89
EAST LEG = 0.94
WEST LEG = 0.93

ALL LEGS = 0.95

TT = 36

$TT\% = \frac{36}{453} = 7.95\%$

$\approx 8\%$

TOTAL: 453

HOUR TOTAL: 1,381

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 12:00PM-01:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
67	24	28	Total
22	6	6	1st
13	5	10	2nd
20	8	7	3rd
12	5	5	4th

	1st	2nd	3rd	4th	Total
Rt	8	6	5	4	23
Thru	61	49	53	59	222
Lt	28	26	32	34	120

Total	1st	2nd	3rd	4th	
23	3	5	7	8	Lt
208	50	44	58	56	Thru
213	62	49	47	55	Rt

	Lt	Thru	Rt
1st	85	12	9
2nd	93	14	9
3rd	83	8	13
4th	90	21	16
Total	351	55	47

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 01:00PM-02:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
74	32	35	Total
12	9	5	1st
19	6	9	2nd
24	8	10	3rd
19	9	11	4th

	1st	2nd	3rd	4th	Total
Rt	10	10	14	12	46
Thru	38	34	53	73	198
Lt	28	24	35	26	113

Total	1st	2nd	3rd	4th	
19	5	9	1	4	Lt
230	52	53	60	65	Thru
241	46	64	64	67	Rt

	Lt	Thru	Rt
1st	78	14	12
2nd	61	17	6
3rd	65	15	9
4th	85	15	8
Total	289	61	35

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ALAMEDA IRWINDALE

EAST-WEST STREET : 1ST 06-08-11

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						SB NORTH LEG						
22	6	5	0	0	1	0	0	0	0	0	0	34
13	5	10	0	0	0	0	0	0	0	0	0	28
20	8	7	0	0	0	0	0	0	0	0	0	35
12	5	5	0	0	0	0	0	0	0	0	0	22
12	8	5	0	1	0	0	0	0	0	0	0	26
18	6	9	1	0	0	0	0	0	0	0	0	34
21	8	10	2	0	0	1	0	0	0	0	0	42
19	9	11	0	0	0	0	0	0	0	0	0	39
						TT=1+0+0=1						
137	55	62	3	1	1	1	0	0	0	0	0	260
						NB SOUTH LEG						
9	12	81	0	0	3	0	0	0	0	0	1	106
9	14	85	0	0	2	0	0	4	0	0	2	116
13	5	68	0	3	8	0	0	3	0	0	4	104
16	21	84	0	0	2	0	0	0	0	0	4	127
11	13	75	1	1	1	0	0	1	0	0	1	104
6	17	55	0	0	2	0	0	2	0	0	2	84
9	15	61	0	0	2	0	0	0	0	0	2	89
8	15	79	0	0	5	0	0	1	0	0	0	108
						TT=18+7+11=36						
81	112	588	1	4	25	0	0	11	0	0	16	838
						WB EAST LEG						
7	61	27	0	0	0	1	0	1	0	0	0	97
3	46	25	1	3	1	2	0	0	0	0	0	81
2	52	32	2	0	0	1	1	0	0	0	0	90
4	58	33	0	0	1	0	1	0	0	0	0	97
10	36	27	0	2	1	0	0	0	0	0	0	76
10	32	24	0	2	0	0	0	0	0	0	0	68
12	52	35	1	1	0	0	0	0	1	0	0	102
10	72	25	2	0	1	0	0	0	0	1	0	111
						TT=8+7+0=15						
58	409	228	6	8	4	4	2	1	1	1	0	722
						EB WEST LEG						
60	49	3	1	0	0	0	1	0	1	0	0	115
45	43	4	2	1	0	1	0	1	1	0	0	98
46	56	7	0	1	0	1	0	0	0	1	0	112
51	56	8	2	0	0	2	0	0	0	0	0	119
46	52	5	0	0	0	0	0	0	0	0	0	103
63	51	9	0	1	0	0	1	0	1	0	0	126
64	60	1	0	0	0	0	0	0	0	0	0	125
62	64	4	1	1	0	0	0	0	4	0	0	136
						TT=7+6+3=16						
437	431	41	6	4	0	4	2	1	7	1	0	934

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ALAMEDA
EAST-WEST STREET: 1ST
JURISDICTION: IRWINDALE

DATE: 06-08-11

PEAK HOUR: 05:00PM

NORTH LEG (SB)

TOTAL: 151

TT = 2

TT% = 2/151 = 1.32% ≈ 1%

	Rt	Thru	Lt	
	65 64	35 37	50	Total
	12	13	15	1st
	17	7	10	2nd
	16	9	14	3rd
	19	8	11	4th

TT = 4

TT% = 4/429 = 0.93% ≈ 1%

EAST LEG TOTAL: (WB) 429

	1st	2nd	3rd	4th	Total
Rt	9	7	9	12	35 37
Thru	72	59	69	40	240
Lt	42	31	40	39	150 152

	Total	1st	2nd	3rd	4th	
	20 18	4	4	5	5	Lt
	390 393	94	88	118	93	Thru
	215 216	48	49	53	66	Rt

WEST LEG TOTAL: (EB) 627

TT = 10

TT% = 10/627 = 1.59% ≈ 2%

	Lt	Thru	Rt
1st	108	18	15
2nd	121	20	21
3rd	120	14	14
4th	95	21	20
Total	444 445	73 75	70

SOUTH LEG (NB)

TOTAL: 587

TT = 16

TT% = 16/587 = 2.73% ≈ 3%

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.91
EAST LEG = 0.87
WEST LEG = 0.89

ALL LEGS = 0.93

HOUR TOTAL: 1,794

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 04:00PM-05:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
58	40	40	Total
15	11	12	1st
16	10	12	2nd
12	11	8	3rd
15	8	8	4th

	1st	2nd	3rd	4th	Total
Rt	8	4	7	10	29
Thru	54	57	45	66	222
Lt	40	25	36	40	141

Total	1st	2nd	3rd	4th	
23	5	1	6	11	Lt
273	62	62	72	77	Thru
189	53	43	49	44	Rt

	Lt	Thru	Rt
1st	93	20	21
2nd	99	19	19
3rd	69	16	17
4th	78	16	17
Total	339	71	74

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ALAMEDA

EAST-WEST STREET: 1ST

TIME: 05:00PM-06:00PM DATE: 06-08-11

NORTH LEG

Rt	Thru	Lt	
64	37	50	Total
12	13	15	1st
17	7	10	2nd
16	9	14	3rd
19	8	11	4th

	1st	2nd	3rd	4th	Total
Rt	9	7	9	12	37
Thru	72	59	69	40	240
Lt	42	31	40	39	152

Total	1st	2nd	3rd	4th	
18	4	4	5	5	Lt
393	94	88	118	93	Thru
216	48	49	53	66	Rt

	Lt	Thru	Rt
1st	108	18	15
2nd	121	20	21
3rd	120	14	14
4th	95	21	20
Total	444	73	70

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ALAMEDA IRWINDALE

EAST-WEST STREET : 1ST 06-08-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
					SB NORTH LEG							
15	11	12	0	0	0	0	0	0	0	0	0	38
16	10	12	0	0	0	0	0	0	0	0	0	38
12	11	8	0	0	0	0	0	0	0	0	0	31
15	8	8	0	0	0	0	0	0	0	0	0	31
12	12	15	0	1	0	0	0	0	0	0	0	40
17	7	10	0	0	0	0	0	0	0	0	0	34
16	9	14	0	0	0	0	0	0	0	0	0	39
18	8	11	1	0	2 0	0	0	0 0	0	0	0 0	38
						TT= 2+0+0= 2						
121	76	90	1	1	0	0	0	0	0	0	0	289
					NB SOUTH LEG							
21	18	88	0	2	2	0	0	1	0	0	2	134
19	18	93	0	1	3	0	0	0	0	0	3	137
16	16	67	1	0	0	0	0	1	0	0	1	102
17	15	74	0	1	1	0	0	0	0	0	3	111
15	18	104	0	0	2	0	0	0	0	0	2	141
21	20	116	0	0	4	0	0	0	0	0	1	162
14	14	116	0	0	3	0	0	0	0	0	1	148
20	21	92	0	0	1	0	0	1	0	0	1	136
					10			1			5	
						TT= 10+1+5= 16						
143	140	750	1	4	16	0	0	3	0	0	14	1071
					WB EAST LEG							
8	54	39	0	0	1	0	0	0	0	0	0	102
3	56	25	0	1	0	1	0	0	0	0	0	86
7	44	34	0	1	0	0	0	1	0	0	1	88
10	65	39	0	1	1	0	0	0	0	0	0	116
9	72	42	0	0	0	0	0	0	0	0	0	123
7	58	31	0	1	0	0	0	0	0	0	0	97
9	68	39	0	1	1	0	0	0	0	0	0	118
12	39	39	0	1	4 0	0	0	0 0	0	0	0 0	91
						TT= 4+0+0= 4						
65	456	288	0	6	3	1	0	1	0	0	1	821
					EB WEST LEG							
53	59	5	0	2	0	0	1	0	0	0	0	120
42	61	1	1	1	0	0	0	0	0	0	0	106
47	71	5	1	1	1	0	0	0	1	0	0	127
43	74	11	0	2	0	1	0	0	0	1	0	132
45	91	4	2	3	0	0	0	0	1	0	0	146
49	87	4	0	1	0	0	0	0	0	0	0	141
53	116	5	0	2	0	0	0	0	0	0	0	176
65	93	5	1	0	0	0	0	0 0	0	0	1 0	164
					9							
						TT= 9+0+1= 10						
397	652	40	5	12	1	1	1	0	2	1	0	1112

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	320	420	410	640	40	310	50	15	45	35	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	3145		1719	1810	1538	1719	1767		1719	1810	1538
Flt Permitted	0.30	1.00		0.31	1.00	1.00	0.73	1.00		0.71	1.00	1.00
Satd. Flow (perm)	579	3145		569	1810	1538	1325	1767		1286	1810	1538
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	352	462	451	703	44	341	55	16	49	38	88
RTOR Reduction (vph)	0	143	0	0	0	14	0	9	0	0	0	67
Lane Group Flow (vph)	16	671	0	451	703	30	341	62	0	49	38	21
Heavy Vehicles (%)	0%	5%	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Effective Green, g (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	400	2173		393	1251	1063	313	418		304	428	364
v/s Ratio Prot		0.21			0.39			0.03			0.02	
v/s Ratio Perm	0.03			c0.79		0.02	c0.26			0.04		0.01
v/c Ratio	0.04	0.31		1.15	0.56	0.03	1.09	0.15		0.16	0.09	0.06
Uniform Delay, d1	5.4	6.7		17.0	8.6	5.4	42.0	33.2		33.3	32.8	32.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.1		92.1	0.6	0.0	76.9	0.7		1.1	0.4	0.3
Delay (s)	5.4	6.8		109.1	9.2	5.4	118.9	34.0		34.5	33.2	32.8
Level of Service	A	A		F	A	A	F	C		C	C	C
Approach Delay (s)		6.7			46.6			104.3			33.4	
Approach LOS		A			D			F			C	

Intersection Summary			
HCM Average Control Delay	42.2	HCM Level of Service	D
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	210	215	120	220	25	350	55	45	30	25	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	3177		1719	1810	1242	1641	1725		1719	1900	1615
Flt Permitted	0.60	1.00		0.48	1.00	1.00	0.74	1.00		0.69	1.00	1.00
Satd. Flow (perm)	1079	3177		861	1810	1242	1279	1725		1247	1900	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	221	226	126	232	26	368	58	47	32	26	68
RTOR Reduction (vph)	0	164	0	0	0	19	0	22	0	0	0	32
Lane Group Flow (vph)	26	283	0	126	232	7	368	83	0	32	26	36
Heavy Vehicles (%)	5%	5%	5%	5%	5%	30%	10%	5%	0%	5%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	11.0	11.0		11.0	11.0	11.0	21.2	21.2		21.2	21.2	21.2
Effective Green, g (s)	11.0	11.0		11.0	11.0	11.0	21.2	21.2		21.2	21.2	21.2
Actuated g/C Ratio	0.27	0.27		0.27	0.27	0.27	0.53	0.53		0.53	0.53	0.53
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	295	869		236	495	340	674	910		658	1002	852
v/s Ratio Prot		0.09			0.13			0.05			0.01	
v/s Ratio Perm	0.02			c0.15		0.01	c0.29			0.03		0.02
v/c Ratio	0.09	0.33		0.53	0.47	0.02	0.55	0.09		0.05	0.03	0.04
Uniform Delay, d1	10.9	11.6		12.4	12.2	10.7	6.3	4.7		4.6	4.6	4.6
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.2		2.3	0.7	0.0	3.2	0.2		0.1	0.0	0.1
Delay (s)	11.0	11.9		14.7	12.9	10.7	9.5	4.9		4.7	4.6	4.7
Level of Service	B	B		B	B	B	A	A		A	A	A
Approach Delay (s)		11.8			13.3			8.5			4.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	40.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	395	215	150	240	35	445	75	70	50	35	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	3256		1719	1810	1615	1719	1763		1805	1810	1538
Flt Permitted	0.56	1.00		0.32	1.00	1.00	0.73	1.00		0.66	1.00	1.00
Satd. Flow (perm)	1070	3256		580	1810	1615	1325	1763		1250	1810	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	425	231	161	258	38	478	81	75	54	38	70
RTOR Reduction (vph)	0	155	0	0	0	25	0	39	0	0	0	36
Lane Group Flow (vph)	22	501	0	161	258	13	478	117	0	54	38	34
Heavy Vehicles (%)	0%	5%	5%	5%	5%	0%	5%	0%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	14.3	14.3		14.3	14.3	14.3	21.1	21.1		21.1	21.1	21.1
Effective Green, g (s)	14.3	14.3		14.3	14.3	14.3	21.1	21.1		21.1	21.1	21.1
Actuated g/C Ratio	0.33	0.33		0.33	0.33	0.33	0.49	0.49		0.49	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	353	1073		191	596	532	644	857		608	880	748
v/s Ratio Prot		0.15			0.14			0.07			0.02	
v/s Ratio Perm	0.02			c0.28		0.01	c0.36			0.04		0.02
v/c Ratio	0.06	0.47		0.84	0.43	0.02	0.74	0.14		0.09	0.04	0.05
Uniform Delay, d1	10.0	11.5		13.5	11.4	9.8	9.0	6.1		6.0	5.9	5.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3		27.2	0.5	0.0	7.6	0.3		0.3	0.1	0.1
Delay (s)	10.0	11.9		40.7	11.9	9.9	16.5	6.5		6.3	5.9	6.0
Level of Service	B	B		D	B	A	B	A		A	A	A
Approach Delay (s)		11.8			21.9			14.0			6.1	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	43.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	320	470	410	640	40	310	50	15	45	35	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	2964		1719	1810	1538	1719	1767		1719	1810	1538
Flt Permitted	0.30	1.00		0.29	1.00	1.00	0.73	1.00		0.71	1.00	1.00
Satd. Flow (perm)	579	2964		532	1810	1538	1325	1767		1286	1810	1538
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	352	516	451	703	44	341	55	16	49	38	88
RTOR Reduction (vph)	0	159	0	0	0	14	0	9	0	0	0	67
Lane Group Flow (vph)	16	709	0	451	703	30	341	62	0	49	38	21
Heavy Vehicles (%)	0%	5%	15%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Effective Green, g (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	400	2048		368	1251	1063	313	418		304	428	364
v/s Ratio Prot		0.24			0.39			0.03			0.02	
v/s Ratio Perm	0.03			c0.85		0.02	c0.26			0.04		0.01
v/c Ratio	0.04	0.35		1.23	0.56	0.03	1.09	0.15		0.16	0.09	0.06
Uniform Delay, d1	5.4	6.9		17.0	8.6	5.4	42.0	33.2		33.3	32.8	32.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.0	0.1		123.4	0.6	0.0	76.9	0.7		1.1	0.4	0.3
Delay (s)	5.4	7.0		140.4	9.2	5.4	118.9	34.0		34.5	33.2	32.8
Level of Service	A	A		F	A	A	F	C		C	C	C
Approach Delay (s)		7.0			58.4			104.3			33.4	
Approach LOS		A			E			F			C	

Intersection Summary			
HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.19		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	210	265	120	220	25	350	55	45	30	25	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	2875		1719	1810	1242	1641	1725		1719	1900	1615
Flt Permitted	0.60	1.00		0.43	1.00	1.00	0.74	1.00		0.69	1.00	1.00
Satd. Flow (perm)	1080	2875		774	1810	1242	1279	1725		1247	1900	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	221	279	126	232	26	368	58	47	32	26	68
RTOR Reduction (vph)	0	201	0	0	0	19	0	22	0	0	0	32
Lane Group Flow (vph)	26	299	0	126	232	7	368	83	0	32	26	36
Heavy Vehicles (%)	5%	5%	23%	5%	5%	30%	10%	5%	0%	5%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	11.4	11.4		11.4	11.4	11.4	21.2	21.2		21.2	21.2	21.2
Effective Green, g (s)	11.4	11.4		11.4	11.4	11.4	21.2	21.2		21.2	21.2	21.2
Actuated g/C Ratio	0.28	0.28		0.28	0.28	0.28	0.52	0.52		0.52	0.52	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	303	807		217	508	349	668	901		651	992	843
v/s Ratio Prot		0.10			0.13			0.05			0.01	
v/s Ratio Perm	0.02			c0.16		0.01	c0.29			0.03		0.02
v/c Ratio	0.09	0.37		0.58	0.46	0.02	0.55	0.09		0.05	0.03	0.04
Uniform Delay, d1	10.8	11.7		12.5	12.0	10.6	6.5	4.9		4.8	4.7	4.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3		3.9	0.7	0.0	3.3	0.2		0.1	0.0	0.1
Delay (s)	10.9	12.0		16.5	12.7	10.6	9.8	5.1		4.9	4.7	4.8
Level of Service	B	B		B	B	B	A	A		A	A	A
Approach Delay (s)		12.0			13.8			8.7			4.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	40.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	395	265	150	240	35	445	75	70	50	35	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.94		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	3067		1719	1810	1615	1719	1763		1805	1810	1538
Flt Permitted	0.57	1.00		0.29	1.00	1.00	0.73	1.00		0.66	1.00	1.00
Satd. Flow (perm)	1075	3067		525	1810	1615	1325	1763		1250	1810	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	425	285	161	258	38	478	81	75	54	38	70
RTOR Reduction (vph)	0	188	0	0	0	25	0	39	0	0	0	37
Lane Group Flow (vph)	22	522	0	161	258	13	478	117	0	54	38	33
Heavy Vehicles (%)	0%	5%	19%	5%	5%	0%	5%	0%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	15.0	15.0		15.0	15.0	15.0	21.0	21.0		21.0	21.0	21.0
Effective Green, g (s)	15.0	15.0		15.0	15.0	15.0	21.0	21.0		21.0	21.0	21.0
Actuated g/C Ratio	0.34	0.34		0.34	0.34	0.34	0.48	0.48		0.48	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	366	1046		179	617	551	632	841		597	864	734
v/s Ratio Prot		0.17			0.14			0.07			0.02	
v/s Ratio Perm	0.02			c0.31		0.01	c0.36			0.04		0.02
v/c Ratio	0.06	0.50		0.90	0.42	0.02	0.76	0.14		0.09	0.04	0.05
Uniform Delay, d1	9.8	11.5		13.8	11.1	9.6	9.4	6.4		6.3	6.1	6.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.4		39.5	0.5	0.0	8.2	0.3		0.3	0.1	0.1
Delay (s)	9.8	11.9		53.3	11.6	9.7	17.6	6.8		6.6	6.2	6.3
Level of Service	A	B		D	B	A	B	A		A	A	A
Approach Delay (s)		11.8			26.1			15.0			6.4	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	350	510	445	700	45	340	55	15	50	40	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.91		1.00	1.00	0.85	1.00	0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	2965		1719	1810	1538	1719	1770		1719	1810	1538
Flt Permitted	0.27	1.00		0.27	1.00	1.00	0.73	1.00		0.71	1.00	1.00
Satd. Flow (perm)	511	2965		483	1810	1538	1318	1770		1280	1810	1538
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	385	560	489	769	49	374	60	16	55	44	93
RTOR Reduction (vph)	0	173	0	0	0	15	0	8	0	0	0	71
Lane Group Flow (vph)	16	772	0	489	769	34	374	68	0	55	44	22
Heavy Vehicles (%)	0%	5%	15%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Effective Green, g (s)	76.0	76.0		76.0	76.0	76.0	26.0	26.0		26.0	26.0	26.0
Actuated g/C Ratio	0.69	0.69		0.69	0.69	0.69	0.24	0.24		0.24	0.24	0.24
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	353	2049		334	1251	1063	312	418		303	428	364
v/s Ratio Prot		0.26			0.42			0.04			0.02	
v/s Ratio Perm	0.03			c1.01		0.02	c0.28			0.04		0.01
v/c Ratio	0.05	0.38		1.46	0.61	0.03	1.20	0.16		0.18	0.10	0.06
Uniform Delay, d1	5.4	7.1		17.0	9.1	5.4	42.0	33.3		33.5	32.9	32.5
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1		224.6	0.9	0.0	116.2	0.8		1.3	0.5	0.3
Delay (s)	5.5	7.2		241.6	10.0	5.4	158.2	34.2		34.8	33.4	32.9
Level of Service	A	A		F	B	A	F	C		C	C	C
Approach Delay (s)		7.2			96.5			137.3			33.5	
Approach LOS		A			F			F			C	

Intersection Summary			
HCM Average Control Delay	69.2	HCM Level of Service	E
HCM Volume to Capacity ratio	1.40		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	230	290	130	240	25	380	60	50	35	25	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.92		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	2876		1719	1810	1242	1641	1723		1719	1900	1615
Flt Permitted	0.56	1.00		0.39	1.00	1.00	0.74	1.00		0.68	1.00	1.00
Satd. Flow (perm)	1020	2876		705	1810	1242	1279	1723		1235	1900	1615
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	26	242	305	137	253	26	400	63	53	37	26	74
RTOR Reduction (vph)	0	216	0	0	0	18	0	26	0	0	0	36
Lane Group Flow (vph)	26	331	0	137	253	8	400	90	0	37	26	38
Heavy Vehicles (%)	5%	5%	23%	5%	5%	30%	10%	5%	0%	5%	0%	0%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	12.0	12.0		12.0	12.0	12.0	21.2	21.2		21.2	21.2	21.2
Effective Green, g (s)	12.0	12.0		12.0	12.0	12.0	21.2	21.2		21.2	21.2	21.2
Actuated g/C Ratio	0.29	0.29		0.29	0.29	0.29	0.51	0.51		0.51	0.51	0.51
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	297	838		205	527	362	658	887		635	978	831
v/s Ratio Prot		0.12			0.14			0.05			0.01	
v/s Ratio Perm	0.03			c0.19		0.01	c0.31			0.03		0.02
v/c Ratio	0.09	0.39		0.67	0.48	0.02	0.61	0.10		0.06	0.03	0.05
Uniform Delay, d1	10.6	11.7		12.8	12.0	10.4	7.1	5.1		5.0	4.9	5.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3		8.0	0.7	0.0	4.1	0.2		0.2	0.1	0.1
Delay (s)	10.7	12.0		20.8	12.7	10.4	11.2	5.4		5.2	5.0	5.1
Level of Service	B	B		C	B	B	B	A		A	A	A
Approach Delay (s)		11.9			15.3			9.9			5.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	41.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
20: WB 210 Fwy/Alameda St & First St

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	20	340	290	165	260	40	485	80	75	55	40	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.93		1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	3016		1719	1810	1615	1719	1762		1805	1810	1538
Flt Permitted	0.54	1.00		0.31	1.00	1.00	0.73	1.00		0.65	1.00	1.00
Satd. Flow (perm)	1019	3016		565	1810	1615	1319	1762		1238	1810	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	22	366	312	177	280	43	522	86	81	59	43	75
RTOR Reduction (vph)	0	204	0	0	0	28	0	43	0	0	0	39
Lane Group Flow (vph)	22	474	0	177	280	15	522	124	0	59	43	36
Heavy Vehicles (%)	0%	5%	19%	5%	5%	0%	5%	0%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	15.3	15.3		15.3	15.3	15.3	21.0	21.0		21.0	21.0	21.0
Effective Green, g (s)	15.3	15.3		15.3	15.3	15.3	21.0	21.0		21.0	21.0	21.0
Actuated g/C Ratio	0.35	0.35		0.35	0.35	0.35	0.47	0.47		0.47	0.47	0.47
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	352	1042		195	625	558	625	835		587	858	729
v/s Ratio Prot		0.16			0.15			0.07			0.02	
v/s Ratio Perm	0.02			c0.31		0.01	c0.40			0.05		0.02
v/c Ratio	0.06	0.45		0.91	0.45	0.03	0.84	0.15		0.10	0.05	0.05
Uniform Delay, d1	9.7	11.3		13.8	11.2	9.6	10.1	6.6		6.4	6.3	6.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3		39.2	0.5	0.0	12.5	0.4		0.3	0.1	0.1
Delay (s)	9.8	11.6		53.0	11.7	9.6	22.6	7.0		6.8	6.4	6.4
Level of Service	A	B		D	B	A	C	A		A	A	A
Approach Delay (s)		11.5			26.2			18.8			6.5	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	17.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	44.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

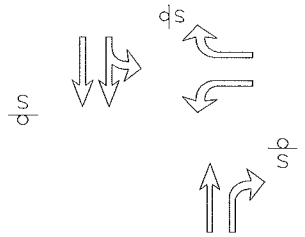
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	210	5%		210	20	230
WB THRU	0	0%		0	0	0
WB RIGHT	15	80%	**50**	65	5	70
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	20	35%		20	5	25
NB RIGHT	635	5%		635	55	690
SB LEFT	5	60%		5	5	10
SB THRU	10	65%	**50**	60	5	65
SB RIGHT	0	0%		0	0	0
TOTALS	**895**		**100**	**995**	**95**	**1090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	210	5%		210	20	230
WB THRU	0	0%		0	0	0
WB RIGHT	15	80%		15	5	20
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	20	35%	**50**	70	5	75
NB RIGHT	635	5%		635	55	690
SB LEFT	5	60%	**50**	55	5	60
SB THRU	10	65%		10	5	15
SB RIGHT	0	0%		0	0	0
TOTALS	**895**		**100**	**995**	**95**	**1090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	260	5%		260	25	285
WB THRU	0	0%		0	0	0
WB RIGHT	35	65%	**50**	85	5	90
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	35	65%		35	5	40
NB RIGHT	310	5%		310	30	340
SB LEFT	15	70%		15	5	20
SB THRU	45	60%	**50**	95	10	105
SB RIGHT	0	0%		0	0	0
TOTALS	**700**		**100**	**800**	**80**	**880**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	260	5%		260	25	285
WB THRU	0	0%		0	0	0
WB RIGHT	35	65%		35	5	40
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	35	65%	**50**	85	5	90
NB RIGHT	310	5%		310	30	340
SB LEFT	15	70%	**50**	65	5	70
SB THRU	45	60%		45	5	50
SB RIGHT	0	0%		0	0	0
TOTALS	**700**		**100**	**800**	**75**	**875**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	430	5%		430	40	470
WB THRU	0	0%		0	0	0
WB RIGHT	10	30%	**50**	60	5	65
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	10	5%		10	5	15
NB RIGHT	460	5%		460	40	500
SB LEFT	15	25%		15	5	20
SB THRU	35	30%	**50**	85	5	90
SB RIGHT	0	0%		0	0	0
TOTALS	**960**		**100**	**1060**	**100**	**1160**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	430	5%		430	40	470
WB THRU	0	0%		0	0	0
WB RIGHT	10	30%		10	5	15
SCHOLL CANYON RD						
NB LEFT	0	0%		0	0	0
NB THRU	10	5%	**50**	60	5	65
NB RIGHT	460	5%		460	40	500
SB LEFT	15	25%	**50**	65	5	70
SB THRU	35	30%		35	5	40
SB RIGHT	0	0%		0	0	0
TOTALS	**960**		**100**	**1060**	**100**	**1160**

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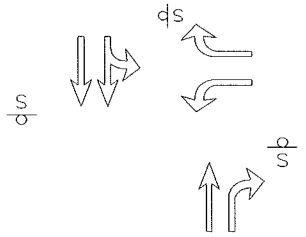
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

WB 134 FWY

EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	200	11	33	235	**0**	235	20	255
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	3	11	33	35	**150**	185	15	200

SCHOLL CANYON RD

NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	14	8	24	40	**0**	40	5	45
NB RIGHT	631	4	12	645	**0**	645	60	705
SB LEFT	2	3	9	10	**0**	10	5	15
SB THRU	3	6	18	20	**150**	170	15	185
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**853**				**300**	**1285**	**120**	**1405**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	200	11	33	235	**0**	235	20	255
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	3	11	33	35	**0**	35	5	40
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	14	8	24	40	**150**	190	15	205
NB RIGHT	631	4	12	645	**0**	645	60	705
SB LEFT	2	3	9	10	**150**	160	15	175
SB THRU	3	6	18	20	**0**	20	5	25
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**853**				**300**	**1285**	**120**	**1405**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	253	6	18	270	**0**	270	25	295
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	13	24	72	85	**150**	235	20	255
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	12	22	66	80	**0**	80	5	85
NB RIGHT	303	7	21	325	**0**	325	30	355
SB LEFT	5	12	36	40	**0**	40	5	45
SB THRU	19	26	78	95	**150**	245	20	265
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**605**				**300**	**1195**	**105**	**1300**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	253	6	18	270	**0**	270	25	295
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	13	24	72	85	**0**	85	5	90
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	12	22	66	80	**150**	230	20	250
NB RIGHT	303	7	21	325	**0**	325	30	355
SB LEFT	5	12	36	40	**150**	190	15	205
SB THRU	19	26	78	95	**0**	95	10	105
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**605**				**300**	**1195**	**105**	**1300**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	430	1	3	435	**0**	435	40	475
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	7	3	9	15	**150**	165	15	180
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	9	0	0	10	**0**	10	5	15
NB RIGHT	452	6	18	470	**0**	470	40	510
SB LEFT	10	3	9	20	**0**	20	5	25
SB THRU	26	11	33	60	**150**	210	20	230
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**934**				**300**	**1310**	**125**	**1435**

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TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : WB 134 FWY
N/S STREET : SCHOLL CANYON RD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 21
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	430	1	3	435	**0**	435	40	475
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	7	3	9	15	**0**	15	5	20
SCHOLL CANYON RD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	9	0	0	10	**150**	160	15	175
NB RIGHT	452	6	18	470	**0**	470	40	510
SB LEFT	10	3	9	20	**150**	170	15	185
SB THRU	26	11	33	60	**0**	60	5	65
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**934**				**300**	**1310**	**120**	**1430**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN
EAST-WEST STREET: 134 FWY WB RAMPS DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 07:15AM

Scholl Canyon Rd (SB)

NORTH LEG

TOTAL: 14

	Rt	Thru	Lt	
		9 ≈10	5	Total
		1	0	1st
		4	0	2nd
		2	1	3rd
		2	4	4th

TT = 9

TT% = $\frac{9}{14}$ = 64.3% ≈ 64%

EAST LEG TOTAL: 225

	1st	2nd	3rd	4th	Total
Rt	2	4	1	7	14 ≈15
Thru					
Lt	61	51	47	52	211 ≈210

134 Fwy offramp (WB)

TT = 22

TT% = $\frac{22}{225}$ = 9.78 ≈ 10%

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.58
SOUTH LEG = 0.90
EAST LEG = 0.89
WEST LEG =

ALL LEGS = 0.91

	Lt	Thru	Rt
1st		4	145
2nd		6	153
3rd		5	162
4th		7	175
Total		22 ≈20	635

TOTAL: 657

TT = 12

TT% = $\frac{12}{657}$ = 1.83% ≈ 2%

SOUTH LEG
Scholl Canyon Rd (NB)

HOUR TOTAL: 896

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 07:00AM-08:00AM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt	
		8	1	Total
		1	0	1st
		1	0	2nd
		4	0	3rd
		2	1	4th

	1st	2nd	3rd	4th	Total
Rt	3	2	4	1	10
Thru					
Lt	48	61	51	47	207

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		3	112
2nd		4	145
3rd		6	153
4th		5	162
Total		18	572

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 08:00AM-09:00AM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt	
		22	12	Total
		2	4	1st
		3	1	2nd
		10	5	3rd
		7	2	4th

	1st	2nd	3rd	4th	Total
Rt	7	9	5	5	26
Thru					
Lt	52	45	67	57	221

	Total	1st	2nd	3rd	4th	
						Lt
						Thru
						Rt

	Lt	Thru	Rt
1st		7	175
2nd		7	130
3rd		5	131
4th		6	138
Total		25	574

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN PASADENA

EAST-WEST STREET : 134 FWY WB RAMPS 10-25-11

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						(SB) NORTH LEG						
0	1	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	1	0	0	0	0	0	0	0	1
0	3	0	0	1	0	0	0	0	0	0	0	4
0	0	1	0	2	0	0	0	0	0	0	0	3
0	0	1	0	1	0	0	1	0	0	0	3	6
0	0	1	0	2 5	0	0	1 1	0	0	0 3	0	14 4
0	10	5	0	0	0	0	0	0	0	0	0	15
0	7	2	0	0	0	0	0	0	0	0	0	9
						TT=5+1+3=9						
0	21	10	0	7	0	0	2	0	0	0	3	43
						(NB) SOUTH LEG						
110	0	0	2	3	0	0	0	0	0	0	0	115
145	2	0	0	1	0	0	1	0	0	0	0	149
150	5	0	2	0	0	1	1	0	0	0	0	159
161	3	0	1	1	0	0	0	0	0	1	0	167
175	4	0	0	2	0	0	0	0	0	1	0	182
128	5	0	1	0 7	0	0	2 3	0	1	0 2	0	657 137
131	4	0	0	0	0	0	0	0	0	1	0	136
138	6	0	0	0	0	0	0	0	0	0	0	144
						TT=7+3+2=12						
1138	29	0	6	7	0	1	4	0	1	3	0	1189
						(WB) EAST LEG						
1	0	47	0	0	0	1	0	0	1	0	1	51
0	0	61	0	0	0	0	0	0	2	0	0	63
0	0	47	3	0	1	1	0	0	0	0	3	55
0	0	41	1	0	3	0	0	0	0	0	3	48
3	0	51	3	0	1	0	0	0	1	0	0	59
2	0	45	3	0 12	0	0	0 1	0	4	0 9	0	225 54
5	0	67	0	0	0	0	0	0	0	0	0	72
5	0	57	0	0	0	0	0	0	0	0	0	62
						TT=12+1+9=22						
16	0	416	10	0	5	2	0	0	8	0	7	464
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN
EAST-WEST STREET: 134 FWY WB RAMPS DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 12:30PM

Scholl Canyon Rd (SB)
NORTH LEG

TOTAL: 62

	Rt	Thru	Lt	
		45	17 ≈15	Total
		5	5	1st
		19	5	2nd
		14	5	3rd
		7	2	4th

TT = 38
TT% = 38/62 = 61.3% ≈ 61%

EAST LEG TOTAL: 296

	1st	2nd	3rd	4th	Total
Rt	12	7	10	8	37 ≈35
Thru					
Lt	68	60	66	65	259 ≈260

134 Fwy offramp (WB)
TT = 30
TT% = 30/296 = 10.14% ≈ 10%

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.65
SOUTH LEG = 0.90
EAST LEG = 0.93
WEST LEG =

ALL LEGS = 0.94

	Lt	Thru	Rt
1st		6	78
2nd		7	66
3rd		6	85
4th		15	81
Total		34 ≈35	310

TT = 29
TT% = 29/344 = 8.43% ≈ 8%

TOTAL: 344

SOUTH LEG
Scholl Canyon Rd (NB)

HOUR TOTAL: 702

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 12:00PM-01:00PM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total		38	18
1st		7	5
2nd		7	3
3rd		5	5
4th		19	5

	1st	2nd	3rd	4th	Total
Rt	5	4	12	7	28
Thru					
Lt	63	66	68	60	257

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		3	75
2nd		10	74
3rd		6	78
4th		7	66
Total		26	293

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 01:00PM-02:00PM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total		31	17
1st		14	5
2nd		7	2
3rd		4	5
4th		6	5

	1st	2nd	3rd	4th	Total
Rt	10	8	4	7	29
Thru					
Lt	66	65	56	50	237

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		6	85
2nd		15	81
3rd		7	79
4th		5	69
Total		33	314

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN PASADENA

EAST-WEST STREET : 134 FWY WB RAMPS 10-25-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						(SB) NORTH LEG						
0	3	0	0	1	2	0	3	3	0	0	0	12
0	0	2	0	1	0	0	5	1	0	1	0	10
0	0	2	0	1	0	0	2	3	0	2	0	10
0	13	1	0	1	0	0	5	4	0	0	0	24
0	6	1	0	2	2	0	5	2	0	1	0	19
0	0	1	0	2	1	0	5	0	0	0	0	9
0	2	0	0	0 9	0	0	1 26	4	0	1 3	1	62 9
0	4	2	0	0	1	0	2	2	0	0	0	11
						TT= 9+26+3 = 38						
0	28	9	0	8	6	0	28	19	0	5	1	104
						(NB) SOUTH LEG						
73	1	0	0	1	0	2	0	0	0	1	0	78
73	5	0	1	0	0	0	4	0	0	1	0	84
78	1	0	0	1	0	0	3	0	0	1	0	84
62	1	0	2	1	0	1	4	0	1	1	0	73
83	3	0	2	0	0	0	3	0	0	0	0	91
80	7	0	1	4	0	0	3	0	0	1	0	96
78	3	0	0	1 11	0	0	2 14	0	1	1 4	0	344 86
68	1	0	1	0	0	0	3	0	0	1	0	74
						TT= 11+14+4 = 29						
595	22	0	7	8	0	3	22	0	2	7	0	666
						(WB) EAST LEG						
0	0	63	4	0	0	0	0	0	1	0	0	68
0	0	66	0	0	0	3	0	0	1	0	0	70
2	0	67	0	0	1	6	0	0	4	0	0	80
3	0	58	1	0	1	3	0	0	0	0	1	67
6	0	64	2	0	1	2	0	0	0	0	1	76
2	0	64	0	0	1	1	0	0	5	0	0	73
0	0	56	0	0 7	0	1	0 12	0	3	0 11	0	296 60
1	0	49	2	0	1	3	0	0	1	0	0	57
						TT= 7+12+11 = 30						
14	0	487	9	0	5	19	0	0	15	0	2	551
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN
EAST-WEST STREET: 134 FWY WB RAMPS DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 04:45PM

Scholl Canyon Rd (SB)
NORTH LEG

TOTAL: 50

	Rt	Thru	Lt	
		37 ≈35	13 ≈15	Total
		8	6	1st
		16	3	2nd
		5	1	3rd
		8	3	4th

TT = 14

$TT\% = \frac{14}{50} = 28\%$

EAST LEG TOTAL: 441

	1st	2nd	3rd	4th	Total
Rt	3	2	2	3	10
Thru					
Lt	102	118	117	94	431 ≈430

134 Fwy offramp (WB)

TT = 4

$TT\% = \frac{4}{441} = 0.91\% \approx 1\%$

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.66
SOUTH LEG = 0.96
EAST LEG = 0.92
WEST LEG =

ALL LEGS = 0.92

	Lt	Thru	Rt
1st		3	116
2nd		3	117
3rd		1	121
4th		2	104
Total		9 ≈10	458 ≈460

TT = 6

$TT\% = \frac{6}{467} = 1.28\% \approx 1\%$

TOTAL: 467

SOUTH LEG
Scholl Canyon Rd (NB)

HOUR TOTAL: 958

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 04:00PM-05:00PM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total		36	16
1st		8	6
2nd		8	1
3rd		12	3
4th		8	6

	1st	2nd	3rd	4th	Total
Rt	2	10	10	3	25
Thru					
Lt	86	99	82	102	369

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		5	99
2nd		5	92
3rd		3	96
4th		3	116
Total		16	403

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN

EAST-WEST STREET: 134 FWY WB RAMPS

TIME: 05:00PM-06:00PM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total		33	7
1st		16	3
2nd		5	1
3rd		8	3
4th		4	0

	1st	2nd	3rd	4th	Total
Rt	2	2	3	1	8
Thru					
Lt	118	117	94	111	440

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		3	117
2nd		1	121
3rd		2	104
4th		3	104
Total		9	446

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN PASADENA

EAST-WEST STREET : 134 FWY WB RAMPS 10-25-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						(SB) NORTH LEG						
0	2	5	0	2	1	0	2	0	0	2	0	14
0	5	0	0	1	0	0	1	1	0	1	0	9
0	10	0	0	1	1	0	0	2	0	1	0	15
0	3	4	0	2	1	0	3	1	0	0	0	14
0	10	2	0	1	0	0	4	1	0	1	0	19
0	5	1	0	0	0	0	0	0	0	0	0	6
0	8	3	0	0	0	0	0	0	0	0	0	11
0	4	0	0	0 4	0	0	0 9	0	0	0 1	0	50 4
						TT=4+9+1=14						
0	47	15	0	7	3	0	10	5	0	5	0	92
						(NB) SOUTH LEG						
96	3	0	2	1	0	0	0	0	1	1	0	104
91	3	0	1	1	0	0	1	0	0	0	0	97
93	2	0	1	0	0	1	0	0	1	1	0	99
114	3	0	1	0	0	0	0	0	1	0	0	119
117	3	0	0	0	0	0	0	0	0	0	0	120
118	1	0	2	0	0	1	0	0	0	0	0	122
103	2	0	1	0	0	0	0	0	0	0	0	106
104	2	0	0	0 4	0	0	0 1	0	0	1 1	0	467 107
						TT=4+1+1=6						
836	19	0	8	2	0	2	1	0	3	3	0	874
						(WB) EAST LEG						
0	0	85	1	0	1	1	0	0	0	0	0	88
4	0	99	4	0	0	2	0	0	0	0	0	109
5	0	80	1	0	0	3	0	0	1	0	2	92
2	0	102	1	0	0	0	0	0	0	0	0	105
2	0	118	0	0	0	0	0	0	0	0	0	120
1	0	117	1	0	0	0	0	0	0	0	0	119
2	0	93	1	0	1	0	0	0	0	0	0	97
1	0	110	0	0 4	1	0	0 0	0	0	0	0 0	441 112
						TT=4+0+0=4						
17	0	804	9	0	3	6	0	0	1	0	2	842
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

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Intersection	
Intersection Delay (sec/veh)	30.8
Intersection LOS	D

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	210	15	20	635	5	10	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	100%
Heavy Vehicles(%)	5	80	35	5	60	35	Volume Right (%)	0%
Movement Flow Rate	231	16	22	698	5	11	Sign Control	Stop
Number of Lanes	1	1	1	1	Traffic Volume by Lane	2		20
							Left Turning Volume	20

Approach	NW	NE	SW			
Opposing Approach		SW	NE	Right Turning Volume		0
Opposing Lanes	0	2	2	Lane Flow Rate		22
Conflicting Approach Left	NE		NW	Geometry Group		7
Conflicting Lanes Left	2	0	2	Degree of Utilization, X		0.036
Conflicting Approach Right	SW	NW		Departure Headway, Hd		5.966
Conflicting Lanes Right	2	2	0	Convergence(Y/N)		Yes
HCM Control Delay	14.7	36.8	10.3	Capacity		595
HCM LOS	B	E	B	Service Time		3.751
				HCM Lane V/C Ratio		0.037

HCM Control Delay	9	37.7	15	9.9	10.4	10.2
HCM Lane LOS	A	E	B	A	B	B
HCM 95th Percentile Queue	0.1	32.2	2.4	0.1	0.1	0

Intersection	
Intersection Delay (sec/veh)	12.3
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	260	35	35	310	15	45	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	100%
Heavy Vehicles(%)	0	65	65	5	70	30	Volume Right (%)	0%
Movement Flow Rate	277	37	37	330	16	48	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	35
							Left Turning Volume	35

Approach	NW	NE	SW		
				Through Volume	0
Opposing Approach		SW	NE	Right Turning Volume	0
Opposing Lanes	0	2	2	Lane Flow Rate	37
Conflicting Approach Left	NE		NW	Geometry Group	7
Conflicting Lanes Left	2	0	2	Degree of Utilization, X	0.069
Conflicting Approach Right	SW	NW		Departure Headway, Hd	6.664
Conflicting Lanes Right	2	2	0	Convergence(Y/N)	Yes
HCM Control Delay	13.5	11.5	10.5	Capacity	535
HCM LOS	B	B	B	Service Time	4.436
				HCM Lane V/C Ratio	0.069

HCM Control Delay	9.9	11.7	14.1	9.2	10.7	10.2
HCM Lane LOS	A	B	B	A	B	B
HCM 95th Percentile Queue	0.2	2.5	2.6	0.2	0.2	0.2

Intersection	
Intersection Delay (sec/veh)	31.4
Intersection LOS	D

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	430	10	10	460	15	35	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	100%
Heavy Vehicles(%)	5	30	0	5	25	30	Volume Right (%)	0%
Movement Flow Rate	467	11	11	500	16	38	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	10
							Left Turning Volume	10

Approach	NW	NE	SW	SE		
Opposing Approach		SW	NE		Through Volume	0
Opposing Lanes	0	2	2	0	Right Turning Volume	0
Conflicting Approach Left	NE		NW		Lane Flow Rate	11
Conflicting Lanes Left	2	0	2	3	Geometry Group	7
Conflicting Approach Right	SW	NW			Degree of Utilization, X	0.019
Conflicting Lanes Right	2	2	0		Departure Headway, Hd	6.311
HCM Control Delay	39.3	26.2	11		Convergence(Y/N)	Yes
HCM LOS	E	D	B		Capacity	565
					Service Time	4.076
					HCM Lane V/C Ratio	0.019

HCM Control Delay	9.2	26.6	40	8.8	11.1	10.9	
HCM Lane LOS	A	D	E	A	B	B	
HCM 95th Percentile Queue	0.1	11.2	20	0.1	0.2	0.2	

Intersection	
Intersection Delay (sec/veh)	36.2
Intersection LOS	E

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	210	65	20	635	5	60	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	100%
Heavy Vehicles(%)	5	95	35	5	60	34	Volume Right (%)	0%
Movement Flow Rate	231	71	22	698	5	66	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	20
							Left Turning Volume	20

Approach	NW	NE	SW	SE		
Opposing Approach		SW		NW	Through Volume	0
Opposing Lanes	0	2	2	0	Right Turning Volume	0
Conflicting Approach Left	NE		NW		Lane Flow Rate	22
Conflicting Lanes Left	2	0	2	2	Geometry Group	7
Conflicting Approach Right	SW	NW			Degree of Utilization, X	0.038
Conflicting Lanes Right	2	2			Departure Headway, Hd	6.36
HCM Control Delay	14.8	47.7	11.4	0	Convergence(Y/N)	Yes
HCM LOS	B	E	B		Capacity	566
					Service Time	4.06
					HCM Lane V/C Ratio	0.039

HCM Control Delay	9.3	48.9	15.8	11.5	10.8	11.7	
HCM Lane LOS	A	E	C	B	B	B	
HCM 95th Percentile Queue	0.1	67.8	2.5	0.5	0.2	0.3	

Intersection	
Intersection Delay (sec/veh)	12.9
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	260	85	35	310	15	95	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	100%
Heavy Vehicles(%)	0	86	65	5	70	81	Volume Right (%)	0%
Movement Flow Rate	277	90	37	330	16	101	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	35
							Left Turning Volume	35

Approach	NW	NE	SW		
				Through Volume	0
Opposing Approach		SW	NE	Right Turning Volume	0
Opposing Lanes	0	2	2	Lane Flow Rate	37
Conflicting Approach Left	NE		NW	Geometry Group	7
Conflicting Lanes Left	2	0	2	Degree of Utilization, X	0.073
Conflicting Approach Right	SW	NW		Departure Headway, Hd	7.01
Conflicting Lanes Right	2	2	0	Convergence(Y/N)	Yes
HCM Control Delay	13.9	12.5	11.3	Capacity	512
HCM LOS	B	B	B	Service Time	4.739
				HCM Lane V/C Ratio	0.072

HCM Control Delay	10.3	12.7	15	10.7	11.1	11.5
HCM Lane LOS	B	B	B	B	B	B
HCM 95th Percentile Queue	0.2	2.7	2.9	0.6	0.3	0.5

Intersection	
Intersection Delay (sec/veh)	34
Intersection LOS	D

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	430	60	10	460	15	85	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	100%
Heavy Vehicles(%)	5	88	0	5	25	71	Volume Right (%)	0%
Movement Flow Rate	467	65	11	500	16	92	Sign Control	Stop
Number of Lanes	1	1	1	1	0	2	Traffic Volume by Lane	10
							Left Turning Volume	10

Approach	NW	NE	SW		
Opposing Approach		SW	NE	Through Volume	0
Opposing Lanes	0	2	2	Right Turning Volume	0
Conflicting Approach Left	NE		NW	Lane Flow Rate	11
Conflicting Lanes Left	2	0	2	Geometry Group	7
Conflicting Approach Right	SW	NW		Degree of Utilization, X	0.02
Conflicting Lanes Right	2	2	0	Departure Headway, Hd	6.594
HCM Control Delay	41.5	30.9	12.3	Convergence(Y/N)	Yes
HCM LOS	E	D	B	Capacity	539
				Service Time	4.381
				HCM Lane V/C Ratio	0.02

HCM Control Delay	9.5	31.4	45.8	11	11.6	12.8
HCM Lane LOS	A	D	E	B	B	B
HCM 95th Percentile Queue	0.1	14.3	26.4	0.4	0.4	0.5

Intersection	
Intersection Delay (sec/veh)	41.4
Intersection LOS	E

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	230	70	20	690	5	65	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	100%
Heavy Vehicles(%)	5	95	35	5	60	94	Volume Right (%)	0%
Movement Flow Rate	253	77	22	758	5	71	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	20
							Left Turning Volume	20

Approach	NW	NE	SW				Through Volume	0
Opposing Approach		SW	NE				Right Turning Volume	0
Opposing Lanes	0	2	2				Lane Flow Rate	22
Conflicting Approach Left	NE		NW				Geometry Group	7
Conflicting Lanes Left	2	0	2				Degree of Utilization, X	0.039
Conflicting Approach Right	SW	NW	Departure Headway, Hd					6.462
Conflicting Lanes Right	2	2	0				Convergence(Y/N)	Yes
HCM Control Delay	15.6	55.2	11.5				Capacity	557
HCM LOS	C	F	B				Service Time	4.162
			HCM Lane V/C Ratio					0.039
HCM Control Delay	9.4	56.5	16.8	11.6	10.9	11.8		
HCM Lane LOS	A	F	C	B	B	B		
HCM 95th Percentile Queue	0.1	124.4	3	0.6	0.2	0.4		

Intersection	
Intersection Delay (sec/veh)	15.5
Intersection LOS	C

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	230	70	20	690	5	65	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	6%
Heavy Vehicles(%)	5	95	35	5	60	94	Volume Right (%)	94%
Movement Flow Rate	253	77	22	758	5	71	Sign Control	Stop
Number of Lanes	2	0	1	1	0	2	Traffic Volume by Lane	358
							Left Turning Volume	20

Approach	NW	NE	SW		
Opposing Approach		SW	NE	Through Volume	338
Opposing Lanes	0	2	2	Right Turning Volume	0
Conflicting Approach Left	NE		NW	Lane Flow Rate	394
Conflicting Lanes Left	2	0	2	Geometry Group	7
Conflicting Approach Right	SW	NW	0	Degree of Utilization, X	0.633
Conflicting Lanes Right	2	2	0	Departure Headway, Hd	5.788
HCM Control Delay	14.4	16.3	11.7	Convergence(Y/N)	Yes
HCM LOS	B	C	B	Capacity	626
				Service Time	3.521
				HCM Lane V/C Ratio	0.629

HCM Control Delay	18	14.5	13.5	15.4	11.1	12.1
HCM Lane LOS	C	B	B	C	B	B
HCM 95th Percentile Queue	5.2	3.8	1.5	1.7	0.2	0.4

Intersection	
Intersection Delay (sec/veh)	14.4
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	285	95	40	340	15	105	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	100%
Heavy Vehicles(%)	0	86	65	5	70	81	Volume Right (%)	0%
Movement Flow Rate	303	101	43	362	16	112	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	40
							Left Turning Volume	40

Approach	NW	NE	SW	SE		
Opposing Approach		SW		NE	Through Volume	0
Opposing Lanes	0	2	2	1	Right Turning Volume	0
Conflicting Approach Left	NE		NW		Lane Flow Rate	43
Conflicting Lanes Left	2	0	2		Geometry Group	7
Conflicting Approach Right	SW	NW			Degree of Utilization, X	0.085
Conflicting Lanes Right	2	2	0		Departure Headway, Hd	7.176
HCM Control Delay	15.5	14.1	11.8		Convergence(Y/N)	Yes
HCM LOS	C	B	B		Capacity	500
					Service Time	4.915
					HCM Lane V/C Ratio	0.086

HCM Control Delay	10.6	14.5	17	11.1	11.5	12	
HCM Lane LOS	B	B	C	B	B	B	
HCM 95th Percentile Queue	0.3	3.6	3.7	0.7	0.4	0.6	

Intersection	
Intersection Delay (sec/veh)	12.9
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	285	95	40	340	15	105	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	21%
Heavy Vehicles(%)	0	86	65	5	70	81	Volume Right (%)	79%
Movement Flow Rate	303	101	43	362	16	112	Sign Control	Stop
Number of Lanes	2	0	1	1	0	2	Traffic Volume by Lane	193
							Left Turning Volume	40

Approach	NW	NE	SW	SE	Through Volume	153
Opposing Approach		SW		NE	Right Turning Volume	0
Opposing Lanes	0	2	2	0	Lane Flow Rate	205
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2	0	Degree of Utilization, X	0.379
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.642
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	14.2	12	11.9		Capacity	542
HCM LOS	B	B	B		Service Time	4.375
					HCM Lane V/C Ratio	0.378

HCM Control Delay	13.4	10.6	13.1	15.3	11.6	12.1
HCM Lane LOS	B	B	B	C	B	B
HCM 95th Percentile Queue	1.8	1.3	1.7	2.1	0.4	0.6

Intersection	
Intersection Delay (sec/veh)	49.9
Intersection LOS	E

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	470	65	10	500	15	85	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	100%
Heavy Vehicles(%)	5	88	0	5	25	71	Volume Right (%)	0%
Movement Flow Rate	511	71	11	543	16	103	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	10
							Left Turning Volume	10

Approach	NW	NE	SW	SE		
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2	2	Lane Flow Rate	11
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2	2	Degree of Utilization, X	0.021
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.843
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	60.3	47.1	12.6		Capacity	530
HCM LOS	F	E	B		Service Time	4.493
					HCM Lane V/C Ratio	0.021

HCM Control Delay	9.6	47.9	67.1	11.4	11.9	13.2	
HCM Lane LOS	A	E	F	B	B	B	
HCM 95th Percentile Queue	0.1	39.6	105.6	0.5	0.4	0.6	

Approach	NW	NE	SW	SE		
Through Volume						0

Intersection	
Intersection Delay (sec/veh)	16.9
Intersection LOS	C

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	470	65	10	500	15	85	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	4%
Heavy Vehicles(%)	5	88	0	5	25	71	Volume Right (%)	96%
Movement Flow Rate	511	71	11	543	16	93	Sign Control	Stop
Number of Lanes	2	0	1	1	0	2	Traffic Volume by Lane	255
							Left Turning Volume	10

Approach	NW	NE	SW			
Opposing Approach		SW	NE	Right Turning Volume		0
Opposing Lanes	0	2	2	Lane Flow Rate		277
Conflicting Approach Left	NE		NW	Geometry Group		7
Conflicting Lanes Left	2	0	2	Degree of Utilization, X		0.458
Conflicting Approach Right	SW	NW		Departure Headway, Hd		5.949
Conflicting Lanes Right	2	2	0	Convergence(Y/N)		Yes
HCM Control Delay	20.9	13.8	12.2	Capacity		604
HCM LOS	C	B	B	Service Time		3.705
				HCM Lane V/C Ratio		0.459

HCM Control Delay	13.7	13.9	21.9	19.6	11.5	12.8
HCM Lane LOS	B	B	C	C	B	B
HCM 95th Percentile Queue	2.5	2.6	5.7	3.4	0.4	0.6

Intersection	
Intersection Delay (sec/veh)	32.2
Intersection LOS	D

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	210	15	70	635	55	10	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	100%
Heavy Vehicles(%)	5	80	81	5	96	35	Volume Right (%)	0%
Movement Flow Rate	231	16	77	698	60	11	Sign Control	Stop
Number of Lanes	1	1	1	1	0	2	Traffic Volume by Lane	70
							Left Turning Volume	70

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	77
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.147
Conflicting Approach Right	SW	NW			Departure Headway, Hd	6.998
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	15.6	39.3	12.5		Capacity	515
HCM LOS	C	E	B		Service Time	4.698
					HCM Lane V/C Ratio	0.15

HCM Control Delay	10.9	42.4	16	10.2	12.8	10.3
HCM Lane LOS	B	E	C	B	B	B
HCM 95th Percentile Queue	0.5	42.9	2.6	0.1	0.5	0

Intersection	
Intersection Delay (sec/veh)	13.2
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	260	35	85	310	65	45	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	100%
Heavy Vehicles(%)	0	65	86	5	93	80	Volume Right (%)	0%
Movement Flow Rate	277	37	90	330	69	48	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	85
							Left Turning Volume	85

Approach	NW	NE	SW		
				Through Volume	0
Opposing Approach		SW	NE	Right Turning Volume	0
Opposing Lanes	0	2	2	Lane Flow Rate	90
Conflicting Approach Left	NE		NW	Geometry Group	7
Conflicting Lanes Left	2	0	2	Degree of Utilization, X	0.182
Conflicting Approach Right	SW	NW		Departure Headway, Hd	7.262
Conflicting Lanes Right	2	2	0	Convergence(Y/N)	Yes
HCM Control Delay	14.9	12.3	12.1	Capacity	496
HCM LOS	B	B	B	Service Time	4.989
				HCM Lane V/C Ratio	0.181

HCM Control Delay	11.6	12.5	15.6	9.6	12.8	10.4
HCM Lane LOS	B	B	C	A	B	B
HCM 95th Percentile Queue	0.7	2.7	3	0.2	0.7	0.2

Intersection	
Intersection Delay (sec/veh)	35.4
Intersection LOS	E

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	430	10	60	460	65	85	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	100%
Heavy Vehicles(%)	5	30	83	5	83	30	Volume Right (%)	0%
Movement Flow Rate	467	11	65	500	71	39	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	60
							Left Turning Volume	60

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	65
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.145
Conflicting Approach Right	SW	NW			Departure Headway, Hd	7.999
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	48.3	28.7	13.7		Capacity	446
HCM LOS	E	D	B		Service Time	5.791
					HCM Lane V/C Ratio	0.146

HCM Control Delay	12.2	30.8	49.2	9.2	14.5	11.1
HCM Lane LOS	B	D	E	A	B	B
HCM 95th Percentile Queue	0.5	13.8	31.3	0.1	0.8	0.2

Intersection	
Intersection Delay (sec/veh)	41.3
Intersection LOS	E

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	230	70	20	690	5	65	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	Volume Thru (%)	100%
Heavy Vehicles(%)	5	80	81	5	96	85	Volume Right (%)	0%
Movement Flow Rate	253	77	22	758	5	71	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	20
							Left Turning Volume	20

Approach	NW	NE	SW		
Opposing Approach		SW	NE	Through Volume	0
Opposing Lanes	0	2	2	Right Turning Volume	0
Conflicting Approach Left	NE		NW	Lane Flow Rate	22
Conflicting Lanes Left	2	0	2	Geometry Group	7
Conflicting Approach Right	SW	NW		Degree of Utilization, X	0.044
Conflicting Lanes Right	2	2	0	Departure Headway, Hd	7.246
HCM Control Delay	15.6	55.1	11.4	Convergence(Y/N)	Yes
HCM LOS	C	F	B	Capacity	497
				Service Time	4.946
				HCM Lane V/C Ratio	0.044

HCM Control Delay	10.3	56.4	16.9	11.3	11.6	11.2
HCM Lane LOS	B	F	C	B	B	B
HCM 95th Percentile Queue	0.1	124.5	3	0.5	0.2	0.3

Intersection	
Intersection Delay (sec/veh)	17.6
Intersection LOS	C

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	230	70	20	690	5	65	Volume Left (%)	0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.94	Volume Thru (%)	6%
Heavy Vehicles(%)	5	80	81	5	96	85	Volume Right (%)	94%
Movement Flow Rate	253	77	22	758	5	71	Sign Control	Stop
Number of Lanes	2	0	1	1	1	2	Traffic Volume by Lane	358
							Left Turning Volume	20

Approach	NW	NE	SW		
Opposing Approach		SW	NE	Through Volume	338
Opposing Lanes	0	2	2	Right Turning Volume	0
Conflicting Approach Left	NE		NW	Lane Flow Rate	394
Conflicting Lanes Left	2	0	2	Geometry Group	7
Conflicting Approach Right	SW	NW	0	Degree of Utilization, X	0.719
Conflicting Lanes Right	2	2	0	Departure Headway, Hd	6.577
HCM Control Delay	14.3	19.5	11.7	Convergence(Y/N)	Yes
HCM LOS	B	C	B	Capacity	551
				Service Time	4.307
				HCM Lane V/C Ratio	0.715

HCM Control Delay	24.4	14.5	13.7	15	11.9	11.6
HCM Lane LOS	C	B	B	B	B	B
HCM 95th Percentile Queue	7.6	3.8	1.5	1.7	0.2	0.3

Intersection	
Intersection Delay (sec/veh)	14.3
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	285	95	40	340	15	105	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	100%
Heavy Vehicles(%)	0	65	86	5	93	80	Volume Right (%)	0%
Movement Flow Rate	303	101	43	362	16	112	Sign Control	Stop
Number of Lanes	1	1	1	1	0	2	Traffic Volume by Lane	40
							Left Turning Volume	40

Approach	NW	NE	SW		
Opposing Approach		SW	NE	Through Volume	0
Opposing Lanes	0	2	2	Right Turning Volume	0
Conflicting Approach Left	NE		NW	Lane Flow Rate	43
Conflicting Lanes Left	2	0	2	Geometry Group	7
Conflicting Approach Right	SW	NW	0	Degree of Utilization, X	0.089
Conflicting Lanes Right	2	2		Departure Headway, Hd	7.524
HCM Control Delay	15.4	14.1	11.7	Convergence(Y/N)	Yes
HCM LOS	C	B	B	Capacity	477
				Service Time	5.262
				HCM Lane V/C Ratio	0.09

HCM Control Delay	11	14.5	17	10.6	12	11.5
HCM Lane LOS	B	B	C	B	B	B
HCM 95th Percentile Queue	0.3	3.6	3.7	0.7	0.4	0.5

Intersection	
Intersection Delay (sec/veh)	12.9
Intersection LOS	B

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	285	95	40	340	15	105	Volume Left (%)	0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	Volume Thru (%)	21%
Heavy Vehicles(%)	0	65	86	5	93	80	Volume Right (%)	79%
Movement Flow Rate	303	101	43	362	16	112	Sign Control	Stop
Number of Lanes	2	0	1	1	0	2	Traffic Volume by Lane	193
							Left Turning Volume	40

Approach	NW	NE	SW		
				Through Volume	153
Opposing Approach		SW	NE	Right Turning Volume	0
Opposing Lanes	0	2	2	Lane Flow Rate	205
Conflicting Approach Left	NE		NW	Geometry Group	7
Conflicting Lanes Left	2	0	2	Degree of Utilization, X	0.398
Conflicting Approach Right	SW	NW		Departure Headway, Hd	6.975
Conflicting Lanes Right	2	2	0	Convergence(Y/N)	Yes
HCM Control Delay	13.8	12.4	11.8	Capacity	517
HCM LOS	B	B	B	Service Time	4.706
				HCM Lane V/C Ratio	0.397

HCM Control Delay	14.3	10.5	13.1	14.4	12	11.6
HCM Lane LOS	B	B	B	B	B	B
HCM 95th Percentile Queue	2	1.3	1.8	2	0.4	0.5

Intersection	
Intersection Delay (sec/veh)	53.8
Intersection LOS	F

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	470	65	10	500	10	500	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	100%
Heavy Vehicles(%)	5	30	83	5	83	30	Volume Right (%)	0%
Movement Flow Rate	511	71	11	543	11	543	Sign Control	Stop
Number of Lanes	1	1	1	1	1	2	Traffic Volume by Lane	10
							Left Turning Volume	10

Approach	NW	NE	SW		Through Volume	0
Opposing Approach		SW	NE		Right Turning Volume	0
Opposing Lanes	0	2	2		Lane Flow Rate	11
Conflicting Approach Left	NE		NW		Geometry Group	7
Conflicting Lanes Left	2	0	2		Degree of Utilization, X	0.027
Conflicting Approach Right	SW	NW			Departure Headway, Hd	8.981
Conflicting Lanes Right	2	2	0		Convergence(Y/N)	Yes
HCM Control Delay	64.1	64.9	31.9		Capacity	398
HCM LOS	F	F	D		Service Time	6.759
					HCM Lane V/C Ratio	0.028

HCM Control Delay	12	66	71.4	11.3	19.9	38.3
HCM Lane LOS	B	F	F	B	C	E
HCM 95th Percentile Queue	0.1	107.3	99.6	0.5	2.8	13.3

Intersection	
Intersection Delay (sec/veh)	28.3
Intersection LOS	D

Movement	NWL	NWR	NET	NER	SWL	SWT	Lane	NELn1
Volume (vph)	470	65	10	500	10	500	Volume Left (%)	0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	Volume Thru (%)	4%
Heavy Vehicles(%)	5	30	83	5	83	30	Volume Right (%)	96%
Movement Flow Rate	511	71	11	543	11	543	Sign Control	Stop
Number of Lanes	2	0	1	1	0	2	Traffic Volume by Lane	255
							Left Turning Volume	10

Approach	NW	NE	SW	SE		Through Volume	245
Opposing Approach		SW		NE		Right Turning Volume	0
Opposing Lanes	0	2	2	0		Lane Flow Rate	277
Conflicting Approach Left	NE		NW			Geometry Group	7
Conflicting Lanes Left	2	0	2			Degree of Utilization, X	0.657
Conflicting Approach Right	SW	NW				Departure Headway, Hd	8.535
Conflicting Lanes Right	2	2	0			Convergence(Y/N)	Yes
HCM Control Delay	29.7	22.3	32.9			Capacity	424
HCM LOS	D	C	D			Service Time	6.273
						HCM Lane V/C Ratio	0.653

HCM Control Delay	26.2	18.3	35.6	21.4	20.4	39.6
HCM Lane LOS	D	C	E	C	C	E
HCM 95th Percentile Queue	5.7	3.7	10.9	3.8	2.9	13.9

Hall & Foreman, Inc.

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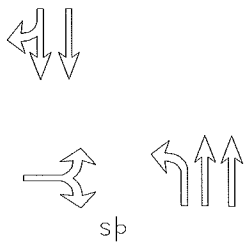
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EAGLE VISTA DRIVE						
EB LEFT	45	5%		45	5	50
EB THRU	0	0%		0	0	0
EB RIGHT	60	5%		60	5	65
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FIGUEROA ST						
NB LEFT	25	30%		25	5	30
NB THRU	625	5%		625	55	680
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	220	5%	50	270	25	295
SB RIGHT	10	5%		10	5	15
TOTALS	**985**		**50**	**1035**	**100**	**1135**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EAGLE VISTA DRIVE						
EB LEFT	45	5%		45	5	50
EB THRU	0	0%		0	0	0
EB RIGHT	60	5%		60	5	65
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FIGUEROA ST						
NB LEFT	25	30%		25	5	30
NB THRU	625	5%	**50**	675	60	735
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	220	5%		220	20	240
SB RIGHT	10	5%		10	5	15
TOTALS	**985**		**50**	**1035**	**100**	**1135**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EAGLE VISTA DRIVE						
EB LEFT	30	5%		30	5	35
EB THRU	0	0%		0	0	0
EB RIGHT	50	5%		50	5	55
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FIGUEROA ST						
NB LEFT	40	5%		40	5	45
NB THRU	325	10%		325	30	355
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	275	10%	**50**	325	30	355
SB RIGHT	15	5%		15	5	20
TOTALS	**735**		**50**	**785**	**80**	**865**

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TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

EAGLE VISTA DRIVE

EB LEFT	30	5%		30	5	35
EB THRU	0	0%		0	0	0
EB RIGHT	50	5%		50	5	55
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

FIGUEROA ST

NB LEFT	40	5%		40	5	45
NB THRU	325	10%	**50**	375	35	410
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	275	10%		275	25	300
SB RIGHT	15	5%		15	5	20
TOTALS	**735**		**50**	**785**	**80**	**865**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

EAGLE VISTA DRIVE

EB LEFT	40	5%		40	5	45
EB THRU	0	0%		0	0	0
EB RIGHT	70	5%		70	5	75
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

FIGUEROA ST

NB LEFT	105	5%		105	10	115
NB THRU	430	5%		430	40	470
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%	**50**	485	45	530
SB RIGHT	25	5%		25	5	30
TOTALS	**1105**		**50**	**1155**	**110**	**1265**

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TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

EAGLE VISTA DRIVE

EB LEFT	40	5%		40	5	45
EB THRU	0	0%		0	0	0
EB RIGHT	70	5%		70	5	75
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

FIGUEROA ST

NB LEFT	105	5%		105	10	115
NB THRU	430	5%	**50**	480	45	525
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	435	5%		435	40	475
SB RIGHT	25	5%		25	5	30
TOTALS	**1105**		**50**	**1155**	**110**	**1265**

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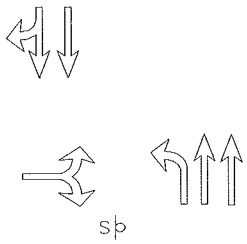
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	43	2	6	50	**0**	50	5	55
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	59	0	0	60	**0**	60	5	65
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	17	8	24	40	**0**	40	5	45
NB THRU	605	20	60	665	**0**	665	60	725
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	212	6	18	230	**150**	380	35	415
SB RIGHT	10	0	0	10	**0**	10	5	15
TOTALS	**946**				**150**	**1205**	**115**	**1320**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	43	2	6	50	**0**	50	5	55
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	59	0	0	60	**0**	60	5	65
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	17	8	24	40	**0**	40	5	45
NB THRU	605	20	60	665	**150**	815	75	890
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	212	6	18	230	**0**	230	20	250
SB RIGHT	10	0	0	10	**0**	10	5	15
TOTALS	**946**				**150**	**1205**	**115**	**1320**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	28	0	0	30	**0**	30	5	35
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	49	0	0	50	**0**	50	5	55
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	39	1	3	40	**0**	40	5	45
NB THRU	295	31	93	390	**0**	390	35	425
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	247	29	87	335	**150**	485	45	530
SB RIGHT	15	1	3	20	**0**	20	5	25
TOTALS	**673**				**150**	**1015**	**100**	**1115**

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TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	28	0	0	30	**0**	30	5	35
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	49	0	0	50	**0**	50	5	55
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	39	1	3	40	**0**	40	5	45
NB THRU	295	31	93	390	**150**	540	50	590
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	247	29	87	335	**0**	335	30	365
SB RIGHT	15	1	3	20	**0**	20	5	25
TOTALS	**673**				**150**	**1015**	**100**	**1115**

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TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	39	0	0	40	**0**	40	5	45
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	68	0	0	70	**0**	70	5	75
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	104	0	0	105	**0**	105	10	115
NB THRU	425	5	15	440	**0**	440	40	480
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	422	13	39	460	**150**	610	55	665
SB RIGHT	27	0	0	25	**0**	25	5	30
TOTALS	**1085**				**150**	**1290**	**120**	**1410**

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TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : EAGLE VISTA DRIVE
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 22
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EAGLE VISTA DRIVE								
EB LEFT	39	0	0	40	**0**	40	5	45
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	68	0	0	70	**0**	70	5	75
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FIGUEROA ST								
NB LEFT	104	0	0	105	**0**	105	10	115
NB THRU	425	5	15	440	**150**	590	55	645
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	422	13	39	460	**0**	460	40	500
SB RIGHT	27	0	0	25	**0**	25	5	30
TOTALS	**1085**				**150**	**1290**	**120**	**1410**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA
EAST-WEST STREET: EAGLE VISTA DR
JURISDICTION: PASADENA
DATE: 10-25-11

PEAK HOUR: 07:15AM

Figueroa St (SB)
NORTH LEG

TOTAL: 228

Rt	Thru	Lt	
10	218 ≈220		Total
1	70		1st
3	43		2nd
3	55		3rd
3	50		4th

TT = 6
TT% = $\frac{6}{228}$ = 2.63% ≈ 3%

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
45	15	11	7	12	Lt
					Thru
≈60 59	10	23	10	16	Rt

WEST LEG TOTAL: 104

Eagle Vista Dr (EB)

TT = 2
TT% = $\frac{2}{104}$ = 1.92% ≈ 2%

	Lt	Thru	Rt
1st	4	135	
2nd	3	141	
3rd	9	174	
4th	9	175	
Total	25	625	

SOUTH LEG
Figueroa St (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.80
SOUTH LEG = 0.88
EAST LEG =
WEST LEG = 0.76

ALL LEGS = 0.93

TT = 28
TT% = $\frac{28}{650}$ = 4.31% ≈ 4%

TOTAL: 650

HOUR TOTAL: 982

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 07:00AM-08:00AM DATE: 10-25-11

NORTH LEG

Rt	Thru	Lt	
8	215		Total
1	47		1st
1	70		2nd
3	43		3rd
3	55		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
39	6	15	11	7	Lt
					Thru
48	5	10	23	10	Rt

	Lt	Thru	Rt
1st	6	100	
2nd	4	135	
3rd	3	141	
4th	9	174	
Total	22	550	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 08:00AM-09:00AM DATE: 10-25-11

NORTH LEG

Rt	Thru	Lt	
11	228		Total
3	50		1st
1	50		2nd
5	73		3rd
2	55		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
40	12	11	9	8	Lt
					Thru
53	16	13	13	11	Rt

	Lt	Thru	Rt
1st	9	175	
2nd	7	116	
3rd	2	146	
4th	13	125	
Total	31	562	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN/FIGUEROA PASADENA

EAST-WEST STREET : EAGLE VISTA DR 10-25-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
					SB NORTH LEG							
1	47	0	0	0	0	0	0	0	0	0	0	48
1	68	0	0	1	0	0	0	0	0	1	0	71
3	42	0	0	1	0	0	0	0	0	0	0	46
3	54	0	0	0	0	0	0	0	0	1	0	58
3	48	0	0	2	0	0	0	0	0	0	0	53
1	43	0	0	5 4	0	0	1 0	0	0	1 2	0	228 51
5	68	0	0	5	0	0	0	0	0	0	0	78
2	48	0	0	6	0	0	0	0	0	1	0	57
						TT = 4+0+2 = 6						
19	418	0	0	20	0	0	1	0	0	4	0	462
					NB SOUTH LEG							
0	100	6	0	0	0	0	0	0	0	0	0	106
0	131	3	0	3	1	0	0	0	0	1	0	139
0	134	2	0	6	1	0	1	0	0	0	0	144
0	171	4	0	1	4	0	1	1	0	1	0	183
0	169	8	0	5	1	0	1	0	0	0	0	184
0	112	5	0	2 22	2	0	0 4	0	0	2 2	0	650 123
0	143	2	0	2	0	0	0	0	0	1	0	148
0	121	13	0	1	0	0	3	0	0	0	0	138
						TT = 22+4+2 = 28						
0	1081	43	0	20	9	0	6	1	0	5	0	1165
					WB EAST LEG							
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
					EB WEST LEG							
5	0	6	0	0	0	0	0	0	0	0	0	11
10	0	15	0	0	0	0	0	0	0	0	0	25
23	0	9	0	0	2	0	0	0	0	0	0	34
10	0	7	0	0	0	0	0	0	0	0	0	17
16	0	12	0	0	0	0	0	0	0	0	0	28
13	0	11	0	0	2 0	0	0	0 0	0	0	0 0	104 24
13	0	9	0	0	0	0	0	0	0	0	0	22
10	0	8	1	0	0	0	0	0	0	0	0	19
						TT = 2+0+0 = 2						
100	0	77	1	0	2	0	0	0	0	0	0	180

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA
EAST-WEST STREET: EAGLE VISTA DR DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 12:45PM

Figueroa St (SB)

NORTH LEG

TOTAL: 292

Rt	Thru	Lt	
16 ≈15	276 ≈275		Total
5	74		1st
4	76		2nd
1	70		3rd
6	56		4th

TT = 30

$TT\% = \frac{30}{292} = 10.3\% \approx 10\%$

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
28 ≈30	7	11	5	5	Lt
					Thru
49 ≈50	13	15	4	17	Rt

WEST LEG TOTAL: 77

Eagle Vista Dr (EB)

TT = 0

$TT = \frac{0}{77} = 0\%$

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.89
EAST LEG =
WEST LEG = 0.74

ALL LEGS = 0.93

	Lt	Thru	Rt
1st	11	70	
2nd	12	80	
3rd	8	95	
4th	9	81	
Total	40	326 ≈325	

SOUTH LEG

Figueroa St (NB)

TT = 32

$TT\% = \frac{32}{366} = 8.74\% \approx 9\%$

TOTAL: 366

HOUR TOTAL: 735

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 12:00PM-01:00PM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total	20	275	
1st	4	66	
2nd	7	67	
3rd	4	68	
4th	5	74	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	27	7	5	8	7
Thru					
Rt	43	9	11	10	13

	Lt	Thru	Rt
1st	7	73	
2nd	4	82	
3rd	8	70	
4th	11	70	
Total	30	295	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 01:00PM-02:00PM DATE: 10-25-11

NORTH LEG

Rt	Thru	Lt	
13	256		Total
4	76		1st
1	70		2nd
6	56		3rd
2	54		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
29	11	5	5	8	Lt
					Thru
49	15	4	17	13	Rt

	Lt	Thru	Rt
1st	12	80	
2nd	8	95	
3rd	9	81	
4th	9	66	
Total	38	322	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN/FIGUEROA PASADENA

EAST-WEST STREET : EAGLE VISTA DR 10-25-11

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
4	59	0	0	2	0	0	5	0	0	0	0	70
7	59	0	0	2	0	0	5	0	0	1	0	74
4	62	0	0	3	0	0	2	0	0	1	0	72
5	61	0	0	2	0	0	9	0	0	2	0	79
4	65	0	0	3	0	0	6	0	0	2	0	80
1	67	0	0	3	0	0	0	0	0	0	0	71
5	54	0	1	1	0	0	1	0	0	0	0	62
2	51	0	0	0	10 0	0	2	16 0	0	1	4 0	292 56
						TT= 10+16+4= 30						
32	478	0	1	16	0	0	30	0	0	7	0	564
						SOUTH LEG						
0	69	7	0	1	0	0	2	0	0	1	0	80
0	75	4	0	2	0	0	5	0	0	0	0	86
0	65	8	0	0	0	0	4	0	0	1	0	78
0	58	11	0	5	0	0	5	0	0	2	0	81
0	76	12	0	3	0	0	1	0	0	0	0	92
0	86	8	0	5	0	0	3	0	0	1	0	103
0	75	8	0	2	1	0	2	0	0	2	0	90
0	61	9	0	1	16 0	0	3	11 0	0	1	5 0	366 75
						TT= 16+11+5= 32						
0	565	67	0	19	1	0	25	0	0	8	0	685
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
7	0	7	2	0	0	0	0	0	0	0	0	16
11	0	5	0	0	0	0	0	0	0	0	0	16
10	0	8	0	0	0	0	0	0	0	0	0	18
13	0	7	0	0	0	0	0	0	0	0	0	20
15	0	11	0	0	0	0	0	0	0	0	0	26
4	0	5	0	0	0	0	0	0	0	0	0	9
17	0	5	0	0	0	0	0	0	0	0	0	22
12	0	8	1	0	0 0	0	0	0 0	0	0	0 0	77 21
						TT= 0+0+0= 0						
89	0	56	3	0	0	0	0	0	0	0	0	148

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA
EAST-WEST STREET: EAGLE VISTA DR DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 04:45PM

Figueroa St (SB)
NORTH LEG

TOTAL: 462

Rt	Thru	Lt	
27 ≈25	435		Total
9	97		1st
6	129		2nd
7	117		3rd
5	92		4th

TT=13

$TT\% = \frac{13}{462} = 2.81\% \approx 3\%$

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
39 ≈40	10	14	12	3	Lt
					Thru
68 ≈70	25	27	9	7	Rt

WEST LEG TOTAL: 107

Eagle Vista Dr (EB)

TT=0

$TT = \frac{0}{107} = 0\%$

	Lt	Thru	Rt
1st	31	110	
2nd	23	106	
3rd	29	110	
4th	21	104	
Total	104 ≈105	430	

SOUTH LEG
Figueroa St (NB)

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.95
EAST LEG =
WEST LEG = 0.65

ALL LEGS = 0.90

TT=5

$TT\% = \frac{5}{534} = 0.94\% \approx 1\%$

TOTAL: 534

HOUR TOTAL: 1,103

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 04:00PM-05:00PM DATE: 10-25-11

NORTH LEG

Rt	Thru	Lt	
27	379		Total
10	79		1st
4	111		2nd
4	92		3rd
9	97		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
27	7	4	6	10	Lt
					Thru
56	8	14	9	25	Rt

	Lt	Thru	Rt
1st	18	96	
2nd	18	95	
3rd	13	92	
4th	31	110	
Total	80	393	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SCHOLL CYN/FIGUEROA

EAST-WEST STREET: EAGLE VISTA DR

TIME: 05:00PM-06:00PM DATE: 10-25-11

NORTH LEG

Rt	Thru	Lt	
31	441		Total
6	129		1st
7	117		2nd
5	92		3rd
13	103		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
34	14	12	3	5	Lt
					Thru
50	27	9	7	7	Rt

	Lt	Thru	Rt
1st	23	106	
2nd	29	110	
3rd	21	104	
4th	23	101	
Total	96	421	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SCHOLL CYN/FIGUEROA PASADENA

EAST-WEST STREET : EAGLE VISTA DR 10-25-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
10	72	0	0	3	0	0	3	0	0	1	0	89
4	108	0	0	1	0	0	1	0	0	1	0	115
4	89	0	0	2	0	0	0	0	0	1	0	96
9	93	0	0	2	0	0	2	0	0	0	0	106
6	122	0	0	1	0	0	5	0	0	1	0	135
7	117	0	0	0	0	0	0	0	0	0	0	124
5	90	0	0	2	0	0	0	0	0	0	0	97
13	102	0	0	1 5	0	0	0 7	0	0	0 1	0	462 116
						TT=5+7+1=13						
58	793	0	0	12	0	0	11	0	0	4	0	878
						SOUTH LEG						
0	93	18	0	2	0	0	0	0	0	1	0	114
0	89	17	0	4	1	0	1	0	0	1	0	113
0	90	13	0	0	0	0	0	0	0	2	0	105
0	109	31	0	1	0	0	0	0	0	0	0	141
0	105	23	0	0	0	0	0	0	0	1	0	129
0	108	29	0	1	0	0	1	0	0	0	0	139
0	103	21	0	1	0	0	0	0	0	0	0	125
0	100	23	0	0 3	0	0	0 1	0	0	1 1	0	534 124
						TT= 3+1+1=5						
0	797	175	0	9	1	0	2	0	0	6	0	990
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	00	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
8	0	7	0	0	0	0	0	0	0	0	0	15
14	0	4	0	0	0	0	0	0	0	0	0	18
9	0	6	0	0	0	0	0	0	0	0	0	15
25	0	10	0	0	0	0	0	0	0	0	0	35
27	0	14	0	0	0	0	0	0	0	0	0	41
9	0	12	0	0	0	0	0	0	0	0	0	21
7	0	3	0	0	0	0	0	0	0	0	0	10
7	0	5	0	0 0	0	0	0 0	0	0	0	0 0	107 12
						TT=0+0+0=0						
106	0	61	0	0	0	0	0	0	0	0	0	167

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Intersection	
Intersection Delay (sec/veh):	1.5

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	25	625	220	10	45	60
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	0	30	5	5	0
Movement Flow Rate	27	672	237	11	48	65
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	247	0	0	0	632	124
Stage 1	0	0	0	0	242	0
Stage 2	0	0	0	0	390	0
Follow-up Headway	2.25	-	0	0	3.55	3.3
Pot Capacity-1 Maneuver	1298	-	-	-	406	907
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	645	-
Mov Capacity-1 Maneuver	1298	-	-	-	397.5	907
Mov Capacity-2 Maneuver	-	-	-	-	397.5	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	631.5	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.3	0	12.6
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			585		
HCM Control Delay (s)	7.832	-	12.6	-	-
HCM Lane VC Ratio	0.021	-	0.193	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.063	-	0.709	0	-

Intersection	
Intersection Delay (sec/veh):	1.7

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	40	325	275	15	30	50
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	10	10	5	0	0
Movement Flow Rate	43	349	296	16	32	54
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	312	0	0	0	565	156
Stage 1	0	0	0	0	304	0
Stage 2	0	0	0	0	261	0
Follow-up Headway	2.25	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1224	-	-	-	460	868
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	765	-
Mov Capacity-1 Maneuver	1224	-	-	-	443.9	868
Mov Capacity-2 Maneuver	-	-	-	-	443.9	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	738.2	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.9	0	11.5
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			639		
HCM Control Delay (s)	8.048	-	11.5	-	-
HCM Lane VC Ratio	0.035	-	0.135	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.109	-	0.464	0	-

Intersection	
Intersection Delay (sec/veh):	2.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	105	430	435	25	40	70
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	5	5	0	0	0
Movement Flow Rate	117	478	483	28	44	78
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	511	0	0	0	969	256
Stage 1	7.17329748772037E-299		0	0	497	0
Stage 2	1.39067116156707E-309		0	0	472	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1065	-	-	-	255	748
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	600	-
Mov Capacity-1 Maneuver	1065	-	-	-	227	748
Mov Capacity-2 Maneuver	-	-	-	-	227	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	534	-

Approach	NB	SB	SE
HCM Control Delay (s)	1.7	0	17.6
HCM LOS	A	A	C

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			408		
HCM Control Delay (s)	8.796	-	17.6	-	-
HCM Lane V/C Ratio	0.11	-	0.3	0	-
HCM Lane LOS	A	-	C	-	-
HCM 95th Percentile Queue (veh)	0.368	-	1.24	0	-

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	25	625	270	10	45	60
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	0	23	5	5	0
Movement Flow Rate	27	672	290	11	48	65
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	301	0	0	0	686	151
Stage 1	0	0	0	0	296	0
Stage 2	0	0	0	0	390	0
Follow-up Headway	2.25	-	0	0	3.55	3.3
Pot Capacity-1 Maneuver	1236	-	-	-	375	877
Stage 1	-	-	-	-	720	-
Stage 2	-	-	-	-	645	-
Mov Capacity-1 Maneuver	1236	-	-	-	366.8	877
Mov Capacity-2 Maneuver	-	-	-	-	366.8	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	630.8	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.3	0	13.2
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			549		
HCM Control Delay (s)	7.977	-	13.2	-	-
HCM Lane VC Ratio	0.022	-	0.206	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.067	-	0.766	0	-

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	40	325	325	15	30	50
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	10	24	5	0	0
Movement Flow Rate	43	349	349	16	32	54
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	366	0	0	0	619	183
Stage 1	0	0	0	0	358	0
Stage 2	0	0	0	0	261	0
Follow-up Headway	2.25	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1167	-	-	-	425	833
Stage 1	-	-	-	-	684	-
Stage 2	-	-	-	-	765	-
Mov Capacity-1 Maneuver	1167	-	-	-	409.3	833
Mov Capacity-2 Maneuver	-	-	-	-	409.3	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	736.7	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.9	0	12
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			600		
HCM Control Delay (s)	8.203	-	12	-	-
HCM Lane VC Ratio	0.037	-	0.143	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.115	-	0.498	0	-

Intersection	
Intersection Delay (sec/veh):	2.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	105	430	485	25	40	70
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	5	15	0	0	0
Movement Flow Rate	117	478	539	28	44	78
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	567	0	0	0	1025	283
Stage 1	0	0	0	0	553	0
Stage 2	0	0	0	0	472	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1014	-	-	-	234	721
Stage 1	-	-	-	-	546	-
Stage 2	-	-	-	-	600	-
Mov Capacity-1 Maneuver	1014	-	-	-	207.1	721
Mov Capacity-2 Maneuver	-	-	-	-	207.1	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	531	-

Approach	NB	SB	SE
HCM Control Delay (s)	1.8	0	19
HCM LOS	A	A	C

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			379		
HCM Control Delay (s)	9.011	-	19	-	-
HCM Lane VC Ratio	0.115	-	0.322	0	-
HCM Lane LOS	A	-	C	-	-
HCM 95th Percentile Queue (veh)	0.389	-	1.37	0	-

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	25	680	295	10	50	65
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	0	23	5	5	0
Movement Flow Rate	27	731	317	11	54	70
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	328	0	0	0	742	164
Stage 1	0	0	0	0	323	0
Stage 2	0	0	0	0	419	0
Follow-up Headway	2.25	-	0	0	3.55	3.3
Pot Capacity-1 Maneuver	1207	-	-	-	345	860
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	623	-
Mov Capacity-1 Maneuver	1207	-	-	-	337.4	860
Mov Capacity-2 Maneuver	-	-	-	-	337.4	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	609.3	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.3	0	14.2
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			514		
HCM Control Delay (s)	8.051	-	14.2	-	-
HCM Lane VC Ratio	0.022	-	0.241	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.068	-	0.933	0	-

Intersection	
Intersection Delay (sec/veh):	1.8

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	45	355	355	15	35	55
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	10	24	5	0	0
Movement Flow Rate	48	382	382	16	38	59
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	398	0	0	0	678	199
Stage 1	0	0	0	0	390	0
Stage 2	0	0	0	0	288	0
Follow-up Headway	2.25	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1135	-	-	-	390	817
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	741	-
Mov Capacity-1 Maneuver	1135	-	-	-	373.2	817
Mov Capacity-2 Maneuver	-	-	-	-	373.2	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	709.1	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.9	0	12.8
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			559		
HCM Control Delay (s)	8.313	-	12.8	-	-
HCM Lane VC Ratio	0.043	-	0.173	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.133	-	0.621	0	-

Intersection	
Intersection Delay (sec/veh):	3

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	115	470	530	25	45	75
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	5	15	0	0	0
Movement Flow Rate	128	522	589	28	50	83
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	617	0	0	0	1120	308
Stage 1	0	0	0	0	603	0
Stage 2	0	0	0	0	517	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	973	-	-	-	204	695
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	569	-
Mov Capacity-1 Maneuver	973	-	-	-	177.3	695
Mov Capacity-2 Maneuver	-	-	-	-	177.3	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	494.5	-

Approach	NB	SB	SE
HCM Control Delay (s)	1.8	0	22.9
HCM LOS	A	A	C

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			332		
HCM Control Delay (s)	9.258	-	22.9	-	-
HCM Lane VC Ratio	0.131	-	0.402	0	-
HCM Lane LOS	A	-	C	-	-
HCM 95th Percentile Queue (veh)	0.452	-	1.872	0	-

Intersection	
Intersection Delay (sec/veh):	1.5

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	25	675	220	10	45	60
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	12	30	5	5	0
Movement Flow Rate	27	726	237	11	48	65
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	247	0	0	0	659	124
Stage 1	0	0	0	0	242	0
Stage 2	0	0	0	0	417	0
Follow-up Headway	2.25	-	0	0	3.55	3.3
Pot Capacity-1 Maneuver	1298	-	-	-	390	907
Stage 1	-	-	-	-	767	-
Stage 2	-	-	-	-	624	-
Mov Capacity-1 Maneuver	1298	-	-	-	381.8	907
Mov Capacity-2 Maneuver	-	-	-	-	381.8	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	610.9	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.3	0	12.9
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			571		
HCM Control Delay (s)	7.832	-	12.9	-	-
HCM Lane VC Ratio	0.021	-	0.198	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.063	-	0.73	0	-

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	40	375	275	15	30	50
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	22	10	5	0	0
Movement Flow Rate	43	403	296	16	32	54
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	312	0	0	0	592	156
Stage 1	0	0	0	0	304	0
Stage 2	0	0	0	0	288	0
Follow-up Headway	2.25	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1224	-	-	-	442	868
Stage 1	-	-	-	-	728	-
Stage 2	-	-	-	-	741	-
Mov Capacity-1 Maneuver	1224	-	-	-	426.5	868
Mov Capacity-2 Maneuver	-	-	-	-	426.5	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	715.1	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.8	0	11.7
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			625		
HCM Control Delay (s)	8.048	-	11.7	-	-
HCM Lane VC Ratio	0.035	-	0.138	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.109	-	0.475	0	-

Intersection	
Intersection Delay (sec/veh):	2.5

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	105	480	435	25	40	70
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	15	5	0	0	0
Movement Flow Rate	117	533	483	28	44	78
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	511	0	0	0	997	256
Stage 1	9.256214219	0012E61	0	0	497	0
Stage 2	2.901167637240	187E-315	0	0	500	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1065	-	-	-	244	748
Stage 1	-	-	-	-	582	-
Stage 2	-	-	-	-	580	-
Mov Capacity-1 Maneuver	1065	-	-	-	217.2	748
Mov Capacity-2 Maneuver	-	-	-	-	217.2	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	516.2	-

Approach	NB	SB	SE
HCM Control Delay (s)	1.6	0	18.1
HCM LOS	A	A	C

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			396		
HCM Control Delay (s)	8.796	-	18.1	-	-
HCM Lane VC Ratio	0.11	-	0.309	0	-
HCM Lane LOS	A	-	C	-	-
HCM 95th Percentile Queue (veh)	0.368	-	1.291	0	-

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	25	680	295	10	50	65
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	12	30	5	5	0
Movement Flow Rate	27	731	317	11	54	70
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	328	0	0	0	742	164
Stage 1	0	0	0	0	323	0
Stage 2	0	0	0	0	419	0
Follow-up Headway	2.25	-	0	0	3.55	3.3
Pot Capacity-1 Maneuver	1207	-	-	-	345	860
Stage 1	-	-	-	-	697	-
Stage 2	-	-	-	-	623	-
Mov Capacity-1 Maneuver	1207	-	-	-	337.4	860
Mov Capacity-2 Maneuver	-	-	-	-	337.4	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	609.3	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.3	0	14.2
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			514		
HCM Control Delay (s)	8.051	-	14.2	-	-
HCM Lane VC Ratio	0.022	-	0.241	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.068	-	0.933	0	-

Intersection	
Intersection Delay (sec/veh):	1.8

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	45	355	355	15	35	55
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles(%)	5	22	10	5	0	0
Movement Flow Rate	48	382	382	16	38	59
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	398	0	0	0	678	199
Stage 1	0	0	0	0	390	0
Stage 2	0	0	0	0	288	0
Follow-up Headway	2.25	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	1135	-	-	-	390	817
Stage 1	-	-	-	-	659	-
Stage 2	-	-	-	-	741	-
Mov Capacity-1 Maneuver	1135	-	-	-	373.2	817
Mov Capacity-2 Maneuver	-	-	-	-	373.2	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	709.1	-

Approach	NB	SB	SE
HCM Control Delay (s)	0.9	0	12.8
HCM LOS	A	A	B

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			559		
HCM Control Delay (s)	8.313	-	12.8	-	-
HCM Lane VC Ratio	0.043	-	0.173	0	-
HCM Lane LOS	A	-	B	-	-
HCM 95th Percentile Queue (veh)	0.133	-	0.621	0	-

Intersection	
Intersection Delay (sec/veh):	3

Movement	NBL	NBT	SBT	SBR	SEL	SER
Volume (vph)	115	470	530	25	45	75
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
Right Turn Channelized	None	None	None	None	None	None
Storage Length	50			0	0	0
Median Width		12	12		12	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Heavy Vehicles(%)	0	15	5	0	0	0
Movement Flow Rate	128	522	589	28	50	83
Number of Lanes	1	2	2	0	1	0

Major/Minor	Major 1		Major 2			
Conflicting Flow Rate - All	617	0	0	0	1120	308
Stage 1	0	0	0	0	603	0
Stage 2	0	0	0	0	517	0
Follow-up Headway	2.2	-	0	0	3.5	3.3
Pot Capacity-1 Maneuver	973	-	-	-	204	695
Stage 1	-	-	-	-	515	-
Stage 2	-	-	-	-	569	-
Mov Capacity-1 Maneuver	973	-	-	-	177.3	695
Mov Capacity-2 Maneuver	-	-	-	-	177.3	-
Stage 1	-	-	-	-	# 0	-
Stage 2	-	-	-	-	494.5	-

Approach	NB	SB	SE
HCM Control Delay (s)	1.8	0	22.9
HCM LOS	A	A	C

Lane	NBL	NBT	SELn1	SBT	SBR
Capacity (vph)			332		
HCM Control Delay (s)	9.258	-	22.9	-	-
HCM Lane VC Ratio	0.131	-	0.402	0	-
HCM Lane LOS	A	-	C	-	-
HCM 95th Percentile Queue (veh)	0.452	-	1.872	0	-

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

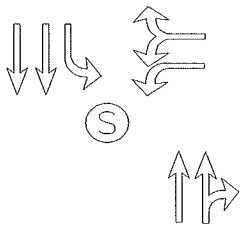
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	365	5%		365	35	400
WB THRU	0	0%		0	0	0
WB RIGHT	40	10%		40	5	45
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	615	5%		615	55	670
NB RIGHT	285	5%		285	25	310
SB LEFT	50	5%	**50**	100	10	110
SB THRU	210	5%		210	20	230
SB RIGHT	0	0%		0	0	0
TOTALS	**1565**		**50**	**1615**	**150**	**1765**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	365	5%		365	35	400
WB THRU	0	0%		0	0	0
WB RIGHT	40	10%	**50**	90	10	100
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	615	5%		615	55	670
NB RIGHT	285	5%		285	25	310
SB LEFT	50	5%		50	5	55
SB THRU	210	5%		210	20	230
SB RIGHT	0	0%		0	0	0
TOTALS	**1565**		**50**	**1615**	**150**	**1765**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	235	5%		235	20	255
WB THRU	0	0%		0	0	0
WB RIGHT	75	25%		75	5	80
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	260	5%		260	25	285
NB RIGHT	225	5%		225	20	245
SB LEFT	65	35%	**50**	115	10	125
SB THRU	280	5%		280	25	305
SB RIGHT	0	0%		0	0	0
TOTALS	**1140**		**50**	**1190**	**105**	**1295**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	235	5%		235	20	255
WB THRU	0	0%		0	0	0
WB RIGHT	75	25%	**50**	125	10	135
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	260	5%		260	25	285
NB RIGHT	225	5%		225	20	245
SB LEFT	65	35%		65	5	70
SB THRU	280	5%		280	25	305
SB RIGHT	0	0%		0	0	0
TOTALS	**1140**		**50**	**1190**	**105**	**1295**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	455	5%		455	40	495
WB THRU	0	0%		0	0	0
WB RIGHT	55	5%		55	5	60
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	480	5%		480	45	525
NB RIGHT	265	5%		265	25	290
SB LEFT	55	15%	**50**	105	10	115
SB THRU	445	5%		445	40	485
SB RIGHT	0	0%		0	0	0
TOTALS	**1755**		**50**	**1805**	**165**	**1970**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	11-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB 134 FWY						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	455	5%		455	40	495
WB THRU	0	0%		0	0	0
WB RIGHT	55	5%	**50**	105	10	115
FIGUEROA ST						
NB LEFT	0	0%		0	0	0
NB THRU	480	5%		480	45	525
NB RIGHT	265	5%		265	25	290
SB LEFT	55	15%		55	5	60
SB THRU	445	5%		445	40	485
SB RIGHT	0	0%		0	0	0
TOTALS	**1755**		**50**	**1805**	**165**	**1970**

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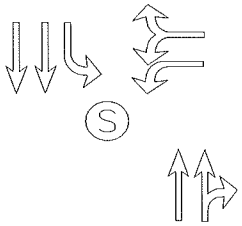
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	358	8	24	380	**0**	380	35	415
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	37	5	15	50	**0**	50	5	55
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	597	17	51	650	**0**	650	60	710
NB RIGHT	284	2	6	290	**0**	290	25	315
SB LEFT	51	0	0	50	**150**	200	20	220
SB THRU	205	5	15	220	**0**	220	20	240
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1532**				**150**	**1790**	**165**	**1955**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	358	8	24	380	**0**	380	35	415
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	37	5	15	50	**150**	200	20	220
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	597	17	51	650	**0**	650	60	710
NB RIGHT	284	2	6	290	**0**	290	25	315
SB LEFT	51	0	0	50	**0**	50	5	55
SB THRU	205	5	15	220	**0**	220	20	240
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1532**				**150**	**1790**	**165**	**1955**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	227	10	30	255	**0**	255	25	280
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	57	17	51	110	**0**	110	10	120
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	256	5	15	270	**0**	270	25	295
NB RIGHT	219	5	15	235	**0**	235	20	255
SB LEFT	42	22	66	110	**150**	260	25	285
SB THRU	272	6	18	290	**0**	290	25	315
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1073**				**150**	**1420**	**130**	**1550**

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TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	227	10	30	255	**0**	255	25	280
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	57	17	51	110	**150**	260	25	285
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	256	5	15	270	**0**	270	25	295
NB RIGHT	219	5	15	235	**0**	235	20	255
SB LEFT	42	22	66	110	**0**	110	10	120
SB THRU	272	6	18	290	**0**	290	25	315
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1073**				**150**	**1420**	**130**	**1550**

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TURN MOVEMENT SUMMARY	MC	11-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	455	0	0	455	**0**	455	40	495
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	56	1	3	60	**0**	60	5	65
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	473	5	15	490	**0**	490	45	535
NB RIGHT	259	5	15	275	**0**	275	25	300
SB LEFT	46	9	27	75	**150**	225	20	245
SB THRU	446	1	3	450	**0**	450	40	490
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1735**				**150**	**1955**	**175**	**2130**

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E/W STREET : EB 134 FWY
N/S STREET : FIGUEROA ST
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 23
ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB 134 FWY								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	455	0	0	455	**0**	455	40	495
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	56	1	3	60	**150**	210	20	230
FIGUEROA ST								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	473	5	15	490	**0**	490	45	535
NB RIGHT	259	5	15	275	**0**	275	25	300
SB LEFT	46	9	27	75	**0**	75	5	80
SB THRU	446	1	3	450	**0**	450	40	490
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1735**				**150**	**1955**	**175**	**2130**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FIGUEROA
EAST-WEST STREET: FWY 134 EB RAMPS
JURISDICTION: PASADENA

DATE: 10-25-11

PEAK HOUR: 07:30AM

Figueroa St (SB)
NORTH LEG

TOTAL: 261

	Rt	Thru	Lt
Total		210	51 ≈50
1st		52	15
2nd		54	12
3rd		53	12
4th		51	12

TT = 5
$TT\% = \frac{5}{261} = 1.92\% \approx 2\%$

EAST LEG TOTAL: 408

	1st	2nd	3rd	4th	Total
Rt	4	9	15	14	42 ≈40
Thru					
Lt	102	93	86	85	366 ≈365

134 Fwy Offramp (EB)
TT = 13
$TT\% = \frac{13}{408} = 3.19\% \approx 3\%$

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.97
SOUTH LEG = 0.91
EAST LEG = 0.96
WEST LEG =

ALL LEGS = 0.95

	Lt	Thru	Rt
1st		150	82
2nd		165	75
3rd		173	74
4th		126	55
Total		614 ≈615	286 ≈285

TT = 19
$TT\% = \frac{19}{900} = 2.11\% \approx 2\%$

TOTAL: 900

SOUTH LEG
Figueroa St (NB)

HOUR TOTAL: 1,569

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total		217	45
1st		40	10
2nd		71	8
3rd		52	15
4th		54	12

	1st	2nd	3rd	4th	Total
Rt	5	8	4	9	26
Thru					
Lt	55	67	102	93	317

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		101	36
2nd		131	44
3rd		150	82
4th		165	75
Total		547	237

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total		236	46
1st		53	12
2nd		51	12
3rd		74	13
4th		58	9

	1st	2nd	3rd	4th	Total
Rt	15	14	9	13	51
Thru					
Lt	86	85	64	94	329

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		173	74
2nd		126	55
3rd		123	80
4th		115	69
Total		537	278

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FIGUEROA PASADENA

EAST-WEST STREET : FWY 134 EB RAMPS 10-25-11

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						(SB) NORTH LEG						
0	40	10	0	0	0	0	0	0	0	0	0	50
0	69	8	0	1	0	0	0	0	0	1	0	79
0	52	15	0	0	0	0	0	0	0	0	0	67
0	53	12	0	0	0	0	0	0	0	1	0	66
0	52	12	0	1	0	0	0	0	0	0	0	65
0	48	12	0	1	0	0	1	0	0	1	0	63
0	73	11	0	1 2	2	0	0 1	0	0	0 2	0	261 87
0	56	7	0	1	1	0	0	1	0	1	0	67
						TT= 2+1+2=5						
0	443	87	0	5	3	0	1	1	0	4	0	544
						(NB) SOUTH LEG						
36	101	0	0	0	0	0	0	0	0	0	0	137
44	128	0	0	2	0	0	0	0	0	1	0	175
81	144	0	1	6	0	0	0	0	0	0	0	232
74	161	0	1	3	0	0	0	0	0	1	0	240
74	170	0	0	2	0	0	1	0	0	0	0	247
55	122	0	0	3	0	0	1	0	0	0	0	181
77	122	0	2	1 16	0	1	0 2	0	0	0 1	0	900 203
67	115	0	2	0	0	0	0	0	0	0	0	184
						TT=16+2+1=19						
508	1063	0	6	17	0	1	2	0	0	2	0	1599
						(EB) EAST LEG						
5	0	55	0	0	0	0	0	0	0	0	0	60
8	0	67	0	0	0	0	0	0	0	0	0	75
2	0	98	1	0	3	1	0	0	0	0	1	106
8	0	91	1	0	2	0	0	0	0	0	0	102
15	0	85	0	0	1	0	0	0	0	0	0	101
12	0	84	1	0	1	0	0	0	1	0	0	99
6	0	63	1	0 10	0	1	0 1	0	1	0 2	1	408 73
11	0	92	0	0	2	2	0	0	0	0	0	107
						TT=10+1+2=13						
67	0	635	4	0	9	4	0	0	2	0	2	723
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FIGUEROA
EAST-WEST STREET: FWY 134 EB RAMPS DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 12:15PM

Figueroa St (SB)
NORTH LEG

TOTAL: 342

	Rt	Thru	Lt	
		278 ≈280	64 ≈65	Total
		69	13	1st
		66	16	2nd
		73	14	3rd
		70	21	4th

TT= 28

$TT\% = \frac{28}{342} = 8.19\% \approx 8\%$

EAST LEG TOTAL: 311

	1st	2nd	3rd	4th	Total
Rt	17	16	21	20	74 ≈75
Thru					
Lt	65	47	57	68	237 ≈235

134 Fwy offramp (EB)

TT= 27

$TT\% = \frac{27}{311} = 8.68\% \approx 9\%$

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.89
EAST LEG = 0.88
WEST LEG =

ALL LEGS = 0.95

	Lt	Thru	Rt
1st		70	66
2nd		61	62
3rd		59	47
4th		71	49
Total		261 ≈260	224 ≈225

TT= 10

$TT = \frac{10}{485} = 2.06\% \approx 2\%$

TOTAL: 485

SOUTH LEG
Figueroa St (NB)

HOUR TOTAL: 1,138

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total		271	55
1st		63	12
2nd		69	13
3rd		66	16
4th		73	14

	1st	2nd	3rd	4th	Total
Rt	8	17	16	21	62
Thru					
Lt	37	65	47	57	206

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		72	46
2nd		70	66
3rd		61	62
4th		59	47
Total		262	221

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total		253	53
1st		70	21
2nd		63	11
3rd		66	9
4th		54	12

	1st	2nd	3rd	4th	Total
Rt	20	26	14	15	75
Thru					
Lt	68	36	40	39	183

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		71	49
2nd		76	56
3rd		78	62
4th		61	50
Total		286	217

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FIGUEROA PASADENA

EAST-WEST STREET : FWY 134 EB RAMPS 10-25-11

BEGINNING TIME : 12:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						(SB) NORTH LEG						
0	62	7	0	1	1	0	0	3	0	0	1	75
0	68	6	0	1	0	0	0	6	0	0	1	82
0	65	14	0	1	0	0	0	0	0	0	2	82
0	70	7	0	0	0	0	1	6	0	2	1	87
0	69	15	0	0	0	0	0	4	0	1	2	91
0	61	10	0	2	2 1	0	0	17 0	0	0	9 0	342 74
0	65	8	0	0	0	0	1	0	0	0	1	75
0	54	9	0	0	1	0	0	1	0	0	1	66
						TT= 2+17+9= 28						
0	514	76	0	5	3	0	2	20	0	3	9	632
						(NB) SOUTH LEG						
45	69	0	1	1	0	0	2	0	0	0	0	118
63	69	0	3	0	0	0	1	0	0	0	0	136
62	61	0	0	0	0	0	0	0	0	0	0	123
45	56	0	0	1	0	2	2	0	0	0	0	106
49	70	0	0	1	0	0	0	0	0	0	0	120
55	74	0	0	1	5 0	1	1	5 0	0	0	0 0	485 132
61	76	0	0	1	0	1	1	0	0	0	0	140
48	60	0	2	1	0	0	0	0	0	0	0	111
						TT= 5+5+0= 10						
428	535	0	6	6	0	4	7	0	0	0	0	986
						(EB) EAST LEG						
7	0	36	0	0	0	0	0	1	1	0	0	45
13	0	62	0	0	1	4	0	0	0	0	2	82
11	0	46	1	0	0	2	0	1	2	0	0	63
16	0	56	2	0	0	1	0	0	2	0	1	78
17	0	63	0	0	4	3	0	1	0	0	0	88
21	0	34	2	0	8 1	2	0	12 1	1	0	7 0	311 62
11	0	39	1	0	0	1	0	1	1	0	0	54
11	0	37	0	0	1	3	0	1	1	0	0	54
						TT= 8+12+7= 27						
107	0	373	6	0	7	16	0	6	8	0	3	526
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FIGUEROA
EAST-WEST STREET: FWY 134 EB RAMPS DATE: 10-25-11
JURISDICTION: PASADENA

PEAK HOUR: 04:45PM

Figueroa St (SB)

NORTH LEG

TOTAL: 502

	Rt	Thru	Lt	
		447 ≈445	55	Total
		101	20	1st
		130	25	2nd
		122	5	3rd
		94	5	4th

TT=10

$TT\% = \frac{10}{502} = 1.99\% \approx 2\%$

EAST LEG TOTAL: 512

	1st	2nd	3rd	4th	Total
Rt	17	18	14	8	57 ≈55
Thru					
Lt	113	108	129	105	455

134 Fwy offramp (EB)

TT=1

$TT = \frac{1}{512} = 0.19\% \approx 1\%$

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.93
EAST LEG = 0.90
WEST LEG =

ALL LEGS = 0.96

	Lt	Thru	Rt
1st		123	76
2nd		111	65
3rd		126	62
4th		118	61
Total		478 ≈480	264 ≈265

TOTAL: 742

TT=10

$TT\% = \frac{10}{742} = 1.35\% \approx 1\%$

SOUTH LEG

Figueroa St (NB)

HOUR TOTAL: 1,756

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total		389	46
1st		80	7
2nd		116	11
3rd		92	8
4th		101	20

	1st	2nd	3rd	4th	Total
Rt	24	21	13	17	75
Thru					
Lt	114	123	106	113	456

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		91	61
2nd		93	63
3rd		92	64
4th		123	76
Total		399	264

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FIGUEROA

EAST-WEST STREET: FWY 134 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 10-25-11

NORTH LEG

	Rt	Thru	Lt
Total		446	44
1st		130	25
2nd		122	5
3rd		94	5
4th		100	9

	1st	2nd	3rd	4th	Total
Rt	18	14	8	15	55
Thru					
Lt	108	129	105	97	439

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		111	65
2nd		126	62
3rd		118	61
4th		108	72
Total		463	260

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FIGUEROA PASADENA

EAST-WEST STREET : FWY 134 EB RAMPS 10-25-11

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	77	5	0	1	1	0	1	1	0	1	0	87
0	116	9	0	0	0	0	0	1	0	0	1	127
0	91	5	0	0	2	0	0	1	0	1	0	100
0	101	16	0	0	2	0	0	2	0	0	0	121
0	130	20	0	0	0	0	0	4	0	0	1	155
0	122	5	0	0	0	0	0	0	0	0	0	127
0	93	5	0	1	0	0	0	0	0	0	0	99
0	99	9	0	1 3	0	0	0 6	0	0	0 1	0	502 109
						TT=3+6+1=10						
0	829	74	0	3	5	0	1	9	0	2	2	925
						SOUTH LEG						
60	89	0	0	2	0	0	0	0	1	0	0	152
63	91	0	0	1	0	0	1	0	0	0	0	156
64	91	0	0	0	0	0	0	0	0	1	0	156
75	122	0	1	1	0	0	0	0	0	0	0	199
63	110	0	0	0	0	0	0	0	2	1	0	176
60	124	0	1	1	0	0	1	0	1	0	0	188
61	117	0	0	1	0	0	0	0	0	0	0	179
71	108	0	0	0 5	0	0	0 1	0	1	0 4	0	742 180
						TT=5+1+4=10						
517	852	0	2	6	0	0	2	0	5	2	0	1386
						EAST LEG						
23	0	113	1	0	1	0	0	0	0	0	0	138
19	0	119	1	0	2	0	0	0	1	0	2	144
13	0	105	0	0	0	0	0	1	0	0	0	119
16	0	113	1	0	0	0	0	0	0	0	0	130
18	0	108	0	0	0	0	0	0	0	0	0	126
14	0	129	0	0	0	0	0	0	0	0	0	143
8	0	105	0	0	0	0	0	0	0	0	0	113
14	0	97	0	0 1	0	0	0 0	0	1	0 0	0	512 112
						TT=1+0+0=1						
125	0	889	3	0	3	0	0	1	2	0	2	1025
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	365	40	615	285	50	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.99		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3294		3275		1805	3438
Flt Permitted	0.96		1.00		0.27	1.00
Satd. Flow (perm)	3294		3275		510	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	384	42	647	300	53	221
RTOR Reduction (vph)	25	0	121	0	0	0
Lane Group Flow (vph)	401	0	826	0	53	221
Heavy Vehicles (%)	5%	10%	5%	5%	0%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	9.1		14.9		14.9	14.9
Effective Green, g (s)	9.1		14.9		14.9	14.9
Actuated g/C Ratio	0.28		0.47		0.47	0.47
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	937		1525		237	1601
v/s Ratio Prot	c0.12		c0.25			0.06
v/s Ratio Perm					0.10	
v/c Ratio	0.43		0.54		0.22	0.14
Uniform Delay, d1	9.3		6.1		5.1	4.9
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.4		0.5	0.0
Delay (s)	9.6		6.5		5.6	4.9
Level of Service	A		A		A	A
Approach Delay (s)	9.6		6.5			5.0
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	32.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	235	75	260	225	65	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.96		0.93		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3116		3199		1337	3438
Flt Permitted	0.96		1.00		0.46	1.00
Satd. Flow (perm)	3116		3199		653	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	79	274	237	68	295
RTOR Reduction (vph)	61	0	110	0	0	0
Lane Group Flow (vph)	265	0	401	0	68	295
Heavy Vehicles (%)	5%	25%	5%	5%	35%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.1		18.7		18.7	18.7
Effective Green, g (s)	8.1		18.7		18.7	18.7
Actuated g/C Ratio	0.23		0.54		0.54	0.54
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	725		1719		351	1847
v/s Ratio Prot	c0.09		c0.13			0.09
v/s Ratio Perm					0.10	
v/c Ratio	0.37		0.23		0.19	0.16
Uniform Delay, d1	11.2		4.3		4.2	4.1
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.3		1.2	0.2
Delay (s)	11.5		4.6		5.4	4.3
Level of Service	B		A		A	A
Approach Delay (s)	11.5		4.6			4.5
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	34.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	455	55	480	265	55	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3453		3255		1570	3438
Flt Permitted	0.96		1.00		0.33	1.00
Satd. Flow (perm)	3453		3255		542	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	474	57	500	276	57	464
RTOR Reduction (vph)	26	0	164	0	0	0
Lane Group Flow (vph)	505	0	612	0	57	464
Heavy Vehicles (%)	0%	5%	5%	5%	15%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	9.8		12.2		12.2	12.2
Effective Green, g (s)	9.8		12.2		12.2	12.2
Actuated g/C Ratio	0.33		0.41		0.41	0.41
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1128		1324		220	1398
v/s Ratio Prot	c0.15		c0.19			0.13
v/s Ratio Perm					0.11	
v/c Ratio	0.45		0.46		0.26	0.33
Uniform Delay, d1	8.0		6.5		5.9	6.1
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.3		0.6	0.1
Delay (s)	8.2		6.8		6.5	6.2
Level of Service	A		A		A	A
Approach Delay (s)	8.2		6.8			6.3
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	30.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	365	40	615	285	100	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.99		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3294		3275		1203	3438
Flt Permitted	0.96		1.00		0.26	1.00
Satd. Flow (perm)	3294		3275		324	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	384	42	647	300	105	221
RTOR Reduction (vph)	14	0	108	0	0	0
Lane Group Flow (vph)	412	0	839	0	105	221
Heavy Vehicles (%)	5%	10%	5%	5%	50%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	10.6		20.4		20.4	20.4
Effective Green, g (s)	10.6		20.4		20.4	20.4
Actuated g/C Ratio	0.27		0.52		0.52	0.52
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	895		1713		169	1798
v/s Ratio Prot	c0.13		0.26			0.06
v/s Ratio Perm					c0.32	
v/c Ratio	0.46		0.49		0.62	0.12
Uniform Delay, d1	11.8		6.0		6.6	4.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		0.2		6.9	0.0
Delay (s)	12.2		6.2		13.5	4.8
Level of Service	B		A		B	A
Approach Delay (s)	12.2		6.2			7.6
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	39.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	235	75	260	225	115	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.96		0.93		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3116		3199		1107	3438
Flt Permitted	0.96		1.00		0.46	1.00
Satd. Flow (perm)	3116		3199		540	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	79	274	237	121	295
RTOR Reduction (vph)	59	0	123	0	0	0
Lane Group Flow (vph)	267	0	388	0	121	295
Heavy Vehicles (%)	5%	25%	5%	5%	63%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.0		14.9		14.9	14.9
Effective Green, g (s)	8.0		14.9		14.9	14.9
Actuated g/C Ratio	0.26		0.48		0.48	0.48
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	807		1543		260	1658
v/s Ratio Prot	c0.09		0.12			0.09
v/s Ratio Perm					c0.22	
v/c Ratio	0.33		0.25		0.47	0.18
Uniform Delay, d1	9.3		4.7		5.3	4.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.2		0.1		1.3	0.1
Delay (s)	9.5		4.8		6.7	4.6
Level of Service	A		A		A	A
Approach Delay (s)	9.5		4.8			5.2
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	30.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	455	55	480	265	105	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3453		3255		1165	3438
Flt Permitted	0.96		1.00		0.32	1.00
Satd. Flow (perm)	3453		3255		396	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	474	57	500	276	109	464
RTOR Reduction (vph)	19	0	148	0	0	0
Lane Group Flow (vph)	512	0	628	0	109	464
Heavy Vehicles (%)	0%	5%	5%	5%	55%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.0		16.4		16.4	16.4
Effective Green, g (s)	11.0		16.4		16.4	16.4
Actuated g/C Ratio	0.31		0.46		0.46	0.46
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1073		1508		183	1593
v/s Ratio Prot	c0.15		0.19			0.13
v/s Ratio Perm					c0.28	
v/c Ratio	0.48		0.42		0.60	0.29
Uniform Delay, d1	9.9		6.3		7.0	5.9
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.2		5.1	0.1
Delay (s)	10.2		6.5		12.2	6.0
Level of Service	B		A		B	A
Approach Delay (s)	10.2		6.5			7.2
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	400	45	670	310	110	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3293		3275		1203	3438
Flt Permitted	0.96		1.00		0.23	1.00
Satd. Flow (perm)	3293		3275		287	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	421	47	705	326	116	242
RTOR Reduction (vph)	15	0	101	0	0	0
Lane Group Flow (vph)	453	0	930	0	116	242
Heavy Vehicles (%)	5%	10%	5%	5%	50%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.7		24.3		24.3	24.3
Effective Green, g (s)	11.7		24.3		24.3	24.3
Actuated g/C Ratio	0.27		0.55		0.55	0.55
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	876		1809		159	1899
v/s Ratio Prot	c0.14		0.28			0.07
v/s Ratio Perm					c0.40	
v/c Ratio	0.52		0.51		0.73	0.13
Uniform Delay, d1	13.7		6.2		7.4	4.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		0.2		15.4	0.0
Delay (s)	14.3		6.4		22.8	4.8
Level of Service	B		A		C	A
Approach Delay (s)	14.3		6.4			10.6
Approach LOS	B		A			B

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	255	80	270	235	120	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.96		0.93		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3119		3198		1107	3438
Flt Permitted	0.96		1.00		0.45	1.00
Satd. Flow (perm)	3119		3198		530	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	268	84	284	247	126	305
RTOR Reduction (vph)	62	0	128	0	0	0
Lane Group Flow (vph)	290	0	403	0	126	305
Heavy Vehicles (%)	5%	25%	5%	5%	63%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.4		15.2		15.2	15.2
Effective Green, g (s)	8.4		15.2		15.2	15.2
Actuated g/C Ratio	0.27		0.48		0.48	0.48
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	829		1538		255	1654
v/s Ratio Prot	c0.09		0.13			0.09
v/s Ratio Perm					c0.24	
v/c Ratio	0.35		0.26		0.49	0.18
Uniform Delay, d1	9.4		4.9		5.6	4.7
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.1		1.5	0.1
Delay (s)	9.6		5.0		7.1	4.7
Level of Service	A		A		A	A
Approach Delay (s)	9.6		5.0			5.4
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	31.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	495	60	525	290	115	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3453		3255		1165	3438
Flt Permitted	0.96		1.00		0.29	1.00
Satd. Flow (perm)	3453		3255		353	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	516	62	547	302	120	505
RTOR Reduction (vph)	19	0	155	0	0	0
Lane Group Flow (vph)	559	0	694	0	120	505
Heavy Vehicles (%)	0%	5%	5%	5%	55%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.8		18.8		18.8	18.8
Effective Green, g (s)	11.8		18.8		18.8	18.8
Actuated g/C Ratio	0.31		0.49		0.49	0.49
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1056		1585		172	1674
v/s Ratio Prot	c0.16		0.21			0.15
v/s Ratio Perm					c0.34	
v/c Ratio	0.53		0.44		0.70	0.30
Uniform Delay, d1	11.1		6.5		7.7	6.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		0.2		11.7	0.1
Delay (s)	11.6		6.6		19.3	6.1
Level of Service	B		A		B	A
Approach Delay (s)	11.6		6.6			8.6
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	365	90	615	285	50	210
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.97		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	2967		3275		1805	3438
Flt Permitted	0.96		1.00		0.28	1.00
Satd. Flow (perm)	2967		3275		528	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	384	95	647	300	53	221
RTOR Reduction (vph)	66	0	125	0	0	0
Lane Group Flow (vph)	413	0	822	0	53	221
Heavy Vehicles (%)	5%	60%	5%	5%	0%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	9.7		14.4		14.4	14.4
Effective Green, g (s)	9.7		14.4		14.4	14.4
Actuated g/C Ratio	0.30		0.45		0.45	0.45
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	897		1469		237	1542
v/s Ratio Prot	c0.14		c0.25			0.06
v/s Ratio Perm					0.10	
v/c Ratio	0.46		0.56		0.22	0.14
Uniform Delay, d1	9.1		6.5		5.4	5.2
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.4		0.5		0.5	0.0
Delay (s)	9.5		7.0		5.9	5.3
Level of Service	A		A		A	A
Approach Delay (s)	9.5		7.0			5.4
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	32.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	235	125	260	225	65	280
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.95		0.93		1.00	1.00
Flt Protected	0.97		1.00		0.95	1.00
Satd. Flow (prot)	2764		3199		1337	3438
Flt Permitted	0.97		1.00		0.46	1.00
Satd. Flow (perm)	2764		3199		653	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	247	132	274	237	68	295
RTOR Reduction (vph)	93	0	140	0	0	0
Lane Group Flow (vph)	286	0	371	0	68	295
Heavy Vehicles (%)	5%	55%	5%	5%	35%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	7.9		11.0		11.0	11.0
Effective Green, g (s)	7.9		11.0		11.0	11.0
Actuated g/C Ratio	0.29		0.41		0.41	0.41
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	812		1308		267	1406
v/s Ratio Prot	c0.10		c0.12			0.09
v/s Ratio Perm					0.10	
v/c Ratio	0.35		0.28		0.25	0.21
Uniform Delay, d1	7.5		5.3		5.2	5.1
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.1		0.5	0.1
Delay (s)	7.7		5.4		5.8	5.2
Level of Service	A		A		A	A
Approach Delay (s)	7.7		5.4			5.3
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	26.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	455	105	480	265	55	445
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.97		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3148		3255		1570	3438
Flt Permitted	0.96		1.00		0.33	1.00
Satd. Flow (perm)	3148		3255		551	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	474	109	500	276	57	464
RTOR Reduction (vph)	56	0	167	0	0	0
Lane Group Flow (vph)	527	0	609	0	57	464
Heavy Vehicles (%)	0%	50%	5%	5%	15%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	10.5		12.0		12.0	12.0
Effective Green, g (s)	10.5		12.0		12.0	12.0
Actuated g/C Ratio	0.34		0.39		0.39	0.39
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1084		1281		217	1353
v/s Ratio Prot	c0.17		c0.19			0.13
v/s Ratio Perm					0.10	
v/c Ratio	0.49		0.48		0.26	0.34
Uniform Delay, d1	7.9		6.9		6.3	6.5
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.3		0.3		0.6	0.2
Delay (s)	8.2		7.2		6.9	6.6
Level of Service	A		A		A	A
Approach Delay (s)	8.2		7.2			6.7
Approach LOS	A		A			A

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	30.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	400	45	670	310	110	230
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3143		3275		1805	3438
Flt Permitted	0.96		1.00		0.22	1.00
Satd. Flow (perm)	3143		3275		415	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	421	47	705	326	116	242
RTOR Reduction (vph)	16	0	110	0	0	0
Lane Group Flow (vph)	452	0	921	0	116	242
Heavy Vehicles (%)	5%	60%	5%	5%	0%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.0		19.7		19.7	19.7
Effective Green, g (s)	11.0		19.7		19.7	19.7
Actuated g/C Ratio	0.28		0.51		0.51	0.51
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	893		1667		211	1750
v/s Ratio Prot	c0.14		c0.28			0.07
v/s Ratio Perm					0.28	
v/c Ratio	0.51		0.55		0.55	0.14
Uniform Delay, d1	11.6		6.5		6.5	5.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		0.4		2.9	0.0
Delay (s)	12.0		6.9		9.4	5.1
Level of Service	B		A		A	A
Approach Delay (s)	12.0		6.9			6.5
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	38.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	255	80	270	235	120	290
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.96		0.93		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	2928		3198		1337	3438
Flt Permitted	0.96		1.00		0.45	1.00
Satd. Flow (perm)	2928		3198		640	3438
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	268	84	284	247	126	305
RTOR Reduction (vph)	65	0	106	0	0	0
Lane Group Flow (vph)	287	0	425	0	126	305
Heavy Vehicles (%)	5%	55%	5%	5%	35%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	8.9		22.6		22.6	22.6
Effective Green, g (s)	8.9		22.6		22.6	22.6
Actuated g/C Ratio	0.23		0.57		0.57	0.57
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	660		1830		366	1967
v/s Ratio Prot	c0.10		0.13			0.09
v/s Ratio Perm					c0.20	
v/c Ratio	0.43		0.23		0.34	0.16
Uniform Delay, d1	13.1		4.2		4.5	4.0
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		0.3		2.6	0.2
Delay (s)	13.6		4.5		7.1	4.1
Level of Service	B		A		A	A
Approach Delay (s)	13.6		4.5			5.0
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.37		
Actuated Cycle Length (s)	39.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
23: Figueroa St & SR134 EB

8/29/2013

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	495	60	525	290	115	485
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0		4.0	4.0
Lane Util. Factor	0.97		0.95		1.00	0.95
Frt	0.98		0.95		1.00	1.00
Flt Protected	0.96		1.00		0.95	1.00
Satd. Flow (prot)	3295		3255		1570	3438
Flt Permitted	0.96		1.00		0.28	1.00
Satd. Flow (perm)	3295		3255		466	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	516	62	547	302	120	505
RTOR Reduction (vph)	19	0	166	0	0	0
Lane Group Flow (vph)	559	0	683	0	120	505
Heavy Vehicles (%)	0%	50%	5%	5%	15%	5%
Turn Type	NA		NA		Perm	NA
Protected Phases	8		2			6
Permitted Phases					6	
Actuated Green, G (s)	11.4		15.8		15.8	15.8
Effective Green, g (s)	11.4		15.8		15.8	15.8
Actuated g/C Ratio	0.32		0.45		0.45	0.45
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1067		1461		209	1543
v/s Ratio Prot	c0.17		0.21			0.15
v/s Ratio Perm					c0.26	
v/c Ratio	0.52		0.47		0.57	0.33
Uniform Delay, d1	9.7		6.8		7.2	6.3
Progression Factor	1.00		1.00		1.00	1.00
Incremental Delay, d2	0.5		0.2		3.8	0.1
Delay (s)	10.2		7.0		11.0	6.4
Level of Service	B		A		B	A
Approach Delay (s)	10.2		7.0			7.3
Approach LOS	B		A			A

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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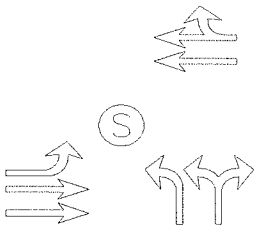
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
24
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	170	5%	**50**	220	20	240
WB THRU	0	0%		0	0	0
WB RIGHT	60	5%		60	5	65
FOOTHILL BLVD						
NB LEFT	130	5%		130	10	140
NB THRU	570	5%		570	50	620
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	390	5%		390	35	425
SB RIGHT	490	5%		490	45	535
TOTALS	**1810**		**50**	**1860**	**165**	**2025**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 24
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	115	10%	**50**	165	15	180
WB THRU	0	0%		0	0	0
WB RIGHT	35	10%		35	5	40
FOOTHILL BLVD						
NB LEFT	105	5%		105	10	115
NB THRU	445	5%		445	40	485
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	255	5%		255	25	280
SB RIGHT	205	5%		205	20	225
TOTALS	**1160**		**50**	**1210**	**115**	**1325**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 24
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	255	5%	**50**	305	25	330
WB THRU	0	0%		0	0	0
WB RIGHT	65	5%		65	5	70
FOOTHILL BLVD						
NB LEFT	210	5%		210	20	230
NB THRU	510	5%		510	45	555
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	260	5%		260	25	285
SB RIGHT	225	5%		225	20	245
TOTALS	**1525**		**50**	**1575**	**140**	**1715**

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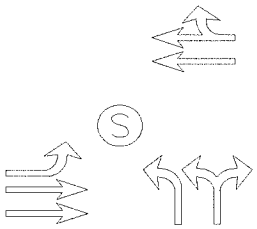
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
24
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	165	4	12	175	**150**	325	30	355
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	56	2	6	60	**0**	60	5	65
FOOTHILL BLVD								
NB LEFT	124	6	18	140	**0**	140	15	155
NB THRU	554	14	42	595	**0**	595	55	650
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	380	10	30	410	**0**	410	35	445
SB RIGHT	482	8	24	505	**0**	505	45	550
TOTALS	**1761**				**150**	**2035**	**185**	**2220**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 24
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	100	13	39	140	**150**	290	25	315
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	30	3	9	40	**0**	40	5	45
FOOTHILL BLVD								
NB LEFT	99	4	12	110	**0**	110	10	120
NB THRU	425	18	54	480	**0**	480	45	525
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	235	19	57	290	**0**	290	25	315
SB RIGHT	196	7	21	215	**0**	215	20	235
TOTALS	**1085**				**150**	**1425**	**130**	**1555**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 24
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	245	11	33	280	**150**	430	40	470
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	67	0	0	65	**0**	65	5	70
FOOTHILL BLVD								
NB LEFT	207	5	15	220	**0**	220	20	240
NB THRU	503	9	27	530	**0**	530	50	580
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	253	7	21	275	**0**	275	25	300
SB RIGHT	224	2	6	230	**0**	230	20	250
TOTALS	**1499**				**150**	**1750**	**160**	**1910**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 880

	Rt	Thru	Lt
Total	490	390	
1st	99	82	
2nd	134	92	
3rd	147	116	
4th	110	100	

EAST LEG TOTAL: 227

	1st	2nd	3rd	4th	Total
Rt	11	17	21	9	58
Thru					
Lt	37	45	40	47	169

WEST LEG TOTAL: 0

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

SOUTH LEG

	Lt	Thru	Rt
1st	24	100	
2nd	39	129	
3rd	50	171	
4th	17	168	
Total	130	568	

TOTAL: 698

PEAK HOUR FACTORS

NORTH LEG = 0.84
SOUTH LEG = 0.79
EAST LEG = 0.92
WEST LEG =

ALL LEGS = 0.83

HOUR TOTAL: 1,805

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total	490	390	
1st	99	82	
2nd	134	92	
3rd	147	116	
4th	110	100	

	1st	2nd	3rd	4th	Total
Rt	11	17	21	9	58
Thru					
Lt	37	45	40	47	169

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	24	100	
2nd	39	129	
3rd	50	171	
4th	17	168	
Total	130	568	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total	309	279	
1st	99	90	
2nd	101	73	
3rd	55	68	
4th	54	48	

	1st	2nd	3rd	4th	Total
Rt	23	17	10	12	62
Thru					
Lt	40	42	36	43	161

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	16	55	
2nd	25	67	
3rd	22	37	
4th	25	31	
Total	88	190	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 WB RAMPS 05-23-12

BEGINNING TIME : 07:00AM (Peak Hr : 7 am)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
98	79	0	1	1	0	0	0	0	0	2	0	181
134	89	0	0	1	0	0	1	0	0	1	0	226
145	116	0	1	0	0	0	0	0	1	0	0	263
105	96	0	5	4	0	0	0	0	0	0	0	210
97	89	0	0	1	0	0	0	0	2	0	0	189
99	64	0	2	7	0	0	0	0	0	2	0	174
55	64	0	0	4	0	0	0	0	0	0	0	123
54	46	0	0	2	0	0	0	0	0	0	0	102
787	643	0	9	20	0	0	1	0	3	5	0	1468
						SOUTH LEG						
0	98	21	0	2	2	0	0	1	0	0	0	124
0	127	38	0	2	1	0	0	0	0	0	0	168
0	166	49	0	5	1	0	0	0	0	0	0	221
0	163	16	0	3	1	0	1	0	0	1	0	185
0	51	15	0	2	0	0	0	0	0	2	1	71
0	59	23	0	7	2	0	1	0	0	0	0	92
0	32	20	0	4	0	0	0	2	0	1	0	59
0	25	21	0	4	3	0	1	0	0	1	1	56
0	721	203	0	29	10	0	3	3	0	5	2	976
						EAST LEG						
11	0	37	0	0	0	0	0	0	0	0	0	48
17	0	43	0	0	0	0	0	0	0	0	2	62
20	0	39	1	0	0	0	0	0	0	0	1	61
8	0	46	1	0	0	0	0	0	0	0	1	56
22	0	39	1	0	0	0	0	0	0	0	1	63
16	0	36	0	0	5	0	0	0	1	0	1	59
10	0	36	0	0	0	0	0	0	0	0	0	46
12	0	38	0	0	2	0	0	1	0	0	2	55
116	0	314	3	0	7	0	0	1	1	0	8	450
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 12:45PM

NORTH LEG

TOTAL: 457

	Rt	Thru	Lt
Total	203	254	
1st	57	66	
2nd	49	54	
3rd	45	61	
4th	52	73	

EAST LEG

EAST LEG TOTAL: 146

	1st	2nd	3rd	4th	Total
Rt	8	10	6	9	33
Thru					
Lt	25	25	33	30	113

WEST LEG

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

SOUTH LEG

	Lt	Thru	Rt
1st	19	132	
2nd	38	122	
3rd	25	96	
4th	23	93	
Total	105	443	

TOTAL: 548

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.86
EAST LEG = 0.94
WEST LEG =

ALL LEGS = 0.94

HOUR TOTAL: 1,151

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total	234	227	
1st	51	50	
2nd	72	63	
3rd	54	48	
4th	57	66	

	1st	2nd	3rd	4th	Total
Rt	10	9	8	8	35
Thru					
Lt	25	26	23	25	99

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	24	103	
2nd	22	108	
3rd	17	90	
4th	19	132	
Total	82	433	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total	181	259	
1st	49	54	
2nd	45	61	
3rd	52	73	
4th	35	71	

	1st	2nd	3rd	4th	Total
Rt	10	6	9	6	31
Thru					
Lt	25	33	30	32	120

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	38	122	
2nd	25	96	
3rd	23	93	
4th	23	114	
Total	109	425	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 WB RAMPS 05-23-12

BEGINNING TIME : 12:00PM (PH: 12:45 PM)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
50	49	0	1	1	0	0	0	0	0	0	0	101
67	60	0	4	3	0	1	0	0	0	0	0	135
51	44	0	2	4	0	1	0	0	0	0	0	102
54	61	0	1	3	0	2	0	0	0	2	0	123
47	52	0	1	0	0	0	2	0	1	0	0	103
43	53	0	1	2	0	0	2	0	1	4	0	106
52	69	0	0	1	0	0	1	0	0	2	0	125
34	69	0	0	2	0	1	0	0	0	0	0	106
398	457	0	10	16	0	5	5	0	2	8	0	901
						SOUTH LEG						
0	100	20	0	2	1	0	0	1	0	1	2	127
0	100	18	0	7	2	0	1	1	0	0	1	130
0	84	17	0	3	0	0	1	0	0	2	0	107
0	126	19	0	3	0	0	1	0	0	2	0	151
0	118	37	0	3	0	0	0	1	0	1	0	160
0	91	24	0	2	0	0	2	0	0	1	1	121
0	90	19	0	3	2	0	0	0	0	0	2	116
0	111	23	0	1	0	0	2	0	0	0	0	137
0	820	177	0	24	5	0	7	3	0	7	6	1049
						EAST LEG						
10	0	24	0	0	1	0	0	0	0	0	0	35
7	0	19	1	0	5	1	0	2	0	0	0	35
8	0	19	0	0	3	0	0	1	0	0	0	31
7	0	20	0	0	1	0	0	3	1	0	1	33
10	0	18	0	0	2	0	0	4	0	0	1	35
5	0	32	0	0	1	1	0	0	0	0	0	39
8	0	30	1	0	0	0	0	0	0	0	0	39
6	0	29	0	0	1	0	0	1	0	0	1	38
61	0	191	2	0	14	2	0	11	1	0	3	285
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 486

	Rt	Thru	Lt
Total	226	260	
1st	65	67	
2nd	65	67	
3rd	47	70	
4th	49	56	

EAST LEG TOTAL: 323

	1st	2nd	3rd	4th	Total
Rt	9	21	23	14	67
Thru					
Lt	71	64	56	65	256

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.94
EAST LEG = 0.95
WEST LEG =

ALL LEGS = 0.95

	Lt	Thru	Rt
1st	61	131	
2nd	50	136	
3rd	45	118	
4th	56	127	
Total	212	512	

TOTAL: 724

SOUTH LEG

HOUR TOTAL: 1,533

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total	266	244	
1st	88	73	
2nd	81	72	
3rd	48	54	
4th	49	45	

	1st	2nd	3rd	4th	Total
Rt	16	7	13	15	51
Thru					
Lt	57	55	56	62	230

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	59	95	
2nd	36	107	
3rd	44	126	
4th	42	151	
Total	181	479	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 WB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total	226	260	
1st	65	67	
2nd	65	67	
3rd	47	70	
4th	49	56	

	1st	2nd	3rd	4th	Total
Rt	9	21	23	14	67
Thru					
Lt	71	64	56	65	256

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	61	131	
2nd	50	136	
3rd	45	118	
4th	56	127	
Total	212	512	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 WB RAMPS 05-23-12

BEGINNING TIME : 04:00PM (PH 5:00 pm)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
85	70	0	2	2	0	1	0	0	0	1	0	161
81	69	0	0	3	0	0	0	0	0	0	0	153
47	52	0	1	2	0	0	0	0	0	0	0	102
49	42	0	0	3	0	0	0	0	0	0	0	94
64	67	0	1	0	0	0	0	0	0	0	0	132
65	65	0	0	1	0	0	1	0	0	0	0	132
47	68	0	0	2	0	0	0	0	0	0	0	117
48	53	0	0	1	0	0	1	0	1	1	0	105
486	486	0	4	14	0	1	2	0	1	2	0	996
						SOUTH LEG						
0	91	55	0	3	3	0	0	0	0	1	1	154
0	101	32	0	4	1	0	1	2	0	1	1	143
0	115	41	0	8	2	0	2	0	0	1	1	170
0	147	38	0	3	2	0	0	1	0	1	1	193
0	128	59	0	2	0	0	0	1	0	1	1	192
0	133	49	0	2	0	0	1	0	0	0	1	186
0	116	44	0	1	1	0	1	0	0	0	0	163
0	126	55	0	0	1	0	1	0	0	0	0	183
0	957	373	0	23	10	0	6	4	0	5	6	1384
						EAST LEG						
16	0	52	0	0	3	0	0	1	0	0	1	73
7	0	49	0	0	1	0	0	3	0	0	2	62
12	0	53	1	0	2	0	0	0	0	0	1	69
15	0	58	0	0	2	0	0	0	0	0	2	77
9	0	67	0	0	1	0	0	0	0	0	3	80
21	0	61	0	0	1	0	0	0	0	0	2	85
23	0	54	0	0	0	0	0	2	0	0	0	79
14	0	63	0	0	0	0	0	1	0	0	1	79
117	0	457	1	0	10	0	0	7	0	0	12	604
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	170	0	60	130	570	0	0	390	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.92		1.00	1.00			0.92	
Flt Protected				0.95	0.98		0.95	1.00			1.00	
Satd. Flow (prot)				1633	1545		1719	3438			3151	
Flt Permitted				0.95	0.98		0.25	1.00			1.00	
Satd. Flow (perm)				1633	1545		444	3438			3151	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	0	0	205	0	72	157	687	0	0	470	590
RTOR Reduction (vph)	0	0	0	0	61	0	0	0	0	0	177	0
Lane Group Flow (vph)	0	0	0	143	73	0	157	687	0	0	883	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				9.0	9.0		39.7	39.7			39.7	
Effective Green, g (s)				9.0	9.0		39.7	39.7			39.7	
Actuated g/C Ratio				0.16	0.16		0.70	0.70			0.70	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				259	245		311	2407			2206	
v/s Ratio Prot								0.20			0.28	
v/s Ratio Perm				c0.09	0.05		c0.35					
v/c Ratio				0.55	0.30		0.50	0.29			0.40	
Uniform Delay, d1				22.0	21.1		3.9	3.2			3.5	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				2.5	0.7		5.8	0.3			0.5	
Delay (s)				24.5	21.8		9.7	3.5			4.1	
Level of Service				C	C		A	A			A	
Approach Delay (s)		0.0			23.2			4.6			4.1	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	56.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	115	0	35	105	445	0	0	255	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.93		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1559	1484		1719	3438			3208	
Flt Permitted				0.95	0.97		0.47	1.00			1.00	
Satd. Flow (perm)				1559	1484		857	3438			3208	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	122	0	37	112	473	0	0	271	218
RTOR Reduction (vph)	0	0	0	0	32	0	0	0	0	0	79	0
Lane Group Flow (vph)	0	0	0	82	45	0	112	473	0	0	410	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				4.9	4.9		22.9	22.9			22.9	
Effective Green, g (s)				4.9	4.9		22.9	22.9			22.9	
Actuated g/C Ratio				0.14	0.14		0.64	0.64			0.64	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				213	203		548	2199			2052	
v/s Ratio Prot								c0.14			0.13	
v/s Ratio Perm				c0.05	0.03		0.13					
v/c Ratio				0.38	0.22		0.20	0.22			0.20	
Uniform Delay, d1				14.1	13.8		2.7	2.7			2.7	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.2	0.6		0.8	0.2			0.2	
Delay (s)				15.2	14.3		3.5	2.9			2.9	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			14.8			3.0			2.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	4.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.24		
Actuated Cycle Length (s)	35.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	255	0	65	210	510	0	0	260	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.94		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1633	1598		1719	3438			3199	
Flt Permitted				0.95	0.97		0.46	1.00			1.00	
Satd. Flow (perm)				1633	1598		839	3438			3199	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	268	0	68	221	537	0	0	274	237
RTOR Reduction (vph)	0	0	0	0	54	0	0	0	0	0	96	0
Lane Group Flow (vph)	0	0	0	172	110	0	221	537	0	0	415	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	0%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				8.5	8.5		24.3	24.3			24.3	
Effective Green, g (s)				8.5	8.5		24.3	24.3			24.3	
Actuated g/C Ratio				0.21	0.21		0.60	0.60			0.60	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				340	333		500	2048			1905	
v/s Ratio Prot								0.16			0.13	
v/s Ratio Perm				c0.11	0.07		c0.26					
v/c Ratio				0.51	0.33		0.44	0.26			0.22	
Uniform Delay, d1				14.3	13.7		4.5	4.0			3.8	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.2	0.6		2.8	0.3			0.3	
Delay (s)				15.5	14.3		7.3	4.3			4.1	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			14.9			5.2			4.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	40.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	220	0	60	130	570	0	0	390	490
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.93		1.00	1.00			0.92	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1350	1397		1719	3438			3151	
Flt Permitted				0.95	0.97		0.23	1.00			1.00	
Satd. Flow (perm)				1350	1397		425	3438			3151	
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	0	0	0	265	0	72	157	687	0	0	470	590
RTOR Reduction (vph)	0	0	0	0	50	0	0	0	0	0	202	0
Lane Group Flow (vph)	0	0	0	172	115	0	157	687	0	0	858	0
Heavy Vehicles (%)	0%	0%	0%	27%	0%	5%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				12.2	12.2		38.9	38.9			38.9	
Effective Green, g (s)				12.2	12.2		38.9	38.9			38.9	
Actuated g/C Ratio				0.21	0.21		0.66	0.66			0.66	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				279	288		280	2263			2074	
v/s Ratio Prot								0.20			0.27	
v/s Ratio Perm				c0.13	0.08		c0.37					
v/c Ratio				0.62	0.40		0.56	0.30			0.41	
Uniform Delay, d1				21.3	20.3		5.5	4.3			4.7	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				4.0	0.9		7.9	0.3			0.6	
Delay (s)				25.3	21.2		13.4	4.7			5.4	
Level of Service				C	C		B	A			A	
Approach Delay (s)		0.0			23.3			6.3			5.4	
Approach LOS		A			C			A			A	

Intersection Summary			
HCM Average Control Delay	8.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	165	0	35	105	445	0	0	255	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.95		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1252	1299		1719	3438			3208	
Flt Permitted				0.95	0.97		0.47	1.00			1.00	
Satd. Flow (perm)				1252	1299		857	3438			3208	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	176	0	37	112	473	0	0	271	218
RTOR Reduction (vph)	0	0	0	0	30	0	0	0	0	0	91	0
Lane Group Flow (vph)	0	0	0	109	74	0	112	473	0	0	398	0
Heavy Vehicles (%)	0%	0%	0%	37%	0%	10%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				7.4	7.4		21.5	21.5			21.5	
Effective Green, g (s)				7.4	7.4		21.5	21.5			21.5	
Actuated g/C Ratio				0.20	0.20		0.58	0.58			0.58	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				251	261		499	2003			1869	
v/s Ratio Prot								c0.14			0.12	
v/s Ratio Perm				c0.09	0.06		0.13					
v/c Ratio				0.43	0.29		0.22	0.24			0.21	
Uniform Delay, d1				12.9	12.5		3.7	3.7			3.7	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.2	0.6		1.0	0.3			0.3	
Delay (s)				14.1	13.1		4.7	4.0			3.9	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			13.6			4.1			3.9	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	36.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	305	0	65	210	510	0	0	260	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.95		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1417	1458		1719	3438			3199	
Flt Permitted				0.95	0.97		0.46	1.00			1.00	
Satd. Flow (perm)				1417	1458		839	3438			3199	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	321	0	68	221	537	0	0	274	237
RTOR Reduction (vph)	0	0	0	0	50	0	0	0	0	0	106	0
Lane Group Flow (vph)	0	0	0	199	140	0	221	537	0	0	405	0
Heavy Vehicles (%)	0%	0%	0%	21%	0%	0%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				11.2	11.2		23.8	23.8			23.8	
Effective Green, g (s)				11.2	11.2		23.8	23.8			23.8	
Actuated g/C Ratio				0.26	0.26		0.55	0.55			0.55	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				369	380		464	1903			1771	
v/s Ratio Prot								0.16			0.13	
v/s Ratio Perm				c0.14	0.10		c0.26					
v/c Ratio				0.54	0.37		0.48	0.28			0.23	
Uniform Delay, d1				13.7	13.0		5.8	5.1			4.9	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.5	0.6		3.5	0.4			0.3	
Delay (s)				15.2	13.6		9.3	5.5			5.2	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			14.4			6.6			5.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	43.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	180	0	35	105	445	0	0	255	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.95		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1252	1296		1719	3438			3208	
Flt Permitted				0.95	0.97		0.47	1.00			1.00	
Satd. Flow (perm)				1252	1296		857	3438			3208	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	191	0	37	112	473	0	0	271	218
RTOR Reduction (vph)	0	0	0	0	29	0	0	0	0	0	93	0
Lane Group Flow (vph)	0	0	0	117	82	0	112	473	0	0	396	0
Heavy Vehicles (%)	0%	0%	0%	37%	0%	10%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				7.7	7.7		21.0	21.0			21.0	
Effective Green, g (s)				7.7	7.7		21.0	21.0			21.0	
Actuated g/C Ratio				0.21	0.21		0.57	0.57			0.57	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				263	272		490	1967			1836	
v/s Ratio Prot								c0.14			0.12	
v/s Ratio Perm				c0.09	0.06		0.13					
v/c Ratio				0.44	0.30		0.23	0.24			0.22	
Uniform Delay, d1				12.6	12.2		3.9	3.9			3.8	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.2	0.6		1.1	0.3			0.3	
Delay (s)				13.8	12.9		4.9	4.2			4.1	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			13.4			4.3			4.1	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	180	0	40	115	485	0	0	280	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.94		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1252	1302		1719	3438			3209	
Flt Permitted				0.95	0.97		0.45	1.00			1.00	
Satd. Flow (perm)				1252	1302		818	3438			3209	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	0	0	0	191	0	43	122	516	0	0	298	239
RTOR Reduction (vph)	0	0	0	0	34	0	0	0	0	0	103	0
Lane Group Flow (vph)	0	0	0	120	80	0	122	516	0	0	434	0
Heavy Vehicles (%)	0%	0%	0%	37%	0%	10%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				7.8	7.8		20.9	20.9			20.9	
Effective Green, g (s)				7.8	7.8		20.9	20.9			20.9	
Actuated g/C Ratio				0.21	0.21		0.57	0.57			0.57	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				266	277		466	1958			1827	
v/s Ratio Prot								c0.15			0.14	
v/s Ratio Perm				c0.10	0.06		0.15					
v/c Ratio				0.45	0.29		0.26	0.26			0.24	
Uniform Delay, d1				12.6	12.1		4.0	4.0			3.9	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.2	0.6		1.4	0.3			0.3	
Delay (s)				13.8	12.7		5.4	4.3			4.2	
Level of Service				B	B		A	A			A	
Approach Delay (s)		0.0			13.3			4.5			4.2	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
24: Foothill Blvd & 210 WB

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	0	0	330	0	70	230	555	0	0	285	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)				4.0	4.0		4.0	4.0			4.0	
Lane Util. Factor				0.95	0.95		1.00	0.95			0.95	
Frt				1.00	0.95		1.00	1.00			0.93	
Flt Protected				0.95	0.97		0.95	1.00			1.00	
Satd. Flow (prot)				1417	1458		1719	3438			3200	
Flt Permitted				0.95	0.97		0.44	1.00			1.00	
Satd. Flow (perm)				1417	1458		801	3438			3200	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	0	347	0	74	242	584	0	0	300	258
RTOR Reduction (vph)	0	0	0	0	51	0	0	0	0	0	117	0
Lane Group Flow (vph)	0	0	0	215	155	0	242	584	0	0	441	0
Heavy Vehicles (%)	0%	0%	0%	21%	0%	0%	5%	5%	0%	0%	5%	5%
Turn Type				Perm	NA		Perm	NA			NA	
Protected Phases					8			2			6	
Permitted Phases				8			2					
Actuated Green, G (s)				11.6	11.6		23.8	23.8			23.8	
Effective Green, g (s)				11.6	11.6		23.8	23.8			23.8	
Actuated g/C Ratio				0.27	0.27		0.55	0.55			0.55	
Clearance Time (s)				4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)				3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)				379	390		439	1885			1755	
v/s Ratio Prot								0.17			0.14	
v/s Ratio Perm				c0.15	0.11		c0.30					
v/c Ratio				0.57	0.40		0.55	0.31			0.25	
Uniform Delay, d1				13.7	13.0		6.3	5.3			5.1	
Progression Factor				1.00	1.00		1.00	1.00			1.00	
Incremental Delay, d2				1.9	0.7		4.9	0.4			0.3	
Delay (s)				15.7	13.7		11.3	5.8			5.5	
Level of Service				B	B		B	A			A	
Approach Delay (s)		0.0			14.7			7.4			5.5	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	43.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

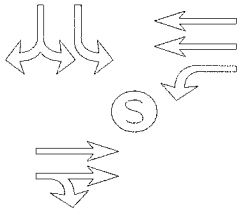
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 25
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	355	5%		355	30	385
EB THRU	0	0%		0	0	0
EB RIGHT	100	5%		100	10	110
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FOOTHILL BLVD						
NB LEFT	0	0%		0	0	0
NB THRU	350	5%		350	30	380
NB RIGHT	290	5%	**50**	340	30	370
SB LEFT	195	5%		195	20	215
SB THRU	355	5%		355	30	385
SB RIGHT	0	0%		0	0	0
TOTALS	**1645**		**50**	**1695**	**150**	**1845**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 25
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	260	5%		260	25	285
EB THRU	0	0%		0	0	0
EB RIGHT	40	20%		40	5	45
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FOOTHILL BLVD						
NB LEFT	0	0%		0	0	0
NB THRU	265	5%		265	25	290
NB RIGHT	160	10%	**50**	210	20	230
SB LEFT	75	5%		75	5	80
SB THRU	305	5%		305	25	330
SB RIGHT	0	0%		0	0	0
TOTALS	**1105**		**50**	**1155**	**105**	**1260**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 25
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	335	5%		335	30	365
EB THRU	0	0%		0	0	0
EB RIGHT	80	5%		80	5	85
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
FOOTHILL BLVD						
NB LEFT	0	0%		0	0	0
NB THRU	390	5%		390	35	425
NB RIGHT	240	5%	**50**	290	25	315
SB LEFT	55	5%		55	5	60
SB THRU	460	5%		460	40	500
SB RIGHT	0	0%		0	0	0
TOTALS	**1560**		**50**	**1610**	**140**	**1750**

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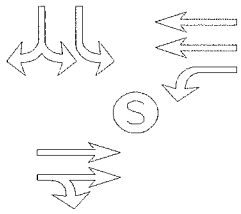
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
25
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

EB I-210 FWY RAMPS

EB LEFT	347	6	18	365	**0**	365	35	400
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	92	7	21	115	**0**	115	10	125
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0

FOOTHILL BLVD

NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	335	15	45	380	**0**	380	35	415
NB RIGHT	279	12	36	315	**150**	465	40	505
SB LEFT	190	3	9	200	**0**	200	20	220
SB THRU	336	17	51	385	**0**	385	35	420
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1579**				**150**	**1910**	**175**	**2085**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 25
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	257	4	12	270	**0**	270	25	295
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	30	8	24	55	**0**	55	5	60
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL BLVD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	248	15	45	295	**0**	295	25	320
NB RIGHT	147	15	45	190	**150**	340	30	370
SB LEFT	73	1	3	75	**0**	75	5	80
SB THRU	288	16	48	335	**0**	335	30	365
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1043**				**150**	**1370**	**120**	**1490**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : FOOTHILL BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
25
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	326	7	21	345	**0**	345	30	375
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	79	3	9	90	**0**	90	10	100
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
FOOTHILL BLVD								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	375	14	42	415	**0**	415	35	450
NB RIGHT	234	5	15	250	**150**	400	35	435
SB LEFT	55	0	0	55	**0**	55	5	60
SB THRU	450	9	27	475	**0**	475	45	520
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1519**				**150**	**1780**	**160**	**1940**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 546

	Rt	Thru	Lt
Total		353	193
1st		81	39
2nd		88	44
3rd		87	64
4th		97	46

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 452

	Total	1st	2nd	3rd	4th
Lt	353	44	86	111	112
Thru					
Rt	99	23	22	17	37

SOUTH LEG

TOTAL: 641

	Lt	Thru	Rt
1st		83	69
2nd		83	81
3rd		110	72
4th		74	69
Total		350	291

PEAK HOUR FACTORS

NORTH LEG = 0.90
SOUTH LEG = 0.88
EAST LEG =
WEST LEG = 0.76

ALL LEGS = 0.89

HOUR TOTAL: 1,639

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		353	193
1st		81	39
2nd		88	44
3rd		87	64
4th		97	46

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	353	44	86	111	112
Thru					
Rt	99	23	22	17	37

	Lt	Thru	Rt
1st		83	69
2nd		83	81
3rd		110	72
4th		74	69
Total		350	291

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		318	110
1st		90	31
2nd		94	29
3rd		77	31
4th		57	19

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	71	29	16	14	12
Thru					
Rt	177	57	44	46	30

	Lt	Thru	Rt
1st		44	54
2nd		71	60
3rd		43	45
4th		47	42
Total		205	201

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 EB RAMPS 05-23-12

BEGINNING TIME : 07:00AM (PH 7am)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	75	39	0	3	0	0	1	0	0	2	0	120
0	86	42	0	1	0	0	1	1	0	0	1	132
0	83	64	0	2	0	0	0	0	0	2	0	151
0	92	45	0	5	0	0	0	0	0	0	1	143
0	88	31	0	2	0	0	0	0	0	0	0	121
0	86	28	0	7	0	0	0	0	0	1	1	123
0	71	31	0	4	0	0	2	0	0	0	0	108
0	52	19	0	5	0	0	0	0	0	0	0	76
0	633	299	0	29	0	0	4	1	0	5	3	974
						SOUTH LEG						
66	81	0	3	2	0	0	0	0	0	0	0	152
79	81	0	2	2	0	0	0	0	0	0	0	164
67	104	0	3	6	0	1	0	0	1	0	0	182
67	69	0	1	3	0	0	1	0	1	1	0	143
50	40	0	3	2	0	0	0	0	1	2	0	98
57	63	0	2	6	0	1	1	0	0	1	0	131
42	38	0	2	4	0	0	0	0	1	1	0	88
39	41	0	3	3	0	0	2	0	0	1	0	89
467	517	0	19	28	0	2	4	0	4	6	0	1047
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
23	0	42	0	0	1	0	0	0	0	0	1	67
21	0	86	0	0	0	0	0	0	1	0	0	108
14	0	108	1	0	2	1	0	0	1	0	1	128
34	0	111	0	0	1	2	0	0	1	0	0	149
55	0	26	0	0	2	1	0	0	1	0	1	86
44	0	15	0	0	1	0	0	0	0	0	0	60
46	0	13	0	0	1	0	0	0	0	0	0	60
30	0	12	0	0	0	0	0	0	0	0	0	42
267	0	413	1	0	8	4	0	0	4	0	3	700

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 378

	Rt	Thru	Lt
Total		304	74
1st		77	22
2nd		72	26
3rd		65	14
4th		90	12

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 299

	Total	1st	2nd	3rd	4th
Lt	261	62	68	63	68
Thru					
Rt	38	8	11	8	11

SOUTH LEG

TOTAL: 425

	Lt	Thru	Rt
1st		62	45
2nd		59	44
3rd		70	37
4th		72	36
Total		263	162

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.98
EAST LEG =
WEST LEG = 0.95

ALL LEGS = 0.95

HOUR TOTAL: 1,102

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		257	67
1st		66	17
2nd		62	20
3rd		65	10
4th		64	20

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	259	68	73	54	64
Thru					
Rt	52	11	9	15	17

	Lt	Thru	Rt
1st		62	23
2nd		64	19
3rd		56	21
4th		68	33
Total		250	96

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		304	74
1st		77	22
2nd		72	26
3rd		65	14
4th		90	12

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	261	62	68	63	68
Thru					
Rt	38	8	11	8	11

	Lt	Thru	Rt
1st		62	45
2nd		59	44
3rd		70	37
4th		72	36
Total		263	162

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 EB RAMPS 05-23-12

BEGINNING TIME : 12:00PM (PH 1:00pm)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	65	17	0	1	0	0	0	0	0	0	0	83
0	59	18	0	3	1	0	0	0	0	0	1	82
0	61	7	0	4	1	0	0	0	0	0	2	75
0	57	18	0	3	2	0	2	0	0	2	0	84
0	72	21	0	2	1	0	2	0	0	1	0	99
0	66	26	0	2	0	0	1	0	0	3	0	98
0	63	14	0	1	0	0	0	0	0	1	0	79
0	87	12	0	2	0	0	0	0	0	1	0	102
0	530	133	0	18	5	0	5	0	0	8	3	702
						SOUTH LEG						
21	59	0	1	2	0	0	0	0	1	1	0	85
15	56	0	3	6	0	1	1	0	0	1	0	83
12	49	0	5	4	0	1	2	0	3	1	0	77
29	62	0	2	3	0	1	1	0	1	2	0	101
39	57	0	3	3	0	1	0	0	2	2	0	107
40	55	0	3	2	0	1	2	0	0	0	0	103
34	67	0	2	3	0	1	0	0	0	0	0	107
34	69	0	2	1	0	0	2	0	0	0	0	108
224	474	0	21	24	0	6	8	0	7	7	0	771
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
9	0	67	1	0	1	1	0	0	0	0	0	79
4	0	70	2	0	1	2	0	1	1	0	1	82
11	0	51	2	0	2	2	0	1	0	0	0	69
12	0	60	2	0	1	2	0	2	1	0	1	81
3	0	60	2	0	0	2	0	1	1	0	1	70
8	0	67	1	0	0	1	0	0	1	0	1	79
8	0	63	0	0	0	0	0	0	0	0	0	71
11	0	67	0	0	0	0	0	1	0	0	0	79
66	0	505	10	0	5	10	0	6	4	0	4	610

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: FOOTHILL BLVD
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 514

	Rt	Thru	Lt
Total		459	55
1st		117	19
2nd		115	16
3rd		113	9
4th		114	11

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 415

	Total	1st	2nd	3rd	4th
Lt	333	70	91	73	99
Thru					
Rt	82	14	14	26	28

SOUTH LEG

TOTAL: 628

	Lt	Thru	Rt
1st		123	54
2nd		70	66
3rd		101	60
4th		95	59
Total		389	239

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.89
EAST LEG =
WEST LEG = 0.82

ALL LEGS = 0.96

HOUR TOTAL: 1,557

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		386	88
1st		102	24
2nd		96	32
3rd		90	18
4th		98	14

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	276	57	71	71	77
Thru					
Rt	88	19	19	24	26

	Lt	Thru	Rt
1st		94	55
2nd		79	51
3rd		94	51
4th		115	61
Total		382	218

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: FOOTHILL BLVD

EAST-WEST STREET: I-210 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		459	55
1st		117	19
2nd		115	16
3rd		113	9
4th		114	11

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	333	70	91	73	99
Thru					
Rt	82	14	14	26	28

	Lt	Thru	Rt
1st		123	54
2nd		70	66
3rd		101	60
4th		95	59
Total		389	239

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : I-210 EB RAMPS 05-23-12

BEGINNING TIME : 04:00PM (PH 5pm)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	99	23	0	2	1	0	0	0	0	1	0	126
0	93	32	0	3	0	0	0	0	0	0	0	128
0	88	18	0	2	0	0	0	0	0	0	0	108
0	95	14	0	3	0	0	0	0	0	0	0	112
0	117	19	0	0	0	0	0	0	0	0	0	136
0	113	16	0	1	0	0	1	0	0	0	0	131
0	110	9	0	2	0	0	0	0	0	1	0	122
0	110	11	0	1	0	0	1	0	0	2	0	125
0	825	142	0	14	1	0	2	0	0	4	0	988
						SOUTH LEG						
54	90	0	1	3	0	0	0	0	0	1	0	149
48	73	0	2	4	0	0	1	0	1	1	0	130
49	85	0	1	6	0	0	2	0	1	1	0	145
58	110	0	2	4	0	0	0	0	1	1	0	176
54	117	0	0	3	0	0	1	0	0	2	0	177
65	66	0	1	3	0	0	1	0	0	0	0	136
57	98	0	2	2	0	0	1	0	1	0	0	161
58	94	0	1	1	0	0	0	0	0	0	0	154
443	733	0	10	26	0	0	6	0	4	6	0	1228
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
18	0	55	1	0	0	0	0	0	0	0	2	76
16	0	68	2	0	1	0	0	2	1	0	0	90
23	0	70	0	0	0	0	0	0	1	0	1	95
26	0	76	0	0	0	0	0	0	0	0	1	103
11	0	69	1	0	0	0	0	0	2	0	1	84
14	0	89	0	0	1	0	0	0	0	0	1	105
26	0	71	0	0	1	0	0	0	0	0	1	99
28	0	97	0	0	1	0	0	0	0	0	1	127
162	0	595	4	0	4	0	0	2	4	0	8	779

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis

25-3. Foothill Blvd & 210 EB

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	355	0	100	0	0	0	0	350	290	195	355	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.93						0.93		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1560						3204		1719	3438	
Flt Permitted	0.95	0.97						1.00		0.36	1.00	
Satd. Flow (perm)	1633	1560						3204		647	3438	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	399	0	112	0	0	0	0	393	326	219	399	0
RTOR Reduction (vph)	0	64	0	0	0	0	0	141	0	0	0	0
Lane Group Flow (vph)	263	184	0	0	0	0	0	578	0	219	399	0
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	5%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	12.6	12.6						27.0		27.0	27.0	
Effective Green, g (s)	12.6	12.6						27.0		27.0	27.0	
Actuated g/C Ratio	0.26	0.26						0.57		0.57	0.57	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	432	413						1817		367	1950	
v/s Ratio Prot								0.18			0.12	
v/s Ratio Perm	c0.16	0.12								c0.34		
v/c Ratio	0.61	0.45						0.32		0.60	0.20	
Uniform Delay, d1	15.3	14.6						5.4		6.7	5.0	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.8						0.5		7.0	0.2	
Delay (s)	17.8	15.4						5.9		13.7	5.3	
Level of Service	B	B						A		B	A	
Approach Delay (s)		16.6			0.0			5.9			8.3	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25 3: Foothill Blvd & 210 EB

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	260	0	40	0	0	0	0	265	160	75	305	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.96						0.94		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1531						3187		1719	3438	
Flt Permitted	0.95	0.96						1.00		0.49	1.00	
Satd. Flow (perm)	1633	1531						3187		893	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	0	42	0	0	0	0	279	168	79	321	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	75	0	0	0	0
Lane Group Flow (vph)	162	121	0	0	0	0	0	372	0	79	321	0
Heavy Vehicles (%)	5%	0%	20%	2%	2%	2%	0%	5%	10%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	7.6	7.6						19.5		19.5	19.5	
Effective Green, g (s)	7.6	7.6						19.5		19.5	19.5	
Actuated g/C Ratio	0.22	0.22						0.56		0.56	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	354	331						1771		496	1910	
v/s Ratio Prot								c0.12			0.09	
v/s Ratio Perm	c0.10	0.08								0.09		
v/c Ratio	0.46	0.37						0.21		0.16	0.17	
Uniform Delay, d1	12.0	11.7						3.9		3.8	3.8	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.3		0.7	0.2	
Delay (s)	12.9	12.4						4.2		4.5	4.0	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.6			0.0			4.2			4.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

253 3: Foothill Blvd & 210 EB

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	335	0	80	0	0	0	0	390	240	55	460	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.94						0.94		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1570						3242		1805	3438	
Flt Permitted	0.95	0.97						1.00		0.40	1.00	
Satd. Flow (perm)	1633	1570						3242		763	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	349	0	83	0	0	0	0	406	250	57	479	0
RTOR Reduction (vph)	0	62	0	0	0	0	0	118	0	0	0	0
Lane Group Flow (vph)	220	150	0	0	0	0	0	538	0	57	479	0
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	5%	0%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	9.0	9.0						19.1		19.1	19.1	
Effective Green, g (s)	9.0	9.0						19.1		19.1	19.1	
Actuated g/C Ratio	0.25	0.25						0.53		0.53	0.53	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	407	391						1715		404	1819	
v/s Ratio Prot								c0.17			0.14	
v/s Ratio Perm	c0.13	0.10								0.07		
v/c Ratio	0.54	0.38						0.31		0.14	0.26	
Uniform Delay, d1	11.8	11.2						4.8		4.3	4.7	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.6						0.5		0.7	0.4	
Delay (s)	13.2	11.9						5.3		5.1	5.0	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.6			0.0			5.3			5.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	43.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25 3: Foothill Blvd & 210 EB 8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	355	0	100	0	0	0	0	350	340	195	355	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.93						0.93		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1560						2988		1719	3438	
Flt Permitted	0.95	0.97						1.00		0.33	1.00	
Satd. Flow (perm)	1633	1560						2988		599	3438	
Peak-hour factor, PHF	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Adj. Flow (vph)	399	0	112	0	0	0	0	393	382	219	399	0
RTOR Reduction (vph)	0	64	0	0	0	0	0	165	0	0	0	0
Lane Group Flow (vph)	263	184	0	0	0	0	0	610	0	219	399	0
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	19%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	12.6	12.6						27.0		27.0	27.0	
Effective Green, g (s)	12.6	12.6						27.0		27.0	27.0	
Actuated g/C Ratio	0.26	0.26						0.57		0.57	0.57	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	432	413						1695		340	1950	
v/s Ratio Prot								0.20			0.12	
v/s Ratio Perm	c0.16	0.12								c0.37		
v/c Ratio	0.61	0.45						0.36		0.64	0.20	
Uniform Delay, d1	15.3	14.6						5.6		7.0	5.0	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.8						0.6		9.1	0.2	
Delay (s)	17.8	15.4						6.2		16.1	5.3	
Level of Service	B	B						A		B	A	
Approach Delay (s)		16.6			0.0			6.2			9.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	47.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25~~3~~: Foothill Blvd & 210 EB

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	260	0	40	0	0	0	0	265	210	75	305	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.96						0.93		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1531						2893		1719	3438	
Flt Permitted	0.95	0.96						1.00		0.47	1.00	
Satd. Flow (perm)	1633	1531						2893		848	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	0	42	0	0	0	0	279	221	79	321	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	98	0	0	0	0
Lane Group Flow (vph)	162	121	0	0	0	0	0	402	0	79	321	0
Heavy Vehicles (%)	5%	0%	20%	2%	2%	2%	0%	5%	31%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	7.6	7.6						19.5		19.5	19.5	
Effective Green, g (s)	7.6	7.6						19.5		19.5	19.5	
Actuated g/C Ratio	0.22	0.22						0.56		0.56	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	354	331						1607		471	1910	
v/s Ratio Prot								c0.14			0.09	
v/s Ratio Perm	c0.10	0.08								0.09		
v/c Ratio	0.46	0.37						0.25		0.17	0.17	
Uniform Delay, d1	12.0	11.7						4.0		3.8	3.8	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.4		0.8	0.2	
Delay (s)	12.9	12.4						4.4		4.6	4.0	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.6			0.0			4.4			4.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

25 3: Foothill Blvd & 210 EB

8/11/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	335	0	80	0	0	0	0	390	290	55	460	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.94						0.94		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1570						3022		1805	3438	
Flt Permitted	0.95	0.97						1.00		0.37	1.00	
Satd. Flow (perm)	1633	1570						3022		710	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	349	0	83	0	0	0	0	406	302	57	479	0
RTOR Reduction (vph)	0	62	0	0	0	0	0	142	0	0	0	0
Lane Group Flow (vph)	220	150	0	0	0	0	0	566	0	57	479	0
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	21%	0%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	9.0	9.0						19.1		19.1	19.1	
Effective Green, g (s)	9.0	9.0						19.1		19.1	19.1	
Actuated g/C Ratio	0.25	0.25						0.53		0.53	0.53	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	407	391						1599		376	1819	
v/s Ratio Prot								c0.19			0.14	
v/s Ratio Perm	c0.13	0.10								0.08		
v/c Ratio	0.54	0.38						0.35		0.15	0.26	
Uniform Delay, d1	11.8	11.2						4.9		4.4	4.7	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	1.5	0.6						0.6		0.9	0.4	
Delay (s)	13.2	11.9						5.5		5.2	5.0	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.6			0.0			5.5			5.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	36.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 210 EB

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	260	0	40	0	0	0	0	265	230	75	305	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.96						0.93		1.00	1.00	
Flt Protected	0.95	0.96						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1531						2869		1719	3438	
Flt Permitted	0.95	0.96						1.00		0.46	1.00	
Satd. Flow (perm)	1633	1531						2869		831	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	0	42	0	0	0	0	279	242	79	321	0
RTOR Reduction (vph)	0	33	0	0	0	0	0	108	0	0	0	0
Lane Group Flow (vph)	162	121	0	0	0	0	0	413	0	79	321	0
Heavy Vehicles (%)	5%	0%	20%	2%	2%	2%	0%	5%	31%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	7.6	7.6						19.5		19.5	19.5	
Effective Green, g (s)	7.6	7.6						19.5		19.5	19.5	
Actuated g/C Ratio	0.22	0.22						0.56		0.56	0.56	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	354	331						1594		462	1910	
v/s Ratio Prot								c0.14			0.09	
v/s Ratio Perm	c0.10	0.08								0.10		
v/c Ratio	0.46	0.37						0.26		0.17	0.17	
Uniform Delay, d1	12.0	11.7						4.1		3.8	3.8	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.4		0.8	0.2	
Delay (s)	12.9	12.4						4.4		4.6	4.0	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.6			0.0			4.4			4.1	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	35.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 210 EB

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	285	0	45	0	0	0	0	290	230	80	330	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.96						0.93		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1530						2893		1719	3438	
Flt Permitted	0.95	0.97						1.00		0.45	1.00	
Satd. Flow (perm)	1633	1530						2893		810	3438	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	300	0	47	0	0	0	0	305	242	84	347	0
RTOR Reduction (vph)	0	36	0	0	0	0	0	111	0	0	0	0
Lane Group Flow (vph)	177	134	0	0	0	0	0	436	0	84	347	0
Heavy Vehicles (%)	5%	0%	20%	2%	2%	2%	0%	5%	31%	5%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	8.3	8.3						19.3		19.3	19.3	
Effective Green, g (s)	8.3	8.3						19.3		19.3	19.3	
Actuated g/C Ratio	0.23	0.23						0.54		0.54	0.54	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	381	357						1568		439	1864	
v/s Ratio Prot								c0.15			0.10	
v/s Ratio Perm	c0.11	0.09								0.10		
v/c Ratio	0.46	0.38						0.28		0.19	0.19	
Uniform Delay, d1	11.7	11.5						4.4		4.2	4.2	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.9	0.7						0.4		1.0	0.2	
Delay (s)	12.6	12.1						4.8		5.1	4.4	
Level of Service	B	B						A		A	A	
Approach Delay (s)		12.4			0.0			4.8			4.5	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	35.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
25: Foothill Blvd & 210 EB

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	365	0	85	0	0	0	0	425	315	60	500	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	
Lane Util. Factor	0.95	0.95						0.95		1.00	0.95	
Frt	1.00	0.94						0.94		1.00	1.00	
Flt Protected	0.95	0.97						1.00		0.95	1.00	
Satd. Flow (prot)	1633	1571						3023		1805	3438	
Flt Permitted	0.95	0.97						1.00		0.33	1.00	
Satd. Flow (perm)	1633	1571						3023		625	3438	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	380	0	89	0	0	0	0	443	328	62	521	0
RTOR Reduction (vph)	0	63	0	0	0	0	0	166	0	0	0	0
Lane Group Flow (vph)	239	167	0	0	0	0	0	605	0	62	521	0
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	21%	0%	5%	0%
Turn Type	Perm	NA						NA		Perm	NA	
Protected Phases		4						2			6	
Permitted Phases	4									6		
Actuated Green, G (s)	11.2	11.2						18.7		18.7	18.7	
Effective Green, g (s)	11.2	11.2						18.7		18.7	18.7	
Actuated g/C Ratio	0.30	0.30						0.49		0.49	0.49	
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	
Lane Grp Cap (vph)	483	464						1492		308	1696	
v/s Ratio Prot								c0.20			0.15	
v/s Ratio Perm	c0.15	0.11								0.10		
v/c Ratio	0.49	0.36						0.41		0.20	0.31	
Uniform Delay, d1	11.0	10.5						6.1		5.4	5.7	
Progression Factor	1.00	1.00						1.00		1.00	1.00	
Incremental Delay, d2	0.8	0.5						0.8		1.5	0.5	
Delay (s)	11.8	11.0						6.9		6.9	6.2	
Level of Service	B	B						A		A	A	
Approach Delay (s)		11.4			0.0			6.9			6.3	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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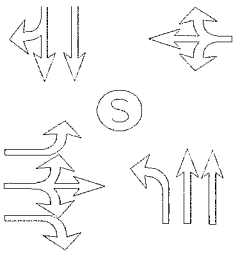
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
26
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	5	5%		5	5	10
EB THRU	320	5%		320	30	350
EB RIGHT	520	5%		520	45	565
WB LEFT	260	5%	**50**	310	30	340
WB THRU	245	5%		245	20	265
WB RIGHT	5	5%		5	5	10
OSBORNE STREET						
NB LEFT	335	5%		335	30	365
NB THRU	10	5%		10	5	15
NB RIGHT	250	5%	**50**	300	25	325
SB LEFT	5	5%		5	5	10
SB THRU	5	5%		5	5	10
SB RIGHT	5	5%		5	5	10
TOTALS	**1965**		**100**	**2065**	**210**	**2275**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
26
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	20	5%		20	5	25
EB THRU	225	10%		225	20	245
EB RIGHT	25	5%		25	5	30
WB LEFT	165	15%	**50**	215	20	235
WB THRU	200	10%		200	20	220
WB RIGHT	5	5%		5	5	10
OSBORNE STREET						
NB LEFT	230	10%		230	20	250
NB THRU	5	5%		5	5	10
NB RIGHT	210	10%	**50**	260	25	285
SB LEFT	5	5%		5	5	10
SB THRU	5	5%		5	5	10
SB RIGHT	15	5%		15	5	20
TOTALS	**1110**		**100**	**1210**	**140**	**1350**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
26
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	15	5%		15	5	20
EB THRU	315	5%		315	30	345
EB RIGHT	265	5%		265	25	290
WB LEFT	205	5%	**50**	255	25	280
WB THRU	305	5%		305	25	330
WB RIGHT	5	5%		5	5	10
OSBORNE STREET						
NB LEFT	680	5%		680	60	740
NB THRU	5	5%		5	5	10
NB RIGHT	395	5%	**50**	445	40	485
SB LEFT	5	5%		5	5	10
SB THRU	5	5%		5	5	10
SB RIGHT	15	5%		15	5	20
TOTALS	**2215**		**100**	**2315**	**235**	**2550**

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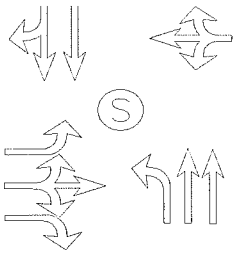
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
26
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	6	0	0	5	**0**	5	5	10
EB THRU	306	15	45	350	**0**	350	30	380
EB RIGHT	498	21	63	560	**0**	560	50	610
WB LEFT	256	6	18	275	**150**	425	40	465
WB THRU	243	3	9	250	**0**	250	25	275
WB RIGHT	4	0	0	5	**0**	5	5	10
OSBORNE STREET								
NB LEFT	324	11	33	355	**0**	355	30	385
NB THRU	12	0	0	10	**0**	10	5	15
NB RIGHT	243	8	24	265	**150**	415	35	450
SB LEFT	3	0	0	5	**0**	5	5	10
SB THRU	2	0	0	5	**0**	5	5	10
SB RIGHT	7	0	0	5	**0**	5	5	10
TOTALS	**1904**				**300**	**2390**	**240**	**2630**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
26
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	18	0	0	20	**0**	20	5	25
EB THRU	203	21	63	265	**0**	265	25	290
EB RIGHT	24	1	3	25	**0**	25	5	30
WB LEFT	140	23	69	210	**150**	360	30	390
WB THRU	185	17	51	235	**0**	235	20	255
WB RIGHT	7	0	0	5	**0**	5	5	10
OSBORNE STREET								
NB LEFT	210	19	57	265	**0**	265	25	290
NB THRU	4	0	0	5	**0**	5	5	10
NB RIGHT	188	21	63	250	**150**	400	35	435
SB LEFT	3	0	0	5	**0**	5	5	10
SB THRU	0	0	0	5	**0**	5	5	10
SB RIGHT	14	0	0	15	**0**	15	5	20
TOTALS	**996**				**300**	**1605**	**170**	**1775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : OSBORNE STREET
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
26
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	14	1	3	15	**0**	15	5	20
EB THRU	307	8	24	330	**0**	330	30	360
EB RIGHT	250	15	45	295	**0**	295	25	320
WB LEFT	196	10	30	225	**150**	375	35	410
WB THRU	286	19	57	345	**0**	345	30	375
WB RIGHT	5	0	0	5	**0**	5	5	10
OSBORNE STREET								
NB LEFT	650	28	84	735	**0**	735	65	800
NB THRU	7	0	0	5	**0**	5	5	10
NB RIGHT	386	11	33	420	**150**	570	50	620
SB LEFT	7	0	0	5	**0**	5	5	10
SB THRU	1	0	0	5	**0**	5	5	10
SB RIGHT	14	1	3	15	**0**	15	5	20
TOTALS	**2123**				**300**	**2700**	**265**	**2965**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OSBORNE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 12

Rt	Thru	Lt	
7	2	3	Total
0	2	0	1st
0	0	1	2nd
3	0	1	3rd
4	0	1	4th

EAST LEG

EAST LEG TOTAL: 512

	1st	2nd	3rd	4th	Total
Rt	0	2	1	1	4
Thru	50	64	71	61	246
Lt	44	71	82	65	262

WEST LEG

Total	1st	2nd	3rd	4th	
6	1	0	3	2	Lt
321	88	92	85	56	Thru
519	134	152	132	101	Rt

WEST LEG TOTAL: 846

SOUTH LEG

North	South	East	West		Lt	Thru	Rt
0	0	0	0	1st	76	2	77
0	0	0	1	2nd	89	3	86
0	0	0	0	3rd	116	4	54
0	0	0	0	4th	54	3	34
			1	Total	335	12	251

TOTAL: 598

PEAK HOUR FACTORS

SOUTH LEG = 0.84
EAST LEG = 0.83
WEST LEG = 0.87

ALL LEGS = 0.88

HOUR TOTAL: 1,968

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 07:00AM-08:00AM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
3	2	2	Total
0	0	0	1st
0	2	0	2nd
0	0	1	3rd
3	0	1	4th

	1st	2nd	3rd	4th	Total
Rt	2	0	2	1	5
Thru	31	50	64	71	216
Lt	21	44	71	82	218

Total	1st	2nd	3rd	4th	
4	0	1	0	3	Lt
341	76	88	92	85	Thru
528	110	134	152	132	Rt

PEDS BY LEG

North	South	East	West	
0	0	0	0	1st
0	0	0	0	2nd
0	0	0	1	3rd
0	0	0	0	4th
0	0	0	1	Total

Lt	Thru	Rt
56	2	74
76	2	77
89	3	86
116	4	54
337	11	291

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 08:00AM-09:00AM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
9	2	5	Total
4	0	1	1st
1	2	1	2nd
3	0	1	3rd
1	0	2	4th

	1st	2nd	3rd	4th	Total
Rt	1	0	4	1	6
Thru	61	62	51	50	224
Lt	65	69	65	37	236

Total	1st	2nd	3rd	4th	
7	2	1	2	2	Lt
211	56	61	45	49	Thru
316	101	88	60	67	Rt

PEDS BY LEG

North	South	East	West
0	0	0	0
0	0	0	0
0	1	0	1
0	0	0	2
0	1	0	3

	Lt	Thru	Rt
1st	54	3	34
2nd	60	2	55
3rd	58	0	48
4th	47	3	50
Total	219	8	187

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : OSBORNE LA

EAST-WEST STREET : FOOTHILL BLVD 05-23-12

BEGINNING TIME : 07:00AM (PH 7:15AM)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	2	0	0	0	0	0	0	0	0	0	0	2
0	0	1	0	0	0	0	0	0	0	0	0	1
3	0	1	0	0	0	0	0	0	0	0	0	4
4	0	1	0	0	0	0	0	0	0	0	0	5
1	2	1	0	0	0	0	0	0	0	0	0	4
3	0	1	0	0	0	0	0	0	0	0	0	4
1	0	2	0	0	0	0	0	0	0	0	0	3
12	4	7	0	0	0	0	0	0	0	0	0	23
						SOUTH LEG						
73	2	56	1	0	0	0	0	0	0	0	0	132
76	2	76	1	0	0	0	0	0	0	0	0	155
82	3	86	2	0	2	0	0	1	2	0	0	178
54	4	113	0	0	2	0	0	1	0	0	0	174
31	3	49	2	0	2	1	0	3	0	0	0	91
47	2	52	5	0	7	3	0	1	0	0	0	117
44	0	57	2	0	0	2	0	0	0	0	1	106
41	3	46	3	0	1	2	0	0	4	0	0	100
448	19	535	16	0	14	8	0	6	6	0	1	1053
						EAST LEG						
2	31	19	0	0	0	0	0	0	0	0	2	54
0	49	42	0	1	0	0	0	0	0	0	2	94
2	64	68	0	0	1	0	0	0	0	0	2	137
1	69	82	0	2	0	0	0	0	0	0	0	154
1	61	64	0	0	0	0	0	1	0	0	0	127
0	58	65	0	4	3	0	0	0	0	0	1	131
4	48	63	0	3	1	0	0	0	0	0	1	120
1	47	33	0	3	3	0	0	0	0	0	1	88
11	427	436	0	13	8	0	0	1	0	0	9	905
						WEST LEG						
110	74	0	0	2	0	0	0	0	0	0	0	186
133	85	1	1	3	0	0	0	0	0	0	0	223
142	85	0	10	7	0	0	0	0	0	0	0	244
130	82	3	0	2	0	0	0	0	2	1	0	220
93	54	2	6	1	0	1	1	0	1	0	0	159
85	54	0	1	5	0	1	1	1	1	1	0	150
57	42	2	2	3	0	1	0	0	0	0	0	107
58	46	2	6	2	0	2	1	0	1	0	0	118
808	522	10	26	25	0	5	3	1	5	2	0	1407

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OSBORNE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 17

Rt	Thru	Lt	
14		3	Total
4	0	0	1st
3	0	0	2nd
0	0	1	3rd
7	0	2	4th

EAST LEG

EAST LEG TOTAL: 372

	1st	2nd	3rd	4th	Total
Rt	1	4	1	1	7
Thru	44	49	50	59	202
Lt	43	44	34	42	163

WEST LEG

Total	1st	2nd	3rd	4th	
18	4	4	4	6	Lt
224	53	52	62	57	Thru
25	10	4	5	6	Rt

WEST LEG TOTAL: 267

SOUTH LEG

	Lt	Thru	Rt
1st	44	0	54
2nd	50	2	53
3rd	68	2	45
4th	67	0	57
Total	229	4	209

TOTAL: 442

PEAK HOUR FACTORS

NORTH LEG = 0.47
SOUTH LEG = 0.89
EAST LEG = 0.91
WEST LEG = 0.94

ALL LEGS = 0.90

HOUR TOTAL: 1,098

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 12:00PM-01:00PM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
11	3	4	Total
8	0	1	1st
1	1	2	2nd
1	2	1	3rd
1	0	0	4th

	1st	2nd	3rd	4th	Total
Rt	1	1	0	0	2
Thru	37	40	47	42	166
Lt	49	38	44	38	169

Total	1st	2nd	3rd	4th	
13	1	6	1	5	Lt
205	53	49	53	50	Thru
36	5	12	8	11	Rt

	Lt	Thru	Rt
1st	42	1	37
2nd	53	0	39
3rd	63	0	37
4th	52	0	43
Total	210	1	156

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 01:00PM-02:00PM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
14	0	3	Total
4	0	0	1st
3	0	0	2nd
0	0	1	3rd
7	0	2	4th

	1st	2nd	3rd	4th	Total
Rt	1	4	1	1	7
Thru	44	49	50	59	202
Lt	43	44	34	42	163

Total	1st	2nd	3rd	4th	
18	4	4	4	6	Lt
224	53	52	62	57	Thru
25	10	4	5	6	Rt

	Lt	Thru	Rt
1st	44	0	54
2nd	50	2	53
3rd	68	2	45
4th	67	0	57
Total	229	4	209

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : OSBORNE 05-23-12

BEGINNING TIME : 12:00PM (PM 1PM)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
8	0	1	0	0	0	0	0	0	0	0	0	9
1	1	2	0	0	0	0	0	0	0	0	0	4
1	2	1	0	0	0	0	0	0	0	0	0	4
1	0	0	0	0	0	0	0	0	0	0	0	1
4	0	0	0	0	0	0	0	0	0	0	0	4
3	0	0	0	0	0	0	0	0	0	0	0	3
0	0	1	0	0	0	0	0	0	0	0	0	1
7	0	2	0	0	0	0	0	0	0	0	0	9
25	3	7	0	0	0	0	0	0	0	0	0	35
						SOUTH LEG						
33	1	37	1	0	2	1	0	2	2	0	1	80
36	0	49	1	0	1	1	0	2	1	0	1	92
32	0	62	5	0	1	0	0	0	0	0	0	100
36	0	50	5	0	1	0	0	1	2	0	0	95
49	0	42	3	0	1	1	0	1	1	0	0	98
52	2	46	1	0	0	0	0	3	0	0	1	105
37	2	61	5	0	2	2	0	2	1	0	3	115
50	0	61	6	0	3	1	0	2	0	0	1	124
325	5	408	27	0	11	6	0	13	7	0	7	809
						EAST LEG						
1	36	47	0	1	1	0	0	1	0	0	0	87
1	35	35	0	5	2	0	0	0	0	0	1	79
0	42	36	0	4	8	0	1	0	0	0	0	91
0	40	34	0	2	2	0	0	1	0	0	1	80
1	40	39	0	3	3	0	1	0	0	0	1	88
4	44	39	0	2	3	0	1	1	0	2	1	97
1	44	26	0	4	5	0	1	2	0	1	1	85
1	57	36	0	1	3	0	1	2	0	0	1	102
9	338	292	0	22	27	0	5	7	0	3	6	709
						WEST LEG						
5	50	1	0	2	0	0	0	0	0	1	0	59
12	42	6	0	6	0	0	0	0	0	1	0	67
7	50	1	0	3	0	0	0	0	1	0	0	62
11	47	5	0	2	0	0	1	0	0	0	0	66
10	46	4	0	6	0	0	1	0	0	0	0	67
4	49	4	0	3	0	0	0	0	0	0	0	60
4	54	4	0	3	0	1	3	0	0	2	0	71
6	54	6	0	1	0	0	0	0	0	2	0	69
59	392	31	0	26	0	1	5	0	1	6	0	521

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: OSBORNE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 23

Rt	Thru	Lt	
15	1	7	Total
1	0	0	1st
2	0	0	2nd
9	1	3	3rd
3	0	4	4th

EAST LEG

EAST LEG TOTAL: 516

	1st	2nd	3rd	4th	Total
Rt	1	1	1	2	5
Thru	71	80	87	67	305
Lt	48	53	52	53	206

WEST LEG

Total	1st	2nd	3rd	4th	
15	2	1	5	7	Lt
315	77	80	78	80	Thru
265	72	73	62	58	Rt

WEST LEG TOTAL: 595

SOUTH LEG

	Lt	Thru	Rt
1st	183	0	106
2nd	151	1	113
3rd	180	4	81
4th	164	2	97
Total	678	7	397

TOTAL: 1,082

PEAK HOUR FACTORS

NORTH LEG = 0.44
SOUTH LEG = 0.94
EAST LEG = 0.92
WEST LEG = 0.97

ALL LEGS = 0.98

HOUR TOTAL: 2,216

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 04:00PM-05:00PM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
6	0	5	Total
2	0	3	1st
0	0	2	2nd
3	0	0	3rd
1	0	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	1	1	2
Thru	73	59	75	71	278
Lt	59	50	35	48	192

Total	1st	2nd	3rd	4th	
13	4	7	0	2	Lt
257	59	61	60	77	Thru
267	52	59	84	72	Rt

	Lt	Thru	Rt
1st	122	2	80
2nd	140	2	66
3rd	131	0	98
4th	183	0	106
Total	576	4	350

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: OSBORNE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 05:00PM-06:00PM DATE: 05-23-12

NORTH LEG

Rt	Thru	Lt	
21	2	9	Total
2	0	0	1st
9	1	3	2nd
3	0	4	3rd
7	1	2	4th

	1st	2nd	3rd	4th	Total
Rt	1	1	2	3	7
Thru	80	87	67	71	305
Lt	53	52	53	48	206

Total	1st	2nd	3rd	4th	
17	1	5	7	4	Lt
294	80	78	80	56	Thru
272	73	62	58	79	Rt

	Lt	Thru	Rt
1st	151	1	113
2nd	180	4	81
3rd	164	2	97
4th	188	4	81
Total	683	11	372

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : FOOTHILL BLVD LA

EAST-WEST STREET : OSBORNE 05-23-12

BEGINNING TIME : 04:00PM (PH 4 45 PM)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
2	0	3	0	0	0	0	0	0	0	0	0	5
0	0	2	0	0	0	0	0	0	0	0	0	2
3	0	0	0	0	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	0	2
8	1	3	1	0	0	0	0	0	0	0	0	13
3	0	4	0	0	0	0	0	0	0	0	0	7
7	1	2	0	0	0	0	0	0	0	0	0	10
26	2	14	1	0	0	0	0	0	0	0	0	43
						SOUTH LEG						
74	2	117	4	0	2	1	0	0	1	0	3	204
62	2	135	3	0	1	1	0	2	0	0	2	208
95	0	128	2	0	1	0	0	0	1	0	2	229
102	0	173	2	0	1	0	0	3	2	0	6	289
110	1	148	2	0	3	1	0	0	0	0	0	265
78	4	175	1	0	1	0	0	1	2	0	3	265
96	2	154	0	0	5	0	0	2	1	0	3	263
81	4	183	0	0	2	0	0	0	0	0	3	273
698	15	1213	14	0	16	3	0	8	7	0	22	1996
						EAST LEG						
0	68	53	0	5	3	0	0	2	0	0	1	132
0	54	45	0	3	1	0	1	2	0	1	2	109
1	74	32	0	0	2	0	0	1	0	1	0	111
1	65	45	0	5	2	0	0	0	0	1	1	120
1	75	50	0	1	1	0	1	0	0	3	2	134
1	84	50	0	2	1	0	1	1	0	0	0	140
2	62	51	0	4	0	0	1	1	0	0	1	122
3	71	45	0	0	0	0	0	2	0	0	1	122
9	553	371	0	20	10	0	4	9	0	6	8	990
						WEST LEG						
49	56	4	1	3	0	1	0	0	1	0	0	115
52	58	7	3	2	0	2	0	0	2	1	0	127
80	59	0	3	1	0	1	0	0	0	0	0	144
69	74	1	2	1	1	0	1	0	1	1	0	151
67	78	1	2	1	0	2	1	0	2	0	0	154
61	75	5	0	2	0	0	0	0	1	1	0	145
53	80	7	3	0	0	1	0	0	1	0	0	145
75	56	4	3	0	0	1	0	0	0	0	0	139
506	536	29	17	10	1	8	2	0	8	3	0	1120

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
26: Foothill Blvd

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	320	520	260	245	5	335	10	250	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.91		1.00	1.00		1.00	0.95	0.85		0.95	
Flt Protected		1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)		3119		1719	3431		1633	1525	1461		1785	
Flt Permitted		1.00		0.27	1.00		0.75	0.79	1.00		0.90	
Satd. Flow (perm)		3119		484	3431		1282	1250	1461		1638	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	364	591	295	278	6	381	11	284	6	6	6
RTOR Reduction (vph)	0	197	0	0	2	0	0	23	167	0	5	0
Lane Group Flow (vph)	0	758	0	295	282	0	232	208	46	0	13	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	0%	5%	0%	5%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		46.0		46.0	46.0		15.0	15.0	15.0		15.0	
Effective Green, g (s)		46.0		46.0	46.0		15.0	15.0	15.0		15.0	
Actuated g/C Ratio		0.67		0.67	0.67		0.22	0.22	0.22		0.22	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		2079		323	2287		279	272	318		356	
v/s Ratio Prot		0.24			0.08							
v/s Ratio Perm				c0.61			c0.18	0.17	0.03		0.01	
v/c Ratio		0.36		0.91	0.12		0.83	0.76	0.15		0.04	
Uniform Delay, d1		5.1		9.8	4.2		25.8	25.3	21.8		21.3	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.5		32.2	0.1		18.6	12.0	0.2		0.0	
Delay (s)		5.6		42.0	4.3		44.4	37.3	22.0		21.3	
Level of Service		A		D	A		D	D	C		C	
Approach Delay (s)		5.6			23.5			34.9			21.3	
Approach LOS		A			C			C			C	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	69.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Foothill Blvd

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	225	25	162	200	5	230	5	210	5	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.98		1.00	1.00		1.00	0.93	0.85		0.90	
Flt Protected		1.00		0.95	1.00		0.95	0.98	1.00		0.99	
Satd. Flow (prot)		3247		1570	3277		1559	1432	1395		1688	
Flt Permitted		1.00		0.58	1.00		0.74	0.84	1.00		0.92	
Satd. Flow (perm)		3247		960	3277		1218	1227	1395		1568	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	250	28	180	222	6	256	6	233	6	0	17
RTOR Reduction (vph)	0	13	0	0	3	0	0	57	116	0	13	0
Lane Group Flow (vph)	0	265	0	180	225	0	172	110	40	0	10	0
Heavy Vehicles (%)	0%	10%	5%	15%	10%	0%	10%	0%	10%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		19.2		19.2	19.2		9.5	9.5	9.5		9.5	
Effective Green, g (s)		19.2		19.2	19.2		9.5	9.5	9.5		9.5	
Actuated g/C Ratio		0.52		0.52	0.52		0.26	0.26	0.26		0.26	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1699		502	1714		315	318	361		406	
v/s Ratio Prot		0.08			0.07							
v/s Ratio Perm				c0.19			c0.14	0.09	0.03		0.01	
v/c Ratio		0.16		0.36	0.13		0.55	0.35	0.11		0.03	
Uniform Delay, d1		4.5		5.1	4.5		11.7	11.1	10.4		10.1	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.2		2.0	0.2		1.9	0.7	0.1		0.0	
Delay (s)		4.7		7.1	4.6		13.7	11.7	10.5		10.2	
Level of Service		A		A	A		B	B	B		B	
Approach Delay (s)		4.7			5.7			12.0			10.2	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Foothill Blvd

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	315	265	205	305	5	680	5	395	5	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.93		1.00	1.00		1.00	0.98	0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)		3202		1719	3433		1633	1544	1461		1678	
Flt Permitted		1.00		0.41	1.00		0.74	0.75	1.00		0.93	
Satd. Flow (perm)		3202		740	3433		1274	1199	1461		1572	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	321	270	209	311	5	694	5	403	5	5	15
RTOR Reduction (vph)	0	158	0	0	3	0	0	17	213	0	9	0
Lane Group Flow (vph)	0	433	0	209	313	0	382	360	130	0	16	0
Heavy Vehicles (%)	0%	5%	5%	5%	5%	0%	5%	0%	5%	0%	0%	5%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		16.1		16.1	16.1		14.7	14.7	14.7		14.7	
Effective Green, g (s)		16.1		16.1	16.1		14.7	14.7	14.7		14.7	
Actuated g/C Ratio		0.41		0.41	0.41		0.38	0.38	0.38		0.38	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1329		307	1425		483	454	554		596	
v/s Ratio Prot		0.14			0.09							
v/s Ratio Perm				c0.28			0.30	c0.30	0.09		0.01	
v/c Ratio		0.33		0.68	0.22		0.79	0.79	0.23		0.03	
Uniform Delay, d1		7.7		9.3	7.3		10.7	10.7	8.2		7.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.7		11.6	0.4		8.6	9.2	0.2		0.0	
Delay (s)		8.3		20.8	7.7		19.3	19.9	8.4		7.6	
Level of Service		A		C	A		B	B	A		A	
Approach Delay (s)		8.3			12.9			16.1			7.6	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	13.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	38.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Foothill Blvd

8/11/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	320	520	310	245	5	335	10	300	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.91		1.00	1.00		1.00	0.94	0.85		0.95	
Flt Protected		1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)		3119		1504	3431		1633	1434	1311		1785	
Flt Permitted		1.00		0.27	1.00		0.75	0.83	1.00		0.90	
Satd. Flow (perm)		3119		422	3431		1282	1215	1311		1635	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	364	591	352	278	6	381	11	341	6	6	6
RTOR Reduction (vph)	0	199	0	0	2	0	0	39	183	0	5	0
Lane Group Flow (vph)	0	756	0	352	282	0	251	208	52	0	13	0
Heavy Vehicles (%)	0%	5%	5%	20%	5%	0%	5%	0%	17%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		46.0		46.0	46.0		15.4	15.4	15.4		15.4	
Effective Green, g (s)		46.0		46.0	46.0		15.4	15.4	15.4		15.4	
Actuated g/C Ratio		0.66		0.66	0.66		0.22	0.22	0.22		0.22	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		2067		280	2274		284	270	291		363	
v/s Ratio Prot		0.24			0.08							
v/s Ratio Perm				c0.83			c0.20	0.17	0.04		0.01	
v/c Ratio		0.37		1.26	0.12		0.88	0.77	0.18		0.04	
Uniform Delay, d1		5.2		11.7	4.3		26.1	25.3	21.9		21.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.5		141.4	0.1		26.0	12.7	0.3		0.0	
Delay (s)		5.7		153.1	4.4		52.1	38.1	22.2		21.2	
Level of Service		A		F	A		D	D	C		C	
Approach Delay (s)		5.7			86.7			37.8			21.2	
Approach LOS		A			F			D			C	

Intersection Summary			
HCM Average Control Delay	37.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	69.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Foothill Blvd

8/11/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	225	25	215	200	5	230	5	260	5	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.98		1.00	1.00		1.00	0.91	0.85		0.90	
Flt Protected		1.00		0.95	1.00		0.95	0.98	1.00		0.99	
Satd. Flow (prot)		3247		1337	3277		1559	1286	1208		1688	
Flt Permitted		1.00		0.58	1.00		0.74	0.88	1.00		0.91	
Satd. Flow (perm)		3247		818	3277		1218	1158	1208		1565	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	250	28	239	222	6	256	6	289	6	0	17
RTOR Reduction (vph)	0	13	0	0	3	0	0	83	129	0	12	0
Lane Group Flow (vph)	0	265	0	239	225	0	189	103	47	0	11	0
Heavy Vehicles (%)	0%	10%	5%	35%	10%	0%	10%	0%	27%	0%	0%	0%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		19.2		19.2	19.2		9.8	9.8	9.8		9.8	
Effective Green, g (s)		19.2		19.2	19.2		9.8	9.8	9.8		9.8	
Actuated g/C Ratio		0.52		0.52	0.52		0.26	0.26	0.26		0.26	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1685		424	1700		323	307	320		415	
v/s Ratio Prot		0.08			0.07							
v/s Ratio Perm				c0.29			c0.16	0.09	0.04		0.01	
v/c Ratio		0.16		0.56	0.13		0.59	0.34	0.15		0.03	
Uniform Delay, d1		4.7		6.1	4.6		11.8	11.0	10.4		10.1	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.2		5.3	0.2		2.7	0.6	0.2		0.0	
Delay (s)		4.9		11.4	4.8		14.5	11.6	10.6		10.1	
Level of Service		A		B	A		B	B	B		B	
Approach Delay (s)		4.9			8.2			12.3			10.1	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	37.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Foothill Blvd

8/11/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	315	265	255	305	5	680	5	445	5	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.93		1.00	1.00		1.00	0.97	0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)		3202		1456	3433		1633	1496	1323		1678	
Flt Permitted		1.00		0.41	1.00		0.74	0.76	1.00		0.93	
Satd. Flow (perm)		3202		626	3433		1274	1184	1323		1569	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	321	270	260	311	5	694	5	454	5	5	15
RTOR Reduction (vph)	0	158	0	0	3	0	0	28	225	0	9	0
Lane Group Flow (vph)	0	433	0	260	313	0	396	366	138	0	16	0
Heavy Vehicles (%)	0%	5%	5%	24%	5%	0%	5%	0%	16%	0%	0%	5%
Turn Type		NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		16.1		16.1	16.1		14.8	14.8	14.8		14.8	
Effective Green, g (s)		16.1		16.1	16.1		14.8	14.8	14.8		14.8	
Actuated g/C Ratio		0.41		0.41	0.41		0.38	0.38	0.38		0.38	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		1325		259	1421		485	450	503		597	
v/s Ratio Prot		0.14			0.09							
v/s Ratio Perm				c0.42			c0.31	0.31	0.10		0.01	
v/c Ratio		0.33		1.00	0.22		0.82	0.81	0.27		0.03	
Uniform Delay, d1		7.7		11.4	7.4		10.8	10.8	8.3		7.5	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.7		56.9	0.4		10.2	10.8	0.3		0.0	
Delay (s)		8.4		68.3	7.7		21.1	21.6	8.6		7.6	
Level of Service		A		E	A		C	C	A		A	
Approach Delay (s)		8.4			35.1			17.3			7.6	
Approach LOS		A			D			B			A	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	38.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	71.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Foothill Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	350	565	340	265	5	365	10	325	5	5	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.91		1.00	1.00		1.00	0.93	0.85		0.95	
Flt Protected		1.00		0.95	1.00		0.95	0.97	1.00		0.98	
Satd. Flow (prot)		3120		1504	3431		1633	1431	1311		1785	
Flt Permitted		1.00		0.17	1.00		0.73	0.76	1.00		1.00	
Satd. Flow (perm)		3120		270	3431		1250	1123	1311		1814	
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	0	398	642	386	301	6	415	11	369	6	6	6
RTOR Reduction (vph)	0	396	0	0	2	0	0	41	126	0	6	0
Lane Group Flow (vph)	0	644	0	386	305	0	274	229	126	0	12	0
Heavy Vehicles (%)	0%	5%	5%	20%	5%	0%	5%	0%	17%	0%	0%	0%
Turn Type		NA		pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	
Protected Phases		6		5	2		7	4	5	3	8	
Permitted Phases				2			4		4	8		
Actuated Green, G (s)		19.5		38.1	38.1		16.9	16.9	31.5		1.5	
Effective Green, g (s)		19.5		38.1	38.1		16.9	16.9	31.5		1.5	
Actuated g/C Ratio		0.31		0.60	0.60		0.27	0.27	0.50		0.02	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)		966		449	2075		405	357	739		43	
v/s Ratio Prot		0.21		c0.20	0.09		c0.12	0.12	0.04			
v/s Ratio Perm				c0.32			c0.06	0.06	0.06		0.01	
v/c Ratio		0.67		0.86	0.15		0.68	0.64	0.17		0.28	
Uniform Delay, d1		18.9		14.3	5.4		20.3	20.4	8.6		30.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		3.6		15.1	0.1		4.4	3.9	0.1		3.6	
Delay (s)		22.6		29.4	5.6		24.7	24.3	8.7		33.8	
Level of Service		C		C	A		C	C	A		C	
Approach Delay (s)		22.6			18.8			19.5			33.8	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	20.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	63.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Foothill Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	245	25	235	220	5	250	5	285	5	0	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.99		1.00	1.00		1.00	0.91	0.85		0.90	
Flt Protected		1.00		0.95	1.00		0.95	0.98	1.00		0.99	
Satd. Flow (prot)		3250		1337	3277		1559	1282	1208		1688	
Flt Permitted		1.00		0.46	1.00		0.64	0.92	1.00		0.97	
Satd. Flow (perm)		3250		649	3277		1052	1203	1208		1659	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	0	272	28	261	244	6	278	6	317	6	0	17
RTOR Reduction (vph)	0	12	0	0	2	0	0	92	100	0	16	0
Lane Group Flow (vph)	0	288	0	261	248	0	208	108	93	0	7	0
Heavy Vehicles (%)	0%	10%	5%	35%	10%	0%	10%	0%	27%	0%	0%	0%
Turn Type		NA		pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases		6		5	2		7	4	4 5	3	8	
Permitted Phases				2			4			8		
Actuated Green, G (s)		17.2		28.2	28.2		12.5	12.5	23.5		2.6	
Effective Green, g (s)		17.2		28.2	28.2		12.5	12.5	23.5		2.6	
Actuated g/C Ratio		0.35		0.58	0.58		0.26	0.26	0.48		0.05	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		1148		475	1898		331	318	583		89	
v/s Ratio Prot		0.09		c0.08	0.08		c0.08	0.04	0.08			
v/s Ratio Perm				c0.24			c0.09	0.05			0.00	
v/c Ratio		0.25		0.55	0.13		0.63	0.34	0.16		0.08	
Uniform Delay, d1		11.2		5.6	4.7		15.6	14.7	7.1		21.9	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		0.5		1.3	0.1		3.7	0.6	0.1		0.4	
Delay (s)		11.7		6.9	4.8		19.3	15.4	7.2		22.3	
Level of Service		B		A	A		B	B	A		C	
Approach Delay (s)		11.7			5.9			14.1			22.3	
Approach LOS		B			A			B			C	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	48.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
26: Foothill Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	0	345	290	280	330	5	740	5	485	5	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor		0.95		1.00	0.95		0.95	0.91	0.95		1.00	
Frt		0.93		1.00	1.00		1.00	0.97	0.85		0.92	
Flt Protected		1.00		0.95	1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)		3203		1456	3433		1633	1496	1323		1678	
Flt Permitted		1.00		0.23	1.00		0.71	0.66	1.00		1.00	
Satd. Flow (perm)		3203		357	3433		1228	1029	1323		1695	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	0	352	296	286	337	5	755	5	495	5	5	15
RTOR Reduction (vph)	0	205	0	0	2	0	0	18	171	0	15	0
Lane Group Flow (vph)	0	443	0	286	340	0	430	411	225	0	10	0
Heavy Vehicles (%)	0%	5%	5%	24%	5%	0%	5%	0%	16%	0%	0%	5%
Turn Type		NA		pm+pt	NA		pm+pt	NA	pt+ov	pm+pt	NA	
Protected Phases		6		5	2		7	4	4 5	3	8	
Permitted Phases				2			4			8		
Actuated Green, G (s)		17.0		27.0	27.0		20.2	20.2	30.2		1.6	
Effective Green, g (s)		17.0		27.0	27.0		20.2	20.2	30.2		1.6	
Actuated g/C Ratio		0.31		0.49	0.49		0.37	0.37	0.55		0.03	
Clearance Time (s)		4.0		4.0	4.0		4.0	4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0		3.0	3.0			3.0	
Lane Grp Cap (vph)		986		294	1679		556	500	724		49	
v/s Ratio Prot		0.14		c0.11	0.10		0.20	c0.22	0.17			
v/s Ratio Perm				c0.37			0.08	c0.08			0.01	
v/c Ratio		0.45		0.97	0.20		0.77	0.82	0.31		0.21	
Uniform Delay, d1		15.3		11.5	8.0		15.1	15.9	6.8		26.2	
Progression Factor		1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2		1.5		44.8	0.3		6.6	10.5	0.2		2.2	
Delay (s)		16.8		56.2	8.3		21.7	26.4	7.1		28.4	
Level of Service		B		E	A		C	C	A		C	
Approach Delay (s)		16.8			30.1			18.7			28.4	
Approach LOS		B			C			B			C	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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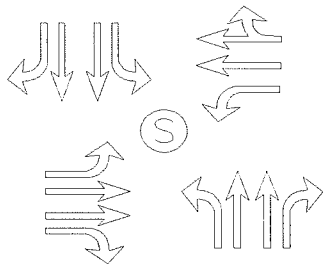
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 27
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

OSBORNE STREET

EB LEFT	300	5%	**50**	350	30	380
EB THRU	535	5%		535	50	585
EB RIGHT	70	20%		70	5	75
WB LEFT	425	10%		425	40	465
WB THRU	630	5%		630	55	685
WB RIGHT	70	15%		70	5	75

GLEN OAKS BLVD

NB LEFT	50	45%		50	5	55
NB THRU	520	15%		520	45	565
NB RIGHT	135	20%	**50**	185	15	200
SB LEFT	45	20%		45	5	50
SB THRU	1070	5%		1070	95	1165
SB RIGHT	170	10%		170	15	185
TOTALS	**4020**		**100**	**4120**	**365**	**4485**

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TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 27
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	170	5%	**50**	220	20	240
EB THRU	425	10%		425	40	465
EB RIGHT	90	10%		90	10	100
WB LEFT	175	10%		175	15	190
WB THRU	500	5%		500	45	545
WB RIGHT	70	10%		70	5	75
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	635	10%		635	55	690
NB RIGHT	150	20%	**50**	200	20	220
SB LEFT	80	5%		80	5	85
SB THRU	425	10%		425	40	465
SB RIGHT	130	5%		130	10	140
TOTALS	**2930**		**100**	**3030**	**270**	**3300**

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N/S STREET : GLEN OAKS BLVD
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PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
27
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	240	5%	**50**	290	25	315
EB THRU	690	5%		690	60	750
EB RIGHT	90	15%		90	10	100
WB LEFT	255	10%		255	25	280
WB THRU	535	5%		535	50	585
WB RIGHT	100	5%		100	10	110
GLEN OAKS BLVD						
NB LEFT	120	5%		120	10	130
NB THRU	875	5%		875	80	955
NB RIGHT	340	5%	**50**	390	35	425
SB LEFT	135	5%		135	10	145
SB THRU	575	10%		575	50	625
SB RIGHT	205	5%		205	20	225
TOTALS	**4160**		**100**	**4260**	**385**	**4645**

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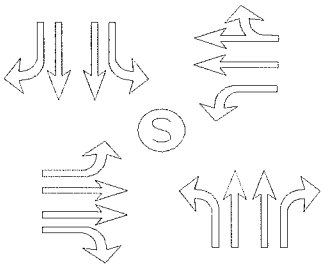
CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	289	9	27	315	**150**	465	40	505
EB THRU	502	32	96	600	**0**	600	55	655
EB RIGHT	55	14	42	95	**0**	95	10	105
WB LEFT	392	33	99	490	**0**	490	45	535
WB THRU	595	34	102	695	**0**	695	65	760
WB RIGHT	62	10	30	90	**0**	90	10	100
GLEN OAKS BLVD								
NB LEFT	26	22	66	90	**0**	90	10	100
NB THRU	451	68	204	655	**0**	655	60	715
NB RIGHT	106	28	84	190	**150**	340	30	370
SB LEFT	38	9	27	65	**0**	65	5	70
SB THRU	994	74	222	1215	**0**	1215	110	1325
SB RIGHT	157	15	45	200	**0**	200	20	220
TOTALS	**3667**				**300**	**5000**	**460**	**5460**

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PROJECTED GROWTH PER YEAR:

INTERSECTION 27
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	162	9	27	190	**150**	340	30	370
EB THRU	390	34	102	490	**0**	490	45	535
EB RIGHT	83	7	21	105	**0**	105	10	115
WB LEFT	155	18	54	210	**0**	210	20	230
WB THRU	474	24	72	545	**0**	545	50	595
WB RIGHT	61	7	21	80	**0**	80	5	85
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	585	50	150	735	**0**	735	65	800
NB RIGHT	118	32	96	215	**150**	365	35	400
SB LEFT	82	0	0	80	**0**	80	5	85
SB THRU	377	47	141	520	**0**	520	45	565
SB RIGHT	128	4	12	140	**0**	140	15	155
TOTALS	**2687**				**300**	**3710**	**335**	**4045**

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PROJECTED GROWTH PER YEAR:

INTERSECTION 27
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	240	21%	1	240	**150**	390	35	425
EB THRU	690	5%	0	690	**0**	690	60	750
EB RIGHT	90	15%	0	90	**0**	90	10	100
WB LEFT	255	10%	0	255	**0**	255	25	280
WB THRU	535	5%	0	535	**0**	535	50	585
WB RIGHT	100	5%	0	100	**0**	100	10	110
GLEN OAKS BLVD								
NB LEFT	120	5%	0	120	**0**	120	10	130
NB THRU	875	5%	0	875	**0**	875	80	955
NB RIGHT	340	17%	1	340	**150**	490	45	535
SB LEFT	135	5%	0	135	**0**	135	10	145
SB THRU	575	10%	0	575	**0**	575	50	625
SB RIGHT	205	5%	0	205	**0**	205	20	225
TOTALS	**4160**				**300**	**4460**	**405**	**4865**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 1,287

	Rt	Thru	Lt
Total	172	1068	47
1st	32	258	6
2nd	40	338	8
3rd	60	305	17
4th	40	167	16

EAST LEG

EAST LEG TOTAL: 1,126

	1st	2nd	3rd	4th	Total
Rt	6	2	15	49	72
Thru	195	139	171	124	629
Lt	120	112	104	89	425

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	298	48	72	95	83
Thru	534	129	134	187	84
Rt	69	14	15	27	13

WEST LEG TOTAL: 901

SOUTH LEG

	Lt	Thru	Rt
1st	9	106	29
2nd	5	114	34
3rd	13	176	41
4th	21	123	30
Total	48	519	134

TOTAL: 701

PEAK HOUR FACTORS

NORTH LEG = 0.83
SOUTH LEG = 0.76
EAST LEG = 0.88
WEST LEG = 0.73

ALL LEGS = 0.83

HOUR TOTAL: 4,015

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 07:00AM-08:00AM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total	164	1170	41
1st	32	269	10
2nd	32	258	6
3rd	40	338	8
4th	60	305	17

	1st	2nd	3rd	4th	Total
Rt	4	6	2	15	27
Thru	105	195	139	171	610
Lt	89	120	112	104	425

	Total	1st	2nd	3rd	4th
Lt	250	35	48	72	95
Thru	543	93	129	134	187
Rt	62	6	14	15	27

	Lt	Thru	Rt
1st	10	66	40
2nd	9	106	29
3rd	5	114	34
4th	13	176	41
Total	37	462	144

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 08:00AM-09:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
123	785	60	Total
40	167	16	1st
28	212	13	2nd
34	233	5	3rd
21	173	26	4th

	1st	2nd	3rd	4th	Total
Rt	49	5	0	0	54
Thru	124	116	76	85	401
Lt	89	117	57	73	336

Total	1st	2nd	3rd	4th	
179	83	47	17	32	Lt
363	84	93	112	74	Thru
32	13	7	2	10	Rt

	Lt	Thru	Rt
1st	21	123	30
2nd	17	170	30
3rd	2	153	4
4th	6	90	28
Total	46	536	92

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : OSBORNE 05-22-12

BEGINNING TIME : 07:00AM (PH 7:15 AM)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
28	251	8	3	6	2	0	5	0	1	7	0	311
31	242	4	1	6	2	0	6	0	0	4	0	296
35	321	6	2	9	2	2	2	0	1	6	0	386
55	287	15	3	7	2	1	4	0	1	7	0	382
36	144	13	2	11	3	1	5	0	1	7	0	223
23	194	10	2	7	3	1	5	0	2	6	0	253
31	218	3	1	7	2	1	3	0	1	5	0	272
21	156	25	0	12	1	0	2	0	0	3	0	220
260	1813	84	14	65	17	6	32	0	7	45	0	2343
						SOUTH LEG						
34	55	4	3	5	6	2	6	0	1	0	0	116
24	94	2	3	6	5	1	4	2	1	2	0	144
25	99	0	3	7	3	2	3	2	4	5	0	153
36	159	8	2	8	4	1	4	1	2	5	0	230
21	99	16	3	11	3	3	4	2	3	9	0	174
23	159	13	3	6	3	2	1	1	2	4	0	217
0	141	0	2	5	1	1	2	1	1	5	0	159
22	86	4	1	1	2	3	2	0	2	1	0	124
185	892	47	20	49	27	15	26	9	16	31	0	1317
						EAST LEG						
3	98	88	1	5	1	0	1	0	0	1	0	198
5	187	117	1	6	1	0	0	1	0	2	1	321
0	129	103	1	6	5	0	2	2	1	2	2	253
12	163	95	2	5	4	0	2	2	1	1	3	290
45	116	77	2	5	6	0	1	3	2	2	3	262
2	109	107	1	4	5	0	2	3	2	1	2	238
0	69	49	0	5	4	0	1	2	0	1	2	133
0	81	66	0	4	4	0	0	1	0	0	2	158
67	952	702	8	40	30	0	9	14	6	10	15	1853
						WEST LEG						
3	90	33	2	2	1	0	1	1	1	0	0	134
11	123	46	3	4	1	0	2	1	0	0	0	191
10	125	69	3	6	2	1	3	1	1	0	0	221
24	181	94	2	3	1	0	2	0	1	1	0	309
10	73	80	2	9	2	0	1	1	1	1	0	180
2	88	43	2	3	4	0	1	0	3	1	0	147
0	105	13	1	5	3	0	2	1	1	0	0	131
7	67	31	1	5	1	1	1	0	1	1	0	116
67	852	409	16	37	15	2	13	5	9	4	0	1429

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 638

Rt	Thru	Lt	
132	424	82	Total
27	95	16	1st
25	80	11	2nd
37	137	39	3rd
43	112	16	4th

EAST LEG

EAST LEG TOTAL: 739

	1st	2nd	3rd	4th	Total
Rt	19	10	35	4	68
Thru	164	141	132	61	498
Lt	57	41	36	39	173

WEST LEG

Total	1st	2nd	3rd	4th	
171	41	40	41	49	Lt
424	130	107	110	77	Thru
90	28	31	25	6	Rt

WEST LEG TOTAL: 685

SOUTH LEG

	Lt	Thru	Rt
1st	29	149	51
2nd	17	144	46
3rd	20	201	22
4th	15	141	31
Total	81	635	150

TOTAL: 866

PEAK HOUR FACTORS

NORTH LEG = 0.75
SOUTH LEG = 0.89
EAST LEG = 0.77
WEST LEG = 0.86

ALL LEGS = 0.88

HOUR TOTAL: 2,928

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 12:00PM-01:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
103	335	42	Total
24	77	11	1st
27	83	4	2nd
27	95	16	3rd
25	80	11	4th

	1st	2nd	3rd	4th	Total
Rt	2	5	19	10	36
Thru	47	50	164	141	402
Lt	44	52	57	41	194

Total	1st	2nd	3rd	4th	
154	28	45	41	40	Lt
337	41	59	130	107	Thru
70	5	6	28	31	Rt

	Lt	Thru	Rt
1st	9	90	24
2nd	9	105	20
3rd	29	149	51
4th	17	144	46
Total	64	488	141

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 01:00PM-02:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
154	507	99	Total
37	137	39	1st
43	112	16	2nd
41	139	28	3rd
33	119	16	4th

	1st	2nd	3rd	4th	Total
Rt	35	4	14	27	80
Thru	132	61	121	74	388
Lt	36	39	44	55	174

Total	1st	2nd	3rd	4th	
184	41	49	41	53	Lt
430	110	77	125	118	Thru
53	25	6	8	14	Rt

	Lt	Thru	Rt
1st	20	201	22
2nd	15	141	31
3rd	8	172	38
4th	20	143	33
Total	63	657	124

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : OSBORNE 05-22-12

BEGINNING TIME : 12:00PM (PH 12:30pm)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
21	64	11	3	7	0	0	3	0	0	3	0	112
24	71	4	3	7	0	0	3	0	0	2	0	114
26	84	16	1	6	0	0	3	0	0	2	0	138
24	68	11	1	6	0	0	3	0	0	3	0	116
36	125	39	1	5	0	0	4	0	0	3	0	213
42	100	16	1	5	0	0	3	0	0	4	0	171
39	124	27	2	8	0	0	3	0	0	4	1	208
30	105	16	3	7	0	0	3	0	0	4	0	168
242	741	140	15	51	0	0	25	0	0	25	1	1240
						SOUTH LEG						
17	82	8	1	2	1	2	3	0	4	3	0	123
16	89	7	0	5	2	2	4	0	2	7	0	134
42	136	26	3	5	3	2	3	0	4	5	0	229
40	133	15	2	5	2	2	2	0	2	4	0	207
14	185	17	3	7	3	3	4	0	2	5	0	243
22	131	14	2	4	1	3	2	0	4	4	0	187
28	160	6	4	6	2	4	1	0	2	5	0	218
27	132	18	2	6	2	2	1	0	2	4	0	196
206	1048	111	17	40	16	20	20	0	22	37	0	1537
						EAST LEG						
0	42	37	1	3	4	0	2	2	1	0	1	93
3	44	47	1	4	3	0	1	2	1	1	0	107
18	158	53	1	3	2	0	1	2	0	2	0	240
8	134	37	2	4	1	0	2	3	0	1	0	192
32	127	30	2	2	3	0	1	3	1	2	0	203
3	55	35	1	3	2	0	2	2	0	1	0	104
13	115	40	1	3	1	0	1	3	0	2	0	179
26	67	50	1	4	3	0	1	2	0	2	0	156
103	742	329	10	26	19	0	11	19	3	11	1	1274
						WEST LEG						
4	38	26	1	0	2	0	2	0	0	1	0	74
4	56	41	2	2	1	0	0	2	0	1	1	110
26	120	38	2	4	2	0	4	0	0	2	1	199
30	101	38	1	3	1	0	2	0	0	1	1	178
23	100	40	2	7	1	0	3	0	0	0	0	176
4	69	46	2	6	3	0	2	0	0	0	0	132
7	119	39	1	3	2	0	3	0	0	0	0	174
13	114	52	1	2	1	0	1	0	0	1	0	185
111	717	320	12	27	13	0	17	2	0	6	3	1228

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 916

Rt	Thru	Lt	
203	577	136	Total
45	151	13	1st
55	136	9	2nd
56	149	65	3rd
47	141	49	4th

EAST LEG

EAST LEG TOTAL: 891

	1st	2nd	3rd	4th	Total
Rt	8	37	44	13	102
Thru	84	178	159	114	535
Lt	77	55	57	65	254

WEST LEG

Total	1st	2nd	3rd	4th	
242	64	49	69	60	Lt
690	152	207	187	144	Thru
90	4	33	27	26	Rt

WEST LEG TOTAL: 1,022

SOUTH LEG

	Lt	Thru	Rt
1st	23	234	100
2nd	30	197	82
3rd	51	207	47
4th	17	238	109
Total	121	876	338

TOTAL: 1,335

PEAK HOUR FACTORS

NORTH LEG = 0.85
SOUTH LEG = 0.92
EAST LEG = 0.83
WEST LEG = 0.88

ALL LEGS = 0.93

HOUR TOTAL: 4,164

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 04:00PM-05:00PM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total	114	497	71
1st	29	73	6
2nd	18	116	31
3rd	22	157	21
4th	45	151	13

	1st	2nd	3rd	4th	Total
Rt	3	5	2	8	18
Thru	61	107	57	84	309
Lt	61	68	58	77	264

	Total	1st	2nd	3rd	4th
Lt	177	35	21	57	64
Thru	531	83	139	157	152
Rt	24	7	9	4	4

	Lt	Thru	Rt
1st	8	224	93
2nd	16	160	81
3rd	29	205	80
4th	23	234	100
Total	76	823	354

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: OSBORNE

TIME: 05:00PM-06:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
195	570	155	Total
55	136	9	1st
56	149	65	2nd
47	141	49	3rd
37	144	32	4th

	1st	2nd	3rd	4th	Total
Rt	37	44	13	20	114
Thru	178	159	114	137	588
Lt	55	57	65	63	240

Total	1st	2nd	3rd	4th	
220	49	69	60	42	Lt
690	207	187	144	152	Thru
114	33	27	26	28	Rt

	Lt	Thru	Rt
1st	30	197	82
2nd	51	207	47
3rd	17	238	109
4th	20	202	72
Total	118	844	310

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : OSBORNE 05-22-12

BEGINNING TIME : 04:00PM (PH 4:45 PM)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
27	61	6	0	7	0	2	2	0	0	3	0	108
17	104	31	0	4	0	1	4	0	0	4	0	165
21	146	21	0	5	0	1	3	0	0	3	0	200
44	140	12	1	2	1	0	2	0	0	7	0	209
55	125	9	0	4	0	0	3	0	0	4	0	200
54	137	65	1	3	0	1	4	0	0	5	0	270
46	131	49	0	5	0	1	2	0	0	3	0	237
34	134	32	1	4	0	2	2	0	0	4	0	213
298	978	225	3	34	1	8	22	0	0	33	0	1602
						SOUTH LEG						
91	209	7	2	9	1	0	3	0	0	3	0	325
77	151	14	2	4	2	1	1	0	1	4	0	257
77	194	27	2	5	2	0	3	0	1	3	0	314
96	224	23	2	6	0	0	2	0	2	2	0	357
79	185	30	1	6	0	1	2	0	1	4	0	309
44	194	51	2	5	0	0	3	0	1	5	0	305
105	231	17	2	3	0	0	1	0	2	3	0	364
68	196	20	3	2	0	0	1	0	1	3	0	294
637	1584	189	16	40	5	2	16	0	9	27	0	2525
						EAST LEG						
0	55	60	2	4	1	1	1	0	0	1	0	125
4	102	63	1	3	2	0	0	1	0	2	2	180
1	54	48	1	2	6	0	0	3	0	1	1	117
8	78	70	0	3	5	0	0	0	0	3	2	169
35	174	49	1	3	4	0	0	0	1	1	2	270
41	153	52	2	3	3	0	0	1	1	3	1	260
12	110	58	1	4	3	0	0	2	0	0	2	192
19	133	55	1	3	4	0	0	2	0	1	2	220
120	859	455	9	25	28	1	1	9	2	12	12	1533
						WEST LEG						
5	81	34	1	1	0	0	1	0	1	0	1	125
4	136	19	5	3	0	0	0	1	0	0	1	169
0	152	55	4	3	0	0	1	0	0	1	2	218
1	147	61	3	3	0	0	1	1	0	1	2	220
30	204	49	3	3	0	0	0	0	0	0	0	289
23	181	68	3	5	0	0	1	0	1	0	1	283
23	140	58	3	3	0	0	1	1	0	0	1	230
23	147	40	3	3	0	0	1	0	2	1	2	222
109	1188	384	25	24	0	0	6	3	4	3	10	1756

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	535	70	425	630	70	50	520	135	45	1070	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1346	1641	3355		1245	3139	1346	1504	3438	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3438	1346	1641	3355		1245	3139	1346	1504	3438	1468
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	361	645	84	512	759	84	60	627	163	54	1289	205
RTOR Reduction (vph)	0	0	69	0	7	0	0	0	42	0	0	21
Lane Group Flow (vph)	361	645	15	512	836	0	60	627	121	54	1289	184
Heavy Vehicles (%)	5%	5%	20%	10%	5%	15%	45%	15%	20%	20%	5%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	28.0	24.0	24.0	38.0	34.0		6.0	44.7	82.7	8.1	46.8	74.8
Effective Green, g (s)	28.0	24.0	24.0	38.0	34.0		6.0	44.7	82.7	8.1	46.8	74.8
Actuated g/C Ratio	0.21	0.18	0.18	0.29	0.26		0.05	0.34	0.63	0.06	0.36	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	368	631	247	477	872		57	1073	892	93	1230	884
v/s Ratio Prot	0.21	0.19		c0.31	c0.25		c0.05	0.20	0.04	0.04	c0.37	0.04
v/s Ratio Perm			0.01						0.05			0.08
v/c Ratio	0.98	1.02	0.06	1.07	0.96		1.05	0.58	0.14	0.58	1.05	0.21
Uniform Delay, d1	51.1	53.4	44.1	46.4	47.7		62.4	35.4	9.7	59.7	42.0	13.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	41.6	41.6	0.5	62.3	22.0		134.7	0.8	0.1	8.9	39.2	0.1
Delay (s)	92.8	95.0	44.6	108.7	69.7		197.1	36.2	9.7	68.6	81.2	13.7
Level of Service	F	F	D	F	E		F	D	A	E	F	B
Approach Delay (s)		90.4			84.5			42.5			71.8	
Approach LOS		F			F			D			E	

Intersection Summary			
HCM Average Control Delay	74.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	130.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	170	425	90	175	500	70	80	635	150	80	425	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3282	1468	1641	3355		1641	3282	1346	1805	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3282	1468	1641	3355		1641	3282	1346	1805	3282	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	193	483	102	199	568	80	91	722	170	91	483	148
RTOR Reduction (vph)	0	0	74	0	18	0	0	0	69	0	0	60
Lane Group Flow (vph)	193	483	28	199	630	0	91	722	101	91	483	88
Heavy Vehicles (%)	5%	10%	10%	10%	5%	10%	10%	10%	20%	0%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	7.1	16.1	16.1	8.1	17.1		3.1	15.2	23.3	3.1	15.2	22.3
Effective Green, g (s)	7.1	16.1	16.1	8.1	17.1		3.1	15.2	23.3	3.1	15.2	22.3
Actuated g/C Ratio	0.12	0.28	0.28	0.14	0.29		0.05	0.26	0.40	0.05	0.26	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	209	903	404	227	981		87	853	628	96	853	691
v/s Ratio Prot	0.11	0.15		c0.12	c0.19		c0.06	c0.22	0.02	0.05	0.15	0.02
v/s Ratio Perm			0.02						0.05			0.04
v/c Ratio	0.92	0.53	0.07	0.88	0.64		1.05	0.85	0.16	0.95	0.57	0.13
Uniform Delay, d1	25.4	18.0	15.7	24.7	18.0		27.7	20.5	11.3	27.6	18.8	11.8
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	41.2	2.3	0.3	29.2	3.2		109.6	7.8	0.1	74.1	0.9	0.1
Delay (s)	66.7	20.3	16.0	53.9	21.3		137.3	28.3	11.4	101.7	19.7	11.9
Level of Service	E	C	B	D	C		F	C	B	F	B	B
Approach Delay (s)		31.2			28.9			35.5			28.4	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	31.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	58.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	690	90	255	535	100	120	875	340	135	575	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3438	1404	1641	3357		1805	3438	1538	1719	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1719	3438	1404	1641	3357		1805	3438	1538	1719	3282	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	258	742	97	274	575	108	129	941	366	145	618	220
RTOR Reduction (vph)	0	0	73	0	17	0	0	0	31	0	0	49
Lane Group Flow (vph)	258	742	24	274	666	0	129	941	335	145	618	171
Heavy Vehicles (%)	5%	5%	15%	10%	5%	5%	0%	5%	5%	5%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	16.0	22.0	22.0	16.6	22.6		8.7	26.0	42.6	9.0	26.3	42.3
Effective Green, g (s)	16.0	22.0	22.0	16.6	22.6		8.7	26.0	42.6	9.0	26.3	42.3
Actuated g/C Ratio	0.18	0.25	0.25	0.19	0.25		0.10	0.29	0.48	0.10	0.29	0.47
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	307	844	345	304	847		175	998	800	173	963	795
v/s Ratio Prot	0.15	c0.22		c0.17	0.20		0.07	c0.27	0.08	c0.08	0.19	0.04
v/s Ratio Perm			0.02						0.14			0.07
v/c Ratio	0.84	0.88	0.07	0.90	0.79		0.74	0.94	0.42	0.84	0.64	0.22
Uniform Delay, d1	35.6	32.5	25.9	35.7	31.2		39.3	31.1	15.4	39.6	27.5	13.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	18.3	12.6	0.4	27.9	7.3		14.9	16.4	0.4	28.3	1.5	0.1
Delay (s)	53.9	45.1	26.3	63.6	38.5		54.2	47.5	15.7	67.8	29.0	14.0
Level of Service	D	D	C	E	D		D	D	B	E	C	B
Approach Delay (s)		45.5			45.7			40.0			31.4	
Approach LOS		D			D			D			C	

Intersection Summary			
HCM Average Control Delay	40.7	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	89.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	350	535	70	425	630	70	50	520	185	45	1070	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1517	3438	1346	1641	3355		1245	3139	1137	1504	3438	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1517	3438	1346	1641	3355		1245	3139	1137	1504	3438	1468
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	422	645	84	512	759	84	60	627	223	54	1289	205
RTOR Reduction (vph)	0	0	67	0	8	0	0	0	40	0	0	12
Lane Group Flow (vph)	422	645	17	512	835	0	60	627	183	54	1289	193
Heavy Vehicles (%)	19%	5%	20%	10%	5%	15%	45%	15%	42%	20%	5%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	27.0	23.0	23.0	30.0	26.0		4.0	34.9	64.9	6.9	37.8	64.8
Effective Green, g (s)	27.0	23.0	23.0	30.0	26.0		4.0	34.9	64.9	6.9	37.8	64.8
Actuated g/C Ratio	0.24	0.21	0.21	0.27	0.23		0.04	0.31	0.59	0.06	0.34	0.58
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	370	714	279	444	787		45	989	707	94	1173	912
v/s Ratio Prot	0.28	0.19		c0.31	c0.25		c0.05	0.20	0.07	0.04	c0.37	0.05
v/s Ratio Perm			0.01						0.09			0.08
v/c Ratio	1.14	0.90	0.06	1.15	1.06		1.33	0.63	0.26	0.57	1.10	0.21
Uniform Delay, d1	41.9	42.8	35.2	40.4	42.4		53.4	32.5	11.2	50.5	36.5	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	90.8	17.0	0.4	91.8	49.6		247.1	1.3	0.2	8.2	57.7	0.1
Delay (s)	132.7	59.8	35.7	132.2	92.0		300.5	33.8	11.4	58.8	94.2	11.0
Level of Service	F	E	D	F	F		F	C	B	E	F	B
Approach Delay (s)		84.7			107.2			45.9			81.9	
Approach LOS		F			F			D			F	

Intersection Summary			
HCM Average Control Delay	82.9	HCM Level of Service	F
HCM Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	110.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	425	90	175	500	70	80	635	200	80	425	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1421	3282	1468	1641	3355		1641	3282	1154	1805	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1421	3282	1468	1641	3355		1641	3282	1154	1805	3282	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	250	483	102	199	568	80	91	722	227	91	483	148
RTOR Reduction (vph)	0	0	73	0	17	0	0	0	68	0	0	45
Lane Group Flow (vph)	250	483	29	199	631	0	91	722	159	91	483	103
Heavy Vehicles (%)	27%	10%	10%	10%	5%	10%	10%	10%	40%	0%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	12.0	18.6	18.6	10.4	17.0		4.0	16.5	26.9	3.1	15.6	27.6
Effective Green, g (s)	12.0	18.6	18.6	10.4	17.0		4.0	16.5	26.9	3.1	15.6	27.6
Actuated g/C Ratio	0.19	0.29	0.29	0.16	0.26		0.06	0.26	0.42	0.05	0.24	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	264	945	423	264	883		102	838	552	87	793	752
v/s Ratio Prot	c0.18	0.15		0.12	c0.19		c0.06	c0.22	0.05	0.05	0.15	0.03
v/s Ratio Perm			0.02						0.09			0.04
v/c Ratio	0.95	0.51	0.07	0.75	0.71		0.89	0.86	0.29	1.05	0.61	0.14
Uniform Delay, d1	26.0	19.2	16.7	25.9	21.6		30.1	23.0	12.5	30.7	21.8	11.3
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.7	2.0	0.3	11.5	4.9		55.9	9.1	0.3	109.6	1.3	0.1
Delay (s)	66.7	21.2	17.0	37.4	26.5		86.0	32.0	12.8	140.3	23.1	11.3
Level of Service	E	C	B	D	C		F	C	B	F	C	B
Approach Delay (s)		34.3			29.1			32.5			35.5	
Approach LOS		C			C			C			D	

Intersection Summary			
HCM Average Control Delay	32.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	64.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	690	90	255	535	100	120	875	390	135	575	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1492	3438	1404	1641	3357		1805	3438	1380	1719	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1492	3438	1404	1641	3357		1805	3438	1380	1719	3282	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	312	742	97	274	575	108	129	941	419	145	618	220
RTOR Reduction (vph)	0	0	72	0	19	0	0	0	28	0	0	43
Lane Group Flow (vph)	312	742	25	274	664	0	129	941	391	145	618	177
Heavy Vehicles (%)	21%	5%	15%	10%	5%	5%	0%	5%	17%	5%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	17.0	21.0	21.0	14.0	18.0		7.9	22.0	36.0	7.0	21.1	38.1
Effective Green, g (s)	17.0	21.0	21.0	14.0	18.0		7.9	22.0	36.0	7.0	21.1	38.1
Actuated g/C Ratio	0.21	0.26	0.26	0.18	0.22		0.10	0.28	0.45	0.09	0.26	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	902	369	287	755		178	945	690	150	866	809
v/s Ratio Prot	c0.21	c0.22		0.17	0.20		0.07	c0.27	0.10	c0.08	0.19	0.05
v/s Ratio Perm			0.02						0.18			0.07
v/c Ratio	0.98	0.82	0.07	0.95	0.88		0.72	1.00	0.57	0.97	0.71	0.22
Uniform Delay, d1	31.4	27.7	22.2	32.7	29.9		35.0	29.0	16.2	36.4	26.7	12.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	45.9	8.4	0.4	40.6	13.8		13.6	28.0	1.1	62.8	2.8	0.1
Delay (s)	77.3	36.1	22.5	73.3	43.8		48.6	57.0	17.3	99.2	29.5	12.4
Level of Service	E	D	C	E	D		D	E	B	F	C	B
Approach Delay (s)		46.1			52.2			45.1			36.0	
Approach LOS		D			D			D			D	

Intersection Summary			
HCM Average Control Delay	44.9	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	380	585	75	465	685	75	55	565	200	50	1165	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1517	3438	1346	1641	3356		1245	3139	1137	1504	3438	1468
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1517	3438	1346	1641	3356		1245	3139	1137	1504	3438	1468
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	458	705	90	560	825	90	66	681	241	60	1404	223
RTOR Reduction (vph)	0	0	69	0	6	0	0	0	40	0	0	10
Lane Group Flow (vph)	458	705	21	560	909	0	66	681	201	60	1404	213
Heavy Vehicles (%)	19%	5%	20%	10%	5%	15%	45%	15%	42%	20%	5%	10%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	35.0	31.0	31.0	40.0	36.0		5.0	45.0	85.0	8.8	48.8	83.8
Effective Green, g (s)	35.0	31.0	31.0	40.0	36.0		5.0	45.0	85.0	8.8	48.8	83.8
Actuated g/C Ratio	0.25	0.22	0.22	0.28	0.26		0.04	0.32	0.60	0.06	0.35	0.60
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	377	757	296	466	858		44	1003	719	94	1192	915
v/s Ratio Prot	0.30	0.21		c0.34	c0.27		c0.05	0.22	0.08	0.04	c0.41	0.06
v/s Ratio Perm			0.02						0.10			0.09
v/c Ratio	1.21	0.93	0.07	1.20	1.06		1.50	0.68	0.28	0.64	1.18	0.23
Uniform Delay, d1	52.9	53.9	43.5	50.4	52.4		67.9	41.6	13.3	64.4	46.0	13.4
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	118.7	19.7	0.5	109.8	47.7		313.2	1.8	0.2	13.4	89.0	0.1
Delay (s)	171.6	73.5	44.0	160.2	100.1		381.1	43.5	13.5	77.8	135.0	13.5
Level of Service	F	E	D	F	F		F	D	B	E	F	B
Approach Delay (s)		107.3			122.9			58.7			116.9	
Approach LOS		F			F			E			F	

Intersection Summary			
HCM Average Control Delay	105.7	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	140.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	465	100	190	545	75	85	690	220	85	465	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1421	3282	1468	1641	3357		1641	3282	1154	1805	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1421	3282	1468	1641	3357		1641	3282	1154	1805	3282	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	273	528	114	216	619	85	97	784	250	97	528	159
RTOR Reduction (vph)	0	0	81	0	15	0	0	0	183	0	0	41
Lane Group Flow (vph)	273	528	33	216	689	0	97	784	67	97	528	118
Heavy Vehicles (%)	27%	10%	10%	10%	5%	10%	10%	10%	40%	0%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	Perm	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	14.8	20.3	20.3	11.5	17.0		4.8	18.8	18.8	4.0	18.0	32.8
Effective Green, g (s)	14.8	20.3	20.3	11.5	17.0		4.8	18.8	18.8	4.0	18.0	32.8
Actuated g/C Ratio	0.21	0.29	0.29	0.16	0.24		0.07	0.27	0.27	0.06	0.25	0.46
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	298	944	422	267	808		112	874	307	102	837	802
v/s Ratio Prot	c0.19	c0.16		0.13	c0.21		c0.06	c0.24		0.05	0.16	0.03
v/s Ratio Perm			0.02						0.06			0.05
v/c Ratio	0.92	0.56	0.08	0.81	0.85		0.87	0.90	0.22	0.95	0.63	0.15
Uniform Delay, d1	27.3	21.4	18.3	28.5	25.6		32.6	25.0	20.2	33.2	23.4	10.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	31.0	2.4	0.4	16.3	11.0		45.8	11.8	0.4	73.1	1.6	0.1
Delay (s)	58.3	23.7	18.7	44.8	36.6		78.4	36.8	20.5	106.3	24.9	10.9
Level of Service	E	C	B	D	D		E	D	C	F	C	B
Approach Delay (s)		33.4			38.6			36.7			32.1	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	35.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	70.6	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	750	100	280	585	110	130	955	425	145	625	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1492	3438	1404	1641	3357		1805	3438	1380	1719	3282	1538
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1492	3438	1404	1641	3357		1805	3438	1380	1719	3282	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	339	806	108	301	629	118	140	1027	457	156	672	242
RTOR Reduction (vph)	0	0	79	0	17	0	0	0	23	0	0	39
Lane Group Flow (vph)	339	806	29	301	730	0	140	1027	434	156	672	203
Heavy Vehicles (%)	21%	5%	15%	10%	5%	5%	0%	5%	17%	5%	10%	5%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA	pm+ov	Prot	NA	pm+ov
Protected Phases	5	2		1	6		3	8	1	7	4	5
Permitted Phases			2						8			4
Actuated Green, G (s)	20.0	24.0	24.0	16.0	20.0		9.6	26.0	42.0	8.0	24.4	44.4
Effective Green, g (s)	20.0	24.0	24.0	16.0	20.0		9.6	26.0	42.0	8.0	24.4	44.4
Actuated g/C Ratio	0.22	0.27	0.27	0.18	0.22		0.11	0.29	0.47	0.09	0.27	0.49
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	332	917	374	292	746		193	993	705	153	890	827
v/s Ratio Prot	c0.23	c0.23		0.18	0.22		0.08	c0.30	0.11	c0.09	0.20	0.05
v/s Ratio Perm			0.02						0.21			0.08
v/c Ratio	1.02	0.88	0.08	1.03	0.98		0.73	1.03	0.62	1.02	0.76	0.25
Uniform Delay, d1	35.0	31.6	24.7	37.0	34.8		38.9	32.0	18.0	41.0	30.1	13.1
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	54.9	11.7	0.4	60.9	28.1		12.7	37.8	1.6	78.0	3.7	0.2
Delay (s)	89.9	43.3	25.1	97.9	62.9		51.6	69.8	19.6	119.0	33.7	13.3
Level of Service	F	D	C	F	E		D	E	B	F	C	B
Approach Delay (s)		54.4			72.9			54.1			41.6	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	55.4	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

9/10/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	380	585	75	465	685	75	55	565	200	50	1165	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91		1.00	0.91	0.91	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.99	0.85	1.00	1.00	0.85
Flt Protected	0.95	0.99	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1380	3231	1346	1493	3196		1245	2968	1035	1504	3438	1468
Flt Permitted	0.95	0.78	1.00	0.95	0.84		0.08	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	1380	2535	1346	1493	2707		101	2968	1035	384	3438	1468
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	458	705	90	560	825	90	66	681	241	60	1404	223
RTOR Reduction (vph)	0	0	43	0	5	0	0	2	63	0	0	72
Lane Group Flow (vph)	376	787	47	482	988	0	66	703	154	60	1404	151
Heavy Vehicles (%)	19%	5%	20%	10%	5%	15%	45%	15%	42%	20%	5%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8	1	7	4	5
Permitted Phases			2				8		8	4		4
Actuated Green, G (s)	36.0	53.0	21.0	41.0	62.0		56.0	52.0	93.0	57.6	52.8	88.8
Effective Green, g (s)	36.0	53.0	21.0	41.0	62.0		56.0	52.0	93.0	57.6	52.8	88.8
Actuated g/C Ratio	0.28	0.41	0.16	0.31	0.47		0.43	0.40	0.71	0.44	0.40	0.68
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	380	1219	257	468	1436		78	1180	768	210	1388	1042
v/s Ratio Prot	0.27	0.18	0.01	c0.32	0.22		c0.03	0.24	0.06	0.01	c0.41	0.04
v/s Ratio Perm		0.08	0.03		c0.11		0.34		0.09	0.12		0.06
v/c Ratio	0.99	0.65	0.18	1.03	0.69		0.85	0.60	0.20	0.29	1.01	0.15
Uniform Delay, d1	47.2	31.3	47.5	44.9	26.8		33.2	31.1	6.4	22.8	39.0	7.5
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	42.9	1.2	0.3	49.5	1.4		53.3	0.8	0.1	0.8	27.0	0.1
Delay (s)	90.1	32.5	47.8	94.4	28.2		86.5	31.9	6.5	23.5	66.0	7.5
Level of Service	F	C	D	F	C		F	C	A	C	E	A
Approach Delay (s)		50.9			49.9			30.0			56.8	
Approach LOS		D			D			C			E	

Intersection Summary			
HCM Average Control Delay	48.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	130.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

9/10/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	465	100	190	545	75	85	690	220	85	465	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91		1.00	0.91	0.91	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1293	3113	1468	1493	3208		1641	3103	1050	1805	3282	1538
Flt Permitted	0.95	0.94	1.00	0.95	0.95		0.29	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	1293	2919	1468	1493	3039		496	3103	1050	376	3282	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	273	528	114	216	619	85	97	784	250	97	528	159
RTOR Reduction (vph)	0	0	72	0	12	0	0	3	125	0	0	83
Lane Group Flow (vph)	246	555	42	194	714	0	97	806	100	97	528	76
Heavy Vehicles (%)	27%	10%	10%	10%	5%	10%	10%	10%	40%	0%	10%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8	1	7	4	5
Permitted Phases			2				8		8	4		4
Actuated Green, G (s)	16.9	41.1	28.8	12.9	33.1		26.3	21.7	34.6	23.3	20.2	37.1
Effective Green, g (s)	16.9	41.1	28.8	12.9	33.1		26.3	21.7	34.6	23.3	20.2	37.1
Actuated g/C Ratio	0.22	0.53	0.37	0.17	0.42		0.34	0.28	0.44	0.30	0.26	0.48
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	281	1582	618	247	1319		235	864	520	169	851	811
v/s Ratio Prot	c0.19	c0.08	0.00	0.13	0.09		c0.02	c0.26	0.03	0.02	0.16	0.02
v/s Ratio Perm		0.11	0.02		c0.14		0.11		0.06	0.15		0.03
v/c Ratio	0.88	0.35	0.07	0.79	0.54		0.41	0.93	0.19	0.57	0.62	0.09
Uniform Delay, d1	29.5	10.7	15.9	31.2	16.7		18.6	27.4	13.2	21.4	25.5	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.7	0.1	0.0	15.0	0.5		1.2	16.6	0.2	4.7	1.4	0.1
Delay (s)	54.2	10.8	15.9	46.2	17.2		19.8	44.0	13.3	26.1	26.9	11.2
Level of Service	D	B	B	D	B		B	D	B	C	C	B
Approach Delay (s)		23.1			23.3			35.8			23.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	27.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
27: Glenoaks Blvd & Osborne St

9/10/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	750	100	280	585	110	130	955	425	145	625	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	1.00	0.91	0.91		1.00	0.91	0.91	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.99	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1357	3267	1404	1493	3206		1805	3256	1256	1719	3282	1538
Flt Permitted	0.95	0.93	1.00	0.95	0.93		0.20	1.00	1.00	0.15	1.00	1.00
Satd. Flow (perm)	1357	3049	1404	1493	2995		382	3256	1256	275	3282	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	339	806	108	301	629	118	140	1027	457	156	672	242
RTOR Reduction (vph)	0	0	56	0	15	0	0	3	141	0	0	115
Lane Group Flow (vph)	305	840	52	271	762	0	140	1070	270	156	672	127
Heavy Vehicles (%)	21%	5%	15%	10%	5%	5%	0%	5%	17%	5%	10%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	5	2	3	1	6		3	8	1	7	4	5
Permitted Phases			2				8		8	4		4
Actuated Green, G (s)	21.0	44.0	30.7	17.0	36.0		36.7	29.0	46.0	31.3	26.3	47.3
Effective Green, g (s)	21.0	44.0	30.7	17.0	36.0		36.7	29.0	46.0	31.3	26.3	47.3
Actuated g/C Ratio	0.23	0.49	0.34	0.19	0.40		0.41	0.32	0.51	0.35	0.29	0.53
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	317	1541	541	282	1238		278	1049	698	176	959	877
v/s Ratio Prot	c0.22	c0.13	0.01	0.18	0.12		c0.04	c0.33	0.07	c0.05	0.20	0.03
v/s Ratio Perm		c0.14	0.03		0.13		0.16		0.14	0.26		0.05
v/c Ratio	0.96	0.55	0.10	0.96	0.62		0.50	1.02	0.39	0.89	0.70	0.15
Uniform Delay, d1	34.1	16.0	20.2	36.2	21.5		18.5	30.5	13.4	26.4	28.3	11.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.2	0.4	0.1	42.8	0.9		1.4	32.8	0.4	37.3	2.3	0.1
Delay (s)	74.3	16.4	20.3	79.0	22.4		19.9	63.3	13.8	63.7	30.7	11.0
Level of Service	E	B	C	E	C		B	E	B	E	C	B
Approach Delay (s)		30.8			37.0			47.0			31.1	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	37.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

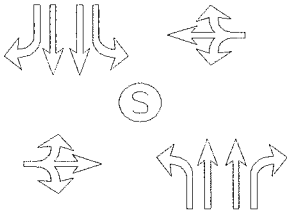
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
28
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
MONTAGUE STREET						
EB LEFT	10	30%		10	5	15
EB THRU	5	5%		5	5	10
EB RIGHT	30	20%		30	5	35
WB LEFT	5	5%		5	5	10
WB THRU	5	5%		5	5	10
WB RIGHT	10	5%		10	5	15
GLEN OAKS BLVD						
NB LEFT	55	5%		55	5	60
NB THRU	640	10%	**50**	690	60	750
NB RIGHT	5	15%		5	5	10
SB LEFT	15	5%		15	5	20
SB THRU	1575	10%	**50**	1625	145	1770
SB RIGHT	55	15%		55	5	60
TOTALS	**2410**		**100**	**2510**	**255**	**2765**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 28
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
MONTAGUE STREET						
EB LEFT	40	30%		40	5	45
EB THRU	5	5%		5	5	10
EB RIGHT	45	20%		45	5	50
WB LEFT	35	5%		35	5	40
WB THRU	5	5%		5	5	10
WB RIGHT	30	5%		30	5	35
GLEN OAKS BLVD						
NB LEFT	60	5%		60	5	65
NB THRU	560	10%	**50**	610	55	665
NB RIGHT	15	15%		15	5	20
SB LEFT	35	5%		35	5	40
SB THRU	525	10%	**50**	575	50	625
SB RIGHT	35	15%		35	5	40
TOTALS	**1390**		**100**	**1490**	**155**	**1645**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 28
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
MONTAGUE STREET						
EB LEFT	55	10%		55	5	60
EB THRU	5	5%		5	5	10
EB RIGHT	60	5%		60	5	65
WB LEFT	10	5%		10	5	15
WB THRU	5	5%		5	5	10
WB RIGHT	30	5%		30	5	35
GLEN OAKS BLVD						
NB LEFT	50	25%		50	5	55
NB THRU	1180	5%	**50**	1230	110	1340
NB RIGHT	15	5%		15	5	20
SB LEFT	15	5%		15	5	20
SB THRU	855	5%	**50**	905	80	985
SB RIGHT	25	15%		25	5	30
TOTALS	**2305**		**100**	**2405**	**240**	**2645**

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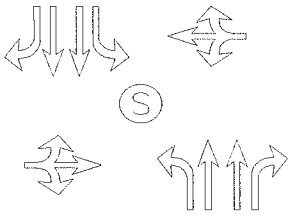
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 28
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
MONTAGUE STREET								
EB LEFT	8	13	39	45	**0**	45	5	50
EB THRU	2	0	0	5	**0**	5	5	10
EB RIGHT	18	10	30	50	**0**	50	5	55
WB LEFT	2	1	3	5	**0**	5	5	10
WB THRU	4	0	0	5	**0**	5	5	10
WB RIGHT	9	0	0	10	**0**	10	5	15
GLEN OAKS BLVD								
NB LEFT	56	3	9	65	**0**	65	5	70
NB THRU	586	51	153	740	**150**	890	80	970
NB RIGHT	4	2	6	10	**0**	10	5	15
SB LEFT	16	2	6	20	**0**	20	5	25
SB THRU	1502	45	135	1635	**150**	1785	160	1945
SB RIGHT	53	6	18	70	**0**	70	5	75
TOTALS	**2260**				**300**	**2960**	**290**	**3250**

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Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 28
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
MONTAGUE STREET								
EB LEFT	28	13	39	65	**0**	65	5	70
EB THRU	7	0	0	5	**0**	5	5	10
EB RIGHT	35	10	30	65	**0**	65	5	70
WB LEFT	36	1	3	40	**0**	40	5	45
WB THRU	3	0	0	5	**0**	5	5	10
WB RIGHT	28	0	0	30	**0**	30	5	35
GLEN OAKS BLVD								
NB LEFT	55	3	9	65	**0**	65	5	70
NB THRU	510	51	153	665	**150**	815	75	890
NB RIGHT	11	2	6	15	**0**	15	5	20
SB LEFT	33	2	6	40	**0**	40	5	45
SB THRU	481	45	135	615	**150**	765	70	835
SB RIGHT	30	6	18	50	**0**	50	5	55
TOTALS	**1257**				**300**	**1960**	**195**	**2155**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : MONTAGUE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 28
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
MONTAGUE STREET								
EB LEFT	48	5	15	65	**0**	65	5	70
EB THRU	0	0	0	5	**0**	5	5	10
EB RIGHT	58	3	9	65	**0**	65	5	70
WB LEFT	10	0	0	10	**0**	10	5	15
WB THRU	1	0	0	5	**0**	5	5	10
WB RIGHT	32	0	0	30	**0**	30	5	35
GLEN OAKS BLVD								
NB LEFT	37	11	33	70	**0**	70	5	75
NB THRU	1148	33	99	1245	**150**	1395	125	1520
NB RIGHT	13	0	0	15	**0**	15	5	20
SB LEFT	16	1	3	20	**0**	20	5	25
SB THRU	802	53	159	960	**150**	1110	100	1210
SB RIGHT	21	3	9	30	**0**	30	5	35
TOTALS	**2186**				**300**	**2820**	**275**	**3095**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: MONTAGUE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 1,648

	Rt	Thru	Lt
Total	56	1576	16
1st	6	405	2
2nd	11	444	6
3rd	24	376	4
4th	15	351	4

EAST LEG TOTAL: 16

	1st	2nd	3rd	4th	Total
Rt	2	2	4	2	10
Thru	0	1	2	1	4
Lt	0	1	1	0	2

WEST LEG TOTAL: 45

	Total	1st	2nd	3rd	4th
Lt	12	2	4	3	3
Thru	2	0	1	0	1
Rt	31	6	9	10	6

SOUTH LEG

TOTAL: 703

	Lt	Thru	Rt
1st	8	146	0
2nd	6	149	1
3rd	19	208	2
4th	23	138	3
Total	56	641	6

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.77
EAST LEG = 0.57
WEST LEG = 0.80

ALL LEGS = 0.92

HOUR TOTAL: 2,412

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 07:00AM-08:00AM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total	49	1574	14
1st	8	349	2
2nd	6	405	2
3rd	11	444	6
4th	24	376	4

	1st	2nd	3rd	4th	Total
Rt	1	2	2	4	9
Thru	0	0	1	2	3
Lt	0	0	1	1	2

	Total	1st	2nd	3rd	4th
Lt	11	2	2	4	3
Thru	1	0	0	1	0
Rt	29	4	6	9	10

	Lt	Thru	Rt
1st	8	115	1
2nd	8	146	0
3rd	6	149	1
4th	19	208	2
Total	41	618	4

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 08:00AM-09:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
53	1117	18	Total
15	351	4	1st
16	270	4	2nd
9	262	8	3rd
13	234	2	4th

	1st	2nd	3rd	4th	Total
Rt	2	1	1	6	10
Thru	1	0	0	0	1
Lt	0	0	0	3	3

Total	1st	2nd	3rd	4th	
20	3	5	8	4	Lt
2	1	0	1	0	Thru
28	6	7	8	7	Rt

	Lt	Thru	Rt
1st	23	138	3
2nd	10	199	4
3rd	9	136	0
4th	8	108	0
Total	50	581	7

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : MONTAGUE PH 05-22-12

BEGINNING TIME : 07:00AM (7:15 AM)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
8	336	2	0	5	0	0	2	0	0	6	0	359
6	391	2	0	5	0	0	3	0	0	6	0	413
11	428	6	0	6	0	0	5	0	0	5	0	461
21	359	4	3	6	0	0	1	0	0	10	0	404
15	324	4	0	6	0	0	4	0	0	17	0	370
16	247	4	0	12	0	0	2	0	0	9	0	290
9	244	8	0	10	0	0	3	0	0	5	0	279
13	208	2	0	16	0	0	4	0	0	6	0	249
99	2537	32	3	66	0	0	24	0	0	64	0	2825
						SOUTH LEG						
1	99	8	0	5	0	0	4	0	0	7	0	124
0	129	8	0	5	0	0	6	0	0	6	0	154
1	135	6	0	4	0	0	5	0	0	5	0	156
1	196	19	1	2	0	0	4	0	0	6	0	229
2	126	23	1	4	0	0	4	0	0	4	0	164
4	180	10	0	8	0	0	3	0	0	8	0	213
0	121	9	0	8	0	0	6	0	0	1	0	145
0	101	5	0	4	0	0	2	2	0	1	1	116
9	1087	88	2	40	0	0	34	2	0	38	1	1301
						EAST LEG						
0	0	0	1	0	0	0	0	0	0	0	0	1
2	0	0	0	0	0	0	0	0	0	0	0	2
2	1	1	0	0	0	0	0	0	0	0	0	4
3	2	1	1	0	0	0	0	0	0	0	0	7
2	1	0	0	0	0	0	0	0	0	0	0	3
1	0	0	0	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	0	0	0	1
6	0	3	0	0	0	0	0	0	0	0	0	9
17	4	5	2	0	0	0	0	0	0	0	0	28
						WEST LEG						
1	0	1	1	0	0	1	0	0	1	0	1	6
5	0	2	1	0	0	0	0	0	0	0	0	8
8	1	3	0	0	0	0	0	0	1	0	1	14
4	0	2	2	0	0	1	0	0	3	0	1	13
1	1	1	1	0	0	0	0	2	4	0	0	10
2	0	2	3	0	0	0	0	0	2	0	3	12
7	1	4	0	0	0	0	0	1	1	0	3	17
7	0	3	0	0	0	0	0	1	0	0	0	11
35	3	18	8	0	0	2	0	4	12	0	9	91

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: MONTAGUE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 12:00PM

NORTH LEG

TOTAL: 597

Rt	Thru	Lt	
36	526	35	Total
10	119	5	1st
8	135	6	2nd
7	119	18	3rd
11	153	6	4th

EAST LEG

EAST LEG TOTAL: 68

	1st	2nd	3rd	4th	Total
Rt	3	10	12	3	28
Thru	0	1	1	1	3
Lt	5	8	12	12	37

WEST LEG

Total	1st	2nd	3rd	4th	
41	17	6	9	9	Lt
7	5	0	0	2	Thru
45	11	7	19	8	Rt

WEST LEG TOTAL: 93

SOUTH LEG

	Lt	Thru	Rt
1st	13	135	5
2nd	9	131	3
3rd	18	144	1
4th	18	151	4
Total	58	561	13

TOTAL: 632

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.91
EAST LEG = 0.68
WEST LEG = 0.70

ALL LEGS = 0.92

HOUR TOTAL: 1,390

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 12:00PM-01:00PM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total	36	526	35
1st	10	119	5
2nd	8	135	6
3rd	7	119	18
4th	11	153	6

	1st	2nd	3rd	4th	Total
Rt	3	10	12	3	28
Thru	0	1	1	1	3
Lt	5	8	12	12	37

	Total	1st	2nd	3rd	4th
Lt	41	17	6	9	9
Thru	7	5	0	0	2
Rt	45	11	7	19	8

	Lt	Thru	Rt
1st	13	135	5
2nd	9	131	3
3rd	18	144	1
4th	18	151	4
Total	58	561	13

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 12:00AM-01:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
35	627	17	Total
12	141	5	1st
10	170	2	2nd
7	152	4	3rd
6	164	6	4th

	1st	2nd	3rd	4th	Total
Rt	14	7	8	7	36
Thru	1	0	1	0	2
Lt	5	6	3	3	17

Total	1st	2nd	3rd	4th	
35	5	3	20	7	Lt
3	0	1	1	1	Thru
34	6	8	10	10	Rt

	Lt	Thru	Rt
1st	11	176	4
2nd	7	186	2
3rd	17	190	2
4th	15	206	4
Total	50	758	12

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : MONTAGUE 05-22-12

BEGINNING TIME : 12:00PM (PM 12 PM)

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
7	111	5	0	5	0	1	2	0	2	1	0	134
8	119	6	0	13	0	0	1	0	0	2	0	149
6	112	18	0	2	0	0	2	0	1	3	0	144
9	139	4	2	8	0	0	4	2	0	2	0	170
11	131	5	1	8	0	0	1	0	0	1	0	158
9	159	2	1	8	0	0	3	0	0	0	0	182
7	144	4	0	5	0	0	2	0	0	1	0	163
5	152	6	1	5	0	0	0	0	0	7	0	176
62	1067	50	5	54	0	1	15	2	3	17	0	1276
						SOUTH LEG						
5	122	12	0	5	1	0	5	0	0	3	0	153
3	119	8	0	7	0	0	2	1	0	3	0	143
1	132	17	0	7	0	0	0	0	0	5	1	163
2	137	18	2	7	0	0	1	0	0	6	0	173
3	166	10	1	9	0	0	1	0	0	0	1	191
2	169	4	0	8	2	0	6	1	0	3	0	195
2	172	15	0	11	1	0	4	1	0	3	0	209
4	185	11	0	14	1	0	4	1	0	3	2	225
22	1202	95	3	68	5	0	23	4	0	26	4	1452
						EAST LEG						
3	0	5	0	0	0	0	0	0	0	0	0	8
10	1	8	0	0	0	0	0	0	0	0	0	19
12	1	12	0	0	0	0	0	0	0	0	0	25
3	1	11	0	0	1	0	0	0	0	0	0	16
14	1	5	0	0	0	0	0	0	0	0	0	20
7	0	6	0	0	0	0	0	0	0	0	0	13
8	1	3	0	0	0	0	0	0	0	0	0	12
7	0	3	0	0	0	0	0	0	0	0	0	10
64	5	53	0	0	1	0	0	0	0	0	0	123
						WEST LEG						
9	5	9	0	0	7	2	0	0	0	0	1	33
5	0	3	0	0	2	1	0	1	1	0	0	13
16	0	7	1	0	0	2	0	1	0	0	1	28
5	2	9	1	0	0	1	0	0	1	0	0	19
6	0	5	0	0	0	0	0	0	0	0	0	11
8	0	1	0	0	2	0	0	0	0	1	0	12
9	1	17	0	0	2	0	0	0	1	0	1	31
10	1	7	0	0	0	0	0	0	0	0	0	18
68	9	58	2	0	13	6	0	2	3	1	3	165

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: MONTAGUE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 896

Rt	Thru	Lt	
24	855	17	Total
3	224	7	1st
6	216	1	2nd
11	216	6	3rd
4	199	3	4th

EAST LEG

EAST LEG TOTAL: 43

	1st	2nd	3rd	4th	Total
Rt	7	12	3	10	32
Thru	0	1	0	0	1
Lt	0	4	1	5	10

WEST LEG

Total	1st	2nd	3rd	4th	
53	19	9	15	10	Lt
	0	0	0	0	Thru
61	27	13	14	7	Rt

WEST LEG TOTAL: 114

SOUTH LEG

	Lt	Thru	Rt
1st	17	308	5
2nd	8	302	3
3rd	17	287	4
4th	6	284	1
Total	48	1181	13

TOTAL: 1,242

PEAK HOUR FACTORS

NORTH LEG = 0.96
SOUTH LEG = 0.94
EAST LEG = 0.63
WEST LEG = 0.62

ALL LEGS = 0.93

HOUR TOTAL: 2,295

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 04:00PM-05:00PM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total	45	688	21
1st	9	171	3
2nd	12	181	5
3rd	11	162	5
4th	13	174	8

	1st	2nd	3rd	4th	Total
Rt	5	7	1	3	16
Thru	1	6	0	1	8
Lt	3	5	1	1	10

	Total	1st	2nd	3rd	4th
Lt	62	12	13	28	9
Thru	12	1	11	0	0
Rt	89	20	12	39	18

	Lt	Thru	Rt
1st	10	349	1
2nd	9	271	4
3rd	10	288	4
4th	10	277	1
Total	39	1185	10

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: MONTAGUE

TIME: 05:00PM-06:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
24	855	17	Total
3	224	7	1st
6	216	1	2nd
11	216	6	3rd
4	199	3	4th

	1st	2nd	3rd	4th	Total
Rt	7	12	3	10	32
Thru	0	1	0	0	1
Lt	0	4	1	5	10

Total	1st	2nd	3rd	4th	
53	19	9	15	10	Lt
0	0	0	0	0	Thru
61	27	13	14	7	Rt

	Lt	Thru	Rt
1st	17	308	5
2nd	8	302	3
3rd	17	287	4
4th	6	284	1
Total	48	1181	13

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : MONTAGUE 05-22-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
9	159	3	0	9	0	0	2	0	0	1	0	183
10	165	5	1	10	0	1	1	0	0	5	0	198
9	149	5	0	7	0	1	2	0	1	4	0	178
11	160	6	0	8	2	0	4	0	2	2	0	195
1	215	6	1	7	0	0	1	0	1	1	1	234
6	202	1	0	10	0	0	2	0	0	2	0	223
11	203	6	0	5	0	0	3	0	0	5	0	233
3	182	3	0	7	0	1	2	0	0	8	0	206
60	1435	35	2	63	2	3	17	0	4	28	1	1650
						SOUTH LEG						
1	330	10	0	10	0	0	7	0	0	2	0	360
4	260	7	0	3	0	0	1	1	0	7	1	284
4	275	9	0	6	0	0	5	0	0	2	1	302
1	272	7	0	3	0	0	1	2	0	1	1	288
5	297	11	0	6	1	0	2	1	0	3	4	330
3	292	6	0	4	1	0	2	1	0	4	0	313
4	282	16	0	4	0	0	0	0	0	1	1	308
1	277	4	0	4	0	0	1	0	0	2	2	291
23	2285	70	0	40	2	0	19	5	0	22	10	2476
						EAST LEG						
5	1	3	0	0	0	0	0	0	0	0	0	9
7	6	5	0	0	0	0	0	0	0	0	0	18
1	0	1	0	0	0	0	0	0	0	0	0	2
3	1	1	0	0	0	0	0	0	0	0	0	5
7	0	0	0	0	0	0	0	0	0	0	0	7
12	1	4	0	0	0	0	0	0	0	0	0	17
3	0	1	0	0	0	0	0	0	0	0	0	4
10	0	5	0	0	0	0	0	0	0	0	0	15
48	9	20	0	0	0	0	0	0	0	0	0	77
						WEST LEG						
18	1	11	0	0	0	1	0	0	1	0	1	33
11	11	10	0	0	2	0	0	0	1	0	1	36
39	0	28	0	0	0	0	0	0	0	0	0	67
16	0	8	0	0	0	0	0	0	2	0	1	27
27	0	19	0	0	0	0	0	0	0	0	0	46
13	0	7	0	0	1	0	0	0	0	0	1	22
12	0	14	0	0	0	1	0	0	1	0	1	29
6	0	8	0	0	0	0	0	0	1	0	2	17
142	12	105	0	0	3	2	0	0	6	0	7	277

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: MONTAGUE
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 12:00AM

NORTH LEG

TOTAL: 679

Rt	Thru	Lt	
35	627	17	Total
12	141	5	1st
10	170	2	2nd
7	152	4	3rd
6	164	6	4th

EAST LEG TOTAL: 55

	1st	2nd	3rd	4th	Total
Rt	14	7	8	7	36
Thru	1	0	1	0	2
Lt	5	6	3	3	17

WEST LEG TOTAL: 72

Total	1st	2nd	3rd	4th	
35	5	3	20	7	Lt
3	0	1	1	1	Thru
34	6	8	10	10	Rt

North	South	East	West

SOUTH LEG

	Lt	Thru	Rt
1st	11	176	4
2nd	7	186	2
3rd	17	190	2
4th	15	206	4
Total	50	758	12

PEAK HOUR FACTORS

SOUTH LEG = 0.91
EAST LEG = 0.69
WEST LEG = 0.58

ALL LEGS = 0.95

TOTAL: 820

HOUR TOTAL: 1,626

Prepared by NEWPORT TRAFFIC STUDIES

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	30	5	5	10	55	640	5	15	1575	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.91			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1421			1724		1719	3282	1404	1719	3282	1404
Flt Permitted		0.92			0.92		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1317			1600		1719	3282	1404	1719	3282	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	5	33	5	5	11	60	696	5	16	1712	60
RTOR Reduction (vph)	0	31	0	0	10	0	0	0	1	0	0	11
Lane Group Flow (vph)	0	18	0	0	11	0	60	696	4	16	1712	49
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	10%	15%	5%	10%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.3			4.3		3.0	47.3	47.3	0.8	45.1	45.1
Effective Green, g (s)		4.3			4.3		3.0	47.3	47.3	0.8	45.1	45.1
Actuated g/C Ratio		0.07			0.07		0.05	0.73	0.73	0.01	0.70	0.70
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		88			107		80	2411	1031	21	2298	983
v/s Ratio Prot							c0.03	0.21		0.01	c0.52	
v/s Ratio Perm		c0.01			0.01				0.00			0.03
v/c Ratio		0.21			0.10		0.75	0.29	0.00	0.76	0.74	0.05
Uniform Delay, d1		28.4			28.2		30.3	2.9	2.3	31.7	6.0	3.0
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.2			0.4		32.0	0.1	0.0	92.1	1.3	0.0
Delay (s)		29.6			28.6		62.4	2.9	2.3	123.8	7.4	3.0
Level of Service		C			C		E	A	A	F	A	A
Approach Delay (s)		29.6			28.6			7.6			8.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	64.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	5	45	35	5	30	60	560	15	35	525	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1404			1702		1719	3282	1404	1719	3282	1404
Flt Permitted		0.82			0.86		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1178			1501		1719	3282	1404	1719	3282	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	5	49	38	5	33	65	609	16	38	571	38
RTOR Reduction (vph)	0	43	0	0	29	0	0	0	7	0	0	18
Lane Group Flow (vph)	0	54	0	0	47	0	65	609	9	38	571	20
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	10%	15%	5%	10%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.6			4.6		1.8	20.6	20.6	0.7	19.5	19.5
Effective Green, g (s)		4.6			4.6		1.8	20.6	20.6	0.7	19.5	19.5
Actuated g/C Ratio		0.12			0.12		0.05	0.54	0.54	0.02	0.51	0.51
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		143			182		82	1784	763	32	1689	722
v/s Ratio Prot							c0.04	c0.19		0.02	0.17	
v/s Ratio Perm		c0.05			0.03				0.01			0.01
v/c Ratio		0.38			0.26		0.79	0.34	0.01	1.19	0.34	0.03
Uniform Delay, d1		15.3			15.1		17.9	4.8	4.0	18.6	5.4	4.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.7			0.8		39.3	0.1	0.0	220.6	0.1	0.0
Delay (s)		17.0			15.9		57.2	5.0	4.0	239.2	5.5	4.5
Level of Service		B			B		E	A	A	F	A	A
Approach Delay (s)		17.0			15.9			9.9			19.2	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	5	60	10	5	30	50	1180	15	15	855	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1510			1709		1444	3438	1615	1719	3438	1404
Flt Permitted		0.83			0.94		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1282			1625		1444	3438	1615	1719	3438	1404
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	59	5	65	11	5	32	54	1269	16	16	919	27
RTOR Reduction (vph)	0	56	0	0	28	0	0	0	5	0	0	11
Lane Group Flow (vph)	0	73	0	0	20	0	54	1269	11	16	919	16
Heavy Vehicles (%)	10%	0%	20%	0%	0%	0%	25%	5%	0%	5%	5%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		6.7			6.7		2.3	30.3	30.3	0.6	28.6	28.6
Effective Green, g (s)		6.7			6.7		2.3	30.3	30.3	0.6	28.6	28.6
Actuated g/C Ratio		0.14			0.14		0.05	0.61	0.61	0.01	0.58	0.58
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		173			220		67	2100	987	21	1982	810
v/s Ratio Prot							c0.04	c0.37		0.01	0.27	
v/s Ratio Perm		c0.06			0.01				0.01			0.01
v/c Ratio		0.42			0.09		0.81	0.60	0.01	0.76	0.46	0.02
Uniform Delay, d1		19.7			18.8		23.4	6.0	3.8	24.4	6.1	4.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.7			0.2		48.7	0.5	0.0	92.1	0.2	0.0
Delay (s)		21.3			19.0		72.1	6.4	3.8	116.5	6.2	4.5
Level of Service		C			B		E	A	A	F	A	A
Approach Delay (s)		21.3			19.0			9.1			8.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	30	5	5	10	55	690	5	15	1625	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.91			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1421			1724		1719	3085	1404	1719	3195	1404
Flt Permitted		0.92			0.93		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1317			1629		1719	3085	1404	1719	3195	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	5	33	5	5	11	60	750	5	16	1766	60
RTOR Reduction (vph)	0	31	0	0	10	0	0	0	1	0	0	10
Lane Group Flow (vph)	0	18	0	0	11	0	60	750	4	16	1766	50
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	17%	15%	5%	13%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.3			4.3		3.0	51.9	51.9	0.8	49.7	49.7
Effective Green, g (s)		4.3			4.3		3.0	51.9	51.9	0.8	49.7	49.7
Actuated g/C Ratio		0.06			0.06		0.04	0.75	0.75	0.01	0.72	0.72
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		82			102		75	2320	1056	20	2301	1011
v/s Ratio Prot							c0.03	0.24		0.01	c0.55	
v/s Ratio Perm		c0.01			0.01				0.00			0.04
v/c Ratio		0.22			0.10		0.80	0.32	0.00	0.80	0.77	0.05
Uniform Delay, d1		30.8			30.5		32.7	2.8	2.1	34.0	6.0	2.8
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.4			0.5		43.9	0.1	0.0	110.1	1.6	0.0
Delay (s)		32.1			31.0		76.6	2.9	2.1	144.1	7.6	2.8
Level of Service		C			C		E	A	A	F	A	A
Approach Delay (s)		32.1			31.0			8.3			8.7	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	69.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	55.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	5	45	35	5	30	60	610	15	35	575	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1404			1702		1719	3085	1404	1719	3059	1404
Flt Permitted		0.82			0.87		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1178			1523		1719	3085	1404	1719	3059	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	43	5	49	38	5	33	65	663	16	38	625	38
RTOR Reduction (vph)	0	43	0	0	29	0	0	0	7	0	0	18
Lane Group Flow (vph)	0	54	0	0	47	0	65	663	9	38	625	20
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	17%	15%	5%	18%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.5			4.5		1.9	21.5	21.5	0.8	20.4	20.4
Effective Green, g (s)		4.5			4.5		1.9	21.5	21.5	0.8	20.4	20.4
Actuated g/C Ratio		0.12			0.12		0.05	0.55	0.55	0.02	0.53	0.53
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		137			177		84	1709	778	35	1608	738
v/s Ratio Prot							c0.04	c0.21		0.02	0.20	
v/s Ratio Perm		c0.05			0.03				0.01			0.01
v/c Ratio		0.39			0.26		0.77	0.39	0.01	1.09	0.39	0.03
Uniform Delay, d1		15.9			15.6		18.2	4.9	3.9	19.0	5.5	4.4
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.8			0.8		34.8	0.1	0.0	179.0	0.2	0.0
Delay (s)		17.7			16.4		53.1	5.1	3.9	198.0	5.6	4.4
Level of Service		B			B		D	A	A	F	A	A
Approach Delay (s)		17.7			16.4			9.2			16.0	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	38.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	55	5	60	10	5	30	50	1230	15	15	905	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1510			1709		1444	3312	1615	1719	3282	1404
Flt Permitted		0.83			0.94		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1282			1625		1444	3312	1615	1719	3282	1404
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	59	5	65	11	5	32	54	1323	16	16	973	27
RTOR Reduction (vph)	0	56	0	0	28	0	0	0	5	0	0	11
Lane Group Flow (vph)	0	73	0	0	20	0	54	1323	11	16	973	16
Heavy Vehicles (%)	10%	0%	20%	0%	0%	0%	25%	9%	0%	5%	10%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		6.8			6.8		2.4	31.8	31.8	0.7	30.1	30.1
Effective Green, g (s)		6.8			6.8		2.4	31.8	31.8	0.7	30.1	30.1
Actuated g/C Ratio		0.13			0.13		0.05	0.62	0.62	0.01	0.59	0.59
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		170			215		68	2053	1001	23	1926	824
v/s Ratio Prot							c0.04	c0.40		0.01	0.30	
v/s Ratio Perm		c0.06			0.01				0.01			0.01
v/c Ratio		0.43			0.09		0.79	0.64	0.01	0.70	0.51	0.02
Uniform Delay, d1		20.5			19.5		24.2	6.2	3.7	25.2	6.2	4.4
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.7			0.2		45.6	0.7	0.0	63.9	0.2	0.0
Delay (s)		22.2			19.7		69.8	6.9	3.7	89.1	6.4	4.4
Level of Service		C			B		E	A	A	F	A	A
Approach Delay (s)		22.2			19.7			9.3			7.7	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	51.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	35	5	5	10	60	750	5	15	1770	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.91			0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1416			1724		1719	3085	1404	1719	3195	1404
Flt Permitted		0.92			0.95		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1321			1662		1719	3085	1404	1719	3195	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	11	5	38	5	5	11	65	815	5	16	1924	65
RTOR Reduction (vph)	0	36	0	0	10	0	0	0	1	0	0	9
Lane Group Flow (vph)	0	18	0	0	11	0	65	815	4	16	1924	56
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	17%	15%	5%	13%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.6			4.6		4.0	65.5	65.5	0.7	62.2	62.2
Effective Green, g (s)		4.6			4.6		4.0	65.5	65.5	0.7	62.2	62.2
Actuated g/C Ratio		0.06			0.06		0.05	0.79	0.79	0.01	0.75	0.75
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		73			92		83	2440	1111	15	2400	1055
v/s Ratio Prot							c0.04	c0.26		0.01	c0.60	
v/s Ratio Perm		c0.01			0.01				0.00			0.04
v/c Ratio		0.25			0.12		0.78	0.33	0.00	1.07	0.80	0.05
Uniform Delay, d1		37.4			37.2		39.0	2.5	1.8	41.0	6.4	2.7
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.8			0.6		37.0	0.1	0.0	255.5	2.0	0.0
Delay (s)		39.2			37.7		76.0	2.5	1.8	296.5	8.5	2.7
Level of Service		D			D		E	A	A	F	A	A
Approach Delay (s)		39.2			37.7			7.9			10.6	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	82.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	60.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	5	50	40	5	35	65	665	15	40	625	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.94		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1402			1701		1719	3085	1404	1719	3059	1404
Flt Permitted		0.85			0.89		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1211			1557		1719	3085	1404	1719	3059	1404
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	5	54	43	5	38	71	723	16	43	679	43
RTOR Reduction (vph)	0	48	0	0	34	0	0	0	7	0	0	21
Lane Group Flow (vph)	0	60	0	0	52	0	71	723	9	43	679	22
Heavy Vehicles (%)	30%	0%	20%	5%	0%	0%	5%	17%	15%	5%	18%	15%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.5			4.5		2.5	21.8	21.8	1.3	20.6	20.6
Effective Green, g (s)		4.5			4.5		2.5	21.8	21.8	1.3	20.6	20.6
Actuated g/C Ratio		0.11			0.11		0.06	0.55	0.55	0.03	0.52	0.52
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		138			177		109	1698	773	56	1591	730
v/s Ratio Prot							c0.04	c0.23		0.03	0.22	
v/s Ratio Perm		c0.05			0.03				0.01			0.02
v/c Ratio		0.44			0.30		0.65	0.43	0.01	0.77	0.43	0.03
Uniform Delay, d1		16.4			16.1		18.1	5.2	4.0	19.0	5.9	4.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.2			0.9		13.1	0.2	0.0	46.0	0.2	0.0
Delay (s)		18.6			17.0		31.2	5.4	4.0	65.0	6.0	4.6
Level of Service		B			B		C	A	A	E	A	A
Approach Delay (s)		18.6			17.0			7.6			9.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	39.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
28: Glenoaks Blvd & Montague St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	5	65	10	5	35	55	1340	15	15	985	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.91		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.99		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1510			1702		1444	3312	1615	1719	3282	1404
Flt Permitted		0.82			0.94		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1275			1622		1444	3312	1615	1719	3282	1404
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	65	5	70	11	5	38	59	1441	16	16	1059	27
RTOR Reduction (vph)	0	61	0	0	33	0	0	0	6	0	0	11
Lane Group Flow (vph)	0	79	0	0	21	0	59	1441	10	16	1059	16
Heavy Vehicles (%)	10%	0%	20%	0%	0%	0%	25%	9%	0%	5%	10%	15%
Turn Type	Perm	NA		custom	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4					5	2		1	6	
Permitted Phases	4			8	8				2			6
Actuated Green, G (s)		7.1			7.1		2.8	33.7	33.7	0.7	31.6	31.6
Effective Green, g (s)		7.1			7.1		2.8	33.7	33.7	0.7	31.6	31.6
Actuated g/C Ratio		0.13			0.13		0.05	0.63	0.63	0.01	0.59	0.59
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		169			215		76	2086	1017	22	1939	829
v/s Ratio Prot							c0.04	c0.44		0.01	0.32	
v/s Ratio Perm		c0.06			0.01				0.01			0.01
v/c Ratio		0.47			0.10		0.78	0.69	0.01	0.73	0.55	0.02
Uniform Delay, d1		21.5			20.4		25.0	6.5	3.7	26.3	6.6	4.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.1			0.2		38.1	1.0	0.0	76.4	0.3	0.0
Delay (s)		23.5			20.6		63.1	7.5	3.7	102.7	6.9	4.5
Level of Service		C			C		E	A	A	F	A	A
Approach Delay (s)		23.5			20.6			9.6			8.3	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	53.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

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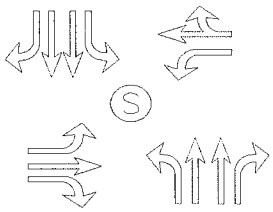
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 29
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	130	5%		130	10	135
EB THRU	15	10%		15	5	25
EB RIGHT	95	10%		95	10	100
WB LEFT	10	40%		10	5	15
WB THRU	5	50%		5	5	10
WB RIGHT	10	35%		10	5	10
GLEN OAKS BLVD						
NB LEFT	95	5%		95	10	105
NB THRU	595	10%	**50**	645	60	705
NB RIGHT	10	50%		10	5	15
SB LEFT	15	45%		15	5	20
SB THRU	1360	5%	**50**	1410	125	1535
SB RIGHT	175	5%		175	15	190
TOTALS	**2515**		**100**	**2615**	**260**	**2865**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 29
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	150	5%		150	15	165
EB THRU	85	5%		85	5	90
EB RIGHT	90	5%		90	10	100
WB LEFT	70	10%		70	5	75
WB THRU	90	5%		90	10	100
WB RIGHT	85	5%		85	5	90
GLEN OAKS BLVD						
NB LEFT	90	10%		90	10	100
NB THRU	565	10%	**50**	615	55	670
NB RIGHT	70	10%		70	5	75
SB LEFT	70	15%		70	5	75
SB THRU	520	5%	**50**	570	50	620
SB RIGHT	80	5%		80	5	85
TOTALS	**1965**		**100**	**2065**	**180**	**2245**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 29
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	220	5%		220	20	240
EB THRU	110	5%		110	10	120
EB RIGHT	155	5%		155	15	170
WB LEFT	90	10%		90	10	100
WB THRU	190	5%		190	15	205
WB RIGHT	100	5%		100	10	110
GLEN OAKS BLVD						
NB LEFT	115	5%		115	10	125
NB THRU	945	5%	**50**	995	90	1085
NB RIGHT	105	5%		105	10	115
SB LEFT	115	5%		115	10	125
SB THRU	740	10%	**50**	790	70	860
SB RIGHT	80	15%		80	5	85
TOTALS	**2965**		**100**	**3065**	**275**	**3340**

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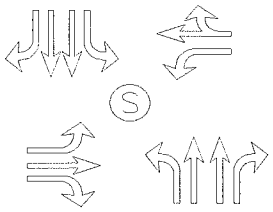
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
29
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	127	1	3	130	**0**	130	10	135
EB THRU	12	1	3	15	**0**	15	5	25
EB RIGHT	87	9	27	115	**0**	115	10	120
WB LEFT	6	4	12	20	**0**	20	5	25
WB THRU	1	1	3	5	**0**	5	5	10
WB RIGHT	6	3	9	15	**0**	15	5	15
GLEN OAKS BLVD								
NB LEFT	90	5	15	105	**0**	105	10	115
NB THRU	533	60	180	715	**150**	865	80	945
NB RIGHT	6	6	18	25	**0**	25	5	30
SB LEFT	7	6	18	25	**0**	25	5	30
SB THRU	1310	49	147	1455	**150**	1605	145	1750
SB RIGHT	162	11	33	195	**0**	195	20	215
TOTALS	**2347**				**300**	**3120**	**305**	**3415**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
29
ROUTE
5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	144	4	12	155	**0**	155	15	170
EB THRU	84	0	0	85	**0**	85	5	90
EB RIGHT	89	3	9	100	**0**	100	10	110
WB LEFT	63	8	24	85	**0**	85	5	90
WB THRU	88	1	3	90	**0**	90	10	100
WB RIGHT	81	5	15	95	**0**	95	10	105
GLEN OAKS BLVD								
NB LEFT	80	8	24	105	**0**	105	10	115
NB THRU	512	53	159	670	**150**	820	75	895
NB RIGHT	64	6	18	80	**0**	80	5	85
SB LEFT	62	9	27	90	**0**	90	10	100
SB THRU	483	39	117	600	**150**	750	70	820
SB RIGHT	82	0	0	80	**0**	80	5	85
TOTALS	**1832**				**300**	**2535**	**230**	**2765**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 29
ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	220	1	3	225	**0**	225	20	245
EB THRU	109	1	3	110	**0**	110	10	120
EB RIGHT	150	7	21	170	**0**	170	15	185
WB LEFT	86	7	21	105	**0**	105	10	115
WB THRU	189	2	6	195	**0**	195	20	215
WB RIGHT	97	2	6	105	**0**	105	10	115
GLEN OAKS BLVD								
NB LEFT	108	5	15	125	**0**	125	10	135
NB THRU	915	32	96	1010	**150**	1160	105	1265
NB RIGHT	103	2	6	110	**0**	110	10	120
SB LEFT	110	4	12	120	**0**	120	10	130
SB THRU	683	56	168	850	**150**	1000	90	1090
SB RIGHT	68	13	39	105	**0**	105	10	115
TOTALS	**2838**				**300**	**3530**	**320**	**3850**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 1,545

	Rt	Thru	Lt
Total	173	1359	13
1st	36	377	2
2nd	42	399	1
3rd	54	321	4
4th	41	262	6

EAST LEG

EAST LEG TOTAL: 21

	1st	2nd	3rd	4th	Total
Rt	2	2	4	1	9
Thru	0	1	1	0	2
Lt	3	2	2	3	10

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	128	21	36	40	31
Thru	13	0	2	5	6
Rt	96	15	21	18	42

WEST LEG TOTAL: 237

SOUTH LEG

	Lt	Thru	Rt
1st	16	138	1
2nd	21	128	3
3rd	29	183	4
4th	29	144	4
Total	95	593	12

TOTAL: 700

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG = 0.81
EAST LEG = 0.75
WEST LEG = 0.75

ALL LEGS = 0.94

HOUR TOTAL: 2,503

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 07:00AM-08:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
154	1427	8	Total
22	330	1	1st
36	377	2	2nd
42	399	1	3rd
54	321	4	4th

	1st	2nd	3rd	4th	Total
Rt	1	2	2	4	9
Thru	0	0	1	1	2
Lt	2	3	2	2	9

Total	1st	2nd	3rd	4th	
113	16	21	36	40	Lt
7	0	0	2	5	Thru
65	11	15	21	18	Rt

	Lt	Thru	Rt
1st	12	117	0
2nd	16	138	1
3rd	21	128	3
4th	29	183	4
Total	78	566	8

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 08:00AM-09:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
114	966	28	Total
41	262	6	1st
22	264	4	2nd
20	241	1	3rd
31	199	17	4th

	1st	2nd	3rd	4th	Total
Rt	1	9	2	3	15
Thru	0	2	0	0	2
Lt	3	2	2	3	10

Total	1st	2nd	3rd	4th	
92	31	26	17	18	Lt
32	6	8	10	8	Thru
136	42	35	33	26	Rt

	Lt	Thru	Rt
1st	29	144	4
2nd	24	168	1
3rd	18	127	0
4th	22	105	4
Total	93	544	9

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : BRANFORD 05-22-12

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
20	318	1	2	5	0	0	2	0	0	5	0	353
32	362	0	3	6	2	0	3	0	1	6	0	415
39	384	1	3	4	0	0	5	0	0	6	0	442
52	314	2	2	3	2	0	1	0	0	3	0	379
39	250	4	1	3	2	0	4	0	1	5	0	309
21	246	3	1	6	1	0	3	0	0	9	0	290
18	222	1	2	7	0	0	3	0	0	9	0	262
31	180	16	0	6	1	0	5	0	0	8	0	247
252	2276	28	14	40	8	0	26	0	2	51	0	2697
						SOUTH LEG						
0	102	10	0	4	0	0	5	1	0	6	1	129
0	121	15	1	5	1	0	6	0	0	6	0	155
2	113	21	0	4	0	1	6	0	0	5	0	152
0	171	28	2	4	1	2	5	0	0	3	0	216
4	128	26	0	3	3	0	5	0	0	8	0	177
1	154	22	0	5	2	0	3	0	0	6	0	193
0	113	18	0	5	0	0	4	0	0	5	0	145
4	93	21	0	3	1	0	5	0	0	4	0	131
11	995	161	3	33	8	3	39	1	0	43	1	1298
						EAST LEG						
0	0	0	0	0	2	1	0	0	0	0	0	3
2	0	3	0	0	0	0	0	0	0	0	0	5
0	1	0	1	0	1	0	0	1	1	0	0	5
4	0	2	0	0	0	0	0	0	0	1	0	7
0	0	1	0	0	1	1	0	1	0	0	0	4
8	2	0	1	0	1	0	0	0	0	0	1	13
1	0	1	0	0	1	1	0	0	0	0	0	4
3	0	2	0	0	1	0	0	0	0	0	0	6
18	3	9	2	0	7	3	0	2	1	1	1	47
						WEST LEG						
11	0	14	0	0	0	0	0	1	0	0	1	27
11	0	21	1	0	0	2	0	0	1	0	0	36
17	2	36	1	0	0	0	0	0	3	0	0	59
18	4	40	0	1	0	0	0	0	0	0	0	63
41	6	30	0	0	0	1	0	0	0	0	1	79
34	8	26	0	0	0	1	0	0	0	0	0	69
32	10	17	1	0	0	0	0	0	0	0	0	60
25	8	18	0	0	0	1	0	0	0	0	0	52
189	38	202	3	1	0	5	0	1	4	0	2	445

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 12:45PM

NORTH LEG

TOTAL: 675

	Rt	Thru	Lt
Total	82	522	71
1st	18	140	25
2nd	20	114	11
3rd	17	110	16
4th	27	158	19

EAST LEG

EAST LEG TOTAL: 246

	1st	2nd	3rd	4th	Total
Rt	12	22	19	33	86
Thru	15	22	21	31	89
Lt	17	11	16	27	71

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	148	33	50	24	41
Thru	84	14	34	12	24
Rt	92	34	18	17	23

WEST LEG TOTAL: 324

SOUTH LEG

	Lt	Thru	Rt
1st	24	117	14
2nd	15	144	15
3rd	22	139	18
4th	27	165	23
Total	88	565	70

TOTAL: 723

PEAK HOUR FACTORS

NORTH LEG = 0.83
SOUTH LEG = 0.84
EAST LEG = 0.68
WEST LEG = 0.79

ALL LEGS = 0.82

HOUR TOTAL: 1,968

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 12:00PM-01:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
69	509	76	Total
15	106	7	1st
15	127	24	2nd
21	136	20	3rd
18	140	25	4th

	1st	2nd	3rd	4th	Total
Rt	12	14	24	12	62
Thru	6	11	15	15	47
Lt	11	16	33	17	77

Total	1st	2nd	3rd	4th	
113	33	20	27	33	Lt
49	8	10	17	14	Thru
110	22	19	35	34	Rt

	Lt	Thru	Rt
1st	26	93	9
2nd	16	123	24
3rd	35	98	19
4th	24	117	14
Total	101	431	66

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 01:00PM-02:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
81	511	61	Total
20	114	11	1st
17	110	16	2nd
27	158	19	3rd
17	129	15	4th

	1st	2nd	3rd	4th	Total
Rt	22	19	33	13	87
Thru	22	21	31	18	92
Lt	11	16	27	10	64

Total	1st	2nd	3rd	4th	
134	50	24	41	19	Lt
90	34	12	24	20	Thru
81	18	17	23	23	Rt

	Lt	Thru	Rt
1st	15	144	15
2nd	22	139	18
3rd	27	165	23
4th	15	151	11
Total	79	599	67

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : BRANFORD 05-22-12

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
15	98	5	0	5	1	0	2	1	0	1	0	128
15	114	22	0	10	2	0	1	0	0	2	0	166
21	128	16	0	3	3	0	2	1	0	3	0	177
18	126	23	0	9	2	0	3	0	0	2	0	183
20	107	7	0	7	3	0	0	1	0	0	0	145
17	102	14	0	6	2	0	2	0	0	0	0	143
27	148	18	0	6	1	0	2	0	0	2	0	204
17	118	13	0	5	2	0	1	0	0	5	0	161
150	941	118	0	51	16	0	13	3	0	15	0	1307
						SOUTH LEG						
9	80	23	0	5	1	0	5	1	0	3	1	128
20	111	15	1	8	0	1	2	0	2	2	1	163
18	87	30	1	6	3	0	1	2	0	4	0	152
12	106	22	0	6	1	1	1	1	1	4	0	155
12	130	12	2	8	1	0	0	2	1	6	0	174
17	125	20	0	8	1	0	3	1	1	3	0	179
23	151	26	0	9	0	0	3	1	0	2	0	215
10	135	13	1	9	2	0	4	0	0	3	0	177
121	925	161	5	59	9	2	19	8	5	27	2	1343
						EAST LEG						
10	6	8	2	0	3	0	0	0	0	0	0	29
11	11	13	2	0	3	1	0	0	0	0	0	41
21	15	29	2	0	2	1	0	0	0	0	2	72
10	15	14	2	0	2	0	0	0	0	0	1	44
20	21	11	2	0	0	0	1	0	0	0	0	55
18	21	15	1	0	1	0	0	0	0	0	0	56
33	31	23	0	0	4	0	0	0	0	0	0	91
12	18	9	1	0	1	0	0	0	0	0	0	41
135	138	122	12	0	16	2	1	0	0	0	3	429
						WEST LEG						
21	8	31	0	0	0	1	0	0	0	0	2	63
16	10	19	0	0	0	2	0	1	1	0	0	49
35	17	21	0	0	0	0	0	2	0	0	4	79
33	14	33	0	0	0	1	0	0	0	0	0	81
17	34	47	0	0	0	1	0	0	0	0	3	102
16	12	24	0	0	0	1	0	0	0	0	0	53
23	24	40	0	0	0	0	0	0	0	0	1	88
23	20	19	0	0	0	0	0	0	0	0	0	62
184	139	234	0	0	0	6	0	3	1	0	10	577

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 934

	Rt	Thru	Lt
Total	81	739	114
1st	8	183	22
2nd	21	148	21
3rd	22	188	32
4th	30	220	39

EAST LEG TOTAL: 383

	1st	2nd	3rd	4th	Total
Rt	16	26	31	26	99
Thru	56	60	44	31	191
Lt	14	27	27	25	93

WEST LEG TOTAL: 488

	Total	1st	2nd	3rd	4th
Lt	221	68	82	20	51
Thru	110	34	24	29	23
Rt	157	22	41	42	52

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.88
EAST LEG = 0.85
WEST LEG = 0.83

ALL LEGS = 0.94

SOUTH LEG

	Lt	Thru	Rt
1st	12	238	16
2nd	67	235	29
3rd	8	231	34
4th	26	243	26
Total	113	947	105

TOTAL: 1,165

HOUR TOTAL: 2,970

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 04:00PM-05:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
92	533	124	Total
31	150	26	1st
16	126	26	2nd
29	155	30	3rd
16	102	42	4th

	1st	2nd	3rd	4th	Total
Rt	20	52	29	40	141
Thru	70	60	70	48	248
Lt	20	33	34	38	125

Total	1st	2nd	3rd	4th	
215	61	24	51	79	Lt
119	14	44	18	43	Thru
148	40	26	39	43	Rt

	Lt	Thru	Rt
1st	32	237	18
2nd	32	195	42
3rd	30	256	37
4th	9	172	45
Total	103	860	142

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: BRANFORD

TIME: 05:00PM-06:00PM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total	81	739	114
1st	8	183	22
2nd	21	148	21
3rd	22	188	32
4th	30	220	39

	1st	2nd	3rd	4th	Total
Rt	16	26	31	26	99
Thru	56	60	44	31	191
Lt	14	27	27	25	93

	Total	1st	2nd	3rd	4th
Lt	221	68	82	20	51
Thru	110	34	24	29	23
Rt	157	22	41	42	52

	Lt	Thru	Rt
1st	12	238	16
2nd	67	235	29
3rd	8	231	34
4th	26	243	26
Total	113	947	105

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : BRANFORD 05-22-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
28	139	25	3	8	1	0	2	0	0	1	0	207
14	109	26	2	12	0	0	1	0	0	4	0	168
25	139	28	3	8	2	0	2	0	1	6	0	214
11	89	42	5	9	0	0	2	0	0	2	0	160
4	171	21	3	7	1	0	3	0	1	2	0	213
16	135	19	5	7	2	0	1	0	0	5	0	190
20	175	32	2	6	0	0	1	0	0	6	0	242
28	202	38	2	6	1	0	4	0	0	8	0	289
146	1159	231	25	63	7	0	16	0	2	34	0	1683
						SOUTH LEG						
18	220	31	0	10	1	0	5	0	0	2	0	287
40	182	31	1	3	1	1	3	0	0	7	0	269
36	242	29	0	6	0	1	6	0	0	2	1	323
42	165	8	1	5	0	2	1	1	0	1	0	226
15	230	11	1	5	1	0	2	0	0	1	0	266
29	226	65	0	4	2	0	2	0	0	3	0	331
33	222	7	0	3	1	0	2	0	1	4	0	273
26	237	25	0	4	1	0	0	0	0	2	0	295
239	1724	207	3	40	7	4	21	1	1	22	1	2270
						EAST LEG						
20	70	17	0	0	2	0	0	1	0	0	0	110
51	60	33	0	0	0	1	0	0	0	0	0	145
25	69	31	1	0	1	2	1	1	1	0	1	133
38	48	36	1	0	2	1	0	0	0	0	0	126
15	54	9	0	0	2	1	1	2	0	1	1	86
26	60	26	0	0	0	0	0	1	0	0	0	113
31	44	26	0	0	1	0	0	0	0	0	0	102
25	31	25	1	0	0	0	0	0	0	0	0	82
231	436	203	3	0	8	5	2	5	1	1	2	897
						WEST LEG						
37	14	61	0	0	0	2	0	0	1	0	0	115
25	44	23	1	0	0	0	0	0	0	0	1	94
37	18	51	0	0	0	0	0	0	2	0	0	108
43	43	78	0	0	0	0	0	1	0	0	0	165
19	34	67	0	0	0	1	0	0	2	0	1	124
39	24	82	1	0	0	1	0	0	0	0	0	147
42	29	20	0	0	0	0	0	0	0	0	0	91
50	22	51	1	1	0	1	0	0	0	0	0	126
292	228	433	3	1	0	5	0	1	5	0	2	970

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
29: 8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	15	95	10	5	10	95	595	10	15	1360	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1958	1468	1289	1220		1719	3282	1077	1245	3438	1538
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1352	1958	1468	1014	1220		1719	3282	1077	1245	3438	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	138	16	101	11	5	11	101	633	11	16	1447	186
RTOR Reduction (vph)	0	0	85	0	9	0	0	0	4	0	0	59
Lane Group Flow (vph)	138	16	16	11	7	0	101	633	7	16	1447	127
Heavy Vehicles (%)	5%	10%	10%	40%	50%	35%	5%	10%	50%	45%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	9.3	9.3	9.3	9.3	9.3		4.0	36.4	36.4	0.7	33.1	33.1
Effective Green, g (s)	9.3	9.3	9.3	9.3	9.3		4.0	36.4	36.4	0.7	33.1	33.1
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16		0.07	0.62	0.62	0.01	0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	215	312	234	161	194		118	2046	671	15	1949	872
v/s Ratio Prot		0.01			0.01		c0.06	c0.19		0.01	c0.42	
v/s Ratio Perm	c0.10		0.01	0.01					0.01			0.08
v/c Ratio	0.64	0.05	0.07	0.07	0.03		0.86	0.31	0.01	1.07	0.74	0.15
Uniform Delay, d1	23.0	20.8	20.9	20.9	20.8		26.9	5.1	4.2	28.8	9.5	6.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	0.1	0.1	0.2	0.1		41.9	0.1	0.0	255.5	1.6	0.1
Delay (s)	29.4	20.9	21.0	21.0	20.8		68.8	5.2	4.2	284.3	11.0	6.0
Level of Service	C	C	C	C	C		E	A	A	F	B	A
Approach Delay (s)		25.5			20.9			13.8			13.1	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: 8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	85	90	70	90	85	90	565	70	70	520	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2153	1538	1641	1678		1641	3282	1468	1570	3438	1615
Flt Permitted	0.59	1.00	1.00	0.69	1.00		0.95	1.00	1.00	0.39	1.00	1.00
Satd. Flow (perm)	1063	2153	1538	1192	1678		1641	3282	1468	644	3438	1615
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	183	104	110	85	110	104	110	689	85	85	634	98
RTOR Reduction (vph)	0	0	85	0	78	0	0	0	35	0	0	57
Lane Group Flow (vph)	183	104	25	85	136	0	110	689	50	85	634	41
Heavy Vehicles (%)	5%	0%	5%	10%	5%	5%	10%	10%	10%	15%	5%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)	9.8	9.8	9.8	9.8	9.8		3.7	25.9	25.9	18.2	18.2	18.2
Effective Green, g (s)	9.8	9.8	9.8	9.8	9.8		3.7	25.9	25.9	18.2	18.2	18.2
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22		0.08	0.59	0.59	0.42	0.42	0.42
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	238	483	345	267	376		139	1945	870	268	1432	673
v/s Ratio Prot		0.05			0.08		c0.07	0.21			c0.18	
v/s Ratio Perm	c0.17		0.02	0.07					0.03	0.13		0.03
v/c Ratio	0.77	0.22	0.07	0.32	0.36		0.79	0.35	0.06	0.32	0.44	0.06
Uniform Delay, d1	15.9	13.8	13.4	14.2	14.3		19.6	4.6	3.8	8.6	9.1	7.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.9	0.2	0.1	0.7	0.6		25.7	0.1	0.0	0.7	0.2	0.0
Delay (s)	29.7	14.0	13.5	14.9	14.9		45.3	4.7	3.8	9.3	9.3	7.7
Level of Service	C	B	B	B	B		D	A	A	A	A	A
Approach Delay (s)		21.1			14.9			9.7			9.1	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: 8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	110	155	90	190	100	115	945	105	115	740	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2051	1538	1719	1716		1719	3438	1538	1719	3282	1404
Flt Permitted	0.47	1.00	1.00	0.68	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	854	2051	1538	1234	1716		1719	3438	1538	1719	3282	1404
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	234	117	165	96	202	106	122	1005	112	122	787	85
RTOR Reduction (vph)	0	0	110	0	35	0	0	0	72	0	0	56
Lane Group Flow (vph)	234	117	55	96	273	0	122	1005	40	122	787	29
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	10%	15%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	17.1	17.1	17.1	17.1	17.1		4.4	18.3	18.3	3.7	17.6	17.6
Effective Green, g (s)	17.1	17.1	17.1	17.1	17.1		4.4	18.3	18.3	3.7	17.6	17.6
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.09	0.36	0.36	0.07	0.34	0.34
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	686	515	413	574		148	1231	551	124	1130	484
v/s Ratio Prot		0.06			0.16		c0.07	c0.29		0.07	0.24	
v/s Ratio Perm	c0.27		0.04	0.08					0.03			0.02
v/c Ratio	0.82	0.17	0.11	0.23	0.48		0.82	0.82	0.07	0.98	0.70	0.06
Uniform Delay, d1	15.6	12.0	11.7	12.3	13.5		23.0	14.9	10.8	23.7	14.4	11.2
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	16.4	0.1	0.1	0.3	0.6		29.6	4.3	0.1	75.3	1.9	0.1
Delay (s)	32.0	12.1	11.8	12.6	14.1		52.5	19.2	10.9	99.0	16.3	11.3
Level of Service	C	B	B	B	B		D	B	B	F	B	B
Approach Delay (s)		21.0			13.7			21.7			26.0	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	51.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Glenoaks Blvd & Branford St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	15	95	10	5	10	95	645	10	15	1410	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1958	1468	1289	1220		1719	3252	1077	1245	3343	1538
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1352	1958	1468	1014	1220		1719	3252	1077	1245	3343	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	138	16	101	11	5	11	101	686	11	16	1500	186
RTOR Reduction (vph)	0	0	85	0	9	0	0	0	4	0	0	57
Lane Group Flow (vph)	138	16	16	11	7	0	101	686	7	16	1500	129
Heavy Vehicles (%)	5%	10%	10%	40%	50%	35%	5%	11%	50%	45%	8%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	9.4	9.4	9.4	9.4	9.4		4.0	37.0	37.0	0.7	33.7	33.7
Effective Green, g (s)	9.4	9.4	9.4	9.4	9.4		4.0	37.0	37.0	0.7	33.7	33.7
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16		0.07	0.63	0.63	0.01	0.57	0.57
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	215	311	233	161	194		116	2036	674	15	1906	877
v/s Ratio Prot		0.01			0.01		c0.06	c0.21		0.01	c0.45	
v/s Ratio Perm	c0.10		0.01	0.01					0.01			0.08
v/c Ratio	0.64	0.05	0.07	0.07	0.03		0.87	0.34	0.01	1.07	0.79	0.15
Uniform Delay, d1	23.3	21.1	21.1	21.1	21.0		27.3	5.2	4.2	29.2	9.9	6.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.4	0.1	0.1	0.2	0.1		46.1	0.1	0.0	255.5	2.2	0.1
Delay (s)	29.7	21.1	21.3	21.3	21.1		73.4	5.3	4.2	284.7	12.1	6.0
Level of Service	C	C	C	C	C		E	A	A	F	B	A
Approach Delay (s)		25.8			21.2			13.9			14.0	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	15.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	59.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Glenoaks Blvd & Branford St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	85	90	70	90	85	90	615	70	70	570	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2153	1538	1641	1678		1641	3085	1468	1570	3195	1615
Flt Permitted	0.55	1.00	1.00	0.69	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	997	2153	1538	1192	1678		1641	3085	1468	1570	3195	1615
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	183	104	110	85	110	104	110	750	85	85	695	98
RTOR Reduction (vph)	0	0	87	0	71	0	0	0	43	0	0	55
Lane Group Flow (vph)	183	104	23	85	143	0	110	750	42	85	695	43
Heavy Vehicles (%)	5%	0%	5%	10%	5%	5%	10%	17%	10%	15%	13%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	10.5	10.5	10.5	10.5	10.5		5.1	24.2	24.2	2.6	21.7	21.7
Effective Green, g (s)	10.5	10.5	10.5	10.5	10.5		5.1	24.2	24.2	2.6	21.7	21.7
Actuated g/C Ratio	0.21	0.21	0.21	0.21	0.21		0.10	0.49	0.49	0.05	0.44	0.44
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	212	459	328	254	357		170	1514	721	83	1406	711
v/s Ratio Prot		0.05			0.09		0.07	c0.24		c0.05	0.22	
v/s Ratio Perm	c0.18		0.02	0.07					0.03			0.03
v/c Ratio	0.86	0.23	0.07	0.33	0.40		0.65	0.50	0.06	1.02	0.49	0.06
Uniform Delay, d1	18.7	16.0	15.5	16.4	16.7		21.2	8.4	6.6	23.3	9.9	7.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.4	0.3	0.1	0.8	0.7		8.2	0.3	0.0	105.5	0.3	0.0
Delay (s)	47.1	16.3	15.6	17.2	17.4		29.4	8.7	6.6	128.9	10.1	8.0
Level of Service	D	B	B	B	B		C	A	A	F	B	A
Approach Delay (s)		30.3			17.4			10.9			21.4	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	18.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	49.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Glenoaks Blvd & Branford St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	220	110	155	90	190	100	115	995	105	115	790	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2051	1538	1719	1716		1719	3282	1538	1719	3252	1404
Flt Permitted	0.46	1.00	1.00	0.68	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	837	2051	1538	1234	1716		1719	3282	1538	1719	3252	1404
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	234	117	165	96	202	106	122	1059	112	122	840	85
RTOR Reduction (vph)	0	0	111	0	34	0	0	0	70	0	0	55
Lane Group Flow (vph)	234	117	54	96	274	0	122	1059	42	122	840	30
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	10%	5%	5%	11%	15%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0		4.5	19.5	19.5	3.7	18.7	18.7
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0		4.5	19.5	19.5	3.7	18.7	18.7
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33		0.09	0.37	0.37	0.07	0.36	0.36
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	273	668	501	402	559		148	1226	575	122	1165	503
v/s Ratio Prot		0.06			0.16		c0.07	c0.32		0.07	0.26	
v/s Ratio Perm	c0.28		0.03	0.08					0.03			0.02
v/c Ratio	0.86	0.18	0.11	0.24	0.49		0.82	0.86	0.07	1.00	0.72	0.06
Uniform Delay, d1	16.5	12.6	12.3	12.9	14.1		23.5	15.1	10.5	24.2	14.5	11.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	22.3	0.1	0.1	0.3	0.7		29.6	6.5	0.1	81.5	2.2	0.1
Delay (s)	38.8	12.7	12.4	13.2	14.8		53.0	21.7	10.6	105.7	16.7	11.0
Level of Service	D	B	B	B	B		D	C	B	F	B	B
Approach Delay (s)		24.4			14.4			23.7			26.6	
Approach LOS		C			B			C			C	

Intersection Summary			
HCM Average Control Delay	23.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	52.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Glenoaks Blvd & Branford St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	15	105	10	5	10	105	705	10	15	1535	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.90		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1958	1468	1289	1220		1719	3252	1077	1245	3343	1538
Flt Permitted	0.75	1.00	1.00	0.75	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1352	1958	1468	1014	1220		1719	3252	1077	1245	3343	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	149	16	112	11	5	11	112	750	11	16	1633	202
RTOR Reduction (vph)	0	0	93	0	9	0	0	0	4	0	0	52
Lane Group Flow (vph)	149	16	19	11	7	0	112	750	7	16	1633	150
Heavy Vehicles (%)	5%	10%	10%	40%	50%	35%	5%	11%	50%	45%	8%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	12.2	12.2	12.2	12.2	12.2		5.0	46.7	46.7	0.8	42.5	42.5
Effective Green, g (s)	12.2	12.2	12.2	12.2	12.2		5.0	46.7	46.7	0.8	42.5	42.5
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17		0.07	0.65	0.65	0.01	0.59	0.59
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	230	333	250	173	208		120	2118	701	14	1982	912
v/s Ratio Prot		0.01			0.01		c0.07	0.23		0.01	c0.49	
v/s Ratio Perm	c0.11		0.01	0.01					0.01			0.10
v/c Ratio	0.65	0.05	0.08	0.06	0.03		0.93	0.35	0.01	1.14	0.82	0.16
Uniform Delay, d1	27.7	24.9	25.0	25.0	24.8		33.2	5.7	4.4	35.5	11.6	6.6
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.1	0.1	0.2	0.1		61.3	0.1	0.0	291.3	2.9	0.1
Delay (s)	33.9	25.0	25.1	25.1	24.9		94.5	5.8	4.4	326.7	14.5	6.7
Level of Service	C	C	C	C	C		F	A	A	F	B	A
Approach Delay (s)		29.8			25.0			17.1			16.4	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	17.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	71.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Glenoaks Blvd & Branford St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	95	100	75	100	95	100	670	75	75	620	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.93		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2153	1538	1641	1677		1641	3085	1468	1570	3195	1615
Flt Permitted	0.55	1.00	1.00	0.68	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	989	2153	1538	1179	1677		1641	3085	1468	1570	3195	1615
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	201	116	122	91	122	116	122	817	91	91	756	104
RTOR Reduction (vph)	0	0	88	0	65	0	0	0	54	0	0	65
Lane Group Flow (vph)	201	116	34	91	173	0	122	817	37	91	756	39
Heavy Vehicles (%)	5%	0%	5%	10%	5%	5%	10%	17%	10%	15%	13%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8					2			6
Actuated Green, G (s)	14.0	14.0	14.0	14.0	14.0		5.2	20.2	20.2	3.7	18.7	18.7
Effective Green, g (s)	14.0	14.0	14.0	14.0	14.0		5.2	20.2	20.2	3.7	18.7	18.7
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28		0.10	0.40	0.40	0.07	0.37	0.37
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	277	604	432	331	471		171	1249	594	116	1197	605
v/s Ratio Prot		0.05			0.10		c0.07	c0.26		0.06	0.24	
v/s Ratio Perm	c0.20		0.02	0.08					0.03			0.02
v/c Ratio	0.73	0.19	0.08	0.27	0.37		0.71	0.65	0.06	0.78	0.63	0.06
Uniform Delay, d1	16.2	13.6	13.2	14.0	14.4		21.6	12.0	9.1	22.7	12.8	10.0
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	9.1	0.2	0.1	0.5	0.5		13.2	1.2	0.0	28.5	1.1	0.0
Delay (s)	25.3	13.8	13.3	14.4	14.9		34.8	13.3	9.1	51.2	13.9	10.0
Level of Service	C	B	B	B	B		C	B	A	D	B	B
Approach Delay (s)		18.9			14.8			15.4			17.0	
Approach LOS		B			B			B			B	

Intersection Summary

HCM Average Control Delay	16.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
29: Glenoaks Blvd & Branford St

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	120	170	100	205	110	125	1085	115	125	860	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	1.00	0.85	1.00	0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	2051	1538	1719	1715		1719	3282	1538	1719	3252	1404
Flt Permitted	0.42	1.00	1.00	0.67	1.00		0.95	1.00	1.00	0.23	1.00	1.00
Satd. Flow (perm)	766	2051	1538	1221	1715		1719	3282	1538	419	3252	1404
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	255	128	181	106	218	117	133	1154	122	133	915	90
RTOR Reduction (vph)	0	0	119	0	32	0	0	0	58	0	0	57
Lane Group Flow (vph)	255	128	62	106	303	0	133	1154	64	133	915	33
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	10%	5%	5%	11%	15%
Turn Type	Perm	NA	Perm	Perm	NA		Prot	NA	Perm	Perm	NA	Perm
Protected Phases		4			8		5	2			6	
Permitted Phases	4		4	8					2	6		6
Actuated Green, G (s)	20.0	20.0	20.0	20.0	20.0		5.0	30.7	30.7	21.7	21.7	21.7
Effective Green, g (s)	20.0	20.0	20.0	20.0	20.0		5.0	30.7	30.7	21.7	21.7	21.7
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34		0.09	0.52	0.52	0.37	0.37	0.37
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	261	699	524	416	584		146	1716	804	155	1202	519
v/s Ratio Prot		0.06			0.18		c0.08	0.35			0.28	
v/s Ratio Perm	c0.33		0.04	0.09					0.04	c0.32		0.02
v/c Ratio	0.98	0.18	0.12	0.25	0.52		0.91	0.67	0.08	0.86	0.76	0.06
Uniform Delay, d1	19.1	13.6	13.3	14.0	15.5		26.6	10.3	7.0	17.1	16.2	11.9
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	48.8	0.1	0.1	0.3	0.8		48.7	1.1	0.0	34.6	2.9	0.1
Delay (s)	67.9	13.7	13.4	14.3	16.3		75.4	11.4	7.0	51.7	19.1	12.0
Level of Service	E	B	B	B	B		E	B	A	D	B	B
Approach Delay (s)		38.1			15.8			17.0			22.4	
Approach LOS		D			B			B			C	

Intersection Summary			
HCM Average Control Delay	21.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

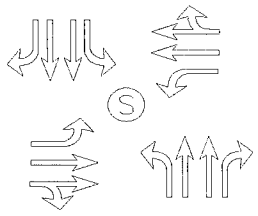
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
5A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

SHELDON STREET

EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%		90	10	100
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%	**50**	90	10	100

GLEN OAKS BLVD

NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%		45	5	50
SB LEFT	85	30%	**50**	135	10	145
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**100**	**3475**	**315**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%	**50**	140	15	155
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%		40	5	45
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%	**50**	95	10	105
SB LEFT	85	30%		85	5	90
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**100**	**3475**	**315**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%		90	10	100
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%	**50**	90	10	100
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%		45	5	50
SB LEFT	85	30%	**50**	135	10	145
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**100**	**3475**	**315**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	4 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%		90	10	100
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%		40	5	45
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%	**50**	95	10	105
SB LEFT	85	30%		85	5	90
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**50**	**3425**	**310**	**3735**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	5 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%		90	10	100
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%		40	5	45
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%	**50**	530	50	580
NB RIGHT	45	10%		45	5	50
SB LEFT	85	30%		85	5	90
SB THRU	1235	5%	**50**	1285	115	1400
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**100**	**3475**	**315**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	6 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%		90	10	100
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%		40	5	45
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%	**50**	95	10	105
SB LEFT	85	30%		85	5	90
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**50**	**3425**	**310**	**3735**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	7 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	115	5%		115	10	125
EB THRU	405	5%		405	35	440
EB RIGHT	45	5%		45	5	50
WB LEFT	90	5%	**50**	140	15	155
WB THRU	595	5%		595	55	650
WB RIGHT	40	5%		40	5	45
GLEN OAKS BLVD						
NB LEFT	80	10%		80	5	85
NB THRU	480	5%		480	45	525
NB RIGHT	45	10%	**50**	95	10	105
SB LEFT	85	30%		85	5	90
SB THRU	1235	5%		1235	110	1345
SB RIGHT	160	10%		160	15	175
TOTALS	**3375**		**100**	**3475**	**315**	**3790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	8 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%		45	5	50
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%	**50**	100	10	110
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%		50	5	55
SB LEFT	50	5%	**50**	100	10	110
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**100**	**2230**	**200**	**2430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	9 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%	**50**	95	10	105
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%		50	5	55
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%	**50**	100	10	110
SB LEFT	50	5%		50	5	55
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**100**	**2230**	**200**	**2430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	10 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%		45	5	50
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%	**50**	100	10	110
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%		50	5	55
SB LEFT	50	5%	**50**	100	10	110
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**100**	**2230**	**200**	**2430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	11 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%		45	5	50
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%		50	5	55
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%	**50**	100	10	110
SB LEFT	50	5%		50	5	55
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**50**	**2180**	**195**	**2375**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	12 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%		45	5	50
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%		50	5	55
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%	**50**	585	55	640
NB RIGHT	50	25%		50	5	55
SB LEFT	50	5%		50	5	55
SB THRU	490	5%	**50**	540	50	590
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**100**	**2230**	**200**	**2430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	13 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%		45	5	50
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%		50	5	55
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%	**50**	100	10	110
SB LEFT	50	5%		50	5	55
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**50**	**2180**	**195**	**2375**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	14 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	130	5%		130	10	140
EB THRU	240	25%		240	20	260
EB RIGHT	80	25%		80	5	85
WB LEFT	45	10%	**50**	95	10	105
WB THRU	285	15%		285	25	310
WB RIGHT	50	10%		50	5	55
GLEN OAKS BLVD						
NB LEFT	80	20%		80	5	85
NB THRU	535	5%		535	50	585
NB RIGHT	50	25%	**50**	100	10	110
SB LEFT	50	5%		50	5	55
SB THRU	490	5%		490	45	535
SB RIGHT	95	15%		95	10	105
TOTALS	**2130**		**100**	**2230**	**200**	**2430**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	15 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%		40	5	45
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%	**50**	110	10	120
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%		70	5	75
SB LEFT	90	5%	**50**	140	15	155
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**100**	**3190**	**290**	**3480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	16 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%	**50**	90	10	100
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%		60	5	65
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%	**50**	120	10	130
SB LEFT	90	5%		90	10	100
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**100**	**3190**	**290**	**3480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	17 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%		40	5	45
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%	**50**	110	10	120
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%		70	5	75
SB LEFT	90	5%	**50**	140	15	155
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**100**	**3190**	**290**	**3480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	18 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%		40	5	45
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%		60	5	65
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%	**50**	120	10	130
SB LEFT	90	5%		90	10	100
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**50**	**3140**	**285**	**3425**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	19 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%		40	5	45
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%		60	5	65
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%	**50**	870	80	950
NB RIGHT	70	10%		70	5	75
SB LEFT	90	5%		90	10	100
SB THRU	730	5%	**50**	780	70	850
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**100**	**3190**	**290**	**3480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	20 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%		40	5	45
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%		60	5	65
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%	**50**	120	10	130
SB LEFT	90	5%		90	10	100
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**50**	**3140**	**285**	**3425**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	21 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	300	5%		300	25	325
EB THRU	325	5%		325	30	355
EB RIGHT	65	5%		65	5	70
WB LEFT	40	20%	**50**	90	10	100
WB THRU	325	5%		325	30	355
WB RIGHT	60	5%		60	5	65
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	820	5%		820	75	895
NB RIGHT	70	10%	**50**	120	10	130
SB LEFT	90	5%		90	10	100
SB THRU	730	5%		730	65	795
SB RIGHT	145	5%		145	15	160
TOTALS	**3090**		**100**	**3190**	**290**	**3480**

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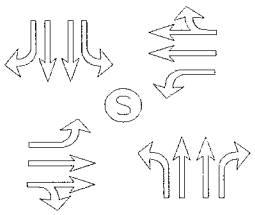
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**0**	105	10	115
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**150**	200	20	220
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**0**	520	45	565
NB RIGHT	39	4	12	50	**0**	50	5	55
SB LEFT	62	24	72	135	**150**	285	25	310
SB THRU	1172	61	183	1355	**0**	1355	120	1475
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**300**	**4085**	**370**	**4455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**150**	255	25	280
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**0**	50	5	55
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**0**	520	45	565
NB RIGHT	39	4	12	50	**150**	200	20	220
SB LEFT	62	24	72	135	**0**	135	10	145
SB THRU	1172	61	183	1355	**0**	1355	120	1475
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**300**	**4085**	**370**	**4455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**0**	105	10	115
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**150**	200	20	220
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**0**	520	45	565
NB RIGHT	39	4	12	50	**0**	50	5	55
SB LEFT	62	24	72	135	**150**	285	25	310
SB THRU	1172	61	183	1355	**0**	1355	120	1475
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**300**	**4085**	**370**	**4455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	4 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**0**	105	10	115
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**0**	50	5	55
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**0**	520	45	565
NB RIGHT	39	4	12	50	**150**	200	20	220
SB LEFT	62	24	72	135	**0**	135	10	145
SB THRU	1172	61	183	1355	**0**	1355	120	1475
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**150**	**3935**	**355**	**4290**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	5 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

SHELDON STREET

EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**0**	105	10	115
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**0**	50	5	55

GLEN OAKS BLVD

NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**150**	670	60	730
NB RIGHT	39	4	12	50	**0**	50	5	55
SB LEFT	62	24	72	135	**0**	135	10	145
SB THRU	1172	61	183	1355	**150**	1505	135	1640
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**300**	**4085**	**370**	**4455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	6 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**0**	105	10	115
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**0**	50	5	55
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**0**	520	45	565
NB RIGHT	39	4	12	50	**150**	200	20	220
SB LEFT	62	24	72	135	**0**	135	10	145
SB THRU	1172	61	183	1355	**0**	1355	120	1475
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**150**	**3935**	**355**	**4290**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	7 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	109	7	21	130	**0**	130	10	140
EB THRU	393	12	36	430	**0**	430	40	470
EB RIGHT	42	3	9	50	**0**	50	5	55
WB LEFT	85	6	18	105	**150**	255	25	280
WB THRU	559	34	102	660	**0**	660	60	720
WB RIGHT	39	3	9	50	**0**	50	5	55
GLEN OAKS BLVD								
NB LEFT	72	9	27	100	**0**	100	10	110
NB THRU	457	21	63	520	**0**	520	45	565
NB RIGHT	39	4	12	50	**150**	200	20	220
SB LEFT	62	24	72	135	**0**	135	10	145
SB THRU	1172	61	183	1355	**0**	1355	120	1475
SB RIGHT	144	18	54	200	**0**	200	20	220
TOTALS	**3173**				**300**	**4085**	**370**	**4455**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	8 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	**0**	150	15	165
EB THRU	177	65	195	370	**0**	370	35	405
EB RIGHT	58	21	63	120	**0**	120	10	130
WB LEFT	39	4	12	50	**0**	50	5	55
WB THRU	245	41	123	370	**0**	370	35	405
WB RIGHT	44	5	15	60	**150**	210	20	230
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	**0**	110	10	120
NB THRU	498	36	108	605	**0**	605	55	660
NB RIGHT	36	12	36	70	**0**	70	5	75
SB LEFT	49	3	9	60	**150**	210	20	230
SB THRU	458	33	99	555	**0**	555	50	605
SB RIGHT	78	16	48	125	**0**	125	10	135
TOTALS	**1865**				**300**	**2945**	**270**	**3215**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	9 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	**0**	150	15	165
EB THRU	177	65	195	370	**0**	370	35	405
EB RIGHT	58	21	63	120	**0**	120	10	130
WB LEFT	39	4	12	50	**150**	200	20	220
WB THRU	245	41	123	370	**0**	370	35	405
WB RIGHT	44	5	15	60	**0**	60	5	65
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	**0**	110	10	120
NB THRU	498	36	108	605	**0**	605	55	660
NB RIGHT	36	12	36	70	**150**	220	20	240
SB LEFT	49	3	9	60	**0**	60	5	65
SB THRU	458	33	99	555	**0**	555	50	605
SB RIGHT	78	16	48	125	**0**	125	10	135
TOTALS	**1865**				**300**	**2945**	**270**	**3215**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	10 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	**0**	150	15	165
EB THRU	177	65	195	370	**0**	370	35	405
EB RIGHT	58	21	63	120	**0**	120	10	130
WB LEFT	39	4	12	50	**0**	50	5	55
WB THRU	245	41	123	370	**0**	370	35	405
WB RIGHT	44	5	15	60	**150**	210	20	230
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	**0**	110	10	120
NB THRU	498	36	108	605	**0**	605	55	660
NB RIGHT	36	12	36	70	**0**	70	5	75
SB LEFT	49	3	9	60	**150**	210	20	230
SB THRU	458	33	99	555	**0**	555	50	605
SB RIGHT	78	16	48	125	**0**	125	10	135
TOTALS	**1865**				**300**	**2945**	**270**	**3215**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	11 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	0	150	15	165
EB THRU	177	65	195	370	0	370	35	405
EB RIGHT	58	21	63	120	0	120	10	130
WB LEFT	39	4	12	50	0	50	5	55
WB THRU	245	41	123	370	0	370	35	405
WB RIGHT	44	5	15	60	0	60	5	65
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	0	110	10	120
NB THRU	498	36	108	605	0	605	55	660
NB RIGHT	36	12	36	70	150	220	20	240
SB LEFT	49	3	9	60	0	60	5	65
SB THRU	458	33	99	555	0	555	50	605
SB RIGHT	78	16	48	125	0	125	10	135
TOTALS	**1865**				**150**	**2795**	**255**	**3050**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	12 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	**0**	150	15	165
EB THRU	177	65	195	370	**0**	370	35	405
EB RIGHT	58	21	63	120	**0**	120	10	130
WB LEFT	39	4	12	50	**0**	50	5	55
WB THRU	245	41	123	370	**0**	370	35	405
WB RIGHT	44	5	15	60	**0**	60	5	65
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	**0**	110	10	120
NB THRU	498	36	108	605	**150**	755	70	825
NB RIGHT	36	12	36	70	**0**	70	5	75
SB LEFT	49	3	9	60	**0**	60	5	65
SB THRU	458	33	99	555	**150**	705	65	770
SB RIGHT	78	16	48	125	**0**	125	10	135
TOTALS	**1865**				**300**	**2945**	**270**	**3215**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	13 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	**0**	150	15	165
EB THRU	177	65	195	370	**0**	370	35	405
EB RIGHT	58	21	63	120	**0**	120	10	130
WB LEFT	39	4	12	50	**0**	50	5	55
WB THRU	245	41	123	370	**0**	370	35	405
WB RIGHT	44	5	15	60	**0**	60	5	65
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	**0**	110	10	120
NB THRU	498	36	108	605	**0**	605	55	660
NB RIGHT	36	12	36	70	**150**	220	20	240
SB LEFT	49	3	9	60	**0**	60	5	65
SB THRU	458	33	99	555	**0**	555	50	605
SB RIGHT	78	16	48	125	**0**	125	10	135
TOTALS	**1865**				**150**	**2795**	**255**	**3050**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	14 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	121	9	27	150	**0**	150	15	165
EB THRU	177	65	195	370	**0**	370	35	405
EB RIGHT	58	21	63	120	**0**	120	10	130
WB LEFT	39	4	12	50	**150**	200	20	220
WB THRU	245	41	123	370	**0**	370	35	405
WB RIGHT	44	5	15	60	**0**	60	5	65
GLEN OAKS BLVD								
NB LEFT	62	16	48	110	**0**	110	10	120
NB THRU	498	36	108	605	**0**	605	55	660
NB RIGHT	36	12	36	70	**150**	220	20	240
SB LEFT	49	3	9	60	**0**	60	5	65
SB THRU	458	33	99	555	**0**	555	50	605
SB RIGHT	78	16	48	125	**0**	125	10	135
TOTALS	**1865**				**300**	**2945**	**270**	**3215**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	15 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
30
ROUTE
5A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

SHELDON STREET

EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**0**	50	5	55
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**150**	215	20	235

GLEN OAKS BLVD

NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**0**	905	80	985
NB RIGHT	61	7	21	80	**0**	80	5	85
SB LEFT	88	4	12	100	**150**	250	25	275
SB THRU	705	26	78	785	**0**	785	70	855
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**300**	**3670**	**330**	**4000**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	16 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 5B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**150**	200	20	220
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**0**	65	5	70
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**0**	905	80	985
NB RIGHT	61	7	21	80	**150**	230	20	250
SB LEFT	88	4	12	100	**0**	100	10	110
SB THRU	705	26	78	785	**0**	785	70	855
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**300**	**3670**	**330**	**4000**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	17 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**0**	50	5	55
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**150**	215	20	235
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**0**	905	80	985
NB RIGHT	61	7	21	80	**0**	80	5	85
SB LEFT	88	4	12	100	**150**	250	25	275
SB THRU	705	26	78	785	**0**	785	70	855
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**300**	**3670**	**330**	**4000**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	18 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**0**	50	5	55
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**0**	65	5	70
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**0**	905	80	985
NB RIGHT	61	7	21	80	**150**	230	20	250
SB LEFT	88	4	12	100	**0**	100	10	110
SB THRU	705	26	78	785	**0**	785	70	855
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**150**	**3520**	**315**	**3835**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	19 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**0**	50	5	55
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**0**	65	5	70
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**150**	1055	95	1150
NB RIGHT	61	7	21	80	**0**	80	5	85
SB LEFT	88	4	12	100	**0**	100	10	110
SB THRU	705	26	78	785	**150**	935	85	1020
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**300**	**3670**	**330**	**4000**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	20 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 6C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**0**	50	5	55
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**0**	65	5	70
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**0**	905	80	985
NB RIGHT	61	7	21	80	**150**	230	20	250
SB LEFT	88	4	12	100	**0**	100	10	110
SB THRU	705	26	78	785	**0**	785	70	855
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**150**	**3520**	**315**	**3835**

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Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	21 OF 21

E/W STREET : SHELDON STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 30
ROUTE 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	286	15	45	330	**0**	330	30	360
EB THRU	323	4	12	335	**0**	335	30	365
EB RIGHT	63	4	12	75	**0**	75	5	80
WB LEFT	31	7	21	50	**150**	200	20	220
WB THRU	315	12	36	350	**0**	350	30	380
WB RIGHT	57	2	6	65	**0**	65	5	70
GLEN OAKS BLVD								
NB LEFT	109	11	33	140	**0**	140	15	155
NB THRU	778	43	129	905	**0**	905	80	985
NB RIGHT	61	7	21	80	**150**	230	20	250
SB LEFT	88	4	12	100	**0**	100	10	110
SB THRU	705	26	78	785	**0**	785	70	855
SB RIGHT	141	5	15	155	**0**	155	15	170
TOTALS	**2957**				**300**	**3670**	**330**	**4000**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 1,481

Rt	Thru	Lt	
162	1233	86	Total
28	288	16	1st
32	340	19	2nd
48	336	26	3rd
54	269	25	4th

EAST LEG

EAST LEG TOTAL: 726

	1st	2nd	3rd	4th	Total
Rt	10	8	14	10	42
Thru	113	166	144	170	593
Lt	14	25	21	31	91

WEST LEG

Total	1st	2nd	3rd	4th	
116	16	27	33	40	Lt
405	89	100	111	105	Thru
45	10	10	11	14	Rt

WEST LEG TOTAL: 566

SOUTH LEG

	Lt	Thru	Rt
1st	16	100	8
2nd	19	116	14
3rd	22	109	10
4th	24	153	11
Total	81	478	43

TOTAL: 602

PEAK HOUR FACTORS

NORTH LEG = 0.90
SOUTH LEG = 0.80
EAST LEG = 0.86
WEST LEG = 0.89

ALL LEGS = 0.93

HOUR TOTAL: 3,375

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 07:00AM-08:00AM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total	162	1233	86
1st	28	288	16
2nd	32	340	19
3rd	48	336	26
4th	54	269	25

	1st	2nd	3rd	4th	Total
Rt	10	8	14	10	42
Thru	113	166	144	170	593
Lt	14	25	21	31	91

	Total	1st	2nd	3rd	4th
Lt	116	16	27	33	40
Thru	405	89	100	111	105
Rt	45	10	10	11	14

	Lt	Thru	Rt
1st	16	100	8
2nd	19	116	14
3rd	22	109	10
4th	24	153	11
Total	81	478	43

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 08:00AM-09:00AM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
132	800	90	Total
42	203	34	1st
45	202	19	2nd
25	215	20	3rd
20	180	17	4th

	1st	2nd	3rd	4th	Total
Rt	14	12	5	6	37
Thru	106	101	103	130	440
Lt	19	12	21	11	63

Total	1st	2nd	3rd	4th	
152	34	31	47	40	Lt
269	63	66	71	69	Thru
62	15	24	13	10	Rt

	Lt	Thru	Rt
1st	23	127	12
2nd	24	142	16
3rd	22	90	5
4th	20	117	10
Total	89	476	43

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : SHELDON 05-22-12

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
23	276	9	3	4	1	1	1	1	1	7	5	332
27	326	15	4	8	1	0	1	0	1	5	3	391
45	322	20	3	6	0	0	0	0	0	8	6	410
49	248	18	4	12	0	0	1	0	1	8	7	348
37	193	21	2	6	0	0	0	0	3	4	13	279
35	186	10	5	9	1	1	3	0	4	4	8	266
18	208	17	4	3	0	2	1	0	1	3	3	260
15	174	13	3	3	0	0	1	0	2	2	4	217
249	1933	123	28	51	3	4	8	1	13	41	49	2503
						SOUTH LEG						
5	94	14	1	5	1	1	0	1	1	1	0	124
14	111	15	0	3	2	0	1	1	0	1	1	149
10	104	22	0	3	0	0	1	0	0	1	0	141
10	148	21	1	5	3	0	0	0	0	0	0	188
7	121	16	5	4	2	0	1	0	0	1	5	162
12	127	21	1	5	1	0	5	0	3	5	2	182
3	82	20	0	4	0	2	3	1	0	1	1	117
10	108	19	0	6	0	0	2	1	0	1	0	147
71	895	148	8	35	9	3	13	4	4	11	9	1210
						EAST LEG						
9	105	13	1	1	0	0	1	0	0	6	1	137
6	160	23	2	2	1	0	0	1	0	4	0	199
14	136	19	0	1	0	0	0	0	0	7	2	179
10	158	30	0	0	1	0	1	0	0	11	0	211
13	92	15	1	3	1	0	0	1	0	11	2	139
10	92	11	0	0	0	2	0	0	0	9	1	125
4	95	20	1	2	0	0	0	1	0	6	0	129
6	128	11	0	1	0	0	1	0	0	0	0	147
72	966	142	5	10	3	2	3	3	0	54	6	1266
						WEST LEG						
9	86	15	1	1	0	0	0	0	0	2	1	115
10	97	26	0	2	1	0	1	0	0	0	0	137
10	108	31	0	1	1	0	1	0	1	1	1	155
13	102	37	1	2	1	0	0	0	0	1	2	159
14	60	31	1	3	2	0	0	0	0	0	1	112
20	62	27	3	2	1	0	0	1	1	2	2	121
11	64	42	2	1	3	0	1	1	0	5	1	131
10	65	40	0	1	0	0	1	0	0	2	0	119
97	644	249	8	13	9	0	4	2	2	13	8	1049

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 637

Rt	Thru	Lt	
94	491	52	Total
19	116	12	1st
22	103	11	2nd
28	161	10	3rd
25	111	19	4th

EAST LEG TOTAL: 378

	1st	2nd	3rd	4th	Total
Rt	8	12	16	13	49
Thru	68	83	72	63	286
Lt	11	10	9	13	43

WEST LEG TOTAL: 451

Total	1st	2nd	3rd	4th	
130	23	25	43	39	Lt
242	51	67	55	69	Thru
79	20	22	14	23	Rt

SOUTH LEG

TOTAL: 660

	Lt	Thru	Rt
1st	17	135	10
2nd	14	132	10
3rd	19	151	15
4th	28	116	13
Total	78	534	48

PEAK HOUR FACTORS

NORTH LEG = 0.80
SOUTH LEG = 0.89
EAST LEG = 0.90
WEST LEG = 0.86

ALL LEGS = 0.90

HOUR TOTAL: 2,126

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 12:00PM-01:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
144	464	57	Total
30	109	10	1st
42	96	16	2nd
33	134	15	3rd
39	125	16	4th

	1st	2nd	3rd	4th	Total
Rt	8	4	4	6	22
Thru	85	57	81	52	275
Lt	5	8	7	9	29

Total	1st	2nd	3rd	4th	
112	23	30	31	28	Lt
259	61	66	71	61	Thru
73	14	26	21	12	Rt

	Lt	Thru	Rt
1st	15	89	10
2nd	16	128	15
3rd	9	111	12
4th	8	116	11
Total	48	444	48

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 01:00PM-02:00PM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total	94	491	52
1st	19	116	12
2nd	22	103	11
3rd	28	161	10
4th	25	111	19

	1st	2nd	3rd	4th	Total
Rt	8	12	16	13	49
Thru	68	83	72	63	286
Lt	11	10	9	13	43

	Total	1st	2nd	3rd	4th
Lt	130	23	25	43	39
Thru	242	51	67	55	69
Rt	79	20	22	14	23

	Lt	Thru	Rt
1st	17	135	10
2nd	14	132	10
3rd	19	151	15
4th	28	116	13
Total	78	534	48

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : SHELDON 05-22-12

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
27	102	7	3	4	1	0	1	1	0	2	1	149
32	88	14	8	6	2	1	1	0	1	1	0	154
33	127	14	0	2	1	0	3	0	0	2	0	182
33	115	15	3	6	1	1	2	0	2	2	0	180
16	109	11	1	2	1	2	4	0	0	1	0	147
16	94	11	6	6	0	0	2	0	0	1	0	136
26	153	8	2	5	1	0	3	0	0	0	1	199
20	102	19	4	7	0	0	0	0	1	2	0	155
203	890	99	27	38	7	4	16	1	4	11	2	1302
						SOUTH LEG						
10	83	13	0	2	0	0	1	2	0	3	0	114
8	122	13	3	0	0	1	2	3	3	4	0	159
9	106	7	3	3	1	0	1	1	0	1	0	132
9	110	6	1	2	0	1	1	2	0	3	0	135
9	129	17	1	5	0	0	0	0	0	1	0	162
5	119	13	2	7	1	1	1	0	2	5	0	156
14	145	16	1	4	1	0	0	0	0	2	2	185
8	105	16	2	5	3	0	2	3	3	4	6	157
72	919	101	13	28	6	3	8	11	8	23	8	1200
						EAST LEG						
8	79	4	0	1	1	0	0	0	0	5	0	98
4	45	5	0	2	2	0	0	1	0	10	0	69
4	74	6	0	2	1	0	0	0	0	5	0	92
6	45	8	0	1	1	0	0	0	0	6	0	67
6	61	9	2	1	0	0	0	0	0	6	2	87
11	76	9	1	2	1	0	0	0	0	5	0	105
14	55	9	1	2	0	0	2	0	1	13	0	97
13	53	12	0	1	1	0	0	0	0	9	0	89
66	488	62	4	12	7	0	2	1	1	59	2	704
						WEST LEG						
14	53	22	0	2	0	0	1	0	0	5	1	98
23	57	28	2	0	2	1	2	0	0	7	0	122
17	56	30	1	1	0	2	2	0	1	12	1	123
11	52	21	1	1	2	0	1	1	0	7	4	101
18	36	20	2	2	1	0	1	0	0	12	2	94
14	50	23	5	6	0	2	4	0	1	7	2	114
10	38	40	1	4	1	0	3	0	3	10	2	112
16	53	38	2	4	1	2	3	0	3	9	0	131
123	395	222	14	20	7	7	17	1	8	69	12	895

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 969

Rt	Thru	Lt	
146	731	92	Total
58	187	26	1st
27	187	23	2nd
23	185	26	3rd
38	172	17	4th

EAST LEG TOTAL: 424

	1st	2nd	3rd	4th	Total
Rt	14	16	14	15	59
Thru	98	71	75	83	327
Lt	15	9	8	6	38

WEST LEG TOTAL: 695

Total	1st	2nd	3rd	4th	
301	68	89	79	65	Lt
327	68	92	85	82	Thru
67	21	16	14	16	Rt

SOUTH LEG

TOTAL: 1,009

	Lt	Thru	Rt
1st	26	209	25
2nd	30	203	16
3rd	31	207	14
4th	33	202	13
Total	120	821	68

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.97
EAST LEG = 0.83
WEST LEG = 0.88

ALL LEGS = 0.95

HOUR TOTAL: 3,097

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 04:00PM-05:00PM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total	166	515	95
1st	28	134	35
2nd	42	125	13
3rd	45	151	22
4th	51	105	25

	1st	2nd	3rd	4th	Total
Rt	13	13	15	13	54
Thru	74	77	62	70	283
Lt	8	12	9	9	38

	Total	1st	2nd	3rd	4th
Lt	283	78	72	65	68
Thru	332	61	69	99	103
Rt	70	22	14	15	19

	Lt	Thru	Rt
1st	38	184	11
2nd	27	175	17
3rd	25	241	22
4th	28	143	20
Total	118	743	70

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SHELDON

TIME: 05:00PM-06:00PM DATE: 05-22-12

NORTH LEG

Rt	Thru	Lt	
146	731	92	Total
58	187	26	1st
27	187	23	2nd
23	185	26	3rd
38	172	17	4th

	1st	2nd	3rd	4th	Total
Rt	14	16	14	15	59
Thru	98	71	75	83	327
Lt	15	9	8	6	38

Total	1st	2nd	3rd	4th	
301	68	89	79	65	Lt
327	68	92	85	82	Thru
67	21	16	14	16	Rt

	Lt	Thru	Rt
1st	26	209	25
2nd	30	203	16
3rd	31	207	14
4th	33	202	13
Total	120	821	68

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : SHELDON 05-22-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
23	119	35	2	7	0	2	4	0	1	4	0	197
37	116	9	4	5	2	0	3	2	1	1	0	180
41	144	20	3	4	1	1	2	0	0	1	1	218
50	99	25	1	3	0	0	1	0	0	2	0	181
58	181	25	0	5	0	0	1	1	0	0	0	271
25	181	23	2	4	0	0	1	0	0	1	0	237
21	176	25	1	5	1	1	3	0	0	1	0	234
37	167	15	0	4	1	0	0	1	1	1	0	227
292	1183	177	13	37	5	4	15	4	3	11	1	1745
						SOUTH LEG						
6	166	34	1	14	3	4	0	0	0	4	1	233
12	165	25	3	5	2	2	1	0	0	4	0	219
17	234	25	0	6	0	5	0	0	0	1	0	288
19	136	26	1	5	1	0	1	1	0	1	0	191
23	194	21	0	12	2	2	0	2	0	3	1	260
14	197	30	1	5	0	1	0	0	0	1	0	249
13	194	31	0	12	0	1	0	0	0	1	0	252
11	193	27	0	6	3	2	0	0	0	3	3	248
115	1479	219	6	65	11	17	2	3	0	18	5	1940
						EAST LEG						
11	73	1	1	0	1	1	0	6	0	1	0	95
13	73	11	0	2	0	0	2	0	0	0	1	102
13	59	8	1	1	1	1	0	0	0	2	0	86
13	69	8	0	0	1	0	1	0	0	0	0	92
14	91	11	0	3	0	0	4	4	0	0	0	127
14	68	8	0	2	0	1	1	1	1	0	0	96
14	74	7	0	1	0	0	0	1	0	0	0	97
15	82	5	0	1	0	0	0	1	0	0	0	104
107	589	59	2	10	3	3	8	13	1	3	1	799
						WEST LEG						
20	55	75	2	3	2	0	1	1	0	2	0	161
13	64	70	1	2	0	0	2	2	0	1	0	155
14	94	62	0	3	1	1	2	2	0	0	0	179
18	99	66	0	1	0	1	2	2	0	1	0	190
19	66	63	0	1	3	1	1	1	1	0	1	157
16	90	86	0	1	2	0	1	1	0	0	0	197
12	85	76	1	0	2	0	0	0	1	0	1	178
16	82	61	0	0	3	0	0	0	0	0	1	163
128	635	559	4	11	13	3	9	9	2	4	3	1380

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1235	160	80	480	45	115	405	45	90	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1468	1719	3387		1719	3406	
Flt Permitted	0.46	1.00	1.00	0.20	1.00	1.00	0.30	1.00		0.45	1.00	
Satd. Flow (perm)	674	3438	1468	340	3438	1468	552	3387		821	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1328	172	86	516	48	124	435	48	97	640	43
RTOR Reduction (vph)	0	0	52	0	0	25	0	15	0	0	11	0
Lane Group Flow (vph)	91	1328	120	86	516	23	124	468	0	97	672	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Effective Green, g (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	325	1658	708	164	1658	708	181	1110		269	1116	
v/s Ratio Prot		c0.39			0.15			0.14			0.20	
v/s Ratio Perm	0.13		0.08	0.25		0.02	c0.22			0.12		
v/c Ratio	0.28	0.80	0.17	0.52	0.31	0.03	0.69	0.42		0.36	0.60	
Uniform Delay, d1	6.5	9.2	6.1	7.6	6.6	5.7	12.3	11.0		10.8	11.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.9	0.1	3.0	0.1	0.0	10.2	0.3		0.8	0.9	
Delay (s)	7.0	12.1	6.3	10.6	6.7	5.8	22.5	11.3		11.6	12.8	
Level of Service	A	B	A	B	A	A	C	B		B	B	
Approach Delay (s)		11.2			7.2			13.6			12.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Route 100

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	490	95	80	535	50	130	240	80	45	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	1292	1719	2780		1641	3089	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	774	3438	1404	711	3438	1292	959	2780		931	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	544	106	89	594	56	144	267	89	50	317	56
RTOR Reduction (vph)	0	0	65	0	0	34	0	58	0	0	37	0
Lane Group Flow (vph)	56	544	41	89	594	22	144	298	0	50	336	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	11.9	11.9	11.9	11.9	11.9	11.9	10.6	10.6		10.6	10.6	
Effective Green, g (s)	11.9	11.9	11.9	11.9	11.9	11.9	10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	1341	548	277	1341	504	333	966		324	1074	
v/s Ratio Prot		0.16			c0.17			0.11			0.11	
v/s Ratio Perm	0.07		0.03	0.13		0.02	c0.15			0.05		
v/c Ratio	0.19	0.41	0.08	0.32	0.44	0.04	0.43	0.31		0.15	0.31	
Uniform Delay, d1	6.1	6.7	5.8	6.5	6.9	5.8	7.6	7.3		6.9	7.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.7	0.2	0.0	0.9	0.2		0.2	0.2	
Delay (s)	6.4	6.9	5.9	7.2	7.1	5.8	8.5	7.5		7.1	7.5	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.7			7.0			7.8			7.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	30.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	730	145	120	820	70	300	325	65	40	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1468	1719	3353		1504	3358	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	492	3438	1538	510	3438	1468	930	3353		810	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	768	153	126	863	74	316	342	68	42	342	63
RTOR Reduction (vph)	0	0	93	0	0	45	0	41	0	0	37	0
Lane Group Flow (vph)	95	768	60	126	863	29	316	369	0	42	368	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1341	600	199	1341	572	370	1334		322	1336	
v/s Ratio Prot		0.22			c0.25			0.11			0.11	
v/s Ratio Perm	0.19		0.04	0.25		0.02	c0.34			0.05		
v/c Ratio	0.49	0.57	0.10	0.63	0.64	0.05	0.85	0.28		0.13	0.28	
Uniform Delay, d1	8.7	9.0	7.3	9.3	9.4	7.2	10.4	7.7		7.2	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.6	0.1	6.4	1.1	0.0	17.2	0.1		0.2	0.1	
Delay (s)	10.7	9.6	7.4	15.7	10.4	7.2	27.5	7.8		7.4	7.8	
Level of Service	B	A	A	B	B	A	C	A		A	A	
Approach Delay (s)		9.4			10.8			16.4			7.8	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	135	1235	160	80	480	45	115	405	45	90	595	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1157	3438	1468	1641	3438	1468	1719	3387		1719	3160	
Flt Permitted	0.46	1.00	1.00	0.18	1.00	1.00	0.27	1.00		0.44	1.00	
Satd. Flow (perm)	557	3438	1468	303	3438	1468	482	3387		804	3160	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	145	1328	172	86	516	48	124	435	48	97	640	97
RTOR Reduction (vph)	0	0	52	0	0	24	0	17	0	0	25	0
Lane Group Flow (vph)	145	1328	120	86	516	24	124	466	0	97	712	0
Heavy Vehicles (%)	56%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	58%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	22.8	22.8	22.8	22.8	22.8	22.8	15.7	15.7		15.7	15.7	
Effective Green, g (s)	22.8	22.8	22.8	22.8	22.8	22.8	15.7	15.7		15.7	15.7	
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	273	1686	720	149	1686	720	163	1144		271	1067	
v/s Ratio Prot		c0.39			0.15			0.14			0.23	
v/s Ratio Perm	0.26		0.08	0.28		0.02	c0.26			0.12		
v/c Ratio	0.53	0.79	0.17	0.58	0.31	0.03	0.76	0.41		0.36	0.67	
Uniform Delay, d1	8.2	9.8	6.6	8.4	7.1	6.1	13.7	11.8		11.6	13.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	2.5	0.1	5.3	0.1	0.0	18.7	0.2		0.8	1.6	
Delay (s)	10.1	12.4	6.7	13.7	7.2	6.2	32.4	12.1		12.4	14.8	
Level of Service	B	B	A	B	A	A	C	B		B	B	
Approach Delay (s)		11.6			8.0			16.2			14.5	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	46.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	490	95	80	535	50	130	240	80	45	285	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1180	3438	1404	1504	3438	1292	1719	2780		1641	2767	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.50	1.00		0.54	1.00	
Satd. Flow (perm)	531	3438	1404	711	3438	1292	909	2780		931	2767	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	111	544	106	89	594	56	144	267	89	50	317	111
RTOR Reduction (vph)	0	0	64	0	0	34	0	58	0	0	73	0
Lane Group Flow (vph)	111	544	42	89	594	22	144	298	0	50	355	0
Heavy Vehicles (%)	53%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	55%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.6	12.6	12.6	12.6	12.6	12.6	10.9	10.9		10.9	10.9	
Effective Green, g (s)	12.6	12.6	12.6	12.6	12.6	12.6	10.9	10.9		10.9	10.9	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	212	1375	562	284	1375	517	315	962		322	957	
v/s Ratio Prot		0.16			0.17			0.11			0.13	
v/s Ratio Perm	c0.21		0.03	0.13		0.02	c0.16			0.05		
v/c Ratio	0.52	0.40	0.08	0.31	0.43	0.04	0.46	0.31		0.16	0.37	
Uniform Delay, d1	7.2	6.7	5.8	6.5	6.9	5.8	8.0	7.5		7.1	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	0.2	0.1	0.6	0.2	0.0	1.1	0.2		0.2	0.2	
Delay (s)	9.5	6.9	5.9	7.1	7.1	5.8	9.1	7.7		7.3	8.0	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		7.2			7.0			8.1			7.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	31.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	140	730	145	120	820	70	300	325	65	40	325	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1299	3438	1538	1641	3438	1468	1719	3353		1504	2997	
Flt Permitted	0.25	1.00	1.00	0.30	1.00	1.00	0.47	1.00		0.51	1.00	
Satd. Flow (perm)	345	3438	1538	516	3438	1468	852	3353		805	2997	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	768	153	126	863	74	316	342	68	42	342	116
RTOR Reduction (vph)	0	0	84	0	0	41	0	33	0	0	55	0
Lane Group Flow (vph)	147	768	69	126	863	33	316	377	0	42	403	0
Heavy Vehicles (%)	39%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	48%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	22.2	22.2	22.2	22.2	22.2	22.2	19.0	19.0		19.0	19.0	
Effective Green, g (s)	22.2	22.2	22.2	22.2	22.2	22.2	19.0	19.0		19.0	19.0	
Actuated g/C Ratio	0.45	0.45	0.45	0.45	0.45	0.45	0.39	0.39		0.39	0.39	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	156	1551	694	233	1551	662	329	1295		311	1157	
v/s Ratio Prot		0.22			0.25			0.11			0.13	
v/s Ratio Perm	c0.43		0.04	0.24		0.02	c0.37			0.05		
v/c Ratio	0.94	0.50	0.10	0.54	0.56	0.05	0.96	0.29		0.14	0.35	
Uniform Delay, d1	12.9	9.5	7.8	9.8	9.9	7.6	14.7	10.4		9.8	10.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	54.8	0.3	0.1	2.6	0.4	0.0	39.0	0.1		0.2	0.2	
Delay (s)	67.7	9.8	7.8	12.4	10.3	7.6	53.7	10.6		10.0	10.9	
Level of Service	E	A	A	B	B	A	D	B		A	B	
Approach Delay (s)		17.5			10.4			29.4			10.8	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM Average Control Delay	16.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	49.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	145	1345	175	85	525	50	125	440	50	100	650	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1157	3438	1468	1641	3438	1468	1719	3385		1719	3156	
Flt Permitted	0.43	1.00	1.00	0.19	1.00	1.00	0.26	1.00		0.42	1.00	
Satd. Flow (perm)	521	3438	1468	329	3438	1468	479	3385		756	3156	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	156	1446	188	91	565	54	134	473	54	108	699	108
RTOR Reduction (vph)	0	0	42	0	0	28	0	11	0	0	28	0
Lane Group Flow (vph)	156	1446	146	91	565	26	134	516	0	108	779	0
Heavy Vehicles (%)	56%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	58%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	15.1	15.1		15.1	15.1	
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	15.1	15.1		15.1	15.1	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	248	1637	699	157	1637	699	164	1159		259	1081	
v/s Ratio Prot		c0.42			0.16			0.15			0.25	
v/s Ratio Perm	0.30		0.10	0.28		0.02	c0.28			0.14		
v/c Ratio	0.63	0.88	0.21	0.58	0.35	0.04	0.82	0.45		0.42	0.72	
Uniform Delay, d1	8.6	10.4	6.7	8.4	7.2	6.2	13.2	11.3		11.1	12.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	6.0	0.1	5.1	0.1	0.0	25.9	0.3		1.1	2.4	
Delay (s)	13.6	16.5	6.9	13.5	7.4	6.2	39.2	11.5		12.2	15.1	
Level of Service	B	B	A	B	A	A	D	B		B	B	
Approach Delay (s)		15.2			8.1			17.1			14.7	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	14.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	44.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	110	535	105	85	585	55	140	260	85	50	310	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1180	3438	1404	1504	3438	1292	1719	2782		1641	2764	
Flt Permitted	0.39	1.00	1.00	0.42	1.00	1.00	0.48	1.00		0.52	1.00	
Satd. Flow (perm)	482	3438	1404	671	3438	1292	877	2782		907	2764	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	122	594	117	94	650	61	156	289	94	56	344	122
RTOR Reduction (vph)	0	0	66	0	0	34	0	63	0	0	81	0
Lane Group Flow (vph)	122	594	51	94	650	27	156	320	0	56	385	0
Heavy Vehicles (%)	53%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	55%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	15.3	15.3	15.3	15.3	15.3	15.3	11.7	11.7		11.7	11.7	
Effective Green, g (s)	15.3	15.3	15.3	15.3	15.3	15.3	11.7	11.7		11.7	11.7	
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	211	1503	614	293	1503	565	293	930		303	924	
v/s Ratio Prot		0.17			0.19			0.12			0.14	
v/s Ratio Perm	c0.25		0.04	0.14		0.02	c0.18			0.06		
v/c Ratio	0.58	0.40	0.08	0.32	0.43	0.05	0.53	0.34		0.18	0.42	
Uniform Delay, d1	7.4	6.7	5.8	6.4	6.8	5.7	9.4	8.8		8.3	9.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.8	0.2	0.1	0.6	0.2	0.0	1.9	0.2		0.3	0.3	
Delay (s)	11.2	6.9	5.8	7.1	7.0	5.7	11.3	9.0		8.6	9.3	
Level of Service	B	A	A	A	A	A	B	A		A	A	
Approach Delay (s)		7.4			6.9			9.7			9.2	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	35.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	155	795	160	130	895	75	325	355	70	45	355	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1299	3438	1538	1641	3438	1468	1719	3353		1504	2999	
Flt Permitted	0.25	1.00	1.00	0.26	1.00	1.00	0.47	1.00		0.49	1.00	
Satd. Flow (perm)	342	3438	1538	444	3438	1468	842	3353		780	2999	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	163	837	168	137	942	79	342	374	74	47	374	126
RTOR Reduction (vph)	0	0	101	0	0	47	0	40	0	0	28	0
Lane Group Flow (vph)	163	837	67	137	942	32	342	408	0	47	472	0
Heavy Vehicles (%)	39%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	48%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0	16.0	16.0	16.0	16.0	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	137	1375	615	178	1375	587	337	1341		312	1200	
v/s Ratio Prot		0.24			0.27			0.12			0.16	
v/s Ratio Perm	c0.48		0.04	0.31		0.02	c0.41			0.06		
v/c Ratio	1.19	0.61	0.11	0.77	0.69	0.05	1.01	0.30		0.15	0.39	
Uniform Delay, d1	12.0	9.5	7.5	10.4	9.9	7.4	12.0	8.2		7.7	8.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	136.8	0.8	0.1	18.0	1.4	0.0	52.8	0.1		0.2	0.2	
Delay (s)	148.8	10.3	7.6	28.4	11.4	7.4	64.8	8.3		7.9	8.8	
Level of Service	F	B	A	C	B	A	E	A		A	A	
Approach Delay (s)		29.2			13.1			32.8			8.7	
Approach LOS		C			B			C			A	

Intersection Summary			
HCM Average Control Delay	21.8	HCM Level of Service	C
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1235	160	80	480	95	115	405	45	140	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1029	1719	3387		1299	3406	
Flt Permitted	0.46	1.00	1.00	0.20	1.00	1.00	0.31	1.00		0.45	1.00	
Satd. Flow (perm)	674	3438	1468	340	3438	1029	556	3387		621	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1328	172	86	516	102	124	435	48	151	640	43
RTOR Reduction (vph)	0	0	52	0	0	53	0	15	0	0	11	0
Lane Group Flow (vph)	91	1328	120	86	516	49	124	468	0	151	672	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	57%	5%	5%	5%	39%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	20.3	20.3	20.3	20.3	20.3	20.3	14.2	14.2		14.2	14.2	
Effective Green, g (s)	20.3	20.3	20.3	20.3	20.3	20.3	14.2	14.2		14.2	14.2	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	1642	701	162	1642	491	186	1132		207	1138	
v/s Ratio Prot		c0.39			0.15			0.14			0.20	
v/s Ratio Perm	0.13		0.08	0.25		0.05	0.22			c0.24		
v/c Ratio	0.28	0.81	0.17	0.53	0.31	0.10	0.67	0.41		0.73	0.59	
Uniform Delay, d1	6.7	9.4	6.3	7.8	6.8	6.1	12.1	10.9		12.5	11.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.0	0.1	3.3	0.1	0.1	8.7	0.2		12.1	0.8	
Delay (s)	7.2	12.5	6.4	11.1	6.9	6.2	20.8	11.2		24.6	12.6	
Level of Service	A	B	A	B	A	A	C	B		C	B	
Approach Delay (s)		11.5			7.3			13.1			14.7	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	42.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	490	95	80	535	100	130	240	80	95	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	991	1719	2780		1150	3089	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	774	3438	1404	711	3438	991	959	2780		652	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	544	106	89	594	111	144	267	89	106	317	56
RTOR Reduction (vph)	0	0	64	0	0	68	0	58	0	0	36	0
Lane Group Flow (vph)	56	544	42	89	594	43	144	298	0	106	337	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	63%	5%	25%	25%	57%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.8	10.8		10.8	10.8	
Effective Green, g (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.8	10.8		10.8	10.8	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	303	1346	550	278	1346	388	335	972		228	1080	
v/s Ratio Prot		0.16			c0.17			0.11			0.11	
v/s Ratio Perm	0.07		0.03	0.13		0.04	0.15			c0.16		
v/c Ratio	0.18	0.40	0.08	0.32	0.44	0.11	0.43	0.31		0.46	0.31	
Uniform Delay, d1	6.2	6.8	5.9	6.5	6.9	6.0	7.7	7.3		7.8	7.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.7	0.2	0.1	0.9	0.2		1.5	0.2	
Delay (s)	6.5	7.0	6.0	7.2	7.1	6.1	8.6	7.5		9.3	7.5	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.8			7.0			7.8			7.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	30.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	730	145	120	820	120	300	325	65	90	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1091	1719	3353		1101	3358	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	492	3438	1538	510	3438	1091	930	3353		592	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	768	153	126	863	126	316	342	68	95	342	63
RTOR Reduction (vph)	0	0	93	0	0	77	0	41	0	0	37	0
Lane Group Flow (vph)	95	768	60	126	863	49	316	369	0	95	368	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	48%	5%	5%	5%	64%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1341	600	199	1341	425	370	1334		236	1336	
v/s Ratio Prot		0.22			c0.25			0.11			0.11	
v/s Ratio Perm	0.19		0.04	0.25		0.05	c0.34			0.16		
v/c Ratio	0.49	0.57	0.10	0.63	0.64	0.12	0.85	0.28		0.40	0.28	
Uniform Delay, d1	8.7	9.0	7.3	9.3	9.4	7.3	10.4	7.7		8.1	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.6	0.1	6.4	1.1	0.1	17.2	0.1		1.1	0.1	
Delay (s)	10.7	9.6	7.4	15.7	10.4	7.5	27.5	7.8		9.3	7.8	
Level of Service	B	A	A	B	B	A	C	A		A	A	
Approach Delay (s)		9.4			10.7			16.4			8.1	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	95	1345	175	85	525	105	125	440	50	155	650	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1468	1719	3385		1719	3405	
Flt Permitted	0.43	1.00	1.00	0.19	1.00	1.00	0.27	1.00		0.42	1.00	
Satd. Flow (perm)	628	3438	1468	329	3438	1468	492	3385		754	3405	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	1446	188	91	565	113	134	473	54	167	699	48
RTOR Reduction (vph)	0	0	42	0	0	59	0	11	0	0	11	0
Lane Group Flow (vph)	102	1446	146	91	565	54	134	516	0	167	736	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.7	14.7		14.7	14.7	
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.7	14.7		14.7	14.7	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	1652	705	158	1652	705	166	1139		254	1145	
v/s Ratio Prot		c0.42			0.16			0.15			0.22	
v/s Ratio Perm	0.16		0.10	0.28		0.04	c0.27			0.22		
v/c Ratio	0.34	0.88	0.21	0.58	0.34	0.08	0.81	0.45		0.66	0.64	
Uniform Delay, d1	7.0	10.2	6.5	8.2	7.1	6.1	13.2	11.4		12.4	12.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	5.5	0.1	5.0	0.1	0.0	24.2	0.3		6.0	1.2	
Delay (s)	7.7	15.7	6.7	13.2	7.2	6.2	37.4	11.6		18.4	13.5	
Level of Service	A	B	A	B	A	A	D	B		B	B	
Approach Delay (s)		14.2			7.7			16.9			14.4	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	13.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	55	535	105	85	585	110	140	260	85	105	310	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	1292	1719	2782		1641	3088	
Flt Permitted	0.39	1.00	1.00	0.43	1.00	1.00	0.51	1.00		0.52	1.00	
Satd. Flow (perm)	705	3438	1404	676	3438	1292	930	2782		907	3088	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	594	117	94	650	122	156	289	94	117	344	61
RTOR Reduction (vph)	0	0	70	0	0	74	0	61	0	0	39	0
Lane Group Flow (vph)	61	594	47	94	650	48	156	322	0	117	366	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.6	12.6	12.6	12.6	12.6	12.6	11.1	11.1		11.1	11.1	
Effective Green, g (s)	12.6	12.6	12.6	12.6	12.6	12.6	11.1	11.1		11.1	11.1	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	280	1367	558	269	1367	514	326	974		318	1081	
v/s Ratio Prot		0.17			c0.19			0.12			0.12	
v/s Ratio Perm	0.09		0.03	0.14		0.04	c0.17			0.13		
v/c Ratio	0.22	0.43	0.08	0.35	0.48	0.09	0.48	0.33		0.37	0.34	
Uniform Delay, d1	6.3	7.0	6.0	6.7	7.1	6.0	8.0	7.6		7.7	7.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2	0.1	0.8	0.3	0.1	1.1	0.2		0.7	0.2	
Delay (s)	6.7	7.2	6.0	7.5	7.4	6.1	9.2	7.8		8.4	7.8	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		7.0			7.2			8.2			7.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	31.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	795	160	130	895	130	325	355	70	100	355	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1468	1719	3353		1504	3359	
Flt Permitted	0.26	1.00	1.00	0.26	1.00	1.00	0.50	1.00		0.49	1.00	
Satd. Flow (perm)	479	3438	1538	458	3438	1468	897	3353		780	3359	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	837	168	137	942	137	342	374	74	105	374	68
RTOR Reduction (vph)	0	0	103	0	0	84	0	40	0	0	27	0
Lane Group Flow (vph)	105	837	65	137	942	53	342	408	0	105	415	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Effective Green, g (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	185	1328	594	177	1328	567	367	1372		319	1375	
v/s Ratio Prot		0.24			0.27			0.12			0.12	
v/s Ratio Perm	0.22		0.04	c0.30		0.04	c0.38			0.13		
v/c Ratio	0.57	0.63	0.11	0.77	0.71	0.09	0.93	0.30		0.33	0.30	
Uniform Delay, d1	9.4	9.7	7.7	10.5	10.1	7.6	11.0	7.8		7.9	7.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	1.0	0.1	18.8	1.8	0.1	30.1	0.1		0.6	0.1	
Delay (s)	13.4	10.7	7.8	29.3	11.9	7.7	41.1	7.9		8.5	7.9	
Level of Service	B	B	A	C	B	A	D	A		A	A	
Approach Delay (s)		10.5			13.4			22.3			8.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1235	160	80	480	95	115	405	45	90	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1468	1719	3387		1719	3406	
Flt Permitted	0.46	1.00	1.00	0.20	1.00	1.00	0.30	1.00		0.45	1.00	
Satd. Flow (perm)	674	3438	1468	340	3438	1468	552	3387		821	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1328	172	86	516	102	124	435	48	97	640	43
RTOR Reduction (vph)	0	0	52	0	0	53	0	15	0	0	11	0
Lane Group Flow (vph)	91	1328	120	86	516	49	124	468	0	97	672	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Effective Green, g (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	325	1658	708	164	1658	708	181	1110		269	1116	
v/s Ratio Prot		c0.39			0.15			0.14			0.20	
v/s Ratio Perm	0.13		0.08	0.25		0.03	c0.22			0.12		
v/c Ratio	0.28	0.80	0.17	0.52	0.31	0.07	0.69	0.42		0.36	0.60	
Uniform Delay, d1	6.5	9.2	6.1	7.6	6.6	5.8	12.3	11.0		10.8	11.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.9	0.1	3.0	0.1	0.0	10.2	0.3		0.8	0.9	
Delay (s)	7.0	12.1	6.3	10.6	6.7	5.9	22.5	11.3		11.6	12.8	
Level of Service	A	B	A	B	A	A	C	B		B	B	
Approach Delay (s)		11.2			7.1			13.6			12.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	490	95	80	535	100	130	240	80	45	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	1292	1719	2780		1641	3089	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	774	3438	1404	711	3438	1292	959	2780		931	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	544	106	89	594	111	144	267	89	50	317	56
RTOR Reduction (vph)	0	0	64	0	0	67	0	58	0	0	37	0
Lane Group Flow (vph)	56	544	42	89	594	44	144	298	0	50	336	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.7	10.7		10.7	10.7	
Effective Green, g (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	304	1351	552	279	1351	508	333	966		323	1073	
v/s Ratio Prot		0.16			c0.17			0.11			0.11	
v/s Ratio Perm	0.07		0.03	0.13		0.03	c0.15			0.05		
v/c Ratio	0.18	0.40	0.08	0.32	0.44	0.09	0.43	0.31		0.15	0.31	
Uniform Delay, d1	6.1	6.7	5.9	6.5	6.9	5.9	7.7	7.3		6.9	7.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.7	0.2	0.1	0.9	0.2		0.2	0.2	
Delay (s)	6.4	6.9	5.9	7.2	7.1	5.9	8.6	7.5		7.2	7.5	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.7			6.9			7.8			7.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	30.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	730	145	120	820	120	300	325	65	40	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1468	1719	3353		1504	3358	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	492	3438	1538	510	3438	1468	930	3353		810	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	768	153	126	863	126	316	342	68	42	342	63
RTOR Reduction (vph)	0	0	93	0	0	77	0	41	0	0	37	0
Lane Group Flow (vph)	95	768	60	126	863	49	316	369	0	42	368	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1341	600	199	1341	572	370	1334		322	1336	
v/s Ratio Prot		0.22			c0.25			0.11			0.11	
v/s Ratio Perm	0.19		0.04	0.25		0.03	c0.34			0.05		
v/c Ratio	0.49	0.57	0.10	0.63	0.64	0.09	0.85	0.28		0.13	0.28	
Uniform Delay, d1	8.7	9.0	7.3	9.3	9.4	7.3	10.4	7.7		7.2	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.6	0.1	6.4	1.1	0.1	17.2	0.1		0.2	0.1	
Delay (s)	10.7	9.6	7.4	15.7	10.4	7.3	27.5	7.8		7.4	7.8	
Level of Service	B	A	A	B	B	A	C	A		A	A	
Approach Delay (s)		9.4			10.7			16.4			7.8	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	1345	175	85	525	105	125	440	50	100	650	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1468	1719	3385		1719	3405	
Flt Permitted	0.43	1.00	1.00	0.19	1.00	1.00	0.27	1.00		0.42	1.00	
Satd. Flow (perm)	628	3438	1468	329	3438	1468	492	3385		754	3405	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	97	1446	188	91	565	113	134	473	54	108	699	48
RTOR Reduction (vph)	0	0	42	0	0	59	0	11	0	0	11	0
Lane Group Flow (vph)	97	1446	146	91	565	54	134	516	0	108	736	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.7	14.7		14.7	14.7	
Effective Green, g (s)	21.0	21.0	21.0	21.0	21.0	21.0	14.7	14.7		14.7	14.7	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	1652	705	158	1652	705	166	1139		254	1145	
v/s Ratio Prot		c0.42			0.16			0.15			0.22	
v/s Ratio Perm	0.15		0.10	0.28		0.04	c0.27			0.14		
v/c Ratio	0.32	0.88	0.21	0.58	0.34	0.08	0.81	0.45		0.43	0.64	
Uniform Delay, d1	7.0	10.2	6.5	8.2	7.1	6.1	13.2	11.4		11.2	12.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.6	5.5	0.1	5.0	0.1	0.0	24.2	0.3		1.1	1.2	
Delay (s)	7.6	15.7	6.7	13.2	7.2	6.2	37.4	11.6		12.4	13.5	
Level of Service	A	B	A	B	A	A	D	B		B	B	
Approach Delay (s)		14.3			7.7			16.9			13.4	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	43.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	55	535	105	85	585	110	140	260	85	50	310	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	1292	1719	2782		1641	3088	
Flt Permitted	0.39	1.00	1.00	0.43	1.00	1.00	0.51	1.00		0.52	1.00	
Satd. Flow (perm)	705	3438	1404	676	3438	1292	930	2782		907	3088	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	594	117	94	650	122	156	289	94	56	344	61
RTOR Reduction (vph)	0	0	70	0	0	74	0	61	0	0	39	0
Lane Group Flow (vph)	61	594	47	94	650	48	156	322	0	56	366	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.6	12.6	12.6	12.6	12.6	12.6	11.1	11.1		11.1	11.1	
Effective Green, g (s)	12.6	12.6	12.6	12.6	12.6	12.6	11.1	11.1		11.1	11.1	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	280	1367	558	269	1367	514	326	974		318	1081	
v/s Ratio Prot		0.17			c0.19			0.12			0.12	
v/s Ratio Perm	0.09		0.03	0.14		0.04	c0.17			0.06		
v/c Ratio	0.22	0.43	0.08	0.35	0.48	0.09	0.48	0.33		0.18	0.34	
Uniform Delay, d1	6.3	7.0	6.0	6.7	7.1	6.0	8.0	7.6		7.1	7.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2	0.1	0.8	0.3	0.1	1.1	0.2		0.3	0.2	
Delay (s)	6.7	7.2	6.0	7.5	7.4	6.1	9.2	7.8		7.4	7.8	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		7.0			7.2			8.2			7.7	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	31.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	795	160	130	895	130	325	355	70	45	355	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1468	1719	3353		1504	3359	
Flt Permitted	0.26	1.00	1.00	0.26	1.00	1.00	0.50	1.00		0.49	1.00	
Satd. Flow (perm)	479	3438	1538	458	3438	1468	897	3353		780	3359	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	837	168	137	942	137	342	374	74	47	374	68
RTOR Reduction (vph)	0	0	103	0	0	84	0	40	0	0	27	0
Lane Group Flow (vph)	105	837	65	137	942	53	342	408	0	47	415	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Effective Green, g (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	185	1328	594	177	1328	567	367	1372		319	1375	
v/s Ratio Prot		0.24			0.27			0.12			0.12	
v/s Ratio Perm	0.22		0.04	c0.30		0.04	c0.38			0.06		
v/c Ratio	0.57	0.63	0.11	0.77	0.71	0.09	0.93	0.30		0.15	0.30	
Uniform Delay, d1	9.4	9.7	7.7	10.5	10.1	7.6	11.0	7.8		7.3	7.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	1.0	0.1	18.8	1.8	0.1	30.1	0.1		0.2	0.1	
Delay (s)	13.4	10.7	7.8	29.3	11.9	7.7	41.1	7.9		7.5	7.9	
Level of Service	B	B	A	C	B	A	D	A		A	A	
Approach Delay (s)		10.5			13.4			22.3			7.9	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1235	160	80	480	95	115	405	45	90	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1029	1719	3387		1719	3406	
Flt Permitted	0.46	1.00	1.00	0.20	1.00	1.00	0.30	1.00		0.45	1.00	
Satd. Flow (perm)	674	3438	1468	340	3438	1029	552	3387		821	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1328	172	86	516	102	124	435	48	97	640	43
RTOR Reduction (vph)	0	0	52	0	0	53	0	15	0	0	11	0
Lane Group Flow (vph)	91	1328	120	86	516	49	124	468	0	97	672	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	57%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Effective Green, g (s)	20.3	20.3	20.3	20.3	20.3	20.3	13.8	13.8		13.8	13.8	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	325	1658	708	164	1658	496	181	1110		269	1116	
v/s Ratio Prot		c0.39			0.15			0.14			0.20	
v/s Ratio Perm	0.13		0.08	0.25		0.05	c0.22			0.12		
v/c Ratio	0.28	0.80	0.17	0.52	0.31	0.10	0.69	0.42		0.36	0.60	
Uniform Delay, d1	6.5	9.2	6.1	7.6	6.6	5.9	12.3	11.0		10.8	11.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	2.9	0.1	3.0	0.1	0.1	10.2	0.3		0.8	0.9	
Delay (s)	7.0	12.1	6.3	10.6	6.7	6.0	22.5	11.3		11.6	12.8	
Level of Service	A	B	A	B	A	A	C	B		B	B	
Approach Delay (s)		11.2			7.1			13.6			12.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	42.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

7/30/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	490	95	80	535	100	130	240	80	45	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	991	1719	2780		1641	3089	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	774	3438	1404	711	3438	991	959	2780		931	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	544	106	89	594	111	144	267	89	50	317	56
RTOR Reduction (vph)	0	0	64	0	0	67	0	58	0	0	37	0
Lane Group Flow (vph)	56	544	42	89	594	44	144	298	0	50	336	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	63%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.7	10.7		10.7	10.7	
Effective Green, g (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	304	1351	552	279	1351	389	333	966		323	1073	
v/s Ratio Prot		0.16			c0.17			0.11			0.11	
v/s Ratio Perm	0.07		0.03	0.13		0.04	c0.15			0.05		
v/c Ratio	0.18	0.40	0.08	0.32	0.44	0.11	0.43	0.31		0.15	0.31	
Uniform Delay, d1	6.1	6.7	5.9	6.5	6.9	5.9	7.7	7.3		6.9	7.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.7	0.2	0.1	0.9	0.2		0.2	0.2	
Delay (s)	6.4	6.9	5.9	7.2	7.1	6.1	8.6	7.5		7.2	7.5	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.7			7.0			7.8			7.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	30.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

7/30/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	730	145	120	820	120	300	325	65	40	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1091	1719	3353		1504	3358	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	492	3438	1538	510	3438	1091	930	3353		810	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	768	153	126	863	126	316	342	68	42	342	63
RTOR Reduction (vph)	0	0	93	0	0	77	0	41	0	0	37	0
Lane Group Flow (vph)	95	768	60	126	863	49	316	369	0	42	368	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	48%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1341	600	199	1341	425	370	1334		322	1336	
v/s Ratio Prot		0.22			c0.25			0.11			0.11	
v/s Ratio Perm	0.19		0.04	0.25		0.05	c0.34			0.05		
v/c Ratio	0.49	0.57	0.10	0.63	0.64	0.12	0.85	0.28		0.13	0.28	
Uniform Delay, d1	8.7	9.0	7.3	9.3	9.4	7.3	10.4	7.7		7.2	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.6	0.1	6.4	1.1	0.1	17.2	0.1		0.2	0.1	
Delay (s)	10.7	9.6	7.4	15.7	10.4	7.5	27.5	7.8		7.4	7.8	
Level of Service	B	A	A	B	B	A	C	A		A	A	
Approach Delay (s)		9.4			10.7			16.4			7.8	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Glenoaks Blvd & Sheldon St

7/30/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	440	50	100	650	45	85	525	105	95	1345	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3385		1719	3405		1641	3097		1388	3360	
Flt Permitted	0.25	1.00		0.39	1.00		0.15	1.00		0.36	1.00	
Satd. Flow (perm)	455	3385		712	3405		266	3097		533	3360	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	134	473	54	108	699	48	91	565	113	102	1446	188
RTOR Reduction (vph)	0	17	0	0	10	0	0	33	0	0	20	0
Lane Group Flow (vph)	134	510	0	108	737	0	91	645	0	102	1614	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	10%	5%	57%	30%	5%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.9	15.9		15.9	15.9		26.0	26.0		26.0	26.0	
Effective Green, g (s)	15.9	15.9		15.9	15.9		26.0	26.0		26.0	26.0	
Actuated g/C Ratio	0.32	0.32		0.32	0.32		0.52	0.52		0.52	0.52	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	145	1079		227	1085		139	1614		278	1751	
v/s Ratio Prot		0.15			0.22			0.21			c0.48	
v/s Ratio Perm	c0.29			0.15			0.34			0.19		
v/c Ratio	0.92	0.47		0.48	0.68		0.65	0.40		0.37	0.92	
Uniform Delay, d1	16.4	13.6		13.7	14.8		8.7	7.2		7.1	11.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	52.2	0.3		1.6	1.7		10.6	0.2		0.8	8.5	
Delay (s)	68.6	14.0		15.2	16.5		19.3	7.4		7.9	19.5	
Level of Service	E	B		B	B		B	A		A	B	
Approach Delay (s)		25.0			16.3			8.8			18.8	
Approach LOS		C			B			A			B	

Intersection Summary			
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	49.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Glenoaks Blvd & Sheldon St

7/30/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	260	85	50	310	55	85	585	110	55	535	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.98		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2782		1641	3088		1504	3087		1719	3301	
Flt Permitted	0.51	1.00		0.52	1.00		0.35	1.00		0.32	1.00	
Satd. Flow (perm)	930	2782		907	3088		557	3087		572	3301	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	156	289	94	56	344	61	94	650	122	61	594	117
RTOR Reduction (vph)	0	62	0	0	39	0	0	38	0	0	40	0
Lane Group Flow (vph)	156	321	0	56	366	0	94	734	0	61	671	0
Heavy Vehicles (%)	5%	25%	25%	10%	15%	10%	20%	5%	63%	5%	5%	15%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	11.2	11.2		11.2	11.2		13.3	13.3		13.3	13.3	
Effective Green, g (s)	11.2	11.2		11.2	11.2		13.3	13.3		13.3	13.3	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	320	959		313	1064		228	1263		234	1351	
v/s Ratio Prot		0.12			0.12			c0.24			0.20	
v/s Ratio Perm	c0.17			0.06			0.17			0.11		
v/c Ratio	0.49	0.34		0.18	0.34		0.41	0.58		0.26	0.50	
Uniform Delay, d1	8.4	7.9		7.4	7.9		6.8	7.4		6.3	7.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.2		0.3	0.2		1.2	0.7		0.6	0.3	
Delay (s)	9.6	8.1		7.7	8.1		8.0	8.1		6.9	7.4	
Level of Service	A	A		A	A		A	A		A	A	
Approach Delay (s)		8.5			8.1			8.1			7.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	32.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Glenoaks Blvd & Sheldon St

7/30/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	325	355	70	45	355	65	130	895	130	100	795	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3353		1504	3359		1641	3206		1719	3352	
Flt Permitted	0.50	1.00		0.49	1.00		0.25	1.00		0.25	1.00	
Satd. Flow (perm)	897	3353		780	3359		440	3206		461	3352	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	342	374	74	47	374	68	137	942	137	105	837	168
RTOR Reduction (vph)	0	40	0	0	27	0	0	29	0	0	42	0
Lane Group Flow (vph)	342	408	0	47	415	0	137	1050	0	105	963	0
Heavy Vehicles (%)	5%	5%	5%	20%	5%	5%	10%	5%	48%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		15.7	15.7		15.7	15.7	
Effective Green, g (s)	16.0	16.0		16.0	16.0		15.7	15.7		15.7	15.7	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	362	1351		314	1354		174	1268		182	1326	
v/s Ratio Prot		0.12			0.12			c0.33			0.29	
v/s Ratio Perm	c0.38			0.06			0.31			0.23		
v/c Ratio	0.94	0.30		0.15	0.31		0.79	0.83		0.58	0.73	
Uniform Delay, d1	11.4	8.1		7.5	8.1		10.5	10.8		9.4	10.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	33.0	0.1		0.2	0.1		20.6	4.6		4.4	2.0	
Delay (s)	44.4	8.2		7.8	8.2		31.1	15.4		13.8	12.2	
Level of Service	D	A		A	A		C	B		B	B	
Approach Delay (s)		23.9			8.2			17.2			12.3	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	39.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1285	160	80	530	45	115	405	45	90	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3312	1468	1641	3167	1468	1719	3387		1719	3406	
Flt Permitted	0.43	1.00	1.00	0.17	1.00	1.00	0.29	1.00		0.44	1.00	
Satd. Flow (perm)	625	3312	1468	288	3167	1468	517	3387		788	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1382	172	86	570	48	124	435	48	97	640	43
RTOR Reduction (vph)	0	0	43	0	0	23	0	17	0	0	10	0
Lane Group Flow (vph)	91	1382	129	86	570	25	124	466	0	97	673	0
Heavy Vehicles (%)	30%	9%	10%	10%	14%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	14.7	14.7		14.7	14.7	
Effective Green, g (s)	24.0	24.0	24.0	24.0	24.0	24.0	14.7	14.7		14.7	14.7	
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.31	0.31		0.31	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	321	1702	754	148	1628	754	163	1066		248	1072	
v/s Ratio Prot		c0.42			0.18			0.14			0.20	
v/s Ratio Perm	0.15		0.09	0.30		0.02	c0.24			0.12		
v/c Ratio	0.28	0.81	0.17	0.58	0.35	0.03	0.76	0.44		0.39	0.63	
Uniform Delay, d1	6.5	9.5	6.0	7.9	6.7	5.6	14.4	12.7		12.5	13.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.1	0.1	5.7	0.1	0.0	18.7	0.3		1.0	1.2	
Delay (s)	6.9	12.5	6.2	13.6	6.9	5.6	33.1	13.0		13.5	14.8	
Level of Service	A	B	A	B	A	A	C	B		B	B	
Approach Delay (s)		11.6			7.6			17.1			14.7	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	46.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	540	95	80	585	50	130	240	80	45	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3167	1404	1504	3195	1292	1719	2780		1641	3089	
Flt Permitted	0.39	1.00	1.00	0.43	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	710	3167	1404	673	3195	1292	959	2780		931	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	600	106	89	650	56	144	267	89	50	317	56
RTOR Reduction (vph)	0	0	63	0	0	33	0	59	0	0	37	0
Lane Group Flow (vph)	56	600	43	89	650	23	144	297	0	50	336	0
Heavy Vehicles (%)	5%	14%	15%	20%	13%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.6	12.6	12.6	12.6	12.6	12.6	10.7	10.7		10.7	10.7	
Effective Green, g (s)	12.6	12.6	12.6	12.6	12.6	12.6	10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	286	1275	565	271	1286	520	328	950		318	1056	
v/s Ratio Prot		0.19			c0.20			0.11			0.11	
v/s Ratio Perm	0.08		0.03	0.13		0.02	c0.15			0.05		
v/c Ratio	0.20	0.47	0.08	0.33	0.51	0.04	0.44	0.31		0.16	0.32	
Uniform Delay, d1	6.1	6.9	5.8	6.4	7.0	5.7	8.0	7.6		7.2	7.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.3	0.1	0.7	0.3	0.0	0.9	0.2		0.2	0.2	
Delay (s)	6.4	7.2	5.8	7.2	7.3	5.7	8.9	7.8		7.4	7.8	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.9			7.2			8.1			7.7	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	31.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	780	145	120	870	70	300	325	65	40	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3252	1538	1641	3282	1468	1719	3353		1504	3358	
Flt Permitted	0.27	1.00	1.00	0.27	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	486	3252	1538	464	3282	1468	930	3353		810	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	821	153	126	916	74	316	342	68	42	342	63
RTOR Reduction (vph)	0	0	93	0	0	45	0	41	0	0	31	0
Lane Group Flow (vph)	95	821	60	126	916	29	316	369	0	42	374	0
Heavy Vehicles (%)	5%	11%	5%	10%	10%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.9	14.9	14.9	14.9	14.9	14.9	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.9	14.9	14.9	14.9	14.9	14.9	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	191	1278	605	182	1290	577	368	1327		321	1329	
v/s Ratio Prot		0.25			c0.28			0.11			0.11	
v/s Ratio Perm	0.20		0.04	0.27		0.02	c0.34			0.05		
v/c Ratio	0.50	0.64	0.10	0.69	0.71	0.05	0.86	0.28		0.13	0.28	
Uniform Delay, d1	8.7	9.3	7.3	9.6	9.7	7.1	10.5	7.8		7.3	7.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	1.1	0.1	10.8	1.9	0.0	17.7	0.1		0.2	0.1	
Delay (s)	10.7	10.5	7.3	20.4	11.5	7.2	28.2	7.9		7.5	7.9	
Level of Service	B	B	A	C	B	A	C	A		A	A	
Approach Delay (s)		10.0			12.3			16.7			7.9	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	95	1400	175	85	580	50	125	440	50	100	650	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3312	1468	1641	3167	1468	1719	3385		1719	3405	
Flt Permitted	0.39	1.00	1.00	0.15	1.00	1.00	0.25	1.00		0.39	1.00	
Satd. Flow (perm)	568	3312	1468	252	3167	1468	444	3385		712	3405	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	1505	188	91	624	54	134	473	54	108	699	48
RTOR Reduction (vph)	0	0	36	0	0	26	0	13	0	0	9	0
Lane Group Flow (vph)	102	1505	152	91	624	28	134	514	0	108	738	0
Heavy Vehicles (%)	30%	9%	10%	10%	14%	10%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	27.4	27.4	27.4	27.4	27.4	27.4	17.7	17.7		17.7	17.7	
Effective Green, g (s)	27.4	27.4	27.4	27.4	27.4	27.4	17.7	17.7		17.7	17.7	
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52	0.52	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	293	1709	757	130	1634	757	148	1128		237	1135	
v/s Ratio Prot		c0.45			0.20			0.15			0.22	
v/s Ratio Perm	0.18		0.10	0.36		0.02	c0.30			0.15		
v/c Ratio	0.35	0.88	0.20	0.70	0.38	0.04	0.91	0.46		0.46	0.65	
Uniform Delay, d1	7.6	11.4	6.9	9.7	7.7	6.3	16.9	13.9		13.9	15.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	5.7	0.1	15.2	0.1	0.0	46.7	0.3		1.4	1.3	
Delay (s)	8.3	17.1	7.1	25.0	7.9	6.4	63.6	14.2		15.3	16.4	
Level of Service	A	B	A	C	A	A	E	B		B	B	
Approach Delay (s)		15.5			9.8			24.2			16.2	
Approach LOS		B			A			C			B	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	53.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.1%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	55	590	105	85	640	55	140	260	85	50	310	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3167	1404	1504	3195	1292	1719	2782		1641	3088	
Flt Permitted	0.35	1.00	1.00	0.39	1.00	1.00	0.51	1.00		0.52	1.00	
Satd. Flow (perm)	635	3167	1404	610	3195	1292	930	2782		907	3088	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	656	117	94	711	61	156	289	94	56	344	61
RTOR Reduction (vph)	0	0	70	0	0	36	0	61	0	0	39	0
Lane Group Flow (vph)	61	656	47	94	711	25	156	322	0	56	366	0
Heavy Vehicles (%)	5%	14%	15%	20%	13%	25%	5%	25%	25%	10%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	13.1	13.1	13.1	13.1	13.1	13.1	11.2	11.2		11.2	11.2	
Effective Green, g (s)	13.1	13.1	13.1	13.1	13.1	13.1	11.2	11.2		11.2	11.2	
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	258	1284	569	247	1296	524	322	965		315	1071	
v/s Ratio Prot		0.21			c0.22			0.12			0.12	
v/s Ratio Perm	0.10		0.03	0.15		0.02	c0.17			0.06		
v/c Ratio	0.24	0.51	0.08	0.38	0.55	0.05	0.48	0.33		0.18	0.34	
Uniform Delay, d1	6.3	7.2	5.9	6.7	7.3	5.8	8.3	7.8		7.3	7.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.3	0.1	1.0	0.5	0.0	1.2	0.2		0.3	0.2	
Delay (s)	6.8	7.5	6.0	7.7	7.8	5.9	9.4	8.0		7.6	8.0	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		7.3			7.7			8.4			8.0	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	32.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	850	160	130	950	75	325	355	70	45	355	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3252	1538	1641	3282	1468	1719	3353		1504	3359	
Flt Permitted	0.26	1.00	1.00	0.26	1.00	1.00	0.50	1.00		0.49	1.00	
Satd. Flow (perm)	473	3252	1538	452	3282	1468	897	3353		780	3359	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	895	168	137	1000	79	342	374	74	47	374	68
RTOR Reduction (vph)	0	0	103	0	0	48	0	32	0	0	23	0
Lane Group Flow (vph)	105	895	65	137	1000	31	342	416	0	47	419	0
Heavy Vehicles (%)	5%	11%	5%	10%	10%	10%	5%	5%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	15.3	15.3	15.3	15.3	15.3	15.3	16.0	16.0		16.0	16.0	
Effective Green, g (s)	15.3	15.3	15.3	15.3	15.3	15.3	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	184	1266	599	176	1278	572	365	1365		318	1368	
v/s Ratio Prot		0.28			c0.30			0.12			0.12	
v/s Ratio Perm	0.22		0.04	0.30		0.02	c0.38			0.06		
v/c Ratio	0.57	0.71	0.11	0.78	0.78	0.05	0.94	0.30		0.15	0.31	
Uniform Delay, d1	9.4	10.1	7.7	10.5	10.5	7.5	11.2	7.9		7.3	7.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	1.8	0.1	19.2	3.2	0.0	31.1	0.1		0.2	0.1	
Delay (s)	13.6	11.9	7.7	29.7	13.7	7.5	42.2	8.0		7.6	8.0	
Level of Service	B	B	A	C	B	A	D	A		A	A	
Approach Delay (s)		11.5			15.1			22.8			8.0	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	39.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	85	1235	160	80	480	95	115	405	45	140	595	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.99		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1029	1719	3387		1299	3406	
Flt Permitted	0.46	1.00	1.00	0.20	1.00	1.00	0.31	1.00		0.45	1.00	
Satd. Flow (perm)	674	3438	1468	340	3438	1029	556	3387		621	3406	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	91	1328	172	86	516	102	124	435	48	151	640	43
RTOR Reduction (vph)	0	0	52	0	0	53	0	15	0	0	11	0
Lane Group Flow (vph)	91	1328	120	86	516	49	124	468	0	151	672	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	57%	5%	5%	5%	39%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	20.3	20.3	20.3	20.3	20.3	20.3	14.2	14.2		14.2	14.2	
Effective Green, g (s)	20.3	20.3	20.3	20.3	20.3	20.3	14.2	14.2		14.2	14.2	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.33	0.33		0.33	0.33	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	1642	701	162	1642	491	186	1132		207	1138	
v/s Ratio Prot		c0.39			0.15			0.14			0.20	
v/s Ratio Perm	0.13		0.08	0.25		0.05	0.22			c0.24		
v/c Ratio	0.28	0.81	0.17	0.53	0.31	0.10	0.67	0.41		0.73	0.59	
Uniform Delay, d1	6.7	9.4	6.3	7.8	6.8	6.1	12.1	10.9		12.5	11.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	3.0	0.1	3.3	0.1	0.1	8.7	0.2		12.1	0.8	
Delay (s)	7.2	12.5	6.4	11.1	6.9	6.2	20.8	11.2		24.6	12.6	
Level of Service	A	B	A	B	A	A	C	B		C	B	
Approach Delay (s)		11.5			7.3			13.1			14.7	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	42.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	50	490	95	80	535	100	130	240	80	95	285	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	991	1719	2780		1150	3089	
Flt Permitted	0.43	1.00	1.00	0.45	1.00	1.00	0.53	1.00		0.54	1.00	
Satd. Flow (perm)	774	3438	1404	711	3438	991	959	2780		652	3089	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	56	544	106	89	594	111	144	267	89	106	317	56
RTOR Reduction (vph)	0	0	64	0	0	68	0	58	0	0	36	0
Lane Group Flow (vph)	56	544	42	89	594	43	144	298	0	106	337	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	63%	5%	25%	25%	57%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.8	10.8		10.8	10.8	
Effective Green, g (s)	12.1	12.1	12.1	12.1	12.1	12.1	10.8	10.8		10.8	10.8	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	303	1346	550	278	1346	388	335	972		228	1080	
v/s Ratio Prot		0.16			c0.17			0.11			0.11	
v/s Ratio Perm	0.07		0.03	0.13		0.04	0.15			c0.16		
v/c Ratio	0.18	0.40	0.08	0.32	0.44	0.11	0.43	0.31		0.46	0.31	
Uniform Delay, d1	6.2	6.8	5.9	6.5	6.9	6.0	7.7	7.3		7.8	7.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.2	0.1	0.7	0.2	0.1	0.9	0.2		1.5	0.2	
Delay (s)	6.5	7.0	6.0	7.2	7.1	6.1	8.6	7.5		9.3	7.5	
Level of Service	A	A	A	A	A	A	A	A		A	A	
Approach Delay (s)		6.8			7.0			7.8			7.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	30.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	90	730	145	120	820	120	300	325	65	90	325	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1091	1719	3353		1101	3358	
Flt Permitted	0.27	1.00	1.00	0.30	1.00	1.00	0.51	1.00		0.51	1.00	
Satd. Flow (perm)	492	3438	1538	510	3438	1091	930	3353		592	3358	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	768	153	126	863	126	316	342	68	95	342	63
RTOR Reduction (vph)	0	0	93	0	0	77	0	41	0	0	37	0
Lane Group Flow (vph)	95	768	60	126	863	49	316	369	0	95	368	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	48%	5%	5%	5%	64%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Effective Green, g (s)	14.7	14.7	14.7	14.7	14.7	14.7	15.0	15.0		15.0	15.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	192	1341	600	199	1341	425	370	1334		236	1336	
v/s Ratio Prot		0.22			c0.25			0.11			0.11	
v/s Ratio Perm	0.19		0.04	0.25		0.05	c0.34			0.16		
v/c Ratio	0.49	0.57	0.10	0.63	0.64	0.12	0.85	0.28		0.40	0.28	
Uniform Delay, d1	8.7	9.0	7.3	9.3	9.4	7.3	10.4	7.7		8.1	7.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	0.6	0.1	6.4	1.1	0.1	17.2	0.1		1.1	0.1	
Delay (s)	10.7	9.6	7.4	15.7	10.4	7.5	27.5	7.8		9.3	7.8	
Level of Service	B	A	A	B	B	A	C	A		A	A	
Approach Delay (s)		9.4			10.7			16.4			8.1	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	95	1345	175	85	525	105	125	440	50	155	650	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1388	3438	1468	1641	3438	1029	1719	3385		1299	3405	
Flt Permitted	0.43	1.00	1.00	0.19	1.00	1.00	0.27	1.00		0.42	1.00	
Satd. Flow (perm)	627	3438	1468	327	3438	1029	489	3385		569	3405	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	102	1446	188	91	565	113	134	473	54	167	699	48
RTOR Reduction (vph)	0	0	42	0	0	59	0	11	0	0	11	0
Lane Group Flow (vph)	102	1446	146	91	565	54	134	516	0	167	736	0
Heavy Vehicles (%)	30%	5%	10%	10%	5%	57%	5%	5%	5%	39%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	21.1	21.1	21.1	21.1	21.1	21.1	14.8	14.8		14.8	14.8	
Effective Green, g (s)	21.1	21.1	21.1	21.1	21.1	21.1	14.8	14.8		14.8	14.8	
Actuated g/C Ratio	0.48	0.48	0.48	0.48	0.48	0.48	0.34	0.34		0.34	0.34	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	301	1652	706	157	1652	495	165	1141		192	1148	
v/s Ratio Prot		c0.42			0.16			0.15			0.22	
v/s Ratio Perm	0.16		0.10	0.28		0.05	0.27			c0.29		
v/c Ratio	0.34	0.88	0.21	0.58	0.34	0.11	0.81	0.45		0.87	0.64	
Uniform Delay, d1	7.1	10.2	6.6	8.2	7.1	6.3	13.3	11.4		13.6	12.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	5.5	0.1	5.1	0.1	0.1	25.3	0.3		31.6	1.2	
Delay (s)	7.7	15.7	6.7	13.3	7.2	6.3	38.5	11.7		45.2	13.5	
Level of Service	A	B	A	B	A	A	D	B		D	B	
Approach Delay (s)		14.3			7.8			17.1			19.3	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	43.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	55	535	105	85	585	110	140	260	85	105	310	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1404	1504	3438	991	1719	2782		1150	3088	
Flt Permitted	0.39	1.00	1.00	0.43	1.00	1.00	0.51	1.00		0.52	1.00	
Satd. Flow (perm)	702	3438	1404	674	3438	991	930	2782		635	3088	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	61	594	117	94	650	122	156	289	94	117	344	61
RTOR Reduction (vph)	0	0	71	0	0	74	0	61	0	0	39	0
Lane Group Flow (vph)	61	594	46	94	650	48	156	322	0	117	366	0
Heavy Vehicles (%)	5%	5%	15%	20%	5%	63%	5%	25%	25%	57%	15%	10%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	12.7	12.7	12.7	12.7	12.7	12.7	11.3	11.3		11.3	11.3	
Effective Green, g (s)	12.7	12.7	12.7	12.7	12.7	12.7	11.3	11.3		11.3	11.3	
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.35	0.35		0.35	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	279	1364	557	267	1364	393	328	982		224	1090	
v/s Ratio Prot		0.17			c0.19			0.12			0.12	
v/s Ratio Perm	0.09		0.03	0.14		0.05	0.17			c0.18		
v/c Ratio	0.22	0.44	0.08	0.35	0.48	0.12	0.48	0.33		0.52	0.34	
Uniform Delay, d1	6.4	7.0	6.0	6.8	7.2	6.1	8.0	7.6		8.2	7.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.2	0.1	0.8	0.3	0.1	1.1	0.2		2.2	0.2	
Delay (s)	6.8	7.3	6.1	7.6	7.4	6.3	9.1	7.8		10.4	7.8	
Level of Service	A	A	A	A	A	A	A	A		B	A	
Approach Delay (s)		7.0			7.3			8.2			8.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	32.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
30: Sheldon St & Glenoaks Blvd

3/26/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	795	160	130	895	130	325	355	70	100	355	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3438	1538	1641	3438	1091	1719	3353		1101	3359	
Flt Permitted	0.26	1.00	1.00	0.26	1.00	1.00	0.50	1.00		0.49	1.00	
Satd. Flow (perm)	479	3438	1538	458	3438	1091	897	3353		571	3359	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	837	168	137	942	137	342	374	74	105	374	68
RTOR Reduction (vph)	0	0	103	0	0	84	0	40	0	0	27	0
Lane Group Flow (vph)	105	837	65	137	942	53	342	408	0	105	415	0
Heavy Vehicles (%)	5%	5%	5%	10%	5%	48%	5%	5%	5%	64%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		6			2			4			8	
Permitted Phases	6		6	2		2	4			8		
Actuated Green, G (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Effective Green, g (s)	15.1	15.1	15.1	15.1	15.1	15.1	16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.41	0.41		0.41	0.41	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	185	1328	594	177	1328	421	367	1372		234	1375	
v/s Ratio Prot		0.24			0.27			0.12			0.12	
v/s Ratio Perm	0.22		0.04	c0.30		0.05	c0.38			0.18		
v/c Ratio	0.57	0.63	0.11	0.77	0.71	0.13	0.93	0.30		0.45	0.30	
Uniform Delay, d1	9.4	9.7	7.7	10.5	10.1	7.7	11.0	7.8		8.4	7.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	1.0	0.1	18.8	1.8	0.1	30.1	0.1		1.4	0.1	
Delay (s)	13.4	10.7	7.8	29.3	11.9	7.9	41.1	7.9		9.7	7.9	
Level of Service	B	B	A	C	B	A	D	A		A	A	
Approach Delay (s)		10.5			13.4			22.3			8.3	
Approach LOS		B			B			C			A	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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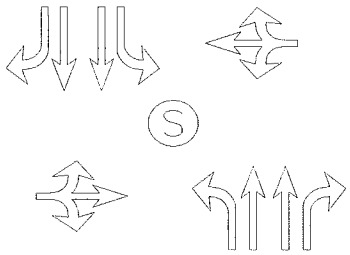
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
5B, 6B, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	15	40%		15	5	20
EB THRU	5	80%		5	5	10
EB RIGHT	5	40%		5	5	10
WB LEFT	15	20%		15	5	20
WB THRU	5	20%		5	5	10
WB RIGHT	10	20%		10	5	15
GLEN OAKS BLVD						
NB LEFT	15	45%		15	5	20
NB THRU	525	10%	**50**	575	50	625
NB RIGHT	25	65%		25	5	30
SB LEFT	30	45%		30	5	35
SB THRU	1250	5%	**50**	1300	115	1415
SB RIGHT	40	20%		40	5	45
TOTALS	**1940**		**100**	**2040**	**215**	**2255**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	15	40%	**50**	65	5	70
EB THRU	5	80%		5	5	10
EB RIGHT	5	40%		5	5	10
WB LEFT	15	20%		15	5	20
WB THRU	5	20%		5	5	10
WB RIGHT	10	20%		10	5	15
GLEN OAKS BLVD						
NB LEFT	15	45%		15	5	20
NB THRU	525	10%		525	45	570
NB RIGHT	25	65%		25	5	30
SB LEFT	30	45%		30	5	35
SB THRU	1250	5%		1250	115	1365
SB RIGHT	40	20%	**50**	90	10	100
TOTALS	**1940**		**100**	**2040**	**215**	**2255**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	15	40%		15	5	20
EB THRU	5	80%		5	5	10
EB RIGHT	5	40%	**50**	55	5	60
WB LEFT	15	20%		15	5	20
WB THRU	5	20%		5	5	10
WB RIGHT	10	20%		10	5	15
GLEN OAKS BLVD						
NB LEFT	15	45%	**50**	65	5	70
NB THRU	525	10%		525	45	570
NB RIGHT	25	65%		25	5	30
SB LEFT	30	45%		30	5	35
SB THRU	1250	5%		1250	115	1365
SB RIGHT	40	20%		40	5	45
TOTALS	**1940**		**100**	**2040**	**210**	**2250**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 5B, 6B, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	25	40%		25	5	30
EB THRU	5	60%		5	5	10
EB RIGHT	30	45%		30	5	35
WB LEFT	20	30%		20	5	25
WB THRU	5	20%		5	5	10
WB RIGHT	15	5%		15	5	20
GLEN OAKS BLVD						
NB LEFT	25	15%		25	5	30
NB THRU	525	15%	**50**	575	50	625
NB RIGHT	15	45%		15	5	20
SB LEFT	10	40%		10	5	15
SB THRU	530	15%	**50**	580	50	630
SB RIGHT	15	45%		15	5	20
TOTALS	**1220**		**100**	**1320**	**150**	**1470**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	25	40%	**50**	75	5	80
EB THRU	5	60%		5	5	10
EB RIGHT	30	45%		30	5	35
WB LEFT	20	30%		20	5	25
WB THRU	5	20%		5	5	10
WB RIGHT	15	5%		15	5	20
GLEN OAKS BLVD						
NB LEFT	25	15%		25	5	30
NB THRU	525	15%		525	45	570
NB RIGHT	15	45%		15	5	20
SB LEFT	10	40%		10	5	15
SB THRU	530	15%		530	50	580
SB RIGHT	15	45%	**50**	65	5	70
TOTALS	**1220**		**100**	**1320**	**145**	**1465**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	25	40%		25	5	30
EB THRU	5	60%		5	5	10
EB RIGHT	30	45%	**50**	80	5	85
WB LEFT	20	30%		20	5	25
WB THRU	5	20%		5	5	10
WB RIGHT	15	5%		15	5	20
GLEN OAKS BLVD						
NB LEFT	25	15%	**50**	75	5	80
NB THRU	525	15%		525	45	570
NB RIGHT	15	45%		15	5	20
SB LEFT	10	40%		10	5	15
SB THRU	530	15%		530	50	580
SB RIGHT	15	45%		15	5	20
TOTALS	**1220**		**100**	**1320**	**145**	**1465**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
5B, 6B, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	40	20%		40	5	45
EB THRU	10	40%		10	5	15
EB RIGHT	20	45%		20	5	25
WB LEFT	30	55%		30	5	35
WB THRU	5	5%		5	5	10
WB RIGHT	55	20%		55	5	60
GLEN OAKS BLVD						
NB LEFT	25	45%		25	5	30
NB THRU	975	5%	**50**	1025	90	1115
NB RIGHT	25	50%		25	5	30
SB LEFT	35	50%		35	5	40
SB THRU	745	5%	**50**	795	70	865
SB RIGHT	15	45%		15	5	20
TOTALS	**1980**		**100**	**2080**	**210**	**2290**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	40	20%	**50**	90	10	100
EB THRU	10	40%		10	5	15
EB RIGHT	20	45%		20	5	25
WB LEFT	30	55%		30	5	35
WB THRU	5	5%		5	5	10
WB RIGHT	55	20%		55	5	60
GLEN OAKS BLVD						
NB LEFT	25	45%		25	5	30
NB THRU	975	5%		975	90	1065
NB RIGHT	25	50%		25	5	30
SB LEFT	35	50%		35	5	40
SB THRU	745	5%		745	65	810
SB RIGHT	15	45%	**50**	65	5	70
TOTALS	**1980**		**100**	**2080**	**210**	**2290**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	12-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PEORIA STREET						
EB LEFT	40	20%		40	5	45
EB THRU	10	40%		10	5	15
EB RIGHT	20	45%	**50**	70	5	75
WB LEFT	30	55%		30	5	35
WB THRU	5	5%		5	5	10
WB RIGHT	55	20%		55	5	60
GLEN OAKS BLVD						
NB LEFT	25	45%	**50**	75	5	80
NB THRU	975	5%		975	90	1065
NB RIGHT	25	50%		25	5	30
SB LEFT	35	50%		35	5	40
SB THRU	745	5%		745	65	810
SB RIGHT	15	45%		15	5	20
TOTALS	**1980**		**100**	**2080**	**205**	**2285**

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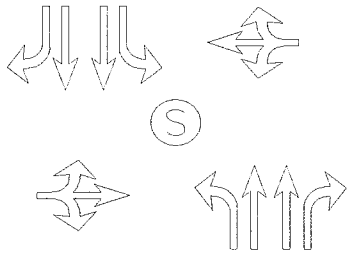
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	1 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
5B, 6B, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	8	6	18	25	**0**	25	5	30
EB THRU	0	4	12	10	**0**	10	5	15
EB RIGHT	1	2	6	5	**0**	5	5	10
WB LEFT	12	3	9	20	**0**	20	5	25
WB THRU	5	1	3	10	**0**	10	5	15
WB RIGHT	10	2	6	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	7	7	21	30	**0**	30	5	35
NB THRU	485	41	123	610	**150**	760	70	830
NB RIGHT	10	16	48	60	**0**	60	5	65
SB LEFT	15	14	42	55	**0**	55	5	60
SB THRU	1179	69	207	1385	**150**	1535	140	1675
SB RIGHT	32	8	24	55	**0**	55	5	60
TOTALS	**1764**				**300**	**2580**	**260**	**2840**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	2 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	8	6	18	25	**150**	175	15	190
EB THRU	0	4	12	10	**0**	10	5	15
EB RIGHT	1	2	6	5	**0**	5	5	10
WB LEFT	12	3	9	20	**0**	20	5	25
WB THRU	5	1	3	10	**0**	10	5	15
WB RIGHT	10	2	6	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	7	7	21	30	**0**	30	5	35
NB THRU	485	41	123	610	**0**	610	55	665
NB RIGHT	10	16	48	60	**0**	60	5	65
SB LEFT	15	14	42	55	**0**	55	5	60
SB THRU	1179	69	207	1385	**0**	1385	125	1510
SB RIGHT	32	8	24	55	**150**	205	20	225
TOTALS	**1764**				**300**	**2580**	**255**	**2835**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	3 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	8	6	18	25	**0**	25	5	30
EB THRU	0	4	12	10	**0**	10	5	15
EB RIGHT	1	2	6	5	**150**	155	15	170
WB LEFT	12	3	9	20	**0**	20	5	25
WB THRU	5	1	3	10	**0**	10	5	15
WB RIGHT	10	2	6	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	7	7	21	30	**150**	180	15	195
NB THRU	485	41	123	610	**0**	610	55	665
NB RIGHT	10	16	48	60	**0**	60	5	65
SB LEFT	15	14	42	55	**0**	55	5	60
SB THRU	1179	69	207	1385	**0**	1385	125	1510
SB RIGHT	32	8	24	55	**0**	55	5	60
TOTALS	**1764**				**300**	**2580**	**250**	**2830**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	4 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 5B, 6B, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	17	10	30	45	**0**	45	5	50
EB THRU	2	3	9	10	**0**	10	5	15
EB RIGHT	19	13	39	60	**0**	60	5	65
WB LEFT	12	6	18	30	**0**	30	5	35
WB THRU	4	1	3	5	**0**	5	5	10
WB RIGHT	12	1	3	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	23	4	12	35	**0**	35	5	40
NB THRU	457	67	201	660	**150**	810	75	885
NB RIGHT	10	7	21	30	**0**	30	5	35
SB LEFT	8	4	12	20	**0**	20	5	25
SB THRU	440	88	264	705	**150**	855	75	930
SB RIGHT	7	7	21	30	**0**	30	5	35
TOTALS	**1011**				**300**	**1945**	**200**	**2145**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	5 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	17	10	30	45	**150**	195	20	215
EB THRU	2	3	9	10	**0**	10	5	15
EB RIGHT	19	13	39	60	**0**	60	5	65
WB LEFT	12	6	18	30	**0**	30	5	35
WB THRU	4	1	3	5	**0**	5	5	10
WB RIGHT	12	1	3	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	23	4	12	35	**0**	35	5	40
NB THRU	457	67	201	660	**0**	660	60	720
NB RIGHT	10	7	21	30	**0**	30	5	35
SB LEFT	8	4	12	20	**0**	20	5	25
SB THRU	440	88	264	705	**0**	705	65	770
SB RIGHT	7	7	21	30	**150**	180	15	195
TOTALS	**1011**				**300**	**1945**	**200**	**2145**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	6 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	17	10	30	45	**0**	45	5	50
EB THRU	2	3	9	10	**0**	10	5	15
EB RIGHT	19	13	39	60	**150**	210	20	230
WB LEFT	12	6	18	30	**0**	30	5	35
WB THRU	4	1	3	5	**0**	5	5	10
WB RIGHT	12	1	3	15	**0**	15	5	20
GLEN OAKS BLVD								
NB LEFT	23	4	12	35	**150**	185	15	200
NB THRU	457	67	201	660	**0**	660	60	720
NB RIGHT	10	7	21	30	**0**	30	5	35
SB LEFT	8	4	12	20	**0**	20	5	25
SB THRU	440	88	264	705	**0**	705	65	770
SB RIGHT	7	7	21	30	**0**	30	5	35
TOTALS	**1011**				**300**	**1945**	**200**	**2145**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	7 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
5B, 6B, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	33	7	21	55	**0**	55	5	60
EB THRU	8	4	12	20	**0**	20	5	25
EB RIGHT	11	9	27	40	**0**	40	5	45
WB LEFT	13	17	51	65	**0**	65	5	70
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	44	10	30	75	**0**	75	5	80
GLEN OAKS BLVD								
NB LEFT	12	11	33	45	**0**	45	5	50
NB THRU	910	67	201	1110	**150**	1260	115	1375
NB RIGHT	14	12	36	50	**0**	50	5	55
SB LEFT	16	17	51	65	**0**	65	5	70
SB THRU	700	43	129	830	**150**	980	90	1070
SB RIGHT	9	7	21	30	**0**	30	5	35
TOTALS	**1775**				**300**	**2690**	**255**	**2945**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	8 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
31
ROUTE
7A, 7C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	33	7	21	55	**150**	205	20	225
EB THRU	8	4	12	20	**0**	20	5	25
EB RIGHT	11	9	27	40	**0**	40	5	45
WB LEFT	13	17	51	65	**0**	65	5	70
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	44	10	30	75	**0**	75	5	80
GLEN OAKS BLVD								
NB LEFT	12	11	33	45	**0**	45	5	50
NB THRU	910	67	201	1110	**0**	1110	100	1210
NB RIGHT	14	12	36	50	**0**	50	5	55
SB LEFT	16	17	51	65	**0**	65	5	70
SB THRU	700	43	129	830	**0**	830	75	905
SB RIGHT	9	7	21	30	**150**	180	15	195
TOTALS	**1775**				**300**	**2690**	**250**	**2940**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	12-Sep-13	VV.110264.0000	9 OF 9

E/W STREET : PEORIA STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 31
ROUTE 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PEORIA STREET								
EB LEFT	33	7	21	55	**0**	55	5	60
EB THRU	8	4	12	20	**0**	20	5	25
EB RIGHT	11	9	27	40	**150**	190	15	205
WB LEFT	13	17	51	65	**0**	65	5	70
WB THRU	5	0	0	5	**0**	5	5	10
WB RIGHT	44	10	30	75	**0**	75	5	80
GLEN OAKS BLVD								
NB LEFT	12	11	33	45	**150**	195	20	215
NB THRU	910	67	201	1110	**0**	1110	100	1210
NB RIGHT	14	12	36	50	**0**	50	5	55
SB LEFT	16	17	51	65	**0**	65	5	70
SB THRU	700	43	129	830	**0**	830	75	905
SB RIGHT	9	7	21	30	**0**	30	5	35
TOTALS	**1775**				**300**	**2690**	**250**	**2940**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PEORIA
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 1,317

	Rt	Thru	Lt
Total	40	1248	29
1st	9	290	5
2nd	10	335	4
3rd	10	353	14
4th	11	270	6

EAST LEG

EAST LEG TOTAL: 33

	1st	2nd	3rd	4th	Total
Rt	0	0	8	4	12
Thru	1	1	3	1	6
Lt	0	1	5	9	15

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	14	2	4	4	4
Thru	4	0	0	2	2
Rt	3	0	0	2	1

WEST LEG TOTAL: 21

SOUTH LEG

	Lt	Thru	Rt
1st	5	112	4
2nd	6	129	6
3rd	3	121	7
4th	0	164	9
Total	14	526	26

TOTAL: 566

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG = 0.82
EAST LEG = 0.52
WEST LEG = 0.66

ALL LEGS = 0.91

HOUR TOTAL: 1,937

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 07:00AM-08:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
40	1248	29	Total
9	290	5	1st
10	335	4	2nd
10	353	14	3rd
11	270	6	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	8	4	12
Thru	1	1	3	1	6
Lt	0	1	5	9	15

Total	1st	2nd	3rd	4th	
14	2	4	4	4	Lt
4	0	0	2	2	Thru
3	0	0	2	1	Rt

	Lt	Thru	Rt
1st	5	112	4
2nd	6	129	6
3rd	3	121	7
4th	0	164	9
Total	14	526	26

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 08:00AM-09:00AM DATE: 05-30-12

NORTH LEG

	Rt	Thru	Lt
Total	24	839	26
1st	7	249	8
2nd	8	231	2
3rd	3	193	8
4th	6	166	8

	1st	2nd	3rd	4th	Total
Rt	1	4	6	1	12
Thru	3	3	3	3	12
Lt	8	10	8	6	32

	Total	1st	2nd	3rd	4th
Lt	5	0	1	2	2
Thru	3	0	1	1	1
Rt	11	2	2	4	3

	Lt	Thru	Rt
1st	3	105	2
2nd	2	126	4
3rd	6	95	5
4th	3	96	5
Total	14	422	16

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PEORIA 05-30-12

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
5	268	1	2	12	2	1	5	2	1	5	0	304
10	318	0	0	8	0	0	5	3	0	4	1	349
7	338	9	1	9	0	1	2	5	1	4	0	377
10	255	5	1	6	0	0	3	0	0	6	1	287
4	236	5	1	6	1	1	4	2	1	3	0	264
7	221	0	0	4	2	1	4	0	0	2	0	241
0	188	6	2	4	0	1	0	1	0	1	1	204
4	155	1	0	8	2	0	2	4	2	1	1	180
47	1979	27	7	57	7	5	25	17	5	26	4	2206
						SOUTH LEG						
3	101	2	0	6	1	1	3	1	0	2	1	121
0	118	5	2	6	1	2	2	0	2	3	0	141
3	112	0	0	5	0	2	2	2	2	2	1	131
4	154	0	2	3	0	1	5	0	2	2	0	173
2	92	3	0	4	0	0	4	0	0	5	0	110
2	118	0	1	3	0	1	3	1	0	2	1	132
4	85	4	1	4	0	0	3	1	0	3	1	106
3	79	1	0	6	1	1	7	0	1	4	1	104
21	859	15	6	37	3	8	29	5	7	23	5	1018
						EAST LEG						
0	1	0	0	0	0	0	0	0	0	0	0	1
0	1	1	0	0	0	0	0	0	0	0	0	2
6	2	3	0	1	1	0	0	1	2	0	0	16
4	1	8	0	0	0	0	0	0	0	0	1	14
0	3	8	0	0	0	0	0	0	1	0	0	12
2	3	9	2	0	1	0	0	0	0	0	0	17
4	3	8	0	0	0	1	0	0	1	0	0	17
1	3	5	0	0	1	0	0	0	0	0	0	10
17	17	42	2	1	3	1	0	1	4	0	1	89
						WEST LEG						
0	0	1	0	0	1	0	0	0	0	0	0	2
0	0	3	0	0	0	0	0	1	0	0	0	4
1	0	1	1	0	2	0	2	0	0	0	1	8
0	0	3	0	1	0	0	0	1	1	1	0	7
0	0	-4	2	0	2	0	0	0	0	0	2	2
1	0	1	0	0	0	1	1	0	0	0	0	4
2	0	0	2	1	2	0	0	0	0	0	0	7
2	0	0	0	0	0	0	1	0	1	0	2	6
6	0	5	5	2	7	1	4	2	2	1	5	40

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PEORIA
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 12:45PM

NORTH LEG

TOTAL: 554

Rt	Thru	Lt	
14	528	12	Total
4	144	3	1st
4	117	2	2nd
3	131	1	3rd
3	136	6	4th

EAST LEG

EAST LEG TOTAL: 36

	1st	2nd	3rd	4th	Total
Rt	5	4	1	3	13
Thru	3	1	1	0	5
Lt	2	2	11	3	18

WEST LEG

Total	1st	2nd	3rd	4th	
27	6	4	6	11	Lt
5	0	2	0	3	Thru
32	13	9	4	6	Rt

WEST LEG TOTAL: 64

SOUTH LEG

	Lt	Thru	Rt
1st	4	112	7
2nd	7	127	6
3rd	9	133	2
4th	7	152	2
Total	27	524	17

TOTAL: 568

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.88
EAST LEG = 0.69
WEST LEG = 0.80

ALL LEGS = 0.92

HOUR TOTAL: 1,222

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 12:00PM-01:00PM DATE: 05-30-12

NORTH LEG

	Rt	Thru	Lt
Total	22	519	16
1st	9	129	3
2nd	6	125	8
3rd	3	121	2
4th	4	144	3

	1st	2nd	3rd	4th	Total
Rt	1	4	3	5	13
Thru	1	2	2	3	8
Lt	3	3	7	2	15

	Total	1st	2nd	3rd	4th
Lt	25	6	3	10	6
Thru	5	1	3	1	0
Rt	33	9	6	5	13

	Lt	Thru	Rt
1st	2	128	1
2nd	3	135	9
3rd	9	126	7
4th	4	112	7
Total	18	501	24

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 01:00PM-02:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
22	488	15	Total
4	117	2	1st
3	131	1	2nd
3	136	6	3rd
12	104	6	4th

	1st	2nd	3rd	4th	Total
Rt	4	1	3	4	12
Thru	1	1	0	4	6
Lt	2	11	3	5	21

Total	1st	2nd	3rd	4th	
23	4	6	11	2	Lt
6	2	0	3	1	Thru
23	9	4	6	4	Rt

	Lt	Thru	Rt
1st	7	127	6
2nd	9	133	2
3rd	7	152	2
4th	3	105	8
Total	26	517	18

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PEORIA 05-30-12

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
6	112	3	2	6	0	1	6	0	0	5	0	141
4	104	4	1	10	4	1	2	0	0	9	0	139
3	101	2	0	8	0	0	4	0	0	8	0	126
2	120	2	2	9	1	0	8	0	0	7	0	151
3	91	1	1	15	1	0	6	0	0	5	0	123
1	110	1	2	7	0	0	4	0	0	10	0	135
1	119	4	2	7	2	0	4	0	0	6	0	145
5	65	2	3	15	0	4	10	3	0	14	1	122
25	822	19	13	77	8	6	44	3	0	64	1	1082
						SOUTH LEG						
1	107	2	0	10	0	0	3	0	0	8	0	131
6	117	3	1	5	0	1	3	0	1	10	0	147
4	110	8	1	7	0	2	3	0	0	6	1	142
3	93	2	1	6	1	1	6	1	2	7	0	123
4	108	6	2	9	1	0	1	0	0	9	0	140
2	119	9	0	6	0	0	2	0	0	6	0	144
1	137	6	1	6	1	0	0	0	0	9	0	161
6	74	0	2	19	2	0	3	0	0	9	1	116
27	865	36	8	68	5	4	21	1	3	64	2	1104
						EAST LEG						
1	0	3	0	1	0	0	0	0	0	0	0	5
0	1	0	2	0	1	2	0	2	0	1	0	9
2	1	5	0	0	2	0	0	0	1	1	0	12
4	3	2	0	0	0	1	0	0	0	0	0	10
4	0	1	0	0	1	0	1	0	0	0	0	7
1	1	8	0	0	2	0	0	1	0	0	0	13
3	0	1	0	0	2	0	0	0	0	0	0	6
0	3	3	2	1	1	1	0	0	1	0	1	13
15	9	23	4	2	9	4	1	3	2	2	1	75
						WEST LEG						
8	0	6	1	1	0	0	0	0	0	0	0	16
5	1	3	1	0	0	0	1	0	0	1	0	12
2	1	6	1	0	3	2	0	1	0	0	0	16
9	0	4	0	0	0	2	0	1	2	0	1	19
5	2	3	0	0	0	3	0	1	1	0	0	15
3	0	1	0	0	1	0	0	1	1	0	3	10
2	0	9	0	1	0	3	2	0	1	0	2	20
0	1	1	2	0	0	1	0	0	1	0	1	7
34	5	33	5	2	4	11	3	4	6	1	7	115

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PEORIA
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 792

Rt	Thru	Lt	
16	743	33	Total
2	185	9	1st
3	164	8	2nd
8	199	7	3rd
3	195	9	4th

EAST LEG TOTAL: 89

	1st	2nd	3rd	4th	Total
Rt	11	12	12	19	54
Thru	0	1	2	2	5
Lt	8	9	4	9	30

WEST LEG TOTAL: 72

Total	1st	2nd	3rd	4th	
40	13	13	8	6	Lt
12	5	2	2	3	Thru
20	8	2	4	6	Rt

SOUTH LEG

TOTAL: 1,026

	Lt	Thru	Rt
1st	2	250	3
2nd	5	222	7
3rd	7	260	8
4th	9	245	8
Total	23	977	26

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.93
EAST LEG = 0.74
WEST LEG = 0.69

ALL LEGS = 0.95

HOUR TOTAL: 1,979

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 04:00PM-05:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
15	615	28	Total
4	131	5	1st
6	135	6	2nd
2	185	9	3rd
3	164	8	4th

	1st	2nd	3rd	4th	Total
Rt	4	5	11	12	32
Thru	1	1	0	1	3
Lt	1	4	8	9	22

Total	1st	2nd	3rd	4th	
45	9	10	13	13	Lt
12	1	4	5	2	Thru
17	3	4	8	2	Rt

	Lt	Thru	Rt
1st	5	213	9
2nd	6	191	9
3rd	2	250	3
4th	5	222	7
Total	18	876	28

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PEORIA

TIME: 05:00PM-06:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
14	751	32	Total
8	199	7	1st
3	195	9	2nd
1	180	13	3rd
2	177	3	4th

	1st	2nd	3rd	4th	Total
Rt	12	19	8	4	43
Thru	2	2	3	1	8
Lt	4	9	3	13	29

Total	1st	2nd	3rd	4th	
31	8	6	9	8	Lt
12	2	3	4	3	Thru
12	4	6	1	1	Rt

	Lt	Thru	Rt
1st	7	260	8
2nd	9	245	8
3rd	3	235	7
4th	0	239	9
Total	19	979	32

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PEORIA 05-30-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	105	2	2	17	0	1	4	3	1	5	0	140
3	123	1	0	8	0	1	2	5	2	2	0	147
1	173	5	1	8	2	0	2	2	0	2	0	196
2	153	3	0	5	2	1	3	3	0	3	0	175
4	184	5	3	8	0	1	4	2	0	3	0	214
2	190	3	0	3	1	1	1	5	0	1	0	207
0	170	6	1	7	4	0	2	2	0	1	1	194
2	169	0	0	2	1	0	2	1	0	4	1	182
14	1267	25	7	58	10	5	20	23	3	21	2	1455
						SOUTH LEG						
6	198	2	1	10	1	2	5	1	0	0	1	227
7	178	1	0	7	1	2	2	3	0	4	1	206
2	238	2	0	7	0	1	5	0	0	0	0	255
4	207	0	0	9	5	2	5	0	1	1	0	234
5	238	5	1	11	0	2	7	1	0	4	1	275
3	227	5	3	14	0	2	2	1	0	2	3	262
5	226	1	0	6	1	2	3	0	0	0	1	245
8	224	0	1	11	0	0	2	0	0	2	0	248
40	1736	16	6	75	8	13	31	6	1	13	7	1952
						EAST LEG						
3	1	1	0	0	0	1	0	0	0	0	0	6
5	0	4	0	1	0	0	0	0	0	0	0	10
10	0	5	0	0	3	0	0	0	1	0	0	19
8	1	0	3	0	8	0	0	1	1	0	0	22
8	2	2	4	0	2	0	0	0	0	0	0	18
18	2	6	0	0	3	0	0	0	1	0	0	30
6	3	3	2	0	0	0	0	0	0	0	0	14
4	1	11	0	0	2	0	0	0	0	0	0	18
62	10	32	9	1	18	1	0	1	3	0	0	137
						WEST LEG						
0	0	9	0	0	0	1	0	0	2	1	0	13
3	3	9	1	0	1	0	1	0	0	0	0	18
3	5	12	3	0	1	1	0	0	1	0	0	26
2	0	10	0	1	3	0	1	0	0	0	0	17
2	1	6	1	0	0	0	1	0	1	0	2	14
4	2	5	0	1	0	1	0	0	1	0	1	15
1	3	8	0	0	1	0	1	0	0	0	0	14
1	0	6	0	0	1	0	2	1	0	1	0	12
16	14	65	5	2	7	3	6	1	5	2	3	129

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	5	15	5	10	15	525	25	30	1250	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.97			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1126			1504		1203	3282	1009	1203	3438	1346
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1161			1542		1203	3282	1009	1203	3438	1346
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	5	5	16	5	11	16	577	27	33	1374	44
RTOR Reduction (vph)	0	5	0	0	11	0	0	0	8	0	0	13
Lane Group Flow (vph)	0	21	0	0	21	0	16	577	19	33	1374	31
Heavy Vehicles (%)	45%	100%	65%	20%	15%	15%	50%	10%	60%	50%	5%	20%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		1.4			1.4		0.6	32.8	32.8	1.1	33.3	33.3
Effective Green, g (s)		1.4			1.4		0.6	32.8	32.8	1.1	33.3	33.3
Actuated g/C Ratio		0.03			0.03		0.01	0.69	0.69	0.02	0.70	0.70
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		34			46		15	2276	700	28	2420	948
v/s Ratio Prot							0.01	0.18		c0.03	c0.40	
v/s Ratio Perm		c0.02			0.01				0.02			0.02
v/c Ratio		0.62			0.46		1.07	0.25	0.03	1.18	0.57	0.03
Uniform Delay, d1		22.7			22.6		23.3	2.7	2.3	23.1	3.5	2.1
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		30.4			7.2		255.5	0.1	0.0	229.1	0.3	0.0
Delay (s)		53.1			29.8		278.8	2.8	2.3	252.2	3.8	2.1
Level of Service		D			C		F	A	A	F	A	A
Approach Delay (s)		53.1			29.8			9.9			9.4	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	47.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	30	20	5	15	25	525	15	10	530	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1243			1420		1570	3139	1154	1337	3139	1077
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1269			1456		1570	3139	1154	1337	3139	1077
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	5	33	22	5	16	27	571	16	11	576	16
RTOR Reduction (vph)	0	30	0	0	15	0	0	0	7	0	0	7
Lane Group Flow (vph)	0	35	0	0	28	0	27	571	9	11	576	9
Heavy Vehicles (%)	35%	60%	40%	35%	20%	10%	15%	15%	40%	35%	15%	50%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		2.8			2.8		0.5	20.2	20.2	0.5	20.2	20.2
Effective Green, g (s)		2.8			2.8		0.5	20.2	20.2	0.5	20.2	20.2
Actuated g/C Ratio		0.08			0.08		0.01	0.57	0.57	0.01	0.57	0.57
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		100			115		22	1786	657	19	1786	613
v/s Ratio Prot							c0.02	0.18		0.01	c0.18	
v/s Ratio Perm		c0.03			0.02				0.01			0.01
v/c Ratio		0.35			0.25		1.23	0.32	0.01	0.58	0.32	0.01
Uniform Delay, d1		15.5			15.4		17.5	4.0	3.3	17.4	4.0	3.3
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.1			1.1		269.8	0.1	0.0	36.3	0.1	0.0
Delay (s)		17.6			16.5		287.3	4.1	3.3	53.7	4.1	3.3
Level of Service		B			B		F	A	A	D	A	A
Approach Delay (s)		17.6			16.5			16.6			5.0	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	10	20	30	5	55	25	975	25	35	745	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1374			1311		1203	3438	1114	1203	3438	1114
Flt Permitted		0.89			0.86		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1257			1149		1203	3438	1114	1203	3438	1114
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	21	32	5	58	26	1026	26	37	784	16
RTOR Reduction (vph)	0	19	0	0	52	0	0	0	11	0	0	6
Lane Group Flow (vph)	0	55	0	0	43	0	26	1026	15	37	784	10
Heavy Vehicles (%)	20%	35%	45%	55%	0%	20%	50%	5%	45%	50%	5%	45%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		4.7			4.7		0.6	25.2	25.2	1.6	26.2	26.2
Effective Green, g (s)		4.7			4.7		0.6	25.2	25.2	1.6	26.2	26.2
Actuated g/C Ratio		0.11			0.11		0.01	0.58	0.58	0.04	0.60	0.60
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		136			124		17	1992	645	44	2071	671
v/s Ratio Prot							0.02	c0.30		c0.03	0.23	
v/s Ratio Perm		c0.04			0.04				0.01			0.01
v/c Ratio		0.41			0.35		1.53	0.52	0.02	0.84	0.38	0.01
Uniform Delay, d1		18.1			18.0		21.4	5.5	3.9	20.8	4.5	3.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.0			1.7		414.2	0.2	0.0	77.3	0.1	0.0
Delay (s)		20.1			19.7		435.6	5.7	3.9	98.2	4.6	3.5
Level of Service		C			B		F	A	A	F	A	A
Approach Delay (s)		20.1			19.7			16.0			8.7	
Approach LOS		C			B			B			A	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	43.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	5	15	5	10	15	575	25	30	1300	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.97			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1126			1504		1203	3059	1009	1203	3312	1346
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1161			1542		1203	3059	1009	1203	3312	1346
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	5	5	16	5	11	16	632	27	33	1429	44
RTOR Reduction (vph)	0	5	0	0	11	0	0	0	8	0	0	13
Lane Group Flow (vph)	0	21	0	0	21	0	16	632	19	33	1429	31
Heavy Vehicles (%)	45%	100%	65%	20%	15%	15%	50%	18%	60%	50%	9%	20%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		1.4			1.4		0.6	34.6	34.6	1.1	35.1	35.1
Effective Green, g (s)		1.4			1.4		0.6	34.6	34.6	1.1	35.1	35.1
Actuated g/C Ratio		0.03			0.03		0.01	0.70	0.70	0.02	0.71	0.71
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		33			44		15	2156	711	27	2368	962
v/s Ratio Prot							0.01	0.21		c0.03	c0.43	
v/s Ratio Perm		c0.02			0.01				0.02			0.02
v/c Ratio		0.64			0.48		1.07	0.29	0.03	1.22	0.60	0.03
Uniform Delay, d1		23.6			23.5		24.2	2.7	2.2	24.0	3.5	2.0
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		35.4			8.2		255.5	0.1	0.0	247.9	0.4	0.0
Delay (s)		59.0			31.7		279.7	2.8	2.2	271.9	3.9	2.1
Level of Service		E			C		F	A	A	F	A	A
Approach Delay (s)		59.0			31.7			9.3			9.8	
Approach LOS		E			C			A			A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	49.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	30	20	5	15	25	575	15	10	580	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	
Frt		0.93			0.95		1.00	1.00	0.85	1.00	1.00	
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)		1243			1420		1570	2959	1154	1337	2931	
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)		1269			1456		1570	2959	1154	1337	2931	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	5	33	22	5	16	27	625	16	11	630	16
RTOR Reduction (vph)	0	30	0	0	15	0	0	0	7	0	3	0
Lane Group Flow (vph)	0	35	0	0	28	0	27	625	9	11	643	0
Heavy Vehicles (%)	35%	60%	40%	35%	20%	10%	15%	22%	40%	35%	22%	50%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			
Actuated Green, G (s)		2.8			2.8		0.6	20.9	20.9	0.6	20.9	
Effective Green, g (s)		2.8			2.8		0.6	20.9	20.9	0.6	20.9	
Actuated g/C Ratio		0.08			0.08		0.02	0.58	0.58	0.02	0.58	
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)		98			112		26	1704	664	22	1688	
v/s Ratio Prot							c0.02	0.21		0.01	c0.22	
v/s Ratio Perm		c0.03			0.02				0.01			
v/c Ratio		0.35			0.25		1.04	0.37	0.01	0.50	0.38	
Uniform Delay, d1		15.9			15.8		17.8	4.1	3.3	17.7	4.2	
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2		2.2			1.2		188.7	0.1	0.0	16.8	0.1	
Delay (s)		18.1			17.0		206.6	4.3	3.3	34.5	4.3	
Level of Service		B			B		F	A	A	C	A	
Approach Delay (s)		18.1			17.0			12.4			4.8	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	36.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	10	20	30	5	55	25	1025	25	35	795	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1374			1311		1203	3282	1114	1203	3252	1114
Flt Permitted		0.86			0.88		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1219			1168		1203	3282	1114	1203	3252	1114
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	21	32	5	58	26	1079	26	37	837	16
RTOR Reduction (vph)	0	18	0	0	50	0	0	0	11	0	0	6
Lane Group Flow (vph)	0	56	0	0	45	0	26	1079	15	37	837	10
Heavy Vehicles (%)	20%	35%	45%	55%	0%	20%	50%	10%	45%	50%	11%	45%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		6.3			6.3		0.6	27.9	27.9	1.6	28.9	28.9
Effective Green, g (s)		6.3			6.3		0.6	27.9	27.9	1.6	28.9	28.9
Actuated g/C Ratio		0.13			0.13		0.01	0.58	0.58	0.03	0.60	0.60
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		161			154		15	1916	650	40	1966	674
v/s Ratio Prot							0.02	c0.33		c0.03	0.26	
v/s Ratio Perm		c0.05			0.04				0.01			0.01
v/c Ratio		0.35			0.29		1.73	0.56	0.02	0.93	0.43	0.01
Uniform Delay, d1		18.9			18.7		23.6	6.2	4.2	23.0	5.0	3.8
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.3			1.0		512.6	0.4	0.0	112.0	0.1	0.0
Delay (s)		20.2			19.8		536.2	6.6	4.2	135.1	5.2	3.8
Level of Service		C			B		F	A	A	F	A	A
Approach Delay (s)		20.2			19.8			18.7			10.6	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	47.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	5	15	5	10	15	625	25	35	1415	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.97			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1126			1504		1203	3282	1009	1203	3438	1346
Flt Permitted		1.00			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1161			1542		1203	3282	1009	1203	3438	1346
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	5	5	16	5	11	16	687	27	38	1555	49
RTOR Reduction (vph)	0	5	0	0	11	0	0	0	9	0	0	13
Lane Group Flow (vph)	0	21	0	0	21	0	16	687	18	38	1555	36
Heavy Vehicles (%)	45%	100%	65%	20%	15%	15%	50%	10%	60%	50%	5%	20%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		1.5			1.5		0.7	33.7	33.7	3.0	36.0	36.0
Effective Green, g (s)		1.5			1.5		0.7	33.7	33.7	3.0	36.0	36.0
Actuated g/C Ratio		0.03			0.03		0.01	0.67	0.67	0.06	0.72	0.72
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		35			46		17	2203	677	72	2465	965
v/s Ratio Prot							0.01	0.21		c0.03	c0.45	
v/s Ratio Perm		c0.02			0.01				0.02			0.03
v/c Ratio		0.60			0.46		0.94	0.31	0.03	0.53	0.63	0.04
Uniform Delay, d1		24.1			24.0		24.7	3.4	2.8	22.9	3.7	2.1
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		26.0			7.2		188.5	0.1	0.0	6.8	0.5	0.0
Delay (s)		50.1			31.2		213.3	3.5	2.8	29.7	4.2	2.1
Level of Service		D			C		F	A	A	C	A	A
Approach Delay (s)		50.1			31.2			8.1			4.7	
Approach LOS		D			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	35	20	5	15	25	625	15	10	630	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.93			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1238			1420		1570	3139	1154	1337	3139	1077
Flt Permitted		0.96			1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1206			1456		1570	3139	1154	1337	3139	1077
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	5	38	22	5	16	27	679	16	11	685	16
RTOR Reduction (vph)	0	35	0	0	15	0	0	0	7	0	0	7
Lane Group Flow (vph)	0	35	0	0	28	0	27	679	9	11	685	9
Heavy Vehicles (%)	35%	60%	40%	35%	20%	10%	15%	15%	40%	35%	15%	50%
Turn Type	Perm	NA		Perm	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8					2			6
Actuated Green, G (s)		2.9			2.9		0.6	21.4	21.4	0.6	21.4	21.4
Effective Green, g (s)		2.9			2.9		0.6	21.4	21.4	0.6	21.4	21.4
Actuated g/C Ratio		0.08			0.08		0.02	0.58	0.58	0.02	0.58	0.58
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		95			114		26	1820	669	22	1820	625
v/s Ratio Prot							c0.02	0.22		0.01	c0.22	
v/s Ratio Perm		c0.03			0.02				0.01			0.01
v/c Ratio		0.37			0.25		1.04	0.37	0.01	0.50	0.38	0.01
Uniform Delay, d1		16.1			16.0		18.1	4.2	3.3	18.0	4.2	3.3
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.4			1.1		188.7	0.1	0.0	16.8	0.1	0.0
Delay (s)		18.5			17.1		206.9	4.3	3.3	34.8	4.3	3.3
Level of Service		B			B		F	A	A	C	A	A
Approach Delay (s)		18.5			17.1			11.8			4.7	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	36.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	31.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

8/29/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	10	20	30	5	55	25	1115	25	40	865	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1374			1311		1203	3438	1114	1203	3438	1114
Flt Permitted		0.84			0.91		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)		1180			1208		1203	3438	1114	1203	3438	1114
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	21	32	5	58	26	1174	26	42	911	16
RTOR Reduction (vph)	0	15	0	0	41	0	0	0	14	0	0	8
Lane Group Flow (vph)	0	59	0	0	54	0	26	1174	12	42	911	8
Heavy Vehicles (%)	20%	35%	45%	55%	0%	20%	50%	5%	45%	50%	5%	45%
Turn Type	Perm	NA		Prot	NA		Prot	NA	Perm	Prot	NA	Perm
Protected Phases		4		3	8		5	2		1	6	
Permitted Phases	4								2			6
Actuated Green, G (s)		17.8			17.8		1.5	27.9	27.9	2.3	28.7	28.7
Effective Green, g (s)		17.8			17.8		1.5	27.9	27.9	2.3	28.7	28.7
Actuated g/C Ratio		0.30			0.30		0.02	0.46	0.46	0.04	0.48	0.48
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		350			358		30	1599	518	46	1645	533
v/s Ratio Prot							0.02	c0.34		c0.03	0.26	
v/s Ratio Perm		c0.05			0.04				0.01			0.01
v/c Ratio		0.17			0.15		0.87	0.73	0.02	0.91	0.55	0.01
Uniform Delay, d1		15.6			15.5		29.2	13.0	8.7	28.8	11.1	8.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		0.2			0.2		108.1	1.8	0.0	99.4	0.4	0.0
Delay (s)		15.9			15.7		137.2	14.8	8.7	128.1	11.5	8.2
Level of Service		B			B		F	B	A	F	B	A
Approach Delay (s)		15.9			15.7			17.3			16.5	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	5	5	15	5	10	15	525	25	30	1250	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.99			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		968			1504		1203	3282	1009	1203	3438	985
Flt Permitted		0.73			0.83		0.16	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)		737			1276		203	3282	1009	551	3438	985
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	71	5	5	16	5	11	16	577	27	33	1374	99
RTOR Reduction (vph)	0	4	0	0	9	0	0	0	9	0	0	31
Lane Group Flow (vph)	0	77	0	0	23	0	16	577	18	33	1374	68
Heavy Vehicles (%)	87%	100%	65%	20%	15%	15%	50%	10%	60%	50%	5%	64%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.8			6.8		31.8	31.8	31.8	31.8	31.8	31.8
Effective Green, g (s)		6.8			6.8		31.8	31.8	31.8	31.8	31.8	31.8
Actuated g/C Ratio		0.15			0.15		0.68	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		108			186		139	2240	689	376	2346	672
v/s Ratio Prot								0.18			c0.40	
v/s Ratio Perm		c0.10			0.02		0.08		0.02	0.06		0.07
v/c Ratio		0.71			0.12		0.12	0.26	0.03	0.09	0.59	0.10
Uniform Delay, d1		19.0			17.3		2.6	2.9	2.4	2.5	3.9	2.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		19.7			0.3		0.4	0.1	0.0	0.1	0.4	0.1
Delay (s)		38.6			17.6		2.9	2.9	2.4	2.6	4.3	2.6
Level of Service		D			B		A	A	A	A	A	A
Approach Delay (s)		38.6			17.6			2.9			4.1	
Approach LOS		D			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	46.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	5	30	20	5	15	25	525	15	10	530	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1061			1420		1570	3139	1154	1337	3139	859
Flt Permitted		0.77			0.79		0.44	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)		843			1151		719	3139	1154	615	3139	859
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	82	5	33	22	5	16	27	571	16	11	576	71
RTOR Reduction (vph)	0	27	0	0	13	0	0	0	7	0	0	30
Lane Group Flow (vph)	0	93	0	0	30	0	27	571	9	11	576	41
Heavy Vehicles (%)	78%	60%	40%	35%	20%	10%	15%	15%	40%	35%	15%	88%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.0			6.0		19.1	19.1	19.1	19.1	19.1	19.1
Effective Green, g (s)		6.0			6.0		19.1	19.1	19.1	19.1	19.1	19.1
Actuated g/C Ratio		0.18			0.18		0.58	0.58	0.58	0.58	0.58	0.58
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		153			209		415	1811	666	355	1811	496
v/s Ratio Prot								0.18			c0.18	
v/s Ratio Perm		c0.11			0.03		0.04		0.01	0.02		0.05
v/c Ratio		0.61			0.14		0.07	0.32	0.01	0.03	0.32	0.08
Uniform Delay, d1		12.5			11.4		3.1	3.6	3.0	3.0	3.6	3.1
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		6.7			0.3		0.1	0.1	0.0	0.0	0.1	0.1
Delay (s)		19.1			11.7		3.1	3.7	3.0	3.1	3.7	3.2
Level of Service		B			B		A	A	A	A	A	A
Approach Delay (s)		19.1			11.7			3.7			3.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	33.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	10	20	30	5	55	25	975	25	35	745	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.98			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1131			1311		1203	3438	1114	1203	3438	864
Flt Permitted		0.72			0.87		0.35	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)		844			1161		442	3438	1114	315	3438	864
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	11	21	32	5	58	26	1026	26	37	784	68
RTOR Reduction (vph)	0	17	0	0	28	0	0	0	11	0	0	28
Lane Group Flow (vph)	0	110	0	0	67	0	26	1026	15	37	784	40
Heavy Vehicles (%)	64%	35%	45%	55%	0%	20%	50%	5%	45%	50%	5%	87%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.6			6.6		20.6	20.6	20.6	20.6	20.6	20.6
Effective Green, g (s)		6.6			6.6		20.6	20.6	20.6	20.6	20.6	20.6
Actuated g/C Ratio		0.19			0.19		0.59	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		158			218		259	2012	652	184	2012	506
v/s Ratio Prot								c0.30			0.23	
v/s Ratio Perm		c0.13			0.06		0.06		0.01	0.12		0.05
v/c Ratio		0.70			0.31		0.10	0.51	0.02	0.20	0.39	0.08
Uniform Delay, d1		13.4			12.3		3.2	4.3	3.1	3.4	3.9	3.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		12.5			0.8		0.2	0.2	0.0	0.5	0.1	0.1
Delay (s)		25.9			13.1		3.4	4.5	3.1	4.0	4.0	3.2
Level of Service		C			B		A	A	A	A	A	A
Approach Delay (s)		25.9			13.1			4.5			4.0	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	5	5	15	5	10	15	570	25	35	1365	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.99			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		968			1504		1203	3282	1009	1203	3438	985
Flt Permitted		0.73			0.85		0.14	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)		736			1304		175	3282	1009	525	3438	985
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	77	5	5	16	5	11	16	626	27	38	1500	110
RTOR Reduction (vph)	0	4	0	0	10	0	0	0	8	0	0	31
Lane Group Flow (vph)	0	83	0	0	22	0	16	626	19	38	1500	79
Heavy Vehicles (%)	87%	100%	65%	20%	15%	15%	50%	10%	60%	50%	5%	64%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		7.2			7.2		38.9	38.9	38.9	38.9	38.9	38.9
Effective Green, g (s)		7.2			7.2		38.9	38.9	38.9	38.9	38.9	38.9
Actuated g/C Ratio		0.13			0.13		0.72	0.72	0.72	0.72	0.72	0.72
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		98			174		126	2360	726	377	2472	708
v/s Ratio Prot								0.19			c0.44	
v/s Ratio Perm		c0.11			0.02		0.09		0.02	0.07		0.08
v/c Ratio		0.84			0.13		0.13	0.27	0.03	0.10	0.61	0.11
Uniform Delay, d1		22.9			20.7		2.3	2.6	2.2	2.3	3.8	2.3
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		45.0			0.3		0.5	0.1	0.0	0.1	0.4	0.1
Delay (s)		67.9			21.0		2.8	2.7	2.2	2.4	4.2	2.4
Level of Service		E			C		A	A	A	A	A	A
Approach Delay (s)		67.9			21.0			2.7			4.1	
Approach LOS		E			C			A			A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	5	35	20	5	15	25	570	15	10	580	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.96			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.97			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1063			1420		1570	3139	1154	1337	3139	859
Flt Permitted		0.77			0.81		0.41	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)		848			1177		682	3139	1154	587	3139	859
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	87	5	38	22	5	16	27	620	16	11	630	76
RTOR Reduction (vph)	0	31	0	0	13	0	0	0	7	0	0	32
Lane Group Flow (vph)	0	99	0	0	30	0	27	620	9	11	630	44
Heavy Vehicles (%)	78%	60%	40%	35%	20%	10%	15%	15%	40%	35%	15%	88%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.2			6.2		19.4	19.4	19.4	19.4	19.4	19.4
Effective Green, g (s)		6.2			6.2		19.4	19.4	19.4	19.4	19.4	19.4
Actuated g/C Ratio		0.18			0.18		0.58	0.58	0.58	0.58	0.58	0.58
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		156			217		394	1812	666	339	1812	496
v/s Ratio Prot								0.20			c0.20	
v/s Ratio Perm		c0.12			0.03		0.04		0.01	0.02		0.05
v/c Ratio		0.63			0.14		0.07	0.34	0.01	0.03	0.35	0.09
Uniform Delay, d1		12.7			11.5		3.1	3.7	3.0	3.1	3.8	3.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		8.2			0.3		0.1	0.1	0.0	0.0	0.1	0.1
Delay (s)		20.8			11.8		3.2	3.9	3.0	3.1	3.9	3.2
Level of Service		C			B		A	A	A	A	A	A
Approach Delay (s)		20.8			11.8			3.8			3.8	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	33.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	10	20	35	5	60	25	1065	25	40	810	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.98			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.96			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1129			1306		1203	3438	1114	1203	3438	864
Flt Permitted		0.79			0.87		0.31	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)		929			1156		392	3438	1114	269	3438	864
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	11	21	37	5	63	26	1121	26	42	853	74
RTOR Reduction (vph)	0	13	0	0	50	0	0	0	10	0	0	29
Lane Group Flow (vph)	0	124	0	0	55	0	26	1121	16	42	853	45
Heavy Vehicles (%)	64%	35%	45%	55%	0%	20%	50%	5%	45%	50%	5%	87%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		9.5			9.5		27.6	27.6	27.6	27.6	27.6	27.6
Effective Green, g (s)		9.5			9.5		27.6	27.6	27.6	27.6	27.6	27.6
Actuated g/C Ratio		0.21			0.21		0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		196			244		240	2104	682	165	2104	529
v/s Ratio Prot								c0.33			0.25	
v/s Ratio Perm		c0.13			0.05		0.07		0.01	0.16		0.05
v/c Ratio		0.63			0.23		0.11	0.53	0.02	0.25	0.41	0.09
Uniform Delay, d1		16.2			14.8		3.6	5.0	3.4	4.0	4.5	3.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		6.5			0.5		0.2	0.3	0.0	0.8	0.1	0.1
Delay (s)		22.7			15.2		3.8	5.3	3.5	4.8	4.6	3.7
Level of Service		C			B		A	A	A	A	A	A
Approach Delay (s)		22.7			15.2			5.2			4.6	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	45.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	55	15	5	10	65	525	25	30	1250	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.90			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		906			1504		960	3282	1009	1203	3438	1346
Flt Permitted		0.93			0.89		0.17	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)		849			1378		174	3282	1009	551	3438	1346
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	5	60	16	5	11	71	577	27	33	1374	44
RTOR Reduction (vph)	0	54	0	0	10	0	0	0	7	0	0	11
Lane Group Flow (vph)	0	27	0	0	22	0	71	577	20	33	1374	33
Heavy Vehicles (%)	45%	100%	97%	20%	15%	15%	88%	10%	60%	50%	5%	20%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.5			6.5		45.7	45.7	45.7	45.7	45.7	45.7
Effective Green, g (s)		6.5			6.5		45.7	45.7	45.7	45.7	45.7	45.7
Actuated g/C Ratio		0.11			0.11		0.76	0.76	0.76	0.76	0.76	0.76
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		92			149		132	2491	766	418	2610	1022
v/s Ratio Prot								0.18			0.40	
v/s Ratio Perm		c0.03			0.02		c0.41		0.02	0.06		0.02
v/c Ratio		0.30			0.15		0.54	0.23	0.03	0.08	0.53	0.03
Uniform Delay, d1		24.7			24.3		3.0	2.1	1.8	1.9	2.9	1.8
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.8			0.5		4.2	0.0	0.0	0.1	0.2	0.0
Delay (s)		26.6			24.8		7.1	2.2	1.8	1.9	3.1	1.8
Level of Service		C			C		A	A	A	A	A	A
Approach Delay (s)		26.6			24.8			2.7			3.0	
Approach LOS		C			C			A			A	

Intersection Summary			
HCM Average Control Delay	4.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	60.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	80	20	5	15	75	525	15	10	530	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.90			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1011			1420		1056	3139	1154	1337	3139	1077
Flt Permitted		0.91			0.84		0.44	1.00	1.00	0.44	1.00	1.00
Satd. Flow (perm)		930			1225		484	3139	1154	615	3139	1077
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	5	87	22	5	16	82	571	16	11	576	16
RTOR Reduction (vph)	0	74	0	0	14	0	0	0	6	0	0	6
Lane Group Flow (vph)	0	45	0	0	29	0	82	571	10	11	576	10
Heavy Vehicles (%)	35%	60%	78%	35%	20%	10%	71%	15%	40%	35%	15%	50%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		4.8			4.8		19.1	19.1	19.1	19.1	19.1	19.1
Effective Green, g (s)		4.8			4.8		19.1	19.1	19.1	19.1	19.1	19.1
Actuated g/C Ratio		0.15			0.15		0.60	0.60	0.60	0.60	0.60	0.60
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		140			184		290	1879	691	368	1879	645
v/s Ratio Prot								0.18			c0.18	
v/s Ratio Perm		c0.05			0.02		0.17		0.01	0.02		0.01
v/c Ratio		0.32			0.16		0.28	0.30	0.01	0.03	0.31	0.01
Uniform Delay, d1		12.1			11.8		3.1	3.1	2.6	2.6	3.1	2.6
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.3			0.4		0.5	0.1	0.0	0.0	0.1	0.0
Delay (s)		13.4			12.2		3.6	3.2	2.6	2.6	3.2	2.6
Level of Service		B			B		A	A	A	A	A	A
Approach Delay (s)		13.4			12.2			3.3			3.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	4.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	31.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	10	70	30	5	55	75	975	25	35	745	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.92			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1086			1311		986	3438	1114	1203	3438	1114
Flt Permitted		0.85			0.89		0.35	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)		941			1192		368	3438	1114	324	3438	1114
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	11	74	32	5	58	79	1026	26	37	784	16
RTOR Reduction (vph)	0	62	0	0	29	0	0	0	10	0	0	6
Lane Group Flow (vph)	0	65	0	0	66	0	79	1026	16	37	784	10
Heavy Vehicles (%)	20%	35%	84%	55%	0%	20%	83%	5%	45%	50%	5%	45%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		5.5			5.5		21.0	21.0	21.0	21.0	21.0	21.0
Effective Green, g (s)		5.5			5.5		21.0	21.0	21.0	21.0	21.0	21.0
Actuated g/C Ratio		0.16			0.16		0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		150			190		224	2093	678	197	2093	678
v/s Ratio Prot								c0.30			0.23	
v/s Ratio Perm		c0.07			0.06		0.21		0.01	0.11		0.01
v/c Ratio		0.43			0.35		0.35	0.49	0.02	0.19	0.37	0.01
Uniform Delay, d1		13.1			12.9		3.4	3.8	2.7	3.0	3.4	2.7
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		2.0			1.1		1.0	0.2	0.0	0.5	0.1	0.0
Delay (s)		15.1			14.0		4.3	3.9	2.7	3.4	3.5	2.7
Level of Service		B			B		A	A	A	A	A	A
Approach Delay (s)		15.1			14.0			3.9			3.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	4.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	34.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	5	60	15	5	10	70	570	25	35	1365	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.90			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		901			1504		960	3282	1009	1203	3438	1346
Flt Permitted		0.94			0.83		0.14	1.00	1.00	0.41	1.00	1.00
Satd. Flow (perm)		851			1285		138	3282	1009	525	3438	1346
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	16	5	66	16	5	11	77	626	27	38	1500	49
RTOR Reduction (vph)	0	19	0	0	10	0	0	0	8	0	0	14
Lane Group Flow (vph)	0	68	0	0	22	0	77	626	19	38	1500	35
Heavy Vehicles (%)	45%	100%	97%	20%	15%	15%	88%	10%	60%	50%	5%	20%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		6.7			6.7		35.0	35.0	35.0	35.0	35.0	35.0
Effective Green, g (s)		6.7			6.7		35.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio		0.13			0.13		0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		115			173		97	2311	711	370	2421	948
v/s Ratio Prot								0.19			0.44	
v/s Ratio Perm		c0.08			0.02		c0.56		0.02	0.07		0.03
v/c Ratio		0.59			0.13		0.79	0.27	0.03	0.10	0.62	0.04
Uniform Delay, d1		20.2			18.9		4.9	2.7	2.2	2.3	3.9	2.2
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		7.9			0.3		34.6	0.1	0.0	0.1	0.5	0.0
Delay (s)		28.1			19.3		39.6	2.8	2.2	2.5	4.3	2.2
Level of Service		C			B		D	A	A	A	A	A
Approach Delay (s)		28.1			19.3			6.6			4.2	
Approach LOS		C			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	49.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	85	20	5	15	80	570	15	10	580	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.90			0.95		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.99			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1007			1420		1056	3139	1154	1337	3139	1077
Flt Permitted		0.91			0.87		0.41	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)		929			1269		459	3139	1154	587	3139	1077
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	5	92	22	5	16	87	620	16	11	630	16
RTOR Reduction (vph)	0	79	0	0	14	0	0	0	6	0	0	6
Lane Group Flow (vph)	0	45	0	0	29	0	87	620	10	11	630	10
Heavy Vehicles (%)	35%	60%	78%	35%	20%	10%	71%	15%	40%	35%	15%	50%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		4.9			4.9		20.7	20.7	20.7	20.7	20.7	20.7
Effective Green, g (s)		4.9			4.9		20.7	20.7	20.7	20.7	20.7	20.7
Actuated g/C Ratio		0.15			0.15		0.62	0.62	0.62	0.62	0.62	0.62
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		135			185		283	1934	711	362	1934	664
v/s Ratio Prot								0.20			c0.20	
v/s Ratio Perm		c0.05			0.02		0.19		0.01	0.02		0.01
v/c Ratio		0.34			0.16		0.31	0.32	0.01	0.03	0.33	0.01
Uniform Delay, d1		12.9			12.5		3.1	3.1	2.5	2.5	3.1	2.5
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.5			0.4		0.6	0.1	0.0	0.0	0.1	0.0
Delay (s)		14.4			13.0		3.7	3.2	2.5	2.6	3.2	2.5
Level of Service		B			B		A	A	A	A	A	A
Approach Delay (s)		14.4			13.0			3.2			3.2	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	4.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	33.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
31: Glenoaks Blvd & Peoria Street

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	10	75	35	5	60	80	1065	25	40	810	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor		1.00			1.00		1.00	0.95	1.00	1.00	0.95	1.00
Frt		0.92			0.92		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected		0.98			0.98		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)		1089			1306		986	3438	1114	1203	3438	1114
Flt Permitted		0.89			0.89		0.32	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)		986			1176		331	3438	1114	284	3438	1114
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	11	79	37	5	63	84	1121	26	42	853	16
RTOR Reduction (vph)	0	66	0	0	53	0	0	0	9	0	0	5
Lane Group Flow (vph)	0	71	0	0	52	0	84	1121	17	42	853	11
Heavy Vehicles (%)	20%	35%	84%	55%	0%	20%	83%	5%	45%	50%	5%	45%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		6
Actuated Green, G (s)		7.4			7.4		29.7	29.7	29.7	29.7	29.7	29.7
Effective Green, g (s)		7.4			7.4		29.7	29.7	29.7	29.7	29.7	29.7
Actuated g/C Ratio		0.16			0.16		0.66	0.66	0.66	0.66	0.66	0.66
Clearance Time (s)		4.0			4.0		4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)		3.0			3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)		162			193		218	2264	734	187	2264	734
v/s Ratio Prot								c0.33			0.25	
v/s Ratio Perm		c0.07			0.04		0.25		0.02	0.15		0.01
v/c Ratio		0.44			0.27		0.39	0.50	0.02	0.22	0.38	0.01
Uniform Delay, d1		17.0			16.5		3.5	3.9	2.7	3.1	3.5	2.7
Progression Factor		1.00			1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2		1.9			0.8		1.1	0.2	0.0	0.6	0.1	0.0
Delay (s)		18.9			17.3		4.7	4.1	2.7	3.7	3.6	2.7
Level of Service		B			B		A	A	A	A	A	A
Approach Delay (s)		18.9			17.3			4.1			3.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	5.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	45.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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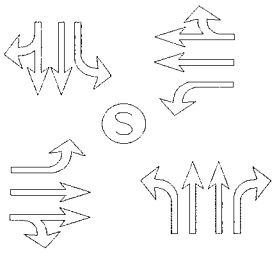
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	115	25%		115	10	125
EB THRU	470	5%		470	40	510
EB RIGHT	45	15%		45	5	50
WB LEFT	30	5%		30	5	35
WB THRU	565	5%		565	50	615
WB RIGHT	75	10%		75	5	80
GLEN OAKS BLVD						
NB LEFT	95	15%		95	10	105
NB THRU	395	20%	**50**	445	40	485
NB RIGHT	20	20%		20	0	20
SB LEFT	90	5%		90	10	100
SB THRU	1015	9%	**50**	1065	95	1160
SB RIGHT	125	40%		125	10	135
TOTALS	**3040**		**100**	**3140**	**280**	**3420**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	115	48%	**50**	165	15	180
EB THRU	470	5%		470	40	510
EB RIGHT	45	15%		45	5	50
WB LEFT	30	5%		30	5	35
WB THRU	565	5%		565	50	615
WB RIGHT	75	10%		75	5	80
GLEN OAKS BLVD						
NB LEFT	95	15%		95	10	105
NB THRU	395	10%		395	35	430
NB RIGHT	20	20%		20	5	25
SB LEFT	90	5%		90	10	100
SB THRU	1015	5%		1015	90	1105
SB RIGHT	125	57%	**50**	175	15	190
TOTALS	**3040**		**100**	**3140**	**285**	**3425**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	25-Jun-12	VV.110264.0000	3 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	110	45%		110	10	120
EB THRU	390	5%		390	35	425
EB RIGHT	60	15%		60	5	65
WB LEFT	25	5%		25	5	30
WB THRU	425	5%		425	40	465
WB RIGHT	45	10%		45	5	50
GLEN OAKS BLVD						
NB LEFT	110	15%		110	10	120
NB THRU	435	19%	**50**	485	45	530
NB RIGHT	30	5%		30	5	35
SB LEFT	90	10%		90	10	100
SB THRU	355	25%	**50**	405	35	440
SB RIGHT	100	45%		100	10	110
TOTALS	**2175**		**100**	**2275**	**215**	**2490**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

TUXFORD STREET

EB LEFT	110	62%	**50**	160	15	175
EB THRU	390	5%		390	35	425
EB RIGHT	60	15%		60	5	65
WB LEFT	25	5%		25	5	30
WB THRU	425	5%		425	40	465
WB RIGHT	45	10%		45	5	50

GLEN OAKS BLVD

NB LEFT	110	15%		110	10	120
NB THRU	435	10%		435	40	475
NB RIGHT	30	5%		30	5	35
SB LEFT	90	10%		90	10	100
SB THRU	355	15%		355	30	385
SB RIGHT	100	63%	**50**	150	15	165
TOTALS	**2175**		**100**	**2275**	**215**	**2490**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	25-Jun-12	VV.110264.0000	5 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	140	25%		140	15	155
EB THRU	505	5%		505	45	550
EB RIGHT	95	10%		95	10	105
WB LEFT	60	5%		60	5	65
WB THRU	345	5%		345	30	375
WB RIGHT	80	5%		80	5	85
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	800	15%	**50**	850	75	925
NB RIGHT	60	5%		60	5	65
SB LEFT	130	5%		130	10	140
SB THRU	590	12%	**50**	640	60	700
SB RIGHT	90	10%		90	10	100
TOTALS	**3015**		**100**	**3115**	**280**	**3395**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	140	45%	**50**	190	15	205
EB THRU	505	5%		505	45	550
EB RIGHT	95	10%		95	10	105
WB LEFT	60	5%		60	5	65
WB THRU	345	5%		345	30	375
WB RIGHT	80	5%		80	5	85
GLEN OAKS BLVD						
NB LEFT	120	10%		120	10	130
NB THRU	800	10%		800	70	870
NB RIGHT	60	5%		60	5	65
SB LEFT	130	5%		130	10	140
SB THRU	590	5%		590	55	645
SB RIGHT	90	42%	**50**	140	15	155
TOTALS	**3015**		**100**	**3115**	**275**	**3390**

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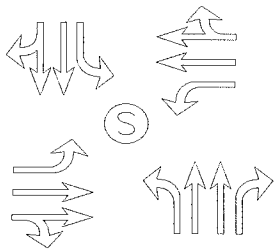
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

TUXFORD STREET

EB LEFT	88	29	87	175	**0**	175	15	190
EB THRU	448	21	63	510	**0**	510	45	555
EB RIGHT	37	6	18	55	**0**	55	5	60
WB LEFT	28	1	3	30	**0**	30	5	35
WB THRU	540	25	75	615	**0**	615	55	670
WB RIGHT	67	8	24	90	**0**	90	10	100

GLEN OAKS BLVD

NB LEFT	83	12	36	120	**0**	120	10	130
NB THRU	359	37	111	470	**150**	620	55	675
NB RIGHT	18	4	12	30	**0**	30	5	35
SB LEFT	83	5	15	100	**0**	100	10	110
SB THRU	963	52	156	1120	**150**	1270	115	1385
SB RIGHT	77	47	141	220	**0**	220	20	240
TOTALS	**2791**				**300**	**3835**	**350**	**4185**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	88	29	87	175	**150**	325	30	355
EB THRU	448	21	63	510	**0**	510	45	555
EB RIGHT	37	6	18	55	**0**	55	5	60
WB LEFT	28	1	3	30	**0**	30	5	35
WB THRU	540	25	75	615	**0**	615	55	670
WB RIGHT	67	8	24	90	**0**	90	10	100
GLEN OAKS BLVD								
NB LEFT	83	12	36	120	**0**	120	10	130
NB THRU	359	37	111	470	**0**	470	40	510
NB RIGHT	18	4	12	30	**0**	30	5	35
SB LEFT	83	5	15	100	**0**	100	10	110
SB THRU	963	52	156	1120	**0**	1120	100	1220
SB RIGHT	77	47	141	220	**150**	370	35	405
TOTALS	**2791**				**300**	**3835**	**350**	**4185**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	21-Sep-12	VV.110264.0000	3 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	61	47	141	200	**0**	200	20	220
EB THRU	364	27	81	445	**0**	445	40	485
EB RIGHT	51	10	30	80	**0**	80	5	85
WB LEFT	26	1	3	30	**0**	30	5	35
WB THRU	412	12	36	450	**0**	450	40	490
WB RIGHT	39	5	15	55	**0**	55	5	60
GLEN OAKS BLVD								
NB LEFT	91	17	51	140	**0**	140	15	155
NB THRU	390	47	141	530	**150**	680	60	740
NB RIGHT	27	1	3	30	**0**	30	5	35
SB LEFT	81	8	24	105	**0**	105	10	115
SB THRU	308	49	147	455	**150**	605	55	660
SB RIGHT	53	47	141	195	**0**	195	20	215
TOTALS	**1903**				**300**	**3015**	**280**	**3295**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	61	47	141	200	**150**	350	30	380
EB THRU	364	27	81	445	**0**	445	40	485
EB RIGHT	51	10	30	80	**0**	80	5	85
WB LEFT	26	1	3	30	**0**	30	5	35
WB THRU	412	12	36	450	**0**	450	40	490
WB RIGHT	39	5	15	55	**0**	55	5	60
GLEN OAKS BLVD								
NB LEFT	91	17	51	140	**0**	140	15	155
NB THRU	390	47	141	530	**0**	530	50	580
NB RIGHT	27	1	3	30	**0**	30	5	35
SB LEFT	81	8	24	105	**0**	105	10	115
SB THRU	308	49	147	455	**0**	455	40	495
SB RIGHT	53	47	141	195	**150**	345	30	375
TOTALS	**1903**				**300**	**3015**	**275**	**3290**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	25-Jun-12	VV.110264.0000	5 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
32
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	107	34	102	210	**0**	210	20	230
EB THRU	487	18	54	540	**0**	540	50	590
EB RIGHT	86	11	33	120	**0**	120	10	130
WB LEFT	56	2	6	60	**0**	60	5	65
WB THRU	332	14	42	375	**0**	375	35	410
WB RIGHT	77	5	15	90	**0**	90	10	100
GLEN OAKS BLVD								
NB LEFT	106	13	39	145	**0**	145	15	160
NB THRU	725	73	219	945	**150**	1095	100	1195
NB RIGHT	55	4	12	65	**0**	65	5	70
SB LEFT	122	7	21	145	**0**	145	15	160
SB THRU	561	28	84	645	**150**	795	70	865
SB RIGHT	80	9	27	105	**0**	105	10	115
TOTALS	**2794**				**300**	**3745**	**345**	**4090**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : TUXFORD STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 32
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	107	34	102	210	**150**	257	25	282
EB THRU	487	18	54	540	**0**	487	45	532
EB RIGHT	86	11	33	120	**0**	86	5	91
WB LEFT	56	2	6	60	**0**	56	5	61
WB THRU	332	14	42	375	**0**	332	30	362
WB RIGHT	77	5	15	90	**0**	77	5	82
GLEN OAKS BLVD								
NB LEFT	106	13	39	145	**0**	106	10	116
NB THRU	725	73	219	945	**0**	725	65	790
NB RIGHT	55	4	12	65	**0**	55	5	60
SB LEFT	122	7	21	145	**0**	122	10	132
SB THRU	561	28	84	645	**0**	561	50	611
SB RIGHT	80	9	27	105	**150**	230	20	250
TOTALS	**2794**				**300**	**3094**	**275**	**3369**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 1,227

	Rt	Thru	Lt
Total	124	1015	88
1st	22	239	19
2nd	26	266	23
3rd	47	274	23
4th	29	236	23

EAST LEG TOTAL: 669

	1st	2nd	3rd	4th	Total
Rt	19	26	12	18	75
Thru	123	119	155	168	565
Lt	2	3	9	15	29

WEST LEG TOTAL: 629

	Total	1st	2nd	3rd	4th
Lt	117	22	28	37	30
Thru	469	112	104	116	137
Rt	43	6	12	18	7

SOUTH LEG

TOTAL: 513

	Lt	Thru	Rt
1st	21	81	4
2nd	22	89	8
3rd	24	89	6
4th	28	137	4
Total	95	396	22

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.76
EAST LEG = 0.83
WEST LEG = 0.90

ALL LEGS = 0.91

HOUR TOTAL: 3,038

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 07:00AM-08:00AM DATE: 05-30-12

NORTH LEG

	Rt	Thru	Lt
Total	124	1015	88
1st	22	239	19
2nd	26	266	23
3rd	47	274	23
4th	29	236	23

	1st	2nd	3rd	4th	Total
Rt	19	26	12	18	75
Thru	123	119	155	168	565
Lt	2	3	9	15	29

	Total	1st	2nd	3rd	4th
Lt	117	22	28	37	30
Thru	469	112	104	116	137
Rt	43	6	12	18	7

	Lt	Thru	Rt
1st	21	81	4
2nd	22	89	8
3rd	24	89	6
4th	28	137	4
Total	95	396	22

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 08:00AM-09:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
111	689	70	Total
18	195	11	1st
37	188	21	2nd
25	158	18	3rd
31	148	20	4th

	1st	2nd	3rd	4th	Total
Rt	21	14	14	11	60
Thru	136	132	102	79	449
Lt	12	1	3	4	20

Total	1st	2nd	3rd	4th	
98	20	30	30	18	Lt
318	80	87	82	69	Thru
75	12	19	22	22	Rt

	Lt	Thru	Rt
1st	23	68	4
2nd	16	86	12
3rd	22	89	9
4th	18	75	6
Total	79	318	31

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : TUXFORD 05-30-12

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
13	223	17	2	11	2	2	4	0	5	1	0	280
5	252	22	4	7	1	6	3	0	11	4	0	315
38	262	21	4	7	2	2	4	0	3	1	0	344
21	226	23	3	5	0	2	2	0	3	3	0	288
11	180	10	3	7	1	2	4	0	2	4	0	224
18	185	19	4	2	1	5	0	1	10	1	0	246
18	148	18	0	5	0	3	5	0	4	0	0	201
14	133	15	3	7	2	6	5	2	8	3	1	199
138	1609	145	23	51	9	28	27	3	46	17	1	2097
						SOUTH LEG						
2	68	16	2	7	4	0	2	0	0	4	1	106
7	81	19	1	3	3	0	3	0	0	2	0	119
5	80	22	1	4	2	0	3	0	0	2	0	119
4	130	26	0	3	2	0	2	0	0	2	0	169
4	61	21	0	4	2	0	1	0	0	2	0	95
9	77	12	1	5	3	2	2	0	0	2	1	114
9	73	17	0	6	5	0	5	0	0	5	0	120
5	56	15	0	7	1	1	8	0	0	4	2	99
45	626	148	5	39	22	3	26	0	0	23	4	941
						EAST LEG						
15	113	1	3	5	0	0	3	0	1	2	1	144
24	114	3	2	4	0	0	0	0	0	1	0	148
10	149	9	1	4	0	0	1	0	1	1	0	176
18	164	15	0	4	0	0	0	0	0	0	0	201
20	125	11	1	10	0	0	1	0	0	0	1	169
9	122	1	3	6	0	1	3	0	1	1	0	147
12	96	3	1	3	0	1	2	0	0	1	0	119
8	72	4	3	5	0	0	1	0	0	1	0	94
116	955	47	14	41	0	2	11	0	3	7	2	1198
						WEST LEG						
6	108	10	0	4	2	0	0	7	0	0	3	140
9	99	23	2	5	1	1	0	4	0	0	0	144
16	108	31	2	7	1	0	1	2	0	0	3	171
6	133	24	1	3	0	0	1	3	0	0	3	174
10	77	9	2	2	2	0	1	4	0	0	5	112
18	84	17	1	2	6	0	1	5	0	0	2	136
21	78	19	1	2	3	0	1	4	0	1	4	134
18	62	7	3	6	4	1	1	5	0	0	2	109
104	749	140	12	31	19	2	6	34	0	1	22	1120

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 546

Rt	Thru	Lt	
100	357	89	Total
15	103	25	1st
32	86	27	2nd
29	91	26	3rd
24	77	11	4th

EAST LEG

EAST LEG TOTAL: 495

	1st	2nd	3rd	4th	Total
Rt	8	10	10	16	44
Thru	107	107	101	109	424
Lt	5	5	11	6	27

WEST LEG

Total	1st	2nd	3rd	4th	
108	24	24	31	29	Lt
391	91	92	86	122	Thru
61	16	21	10	14	Rt

WEST LEG TOTAL: 560

SOUTH LEG

	Lt	Thru	Rt
1st	41	118	10
2nd	23	91	5
3rd	26	137	7
4th	18	91	6
Total	108	437	28

TOTAL: 573

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.84
EAST LEG = 0.94
WEST LEG = 0.85

ALL LEGS = 0.96

HOUR TOTAL: 2,174

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 12:00PM-01:00PM DATE: 05-30-12

NORTH LEG

	Rt	Thru	Lt
Total	131	414	56
1st	44	108	13
2nd	23	97	14
3rd	36	104	15
4th	28	105	14

	1st	2nd	3rd	4th	Total
Rt	20	11	15	10	56
Thru	75	63	53	61	252
Lt	14	0	7	11	32

	Total	1st	2nd	3rd	4th
Lt	127	27	34	34	32
Thru	279	63	55	71	90
Rt	99	27	26	25	21

	Lt	Thru	Rt
1st	28	89	8
2nd	25	106	5
3rd	33	92	10
4th	22	98	7
Total	108	385	30

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 01:00PM-02:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
100	357	89	Total
15	103	25	1st
32	86	27	2nd
29	91	26	3rd
24	77	11	4th

	1st	2nd	3rd	4th	Total
Rt	8	10	10	16	44
Thru	107	107	101	109	424
Lt	5	5	11	6	27

Total	1st	2nd	3rd	4th	
108	24	24	31	29	Lt
391	91	92	86	122	Thru
61	16	21	10	14	Rt

	Lt	Thru	Rt
1st	41	118	10
2nd	23	91	5
3rd	26	137	7
4th	18	91	6
Total	108	437	28

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : TUXFORD 05-30-12

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
33	99	13	3	3	0	5	5	0	3	1	0	165
14	90	11	2	3	1	1	1	1	6	3	1	134
28	96	14	2	5	1	3	3	0	3	0	0	155
19	87	12	2	4	2	4	9	0	3	5	0	147
6	96	24	2	3	1	1	3	0	6	1	0	143
21	72	27	3	5	0	2	3	0	6	6	0	145
19	79	20	3	7	5	3	3	0	4	2	1	146
7	61	10	4	8	0	6	3	1	7	5	0	112
147	680	131	21	38	10	25	30	2	38	23	2	1147
						SOUTH LEG						
8	76	25	0	6	0	0	5	2	0	2	1	125
5	97	20	0	5	5	0	2	0	0	2	0	136
10	82	29	0	4	1	0	3	2	0	3	1	135
6	85	21	1	8	1	0	2	0	0	3	0	127
10	109	37	0	5	1	0	2	2	0	2	1	169
4	81	19	1	5	4	0	3	0	0	2	0	119
7	121	21	0	8	2	0	4	2	0	4	1	170
6	79	14	0	10	2	0	0	2	0	2	0	115
56	730	186	2	51	16	0	21	10	0	20	4	1096
						EAST LEG						
20	71	14	0	3	0	0	1	0	0	0	0	109
5	58	0	1	4	0	2	0	0	3	1	0	74
14	47	7	0	4	0	1	1	0	0	1	0	75
10	55	11	0	4	0	0	0	0	0	2	0	82
6	105	5	1	2	0	1	0	0	0	0	0	120
10	103	5	0	3	0	0	1	0	0	0	0	122
9	100	10	0	1	0	0	0	0	1	0	1	122
14	104	6	1	3	0	0	0	0	1	2	0	131
88	643	58	3	24	0	4	3	0	5	6	1	835
						WEST LEG						
26	61	9	1	2	4	0	0	7	0	0	7	117
23	53	25	3	2	5	0	0	2	0	0	2	115
23	67	21	0	3	3	2	1	5	0	0	5	130
19	85	22	2	3	3	0	0	3	0	2	4	143
11	88	16	4	3	0	0	0	6	1	0	2	131
19	82	11	2	6	4	0	3	6	0	1	3	137
8	77	18	1	7	4	0	1	5	1	1	4	127
13	117	16	1	5	5	0	0	5	0	0	3	165
142	630	138	14	31	28	2	5	39	2	4	30	1065

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 807

	Rt	Thru	Lt
Total	89	589	129
1st	26	120	33
2nd	37	164	44
3rd	17	159	34
4th	9	146	18

EAST LEG TOTAL: 486

	1st	2nd	3rd	4th	Total
Rt	36	19	11	16	82
Thru	85	66	105	90	346
Lt	35	7	6	10	58

WEST LEG TOTAL: 743

	Total	1st	2nd	3rd	4th
Lt	141	48	38	32	23
Thru	505	102	130	137	136
Rt	97	41	24	15	17

SOUTH LEG

TOTAL: 976

	Lt	Thru	Rt
1st	32	169	35
2nd	22	212	9
3rd	31	204	8
4th	34	213	7
Total	119	798	59

PEAK HOUR FACTORS

NORTH LEG = 0.82
SOUTH LEG = 0.96
EAST LEG = 0.78
WEST LEG = 0.97

ALL LEGS = 0.98

HOUR TOTAL: 3,012

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 04:00PM-05:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
96	431	144	Total
35	103	34	1st
17	100	26	2nd
18	108	51	3rd
26	120	33	4th

	1st	2nd	3rd	4th	Total
Rt	20	11	14	36	81
Thru	63	94	74	85	316
Lt	3	2	4	35	44

Total	1st	2nd	3rd	4th	
158	36	35	39	48	Lt
393	78	103	110	102	Thru
80	10	16	13	41	Rt

	Lt	Thru	Rt
1st	20	159	8
2nd	39	155	5
3rd	30	171	7
4th	32	169	35
Total	121	654	55

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: TUXFORD

TIME: 05:00PM-06:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
71	583	110	Total
37	164	44	1st
17	159	34	2nd
9	146	18	3rd
8	114	14	4th

	1st	2nd	3rd	4th	Total
Rt	19	11	16	11	57
Thru	66	105	90	69	330
Lt	7	6	10	8	31

Total	1st	2nd	3rd	4th	
105	38	32	23	12	Lt
504	130	137	136	101	Thru
71	24	15	17	15	Rt

	Lt	Thru	Rt
1st	22	212	9
2nd	31	204	8
3rd	34	213	7
4th	21	216	10
Total	108	845	34

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : TUXFORD 05-30-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
24	97	33	5	3	1	2	1	0	4	2	0	172
11	86	24	2	7	1	2	2	1	2	5	0	143
13	94	47	2	8	3	1	3	1	2	3	0	177
21	110	31	0	5	2	2	3	0	3	2	0	179
34	158	41	0	2	2	0	2	1	3	2	0	245
16	155	33	0	1	1	0	2	0	1	1	0	210
9	138	17	0	5	1	0	3	0	0	0	0	173
6	110	13	1	3	1	0	0	0	1	1	0	136
134	948	239	10	34	12	7	16	3	16	16	0	1435
						SOUTH LEG						
7	137	17	1	10	2	0	6	1	0	6	0	187
4	133	32	1	6	2	0	10	3	0	6	2	199
5	152	25	2	7	2	0	8	2	0	4	1	208
34	150	26	1	7	2	0	8	3	0	4	1	236
8	193	19	1	5	3	0	10	0	0	4	0	243
8	183	29	0	7	2	0	9	0	0	5	0	243
5	199	32	1	6	2	0	6	0	1	2	0	254
10	206	21	0	5	0	0	4	0	0	1	0	247
81	1353	201	7	53	15	0	61	9	1	32	4	1817
						EAST LEG						
17	58	0	2	3	1	0	2	2	1	0	0	86
11	85	2	0	7	0	0	2	0	0	0	0	107
12	66	3	0	7	1	1	1	0	1	0	0	92
33	80	35	0	4	0	3	1	0	0	0	0	156
18	61	6	0	4	1	1	1	0	0	0	0	92
10	102	5	0	2	1	0	1	0	1	0	0	122
16	89	10	0	0	0	0	0	0	0	1	0	116
7	66	8	2	2	0	1	1	0	1	0	0	88
124	607	69	4	29	4	6	9	2	4	1	0	859
						WEST LEG						
8	75	29	1	3	3	1	0	3	0	0	1	124
11	95	30	4	5	2	0	3	3	1	0	0	154
10	103	24	3	5	2	0	2	9	0	0	4	162
39	96	36	2	4	3	0	2	5	0	0	4	191
21	127	29	3	2	5	0	1	2	0	0	2	192
13	129	26	2	4	1	0	3	2	0	1	3	184
13	135	16	3	1	2	0	0	4	1	0	1	176
10	99	9	5	2	2	0	0	1	0	0	0	128
125	859	199	23	26	20	1	11	29	2	1	15	1311

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	470	45	30	565	75	95	395	20	90	1015	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3366		1719	3359		1570	3282	1346	1719	3263	
Flt Permitted	0.30	1.00		0.39	1.00		0.20	1.00	1.00	0.50	1.00	
Satd. Flow (perm)	510	3366		709	3359		332	3282	1346	904	3263	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	126	516	49	33	621	82	104	434	22	99	1115	137
RTOR Reduction (vph)	0	17	0	0	23	0	0	0	12	0	20	0
Lane Group Flow (vph)	126	548	0	33	680	0	104	434	10	99	1232	0
Heavy Vehicles (%)	25%	5%	15%	5%	5%	10%	15%	10%	20%	5%	5%	40%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	14.0	14.0		14.0	14.0		19.9	19.9	19.9	19.9	19.9	
Effective Green, g (s)	14.0	14.0		14.0	14.0		19.9	19.9	19.9	19.9	19.9	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.47	0.47	0.47	0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	170	1125		237	1122		158	1559	639	429	1550	
v/s Ratio Prot		0.16			0.20			0.13			c0.38	
v/s Ratio Perm	c0.25			0.05			0.31		0.01	0.11		
v/c Ratio	0.74	0.49		0.14	0.61		0.66	0.28	0.02	0.23	0.79	
Uniform Delay, d1	12.3	11.1		9.7	11.6		8.4	6.7	5.8	6.5	9.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	15.9	0.3		0.3	0.9		9.5	0.1	0.0	0.3	2.9	
Delay (s)	28.2	11.4		10.0	12.6		17.9	6.8	5.8	6.8	12.2	
Level of Service	C	B		B	B		B	A	A	A	B	
Approach Delay (s)		14.5			12.5			8.8			11.8	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.77		
Actuated Cycle Length (s)	41.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	390	60	25	425	45	110	435	30	90	355	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1411	3328		1719	3373		1570	3282	1538	1641	2871	
Flt Permitted	0.47	1.00		0.48	1.00		0.48	1.00	1.00	0.49	1.00	
Satd. Flow (perm)	703	3328		875	3373		794	3282	1538	847	2871	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	115	406	62	26	443	47	115	453	31	94	370	104
RTOR Reduction (vph)	0	32	0	0	21	0	0	0	20	0	66	0
Lane Group Flow (vph)	115	436	0	26	469	0	115	453	11	94	408	0
Heavy Vehicles (%)	45%	5%	15%	5%	5%	10%	15%	10%	5%	10%	15%	45%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.0	11.0		11.0	11.0		10.9	10.9	10.9	10.9	10.9	
Effective Green, g (s)	11.0	11.0		11.0	11.0		10.9	10.9	10.9	10.9	10.9	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.36	0.36	0.36	0.36	0.36	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	259	1224		322	1241		289	1196	561	309	1047	
v/s Ratio Prot		0.13			0.14			0.14			0.14	
v/s Ratio Perm	c0.16			0.03			c0.14		0.01	0.11		
v/c Ratio	0.44	0.36		0.08	0.38		0.40	0.38	0.02	0.30	0.39	
Uniform Delay, d1	7.1	6.9		6.2	6.9		7.1	7.0	6.1	6.8	7.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.2	0.2		0.1	0.2		0.9	0.2	0.0	0.6	0.2	
Delay (s)	8.4	7.1		6.3	7.1		8.0	7.2	6.1	7.3	7.3	
Level of Service	A	A		A	A		A	A	A	A	A	
Approach Delay (s)		7.3			7.1			7.3			7.3	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	29.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	505	95	60	345	80	120	800	60	130	590	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3331		1719	3341		1641	3282	1538	1719	3349	
Flt Permitted	0.50	1.00		0.37	1.00		0.36	1.00	1.00	0.29	1.00	
Satd. Flow (perm)	861	3331		676	3341		621	3282	1538	532	3349	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	515	97	61	352	82	122	816	61	133	602	92
RTOR Reduction (vph)	0	36	0	0	46	0	0	0	34	0	28	0
Lane Group Flow (vph)	143	576	0	61	388	0	122	816	27	133	666	0
Heavy Vehicles (%)	25%	5%	10%	5%	5%	5%	10%	10%	5%	5%	5%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.5	12.5		12.5	12.5		16.7	16.7	16.7	16.7	16.7	
Effective Green, g (s)	12.5	12.5		12.5	12.5		16.7	16.7	16.7	16.7	16.7	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.45	0.45	0.45	0.45	0.45	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	289	1119		227	1123		279	1473	690	239	1503	
v/s Ratio Prot		c0.17			0.12			0.25			0.20	
v/s Ratio Perm	0.17			0.09			0.20		0.02	c0.25		
v/c Ratio	0.49	0.51		0.27	0.35		0.44	0.55	0.04	0.56	0.44	
Uniform Delay, d1	9.8	9.9		9.0	9.3		7.0	7.5	5.8	7.5	7.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	0.4		0.6	0.2		1.1	0.5	0.0	2.8	0.2	
Delay (s)	11.2	10.3		9.7	9.5		8.1	8.0	5.8	10.3	7.3	
Level of Service	B	B		A	A		A	A	A	B	A	
Approach Delay (s)		10.5			9.5			7.9			7.8	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	37.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	470	45	30	565	75	95	445	20	90	1065	125
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3366		1719	3359		1570	3008	1346	1719	3165	
Flt Permitted	0.29	1.00		0.39	1.00		0.20	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	506	3366		706	3359		326	3008	1346	857	3165	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	126	516	49	33	621	82	104	489	22	99	1170	137
RTOR Reduction (vph)	0	17	0	0	23	0	0	0	11	0	19	0
Lane Group Flow (vph)	126	548	0	33	680	0	104	489	11	99	1288	0
Heavy Vehicles (%)	25%	5%	15%	5%	5%	10%	15%	20%	20%	5%	9%	40%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	14.1	14.1		14.1	14.1		20.3	20.3	20.3	20.3	20.3	
Effective Green, g (s)	14.1	14.1		14.1	14.1		20.3	20.3	20.3	20.3	20.3	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.48	0.48	0.48	0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	168	1119		235	1117		156	1440	644	410	1515	
v/s Ratio Prot		0.16			0.20			0.16			c0.41	
v/s Ratio Perm	c0.25			0.05			0.32		0.01	0.12		
v/c Ratio	0.75	0.49		0.14	0.61		0.67	0.34	0.02	0.24	0.85	
Uniform Delay, d1	12.6	11.3		9.9	11.8		8.5	6.9	5.8	6.5	9.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.0	0.3		0.3	0.9		10.3	0.1	0.0	0.3	4.7	
Delay (s)	29.6	11.6		10.2	12.8		18.7	7.0	5.8	6.8	14.4	
Level of Service	C	B		B	B		B	A	A	A	B	
Approach Delay (s)		14.9			12.7			9.0			13.9	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	12.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	42.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	390	60	25	425	45	110	485	30	90	405	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1411	3328		1719	3373		1570	3034	1538	1641	2716	
Flt Permitted	0.47	1.00		0.48	1.00		0.46	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	703	3328		875	3373		755	3034	1538	806	2716	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	115	406	62	26	443	47	115	505	31	94	422	104
RTOR Reduction (vph)	0	33	0	0	21	0	0	0	19	0	56	0
Lane Group Flow (vph)	115	435	0	26	469	0	115	505	12	94	470	0
Heavy Vehicles (%)	45%	5%	15%	5%	5%	10%	15%	19%	5%	10%	25%	45%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.1	11.1		11.1	11.1		11.6	11.6	11.6	11.6	11.6	
Effective Green, g (s)	11.1	11.1		11.1	11.1		11.6	11.6	11.6	11.6	11.6	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.38	0.38	0.38	0.38	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	254	1203		316	1220		285	1146	581	305	1026	
v/s Ratio Prot		0.13			0.14			0.17			c0.17	
v/s Ratio Perm	c0.16			0.03			0.15		0.01	0.12		
v/c Ratio	0.45	0.36		0.08	0.38		0.40	0.44	0.02	0.31	0.46	
Uniform Delay, d1	7.5	7.2		6.4	7.3		7.0	7.1	6.0	6.7	7.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.3	0.2		0.1	0.2		0.9	0.3	0.0	0.6	0.3	
Delay (s)	8.8	7.4		6.6	7.5		7.9	7.4	6.0	7.3	7.5	
Level of Service	A	A		A	A		A	A	A	A	A	
Approach Delay (s)		7.7			7.4			7.4			7.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	30.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	140	505	95	60	345	80	120	850	60	130	640	90
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3331		1719	3341		1641	3139	1538	1719	3171	
Flt Permitted	0.50	1.00		0.37	1.00		0.33	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	861	3331		670	3341		573	3139	1538	489	3171	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	515	97	61	352	82	122	867	61	133	653	92
RTOR Reduction (vph)	0	36	0	0	47	0	0	0	33	0	25	0
Lane Group Flow (vph)	143	576	0	61	387	0	122	867	28	133	720	0
Heavy Vehicles (%)	25%	5%	10%	5%	5%	5%	10%	15%	5%	5%	12%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.6	12.6		12.6	12.6		17.2	17.2	17.2	17.2	17.2	
Effective Green, g (s)	12.6	12.6		12.6	12.6		17.2	17.2	17.2	17.2	17.2	
Actuated g/C Ratio	0.33	0.33		0.33	0.33		0.46	0.46	0.46	0.46	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	287	1110		223	1114		261	1428	700	223	1443	
v/s Ratio Prot		c0.17			0.12			c0.28			0.23	
v/s Ratio Perm	0.17			0.09			0.21		0.02	0.27		
v/c Ratio	0.50	0.52		0.27	0.35		0.47	0.61	0.04	0.60	0.50	
Uniform Delay, d1	10.1	10.2		9.2	9.5		7.1	7.8	5.7	7.7	7.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.4	0.4		0.7	0.2		1.3	0.7	0.0	4.2	0.3	
Delay (s)	11.4	10.6		9.9	9.7		8.5	8.5	5.7	11.9	7.5	
Level of Service	B	B		A	A		A	A	A	B	A	
Approach Delay (s)		10.7			9.7			8.3			8.2	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	37.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	510	50	35	615	80	105	485	20	100	1160	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3363		1719	3360		1570	3282	1346	1719	3271	
Flt Permitted	0.27	1.00		0.35	1.00		0.19	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	459	3363		639	3360		315	3282	1346	812	3271	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	137	560	55	38	676	88	115	533	22	110	1275	148
RTOR Reduction (vph)	0	16	0	0	23	0	0	0	12	0	19	0
Lane Group Flow (vph)	137	599	0	38	741	0	115	533	11	110	1404	0
Heavy Vehicles (%)	25%	5%	15%	5%	5%	10%	15%	10%	20%	5%	5%	40%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	15.0	15.0		15.0	15.0		21.0	21.0	21.0	21.0	21.0	
Effective Green, g (s)	15.0	15.0		15.0	15.0		21.0	21.0	21.0	21.0	21.0	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.48	0.48	0.48	0.48	0.48	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	156	1146		218	1145		150	1566	642	388	1561	
v/s Ratio Prot		0.18			0.22			0.16			c0.43	
v/s Ratio Perm	c0.30			0.06			0.37		0.01	0.14		
v/c Ratio	0.88	0.52		0.17	0.65		0.77	0.34	0.02	0.28	0.90	
Uniform Delay, d1	13.6	11.6		10.2	12.3		9.5	7.2	6.1	7.0	10.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	38.6	0.4		0.4	1.3		20.6	0.1	0.0	0.4	7.3	
Delay (s)	52.3	12.1		10.5	13.5		30.1	7.3	6.1	7.4	17.8	
Level of Service	D	B		B	B		C	A	A	A	B	
Approach Delay (s)		19.4			13.4			11.2			17.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	425	65	25	465	50	120	530	35	100	440	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1411	3327		1719	3372		1570	3282	1538	1641	2893	
Flt Permitted	0.45	1.00		0.46	1.00		0.44	1.00	1.00	0.45	1.00	
Satd. Flow (perm)	672	3327		839	3372		721	3282	1538	770	2893	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	125	443	68	26	484	52	125	552	36	104	458	115
RTOR Reduction (vph)	0	32	0	0	21	0	0	0	22	0	57	0
Lane Group Flow (vph)	125	479	0	26	515	0	125	552	14	104	516	0
Heavy Vehicles (%)	45%	5%	15%	5%	5%	10%	15%	10%	5%	10%	15%	45%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	11.7	11.7		11.7	11.7		12.1	12.1	12.1	12.1	12.1	
Effective Green, g (s)	11.7	11.7		11.7	11.7		12.1	12.1	12.1	12.1	12.1	
Actuated g/C Ratio	0.37	0.37		0.37	0.37		0.38	0.38	0.38	0.38	0.38	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	247	1224		309	1241		274	1249	585	293	1101	
v/s Ratio Prot		0.14			0.15			0.17			c0.18	
v/s Ratio Perm	c0.19			0.03			0.17		0.01	0.14		
v/c Ratio	0.51	0.39		0.08	0.41		0.46	0.44	0.02	0.35	0.47	
Uniform Delay, d1	7.8	7.4		6.6	7.5		7.4	7.3	6.2	7.1	7.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.6	0.2		0.1	0.2		1.2	0.3	0.0	0.7	0.3	
Delay (s)	9.4	7.6		6.7	7.7		8.6	7.6	6.2	7.8	7.7	
Level of Service	A	A		A	A		A	A	A	A	A	
Approach Delay (s)		8.0			7.7			7.7			7.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	31.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	550	105	65	375	85	130	925	65	140	700	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1637	3330		1719	3343		1641	3282	1538	1719	3354	
Flt Permitted	0.48	1.00		0.33	1.00		0.29	1.00	1.00	0.23	1.00	
Satd. Flow (perm)	820	3330		594	3343		505	3282	1538	422	3354	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	158	561	107	66	383	87	133	944	66	143	714	102
RTOR Reduction (vph)	0	36	0	0	45	0	0	0	36	0	25	0
Lane Group Flow (vph)	158	632	0	66	425	0	133	944	30	143	791	0
Heavy Vehicles (%)	25%	5%	10%	5%	5%	5%	10%	10%	5%	5%	5%	10%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	13.5	13.5		13.5	13.5		18.2	18.2	18.2	18.2	18.2	
Effective Green, g (s)	13.5	13.5		13.5	13.5		18.2	18.2	18.2	18.2	18.2	
Actuated g/C Ratio	0.34	0.34		0.34	0.34		0.46	0.46	0.46	0.46	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	279	1132		202	1137		232	1505	705	193	1538	
v/s Ratio Prot		0.19			0.13			0.29			0.24	
v/s Ratio Perm	c0.19			0.11			0.26		0.02	c0.34		
v/c Ratio	0.57	0.56		0.33	0.37		0.57	0.63	0.04	0.74	0.51	
Uniform Delay, d1	10.7	10.7		9.7	9.9		7.9	8.2	5.9	8.8	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.6	0.6		0.9	0.2		3.4	0.8	0.0	14.2	0.3	
Delay (s)	13.3	11.3		10.7	10.1		11.3	9.0	6.0	23.0	7.9	
Level of Service	B	B		B	B		B	A	A	C	A	
Approach Delay (s)		11.7			10.2			9.1			10.2	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	39.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	470	45	30	565	75	95	395	20	90	1015	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1382	3366		1719	3359		1570	3282	1346	1719	3134	
Flt Permitted	0.31	1.00		0.40	1.00		0.18	1.00	1.00	0.50	1.00	
Satd. Flow (perm)	454	3366		719	3359		300	3282	1346	901	3134	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	181	516	49	33	621	82	104	434	22	99	1115	192
RTOR Reduction (vph)	0	14	0	0	20	0	0	0	12	0	28	0
Lane Group Flow (vph)	181	551	0	33	683	0	104	434	10	99	1279	0
Heavy Vehicles (%)	48%	5%	15%	5%	5%	10%	15%	10%	20%	5%	5%	57%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	20.0	20.0		20.0	20.0		22.0	22.0	22.0	22.0	22.0	
Effective Green, g (s)	20.0	20.0		20.0	20.0		22.0	22.0	22.0	22.0	22.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.44	0.44	0.44	0.44	0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	182	1346		288	1344		132	1444	592	396	1379	
v/s Ratio Prot		0.16			0.20			0.13			c0.41	
v/s Ratio Perm	c0.40			0.05			0.35		0.01	0.11		
v/c Ratio	0.99	0.41		0.11	0.51		0.79	0.30	0.02	0.25	0.93	
Uniform Delay, d1	14.9	10.8		9.4	11.3		12.0	9.0	7.9	8.8	13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	64.8	0.2		0.2	0.3		26.0	0.1	0.0	0.3	10.9	
Delay (s)	79.7	11.0		9.6	11.6		38.0	9.2	7.9	9.1	24.2	
Level of Service	E	B		A	B		D	A	A	A	C	
Approach Delay (s)		27.6			11.5			14.5			23.1	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	390	60	25	425	45	110	435	30	90	355	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1263	3328		1719	3373		1570	3282	1538	1641	2669	
Flt Permitted	0.47	1.00		0.48	1.00		0.46	1.00	1.00	0.49	1.00	
Satd. Flow (perm)	629	3328		875	3373		755	3282	1538	847	2669	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	167	406	62	26	443	47	115	453	31	94	370	156
RTOR Reduction (vph)	0	31	0	0	20	0	0	0	20	0	101	0
Lane Group Flow (vph)	167	437	0	26	470	0	115	453	11	94	425	0
Heavy Vehicles (%)	62%	5%	15%	5%	5%	10%	15%	10%	5%	10%	15%	63%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	12.9	12.9		12.9	12.9		11.3	11.3	11.3	11.3	11.3	
Effective Green, g (s)	12.9	12.9		12.9	12.9		11.3	11.3	11.3	11.3	11.3	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.35	0.35	0.35	0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	252	1333		351	1351		265	1152	540	297	937	
v/s Ratio Prot		0.13			0.14			0.14			c0.16	
v/s Ratio Perm	c0.27			0.03			0.15		0.01	0.11		
v/c Ratio	0.66	0.33		0.07	0.35		0.43	0.39	0.02	0.32	0.45	
Uniform Delay, d1	7.9	6.7		6.0	6.7		8.0	7.9	6.8	7.6	8.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	6.4	0.1		0.1	0.2		1.1	0.2	0.0	0.6	0.3	
Delay (s)	14.3	6.8		6.1	6.9		9.1	8.1	6.8	8.2	8.4	
Level of Service	B	A		A	A		A	A	A	A	A	
Approach Delay (s)		8.8			6.8			8.2			8.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	32.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	505	95	60	345	80	120	800	60	130	590	140
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1411	3331		1719	3341		1641	3282	1538	1719	3128	
Flt Permitted	0.50	1.00		0.38	1.00		0.32	1.00	1.00	0.28	1.00	
Satd. Flow (perm)	742	3331		682	3341		556	3282	1538	515	3128	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	194	515	97	61	352	82	122	816	61	133	602	143
RTOR Reduction (vph)	0	35	0	0	45	0	0	0	34	0	49	0
Lane Group Flow (vph)	194	577	0	61	389	0	122	816	27	133	696	0
Heavy Vehicles (%)	45%	5%	10%	5%	5%	5%	10%	10%	5%	5%	5%	42%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	14.1	14.1		14.1	14.1		17.0	17.0	17.0	17.0	17.0	
Effective Green, g (s)	14.1	14.1		14.1	14.1		17.0	17.0	17.0	17.0	17.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.43	0.43	0.43	0.43	0.43	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	268	1201		246	1205		242	1427	669	224	1360	
v/s Ratio Prot		0.17			0.12			0.25			0.22	
v/s Ratio Perm	c0.26			0.09			0.22		0.02	c0.26		
v/c Ratio	0.72	0.48		0.25	0.32		0.50	0.57	0.04	0.59	0.51	
Uniform Delay, d1	10.8	9.7		8.8	9.0		8.0	8.3	6.4	8.4	8.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	9.3	0.3		0.5	0.2		1.7	0.6	0.0	4.2	0.3	
Delay (s)	20.1	10.0		9.3	9.2		9.7	8.9	6.4	12.6	8.4	
Level of Service	C	A		A	A		A	A	A	B	A	
Approach Delay (s)		12.4			9.2			8.8			9.0	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	510	50	35	615	80	105	430	20	100	1105	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1382	3363		1719	3360		1570	3282	1346	1719	3134	
Flt Permitted	0.30	1.00		0.38	1.00		0.22	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	430	3363		690	3360		367	3282	1346	854	3134	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	198	560	55	38	676	88	115	473	22	110	1214	209
RTOR Reduction (vph)	0	10	0	0	23	0	0	0	13	0	31	0
Lane Group Flow (vph)	198	605	0	38	741	0	115	473	9	110	1392	0
Heavy Vehicles (%)	48%	5%	15%	5%	5%	10%	15%	10%	20%	5%	5%	57%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	19.0	19.0		19.0	19.0		18.0	18.0	18.0	18.0	18.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0		18.0	18.0	18.0	18.0	18.0	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	182	1420		291	1419		147	1313	538	342	1254	
v/s Ratio Prot		0.18			0.22			0.14			c0.44	
v/s Ratio Perm	c0.46			0.06			0.31		0.01	0.13		
v/c Ratio	1.09	0.43		0.13	0.52		0.78	0.36	0.02	0.32	1.11	
Uniform Delay, d1	13.0	9.2		7.9	9.6		11.8	9.5	8.2	9.3	13.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	92.1	0.2		0.2	0.3		23.2	0.2	0.0	0.5	61.2	
Delay (s)	105.1	9.4		8.2	10.0		35.0	9.6	8.2	9.8	74.7	
Level of Service	F	A		A	A		C	A	A	A	E	
Approach Delay (s)		32.7			9.9			14.4			70.0	
Approach LOS		C			A			B			E	

Intersection Summary			
HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	425	65	25	465	50	120	475	35	100	385	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.99		1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1263	3327		1719	3372		1570	3282	1538	1641	2664	
Flt Permitted	0.45	1.00		0.46	1.00		0.42	1.00	1.00	0.47	1.00	
Satd. Flow (perm)	601	3327		839	3372		691	3282	1538	813	2664	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	182	443	68	26	484	52	125	495	36	104	401	172
RTOR Reduction (vph)	0	30	0	0	20	0	0	0	23	0	111	0
Lane Group Flow (vph)	182	481	0	26	516	0	125	495	13	104	462	0
Heavy Vehicles (%)	62%	5%	15%	5%	5%	10%	15%	10%	5%	10%	15%	63%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	14.4	14.4		14.4	14.4		12.2	12.2	12.2	12.2	12.2	
Effective Green, g (s)	14.4	14.4		14.4	14.4		12.2	12.2	12.2	12.2	12.2	
Actuated g/C Ratio	0.42	0.42		0.42	0.42		0.35	0.35	0.35	0.35	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	250	1385		349	1403		244	1157	542	287	939	
v/s Ratio Prot		0.14			0.15			0.15			0.17	
v/s Ratio Perm	c0.30			0.03			c0.18		0.01	0.13		
v/c Ratio	0.73	0.35		0.07	0.37		0.51	0.43	0.02	0.36	0.49	
Uniform Delay, d1	8.5	6.9		6.1	7.0		8.8	8.5	7.3	8.3	8.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.1	0.2		0.1	0.2		1.8	0.3	0.0	0.8	0.4	
Delay (s)	18.6	7.0		6.2	7.1		10.7	8.8	7.3	9.1	9.2	
Level of Service	B	A		A	A		B	A	A	A	A	
Approach Delay (s)		10.1			7.1			9.1			9.2	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	8.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	34.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
32: Glenoaks Blvd & Tuxford Street/Tuxford

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	550	105	65	375	85	130	870	65	140	645	155
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	16	12	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1411	3330		1719	3343		1641	3282	1538	1719	3125	
Flt Permitted	0.48	1.00		0.35	1.00		0.28	1.00	1.00	0.27	1.00	
Satd. Flow (perm)	717	3330		641	3343		476	3282	1538	486	3125	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	209	561	107	66	383	87	133	888	66	143	658	158
RTOR Reduction (vph)	0	41	0	0	35	0	0	0	39	0	52	0
Lane Group Flow (vph)	209	627	0	66	435	0	133	888	27	143	764	0
Heavy Vehicles (%)	45%	5%	10%	5%	5%	5%	10%	10%	5%	5%	5%	42%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)	14.2	14.2		14.2	14.2		14.9	14.9	14.9	14.9	14.9	
Effective Green, g (s)	14.2	14.2		14.2	14.2		14.9	14.9	14.9	14.9	14.9	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	274	1275		245	1280		191	1318	618	195	1255	
v/s Ratio Prot		0.19			0.13			0.27			0.24	
v/s Ratio Perm	c0.29			0.10			0.28		0.02	c0.29		
v/c Ratio	0.76	0.49		0.27	0.34		0.70	0.67	0.04	0.73	0.61	
Uniform Delay, d1	10.0	8.7		7.9	8.1		9.2	9.1	6.8	9.4	8.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	11.9	0.3		0.6	0.2		10.5	1.4	0.0	13.3	0.8	
Delay (s)	21.8	9.0		8.5	8.3		19.7	10.5	6.8	22.7	9.6	
Level of Service	C	A		A	A		B	B	A	C	A	
Approach Delay (s)		12.1			8.3			11.4			11.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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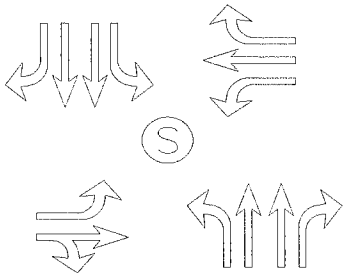
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
33
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PENROSE STREET						
EB LEFT	120	5%		120	10	130
EB THRU	125	5%		125	10	135
EB RIGHT	20	25%		20	5	25
WB LEFT	5	0%		5	5	10
WB THRU	70	5%		70	5	75
WB RIGHT	35	10%		35	5	40
GLEN OAKS BLVD						
NB LEFT	25	0%		25	5	30
NB THRU	365	21%	**50**	415	35	450
NB RIGHT	5	0%		5	5	10
SB LEFT	35	15%		35	5	40
SB THRU	920	10%	**50**	970	85	1055
SB RIGHT	95	5%		95	10	105
TOTALS	**1820**		**100**	**1920**	**185**	**2105**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 33
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PENROSE STREET						
EB LEFT	90	10%		90	10	100
EB THRU	130	5%		130	10	140
EB RIGHT	50	5%		50	5	55
WB LEFT	20	10%		20	5	25
WB THRU	85	5%		85	5	90
WB RIGHT	35	5%		35	5	40
GLEN OAKS BLVD						
NB LEFT	45	0%		45	5	50
NB THRU	465	14%	**50**	515	45	560
NB RIGHT	25	5%		25	5	30
SB LEFT	25	10%		25	5	30
SB THRU	440	19%	**50**	490	45	535
SB RIGHT	35	10%		35	5	40
TOTALS	**1445**		**100**	**1545**	**150**	**1695**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
33
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
PENROSE STREET						
EB LEFT	185	5%		185	15	200
EB THRU	200	5%		200	20	220
EB RIGHT	55	10%		55	5	60
WB LEFT	45	5%		45	5	50
WB THRU	140	10%		140	15	155
WB RIGHT	75	5%		75	5	80
GLEN OAKS BLVD						
NB LEFT	75	0%		75	5	80
NB THRU	700	16%	**50**	750	70	820
NB RIGHT	40	0%		40	5	45
SB LEFT	45	0%		45	5	50
SB THRU	520	18%	**50**	570	50	620
SB RIGHT	110	5%		110	10	120
TOTALS	**2190**		**100**	**2290**	**210**	**2500**

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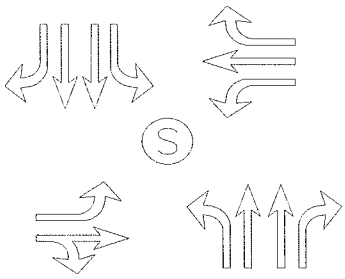
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 33
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PENROSE STREET								
EB LEFT	110	8	24	135	**0**	135	10	145
EB THRU	121	3	9	130	**0**	130	10	140
EB RIGHT	17	5	15	30	**0**	30	5	35
WB LEFT	2	0	0	5	**0**	5	5	10
WB THRU	68	3	9	75	**0**	75	5	80
WB RIGHT	31	4	12	45	**0**	45	5	50
GLEN OAKS BLVD								
NB LEFT	25	0	0	25	**0**	25	5	30
NB THRU	332	35	105	435	**150**	585	55	640
NB RIGHT	2	0	0	5	**0**	5	5	10
SB LEFT	32	5	15	45	**0**	45	5	50
SB THRU	871	47	141	1010	**150**	1160	105	1265
SB RIGHT	89	4	12	100	**0**	100	10	110
TOTALS	**1700**				**300**	**2340**	**225**	**2565**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 33
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PENROSE STREET								
EB LEFT	82	10	30	110	**0**	110	10	120
EB THRU	127	2	6	135	**0**	135	10	145
EB RIGHT	51	1	3	55	**0**	55	5	60
WB LEFT	20	2	6	25	**0**	25	5	30
WB THRU	83	2	6	90	**0**	90	10	100
WB RIGHT	36	1	3	40	**0**	40	5	45
GLEN OAKS BLVD								
NB LEFT	44	0	0	45	**0**	45	5	50
NB THRU	432	31	93	525	**150**	675	60	735
NB RIGHT	23	1	3	25	**0**	25	5	30
SB LEFT	23	3	9	30	**0**	30	5	35
SB THRU	406	35	105	510	**150**	660	60	720
SB RIGHT	29	4	12	40	**0**	40	5	45
TOTALS	**1356**				**300**	**1930**	**185**	**2115**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : PENROSE STREET
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 33
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
PENROSE STREET								
EB LEFT	175	12	36	210	**0**	210	20	230
EB THRU	190	8	24	215	**0**	215	20	235
EB RIGHT	52	5	15	65	**0**	65	5	70
WB LEFT	41	3	9	50	**0**	50	5	55
WB THRU	128	11	33	160	**0**	160	15	175
WB RIGHT	74	3	9	85	**0**	85	5	90
GLEN OAKS BLVD								
NB LEFT	75	0	0	75	**0**	75	5	80
NB THRU	646	54	162	810	**150**	960	85	1045
NB RIGHT	38	0	0	40	**0**	40	5	45
SB LEFT	47	0	0	45	**0**	45	5	50
SB THRU	457	62	186	645	**150**	795	70	865
SB RIGHT	106	3	9	115	**0**	115	10	125
TOTALS	**2029**				**300**	**2815**	**250**	**3065**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PENROE
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 1,048

Rt	Thru	Lt	
93	918	37	Total
18	250	4	1st
21	266	10	2nd
27	212	14	3rd
27	190	9	4th

EAST LEG

EAST LEG TOTAL: 108

	1st	2nd	3rd	4th	Total
Rt	8	6	12	9	35
Thru	12	14	19	26	71
Lt	0	0	0	2	2

WEST LEG

Total	1st	2nd	3rd	4th	
118	22	38	33	25	Lt
124	18	38	50	18	Thru
22	4	5	4	9	Rt

WEST LEG TOTAL: 264

SOUTH LEG

	Lt	Thru	Rt
1st	6	82	1
2nd	4	81	0
3rd	6	114	0
4th	9	90	1
Total	25	367	2

TOTAL: 394

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.82
EAST LEG = 0.73
WEST LEG = 0.76

ALL LEGS = 0.92

HOUR TOTAL: 1,814

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 07:00AM-08:00AM DATE: 05-30-12

NORTH LEG

	Rt	Thru	Lt
Total	81	947	34
1st	15	219	6
2nd	18	250	4
3rd	21	266	10
4th	27	212	14

	1st	2nd	3rd	4th	Total
Rt	6	8	6	12	32
Thru	10	12	14	19	55
Lt	0	0	0	0	0

	Total	1st	2nd	3rd	4th
Lt	112	19	22	38	33
Thru	117	11	18	38	50
Rt	18	5	4	5	4

	Lt	Thru	Rt
1st	5	80	0
2nd	6	82	1
3rd	4	81	0
4th	6	114	0
Total	21	357	1

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 08:00AM-09:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
86	635	35	Total
27	190	9	1st
22	158	6	2nd
21	140	10	3rd
16	147	10	4th

	1st	2nd	3rd	4th	Total
Rt	9	6	7	15	37
Thru	26	14	19	14	73
Lt	2	3	7	1	13

Total	1st	2nd	3rd	4th	
109	25	27	32	25	Lt
76	18	14	20	24	Thru
28	9	4	10	5	Rt

	Lt	Thru	Rt
1st	9	90	1
2nd	6	79	3
3rd	12	71	4
4th	7	61	2
Total	34	301	10

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PENROE 05-30-12

BEGINNING TIME : 07:00AM PH: 7:15AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
14	207	5	0	7	0	0	2	0	1	3	1	240
18	236	2	0	6	2	0	4	0	0	4	0	272
17	257	8	3	5	2	1	4	0	0	0	0	297
27	196	13	0	6	1	0	4	0	0	6	0	253
27	182	9	0	3	0	0	3	0	0	2	0	226
21	147	5	0	8	0	1	3	1	0	0	0	186
20	130	9	0	6	0	1	2	1	0	2	0	171
11	138	9	2	6	1	2	2	0	1	1	0	173
155	1493	60	5	47	6	5	24	2	2	18	1	1818
						SOUTH LEG						
0	74	5	0	4	0	0	0	0	0	2	0	85
1	72	6	0	6	0	0	3	0	0	1	0	89
0	74	4	0	5	0	0	0	0	0	2	0	85
0	107	6	0	3	0	0	3	0	0	1	0	120
1	79	9	0	3	0	0	5	0	0	3	0	100
3	74	6	0	2	0	0	2	0	0	1	0	88
4	60	12	0	5	0	0	1	0	0	5	0	87
1	50	7	0	4	0	0	4	0	1	3	0	70
10	590	55	0	32	0	0	18	0	1	18	0	724
						EAST LEG						
6	10	0	0	0	0	0	0	0	0	0	0	16
8	12	0	0	0	0	0	0	0	0	0	0	20
2	12	0	3	2	0	1	0	0	0	0	0	20
12	19	0	0	0	0	0	0	0	0	0	0	31
9	25	2	0	1	0	0	0	0	0	0	0	37
6	14	3	0	0	0	0	0	0	0	0	0	23
7	19	7	0	0	0	0	0	0	0	0	0	33
14	14	1	0	0	0	1	0	0	0	0	0	30
64	125	13	3	3	0	2	0	0	0	0	0	210
						WEST LEG						
5	10	17	0	1	1	0	0	0	0	0	1	35
2	15	21	1	3	1	1	0	0	0	0	0	44
4	38	36	1	0	0	0	0	1	0	0	1	81
2	50	33	1	0	0	0	0	0	1	0	0	87
9	18	20	0	0	2	0	0	2	0	0	1	52
2	12	26	1	0	0	0	2	1	1	0	0	45
10	15	31	0	3	0	0	0	0	0	2	1	62
4	24	22	1	0	0	0	0	2	0	0	1	54
38	182	206	5	7	4	1	2	6	2	2	5	460

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PENROE
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 500

Rt	Thru	Lt	
33	441	26	Total
4	123	3	1st
14	113	11	2nd
8	74	5	3rd
7	131	7	4th

EAST LEG

EAST LEG TOTAL: 144

	1st	2nd	3rd	4th	Total
Rt	7	12	11	7	37
Thru	14	20	26	25	85
Lt	1	5	14	2	22

WEST LEG

Total	1st	2nd	3rd	4th	
92	20	16	37	19	Lt
129	27	27	39	36	Thru
52	14	9	21	8	Rt

WEST LEG TOTAL: 273

SOUTH LEG

	Lt	Thru	Rt
1st	7	131	4
2nd	23	129	2
3rd	10	90	10
4th	4	113	8
Total	44	463	24

TOTAL: 531

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.86
EAST LEG = 0.71
WEST LEG = 0.70

ALL LEGS = 0.95

HOUR TOTAL: 1,448

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 12:00PM-01:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
49	479	41	Total
13	117	10	1st
17	113	8	2nd
11	140	10	3rd
8	109	13	4th

	1st	2nd	3rd	4th	Total
Rt	13	14	10	8	45
Thru	4	10	17	13	44
Lt	3	3	1	5	12

Total	1st	2nd	3rd	4th	
83	22	19	21	21	Lt
81	24	15	24	18	Thru
48	19	9	11	9	Rt

	Lt	Thru	Rt
1st	11	111	1
2nd	17	108	5
3rd	12	103	2
4th	15	108	5
Total	55	430	13

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 01:00PM-02:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
33	441	26	Total
4	123	3	1st
14	113	11	2nd
8	74	5	3rd
7	131	7	4th

	1st	2nd	3rd	4th	Total
Rt	7	12	11	7	37
Thru	14	20	26	25	85
Lt	1	5	14	2	22

Total	1st	2nd	3rd	4th	
92	20	16	37	19	Lt
129	27	27	39	36	Thru
52	14	9	21	8	Rt

	Lt	Thru	Rt
1st	7	131	4
2nd	23	129	2
3rd	10	90	10
4th	4	113	8
Total	44	463	24

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PENROE 05-30-12

BEGINNING TIME : 12:00PM PH: 1:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
13	108	10	0	3	0	0	5	0	0	1	0	140
17	98	6	0	5	1	0	3	1	0	7	0	138
11	130	10	0	4	0	0	6	0	0	0	0	161
8	82	12	0	10	0	0	10	1	0	7	0	130
4	112	3	0	8	0	0	2	0	0	1	0	130
14	101	11	0	7	0	0	2	0	0	3	0	138
7	71	3	0	3	0	0	0	1	1	0	1	87
4	122	6	1	6	0	0	3	1	2	0	0	145
78	824	61	1	46	1	0	31	4	3	19	1	1069
						SOUTH LEG						
1	102	11	0	5	0	0	2	0	0	2	0	123
5	90	16	0	9	1	0	4	0	0	5	0	130
2	93	12	0	7	0	0	1	0	0	2	0	117
5	83	15	0	7	0	0	10	0	0	8	0	128
4	125	7	0	6	0	0	0	0	0	0	0	142
2	118	23	0	5	0	0	1	0	0	5	0	154
10	84	10	0	5	0	0	0	0	0	1	0	110
7	105	4	0	3	0	0	3	0	1	2	0	125
36	800	98	0	47	1	0	21	0	1	25	0	1029
						EAST LEG						
11	4	3	1	0	0	1	0	0	0	0	0	20
14	9	3	0	0	0	0	1	0	0	0	0	27
9	16	1	1	0	0	0	1	0	0	0	0	28
7	13	4	1	0	1	0	0	0	0	0	0	26
7	12	1	0	1	0	0	1	0	0	0	0	22
11	20	3	0	0	0	0	0	1	1	0	1	37
11	26	14	0	0	0	0	0	0	0	0	0	51
7	25	2	0	0	0	0	0	0	0	0	0	34
77	125	31	3	1	1	1	3	1	1	0	1	245
						WEST LEG						
18	24	21	1	0	0	0	0	1	0	0	0	65
8	14	19	0	1	0	1	0	0	0	0	0	43
9	24	21	2	0	0	0	0	0	0	0	0	56
7	17	20	2	0	1	0	1	0	0	0	0	48
14	25	18	0	2	0	0	0	2	0	0	0	61
9	27	13	0	0	1	0	0	0	0	0	2	52
21	39	35	0	0	2	0	0	0	0	0	0	97
7	36	16	1	0	1	0	0	1	0	0	1	63
93	206	163	6	3	5	1	1	4	0	0	3	485

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: PENROE
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 675

Rt	Thru	Lt	
109	519	47	Total
23	114	11	1st
46	167	15	2nd
19	137	6	3rd
21	101	15	4th

EAST LEG TOTAL: 260

	1st	2nd	3rd	4th	Total
Rt	13	25	11	28	77
Thru	35	54	25	25	139
Lt	12	22	6	4	44

WEST LEG TOTAL: 442

Total	1st	2nd	3rd	4th	
187	48	82	10	47	Lt
198	52	65	37	44	Thru
57	11	16	17	13	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.74
SOUTH LEG = 0.84
EAST LEG = 0.64
WEST LEG = 0.68

ALL LEGS = 0.75

SOUTH LEG

TOTAL: 813

	Lt	Thru	Rt
1st	13	157	1
2nd	22	206	14
3rd	19	167	12
4th	21	170	11
Total	75	700	38

HOUR TOTAL: 2,190

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 04:00PM-05:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
75	478	24	Total
22	125	10	1st
17	108	2	2nd
12	118	6	3rd
24	127	6	4th

	1st	2nd	3rd	4th	Total
Rt	20	17	8	13	58
Thru	26	25	11	19	81
Lt	7	9	0	8	24

Total	1st	2nd	3rd	4th	
172	52	43	46	31	Lt
97	23	24	27	23	Thru
52	22	11	7	12	Rt

	Lt	Thru	Rt
1st	13	148	5
2nd	9	138	5
3rd	3	147	2
4th	13	166	3
Total	38	599	15

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: PENROE

TIME: 05:00PM-06:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
109	519	47	Total
23	114	11	1st
46	167	15	2nd
19	137	6	3rd
21	101	15	4th

	1st	2nd	3rd	4th	Total
Rt	13	25	11	28	77
Thru	35	54	25	25	139
Lt	12	22	6	4	44

Total	1st	2nd	3rd	4th	
187	48	82	10	47	Lt
198	52	65	37	44	Thru
57	11	16	17	13	Rt

	Lt	Thru	Rt
1st	13	157	1
2nd	22	206	14
3rd	19	167	12
4th	21	170	11
Total	75	700	38

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : PENROE 05-30-12

BEGINNING TIME : 04:00PM PH: 5:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
18	113	10	3	8	0	0	2	0	1	2	0	157
16	94	2	1	6	0	0	4	0	0	4	0	127
12	106	6	0	8	0	0	3	0	0	1	0	136
23	113	6	0	8	0	1	3	0	0	3	0	157
21	105	11	1	6	0	0	1	0	1	2	0	148
45	154	15	1	8	0	0	0	0	0	5	0	228
19	110	6	0	9	0	0	10	0	0	8	0	162
21	88	15	0	8	0	0	3	0	0	2	0	137
175	883	71	6	61	0	1	26	0	2	27	0	1252
						SOUTH LEG						
5	134	13	0	7	0	0	6	0	0	1	0	166
4	117	9	1	7	0	0	7	0	0	7	0	152
2	139	3	0	6	0	0	1	0	0	1	0	152
3	154	13	0	6	0	0	3	0	0	3	0	182
1	147	13	0	7	0	0	2	0	0	1	0	171
14	195	22	0	6	0	0	3	0	0	2	0	242
12	145	19	0	12	0	0	5	0	0	5	0	198
11	159	21	0	11	0	0	0	0	0	0	0	202
52	1190	113	1	62	0	0	27	0	0	20	0	1465
						EAST LEG						
20	25	7	0	1	0	0	0	0	0	0	0	53
17	25	9	0	0	0	0	0	0	0	0	0	51
8	11	0	0	0	0	0	0	0	0	0	0	19
13	17	8	0	2	0	0	0	0	0	0	0	40
12	32	12	0	2	0	1	1	0	0	0	0	60
24	51	21	0	1	0	1	2	1	0	0	0	101
10	21	6	1	2	0	0	2	0	0	0	0	42
28	24	2	0	0	0	0	1	2	0	0	0	57
132	206	65	1	8	0	2	6	3	0	0	0	423
						WEST LEG						
22	23	48	0	0	2	0	0	0	0	0	2	97
11	23	37	0	1	0	0	0	6	0	0	0	78
7	25	37	0	2	4	0	0	5	0	0	0	80
12	20	25	0	2	2	0	1	3	0	0	1	66
11	52	42	0	0	1	0	0	1	0	0	4	111
15	63	78	0	0	0	1	1	2	0	1	2	163
14	36	10	0	0	0	1	1	0	2	0	0	64
12	39	45	0	1	0	0	1	0	1	3	2	104
104	281	322	0	6	9	2	4	17	3	4	11	763

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	125	20	5	70	35	25	365	5	35	920	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	12	12	12	12	10
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1726		1805	1810	1468	1805	3282	1615	1570	3438	1436
Flt Permitted	0.71	1.00		0.66	1.00	1.00	0.25	1.00	1.00	0.52	1.00	1.00
Satd. Flow (perm)	1280	1726		1248	1810	1468	474	3282	1615	856	3438	1436
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	136	22	5	76	38	27	397	5	38	1000	103
RTOR Reduction (vph)	0	17	0	0	0	30	0	0	2	0	0	47
Lane Group Flow (vph)	130	141	0	5	76	8	27	397	3	38	1000	56
Heavy Vehicles (%)	5%	5%	25%	0%	5%	10%	0%	10%	0%	15%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	7.4	7.4		7.4	7.4	7.4	18.2	18.2	18.2	18.2	18.2	18.2
Effective Green, g (s)	7.4	7.4		7.4	7.4	7.4	18.2	18.2	18.2	18.2	18.2	18.2
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.54	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	282	380		275	399	323	257	1778	875	464	1862	778
v/s Ratio Prot		0.08			0.04			0.12			c0.29	
v/s Ratio Perm	c0.10			0.00		0.01	0.06		0.00	0.04		0.04
v/c Ratio	0.46	0.37		0.02	0.19	0.03	0.11	0.22	0.00	0.08	0.54	0.07
Uniform Delay, d1	11.4	11.1		10.3	10.7	10.3	3.7	4.0	3.5	3.7	5.0	3.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.6		0.0	0.2	0.0	0.2	0.1	0.0	0.1	0.3	0.0
Delay (s)	12.6	11.7		10.3	10.9	10.3	3.9	4.1	3.5	3.8	5.3	3.7
Level of Service	B	B		B	B	B	A	A	A	A	A	A
Approach Delay (s)		12.1			10.7			4.1			5.1	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	33.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	130	50	20	85	35	45	465	25	25	440	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1734		1641	1810	1538	1805	3438	1538	1641	3282	1468
Flt Permitted	0.70	1.00		0.64	1.00	1.00	0.49	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1208	1734		1102	1810	1538	923	3438	1538	818	3282	1468
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	137	53	21	89	37	47	489	26	26	463	37
RTOR Reduction (vph)	0	40	0	0	0	28	0	0	14	0	0	19
Lane Group Flow (vph)	95	150	0	21	89	9	47	489	12	26	463	18
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%	0%	5%	5%	10%	10%	10%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	6.7	6.7		6.7	6.7	6.7	13.6	13.6	13.6	13.6	13.6	13.6
Effective Green, g (s)	6.7	6.7		6.7	6.7	6.7	13.6	13.6	13.6	13.6	13.6	13.6
Actuated g/C Ratio	0.24	0.24		0.24	0.24	0.24	0.48	0.48	0.48	0.48	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	286	411		261	429	364	444	1652	739	393	1577	705
v/s Ratio Prot		c0.09			0.05			c0.14			0.14	
v/s Ratio Perm	0.08			0.02		0.01	0.05		0.01	0.03		0.01
v/c Ratio	0.33	0.36		0.08	0.21	0.02	0.11	0.30	0.02	0.07	0.29	0.03
Uniform Delay, d1	8.9	9.0		8.4	8.7	8.3	4.0	4.5	3.8	3.9	4.4	3.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.6		0.1	0.2	0.0	0.1	0.1	0.0	0.1	0.1	0.0
Delay (s)	9.6	9.6		8.5	8.9	8.3	4.1	4.6	3.9	4.0	4.5	3.9
Level of Service	A	A		A	A	A	A	A	A	A	A	A
Approach Delay (s)		9.6			8.7			4.5			4.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	5.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.32		
Actuated Cycle Length (s)	28.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	200	55	45	140	75	75	700	40	45	520	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1734		1719	1727	1538	1805	3282	1615	1805	3282	1538
Flt Permitted	0.64	1.00		0.47	1.00	1.00	0.36	1.00	1.00	0.24	1.00	1.00
Satd. Flow (perm)	1158	1734		859	1727	1538	682	3282	1615	453	3282	1538
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	247	267	73	60	187	100	100	933	53	60	693	147
RTOR Reduction (vph)	0	23	0	0	0	44	0	0	29	0	0	80
Lane Group Flow (vph)	247	317	0	60	187	56	100	933	24	60	693	67
Heavy Vehicles (%)	5%	5%	10%	5%	10%	5%	0%	10%	0%	0%	10%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	12.9	12.9		12.9	12.9	12.9	17.3	17.3	17.3	17.3	17.3	17.3
Effective Green, g (s)	12.9	12.9		12.9	12.9	12.9	17.3	17.3	17.3	17.3	17.3	17.3
Actuated g/C Ratio	0.34	0.34		0.34	0.34	0.34	0.45	0.45	0.45	0.45	0.45	0.45
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	391	586		290	583	519	309	1486	731	205	1486	697
v/s Ratio Prot		0.18			0.11			c0.28			0.21	
v/s Ratio Perm	c0.21			0.07		0.04	0.15		0.01	0.13		0.04
v/c Ratio	0.63	0.54		0.21	0.32	0.11	0.32	0.63	0.03	0.29	0.47	0.10
Uniform Delay, d1	10.7	10.2		9.0	9.4	8.7	6.7	8.0	5.8	6.6	7.2	6.0
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.3	1.0		0.4	0.3	0.1	0.6	0.8	0.0	0.8	0.2	0.1
Delay (s)	14.0	11.3		9.4	9.7	8.8	7.3	8.8	5.8	7.4	7.5	6.0
Level of Service	B	B		A	A	A	A	A	A	A	A	A
Approach Delay (s)		12.4			9.4			8.5			7.2	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	38.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	120	125	20	5	70	35	25	415	5	35	970	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1726		1805	1810	1468	1805	2983	1615	1570	3282	1538
Flt Permitted	0.71	1.00		0.66	1.00	1.00	0.23	1.00	1.00	0.49	1.00	1.00
Satd. Flow (perm)	1280	1726		1248	1810	1468	435	2983	1615	812	3282	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	130	136	22	5	76	38	27	451	5	38	1054	103
RTOR Reduction (vph)	0	17	0	0	0	30	0	0	2	0	0	47
Lane Group Flow (vph)	130	141	0	5	76	8	27	451	3	38	1054	56
Heavy Vehicles (%)	5%	5%	25%	0%	5%	10%	0%	21%	0%	15%	10%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	7.5	7.5		7.5	7.5	7.5	18.6	18.6	18.6	18.6	18.6	18.6
Effective Green, g (s)	7.5	7.5		7.5	7.5	7.5	18.6	18.6	18.6	18.6	18.6	18.6
Actuated g/C Ratio	0.22	0.22		0.22	0.22	0.22	0.55	0.55	0.55	0.55	0.55	0.55
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	282	380		274	398	323	237	1627	881	443	1790	839
v/s Ratio Prot		0.08			0.04			0.15			c0.32	
v/s Ratio Perm	c0.10			0.00		0.01	0.06		0.00	0.05		0.04
v/c Ratio	0.46	0.37		0.02	0.19	0.03	0.11	0.28	0.00	0.09	0.59	0.07
Uniform Delay, d1	11.5	11.3		10.4	10.8	10.4	3.8	4.2	3.5	3.7	5.2	3.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.6		0.0	0.2	0.0	0.2	0.1	0.0	0.1	0.5	0.0
Delay (s)	12.7	11.9		10.4	11.1	10.5	4.0	4.2	3.5	3.8	5.7	3.7
Level of Service	B	B		B	B	B	A	A	A	A	A	A
Approach Delay (s)		12.3			10.8			4.2			5.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	34.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	49.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	130	50	20	85	35	45	515	25	25	490	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1734		1641	1810	1538	1805	3167	1538	1641	3034	1468
Flt Permitted	0.70	1.00		0.64	1.00	1.00	0.46	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)	1208	1734		1102	1810	1538	877	3167	1538	777	3034	1468
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	137	53	21	89	37	47	542	26	26	516	37
RTOR Reduction (vph)	0	41	0	0	0	28	0	0	13	0	0	19
Lane Group Flow (vph)	95	149	0	21	89	9	47	542	13	26	516	18
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%	0%	14%	5%	10%	19%	10%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	6.7	6.7		6.7	6.7	6.7	14.3	14.3	14.3	14.3	14.3	14.3
Effective Green, g (s)	6.7	6.7		6.7	6.7	6.7	14.3	14.3	14.3	14.3	14.3	14.3
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	279	401		255	418	355	432	1562	758	383	1496	724
v/s Ratio Prot		c0.09			0.05			c0.17			0.17	
v/s Ratio Perm	0.08			0.02		0.01	0.05		0.01	0.03		0.01
v/c Ratio	0.34	0.37		0.08	0.21	0.02	0.11	0.35	0.02	0.07	0.34	0.03
Uniform Delay, d1	9.3	9.4		8.7	9.0	8.6	3.9	4.5	3.8	3.9	4.5	3.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.6		0.1	0.3	0.0	0.1	0.1	0.0	0.1	0.1	0.0
Delay (s)	10.0	10.0		8.9	9.3	8.6	4.0	4.6	3.8	3.9	4.6	3.8
Level of Service	B	A		A	A	A	A	A	A	A	A	A
Approach Delay (s)		10.0			9.1			4.5			4.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	5.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	29.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	185	200	55	45	140	75	75	750	40	45	570	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1734		1719	1727	1538	1805	3112	1615	1805	3059	1538
Flt Permitted	0.64	1.00		0.46	1.00	1.00	0.33	1.00	1.00	0.22	1.00	1.00
Satd. Flow (perm)	1158	1734		830	1727	1538	619	3112	1615	411	3059	1538
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	247	267	73	60	187	100	100	1000	53	60	760	147
RTOR Reduction (vph)	0	23	0	0	0	42	0	0	28	0	0	77
Lane Group Flow (vph)	247	317	0	60	187	58	100	1000	25	60	760	70
Heavy Vehicles (%)	5%	5%	10%	5%	10%	5%	0%	16%	0%	0%	18%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	12.8	12.8		12.8	12.8	12.8	18.8	18.8	18.8	18.8	18.8	18.8
Effective Green, g (s)	12.8	12.8		12.8	12.8	12.8	18.8	18.8	18.8	18.8	18.8	18.8
Actuated g/C Ratio	0.32	0.32		0.32	0.32	0.32	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	374	560		268	558	497	294	1477	767	195	1452	730
v/s Ratio Prot		0.18			0.11			c0.32			0.25	
v/s Ratio Perm	c0.21			0.07		0.04	0.16		0.02	0.15		0.05
v/c Ratio	0.66	0.57		0.22	0.34	0.12	0.34	0.68	0.03	0.31	0.52	0.10
Uniform Delay, d1	11.5	11.1		9.8	10.2	9.4	6.5	8.1	5.5	6.4	7.3	5.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	4.3	1.3		0.4	0.4	0.1	0.7	1.2	0.0	0.9	0.3	0.1
Delay (s)	15.9	12.4		10.2	10.5	9.5	7.2	9.3	5.6	7.3	7.6	5.8
Level of Service	B	B		B	B	A	A	A	A	A	A	A
Approach Delay (s)		13.9			10.2			8.9			7.3	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	39.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	135	20	5	75	40	25	450	5	40	1055	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	1731		1805	1810	1468	1805	3282	1615	1570	3438	1538
Flt Permitted	0.70	1.00		0.65	1.00	1.00	0.22	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1273	1731		1236	1810	1468	413	3282	1615	783	3438	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	141	147	22	5	82	43	27	489	5	43	1147	114
RTOR Reduction (vph)	0	17	0	0	0	33	0	0	2	0	0	53
Lane Group Flow (vph)	141	152	0	5	82	10	27	489	3	43	1147	61
Heavy Vehicles (%)	5%	5%	25%	0%	5%	10%	0%	10%	0%	15%	5%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	7.8	7.8		7.8	7.8	7.8	18.4	18.4	18.4	18.4	18.4	18.4
Effective Green, g (s)	7.8	7.8		7.8	7.8	7.8	18.4	18.4	18.4	18.4	18.4	18.4
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.54	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	290	395		282	413	335	222	1766	869	421	1850	827
v/s Ratio Prot		0.09			0.05			0.15			c0.33	
v/s Ratio Perm	c0.11			0.00		0.01	0.07		0.00	0.05		0.04
v/c Ratio	0.49	0.38		0.02	0.20	0.03	0.12	0.28	0.00	0.10	0.62	0.07
Uniform Delay, d1	11.5	11.2		10.2	10.7	10.3	3.9	4.3	3.7	3.9	5.5	3.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.3	0.6		0.0	0.2	0.0	0.2	0.1	0.0	0.1	0.6	0.0
Delay (s)	12.7	11.8		10.3	10.9	10.3	4.2	4.4	3.7	4.0	6.1	3.8
Level of Service	B	B		B	B	B	A	A	A	A	A	A
Approach Delay (s)		12.2			10.7			4.4			5.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	34.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	100	140	55	20	95	40	50	560	25	25	535	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.96		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	1733		1641	1810	1538	1805	3438	1538	1641	3282	1468
Flt Permitted	0.69	1.00		0.63	1.00	1.00	0.44	1.00	1.00	0.43	1.00	1.00
Satd. Flow (perm)	1196	1733		1087	1810	1538	837	3438	1538	742	3282	1468
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	147	58	21	100	42	53	589	26	26	563	42
RTOR Reduction (vph)	0	44	0	0	0	32	0	0	13	0	0	21
Lane Group Flow (vph)	105	161	0	21	100	10	53	589	13	26	563	21
Heavy Vehicles (%)	10%	5%	5%	10%	5%	5%	0%	5%	5%	10%	10%	10%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		6
Actuated Green, G (s)	6.9	6.9		6.9	6.9	6.9	14.5	14.5	14.5	14.5	14.5	14.5
Effective Green, g (s)	6.9	6.9		6.9	6.9	6.9	14.5	14.5	14.5	14.5	14.5	14.5
Actuated g/C Ratio	0.23	0.23		0.23	0.23	0.23	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	281	407		255	425	361	413	1696	759	366	1619	724
v/s Ratio Prot		c0.09			0.06			0.17			c0.17	
v/s Ratio Perm	0.09			0.02		0.01	0.06		0.01	0.04		0.01
v/c Ratio	0.37	0.39		0.08	0.24	0.03	0.13	0.35	0.02	0.07	0.35	0.03
Uniform Delay, d1	9.4	9.5		8.8	9.1	8.7	4.0	4.6	3.8	3.9	4.6	3.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	0.6		0.1	0.3	0.0	0.1	0.1	0.0	0.1	0.1	0.0
Delay (s)	10.3	10.1		8.9	9.4	8.7	4.2	4.7	3.8	4.0	4.7	3.8
Level of Service	B	B		A	A	A	A	A	A	A	A	A
Approach Delay (s)		10.2			9.2			4.6			4.6	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	29.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
33: Glenoaks Blvd & Penrose St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	200	220	60	50	155	80	80	820	45	50	620	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	1734		1719	1727	1538	1805	3282	1615	1805	3226	
Flt Permitted	0.63	1.00		0.44	1.00	1.00	0.22	1.00	1.00	0.22	1.00	
Satd. Flow (perm)	1137	1734		789	1727	1538	409	3282	1615	409	3226	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	267	293	80	67	207	107	107	1093	60	67	827	160
RTOR Reduction (vph)	0	22	0	0	0	25	0	0	33	0	36	0
Lane Group Flow (vph)	267	351	0	67	207	82	107	1093	27	67	951	0
Heavy Vehicles (%)	5%	5%	10%	5%	10%	5%	0%	10%	0%	0%	10%	5%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8		8	2		2	6		
Actuated Green, G (s)	15.4	15.4		15.4	15.4	15.4	18.6	18.6	18.6	18.6	18.6	
Effective Green, g (s)	15.4	15.4		15.4	15.4	15.4	18.6	18.6	18.6	18.6	18.6	
Actuated g/C Ratio	0.37	0.37		0.37	0.37	0.37	0.44	0.44	0.44	0.44	0.44	
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	417	636		289	633	564	181	1453	715	181	1429	
v/s Ratio Prot		0.20			0.12			c0.33			0.29	
v/s Ratio Perm	c0.23			0.08		0.05	0.26		0.02	0.16		
v/c Ratio	0.64	0.55		0.23	0.33	0.14	0.59	0.75	0.04	0.37	0.67	
Uniform Delay, d1	11.0	10.6		9.2	9.6	8.9	8.8	9.8	6.6	7.8	9.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	3.3	1.0		0.4	0.3	0.1	5.1	2.2	0.0	1.3	1.2	
Delay (s)	14.4	11.6		9.6	9.9	9.0	13.9	12.0	6.6	9.1	10.4	
Level of Service	B	B		A	A	A	B	B	A	A	B	
Approach Delay (s)		12.7			9.6			11.9			10.3	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	42.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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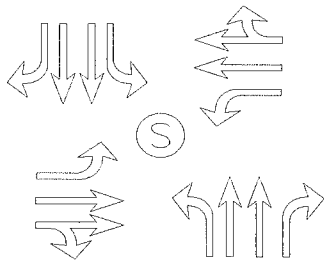
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
34
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SUNLAND BLVD						
EB LEFT	70	15%		70	5	75
EB THRU	670	5%		670	60	730
EB RIGHT	30	0%		30	5	35
WB LEFT	205	5%		205	20	225
WB THRU	750	5%		750	70	820
WB RIGHT	20	5%		20	5	25
GLEN OAKS BLVD						
NB LEFT	10	35%		10	5	15
NB THRU	310	23%	**50**	360	30	390
NB RIGHT	80	5%		80	5	85
SB LEFT	10	35%		10	5	15
SB THRU	640	12%	**50**	690	60	750
SB RIGHT	205	5%		205	20	225
TOTALS	**3000**		**100**	**3100**	**290**	**3390**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 34
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SUNLAND BLVD						
EB LEFT	165	5%		165	15	180
EB THRU	430	5%		430	40	470
EB RIGHT	20	5%		20	5	25
WB LEFT	320	5%		320	30	350
WB THRU	355	5%		355	30	385
WB RIGHT	15	0%		15	5	20
GLEN OAKS BLVD						
NB LEFT	25	10%		25	5	30
NB THRU	350	21%	**50**	400	35	435
NB RIGHT	245	5%		245	20	265
SB LEFT	35	5%		35	5	40
SB THRU	305	23%	**50**	355	30	385
SB RIGHT	170	15%		170	15	185
TOTALS	**2435**		**100**	**2535**	**235**	**2770**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 34
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SUNLAND BLVD						
EB LEFT	165	10%		165	15	180
EB THRU	650	5%		650	60	710
EB RIGHT	55	0%		55	5	60
WB LEFT	360	5%		360	30	390
WB THRU	395	5%		395	35	430
WB RIGHT	5	0%		5	5	10
GLEN OAKS BLVD						
NB LEFT	20	0%		20	5	25
NB THRU	640	12%	**50**	690	60	750
NB RIGHT	385	5%		385	35	420
SB LEFT	50	10%		50	5	55
SB THRU	510	13%	**50**	560	50	610
SB RIGHT	50	10%		50	5	55
TOTALS	**3285**		**100**	**3385**	**310**	**3695**

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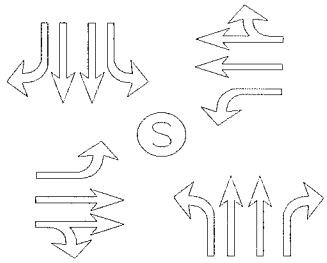
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
34
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SUNLAND BLVD								
EB LEFT	59	9	27	85	**0**	85	5	90
EB THRU	643	25	75	720	**0**	720	65	785
EB RIGHT	32	0	0	30	**0**	30	5	35
WB LEFT	197	7	21	220	**0**	220	20	240
WB THRU	726	22	66	790	**0**	790	70	860
WB RIGHT	21	1	3	25	**0**	25	5	30
GLEN OAKS BLVD								
NB LEFT	8	4	12	20	**0**	20	5	25
NB THRU	283	26	78	360	**150**	510	45	555
NB RIGHT	76	3	9	85	**0**	85	5	90
SB LEFT	7	4	12	20	**0**	20	5	25
SB THRU	605	34	102	705	**150**	855	75	930
SB RIGHT	190	15	45	235	**0**	235	20	255
TOTALS	**2847**				**300**	**3595**	**325**	**3920**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
34
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								

SUNLAND BLVD

EB LEFT	155	11	33	190	**0**	190	15	205
EB THRU	411	20	60	470	**0**	470	40	510
EB RIGHT	17	1	3	20	**0**	20	5	25
WB LEFT	313	9	27	340	**0**	340	30	370
WB THRU	336	21	63	400	**0**	400	35	435
WB RIGHT	15	0	0	15	**0**	15	5	20

GLEN OAKS BLVD

NB LEFT	21	2	6	25	**0**	25	5	30
NB THRU	325	27	81	405	**150**	555	50	605
NB RIGHT	240	6	18	260	**0**	260	25	285
SB LEFT	34	2	6	40	**0**	40	5	45
SB THRU	275	31	93	370	**150**	520	45	565
SB RIGHT	144	28	84	230	**0**	230	20	250
TOTALS	**2286**				**300**	**3065**	**280**	**3345**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : SUNLAND BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
34
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SUNLAND BLVD								
EB LEFT	145	18	54	200	**0**	200	20	220
EB THRU	643	9	27	670	**0**	670	60	730
EB RIGHT	54	0	0	55	**0**	55	5	60
WB LEFT	352	6	18	370	**0**	370	35	405
WB THRU	390	5	15	405	**0**	405	35	440
WB RIGHT	5	0	0	5	**0**	5	5	10
GLEN OAKS BLVD								
NB LEFT	19	0	0	20	**0**	20	5	25
NB THRU	604	37	111	715	**150**	865	80	945
NB RIGHT	374	13	39	415	**0**	415	35	450
SB LEFT	44	5	15	60	**0**	60	5	65
SB THRU	492	17	51	545	**150**	695	65	760
SB RIGHT	45	5	15	60	**0**	60	5	65
TOTALS	**3167**				**300**	**3820**	**355**	**4175**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SUNLAND BLVD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 07:30AM

NORTH LEG

TOTAL: 855

	Rt	Thru	Lt
Total	205	639	11
1st	74	193	4
2nd	54	163	2
3rd	45	155	3
4th	32	128	2

EAST LEG TOTAL: 974

	1st	2nd	3rd	4th	Total
Rt	1	7	5	9	22
Thru	77	257	210	204	748
Lt	57	55	51	41	204

WEST LEG TOTAL: 768

	Total	1st	2nd	3rd	4th
Lt	68	11	27	18	12
Thru	668	123	215	200	130
Rt	32	3	10	14	5

SOUTH LEG

TOTAL: 400

	Lt	Thru	Rt
1st	7	85	29
2nd	1	77	30
3rd	1	73	11
4th	3	74	9
Total	12	309	79

PEAK HOUR FACTORS

NORTH LEG = 0.79
SOUTH LEG = 0.83
EAST LEG = 0.76
WEST LEG = 0.76

ALL LEGS = 0.83

HOUR TOTAL: 2,997

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 07:00AM-08:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
218	732	14	Total
24	195	3	1st
66	181	5	2nd
74	193	4	3rd
54	163	2	4th

	1st	2nd	3rd	4th	Total
Rt	2	3	1	7	13
Thru	61	87	77	257	482
Lt	32	41	57	55	185

Total	1st	2nd	3rd	4th	
54	8	8	11	27	Lt
585	114	133	123	215	Thru
22	4	5	3	10	Rt

	Lt	Thru	Rt
1st	6	88	14
2nd	6	71	21
3rd	7	85	29
4th	1	77	30
Total	20	321	94

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 08:00AM-09:00AM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
119	538	10	Total
45	155	3	1st
32	128	2	2nd
19	129	4	3rd
23	126	1	4th

	1st	2nd	3rd	4th	Total
Rt	5	9	2	1	17
Thru	210	204	135	141	690
Lt	51	41	60	54	206

Total	1st	2nd	3rd	4th	
83	18	12	23	30	Lt
467	200	130	66	71	Thru
27	14	5	5	3	Rt

	Lt	Thru	Rt
1st	1	73	11
2nd	3	74	9
3rd	7	70	14
4th	3	51	24
Total	14	268	58

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : GLEN OAKS BLVD LA

EAST-WEST STREET : SUNLAND BLVD 05-30-12

BEGINNING TIME : 07:00AM PH: 7:30 AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
22	192	3	2	2	0	0	1	0	0	0	0	222
63	176	5	3	4	0	0	0	0	0	1	0	252
70	181	3	3	8	1	0	3	0	1	1	0	271
51	158	1	1	3	1	1	2	0	1	0	0	219
40	146	2	1	6	1	2	2	0	2	1	0	203
29	120	1	1	5	1	0	2	0	2	1	0	162
17	124	3	2	5	1	0	0	0	0	0	0	152
23	126	0	0	0	1	0	0	0	0	0	0	150
315	1223	18	13	33	6	3	10	0	6	4	0	1631
						SOUTH LEG						
14	86	5	0	2	1	0	0	0	0	0	0	108
21	70	6	0	1	0	0	0	0	0	0	0	98
28	79	4	1	4	2	0	2	1	0	0	0	121
29	71	1	1	6	0	0	0	0	0	0	0	108
10	69	1	1	2	0	0	1	0	0	1	0	85
9	64	2	0	6	1	0	3	0	0	1	0	86
14	70	7	0	0	0	0	0	0	0	0	0	91
24	51	3	0	0	0	0	0	0	0	0	0	78
149	560	29	3	21	4	0	6	1	0	2	0	775
						EAST LEG						
1	56	31	1	4	1	0	1	0	0	0	0	95
3	85	40	0	2	0	0	0	0	0	0	1	131
1	72	54	0	3	2	0	0	1	0	2	0	135
7	253	53	0	4	2	0	0	0	0	0	0	319
5	204	50	0	6	1	0	0	0	0	0	0	266
8	197	40	1	4	1	0	3	0	0	0	0	254
0	126	59	2	6	0	0	2	0	0	1	1	197
0	127	53	0	8	0	1	2	0	0	4	1	196
25	1120	380	4	37	7	1	8	1	0	7	3	1593
						WEST LEG						
4	112	7	0	2	1	0	0	0	0	0	0	126
5	132	6	0	1	1	0	0	0	0	0	1	146
3	117	8	0	4	2	0	1	0	0	1	1	137
10	212	24	0	3	2	0	0	0	0	0	1	252
14	199	17	0	1	0	0	0	0	0	0	1	232
5	115	10	0	7	2	0	2	0	0	6	0	147
0	66	19	5	0	3	0	0	0	0	0	1	94
2	59	26	1	7	4	0	1	0	0	4	0	104
43	1012	117	6	25	15	0	4	0	0	11	5	1238

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SUNLAND BLVD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 514

	Rt	Thru	Lt
Total	172	306	36
1st	50	77	10
2nd	48	76	7
3rd	35	67	6
4th	39	86	13

EAST LEG TOTAL: 694

	1st	2nd	3rd	4th	Total
Rt	5	3	2	5	15
Thru	81	106	91	79	357
Lt	77	85	73	87	322

WEST LEG TOTAL: 615

	Total	1st	2nd	3rd	4th
Lt	166	40	40	50	36
Thru	431	99	95	120	117
Rt	18	8	4	4	2

SOUTH LEG

TOTAL: 621

	Lt	Thru	Rt
1st	5	101	55
2nd	4	83	69
3rd	6	80	56
4th	8	88	66
Total	23	352	246

PEAK HOUR FACTORS

NORTH LEG = 0.93
SOUTH LEG = 0.96
EAST LEG = 0.89
WEST LEG = 0.88

ALL LEGS = 0.98

HOUR TOTAL: 2,444

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 12:00PM-01:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
124	374	34	Total
33	100	6	1st
34	83	7	2nd
33	110	5	3rd
24	81	16	4th

	1st	2nd	3rd	4th	Total
Rt	2	0	1	3	6
Thru	103	98	74	74	349
Lt	66	71	71	78	286

Total	1st	2nd	3rd	4th	
176	44	53	40	39	Lt
394	96	86	105	107	Thru
26	4	5	7	10	Rt

	Lt	Thru	Rt
1st	9	75	33
2nd	8	68	34
3rd	5	72	45
4th	1	85	29
Total	23	300	141

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 01:00PM-02:00PM DATE: 05-30-12

NORTH LEG

	Rt	Thru	Lt
Total	172	306	36
1st	50	77	10
2nd	48	76	7
3rd	35	67	6
4th	39	86	13

	1st	2nd	3rd	4th	Total
Rt	5	3	2	5	15
Thru	81	106	91	79	357
Lt	77	85	73	87	322

	Total	1st	2nd	3rd	4th
Lt	166	40	40	50	36
Thru	431	99	95	120	117
Rt	18	8	4	4	2

	Lt	Thru	Rt
1st	5	101	55
2nd	4	83	69
3rd	6	80	56
4th	8	88	66
Total	23	352	246

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SUNLAND BLVD LA

EAST-WEST STREET : GLEN OAKS BLVD 05-30-12

BEGINNING TIME : 12:00PM PH: 1:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
32	94	6	1	3	0	0	2	0	0	1	0	139
31	79	5	2	4	0	0	0	0	1	0	2	124
30	101	5	2	6	0	0	3	0	1	0	0	148
22	72	15	1	7	0	0	2	1	1	0	0	121
49	68	9	1	7	0	0	2	0	0	0	1	137
33	69	6	9	5	0	3	0	1	3	2	0	131
30	58	6	1	6	0	0	2	0	4	1	0	108
32	80	13	3	4	0	3	1	0	1	1	0	138
259	621	65	20	42	0	6	12	2	11	5	3	1046
						SOUTH LEG						
33	73	9	0	2	0	0	0	0	0	0	0	117
34	62	6	0	3	1	0	2	0	0	1	1	110
45	71	3	0	1	2	0	0	0	0	0	0	122
29	76	1	0	6	0	0	2	0	0	1	0	115
54	95	5	1	4	0	0	2	0	0	0	0	161
67	77	3	1	6	1	1	0	0	0	0	0	156
56	73	6	0	1	0	0	2	0	0	4	0	142
63	80	7	3	6	0	0	1	0	0	1	1	162
381	607	40	5	29	4	1	9	0	0	7	2	1085
						EAST LEG						
2	101	66	0	2	0	0	0	0	0	0	0	171
0	97	64	0	0	6	0	1	1	0	0	0	169
1	72	68	0	2	2	0	0	1	0	0	0	146
3	72	77	0	2	1	0	0	0	0	0	0	155
5	74	77	0	4	0	0	1	0	0	2	0	163
3	100	81	0	5	3	0	0	0	0	1	1	194
2	86	72	0	3	1	0	1	0	0	1	0	166
5	76	83	0	2	3	0	0	1	0	1	0	171
21	678	588	0	20	16	0	3	3	0	5	1	1335
						WEST LEG						
3	94	44	1	2	0	0	0	0	0	0	0	144
5	79	43	0	4	2	0	2	4	0	1	4	144
7	100	35	0	3	2	0	2	1	0	0	2	152
10	102	35	0	2	2	0	3	0	0	0	2	156
8	92	40	0	5	0	0	1	0	0	1	0	147
3	92	36	0	2	0	0	0	3	1	1	1	139
4	115	45	0	4	4	0	0	1	0	1	0	174
2	112	34	0	5	2	0	0	0	0	0	0	155
42	786	312	1	27	12	0	8	9	1	4	9	1211

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: GLEN OAKS BLVD
EAST-WEST STREET: SUNLAND BLVD
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 608

Rt	Thru	Lt	
50	509	49	Total
9	127	9	1st
19	148	15	2nd
6	129	11	3rd
16	105	14	4th

EAST LEG

EAST LEG TOTAL: 758

	1st	2nd	3rd	4th	Total
Rt	2	1	1	1	5
Thru	85	112	100	98	395
Lt	99	101	70	88	358

WEST LEG

Total	1st	2nd	3rd	4th	
163	46	32	51	34	Lt
652	148	169	180	155	Thru
54	10	14	20	10	Rt

WEST LEG TOTAL: 869

SOUTH LEG

	Lt	Thru	Rt
1st	3	127	80
2nd	6	177	106
3rd	5	184	108
4th	5	153	93
Total	19	641	387

TOTAL: 1,047

PEAK HOUR FACTORS

NORTH LEG = 0.84
SOUTH LEG = 0.88
EAST LEG = 0.89
WEST LEG = 0.87

ALL LEGS = 0.91

HOUR TOTAL: 3,282

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 04:00PM-05:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
68	448	41	Total
20	121	10	1st
30	85	14	2nd
11	108	9	3rd
7	134	8	4th

	1st	2nd	3rd	4th	Total
Rt	2	3	5	4	14
Thru	92	103	84	101	380
Lt	42	55	77	54	228

Total	1st	2nd	3rd	4th	
208	45	66	47	50	Lt
590	138	154	148	150	Thru
51	13	13	12	13	Rt

	Lt	Thru	Rt
1st	5	117	88
2nd	7	84	90
3rd	0	103	87
4th	1	130	101
Total	13	434	366

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: GLEN OAKS BLVD

EAST-WEST STREET: SUNLAND BLVD

TIME: 05:00PM-06:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
50	509	49	Total
9	127	9	1st
19	148	15	2nd
6	129	11	3rd
16	105	14	4th

	1st	2nd	3rd	4th	Total
Rt	2	1	1	1	5
Thru	85	112	100	98	395
Lt	99	101	70	88	358

Total	1st	2nd	3rd	4th	
163	46	32	51	34	Lt
652	148	169	180	155	Thru
54	10	14	20	10	Rt

	Lt	Thru	Rt
1st	3	127	80
2nd	6	177	106
3rd	5	184	108
4th	5	153	93
Total	19	641	387

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SUNLAND BLVD LA

EAST-WEST STREET : GLEN OAKS BLVD 05-30-12

BEGINNING TIME : 04:00PM PH: 5:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
19	121	10	0	0	0	0	0	0	1	0	0	151
20	80	13	4	2	1	0	0	0	6	3	0	129
7	103	9	4	3	0	0	1	0	0	1	0	128
5	128	8	1	2	0	0	2	0	1	2	0	149
7	122	7	2	3	1	0	1	1	0	1	0	145
17	144	14	1	2	0	0	1	1	1	1	0	182
6	125	10	0	4	0	0	0	0	0	0	1	146
15	101	13	0	4	0	0	0	0	1	0	1	135
96	924	84	12	20	2	0	5	2	10	8	2	1165
						SOUTH LEG						
88	113	5	0	1	0	0	2	0	0	1	0	210
90	77	7	0	3	0	0	2	0	0	2	0	181
86	95	0	1	4	0	0	3	0	0	1	0	190
99	125	1	0	2	0	0	2	0	2	1	0	232
74	115	3	3	8	0	1	4	0	2	0	0	210
102	164	6	3	6	0	0	5	0	1	2	0	289
106	176	5	1	5	0	0	3	0	1	0	0	297
92	149	5	1	4	0	0	0	0	0	0	0	251
737	1014	32	9	33	0	1	21	0	6	7	0	1860
						EAST LEG						
2	91	41	0	1	1	0	0	0	0	0	0	136
3	100	53	0	3	0	0	0	1	0	0	1	161
5	80	74	0	3	2	0	0	0	0	1	1	166
4	95	54	0	6	0	0	0	0	0	0	0	159
2	85	96	0	0	2	0	0	0	0	0	1	186
1	110	101	0	2	0	0	0	0	0	0	0	214
1	100	69	0	0	1	0	0	0	0	0	0	171
1	95	86	0	2	2	0	0	0	0	1	0	187
19	756	574	0	17	8	0	0	1	0	2	3	1380
						WEST LEG						
13	134	45	0	3	0	0	0	0	0	1	0	196
13	142	57	0	8	3	0	1	4	0	3	2	233
12	146	43	0	1	3	0	0	1	0	1	0	207
13	145	46	0	3	2	0	0	0	0	2	2	213
10	143	41	0	3	3	0	1	2	0	1	0	204
14	167	25	0	2	3	0	0	2	0	0	2	215
20	179	47	0	1	3	0	0	1	0	0	0	251
10	154	32	0	1	2	0	0	0	0	0	0	199
105	1210	336	0	22	19	0	2	10	0	8	6	1718

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	670	30	205	750	20	10	310	80	10	640	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1570	3423		1719	3425		1337	3282	1538	1337	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1570	3423		1719	3425		1337	3282	1538	1337	3438	1538
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	84	807	36	247	904	24	12	373	96	12	771	247
RTOR Reduction (vph)	0	5	0	0	3	0	0	0	49	0	0	102
Lane Group Flow (vph)	84	838	0	247	925	0	12	373	47	12	771	145
Heavy Vehicles (%)	15%	5%	0%	5%	5%	5%	35%	10%	5%	35%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pt+ov	Prot	NA	pt+ov
Protected Phases	5	2		1	6		3	8	8 1	7	4	4 5
Permitted Phases												
Actuated Green, G (s)	6.0	18.3		10.0	22.3		0.7	15.9	29.9	0.7	15.9	25.9
Effective Green, g (s)	6.0	18.3		10.0	22.3		0.7	15.9	29.9	0.7	15.9	25.9
Actuated g/C Ratio	0.10	0.30		0.16	0.37		0.01	0.26	0.49	0.01	0.26	0.43
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	155	1029		282	1254		15	857	755	15	898	654
v/s Ratio Prot	0.05	0.24		c0.14	c0.27		c0.01	0.11	0.03	0.01	c0.22	0.09
v/s Ratio Perm												
v/c Ratio	0.54	0.81		0.88	0.74		0.80	0.44	0.06	0.80	0.86	0.22
Uniform Delay, d1	26.1	19.7		24.8	16.8		30.0	18.8	8.1	30.0	21.4	11.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.8	5.0		24.7	2.3		132.2	0.4	0.0	132.2	8.2	0.2
Delay (s)	30.0	24.8		49.6	19.1		162.2	19.1	8.2	162.2	29.6	11.3
Level of Service	C	C		D	B		F	B	A	F	C	B
Approach Delay (s)		25.2			25.5			20.5			26.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	60.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	430	20	320	355	15	25	350	245	35	305	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3416		1719	3424		1641	3282	1538	1719	3282	1404
Flt Permitted	0.95	1.00		0.95	1.00		0.56	1.00	1.00	0.52	1.00	1.00
Satd. Flow (perm)	1719	3416		1719	3424		972	3282	1538	942	3282	1404
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	168	439	20	327	362	15	26	357	250	36	311	173
RTOR Reduction (vph)	0	5	0	0	5	0	0	0	50	0	0	83
Lane Group Flow (vph)	168	454	0	327	372	0	26	357	200	36	311	90
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	10%	10%	5%	5%	10%	15%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	9.7	12.1		13.6	16.0		12.1	12.1	29.7	12.1	12.1	25.8
Effective Green, g (s)	9.7	12.1		13.6	16.0		12.1	12.1	29.7	12.1	12.1	25.8
Actuated g/C Ratio	0.19	0.24		0.27	0.32		0.24	0.24	0.60	0.24	0.24	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	335	830		469	1100		236	797	917	229	797	727
v/s Ratio Prot	0.10	c0.13		c0.19	c0.11			c0.11	0.13		0.09	0.06
v/s Ratio Perm							0.03			0.04		
v/c Ratio	0.50	0.55		0.70	0.34		0.11	0.45	0.22	0.16	0.39	0.12
Uniform Delay, d1	17.9	16.5		16.3	12.9		14.7	16.0	4.7	14.8	15.8	6.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.7		4.5	0.2		0.2	0.4	0.1	0.3	0.3	0.1
Delay (s)	19.1	17.2		20.7	13.1		14.9	16.4	4.8	15.2	16.1	6.3
Level of Service	B	B		C	B		B	B	A	B	B	A
Approach Delay (s)		17.7			16.6			11.8			12.7	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	14.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	49.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	56.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	650	55	360	395	5	20	640	385	50	510	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3411		1719	3434		1805	3438	1538	1641	3438	1468
Flt Permitted	0.95	1.00		0.95	1.00		0.31	1.00	1.00	0.26	1.00	1.00
Satd. Flow (perm)	1641	3411		1719	3434		592	3438	1538	443	3438	1468
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	181	714	60	396	434	5	22	703	423	55	560	55
RTOR Reduction (vph)	0	10	0	0	1	0	0	0	12	0	0	41
Lane Group Flow (vph)	181	764	0	396	438	0	22	703	411	55	560	14
Heavy Vehicles (%)	10%	5%	0%	5%	5%	0%	0%	5%	5%	10%	5%	10%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	Perm
Protected Phases	5	2		1	6			8	8 1		4	
Permitted Phases							8			4		4
Actuated Green, G (s)	9.3	16.5		15.4	22.6		15.6	15.6	35.0	15.6	15.6	15.6
Effective Green, g (s)	9.3	16.5		15.4	22.6		15.6	15.6	35.0	15.6	15.6	15.6
Actuated g/C Ratio	0.16	0.28		0.26	0.38		0.26	0.26	0.59	0.26	0.26	0.26
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	256	946		445	1304		155	901	905	116	901	385
v/s Ratio Prot	0.11	c0.22		c0.23	0.13			c0.20	0.27		0.16	
v/s Ratio Perm							0.04			0.12		0.01
v/c Ratio	0.71	0.81		0.89	0.34		0.14	0.78	0.45	0.47	0.62	0.04
Uniform Delay, d1	23.8	20.0		21.2	13.1		16.8	20.4	6.9	18.5	19.3	16.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.6	5.1		19.1	0.2		0.4	4.4	0.4	3.0	1.3	0.0
Delay (s)	32.4	25.1		40.3	13.3		17.2	24.8	7.2	21.5	20.7	16.4
Level of Service	C	C		D	B		B	C	A	C	C	B
Approach Delay (s)		26.5			26.1			18.2			20.4	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	22.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	59.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	670	30	205	750	20	10	360	80	10	690	205
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1570	3423		1719	3425		1337	2935	1538	1337	3223	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.25	1.00	1.00	0.45	1.00	1.00
Satd. Flow (perm)	1570	3423		1719	3425		354	2935	1538	635	3223	1538
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	84	807	36	247	904	24	12	434	96	12	831	247
RTOR Reduction (vph)	0	6	0	0	4	0	0	0	14	0	0	29
Lane Group Flow (vph)	84	837	0	247	924	0	12	434	82	12	831	218
Heavy Vehicles (%)	15%	5%	0%	5%	5%	5%	35%	23%	5%	35%	12%	5%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	5.0	16.4		9.8	21.2		15.9	15.9	29.7	15.9	15.9	24.9
Effective Green, g (s)	5.0	16.4		9.8	21.2		15.9	15.9	29.7	15.9	15.9	24.9
Actuated g/C Ratio	0.09	0.30		0.18	0.39		0.29	0.29	0.55	0.29	0.29	0.46
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	145	1038		311	1342		104	863	844	187	947	708
v/s Ratio Prot	0.05	c0.24		c0.14	0.27			0.15	0.05		c0.26	0.14
v/s Ratio Perm							0.03			0.02		
v/c Ratio	0.58	0.81		0.79	0.69		0.12	0.50	0.10	0.06	0.88	0.31
Uniform Delay, d1	23.5	17.4		21.2	13.7		14.0	15.8	5.8	13.7	18.2	9.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.5	4.7		13.0	1.5		0.5	0.5	0.1	0.1	9.2	0.2
Delay (s)	29.1	22.1		34.2	15.2		14.5	16.3	5.9	13.9	27.4	9.4
Level of Service	C	C		C	B		B	B	A	B	C	A
Approach Delay (s)		22.7			19.2			14.4			23.2	
Approach LOS		C			B			B			C	

Intersection Summary			
HCM Average Control Delay	20.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	54.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	430	20	320	355	15	25	400	245	35	355	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3416		1719	3424		1641	2983	1538	1719	2935	1404
Flt Permitted	0.95	1.00		0.95	1.00		0.52	1.00	1.00	0.47	1.00	1.00
Satd. Flow (perm)	1719	3416		1719	3424		890	2983	1538	845	2935	1404
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	168	439	20	327	362	15	26	408	250	36	362	173
RTOR Reduction (vph)	0	5	0	0	5	0	0	0	49	0	0	82
Lane Group Flow (vph)	168	454	0	327	372	0	26	408	201	36	362	91
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	10%	21%	5%	5%	23%	15%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	9.8	12.2		13.8	16.2		13.0	13.0	30.8	13.0	13.0	26.8
Effective Green, g (s)	9.8	12.2		13.8	16.2		13.0	13.0	30.8	13.0	13.0	26.8
Actuated g/C Ratio	0.19	0.24		0.27	0.32		0.25	0.25	0.60	0.25	0.25	0.53
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	330	817		465	1088		227	760	929	215	748	738
v/s Ratio Prot	0.10	c0.13		c0.19	c0.11			c0.14	0.13		0.12	0.06
v/s Ratio Perm							0.03			0.04		
v/c Ratio	0.51	0.56		0.70	0.34		0.11	0.54	0.22	0.17	0.48	0.12
Uniform Delay, d1	18.4	17.0		16.8	13.3		14.6	16.4	4.6	14.8	16.1	6.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.8		4.8	0.2		0.2	0.7	0.1	0.4	0.5	0.1
Delay (s)	19.7	17.8		21.5	13.5		14.8	17.1	4.7	15.2	16.6	6.2
Level of Service	B	B		C	B		B	B	A	B	B	A
Approach Delay (s)		18.3			17.2			12.5			13.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	15.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	51.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	58.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	650	55	360	395	5	20	690	385	50	560	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3411		1719	3434		1805	3223	1538	1641	3195	1468
Flt Permitted	0.95	1.00		0.95	1.00		0.27	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	1641	3411		1719	3434		515	3223	1538	432	3195	1468
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	181	714	60	396	434	5	22	758	423	55	615	55
RTOR Reduction (vph)	0	10	0	0	1	0	0	0	12	0	0	28
Lane Group Flow (vph)	181	764	0	396	438	0	22	758	411	55	615	27
Heavy Vehicles (%)	10%	5%	0%	5%	5%	0%	0%	12%	5%	10%	13%	10%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	9.4	16.5		15.5	22.6		16.0	16.0	35.5	16.0	16.0	29.4
Effective Green, g (s)	9.4	16.5		15.5	22.6		16.0	16.0	35.5	16.0	16.0	29.4
Actuated g/C Ratio	0.16	0.28		0.26	0.38		0.27	0.27	0.59	0.27	0.27	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	257	938		444	1293		137	859	910	115	852	719
v/s Ratio Prot	0.11	c0.22		c0.23	0.13			c0.24	0.27		0.19	0.02
v/s Ratio Perm							0.04			0.13		
v/c Ratio	0.70	0.81		0.89	0.34		0.16	0.88	0.45	0.48	0.72	0.04
Uniform Delay, d1	24.0	20.3		21.4	13.4		16.9	21.1	6.8	18.5	20.0	7.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.5	5.5		19.6	0.2		0.6	10.6	0.4	3.1	3.0	0.0
Delay (s)	32.5	25.8		41.1	13.5		17.4	31.7	7.2	21.6	23.0	8.0
Level of Service	C	C		D	B		B	C	A	C	C	A
Approach Delay (s)		27.1			26.6			22.8			21.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.6	HCM Level of Service	C
HCM Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	75	730	35	225	820	20	10	390	85	10	750	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1570	3422		1719	3426		1337	3282	1538	1337	3438	1538
Flt Permitted	0.95	1.00		0.95	1.00		0.25	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)	1570	3422		1719	3426		352	3282	1538	586	3438	1538
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	90	880	42	271	988	24	12	470	102	12	904	271
RTOR Reduction (vph)	0	6	0	0	3	0	0	0	10	0	0	21
Lane Group Flow (vph)	90	916	0	271	1009	0	12	470	92	12	904	250
Heavy Vehicles (%)	15%	5%	0%	5%	5%	5%	35%	10%	5%	35%	5%	5%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	5.0	16.8		10.0	21.8		16.0	16.0	30.0	16.0	16.0	25.0
Effective Green, g (s)	5.0	16.8		10.0	21.8		16.0	16.0	30.0	16.0	16.0	25.0
Actuated g/C Ratio	0.09	0.31		0.18	0.40		0.29	0.29	0.55	0.29	0.29	0.46
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	143	1049		314	1363		103	958	842	171	1004	702
v/s Ratio Prot	0.06	c0.27		c0.16	0.29			0.14	0.06		c0.26	0.16
v/s Ratio Perm							0.03			0.02		
v/c Ratio	0.63	0.87		0.86	0.74		0.12	0.49	0.11	0.07	0.90	0.36
Uniform Delay, d1	24.0	18.0		21.7	14.1		14.2	16.0	6.0	14.0	18.6	9.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	8.4	8.2		20.9	2.2		0.5	0.4	0.1	0.2	10.9	0.3
Delay (s)	32.4	26.2		42.7	16.3		14.7	16.4	6.0	14.2	29.6	10.0
Level of Service	C	C		D	B		B	B	A	B	C	A
Approach Delay (s)		26.7			21.9			14.6			24.9	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM Average Control Delay	22.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	54.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	470	20	350	385	15	25	435	265	40	405	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	0.99		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3417		1719	3425		1641	3282	1538	1719	3282	1404
Flt Permitted	0.95	1.00		0.95	1.00		0.46	1.00	1.00	0.42	1.00	1.00
Satd. Flow (perm)	1719	3417		1719	3425		787	3282	1538	768	3282	1404
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	184	480	20	357	393	15	26	444	270	41	413	189
RTOR Reduction (vph)	0	5	0	0	5	0	0	0	40	0	0	90
Lane Group Flow (vph)	184	495	0	357	403	0	26	444	230	41	413	99
Heavy Vehicles (%)	5%	5%	5%	5%	5%	0%	10%	10%	5%	5%	10%	15%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	10.4	13.0		14.3	16.9		13.1	13.1	31.4	13.1	13.1	27.5
Effective Green, g (s)	10.4	13.0		14.3	16.9		13.1	13.1	31.4	13.1	13.1	27.5
Actuated g/C Ratio	0.20	0.25		0.27	0.32		0.25	0.25	0.60	0.25	0.25	0.52
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	341	848		469	1105		197	821	922	192	821	737
v/s Ratio Prot	0.11	c0.14		c0.21	c0.12			c0.14	0.15		0.13	0.07
v/s Ratio Perm							0.03			0.05		
v/c Ratio	0.54	0.58		0.76	0.36		0.13	0.54	0.25	0.21	0.50	0.13
Uniform Delay, d1	18.9	17.3		17.5	13.6		15.2	17.0	4.9	15.6	16.9	6.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.0		7.2	0.2		0.3	0.7	0.1	0.6	0.5	0.1
Delay (s)	20.5	18.3		24.6	13.8		15.5	17.8	5.1	16.1	17.3	6.4
Level of Service	C	B		C	B		B	B	A	B	B	A
Approach Delay (s)		18.9			18.9			13.1			14.1	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	52.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
34: Glenoaks Blvd & Sunland Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	710	60	390	430	5	20	750	420	55	610	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.99		1.00	1.00		1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1641	3411		1719	3434		1805	3438	1538	1641	3438	1468
Flt Permitted	0.95	1.00		0.95	1.00		0.25	1.00	1.00	0.25	1.00	1.00
Satd. Flow (perm)	1641	3411		1719	3434		475	3438	1538	432	3438	1468
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	198	780	66	429	473	5	22	824	462	60	670	60
RTOR Reduction (vph)	0	10	0	0	1	0	0	0	8	0	0	28
Lane Group Flow (vph)	198	836	0	429	477	0	22	824	454	60	670	32
Heavy Vehicles (%)	10%	5%	0%	5%	5%	0%	0%	5%	5%	10%	5%	10%
Turn Type	Prot	NA		Prot	NA		Perm	NA	pt+ov	Perm	NA	pt+ov
Protected Phases	5	2		1	6			8	8 1		4	4 5
Permitted Phases							8			4		
Actuated Green, G (s)	11.7	16.0		16.0	20.3		16.0	16.0	36.0	16.0	16.0	31.7
Effective Green, g (s)	11.7	16.0		16.0	20.3		16.0	16.0	36.0	16.0	16.0	31.7
Actuated g/C Ratio	0.19	0.27		0.27	0.34		0.27	0.27	0.60	0.27	0.27	0.53
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	320	910		458	1162		127	917	923	115	917	776
v/s Ratio Prot	0.12	c0.25		c0.25	0.14			c0.24	0.30		0.19	0.02
v/s Ratio Perm							0.05			0.14		
v/c Ratio	0.62	0.92		0.94	0.41		0.17	0.90	0.49	0.52	0.73	0.04
Uniform Delay, d1	22.1	21.4		21.5	15.3		16.9	21.2	6.8	18.7	20.0	6.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.5	13.8		26.7	0.2		0.7	11.5	0.4	4.2	3.0	0.0
Delay (s)	25.7	35.2		48.2	15.5		17.6	32.7	7.2	23.0	23.1	6.8
Level of Service	C	D		D	B		B	C	A	C	C	A
Approach Delay (s)		33.4			30.9			23.4			21.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	27.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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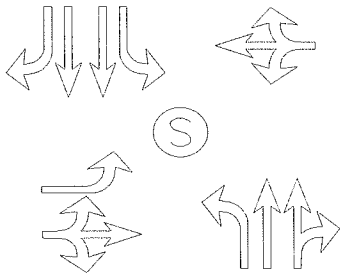
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	175	26%	**50**	225	20	245
EB THRU	0	0%		0	0	0
EB RIGHT	75	10%		75	5	80
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
GLEN OAKS BLVD						
NB LEFT	70	10%		70	5	75
NB THRU	275	5%		275	25	300
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	520	5%		520	45	565
SB RIGHT	420	15%	**50**	470	40	510
TOTALS	**1535**		**100**	**1635**	**140**	**1775**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	240	21%	**50**	290	25	315
EB THRU	0	0%		0	0	0
EB RIGHT	90	20%		90	10	100
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
GLEN OAKS BLVD						
NB LEFT	75	10%		75	5	80
NB THRU	370	5%		370	35	405
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	355	10%		355	30	385
SB RIGHT	305	18%	**50**	355	30	385
TOTALS	**1435**		**100**	**1535**	**135**	**1670**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

ROSCOE BLVD

EB LEFT	545	13%	**50**	595	55	650
EB THRU	0	0%		0	0	0
EB RIGHT	120	10%		120	10	130
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

GLEN OAKS BLVD

NB LEFT	65	10%		65	5	70
NB THRU	540	5%		540	50	590
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	530	5%		530	50	580
SB RIGHT	420	15%	**50**	470	40	510
TOTALS	**2220**		**100**	**2320**	**210**	**2530**

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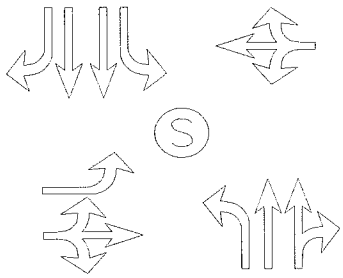
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	169	7	21	190	**150**	340	30	370
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	70	6	18	90	**0**	90	10	100
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
GLEN OAKS BLVD								
NB LEFT	63	7	21	85	**0**	85	5	90
NB THRU	258	15	45	305	**0**	305	25	330
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	501	19	57	560	**0**	560	50	610
SB RIGHT	415	7	21	435	**150**	585	55	640
TOTALS	**1476**				**300**	**1965**	**175**	**2140**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	231	7	21	250	**150**	400	35	435
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	70	18	54	125	**0**	125	10	135
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
GLEN OAKS BLVD								
NB LEFT	66	9	27	95	**0**	95	10	105
NB THRU	349	20	60	410	**0**	410	35	445
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	327	29	87	415	**0**	415	35	450
SB RIGHT	287	17	51	340	**150**	490	45	535
TOTALS	**1330**				**300**	**1935**	**170**	**2105**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : GLEN OAKS BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
35
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	539	6	18	555	**150**	705	65	770
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	108	13	39	145	**0**	145	15	160
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
GLEN OAKS BLVD								
NB LEFT	60	7	21	80	**0**	80	5	85
NB THRU	520	20	60	580	**0**	580	50	630
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	511	21	63	575	**0**	575	50	625
SB RIGHT	411	8	24	435	**150**	585	55	640
TOTALS	**2149**				**300**	**2670**	**240**	**2910**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: GLEN OAKS BLVD DATE:
JURISDICTION: LA

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG TOTAL: 343

	1st	2nd	3rd	4th	Total
Rt					
Thru	62	59	73	79	273
Lt	12	19	23	16	70

	Total	1st	2nd	3rd	4th
Lt					
Thru	520	112	142	129	137
Rt	422	109	91	108	114

WEST LEG TOTAL: 942

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.90
EAST LEG = 0.89
WEST LEG = 0.94

ALL LEGS = 0.95

	Lt	Thru	Rt
1st	48		14
2nd	44		22
3rd	51		19
4th	33		21
Total	176		76

TOTAL: 252

SOUTH LEG

HOUR TOTAL: 1,537

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 07:00AM-08:00AM DATE:

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	62	59	73	79	273
Lt	12	19	23	16	70

Total	1st	2nd	3rd	4th	
					Lt
520	112	142	129	137	Thru
422	109	91	108	114	Rt

	Lt	Thru	Rt
1st	48		14
2nd	44		22
3rd	51		19
4th	33		21
Total	176		76

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 08:00AM-09:00AM DATE:

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	48	66	69	59	242
Lt	19	22	20	14	75

	Total	1st	2nd	3rd	4th
Lt					
Thru	493	144	132	118	99
Rt	287	79	51	76	81

	Lt	Thru	Rt
1st	41		23
2nd	23		19
3rd	29		19
4th	21		16
Total	114		77

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : GLEN OAKS BLVD

BEGINNING TIME : 07:00AM = 7:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
10	0	46	2	0	1	1	0	1	1	0	0	62
22	0	42	0	0	1	0	0	1	0	0	0	66
19	0	49	0	0	1	0	0	0	0	0	1	70
19	0	32	1	0	0	0	0	0	1	0	1	54
20	0	41	1	0	0	1	0	0	1	0	0	64
18	0	22	0	0	1	0	0	0	1	0	0	42
19	0	28	0	0	1	0	0	0	0	0	0	48
14	0	20	1	0	1	1	0	0	0	0	0	37
141	0	280	5	0	6	3	0	2	4	0	2	443
						EAST LEG						
0	60	9	0	2	1	0	0	1	0	0	1	74
0	58	17	0	1	0	0	0	1	0	0	1	78
0	67	22	0	4	0	0	2	1	0	0	0	96
0	73	15	0	5	1	0	0	0	0	1	0	95
0	40	17	0	7	1	0	1	0	0	0	1	67
0	62	21	0	3	1	0	1	0	0	0	0	88
0	61	20	0	5	0	0	2	0	0	1	0	89
0	57	12	0	1	1	0	0	1	0	1	0	73
0	478	133	0	28	5	0	6	4	0	3	3	660
						WEST LEG						
106	109	0	1	2	0	1	1	0	1	0	0	221
89	138	0	2	3	0	0	0	0	0	1	0	233
108	123	0	0	5	0	0	0	0	0	1	0	237
112	131	0	1	4	0	0	2	0	1	0	0	251
77	138	0	1	4	0	1	2	0	0	0	0	223
51	127	0	0	3	0	0	1	0	0	1	0	183
76	113	0	0	4	0	0	0	0	0	1	0	194
78	95	0	2	2	0	1	1	0	0	1	0	180
697	974	0	7	27	0	3	7	0	2	5	0	1722

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: GLEN OAKS BLVD
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 12:45PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG TOTAL: 444

	1st	2nd	3rd	4th	Total
Rt					
Thru	83	103	98	85	369
Lt	14	20	21	20	75

	Total	1st	2nd	3rd	4th
Lt					
Thru	356	101	93	70	92
Rt	304	65	86	60	93

WEST LEG TOTAL: 660

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.94
EAST LEG = 0.90
WEST LEG = 0.89

ALL LEGS = 0.92

	Lt	Thru	Rt
1st	45		29
2nd	62		25
3rd	67		19
4th	64		15
Total	238		88

TOTAL: 326

SOUTH LEG

HOUR TOTAL: 1,430

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 12:00PM-01:00PM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	71	60	73	83	287
Lt	13	15	17	14	59

	Total	1st	2nd	3rd	4th
Lt					
Thru	406	92	100	113	101
Rt	311	82	75	89	65

	Lt	Thru	Rt
1st	41		21
2nd	41		14
3rd	43		23
4th	45		29
Total	170		87

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 01:00PM-02:00PM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	103	98	85	80	366
Lt	20	21	20	19	80

	Total	1st	2nd	3rd	4th
Lt					
Thru	355	93	70	92	100
Rt	307	86	60	93	68

	Lt	Thru	Rt
1st	62		25
2nd	67		19
3rd	64		15
4th	55		11
Total	248		70

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : GLEN OAKS BLVD 05-22-12

BEGINNING TIME : 12:00PM PH: 12:45PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
18	0	35	2	0	3	0	0	2	1	0	1	62
10	0	36	3	0	2	0	0	2	1	0	1	55
18	0	41	4	0	1	1	0	1	0	0	0	66
21	0	43	4	0	1	2	0	1	2	0	0	74
22	0	60	2	0	2	1	0	0	0	0	0	87
14	0	66	5	0	1	0	0	0	0	0	0	86
13	0	62	2	0	1	0	0	0	0	0	1	79
7	0	55	2	0	0	1	0	0	1	0	0	66
123	0	398	24	0	11	5	0	6	5	0	3	575
						EAST LEG						
0	66	10	0	2	1	0	2	1	0	1	1	84
0	57	14	0	3	1	0	0	0	0	0	0	75
0	69	17	0	2	0	0	1	0	0	1	0	90
0	79	11	0	2	0	0	1	1	0	1	2	97
0	96	17	0	5	1	0	0	0	0	2	2	123
0	95	19	0	3	1	0	0	0	0	0	1	119
0	79	19	0	4	1	0	2	0	0	0	0	105
0	74	19	0	2	0	0	1	0	0	3	0	99
0	615	126	0	23	5	0	7	2	0	8	6	792
						WEST LEG						
78	86	0	2	3	0	1	2	0	1	1	0	174
73	95	0	1	5	0	0	0	0	1	0	0	175
86	106	0	1	4	0	0	3	0	2	0	0	202
62	93	0	3	3	0	0	3	0	0	2	0	166
83	89	0	2	2	0	1	1	0	0	1	0	179
56	62	0	2	6	0	2	1	0	0	1	0	130
86	83	0	5	6	0	1	0	0	1	3	0	185
67	91	0	1	7	0	0	2	0	0	0	0	168
591	705	0	17	36	0	5	12	0	5	8	0	1379

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: GLEN OAKS BLVD
JURISDICTION: LA

DATE: 05-22-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG TOTAL: 607

	1st	2nd	3rd	4th	Total
Rt					
Thru	130	149	152	109	540
Lt	16	20	10	21	67

	Total	1st	2nd	3rd	4th
Lt					
Thru	532	123	140	153	116
Rt	419	92	125	115	87

WEST LEG TOTAL: 951

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.92
EAST LEG = 0.90
WEST LEG = 0.89

ALL LEGS = 0.94

	Lt	Thru	Rt
1st	145		23
2nd	132		21
3rd	132		32
4th	136		45
Total	545		121

TOTAL: 666

SOUTH LEG

HOUR TOTAL: 2,224

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 04:00PM-05:00PM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	137	79	75	114	405
Lt	17	17	16	20	70

	Total	1st	2nd	3rd	4th
Lt					
Thru	421	105	87	113	116
Rt	337	87	88	90	72

	Lt	Thru	Rt
1st	79		17
2nd	107		14
3rd	126		35
4th	132		31
Total	444		97

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: GLEN OAKS BLVD

TIME: 05:00PM-06:00PM DATE: 05-22-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	130	149	152	109	540
Lt	16	20	10	21	67

	Total	1st	2nd	3rd	4th
Lt					
Thru	532	123	140	153	116
Rt	419	92	125	115	87

	Lt	Thru	Rt
1st	145		23
2nd	132		21
3rd	132		32
4th	136		45
Total	545		121

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : GLEN OAKS BLVD 05-22-12

BEGINNING TIME : 04:00PM PH: 5 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
10	0	74	3	0	2	3	0	2	1	0	1	96
7	0	103	5	0	2	1	0	1	1	0	1	121
28	0	123	4	0	1	1	0	1	2	0	1	161
26	0	130	2	0	1	0	0	0	3	0	1	163
21	0	145	2	0	0	0	0	0	0	0	0	168
18	0	130	3	0	2	0	0	0	0	0	0	153
28	0	131	3	0	1	1	0	0	0	0	0	164
41	0	133	3	0	2	0	0	0	1	0	1	181
179	0	969	25	0	11	6	0	4	8	0	5	1207
						EAST LEG						
0	135	13	0	2	3	0	0	0	0	0	1	154
0	76	13	0	3	2	0	0	1	0	0	1	96
0	69	14	0	4	1	0	1	1	0	1	0	91
0	109	17	0	2	1	0	1	2	0	2	0	134
0	125	16	0	2	0	0	2	0	0	1	0	146
0	145	20	0	3	0	0	0	0	0	1	0	169
0	148	8	0	3	1	0	0	1	0	1	0	162
0	102	16	0	4	2	0	2	2	0	1	1	130
0	909	117	0	23	10	0	6	7	0	7	3	1082
						WEST LEG						
84	101	0	2	3	0	1	0	0	0	1	0	192
84	80	0	3	4	0	0	0	0	1	3	0	175
83	107	0	5	3	0	0	1	0	2	2	0	203
65	110	0	4	5	0	1	1	0	2	0	0	188
90	119	0	2	2	0	0	2	0	0	0	0	215
123	137	0	2	2	0	0	0	0	0	1	0	265
113	145	0	2	5	0	0	1	0	0	2	0	268
85	110	0	1	4	0	0	1	0	1	1	0	203
727	909	0	21	28	0	2	6	0	6	10	0	1709

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	0	75	0	0	0	70	275	0	0	520	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.91					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.98					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1633	1684					1641	3438			3438	1538
Flt Permitted	0.76	0.90					0.45	1.00			1.00	1.00
Satd. Flow (perm)	1302	1537					773	3438			3438	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	184	0	79	0	0	0	74	289	0	0	547	442
RTOR Reduction (vph)	0	55	0	0	0	0	0	0	0	0	0	256
Lane Group Flow (vph)	136	72	0	0	0	0	74	289	0	0	547	186
Heavy Vehicles (%)	5%	0%	10%	0%	0%	0%	10%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	8.7	8.7					12.1	12.1			12.1	12.1
Effective Green, g (s)	8.7	8.7					12.1	12.1			12.1	12.1
Actuated g/C Ratio	0.30	0.30					0.42	0.42			0.42	0.42
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	393	464					325	1444			1444	646
v/s Ratio Prot								0.08			c0.16	
v/s Ratio Perm	c0.10	0.05					0.10					0.12
v/c Ratio	0.35	0.15					0.23	0.20			0.38	0.29
Uniform Delay, d1	7.8	7.4					5.4	5.3			5.8	5.5
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	0.5	0.2					0.4	0.1			0.2	0.2
Delay (s)	8.4	7.5					5.7	5.4			5.9	5.8
Level of Service	A	A					A	A			A	A
Approach Delay (s)		8.0			0.0			5.4			5.8	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	28.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	0	90	0	0	0	75	370	0	0	355	305
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.92					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.98					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1633	1616					1641	3438			3282	1538
Flt Permitted	0.76	0.88					0.52	1.00			1.00	1.00
Satd. Flow (perm)	1302	1448					904	3438			3282	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	261	0	98	0	0	0	82	402	0	0	386	332
RTOR Reduction (vph)	0	64	0	0	0	0	0	0	0	0	0	208
Lane Group Flow (vph)	185	110	0	0	0	0	82	402	0	0	386	124
Heavy Vehicles (%)	5%	0%	20%	0%	0%	0%	10%	5%	0%	0%	10%	5%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	9.8	9.8					10.6	10.6			10.6	10.6
Effective Green, g (s)	9.8	9.8					10.6	10.6			10.6	10.6
Actuated g/C Ratio	0.35	0.35					0.37	0.37			0.37	0.37
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	449	500					337	1283			1225	574
v/s Ratio Prot								0.12			c0.12	
v/s Ratio Perm	c0.14	0.08					0.09					0.08
v/c Ratio	0.41	0.22					0.24	0.31			0.32	0.22
Uniform Delay, d1	7.1	6.6					6.1	6.3			6.3	6.1
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	0.6	0.2					0.4	0.1			0.1	0.2
Delay (s)	7.7	6.8					6.5	6.5			6.5	6.3
Level of Service	A	A					A	A			A	A
Approach Delay (s)		7.3			0.0			6.5			6.4	
Approach LOS		A			A			A			A	

Intersection Summary

HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	28.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	545	0	120	0	0	0	65	540	0	0	530	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.94					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.97					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1633	1754					1641	3438			3438	1538
Flt Permitted	0.76	0.81					0.43	1.00			1.00	1.00
Satd. Flow (perm)	1302	1461					744	3438			3438	1538
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	580	0	128	0	0	0	69	574	0	0	564	447
RTOR Reduction (vph)	0	53	0	0	0	0	0	0	0	0	0	278
Lane Group Flow (vph)	360	295	0	0	0	0	69	574	0	0	564	169
Heavy Vehicles (%)	5%	0%	10%	0%	0%	0%	10%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	13.7	13.7					13.2	13.2			13.2	13.2
Effective Green, g (s)	13.7	13.7					13.2	13.2			13.2	13.2
Actuated g/C Ratio	0.39	0.39					0.38	0.38			0.38	0.38
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	511	574					281	1300			1300	582
v/s Ratio Prot								c0.17			0.16	
v/s Ratio Perm	c0.28	0.20					0.09					0.11
v/c Ratio	0.70	0.51					0.25	0.44			0.43	0.29
Uniform Delay, d1	8.9	8.1					7.4	8.1			8.1	7.6
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	4.4	0.8					0.5	0.2			0.2	0.3
Delay (s)	13.3	8.8					7.9	8.3			8.3	7.9
Level of Service	B	A					A	A			A	A
Approach Delay (s)		11.1			0.0			8.3			8.1	
Approach LOS		B			A			A			A	

Intersection Summary

HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	34.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	225	0	75	0	0	0	70	275	0	0	520	470
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.92					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.98					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1361	1565					1641	3438			3438	1404
Flt Permitted	0.76	0.87					0.45	1.00			1.00	1.00
Satd. Flow (perm)	1085	1389					773	3438			3438	1404
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	237	0	79	0	0	0	74	289	0	0	547	495
RTOR Reduction (vph)	0	53	0	0	0	0	0	0	0	0	0	288
Lane Group Flow (vph)	164	99	0	0	0	0	74	289	0	0	547	207
Heavy Vehicles (%)	26%	0%	10%	0%	0%	0%	10%	5%	0%	0%	5%	15%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	10.1	10.1					13.0	13.0			13.0	13.0
Effective Green, g (s)	10.1	10.1					13.0	13.0			13.0	13.0
Actuated g/C Ratio	0.32	0.32					0.42	0.42			0.42	0.42
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	352	451					323	1437			1437	587
v/s Ratio Prot								0.08			c0.16	
v/s Ratio Perm	c0.15	0.07					0.10					0.15
v/c Ratio	0.47	0.22					0.23	0.20			0.38	0.35
Uniform Delay, d1	8.4	7.6					5.8	5.8			6.3	6.2
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	1.0	0.2					0.4	0.1			0.2	0.4
Delay (s)	9.3	7.9					6.2	5.8			6.4	6.5
Level of Service	A	A					A	A			A	A
Approach Delay (s)		8.6			0.0			5.9			6.5	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	31.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	290	0	90	0	0	0	75	370	0	0	355	355
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.93					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.97					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1417	1534					1641	3438			3282	1369
Flt Permitted	0.76	0.85					0.52	1.00			1.00	1.00
Satd. Flow (perm)	1130	1341					904	3438			3282	1369
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	0	98	0	0	0	82	402	0	0	386	386
RTOR Reduction (vph)	0	62	0	0	0	0	0	0	0	0	0	245
Lane Group Flow (vph)	211	140	0	0	0	0	82	402	0	0	386	141
Heavy Vehicles (%)	21%	0%	20%	0%	0%	0%	10%	5%	0%	0%	10%	18%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	10.8	10.8					10.8	10.8			10.8	10.8
Effective Green, g (s)	10.8	10.8					10.8	10.8			10.8	10.8
Actuated g/C Ratio	0.36	0.36					0.36	0.36			0.36	0.36
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	412	489					330	1254			1197	500
v/s Ratio Prot								0.12			c0.12	
v/s Ratio Perm	c0.19	0.10					0.09					0.10
v/c Ratio	0.51	0.29					0.25	0.32			0.32	0.28
Uniform Delay, d1	7.3	6.7					6.6	6.8			6.8	6.7
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	1.1	0.3					0.4	0.1			0.2	0.3
Delay (s)	8.4	7.0					7.0	6.9			6.9	7.0
Level of Service	A	A					A	A			A	A
Approach Delay (s)		7.7			0.0			6.9			6.9	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	29.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	595	0	120	0	0	0	65	540	0	0	530	470
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.95					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.97					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1517	1678					1641	3438			3438	1404
Flt Permitted	0.76	0.80					0.41	1.00			1.00	1.00
Satd. Flow (perm)	1210	1389					710	3438			3438	1404
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	633	0	128	0	0	0	69	574	0	0	564	500
RTOR Reduction (vph)	0	44	0	0	0	0	0	0	0	0	0	323
Lane Group Flow (vph)	386	331	0	0	0	0	69	574	0	0	564	177
Heavy Vehicles (%)	13%	0%	10%	0%	0%	0%	10%	5%	0%	0%	5%	15%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	16.9	16.9					13.7	13.7			13.7	13.7
Effective Green, g (s)	16.9	16.9					13.7	13.7			13.7	13.7
Actuated g/C Ratio	0.44	0.44					0.35	0.35			0.35	0.35
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	530	608					252	1220			1220	498
v/s Ratio Prot								c0.17			0.16	
v/s Ratio Perm	c0.32	0.24					0.10					0.13
v/c Ratio	0.73	0.54					0.27	0.47			0.46	0.36
Uniform Delay, d1	9.0	8.0					8.9	9.6			9.6	9.2
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	5.0	1.0					0.6	0.3			0.3	0.4
Delay (s)	13.9	9.0					9.5	9.9			9.9	9.6
Level of Service	B	A					A	A			A	A
Approach Delay (s)		11.5			0.0			9.9			9.8	
Approach LOS		B			A			A			A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	38.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	245	0	80	0	0	0	75	300	0	0	565	510
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.92					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.98					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1633	1716					1641	3438			3438	1538
Flt Permitted	0.76	0.86					0.43	1.00			1.00	1.00
Satd. Flow (perm)	1302	1508					738	3438			3438	1538
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	258	0	84	0	0	0	79	316	0	0	595	537
RTOR Reduction (vph)	0	57	0	0	0	0	0	0	0	0	0	307
Lane Group Flow (vph)	175	110	0	0	0	0	79	316	0	0	595	230
Heavy Vehicles (%)	5%	0%	10%	0%	0%	0%	10%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	10.0	10.0					13.5	13.5			13.5	13.5
Effective Green, g (s)	10.0	10.0					13.5	13.5			13.5	13.5
Actuated g/C Ratio	0.32	0.32					0.43	0.43			0.43	0.43
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	413	479					316	1473			1473	659
v/s Ratio Prot								0.09			c0.17	
v/s Ratio Perm	c0.13	0.07					0.11					0.15
v/c Ratio	0.42	0.23					0.25	0.21			0.40	0.35
Uniform Delay, d1	8.5	7.9					5.8	5.7			6.2	6.0
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	0.7	0.2					0.4	0.1			0.2	0.3
Delay (s)	9.2	8.2					6.2	5.7			6.4	6.4
Level of Service	A	A					A	A			A	A
Approach Delay (s)		8.7			0.0			5.8			6.4	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	31.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	315	0	100	0	0	0	80	405	0	0	385	385
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Lane Util. Factor	0.95	0.95					1.00	0.95			0.95	1.00
Frt	1.00	0.93					1.00	1.00			1.00	0.85
Flt Protected	0.95	0.98					0.95	1.00			1.00	1.00
Satd. Flow (prot)	1633	1641					1641	3438			3282	1538
Flt Permitted	0.76	0.85					0.51	1.00			1.00	1.00
Satd. Flow (perm)	1302	1435					877	3438			3282	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	342	0	109	0	0	0	87	440	0	0	418	418
RTOR Reduction (vph)	0	70	0	0	0	0	0	0	0	0	0	261
Lane Group Flow (vph)	233	148	0	0	0	0	87	440	0	0	418	157
Heavy Vehicles (%)	5%	0%	20%	0%	0%	0%	10%	5%	0%	0%	10%	5%
Turn Type	Perm	NA		Perm			Perm	NA		Perm	NA	Perm
Protected Phases		2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	10.8	10.8					11.3	11.3			11.3	11.3
Effective Green, g (s)	10.8	10.8					11.3	11.3			11.3	11.3
Actuated g/C Ratio	0.36	0.36					0.38	0.38			0.38	0.38
Clearance Time (s)	4.0	4.0					4.0	4.0			4.0	4.0
Vehicle Extension (s)	3.0	3.0					3.0	3.0			3.0	3.0
Lane Grp Cap (vph)	467	515					329	1291			1232	577
v/s Ratio Prot								c0.13			0.13	
v/s Ratio Perm	c0.18	0.10					0.10					0.10
v/c Ratio	0.50	0.29					0.26	0.34			0.34	0.27
Uniform Delay, d1	7.5	6.9					6.5	6.7			6.7	6.5
Progression Factor	1.00	1.00					1.00	1.00			1.00	1.00
Incremental Delay, d2	0.8	0.3					0.4	0.2			0.2	0.3
Delay (s)	8.4	7.2					7.0	6.9			6.9	6.8
Level of Service	A	A					A	A			A	A
Approach Delay (s)		7.8			0.0			6.9			6.8	
Approach LOS		A			A			A			A	

Intersection Summary			
HCM Average Control Delay	7.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	30.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
35: Glenoaks Blvd & Roscoe Blvd

9/3/2013

Movement	EBL2	EBL	EBR	NBL	NBT	NBR	SBL	SBT	SBR	SWL	SWR
Lane Configurations											
Volume (vph)	650	0	130	70	590	0	0	580	510	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	16	12	12	12	12	12	12	12	12	12
Total Lost time (s)	4.0	4.0		4.0	4.0			4.0	4.0		
Lane Util. Factor	0.95	0.95		1.00	0.95			0.95	1.00		
Frt	1.00	0.95		1.00	1.00			1.00	0.85		
Flt Protected	0.95	0.97		0.95	1.00			1.00	1.00		
Satd. Flow (prot)	1633	1762		1641	3438			3438	1538		
Flt Permitted	0.76	0.80		0.39	1.00			1.00	1.00		
Satd. Flow (perm)	1302	1457		670	3438			3438	1538		
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	691	0	138	74	628	0	0	617	543	0	0
RTOR Reduction (vph)	0	46	0	0	0	0	0	0	337	0	0
Lane Group Flow (vph)	422	361	0	74	628	0	0	617	206	0	0
Heavy Vehicles (%)	5%	0%	10%	10%	5%	0%	0%	5%	5%	0%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm		custom
Protected Phases		2			8			4			6
Permitted Phases	2			8			4		4		
Actuated Green, G (s)	14.7	14.7		13.9	13.9			13.9	13.9		
Effective Green, g (s)	14.7	14.7		13.9	13.9			13.9	13.9		
Actuated g/C Ratio	0.40	0.40		0.38	0.38			0.38	0.38		
Clearance Time (s)	4.0	4.0		4.0	4.0			4.0	4.0		
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0	3.0		
Lane Grp Cap (vph)	523	585		254	1306			1306	584		
v/s Ratio Prot					c0.18			0.18			
v/s Ratio Perm	c0.32	0.25		0.11					0.13		
v/c Ratio	0.81	0.62		0.29	0.48			0.47	0.35		
Uniform Delay, d1	9.7	8.7		7.9	8.6			8.6	8.1		
Progression Factor	1.00	1.00		1.00	1.00			1.00	1.00		
Incremental Delay, d2	8.9	1.9		0.6	0.3			0.3	0.4		
Delay (s)	18.6	10.7		8.6	8.9			8.8	8.5		
Level of Service	B	B		A	A			A	A		
Approach Delay (s)		14.7			8.9			8.7		0.0	
Approach LOS		B			A			A		A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	36.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

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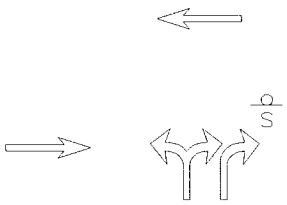
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
36
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	90	10%		90	10	100
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	490	14%	**50**	540	50	590
WB RIGHT	0	0%		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	70	15%		70	5	75
NB THRU	0	0%		0	0	0
NB RIGHT	215	23%	**50**	265	25	290
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**865**		**100**	**965**	**90**	**1055**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
36
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	120	10%		120	10	130
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	375	16%	**50**	425	40	465
WB RIGHT	0	0%		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	60	20%		60	5	65
NB THRU	0	0%		0	0	0
NB RIGHT	235	22%	**50**	285	25	310
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**790**		**100**	**890**	**80**	**970**

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TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
36
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

ROSCOE BLVD

EB LEFT	0	0%		0	0	0
EB THRU	110	15%		110	10	120
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	490	14%	**50**	540	50	590
WB RIGHT	0	0%		0	0	0

NB I-5 FREEWAY RAMPS

NB LEFT	65	20%		65	5	70
NB THRU	0	0%		0	0	0
NB RIGHT	565	13%	**50**	615	55	670
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1230**		**100**	**1330**	**120**	**1450**

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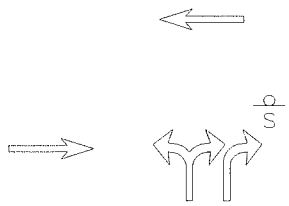
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 36
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	81	7	21	100	**0**	100	10	110
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	481	10	30	510	**150**	660	60	720
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	62	10	30	90	**0**	90	10	100
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	208	7	21	230	**150**	380	35	415
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**832**				**300**	**1230**	**115**	**1345**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
36
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	106	12	36	140	**0**	140	15	155
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	363	13	39	400	**150**	550	50	600
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	49	12	36	85	**0**	85	5	90
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	231	4	12	245	**150**	395	35	430
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**749**				**300**	**1170**	**105**	**1275**

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TURN MOVEMENT SUMMARY	mc	3-Sep-13	VV.110264.0000	3 OF 3

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N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
36
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	94	14	42	135	**0**	135	10	145
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	482	8	24	505	**150**	655	60	715
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	54	12	36	90	**0**	90	10	100
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	559	6	18	575	**150**	725	65	790
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1189**				**300**	**1605**	**145**	**1750**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 NB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 491

	Rt	Thru	Lt
Total		491	
1st		123	
2nd		113	
3rd		133	
4th		122	

EAST LEG TOTAL: 287

	1st	2nd	3rd	4th	Total
Rt	41	60	55	59	215
Thru					
Lt	11	21	17	23	72

WEST LEG TOTAL: 0

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

SOUTH LEG

TOTAL: 88

	Lt	Thru	Rt
1st		25	
2nd		21	
3rd		22	
4th		20	
Total		88	

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.88
EAST LEG = 0.88
WEST LEG =

ALL LEGS = 0.95

HOUR TOTAL: 866

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		491	
1st		123	
2nd		113	
3rd		133	
4th		122	

	1st	2nd	3rd	4th	Total
Rt	41	60	55	59	215
Thru					
Lt	11	21	17	23	72

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		25	
2nd		21	
3rd		22	
4th		20	
Total		88	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		364	
1st		99	
2nd		77	
3rd		90	
4th		98	

	1st	2nd	3rd	4th	Total
Rt	50	45	42	39	176
Thru					
Lt	16	12	10	7	45

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		24	
2nd		21	
3rd		16	
4th		11	
Total		72	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 NB RAMPS 05-23-12

BEGINNING TIME : 07:00AM = PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	119	0	0	0	0	0	2	0	0	2	0	123
0	113	0	0	0	0	0	0	0	0	0	0	113
0	130	0	0	2	0	0	1	0	0	0	0	133
0	119	0	0	2	0	0	1	0	0	0	0	122
0	96	0	0	0	0	0	0	0	0	3	0	99
0	72	0	0	3	0	0	0	0	0	2	0	77
0	87	0	0	2	0	0	1	0	0	0	0	90
0	96	0	0	2	0	0	0	0	0	0	0	98
0	832	0	0	11	0	0	5	0	0	7	0	855
						SOUTH LEG						
0	22	0	0	1	0	0	1	0	0	1	0	25
0	19	0	0	0	0	0	1	0	0	1	0	21
0	22	0	0	0	0	0	0	0	0	0	0	22
0	18	0	0	2	0	0	0	0	0	0	0	20
0	22	0	0	1	0	0	0	0	0	1	0	24
0	20	0	0	0	0	0	1	0	0	0	0	21
0	16	0	0	0	0	0	0	0	0	0	0	16
0	11	0	0	0	0	0	0	0	0	0	0	11
0	150	0	0	4	0	0	3	0	0	3	0	160
						EAST LEG						
38	0	9	2	0	0	0	0	2	1	0	0	52
59	0	19	0	0	2	0	0	0	1	0	0	81
54	0	15	0	0	0	1	0	0	0	0	2	72
57	0	19	1	0	2	1	0	2	0	0	0	82
47	0	13	2	0	2	1	0	0	0	0	1	66
43	0	7	2	0	3	0	0	1	0	0	1	57
42	0	5	0	0	2	0	0	1	0	0	2	52
36	0	4	1	0	2	1	0	0	1	0	1	46
376	0	91	8	0	13	4	0	6	3	0	7	508
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 NB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 12:45PM

NORTH LEG

TOTAL: 376

	Rt	Thru	Lt
Total		376	
1st		72	
2nd		107	
3rd		83	
4th		114	

EAST LEG TOTAL: 296

	1st	2nd	3rd	4th	Total
Rt	63	62	73	37	235
Thru					
Lt	21	11	15	14	61

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.82
SOUTH LEG = 0.80
EAST LEG = 0.84
WEST LEG =

ALL LEGS = 0.95

	Lt	Thru	Rt
1st		36	
2nd		23	
3rd		37	
4th		22	
Total		118	

TOTAL: 118

SOUTH LEG

HOUR TOTAL: 790

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		361	
1st		96	
2nd		90	
3rd		103	
4th		72	

	1st	2nd	3rd	4th	Total
Rt	41	42	28	63	174
Thru					
Lt	11	10	14	21	56

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		23	
2nd		28	
3rd		31	
4th		36	
Total		118	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		393	
1st		107	
2nd		83	
3rd		114	
4th		89	

	1st	2nd	3rd	4th	Total
Rt	62	73	37	50	222
Thru					
Lt	11	15	14	22	62

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		23	
2nd		37	
3rd		22	
4th		28	
Total		110	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 NB RAMPS 05-23-12

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	92	0	0	2	0	0	2	0	0	0	0	96
0	88	0	0	0	0	0	2	0	0	0	0	90
0	102	0	0	1	0	0	0	0	0	0	0	103
0	69	0	0	1	0	0	1	0	0	1	0	72
0	102	0	0	2	0	0	2	0	0	1	0	107
0	79	0	0	0	0	0	2	0	0	2	0	83
0	113	0	0	0	0	0	0	0	0	1	0	114
0	87	0	0	1	0	0	1	0	0	0	0	89
0	732	0	0	7	0	0	10	0	0	5	0	754
						SOUTH LEG						
0	21	0	0	0	0	0	1	0	0	1	0	23
0	27	0	0	0	0	0	1	0	0	0	0	28
0	28	0	0	2	0	0	1	0	0	0	0	31
0	32	0	0	2	0	0	2	0	0	0	0	36
0	21	0	0	2	0	0	0	0	0	0	0	23
0	34	0	0	2	0	0	0	0	0	1	0	37
0	19	0	0	1	0	0	1	0	0	1	0	22
0	27	0	0	1	0	0	0	0	0	0	0	28
0	209	0	0	10	0	0	6	0	0	3	0	228
						EAST LEG						
39	0	6	2	0	2	0	0	1	0	0	2	52
40	0	4	0	0	2	2	0	2	0	0	2	52
23	0	9	2	0	3	2	0	2	1	0	0	42
63	0	17	0	0	4	0	0	0	0	0	0	84
61	0	9	1	0	2	0	0	0	0	0	0	73
71	0	12	1	0	3	0	0	0	1	0	0	88
36	0	11	0	0	2	0	0	1	1	0	0	51
50	0	18	0	0	3	0	0	0	0	0	1	72
383	0	86	6	0	21	4	0	6	3	0	5	514
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 NB RAMPS
JURISDICTION: LA

DATE: 05-23-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 490

	Rt	Thru	Lt
Total		490	
1st		106	
2nd		147	
3rd		129	
4th		108	

EAST LEG

EAST LEG TOTAL: 631

	1st	2nd	3rd	4th	Total
Rt	139	153	145	128	565
Thru					
Lt	13	19	20	14	66

WEST LEG

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

SOUTH LEG

	Lt	Thru	Rt
1st		19	
2nd		34	
3rd		26	
4th		29	
Total		108	

TOTAL: 108

PEAK HOUR FACTORS

NORTH LEG = 0.83
SOUTH LEG = 0.79
EAST LEG = 0.92
WEST LEG =

ALL LEGS = 0.87

HOUR TOTAL: 1,229

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		424	
1st		108	
2nd		108	
3rd		109	
4th		99	

	1st	2nd	3rd	4th	Total
Rt	109	138	143	126	516
Thru					
Lt	13	25	25	19	82

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		9	
2nd		22	
3rd		16	
4th		11	
Total		58	

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 NB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-23-12

NORTH LEG

	Rt	Thru	Lt
Total		490	
1st		106	
2nd		147	
3rd		129	
4th		108	

	1st	2nd	3rd	4th	Total
Rt	139	153	145	128	565
Thru					
Lt	13	19	20	14	66

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st		19	
2nd		34	
3rd		26	
4th		29	
Total		108	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 NB RAMPS 05-23-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	105	0	0	2	0	0	1	0	0	0	0	108
0	108	0	0	0	0	0	0	0	0	0	0	108
0	107	0	0	0	0	0	1	0	0	1	0	109
0	94	0	0	1	0	0	2	0	0	2	0	99
0	104	0	0	1	0	0	0	0	0	1	0	106
0	145	0	0	1	0	0	0	0	0	1	0	147
0	128	0	0	0	0	0	1	0	0	0	0	129
0	105	0	0	1	0	0	1	0	0	1	0	108
0	896	0	0	6	0	0	6	0	0	6	0	914
						SOUTH LEG						
0	5	0	0	2	0	0	1	0	0	1	0	9
0	20	0	0	2	0	0	0	0	0	0	0	22
0	16	0	0	0	0	0	0	0	0	0	0	16
0	10	0	0	1	0	0	0	0	0	0	0	11
0	13	0	0	2	0	0	2	0	0	2	0	19
0	30	0	0	2	0	0	1	0	0	1	0	34
0	24	0	0	2	0	0	0	0	0	0	0	26
0	27	0	0	2	0	0	0	0	0	0	0	29
0	145	0	0	13	0	0	4	0	0	4	0	166
						EAST LEG						
107	0	11	2	0	2	0	0	0	0	0	0	122
133	0	20	3	0	3	1	0	1	1	0	1	163
141	0	19	0	0	2	1	0	2	1	0	2	168
124	0	11	0	0	2	1	0	3	1	0	3	145
139	0	11	0	0	2	0	0	0	0	0	0	152
152	0	17	1	0	2	0	0	0	0	0	0	172
140	0	15	1	0	4	2	0	0	2	0	1	165
128	0	11	0	0	2	0	0	1	0	0	0	142
1064	0	115	7	0	19	5	0	7	5	0	7	1229
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

Intersection	
Intersection Delay (sec/veh):	3.7

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	70	215	90	0	0	480	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	0	0	HCM Control Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	Free	HCM Lane V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	None	HCM Lane LOS	-
Storage Length	250	0					HCM 95th Percentile Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	15	5	10	0	0	5		
Movement Flow Rate	74	226	95	0	0	516		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	611	95	0	-	-	0
Stage 1	95	0	0	-	-	0
Stage 2	516	0	0	-	-	0
Follow-up Headway	3.635	3.345	-	-	-	0
Pot Capacity-1 Maneuver	437	956	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	574	-	-	-	-	-
Mov Capacity-1 Maneuver	437	956	-	-	-	-
Mov Capacity-2 Maneuver	437	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.128	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	4.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	60	235	120	0	0	375	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	0	0	HCM Control Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	Free	HCM Lane V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	None	HCM Lane LOS	-
Storage Length	250	0					HCM 95th Percentile Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	20	5	10	0	0	5		
Movement Flow Rate	63	247	126	0	0	395		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	521	126	0	-	-	0
Stage 1	126	2.73103876999208E-31	1	-	-	0
Stage 2	395	-3.78696930434535E19		-	-	0
Follow-up Headway	3.68	3.345	-	-	-	0
Pot Capacity-1 Maneuver	485	917	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	643	-	-	-	-	-
Mov Capacity-1 Maneuver	485	917	-	-	-	-
Mov Capacity-2 Maneuver	485	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.031	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	9.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	65	565	110	0	0	499	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	0	0	HCM Control Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	Free	HCM Lane V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	None	HCM Lane LOS	-
Storage Length	250	0					HCM 95th Percentile Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87		
Heavy Vehicles(%)	20	5	15	0	0	5		
Movement Flow Rate	75	649	126	0	0	563		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	689	126	0	-	-	0
Stage 1	126	0	0	-	-	0
Stage 2	563	0	0	-	-	0
Follow-up Headway	3.68	3.345	-	-	-	0
Pot Capacity-1 Maneuver	385	917	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	536	-	-	-	-	-
Mov Capacity-1 Maneuver	385	917	-	-	-	-
Mov Capacity-2 Maneuver	385	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	17.676	0	0
HCM LOS	C	A	A

Intersection	
Intersection Delay (sec/veh):	4.1

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	70	265	90	0	0	540	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	0	0	HCM Control Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	Free	HCM Lane V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	None	HCM Lane LOS	-
Storage Length	250	0					HCM 95th Percentile Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	15	23	10	0	0	14		
Movement Flow Rate	74	279	95	0	0	568		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	663	95	0	-	-	0
Stage 1	95	0	0	-	-	0
Stage 2	568	0	0	-	-	0
Follow-up Headway	3.635	3.507	-	-	-	0
Pot Capacity-1 Maneuver	407	903	-	-	-	-
Stage 1	897	-	-	-	-	-
Stage 2	542	-	-	-	-	-
Mov Capacity-1 Maneuver	407	903	-	-	-	-
Mov Capacity-2 Maneuver	407	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.809	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	60	285	120	0	0	425	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	HCM	Control	Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	HCM Lane	V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	HCM Lane	LOS	-
Storage Length	250	0		HCM	95th Per	entile	Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	20	22	10	0	0	16		
Movement Flow Rate	63	300	126	0	0	447		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	573	126	0	-	-	0
Stage 1	126	0	0	-	-	0
Stage 2	447	0	0	-	-	0
Follow-up Headway	3.68	3.498	-	-	-	0
Pot Capacity-1 Maneuver	452	876	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	608	-	-	-	-	-
Mov Capacity-1 Maneuver	452	876	-	-	-	-
Mov Capacity-2 Maneuver	452	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.739	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	11.3

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	65	615	110	0	0	540	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	0	0	HCM Control Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	Free	HCM Lane V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	None	HCM Lane LOS	-
Storage Length	250	0					HCM 95th Percentile Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87		
Heavy Vehicles(%)	20	13	15	0	0	14		
Movement Flow Rate	75	707	126	0	0	621		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	747	126	0	-	-	0
Stage 1	126	0	0	-	-	0
Stage 2	621	0	0	-	-	0
Follow-up Headway	3.68	3.417	-	-	-	0
Pot Capacity-1 Maneuver	356	892	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	503	-	-	-	-	-
Mov Capacity-1 Maneuver	356	892	-	-	-	-
Mov Capacity-2 Maneuver	356	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	22.051	0	0
HCM LOS	C	A	A

Intersection	
Intersection Delay (sec/veh):	4.2

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	75	290	100	0	0	590	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	0	0	HCM Control Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	Free	HCM Lane V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	None	HCM Lane LOS	-
Storage Length	250	0					HCM 95th Percentile Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	15	5	10	0	0	5		
Movement Flow Rate	79	305	105	0	0	621		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	726	105	0	-	-	0
Stage 1	105	0	0	-	-	0
Stage 2	621	0	0	-	-	0
Follow-up Headway	3.635	3.345	-	-	-	0
Pot Capacity-1 Maneuver	373	938	-	-	-	-
Stage 1	888	-	-	-	-	-
Stage 2	512	-	-	-	-	-
Mov Capacity-1 Maneuver	373	938	-	-	-	-
Mov Capacity-2 Maneuver	373	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	12.036	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	4.6

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	65	310	120	0	0	465	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	0	0	HCM Control Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	Free	HCM Lane V/C Ratio	0
Right Turn Channelized	None	None	None	None	None	None	HCM Lane LOS	-
Storage Length	250	0					HCM 95th Percentile Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95		
Heavy Vehicles(%)	20	5	10	0	0	5		
Movement Flow Rate	68	326	126	0	0	489		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	615	126	0	-	-	0
Stage 1	126	0	0	-	-	0
Stage 2	489	0	0	-	-	0
Follow-up Headway	3.68	3.345	-	-	-	0
Pot Capacity-1 Maneuver	427	917	-	-	-	-
Stage 1	857	-	-	-	-	-
Stage 2	581	-	-	-	-	-
Mov Capacity-1 Maneuver	427	917	-	-	-	-
Mov Capacity-2 Maneuver	427	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.776	0	0
HCM LOS	B	A	A

Intersection	
Intersection Delay (sec/veh):	13.4

Movement	WBL	WBR	NBT	NBR	SBL	SBT	Lane	NBT
Volume (vph)	70	670	120	0	0	590	Capacity (vph)	
Conflicting Peds.(#/hr)	0	0	0	0	0	0	HCM Control Delay (s)	-
Sign Control	Stop	Stop	Free	Free	Free	Free	HCM Lane V/C Ratio	1.66438646060188E-316
Right Turn Channelized	None	None	None	None	None	None	HCM Lane LOS	-
Storage Length	250	0					HCM 95th Percentile Queue (veh)	0
Median Width	12		0			0		
Grade (%)	0%		0%			0%		
Peak Hour Factor	0.87	0.87	0.87	0.87	0.87	0.87		
Heavy Vehicles(%)	20	5	15	0	0	5		
Movement Flow Rate	80	770	138	0	0	678		
Number of Lanes	1	1	1	0	0	1		

Major/Minor			Major 1			Major 2
Conflicting Flow Rate - All	816	138	0	-	-	0
Stage 1	138	1.06099789548264E-312		-	-	0
Stage 2	678	0	0	-	-	0
Follow-up Headway	3.68	3.345	-	-	-	0
Pot Capacity-1 Maneuver	323	904	-	-	-	-
Stage 1	846	-	-	-	-	-
Stage 2	472	-	-	-	-	-
Mov Capacity-1 Maneuver	323	904	-	-	-	-
Mov Capacity-2 Maneuver	323	-	-	-	-	-
Stage 1	# 0	-	-	-	-	-
Stage 2	# 0	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	26.319	0	0
HCM LOS	D	A	A

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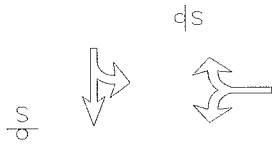
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

ROSCOE BLVD

EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	565	13%	**50**	615	55	670
WB THRU	0	0%		0	0	0
WB RIGHT	25	15%		25	5	30

SB I-5 FREEWAY RAMPS

NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	90	5%		90	10	100
SB THRU	35	5%		35	5	40
SB RIGHT	0	0%		0	0	0
TOTALS	**715**		**50**	**765**	**75**	**840**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
37
ROUTE
5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	330	18%	**50**	380	35	415
WB THRU	0	0%		0	0	0
WB RIGHT	45	5%		45	5	50
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	120	0%		120	10	130
SB THRU	40	0%		40	5	45
SB RIGHT	0	0%		0	0	0
TOTALS	**535**		**50**	**585**	**55**	**640**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
ROSCOE BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	375	16%	**50**	425	40	465
WB THRU	0	0%		0	0	0
WB RIGHT	100	5%		100	10	110
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	110	0%		110	10	120
SB THRU	30	0%		30	5	35
SB RIGHT	0	0%		0	0	0
TOTALS	**615**		**50**	**665**	**65**	**730**

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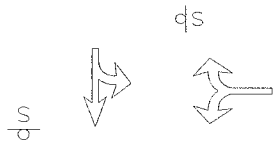
E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	556	10	30	585	**150**	735	65	800
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	21	4	12	35	**0**	35	5	40
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	89	3	9	100	**0**	100	10	110
SB THRU	35	2	6	40	**0**	40	5	45
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**701**				**150**	**910**	**85**	**995**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	315	14	42	355	**150**	505	45	550
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	42	2	6	50	**0**	50	5	55
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	122	0	0	120	**0**	120	10	130
SB THRU	42	0	0	40	**0**	40	5	45
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**521**				**150**	**715**	**65**	**780**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : ROSCOE BLVD
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 37
ROUTE 5B, 6B, 7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
ROSCOE BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	362	13	39	400	**150**	550	50	600
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	98	1	3	100	**0**	100	10	110
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	108	0	0	110	**0**	110	10	120
SB THRU	31	0	0	30	**0**	30	5	35
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**599**				**150**	**790**	**75**	**865**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 SB RAMPS
JURISDICTION: LA

DATE:

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 591

Rt	Thru	Lt	
25		566	Total
5		130	1st
5		141	2nd
6		150	3rd
9		145	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 129

Total	1st	2nd	3rd	4th	
92	26	26	19	21	Lt
37	3	10	14	10	Thru
					Rt

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

PEAK HOUR FACTORS

NORTH LEG = 0.95
SOUTH LEG =
EAST LEG =
WEST LEG = 0.90

ALL LEGS = 0.95

HOUR TOTAL: 720

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 07:00AM-08:00AM DATE:

NORTH LEG

Rt	Thru	Lt	
25		566	Total
5		130	1st
5		141	2nd
6		150	3rd
9		145	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
92	26	26	19	21	Lt
37	3	10	14	10	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 08:00AM-09:00AM DATE:

NORTH LEG

Rt	Thru	Lt	
34		393	Total
6		111	1st
8		91	2nd
11		90	3rd
9		101	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
77	23	22	19	13	Lt
37	5	8	14	10	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 SB RAMPS

BEGINNING TIME : 07:00AM = PH

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
4	0	127	1	0	2	0	0	0	0	0	1	135
5	0	139	0	0	2	0	0	0	0	0	0	146
5	0	147	0	0	2	1	0	1	0	0	0	156
7	0	143	0	0	1	2	0	0	0	0	1	154
5	0	111	1	0	0	0	0	0	0	0	0	117
7	0	89	0	0	2	1	0	0	0	0	0	99
9	0	90	2	0	0	0	0	0	0	0	0	101
8	0	101	1	0	0	0	0	0	0	0	0	110
50	0	947	5	0	9	4	0	1	0	0	2	1018
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
0	1	25	0	1	0	0	1	1	0	0	0	29
0	10	25	0	0	0	0	0	0	0	0	1	36
0	14	18	0	0	0	0	0	0	0	0	1	33
0	10	21	0	0	0	0	0	0	0	0	0	31
0	3	21	0	1	1	0	0	1	0	1	0	28
0	4	22	0	2	0	0	1	0	0	1	0	30
0	13	19	0	0	0	0	1	0	0	0	0	33
0	10	12	0	0	0	0	0	1	0	0	0	23
0	65	163	0	4	1	0	3	3	0	2	2	243

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 SB RAMPS
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 373

Rt	Thru	Lt	
44		329	Total
14		91	1st
11		65	2nd
11		96	3rd
8		77	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
122	29	37	22	34	Lt
42	14	15	6	7	Thru
					Rt

WEST LEG TOTAL: 164

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG =
EAST LEG =
WEST LEG = 0.79

ALL LEGS = 0.91

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

TOTAL: 0

SOUTH LEG

HOUR TOTAL: 537

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
74		296	Total
26		77	1st
23		63	2nd
14		91	3rd
11		65	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
115	24	25	29	37	Lt
44	5	10	14	15	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
67		333	Total
11		96	1st
8		77	2nd
20		94	3rd
28		66	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
109	22	34	22	31	Lt
27	6	7	12	2	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 SB RAMPS 05-30-12

BEGINNING TIME : 12:00PM PH = 12:30PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
25	0	57	1	0	12	0	0	6	0	0	2	103
23	0	58	0	0	2	0	0	3	0	0	0	86
14	0	88	0	0	2	0	0	1	0	0	0	105
10	0	62	1	0	2	0	0	0	0	0	1	76
11	0	95	0	0	1	0	0	0	0	0	0	107
7	0	70	1	0	5	0	0	0	0	0	2	85
19	0	85	1	0	8	0	0	0	0	0	1	114
28	0	57	0	0	7	0	0	2	0	0	0	94
137	0	572	4	0	39	0	0	12	0	0	6	770
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
0	4	22	0	1	2	0	0	0	0	0	0	29
0	10	25	0	0	0	0	0	0	0	0	0	35
0	14	29	0	0	0	0	0	0	0	0	0	43
0	15	37	0	0	0	0	0	0	0	0	0	52
0	6	22	0	0	0	0	0	0	0	0	0	28
0	7	34	0	0	0	0	0	0	0	0	0	41
0	12	22	0	0	0	0	0	0	0	0	0	34
0	2	31	0	0	0	0	0	0	0	0	0	33
0	70	222	0	1	2	0	0	0	0	0	0	295

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: ROSCOE BLVD
EAST-WEST STREET: I-5 SB RAMPS
JURISDICTION: LA

DATE: 05-30-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 473

Rt	Thru	Lt	
99		374	Total
15		98	1st
36		85	2nd
24		109	3rd
24		82	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 139

Total	1st	2nd	3rd	4th	
108	21	35	29	23	Lt
31	11	6	11	3	Thru
					Rt

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG =
EAST LEG =
WEST LEG = 0.85

ALL LEGS = 0.88

HOUR TOTAL: 612

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
113		311	Total
22		88	1st
29		73	2nd
30		76	3rd
32		74	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
71	16	26	19	10	Lt
30	10	6	7	7	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: ROSCOE BLVD

EAST-WEST STREET: I-5 SB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-30-12

NORTH LEG

Rt	Thru	Lt	
99		374	Total
15		98	1st
36		85	2nd
24		109	3rd
24		82	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
108	21	35	29	23	Lt
31	11	6	11	3	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : ROSCOE BLVD LA

EAST-WEST STREET : I-5 SB RAMPS 05-30-12

BEGINNING TIME : 04:00PM PH = 5:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
20	0	80	1	0	5	0	0	1	1	0	2	110
29	0	72	0	0	1	0	0	0	0	0	0	102
30	0	74	0	0	1	0	0	0	0	0	1	106
29	0	72	2	0	2	0	0	0	1	0	0	106
15	0	94	0	0	2	0	0	1	0	0	1	113
36	0	82	0	0	2	0	0	1	0	0	0	121
23	0	106	1	0	2	0	0	0	0	0	1	133
24	0	80	0	0	1	0	0	0	0	0	1	106
206	0	660	4	0	16	0	0	3	2	0	6	897
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
0	10	15	0	0	1	0	0	0	0	0	0	26
0	6	25	0	0	1	0	0	0	0	0	0	32
0	6	19	0	0	0	0	0	0	0	1	0	26
0	6	10	0	1	0	0	0	0	0	0	0	17
0	11	21	0	0	0	0	0	0	0	0	0	32
0	6	35	0	0	0	0	0	0	0	0	0	41
0	11	29	0	0	0	0	0	0	0	0	0	40
0	3	23	0	0	0	0	0	0	0	0	0	26
0	59	177	0	1	2	0	0	0	0	1	0	240

Prepared by Newport Traffic Studies

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	90	35	0	0	565	25
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	5	2	2	5	15
Movement Flow Rate	95	37	0	0	595	26
Number of Lanes	0	1	0	0	1	0

Major/Minor		Minor 1		
Conflicting Flow Rate - All	0	1203	0	0
Stage 1	0	1203	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0.05	-	0
Pot Capacity-1 Maneuver	-	70217	-	-
Stage 1	-	70217	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	120	40	0	0	330	45
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles(%)	0	0	2	2	5	5
Movement Flow Rate	132	44	0	0	363	49
Number of Lanes	0	1	0	0	1	0

Major/Minor		Minor 1		
Conflicting Flow Rate - All	0	750	0	0
Stage 1	0	750	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0	-	0
Pot Capacity-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	110	30	0	0	375	100
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	0	0	2	2	5	5
Movement Flow Rate	125	34	0	0	426	114
Number of Lanes	0	1	0	0	1	0

Major/Minor		Minor 1		
Conflicting Flow Rate - All	0	909	0	0
Stage 1	0	909	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0	-	0
Pot Capacity-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	90	35	0	0	615	25
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	5	2	2	13	15
Movement Flow Rate	95	37	0	0	647	26
Number of Lanes	0	1	0	0	1	0

Major/Minor		Minor 1		
Conflicting Flow Rate - All	0	1308	0	0
Stage 1	0	1308	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0.05	-	0
Pot Capacity-1 Maneuver	-	70064	-	-
Stage 1	-	70064	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	120	40	0	0	380	45
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles(%)	0	0	2	2	18	5
Movement Flow Rate	132	44	0	0	418	49
Number of Lanes	0	1	0	0	1	0

Major/Minor		Minor 1		
Conflicting Flow Rate - All	0	860	0	0
Stage 1	0	860	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0	-	0
Pot Capacity-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	110	30	0	0	425	100
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	0	0	2	2	16	5
Movement Flow Rate	125	34	0	0	483	114
Number of Lanes	0	1	0	0	1	0

Major/Minor		Minor 1		
Conflicting Flow Rate - All	0	1023	0	0
Stage 1	0	1023	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0	-	0
Pot Capacity-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	100	40	0	0	670	25
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	5	2	2	5	15
Movement Flow Rate	105	42	0	0	705	26
Number of Lanes	0	1	0	0	1	0

Major/Minor		Minor 1		
Conflicting Flow Rate - All	0	1424	0	0
Stage 1	0	1424	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0.05	-	0
Pot Capacity-1 Maneuver	-	69894	-	-
Stage 1	-	69894	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	130	45	0	0	415	50
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles(%)	0	0	2	2	5	5
Movement Flow Rate	143	49	0	0	456	55
Number of Lanes	0	1	0	0	1	0

Major/Minor		Minor 1		
Conflicting Flow Rate - All	0	940	0	0
Stage 1	0	940	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0	-	0
Pot Capacity-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Volume (vph)	120	35	0	0	465	110
Conflicting Peds.(#/hr)	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None
Storage Length	0			0	0	0
Median Width		0	0		16	
Grade (%)		0%	0%		0%	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles(%)	0	0	2	2	5	5
Movement Flow Rate	136	40	0	0	528	125
Number of Lanes	0	1	0	0	1	0

Major/Minor	Minor 1			
Conflicting Flow Rate - All	0	1119	0	0
Stage 1	0	1119	0	0
Stage 2	0	0	0	0
Follow-up Headway	-	0	-	0
Pot Capacity-1 Maneuver	-	-	-	-
Stage 1	-	-	-	-
Stage 2	-	-	-	-
Mov Capacity-1 Maneuver	-	# 0	-	-
Mov Capacity-2 Maneuver	-	# 0	-	-
Stage 1	-	# 0	-	-
Stage 2	-	# 0	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	SBL	SBR
Capacity (vph)	-		
HCM Control Delay (s)	-	-	-
HCM Lane VC Ratio	-	-	0
HCM Lane LOS	-	-	-
HCM 95th Percentile Queue (veh)	-	-	0

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

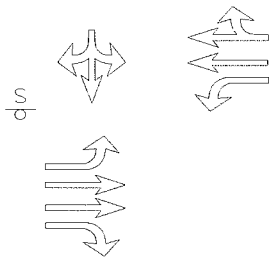
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

BRANFORD STREET

EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0

SB I-5 FREEWAY RAMPS

NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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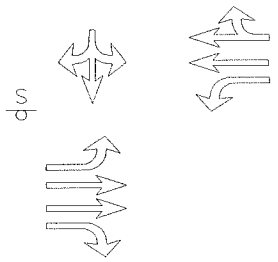
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
38
ROUTE
8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	0	0	0	0
EB THRU	0	0	0	0	0	0	0	0
EB RIGHT	0	0	0	0	0	0	0	0
WB LEFT	0	0	0	0	0	0	0	0
WB THRU	0	0	0	0	0	0	0	0
WB RIGHT	0	0	0	0	0	0	0	0
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	0	0	0	0
NB THRU	0	0	0	0	0	0	0	0
NB RIGHT	0	0	0	0	0	0	0	0
SB LEFT	0	0	0	0	0	0	0	0
SB THRU	0	0	0	0	0	0	0	0
SB RIGHT	0	0	0	0	0	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 38
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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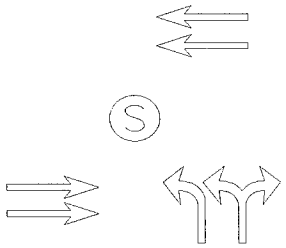
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	0	0		0	0	0
EB THRU	0	0		0	0	0
EB RIGHT	0	0		0	0	0
WB LEFT	0	0		0	0	0
WB THRU	0	0		0	0	0
WB RIGHT	0	0		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	0	0		0	0	0
NB THRU	0	0		0	0	0
NB RIGHT	0	0		0	0	0
SB LEFT	0	0		0	0	0
SB THRU	0	0		0	0	0
SB RIGHT	0	0		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	0	0		0	0	0
EB THRU	0	0		0	0	0
EB RIGHT	0	0		0	0	0
WB LEFT	0	0		0	0	0
WB THRU	0	0		0	0	0
WB RIGHT	0	0		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	0	0		0	0	0
NB THRU	0	0		0	0	0
NB RIGHT	0	0		0	0	0
SB LEFT	0	0		0	0	0
SB THRU	0	0		0	0	0
SB RIGHT	0	0		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	0	0		0	0	0
EB THRU	0	0		0	0	0
EB RIGHT	0	0		0	0	0
WB LEFT	0	0		0	0	0
WB THRU	0	0		0	0	0
WB RIGHT	0	0		0	0	0
NB I-5 FREEWAY RAMPS						
NB LEFT	0	0		0	0	0
NB THRU	0	0		0	0	0
NB RIGHT	0	0		0	0	0
SB LEFT	0	0		0	0	0
SB THRU	0	0		0	0	0
SB RIGHT	0	0		0	0	0
TOTALS	**0**		**0**	**0**	**0**	**0**

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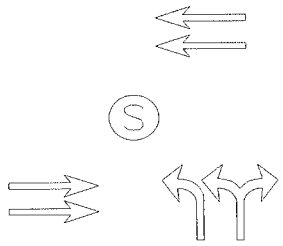
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 39
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
NB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**0**				**0**	**0**	**0**	**0**

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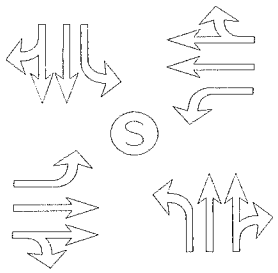
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	150	5%		150	15	165
EB THRU	145	37%	**50**	195	20	215
EB RIGHT	65	10%		65	5	70
WB LEFT	85	5%		85	5	90
WB THRU	205	28%	**50**	255	25	280
WB RIGHT	110	5%		110	10	120
LAUREL CANYON BLVD						
NB LEFT	90	0%		90	10	100
NB THRU	585	5%		585	55	640
NB RIGHT	140	5%		140	15	155
SB LEFT	130	5%		130	10	140
SB THRU	365	5%		365	35	400
SB RIGHT	150	5%		150	15	165
TOTALS	**2220**		**100**	**2320**	**220**	**2540**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	150	5%		150	15	165
EB THRU	145	15%		145	15	160
EB RIGHT	65	10%		65	5	70
WB LEFT	85	5%		85	5	90
WB THRU	205	10%		205	20	225
WB RIGHT	110	35%	**50**	160	15	175
LAUREL CANYON BLVD						
NB LEFT	90	0%		90	10	100
NB THRU	585	5%		585	55	640
NB RIGHT	140	5%		140	15	155
SB LEFT	130	31%	**50**	180	15	195
SB THRU	365	5%		365	35	400
SB RIGHT	150	5%		150	15	165
TOTALS	**2220**		**100**	**2320**	**220**	**2540**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	115	5%		115	10	125
EB THRU	170	34%	**50**	220	20	240
EB RIGHT	210	5%		210	20	230
WB LEFT	90	5%		90	10	100
WB THRU	160	35%	**50**	210	20	230
WB RIGHT	85	5%		85	5	90
LAUREL CANYON BLVD						
NB LEFT	85	5%		85	5	90
NB THRU	460	5%		460	40	500
NB RIGHT	85	5%		85	5	90
SB LEFT	65	0%		65	5	70
SB THRU	585	5%		585	55	640
SB RIGHT	95	0%		95	10	105
TOTALS	**2205**		**100**	**2305**	**205**	**2510**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	115	5%		115	10	125
EB THRU	170	15%		170	15	185
EB RIGHT	210	5%		210	20	230
WB LEFT	90	5%		90	10	100
WB THRU	160	15%		160	15	175
WB RIGHT	85	40%	**50**	135	10	145
LAUREL CANYON BLVD						
NB LEFT	85	5%		85	5	90
NB THRU	460	5%		460	40	500
NB RIGHT	85	5%		85	5	90
SB LEFT	65	43%	**50**	115	10	125
SB THRU	585	5%		585	55	640
SB RIGHT	95	0%		95	10	105
TOTALS	**2205**		**100**	**2305**	**205**	**2510**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	190	5%		190	15	205
EB THRU	380	20%	**50**	430	40	470
EB RIGHT	185	5%		185	15	200
WB LEFT	100	5%		100	10	110
WB THRU	365	21%	**50**	415	35	450
WB RIGHT	125	5%		125	10	135
LAUREL CANYON BLVD						
NB LEFT	115	5%		115	10	125
NB THRU	1120	5%		1120	100	1220
NB RIGHT	120	5%		120	10	130
SB LEFT	60	5%		60	5	65
SB THRU	445	5%		445	40	485
SB RIGHT	135	5%		135	10	145
TOTALS	**3340**		**100**	**3440**	**300**	**3740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	190	5%		190	15	205
EB THRU	380	10%		380	35	415
EB RIGHT	185	5%		185	15	200
WB LEFT	100	5%		100	10	110
WB THRU	365	10%		365	35	400
WB RIGHT	125	32%	**50**	175	15	190
LAUREL CANYON BLVD						
NB LEFT	115	5%		115	10	125
NB THRU	1120	5%		1120	100	1220
NB RIGHT	120	5%		120	10	130
SB LEFT	60	48%	**50**	110	10	120
SB THRU	445	5%		445	40	485
SB RIGHT	135	5%		135	10	145
TOTALS	**3340**		**100**	**3440**	**305**	**3745**

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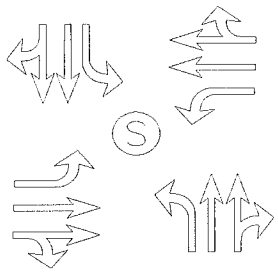
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	146	3	9	155	**0**	155	15	170
EB THRU	125	18	54	180	**150**	330	30	360
EB RIGHT	60	7	21	80	**0**	80	5	85
WB LEFT	78	5	15	95	**0**	95	10	105
WB THRU	188	19	57	245	**150**	395	35	430
WB RIGHT	107	4	12	120	**0**	120	10	130
LAUREL CANYON BLVD								
NB LEFT	89	0	0	90	**0**	90	10	100
NB THRU	582	5	15	595	**0**	595	55	650
NB RIGHT	141	1	3	145	**0**	145	15	160
SB LEFT	129	2	6	135	**0**	135	10	145
SB THRU	354	9	27	380	**0**	380	35	415
SB RIGHT	146	2	6	150	**0**	150	15	165
TOTALS	**2145**				**300**	**2670**	**245**	**2915**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
40
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	146	3	9	155	**0**	155	15	170
EB THRU	125	18	54	180	**0**	180	15	195
EB RIGHT	60	7	21	80	**0**	80	5	85
WB LEFT	78	5	15	95	**0**	95	10	105
WB THRU	188	19	57	245	**0**	245	20	265
WB RIGHT	107	4	12	120	**150**	270	25	295
LAUREL CANYON BLVD								
NB LEFT	89	0	0	90	**0**	90	10	100
NB THRU	582	5	15	595	**0**	595	55	650
NB RIGHT	141	1	3	145	**0**	145	15	160
SB LEFT	129	2	6	135	**150**	285	25	310
SB THRU	354	9	27	380	**0**	380	35	415
SB RIGHT	146	2	6	150	**0**	150	15	165
TOTALS	**2145**				**300**	**2670**	**245**	**2915**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	108	5	15	125	**0**	125	10	135
EB THRU	143	28	84	225	**150**	375	35	410
EB RIGHT	201	7	21	220	**0**	220	20	240
WB LEFT	84	4	12	95	**0**	95	10	105
WB THRU	136	26	78	215	**150**	365	35	400
WB RIGHT	80	6	18	100	**0**	100	10	110
LAUREL CANYON BLVD								
NB LEFT	84	1	3	85	**0**	85	5	90
NB THRU	452	7	21	475	**0**	475	45	520
NB RIGHT	78	6	18	95	**0**	95	10	105
SB LEFT	63	0	0	65	**0**	65	5	70
SB THRU	579	8	24	605	**0**	605	55	660
SB RIGHT	93	0	0	95	**0**	95	10	105
TOTALS	**2101**				**300**	**2700**	**250**	**2950**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	4 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	108	5	15	125	**0**	125	10	135
EB THRU	143	28	84	225	**0**	225	20	245
EB RIGHT	201	7	21	220	**0**	220	20	240
WB LEFT	84	4	12	95	**0**	95	10	105
WB THRU	136	26	78	215	**0**	215	20	235
WB RIGHT	80	6	18	100	**150**	250	25	275
LAUREL CANYON BLVD								
NB LEFT	84	1	3	85	**0**	85	5	90
NB THRU	452	7	21	475	**0**	475	45	520
NB RIGHT	78	6	18	95	**0**	95	10	105
SB LEFT	63	0	0	65	**150**	215	20	235
SB THRU	579	8	24	605	**0**	605	55	660
SB RIGHT	93	0	0	95	**0**	95	10	105
TOTALS	**2101**				**300**	**2700**	**250**	**2950**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	5 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	184	4	12	195	**0**	195	20	215
EB THRU	343	36	108	450	**150**	600	55	655
EB RIGHT	181	5	15	195	**0**	195	20	215
WB LEFT	96	3	9	105	**0**	105	10	115
WB THRU	331	33	99	430	**150**	580	50	630
WB RIGHT	119	4	12	130	**0**	130	10	140
LAUREL CANYON BLVD								
NB LEFT	110	4	12	120	**0**	120	10	130
NB THRU	1110	10	30	1140	**0**	1140	105	1245
NB RIGHT	116	4	12	130	**0**	130	10	140
SB LEFT	58	3	9	65	**0**	65	5	70
SB THRU	438	7	21	460	**0**	460	40	500
SB RIGHT	133	3	9	140	**0**	140	15	155
TOTALS	**3219**				**300**	**3860**	**350**	**4210**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	6 OF 6

E/W STREET : BRANFORD STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 40
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	184	4	12	195	**0**	195	20	215
EB THRU	343	36	108	450	**0**	450	40	490
EB RIGHT	181	5	15	195	**0**	195	20	215
WB LEFT	96	3	9	105	**0**	105	10	115
WB THRU	331	33	99	430	**0**	430	40	470
WB RIGHT	119	4	12	130	**150**	280	25	305
LAUREL CANYON BLVD								
NB LEFT	110	4	12	120	**0**	120	10	130
NB THRU	1110	10	30	1140	**0**	1140	105	1245
NB RIGHT	116	4	12	130	**0**	130	10	140
SB LEFT	58	3	9	65	**150**	215	20	235
SB THRU	438	7	21	460	**0**	460	40	500
SB RIGHT	133	3	9	140	**0**	140	15	155
TOTALS	**3219**				**300**	**3860**	**355**	**4215**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 642

	Rt	Thru	Lt
Total	148	363	131
1st	35	71	20
2nd	46	97	41
3rd	39	101	34
4th	28	94	36

EAST LEG TOTAL: 401

	1st	2nd	3rd	4th	Total
Rt	23	33	29	26	111
Thru	41	49	53	64	207
Lt	20	31	21	11	83

WEST LEG TOTAL: 359

	Total	1st	2nd	3rd	4th
Lt	149	52	36	38	23
Thru	143	35	28	35	45
Rt	67	11	26	16	14

SOUTH LEG

TOTAL: 818

	Lt	Thru	Rt
1st	22	152	25
2nd	16	137	44
3rd	40	155	34
4th	11	143	39
Total	89	587	142

PEAK HOUR FACTORS

NORTH LEG = 0.87
SOUTH LEG = 0.89
EAST LEG = 0.89
WEST LEG = 0.92

ALL LEGS = 0.93

HOUR TOTAL: 2,220

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 07:00AM-08:00AM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
149	310	119	Total
29	41	24	1st
35	71	20	2nd
46	97	41	3rd
39	101	34	4th

	1st	2nd	3rd	4th	Total
Rt	13	23	33	29	98
Thru	37	41	49	53	180
Lt	9	20	31	21	81

Total	1st	2nd	3rd	4th	
152	26	52	36	38	Lt
120	22	35	28	35	Thru
68	15	11	26	16	Rt

	Lt	Thru	Rt
1st	21	128	22
2nd	22	152	25
3rd	16	137	44
4th	40	155	34
Total	99	572	125

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 08:00AM-09:00AM DATE: 06-05-12

NORTH LEG

	Rt	Thru	Lt
Total	110	275	111
1st	28	94	36
2nd	34	65	26
3rd	21	65	30
4th	27	51	19

	1st	2nd	3rd	4th	Total
Rt	26	25	23	23	97
Thru	64	53	38	42	197
Lt	11	12	27	14	64

	Total	1st	2nd	3rd	4th
Lt	73	23	16	21	13
Thru	183	45	50	45	43
Rt	58	14	9	21	14

	Lt	Thru	Rt
1st	11	143	39
2nd	14	114	13
3rd	20	139	24
4th	16	87	10
Total	61	483	86

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : BRANFORD 06-05-12

BEGINNING TIME : 07:00AM PH = 7:15

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
29	37	24	0	3	0	0	0	0	0	1	0	94
34	69	19	1	1	1	0	1	0	0	0	0	126
46	95	40	0	2	1	0	0	0	0	0	0	184
38	100	34	0	1	0	0	0	0	1	0	0	174
28	90	36	0	3	0	0	1	0	0	0	0	158
32	64	26	2	1	0	0	0	0	0	0	0	125
21	63	29	0	2	1	0	0	0	0	0	0	116
27	48	19	0	1	0	0	1	0	0	1	0	97
255	566	227	3	14	3	0	3	0	1	2	0	1074
						SOUTH LEG						
21	126	21	1	1	0	0	1	0	0	0	0	171
25	152	22	0	0	0	0	0	0	0	0	0	199
44	133	16	0	1	0	0	1	0	0	2	0	197
33	154	40	1	1	0	0	0	0	0	0	0	229
39	143	11	0	0	0	0	0	0	0	0	0	193
12	109	13	1	2	0	0	1	0	0	2	1	141
23	139	20	1	0	0	0	0	0	0	0	0	183
9	86	16	1	1	0	0	0	0	0	0	0	113
206	1042	159	5	6	0	0	3	0	0	4	1	1426
						EAST LEG						
13	32	8	0	3	1	0	1	0	0	1	0	59
23	35	19	0	3	0	0	0	1	0	3	0	84
31	45	30	0	3	1	2	1	0	0	0	0	113
27	46	19	0	3	1	0	3	0	2	1	1	103
26	62	10	0	2	0	0	0	1	0	0	0	101
24	48	12	0	3	0	1	0	0	0	2	0	90
23	31	26	0	5	0	0	2	0	0	0	1	88
23	34	11	0	7	1	0	0	2	0	1	0	79
190	333	135	0	29	4	3	7	4	2	8	2	717
						WEST LEG						
15	18	26	0	2	0	0	1	0	0	1	0	63
9	30	51	1	2	1	0	1	0	1	2	0	98
24	25	36	0	1	0	0	2	0	2	0	0	90
15	28	37	1	3	1	0	1	0	0	3	0	89
12	42	22	0	1	0	1	2	0	1	0	1	82
9	47	15	0	1	1	0	0	0	0	2	0	75
19	38	21	0	2	0	2	2	0	0	3	0	87
14	37	13	0	1	0	0	3	0	0	2	0	70
117	265	221	2	13	3	3	12	0	4	13	1	654

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 743

Rt	Thru	Lt	
93	587	63	Total
31	161	16	1st
23	139	12	2nd
20	143	16	3rd
19	144	19	4th

EAST LEG TOTAL: 336

	1st	2nd	3rd	4th	Total
Rt	31	21	20	14	86
Thru	41	33	34	54	162
Lt	20	18	19	31	88

WEST LEG TOTAL: 492

Total	1st	2nd	3rd	4th	
113	22	33	32	26	Lt
171	48	49	33	41	Thru
208	44	60	60	44	Rt

SOUTH LEG

TOTAL: 628

	Lt	Thru	Rt
1st	16	116	22
2nd	23	109	20
3rd	14	111	21
4th	32	123	21
Total	85	459	84

PEAK HOUR FACTORS

NORTH LEG = 0.89
SOUTH LEG = 0.89
EAST LEG = 0.85
WEST LEG = 0.87

ALL LEGS = 0.97

HOUR TOTAL: 2,199

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 12:00PM-01:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
102	537	61	Total
22	114	14	1st
26	123	19	2nd
31	161	16	3rd
23	139	12	4th

	1st	2nd	3rd	4th	Total
Rt	14	22	31	21	88
Thru	33	37	41	33	144
Lt	20	22	20	18	80

Total	1st	2nd	3rd	4th	
122	36	31	22	33	Lt
156	23	36	48	49	Thru
207	61	42	44	60	Rt

	Lt	Thru	Rt
1st	20	90	22
2nd	20	112	23
3rd	16	116	22
4th	23	109	20
Total	79	427	87

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 01:00PM-02:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
78	535	75	Total
20	143	16	1st
19	144	19	2nd
16	136	23	3rd
23	112	17	4th

	1st	2nd	3rd	4th	Total
Rt	20	14	22	29	85
Thru	34	54	45	41	174
Lt	19	31	26	18	94

Total	1st	2nd	3rd	4th	
109	32	26	29	22	Lt
147	33	41	37	36	Thru
166	60	44	32	30	Rt

	Lt	Thru	Rt
1st	14	111	21
2nd	32	123	21
3rd	22	103	21
4th	21	99	16
Total	89	436	79

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : BRANFORD 06-05-12

BEGINNING TIME : 12:00PM PH = 12:30 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
22	112	14	0	0	0	0	0	0	0	2	0	150
26	123	19	0	0	0	0	0	0	0	0	0	168
31	158	16	0	2	0	0	1	0	0	0	0	208
23	139	12	0	0	0	0	0	0	0	0	0	174
20	140	16	0	2	0	0	0	0	0	1	0	179
19	142	19	0	0	0	0	2	0	0	0	0	182
16	133	23	0	2	0	0	1	0	0	0	0	175
23	111	17	0	0	0	0	1	0	0	0	0	152
180	1058	136	0	6	0	0	5	0	0	3	0	1388
						SOUTH LEG						
21	89	20	0	1	0	0	0	0	1	0	0	132
23	112	19	0	0	0	0	0	1	0	0	0	155
19	115	16	0	1	0	0	0	0	3	0	0	154
19	105	22	0	2	0	1	1	0	0	1	1	152
21	110	14	0	0	0	0	1	0	0	0	0	146
19	122	32	1	0	0	1	0	0	0	1	0	176
20	103	21	0	0	0	1	0	0	0	0	1	146
16	98	21	0	0	0	0	0	0	0	1	0	136
158	854	165	1	4	0	3	2	1	4	3	2	1197
						EAST LEG						
14	26	20	0	4	0	0	1	0	0	2	0	67
22	30	21	0	3	0	0	1	0	0	3	1	81
30	37	19	0	2	0	0	0	0	1	2	1	92
18	29	17	2	2	1	1	1	0	0	1	0	72
18	22	18	1	6	0	0	4	0	1	2	1	73
14	48	30	0	3	1	0	2	0	0	1	0	99
20	39	25	0	2	0	1	1	0	1	3	1	93
27	34	18	1	3	0	1	2	0	0	2	0	88
163	265	168	4	25	2	3	12	0	3	16	4	665
						WEST LEG						
59	14	34	1	4	1	1	2	0	0	3	1	120
42	29	30	0	3	0	0	3	0	0	1	1	109
43	41	20	1	3	0	0	2	1	0	2	1	114
57	41	32	0	3	1	1	3	0	2	2	0	142
57	28	32	1	3	0	1	2	0	1	0	0	125
44	33	24	0	3	0	0	4	1	0	1	1	111
30	29	27	2	4	1	0	2	0	0	2	1	98
30	32	22	0	2	0	0	1	0	0	1	0	88
362	247	221	5	25	3	3	19	2	3	12	5	907

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 642

Rt	Thru	Lt	
136	445	61	Total
26	122	19	1st
33	99	20	2nd
33	114	12	3rd
44	110	10	4th

EAST LEG TOTAL: 586

	1st	2nd	3rd	4th	Total
Rt	36	33	31	23	123
Thru	71	62	112	119	364
Lt	26	20	31	22	99

WEST LEG TOTAL: 753

Total	1st	2nd	3rd	4th	
188	51	50	44	43	Lt
379	90	87	99	103	Thru
186	42	49	53	42	Rt

SOUTH LEG

TOTAL: 1,354

	Lt	Thru	Rt
1st	33	283	19
2nd	30	288	32
3rd	22	283	36
4th	29	266	33
Total	114	1120	120

PEAK HOUR FACTORS

NORTH LEG = 0.96
SOUTH LEG = 0.97
EAST LEG = 0.84
WEST LEG = 0.96

ALL LEGS = 0.96

HOUR TOTAL: 3,335

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 04:00PM-05:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
122	434	74	Total
34	99	14	1st
29	114	21	2nd
26	122	19	3rd
33	99	20	4th

	1st	2nd	3rd	4th	Total
Rt	26	31	36	33	126
Thru	79	47	71	62	259
Lt	31	22	26	20	99

Total	1st	2nd	3rd	4th	
191	46	44	51	50	Lt
360	93	90	90	87	Thru
192	51	50	42	49	Rt

	Lt	Thru	Rt
1st	25	214	31
2nd	33	269	29
3rd	33	283	19
4th	30	288	32
Total	121	1054	111

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: BRANFORD

TIME: 05:00PM-06:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
149	417	63	Total
33	114	12	1st
44	110	10	2nd
41	93	22	3rd
31	100	19	4th

	1st	2nd	3rd	4th	Total
Rt	31	23	22	19	95
Thru	112	119	89	99	419
Lt	31	22	25	29	107

Total	1st	2nd	3rd	4th	
189	44	43	53	49	Lt
351	99	103	78	71	Thru
186	53	42	36	55	Rt

	Lt	Thru	Rt
1st	22	283	36
2nd	29	266	33
3rd	31	243	31
4th	26	251	25
Total	108	1043	125

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : BRANFORD 06-05-12

BEGINNING TIME : 04:00PM PH = 4:30

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
34	97	14	0	1	0	0	0	0	0	1	0	147
29	112	17	0	0	2	0	1	2	0	1	0	164
26	122	19	0	0	0	0	0	0	0	0	0	167
33	96	19	0	2	1	0	0	0	0	1	0	152
33	111	10	0	0	0	0	2	2	0	1	0	159
41	109	10	1	0	0	2	0	0	0	1	0	164
40	92	22	1	0	0	0	0	0	0	1	0	156
30	97	18	0	2	0	1	0	1	0	1	0	150
266	836	129	2	5	3	3	3	5	0	7	0	1259
						SOUTH LEG						
30	211	24	0	1	0	0	2	0	1	0	1	270
28	269	31	1	0	1	0	0	0	0	0	1	331
18	280	31	0	1	0	1	1	1	0	1	1	335
31	284	30	0	4	0	0	0	0	1	0	0	350
36	283	22	0	0	0	0	0	0	0	0	0	341
31	263	27	1	0	1	0	1	0	1	2	1	328
31	243	31	0	0	0	0	0	0	0	0	0	305
25	251	25	0	0	0	0	0	0	0	0	1	302
230	2084	221	2	6	2	1	4	1	3	3	5	2562
						EAST LEG						
25	74	28	0	2	1	0	2	1	1	1	1	136
31	37	22	0	3	0	0	4	0	0	3	0	100
36	62	26	0	4	0	0	4	0	0	1	0	133
31	55	18	1	3	1	1	3	0	0	1	1	115
30	103	30	0	4	0	0	3	1	1	2	0	174
22	111	22	0	5	0	1	2	0	0	1	0	164
22	79	23	0	3	1	0	5	0	0	2	1	136
17	94	28	1	2	0	0	2	0	1	1	1	147
214	615	197	2	26	3	2	25	2	3	12	4	1105
						WEST LEG						
51	85	46	0	3	0	0	2	0	0	3	0	190
50	83	43	0	3	0	0	2	1	0	2	0	184
41	82	50	0	3	0	1	3	0	0	2	1	183
48	78	49	1	3	1	0	5	0	0	1	0	186
53	91	43	0	2	0	0	4	1	0	2	0	196
39	92	42	1	5	0	2	5	0	0	1	1	188
36	70	53	0	2	0	0	5	0	0	1	0	167
55	66	49	0	1	0	0	3	0	0	1	0	175
373	647	375	2	22	1	3	29	2	0	13	2	1469

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	145	65	85	205	110	90	585	140	130	365	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.95		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3034		1719	3160		1805	3338		1719	3288	
Flt Permitted	0.55	1.00		0.61	1.00		0.43	1.00		0.30	1.00	
Satd. Flow (perm)	992	3034		1105	3160		820	3338		550	3288	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	161	156	70	91	220	118	97	629	151	140	392	161
RTOR Reduction (vph)	0	45	0	0	76	0	0	46	0	0	86	0
Lane Group Flow (vph)	161	181	0	91	262	0	97	734	0	140	467	0
Heavy Vehicles (%)	5%	15%	10%	5%	10%	5%	0%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	353	1079		393	1124		383	1558		257	1534	
v/s Ratio Prot		0.06			0.08			0.22			0.14	
v/s Ratio Perm	c0.16			0.08			0.12			c0.25		
v/c Ratio	0.46	0.17		0.23	0.23		0.25	0.47		0.54	0.30	
Uniform Delay, d1	11.2	9.9		10.2	10.2		7.3	8.2		8.6	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.2	0.3		1.4	0.5		1.6	1.0		8.1	0.5	
Delay (s)	15.4	10.3		11.6	10.7		8.8	9.2		16.6	8.0	
Level of Service	B	B		B	B		A	A		B	A	
Approach Delay (s)		12.4			10.9			9.2			9.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	170	210	90	160	85	85	460	85	65	585	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.92		1.00	0.95		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3024		1719	3068		1719	3357		1805	3389	
Flt Permitted	0.60	1.00		0.52	1.00		0.33	1.00		0.42	1.00	
Satd. Flow (perm)	1077	3024		943	3068		602	3357		801	3389	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	175	216	93	165	88	88	474	88	67	603	98
RTOR Reduction (vph)	0	90	0	0	53	0	0	38	0	0	32	0
Lane Group Flow (vph)	119	301	0	93	200	0	88	524	0	67	669	0
Heavy Vehicles (%)	5%	15%	5%	5%	15%	5%	5%	5%	5%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	431	1210		377	1227		241	1343		320	1356	
v/s Ratio Prot		0.10			0.07			0.16			c0.20	
v/s Ratio Perm	c0.11			0.10			0.15			0.08		
v/c Ratio	0.28	0.25		0.25	0.16		0.37	0.39		0.21	0.49	
Uniform Delay, d1	8.1	8.0		8.0	7.7		8.4	8.5		7.9	9.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.5		1.6	0.3		4.2	0.9		1.5	1.3	
Delay (s)	9.7	8.5		9.5	8.0		12.7	9.4		9.3	10.3	
Level of Service	A	A		A	A		B	A		A	B	
Approach Delay (s)		8.8			8.4			9.8			10.2	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	9.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	380	185	100	365	125	115	1120	120	60	445	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.96		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3168		1719	3193		1719	3388		1719	3318	
Flt Permitted	0.43	1.00		0.38	1.00		0.40	1.00		0.19	1.00	
Satd. Flow (perm)	783	3168		679	3193		723	3388		345	3318	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	198	396	193	104	380	130	120	1167	125	62	464	141
RTOR Reduction (vph)	0	124	0	0	24	0	0	18	0	0	63	0
Lane Group Flow (vph)	198	465	0	104	486	0	120	1274	0	62	542	0
Heavy Vehicles (%)	5%	10%	5%	5%	10%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	278	1126		241	1135		337	1581		161	1548	
v/s Ratio Prot		0.15			0.15			c0.38			0.16	
v/s Ratio Perm	c0.25			0.15			0.17			0.18		
v/c Ratio	0.71	0.41		0.43	0.43		0.36	0.81		0.39	0.35	
Uniform Delay, d1	12.5	11.0		11.0	11.0		7.7	10.3		7.8	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	14.4	1.1		5.5	1.2		2.9	4.5		6.8	0.6	
Delay (s)	26.9	12.1		16.6	12.2		10.6	14.7		14.6	8.3	
Level of Service	C	B		B	B		B	B		B	A	
Approach Delay (s)		15.8			12.9			14.4			8.9	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	13.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	76.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	150	195	65	85	255	110	90	585	140	130	365	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.95		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2668		1719	2847		1805	3338		1719	3288	
Flt Permitted	0.52	1.00		0.58	1.00		0.43	1.00		0.30	1.00	
Satd. Flow (perm)	942	2668		1049	2847		820	3338		550	3288	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	161	210	70	91	274	118	97	629	151	140	392	161
RTOR Reduction (vph)	0	45	0	0	76	0	0	46	0	0	86	0
Lane Group Flow (vph)	161	235	0	91	316	0	97	734	0	140	467	0
Heavy Vehicles (%)	5%	37%	10%	5%	28%	5%	0%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8	8		2			6	6	
Actuated Green, G (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	335	949		373	1012		383	1558		257	1534	
v/s Ratio Prot		0.09			0.11			0.22			0.14	
v/s Ratio Perm	c0.17			0.09			0.12			c0.25		
v/c Ratio	0.48	0.25		0.24	0.31		0.25	0.47		0.54	0.30	
Uniform Delay, d1	11.3	10.2		10.2	10.5		7.3	8.2		8.6	7.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.9	0.6		1.6	0.8		1.6	1.0		8.1	0.5	
Delay (s)	16.1	10.9		11.8	11.3		8.8	9.2		16.6	8.0	
Level of Service	B	B		B	B		A	A		B	A	
Approach Delay (s)		12.8			11.4			9.2			9.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	115	220	210	90	210	85	85	460	85	65	585	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2792		1719	2734		1719	3357		1805	3389	
Flt Permitted	0.57	1.00		0.50	1.00		0.33	1.00		0.42	1.00	
Satd. Flow (perm)	1025	2792		896	2734		602	3357		801	3389	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	119	227	216	93	216	88	88	474	88	67	603	98
RTOR Reduction (vph)	0	90	0	0	53	0	0	38	0	0	32	0
Lane Group Flow (vph)	119	353	0	93	251	0	88	524	0	67	669	0
Heavy Vehicles (%)	5%	34%	5%	5%	35%	5%	5%	5%	5%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	410	1117		358	1094		241	1343		320	1356	
v/s Ratio Prot		c0.13			0.09			0.16			c0.20	
v/s Ratio Perm	0.12			0.10			0.15			0.08		
v/c Ratio	0.29	0.32		0.26	0.23		0.37	0.39		0.21	0.49	
Uniform Delay, d1	8.1	8.2		8.0	7.9		8.4	8.5		7.9	9.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	0.7		1.8	0.5		4.2	0.9		1.5	1.3	
Delay (s)	9.9	9.0		9.8	8.4		12.7	9.4		9.3	10.3	
Level of Service	A	A		A	A		B	A		A	B	
Approach Delay (s)		9.2			8.7			9.8			10.2	
Approach LOS		A			A			A			B	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	430	185	100	415	125	115	1120	120	60	445	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.95		1.00	0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2985		1719	2971		1719	3388		1719	3318	
Flt Permitted	0.39	1.00		0.34	1.00		0.40	1.00		0.19	1.00	
Satd. Flow (perm)	713	2985		615	2971		723	3388		345	3318	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	198	448	193	104	432	130	120	1167	125	62	464	141
RTOR Reduction (vph)	0	107	0	0	24	0	0	18	0	0	63	0
Lane Group Flow (vph)	198	534	0	104	538	0	120	1274	0	62	542	0
Heavy Vehicles (%)	5%	20%	5%	5%	21%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	254	1061		219	1056		337	1581		161	1548	
v/s Ratio Prot		0.18			0.18			c0.38			0.16	
v/s Ratio Perm	c0.28			0.17			0.17			0.18		
v/c Ratio	0.78	0.50		0.47	0.51		0.36	0.81		0.39	0.35	
Uniform Delay, d1	12.9	11.4		11.2	11.4		7.7	10.3		7.8	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.7	1.7		7.2	1.8		2.9	4.5		6.8	0.6	
Delay (s)	33.7	13.1		18.5	13.2		10.6	14.7		14.6	8.3	
Level of Service	C	B		B	B		B	B		B	A	
Approach Delay (s)		17.9			14.0			14.4			8.9	
Approach LOS		B			B			B			A	

Intersection Summary			
HCM Average Control Delay	14.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	165	215	70	95	280	120	100	640	155	140	400	165
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.96		1.00	0.97		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2667		1719	2847		1805	3337		1719	3288	
Flt Permitted	0.50	1.00		0.57	1.00		0.40	1.00		0.27	1.00	
Satd. Flow (perm)	898	2667		1023	2847		757	3337		485	3288	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	177	231	75	102	301	129	108	688	167	151	430	177
RTOR Reduction (vph)	0	48	0	0	83	0	0	47	0	0	94	0
Lane Group Flow (vph)	177	258	0	102	347	0	108	808	0	151	513	0
Heavy Vehicles (%)	5%	37%	10%	5%	28%	5%	0%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		21.0	21.0		21.0	21.0	
Actuated g/C Ratio	0.36	0.36		0.36	0.36		0.47	0.47		0.47	0.47	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	319	948		364	1012		353	1557		226	1534	
v/s Ratio Prot		0.10			0.12			0.24			0.16	
v/s Ratio Perm	c0.20			0.10			0.14			c0.31		
v/c Ratio	0.55	0.27		0.28	0.34		0.31	0.52		0.67	0.33	
Uniform Delay, d1	11.6	10.3		10.4	10.6		7.5	8.4		9.3	7.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.8	0.7		1.9	0.9		2.2	1.2		14.6	0.6	
Delay (s)	18.4	11.1		12.3	11.6		9.7	9.7		23.9	8.2	
Level of Service	B	B		B	B		A	A		C	A	
Approach Delay (s)		13.8			11.7			9.7			11.3	
Approach LOS		B			B			A			B	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	125	240	230	100	230	95	95	500	95	70	640	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.93		1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2792		1719	2734		1719	3356		1805	3388	
Flt Permitted	0.55	1.00		0.48	1.00		0.29	1.00		0.39	1.00	
Satd. Flow (perm)	995	2792		861	2734		532	3356		736	3388	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	129	247	237	103	237	98	98	515	98	72	660	108
RTOR Reduction (vph)	0	74	0	0	59	0	0	39	0	0	33	0
Lane Group Flow (vph)	129	410	0	103	276	0	98	574	0	72	735	0
Heavy Vehicles (%)	5%	34%	5%	5%	35%	5%	5%	5%	5%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	0.40	0.40		0.40	0.40		0.40	0.40		0.40	0.40	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	398	1117		344	1094		213	1342		294	1355	
v/s Ratio Prot		c0.15			0.10			0.17			c0.22	
v/s Ratio Perm	0.13			0.12			0.18			0.10		
v/c Ratio	0.32	0.37		0.30	0.25		0.46	0.43		0.24	0.54	
Uniform Delay, d1	8.3	8.4		8.2	8.0		8.8	8.7		8.0	9.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	0.9		2.2	0.6		7.0	1.0		2.0	1.6	
Delay (s)	10.4	9.4		10.4	8.6		15.8	9.7		10.0	10.8	
Level of Service	B	A		B	A		B	A		A	B	
Approach Delay (s)		9.6			9.0			10.5			10.7	
Approach LOS		A			A			B			B	

Intersection Summary			
HCM Average Control Delay	10.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	40.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.2%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
40: Laurel Canyon & Branford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	205	470	200	110	450	135	125	1220	130	65	485	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.96		1.00	0.97		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2985		1719	2971		1719	3389		1719	3319	
Flt Permitted	0.36	1.00		0.31	1.00		0.36	1.00		0.17	1.00	
Satd. Flow (perm)	652	2985		554	2971		652	3389		315	3319	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	214	490	208	115	469	141	130	1271	135	68	505	151
RTOR Reduction (vph)	0	94	0	0	16	0	0	16	0	0	56	0
Lane Group Flow (vph)	214	604	0	115	594	0	130	1390	0	68	600	0
Heavy Vehicles (%)	5%	20%	5%	5%	21%	5%	5%	5%	5%	5%	5%	5%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.0	19.0		19.0	19.0		23.0	23.0		23.0	23.0	
Effective Green, g (s)	19.0	19.0		19.0	19.0		23.0	23.0		23.0	23.0	
Actuated g/C Ratio	0.38	0.38		0.38	0.38		0.46	0.46		0.46	0.46	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	248	1134		211	1129		300	1559		145	1527	
v/s Ratio Prot		0.20			0.20			c0.41			0.18	
v/s Ratio Perm	c0.33			0.21			0.20			0.22		
v/c Ratio	0.86	0.53		0.55	0.53		0.43	0.89		0.47	0.39	
Uniform Delay, d1	14.3	12.0		12.1	12.0		9.1	12.4		9.3	8.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	30.6	1.8		9.8	1.8		4.5	8.1		10.5	0.8	
Delay (s)	44.9	13.8		21.9	13.8		13.6	20.5		19.8	9.7	
Level of Service	D	B		C	B		B	C		B	A	
Approach Delay (s)		21.1			15.1			19.9			10.6	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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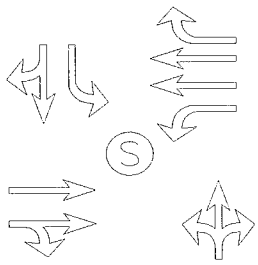
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	0	0%		0	0	0
EB THRU	795	5%		795	70	865
EB RIGHT	685	0%		685	60	745
WB LEFT	60	0%		60	5	65
WB THRU	1155	5%		1155	105	1260
WB RIGHT	515	5%		515	45	560
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	145	41%	**50**	195	20	215
SB THRU	20	0%		20	5	25
SB RIGHT	190	10%		190	15	205
TOTALS	**3565**		**50**	**3615**	**325**	**3940**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	0	0%		0	0	0
EB THRU	595	5%		595	55	650
EB RIGHT	165	0%		165	15	180
WB LEFT	35	0%		35	5	40
WB THRU	910	5%		910	80	990
WB RIGHT	220	5%		220	20	240
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	380	16%	**50**	430	40	470
SB THRU	20	0%		20	5	25
SB RIGHT	360	5%		360	30	390
TOTALS	**2685**		**50**	**2735**	**250**	**2985**

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N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	0	0%		0	0	0
EB THRU	895	5%		895	80	975
EB RIGHT	275	0%		275	25	300
WB LEFT	35	0%		35	5	40
WB THRU	1220	5%		1220	110	1330
WB RIGHT	225	5%		225	20	245
SB I-5 FREEWAY RAMPS						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	455	14%	**50**	505	45	550
SB THRU	20	0%		20	5	25
SB RIGHT	610	5%		610	55	665
TOTALS	**3735**		**50**	**3785**	**345**	**4130**

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CONDITION : AM PEAK HOUR

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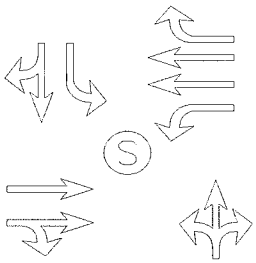
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	754	39	117	870	**0**	870	80	950
EB RIGHT	686	0	0	685	**0**	685	60	745
WB LEFT	59	0	0	60	**0**	60	5	65
WB THRU	1122	33	99	1220	**0**	1220	110	1330
WB RIGHT	492	22	66	560	**0**	560	50	610
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	118	27	81	200	**150**	350	30	380
SB THRU	22	0	0	20	**0**	20	5	25
SB RIGHT	169	22	66	235	**0**	235	20	255
TOTALS	**3422**				**150**	**4000**	**360**	**4360**

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N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	571	24	72	645	**0**	645	60	705
EB RIGHT	163	0	0	165	**0**	165	15	180
WB LEFT	35	0	0	35	**0**	35	5	40
WB THRU	896	12	36	930	**0**	930	85	1015
WB RIGHT	209	13	39	250	**0**	250	25	275
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	355	26	78	435	**150**	585	55	640
SB THRU	19	0	0	20	**0**	20	5	25
SB RIGHT	343	19	57	400	**0**	400	35	435
TOTALS	**2591**				**150**	**3030**	**285**	**3315**

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E/W STREET : OSBORNE STREET
N/S STREET : SB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 41
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	864	29	87	950	**0**	950	85	1035
EB RIGHT	276	0	0	275	**0**	275	25	300
WB LEFT	33	0	0	35	**0**	35	5	40
WB THRU	1192	29	87	1280	**0**	1280	115	1395
WB RIGHT	221	5	15	235	**0**	235	20	255
SB I-5 FREEWAY RAMPS								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	443	13	39	480	**150**	630	55	685
SB THRU	19	0	0	20	**0**	20	5	25
SB RIGHT	603	5	15	620	**0**	620	55	675
TOTALS	**3651**				**150**	**4045**	**365**	**4410**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 SB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 358

Rt	Thru	Lt	
191	22	145	Total
32	1	38	1st
37	10	24	2nd
41	4	38	3rd
81	7	45	4th

EAST LEG TOTAL: 1,728

	1st	2nd	3rd	4th	Total
Rt	163	141	131	79	514
Thru	225	270	390	270	1155
Lt	20	25	8	6	59

WEST LEG TOTAL: 1,479

Total	1st	2nd	3rd	4th	
					Lt
793	168	206	235	184	Thru
686	200	172	166	148	Rt

PEAK HOUR FACTORS

NORTH LEG = 0.67
SOUTH LEG =
EAST LEG = 0.82
WEST LEG = 0.92

ALL LEGS = 0.88

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

HOUR TOTAL: 3,565

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 07:00AM-08:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
191	22	145	Total
32	1	38	1st
37	10	24	2nd
41	4	38	3rd
81	7	45	4th

	1st	2nd	3rd	4th	Total
Rt	163	141	131	79	514
Thru	225	270	390	270	1155
Lt	20	25	8	6	59

Total	1st	2nd	3rd	4th	
					Lt
793	168	206	235	184	Thru
686	200	172	166	148	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 08:00AM-09:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
301	22	230	Total
74	5	56	1st
76	10	74	2nd
76	1	48	3rd
75	6	52	4th

	1st	2nd	3rd	4th	Total
Rt	68	68	80	59	275
Thru	237	198	171	146	752
Lt	11	11	6	5	33

Total	1st	2nd	3rd	4th	
					Lt
572	187	154	129	102	Thru
434	142	112	105	75	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 SB RAMPS LA

EAST-WEST STREET : OSBORNE 05-24-12

BEGINNING TIME : 07:00AM = PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
23	1	28	5	0	2	0	0	4	4	0	4	71
31	10	17	4	0	3	2	0	1	0	0	3	71
38	4	32	2	0	2	1	0	2	0	0	2	83
77	7	41	4	0	2	0	0	1	0	0	1	133
68	5	51	3	0	3	1	0	1	2	0	1	135
71	10	70	4	0	2	1	0	0	0	0	2	160
74	1	45	2	0	1	0	0	1	0	0	1	125
72	6	50	2	0	2	1	0	0	0	0	0	133
454	44	334	26	0	17	6	0	10	6	0	14	911
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
156	216	20	4	4	0	0	4	0	3	1	0	408
134	260	25	3	6	0	2	3	0	2	1	0	436
128	383	8	2	3	0	0	2	0	1	2	0	529
74	263	6	2	5	0	2	1	0	1	1	0	355
65	232	11	3	4	0	0	0	0	0	1	0	316
62	189	11	4	6	0	2	2	0	0	1	0	277
76	166	6	3	3	0	0	2	0	1	0	0	257
55	140	5	2	4	0	1	1	0	1	1	0	210
750	1849	92	23	35	0	7	15	0	9	8	0	2788
						WEST LEG						
200	157	0	0	4	0	0	4	0	0	3	0	368
172	199	0	0	3	0	0	4	0	0	0	0	378
166	225	0	0	5	0	0	3	0	0	2	0	401
148	173	0	0	6	0	0	5	0	0	0	0	332
142	182	0	0	2	0	0	2	0	0	1	0	329
112	146	0	0	5	0	0	2	0	0	1	0	266
105	123	0	0	3	0	0	3	0	0	0	0	234
75	95	0	0	4	0	0	2	0	0	1	0	177
1120	1300	0	0	32	0	0	25	0	0	8	0	2485

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 SB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 762

Rt	Thru	Lt	
362	19	381	Total
123	6	129	1st
84	2	80	2nd
80	6	77	3rd
75	5	95	4th

EAST LEG TOTAL: 1,165

	1st	2nd	3rd	4th	Total
Rt	53	60	62	47	222
Thru	253	205	216	234	908
Lt	8	10	8	9	35

Total	1st	2nd	3rd	4th	
					Lt
595	137	156	158	144	Thru
163	41	36	44	42	Rt

WEST LEG TOTAL: 758

PEAK HOUR FACTORS

NORTH LEG = 0.74
SOUTH LEG =
EAST LEG = 0.93
WEST LEG = 0.94

ALL LEGS = 0.90

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

TOTAL: 0

SOUTH LEG

HOUR TOTAL: 2,685

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 12:00PM-01:00PM DATE: 05-24-12

NORTH LEG

	Rt	Thru	Lt
Total	279	12	245
1st	79	2	69
2nd	77	4	78
3rd	57	4	42
4th	66	2	56

	1st	2nd	3rd	4th	Total
Rt	50	61	45	40	196
Thru	207	214	170	215	806
Lt	7	7	6	5	25

	Total	1st	2nd	3rd	4th
Lt					
Thru	513	138	137	115	123
Rt	136	43	30	30	33

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 01:00PM-02:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
362	19	381	Total
123	6	129	1st
84	2	80	2nd
80	6	77	3rd
75	5	95	4th

	1st	2nd	3rd	4th	Total
Rt	53	60	62	47	222
Thru	253	205	216	234	908
Lt	8	10	8	9	35

Total	1st	2nd	3rd	4th	
					Lt
595	137	156	158	144	Thru
163	41	36	44	42	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 SB RAMPS LA

EAST-WEST STREET : OSBORNE 05-24-12

BEGINNING TIME : 12:00PM PH=1:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
71	2	63	2	0	2	3	0	2	3	0	2	150
74	4	69	3	0	3	0	0	3	0	0	3	159
52	4	34	2	0	4	1	0	0	2	0	4	103
61	2	46	4	0	5	0	0	1	1	0	4	124
117	6	122	3	0	2	2	0	2	1	0	3	258
80	2	76	2	0	1	2	0	1	0	0	2	166
76	6	67	4	0	5	0	0	3	0	0	2	163
70	5	90	3	0	3	1	0	1	1	0	1	175
601	31	567	23	0	25	9	0	13	8	0	21	1298
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	00	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
44	203	7	4	1	0	1	1	0	1	2	0	264
55	212	7	3	1	0	1	1	0	2	0	0	282
41	167	6	2	1	0	2	2	0	0	0	0	221
38	212	5	2	2	0	0	0	0	0	1	0	260
49	252	8	1	0	0	2	0	0	1	1	0	314
57	199	10	2	2	0	0	1	0	1	3	0	275
58	213	8	3	2	0	1	1	0	0	0	0	286
45	232	9	2	1	0	0	0	0	0	1	0	290
387	1690	60	19	10	0	7	6	0	5	8	0	2192
						WEST LEG						
43	132	0	0	3	0	0	1	0	0	2	0	181
30	134	0	0	2	0	0	1	0	0	0	0	167
30	110	0	0	3	0	0	1	0	0	1	0	145
33	119	0	0	1	0	0	3	0	0	0	0	156
41	131	0	0	2	0	0	2	0	0	2	0	178
36	151	0	0	2	0	0	1	0	0	2	0	192
44	149	0	0	5	0	0	1	0	0	3	0	202
42	140	0	0	3	0	0	1	0	0	0	0	186
299	1066	0	0	21	0	0	11	0	0	10	0	1407

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 SB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 1,083

Rt	Thru	Lt	
608	19	456	Total
131	4	106	1st
160	7	134	2nd
149	6	113	3rd
168	2	103	4th

EAST LEG TOTAL: 1,480

	1st	2nd	3rd	4th	Total
Rt	64	66	51	45	226
Thru	284	281	329	327	1221
Lt	9	11	8	5	33

WEST LEG TOTAL: 1,169

Total	1st	2nd	3rd	4th	
					Lt
893	253	189	227	224	Thru
276	62	76	80	58	Rt

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

PEAK HOUR FACTORS

NORTH LEG = 0.90
SOUTH LEG =
EAST LEG = 0.95
WEST LEG = 0.93

ALL LEGS = 0.97

HOUR TOTAL: 3,732

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 04:00PM-05:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
573	17	466	Total
124	4	116	1st
158	2	110	2nd
131	4	106	3rd
160	7	134	4th

	1st	2nd	3rd	4th	Total
Rt	37	47	64	66	214
Thru	273	286	284	281	1124
Lt	11	8	9	11	39

Total	1st	2nd	3rd	4th	
					Lt
862	204	216	253	189	Thru
256	58	60	62	76	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 SB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 05:00PM-06:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
628	19	441	Total
149	6	113	1st
168	2	103	2nd
162	2	118	3rd
149	9	107	4th

	1st	2nd	3rd	4th	Total
Rt	51	45	42	45	183
Thru	329	327	286	260	1202
Lt	8	5	3	3	19

Total	1st	2nd	3rd	4th	
					Lt
915	227	224	232	232	Thru
249	80	58	52	59	Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 SB RAMPS LA

EAST-WEST STREET : OSBORNE 05-24-12

BEGINNING TIME : 04:00PM PH = 4:30PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
120	4	113	2	0	1	1	0	0	1	0	2	244
157	2	105	1	0	1	0	0	1	0	0	3	270
130	4	104	0	0	0	0	0	0	1	0	2	241
158	7	129	1	0	2	1	0	1	0	0	2	301
148	6	111	0	0	0	1	0	1	0	0	1	268
167	2	99	1	0	1	0	0	1	0	0	2	273
162	2	114	0	0	3	0	0	0	0	0	1	282
149	9	105	0	0	0	0	0	2	0	0	0	265
1191	36	880	5	0	8	3	0	6	2	0	13	2144
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
34	262	11	2	6	0	1	4	0	0	1	0	321
46	281	8	0	5	0	0	0	0	1	0	0	341
63	277	9	0	3	0	1	2	0	0	2	0	357
65	274	11	1	6	0	0	1	0	0	0	0	358
50	322	8	0	5	0	0	1	0	1	1	0	388
43	319	5	1	5	0	1	2	0	0	1	0	377
41	279	3	0	4	0	0	3	0	1	0	0	331
44	256	3	0	3	0	0	1	0	1	0	0	308
386	2270	58	4	37	0	3	14	0	4	5	0	2781
						WEST LEG						
58	198	0	0	3	0	0	2	0	0	1	0	262
60	208	0	0	5	0	0	1	0	0	2	0	276
62	245	0	0	4	0	0	3	0	0	1	0	315
76	182	0	0	5	0	0	1	0	0	1	0	265
80	221	0	0	3	0	0	1	0	0	2	0	307
58	216	0	0	5	0	0	2	0	0	1	0	282
52	223	0	0	6	0	0	1	0	0	2	0	284
59	228	0	0	2	0	0	1	0	0	1	0	291
505	1721	0	0	33	0	0	12	0	0	11	0	2282

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	145	20	190	0	0	0	0	795	685	60	1155	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1504	1506						3272		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.12	1.00	1.00
Satd. Flow (perm)	1199	1506						3272		233	3438	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	165	23	216	0	0	0	0	903	778	68	1312	585
RTOR Reduction (vph)	0	38	0	0	0	0	0	271	0	0	0	254
Lane Group Flow (vph)	165	201	0	0	0	0	0	1410	0	68	1312	331
Heavy Vehicles (%)	20%	0%	10%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	17.1	17.1						32.6		32.6	32.6	32.6
Effective Green, g (s)	17.1	17.1						32.6		32.6	32.6	32.6
Actuated g/C Ratio	0.30	0.30						0.56		0.56	0.56	0.56
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	355	446						1849		132	1942	869
v/s Ratio Prot		0.13						c0.43			0.38	
v/s Ratio Perm	c0.14									0.29		0.21
v/c Ratio	0.46	0.45						0.76		0.52	0.68	0.38
Uniform Delay, d1	16.6	16.5						9.6		7.7	8.8	7.0
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	4.3	3.3						1.9		3.4	0.9	0.3
Delay (s)	20.9	19.8						11.5		11.1	9.8	7.2
Level of Service	C	B						B		B	A	A
Approach Delay (s)		20.2			0.0			11.5			9.1	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	380	20	360	0	0	0	0	595	165	35	910	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1556						3361		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.26	1.00	1.00
Satd. Flow (perm)	1370	1556						3361		490	3438	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	422	22	400	0	0	0	0	661	183	39	1011	244
RTOR Reduction (vph)	0	21	0	0	0	0	0	64	0	0	0	148
Lane Group Flow (vph)	422	401	0	0	0	0	0	780	0	39	1011	96
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	16.0	16.0						15.5		15.5	15.5	15.5
Effective Green, g (s)	16.0	16.0						15.5		15.5	15.5	15.5
Actuated g/C Ratio	0.41	0.41						0.39		0.39	0.39	0.39
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	555	630						1319		192	1349	604
v/s Ratio Prot		0.26						0.23			c0.29	
v/s Ratio Perm	c0.31									0.08		0.06
v/c Ratio	0.76	0.64						0.59		0.20	0.75	0.16
Uniform Delay, d1	10.1	9.4						9.5		7.9	10.3	7.8
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	9.5	4.8						0.7		0.5	2.3	0.1
Delay (s)	19.6	14.3						10.2		8.4	12.7	7.9
Level of Service	B	B						B		A	B	A
Approach Delay (s)		16.9			0.0			10.2			11.6	
Approach LOS		B			A			B			B	

Intersection Summary			
HCM Average Control Delay	12.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	39.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.4%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	455	20	610	0	0	0	0	895	275	35	1220	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.85						0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1719	1549						3354		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.18	1.00	1.00
Satd. Flow (perm)	1370	1549						3354		345	3438	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	469	21	629	0	0	0	0	923	284	36	1258	232
RTOR Reduction (vph)	0	8	0	0	0	0	0	53	0	0	0	139
Lane Group Flow (vph)	469	642	0	0	0	0	0	1154	0	36	1258	93
Heavy Vehicles (%)	5%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	25.0	25.0						22.0		22.0	22.0	22.0
Effective Green, g (s)	25.0	25.0						22.0		22.0	22.0	22.0
Actuated g/C Ratio	0.45	0.45						0.40		0.40	0.40	0.40
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	623	704						1342		138	1375	615
v/s Ratio Prot		c0.41						0.34			c0.37	
v/s Ratio Perm	0.34									0.10		0.06
v/c Ratio	0.75	0.91						0.86		0.26	0.91	0.15
Uniform Delay, d1	12.4	14.0						15.1		11.1	15.6	10.5
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	8.2	18.1						5.9		1.0	9.6	0.1
Delay (s)	20.6	32.1						20.9		12.1	25.2	10.7
Level of Service	C	C						C		B	C	B
Approach Delay (s)		27.3			0.0			20.9			22.7	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/13/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	195	20	190	0	0	0	0	795	685	60	1155	515
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1280	1506						3272		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.12	1.00	1.00
Satd. Flow (perm)	1020	1506						3272		233	3438	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	222	23	216	0	0	0	0	903	778	68	1312	585
RTOR Reduction (vph)	0	38	0	0	0	0	0	271	0	0	0	254
Lane Group Flow (vph)	222	201	0	0	0	0	0	1410	0	68	1312	331
Heavy Vehicles (%)	41%	0%	10%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	17.1	17.1						32.6		32.6	32.6	32.6
Effective Green, g (s)	17.1	17.1						32.6		32.6	32.6	32.6
Actuated g/C Ratio	0.30	0.30						0.56		0.56	0.56	0.56
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	302	446						1849		132	1942	869
v/s Ratio Prot		0.13						c0.43			0.38	
v/s Ratio Perm	c0.22									0.29		0.21
v/c Ratio	0.74	0.45						0.76		0.52	0.68	0.38
Uniform Delay, d1	18.3	16.5						9.6		7.7	8.8	7.0
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	14.7	3.3						1.9		3.4	0.9	0.3
Delay (s)	33.0	19.8						11.5		11.1	9.8	7.2
Level of Service	C	B						B		B	A	A
Approach Delay (s)		26.1			0.0			11.5			9.1	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM Average Control Delay	12.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	57.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/13/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	430	20	360	0	0	0	0	595	165	35	910	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1556	1556						3361		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.26	1.00	1.00
Satd. Flow (perm)	1240	1556						3361		490	3438	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	478	22	400	0	0	0	0	661	183	39	1011	244
RTOR Reduction (vph)	0	21	0	0	0	0	0	64	0	0	0	148
Lane Group Flow (vph)	478	401	0	0	0	0	0	780	0	39	1011	96
Heavy Vehicles (%)	16%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	16.0	16.0						15.5		15.5	15.5	15.5
Effective Green, g (s)	16.0	16.0						15.5		15.5	15.5	15.5
Actuated g/C Ratio	0.41	0.41						0.39		0.39	0.39	0.39
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	502	630						1319		192	1349	604
v/s Ratio Prot		0.26						0.23			c0.29	
v/s Ratio Perm	c0.39									0.08		0.06
v/c Ratio	0.95	0.64						0.59		0.20	0.75	0.16
Uniform Delay, d1	11.4	9.4						9.5		7.9	10.3	7.8
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	29.9	4.8						0.7		0.5	2.3	0.1
Delay (s)	41.3	14.3						10.2		8.4	12.7	7.9
Level of Service	D	B						B		A	B	A
Approach Delay (s)		28.6			0.0			10.2			11.6	
Approach LOS		C			A			B			B	

Intersection Summary			
HCM Average Control Delay	16.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	39.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/13/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	505	20	610	0	0	0	0	895	275	35	1220	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.85						0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	1549						3354		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.18	1.00	1.00
Satd. Flow (perm)	1262	1549						3354		345	3438	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	521	21	629	0	0	0	0	923	284	36	1258	232
RTOR Reduction (vph)	0	8	0	0	0	0	0	53	0	0	0	139
Lane Group Flow (vph)	521	642	0	0	0	0	0	1154	0	36	1258	93
Heavy Vehicles (%)	14%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	25.0	25.0						22.0		22.0	22.0	22.0
Effective Green, g (s)	25.0	25.0						22.0		22.0	22.0	22.0
Actuated g/C Ratio	0.45	0.45						0.40		0.40	0.40	0.40
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	574	704						1342		138	1375	615
v/s Ratio Prot		c0.41						0.34			c0.37	
v/s Ratio Perm	0.41									0.10		0.06
v/c Ratio	0.91	0.91						0.86		0.26	0.91	0.15
Uniform Delay, d1	13.9	14.0						15.1		11.1	15.6	10.5
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	20.6	18.1						5.9		1.0	9.6	0.1
Delay (s)	34.5	32.1						20.9		12.1	25.2	10.7
Level of Service	C	C						C		B	C	B
Approach Delay (s)		33.2			0.0			20.9			22.7	
Approach LOS		C			A			C			C	

Intersection Summary			
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/15/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	215	20	205	0	0	0	0	865	745	65	1260	560
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1280	1504						3272		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.12	1.00	1.00
Satd. Flow (perm)	1020	1504						3272		226	3438	1538
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	244	23	233	0	0	0	0	983	847	74	1432	636
RTOR Reduction (vph)	0	28	0	0	0	0	0	265	0	0	0	271
Lane Group Flow (vph)	244	228	0	0	0	0	0	1565	0	74	1432	365
Heavy Vehicles (%)	41%	0%	10%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	17.0	17.0						33.7		33.7	33.7	33.7
Effective Green, g (s)	17.0	17.0						33.7		33.7	33.7	33.7
Actuated g/C Ratio	0.29	0.29						0.57		0.57	0.57	0.57
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	295	436						1878		130	1974	883
v/s Ratio Prot		0.15						c0.48			0.42	
v/s Ratio Perm	c0.24									0.33		0.24
v/c Ratio	0.83	0.52						0.83		0.57	0.73	0.41
Uniform Delay, d1	19.5	17.4						10.2		7.9	9.1	7.0
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	22.6	4.4						3.3		5.6	1.4	0.3
Delay (s)	42.1	21.9						13.5		13.5	10.5	7.3
Level of Service	D	C						B		B	B	A
Approach Delay (s)		31.7			0.0			13.5			9.6	
Approach LOS		C			A			B			A	

Intersection Summary			
HCM Average Control Delay	13.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	58.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/15/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	470	20	390	0	0	0	0	650	180	40	990	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.86						0.97		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1556	1555						3361		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.25	1.00	1.00
Satd. Flow (perm)	1240	1555						3361		484	3438	1538
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	522	22	433	0	0	0	0	722	200	44	1100	267
RTOR Reduction (vph)	0	16	0	0	0	0	0	63	0	0	0	161
Lane Group Flow (vph)	522	439	0	0	0	0	0	859	0	44	1100	106
Heavy Vehicles (%)	16%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	16.0	16.0						15.7		15.7	15.7	15.7
Effective Green, g (s)	16.0	16.0						15.7		15.7	15.7	15.7
Actuated g/C Ratio	0.40	0.40						0.40		0.40	0.40	0.40
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	500	627						1329		191	1360	608
v/s Ratio Prot		0.28						0.26			c0.32	
v/s Ratio Perm	c0.42									0.09		0.07
v/c Ratio	1.04	0.70						0.65		0.23	0.81	0.17
Uniform Delay, d1	11.9	9.9						9.7		8.0	10.7	7.8
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	52.2	6.4						1.1		0.6	3.7	0.1
Delay (s)	64.1	16.3						10.8		8.6	14.3	7.9
Level of Service	E	B						B		A	B	A
Approach Delay (s)		41.8			0.0			10.8			12.9	
Approach LOS		D			A			B			B	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.93		
Actuated Cycle Length (s)	39.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
41: Osborne St & I-5 SB

8/15/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	550	20	665	0	0	0	0	975	300	40	1330	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Lane Util. Factor	1.00	1.00						0.95		1.00	0.95	1.00
Frt	1.00	0.85						0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00						1.00		0.95	1.00	1.00
Satd. Flow (prot)	1583	1548						3354		1805	3438	1538
Flt Permitted	0.76	1.00						1.00		0.18	1.00	1.00
Satd. Flow (perm)	1262	1548						3354		345	3438	1538
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	567	21	686	0	0	0	0	1005	309	41	1371	253
RTOR Reduction (vph)	0	5	0	0	0	0	0	53	0	0	0	152
Lane Group Flow (vph)	567	702	0	0	0	0	0	1261	0	41	1371	101
Heavy Vehicles (%)	14%	0%	5%	0%	0%	0%	0%	5%	0%	0%	5%	5%
Turn Type	Perm	NA		Perm				NA		Perm	NA	Perm
Protected Phases		6			2			4			8	
Permitted Phases	6			2						8		8
Actuated Green, G (s)	25.0	25.0						22.0		22.0	22.0	22.0
Effective Green, g (s)	25.0	25.0						22.0		22.0	22.0	22.0
Actuated g/C Ratio	0.45	0.45						0.40		0.40	0.40	0.40
Clearance Time (s)	4.0	4.0						4.0		4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0						3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	574	704						1342		138	1375	615
v/s Ratio Prot		c0.45						0.38			c0.40	
v/s Ratio Perm	0.45									0.12		0.07
v/c Ratio	0.99	1.00						0.94		0.30	1.00	0.16
Uniform Delay, d1	14.8	15.0						15.9		11.2	16.5	10.6
Progression Factor	1.00	1.00						1.00		1.00	1.00	1.00
Incremental Delay, d2	34.7	33.1						12.7		1.2	23.4	0.1
Delay (s)	49.5	48.0						28.5		12.4	39.9	10.7
Level of Service	D	D						C		B	D	B
Approach Delay (s)		48.7			0.0			28.5			34.8	
Approach LOS		D			A			C			C	

Intersection Summary			
HCM Average Control Delay	37.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.6%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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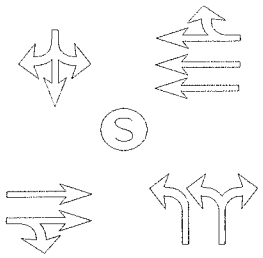
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 42
ROUTE 8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	5	0%		5	5	10
EB THRU	955	10%	**50**	1005	90	1095
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	1500	5%		1500	135	1635
WB RIGHT	25	67%	**50**	75	5	80
NB I-5 FREEWAY RAMPS						
NB LEFT	230	10%		230	20	250
NB THRU	0	0%		0	0	0
NB RIGHT	180	10%		180	15	195
SB LEFT	5	0%		5	5	10
SB THRU	0	0%		0	0	0
SB RIGHT	5	0%		5	5	10
TOTALS	**2905**		**100**	**3005**	**280**	**3285**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 42
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	5	0%		5	5	10
EB THRU	955	10%	**50**	1005	90	1095
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	820	5%		820	75	895
WB RIGHT	15	77%	**50**	65	5	70
NB I-5 FREEWAY RAMPS						
NB LEFT	305	5%		305	25	330
NB THRU	0	0%		0	0	0
NB RIGHT	220	5%		220	20	240
SB LEFT	5	0%		5	5	10
SB THRU	0	0%		0	0	0
SB RIGHT	5	0%		5	5	10
TOTALS	**2330**		**100**	**2430**	**230**	**2660**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 42
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	5	0%		5	5	10
EB THRU	1340	5%	**50**	1390	125	1515
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	1075	5%		1075	95	1170
WB RIGHT	30	63%	**50**	80	5	85
NB I-5 FREEWAY RAMPS						
NB LEFT	410	5%		410	35	445
NB THRU	0	0%		0	0	0
NB RIGHT	205	5%		205	20	225
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	5	0%		5	5	10
TOTALS	**3070**		**100**	**3170**	**290**	**3460**

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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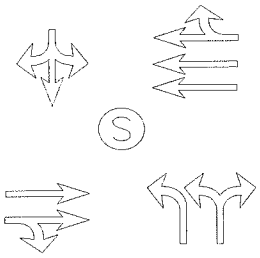
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	21-Sep-12	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
42
ROUTE
8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	2	0	0	5	**0**	5	5	10
EB THRU	918	5	15	935	**150**	1085	100	1185
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	1474	5	15	1490	**0**	1490	135	1625
WB RIGHT	27	0	0	25	**150**	175	15	190
NB I-5 FREEWAY RAMPS								
NB LEFT	212	10	30	240	**0**	240	20	260
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	166	10	30	195	**0**	195	20	215
SB LEFT	2	0	0	5	**0**	5	5	10
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	1	0	0	5	**0**	5	5	10
TOTALS	**2802**				**300**	**3200**	**305**	**3505**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	21-Sep-12	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 42
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	1	0	0	5	**0**	5	5	10
EB THRU	927	29	87	1015	**150**	1165	105	1270
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	794	28	84	880	**0**	880	80	960
WB RIGHT	17	0	0	15	**150**	165	15	180
NB I-5 FREEWAY RAMPS								
NB LEFT	298	5	15	315	**0**	315	30	345
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	207	13	39	245	**0**	245	20	265
SB LEFT	2	0	0	5	**0**	5	5	10
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	1	0	0	5	**0**	5	5	10
TOTALS	**2247**				**300**	**2785**	**265**	**3050**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	21-Sep-12	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : NB I-5 FREEWAY RAMPS
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 42
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	3	0	0	5	**0**	5	5	10
EB THRU	1306	32	96	1400	**150**	1550	140	1690
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	1035	42	126	1160	**0**	1160	105	1265
WB RIGHT	28	0	0	30	**150**	180	15	195
NB I-5 FREEWAY RAMPS								
NB LEFT	406	6	18	425	**0**	425	40	465
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	198	6	18	215	**0**	215	20	235
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	1	0	0	5	**0**	5	5	10
TOTALS	**2977**				**300**	**3540**	**330**	**3870**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 NB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 3

	Rt	Thru	Lt
Total	1		2
1st	0		0
2nd	0		1
3rd	0		1
4th	1		0

EAST LEG TOTAL: 1,527

	1st	2nd	3rd	4th	Total
Rt	6	5	5	11	27
Thru	359	377	471	293	1500
Lt					

WEST LEG TOTAL: 958

	Total	1st	2nd	3rd	4th
Lt	2	0	0	1	1
Thru	956	215	233	277	231
Rt					

SOUTH LEG

TOTAL: 411

	Lt	Thru	Rt
1st	45		33
2nd	62		44
3rd	57		49
4th	66		55
Total	230		181

PEAK HOUR FACTORS

NORTH LEG = 0.75
SOUTH LEG = 0.85
EAST LEG = 0.80
WEST LEG = 0.86

ALL LEGS = 0.84

HOUR TOTAL: 2,899

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
1		2	Total
0		0	1st
0		1	2nd
0		1	3rd
1		0	4th

	1st	2nd	3rd	4th	Total
Rt	6	5	5	11	27
Thru	359	377	471	293	1500
Lt					

Total	1st	2nd	3rd	4th	
2	0	0	1	1	Lt
956	215	233	277	231	Thru
					Rt

	Lt	Thru	Rt
1st	45		33
2nd	62		44
3rd	57		49
4th	66		55
Total	230		181

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
2		1	Total
0		0	1st
1		1	2nd
1		0	3rd
0		0	4th

	1st	2nd	3rd	4th	Total
Rt	10	6	6	0	22
Thru	233	189	201	187	810
Lt					

Total	1st	2nd	3rd	4th	
5	0	0	4	1	Lt
837	245	195	194	203	Thru
					Rt

	Lt	Thru	Rt
1st	67		40
2nd	52		57
3rd	55		49
4th	63		60
Total	237		206

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 NB RAMPS LA

EAST-WEST STREET : OSBORNE 05-31-12

BEGINNING TIME : 07:00AM *PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	1
0	0	1	0	0	0	0	0	0	0	0	0	1
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0	0	0	0	0	2
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	3	0	0	0	0	0	0	0	0	0	6
						SOUTH LEG						
29	0	42	1	0	1	2	0	1	1	0	1	78
39	0	58	3	0	2	0	0	1	2	0	1	106
46	0	53	1	0	3	1	0	0	1	0	1	106
52	0	59	2	0	3	1	0	2	0	0	2	121
36	0	63	1	0	4	3	0	0	0	0	0	107
52	0	48	2	0	2	1	0	1	2	0	1	109
46	0	53	2	0	1	0	0	0	1	0	1	104
54	0	54	2	0	4	1	0	3	3	0	2	123
354	0	430	14	0	20	9	0	8	10	0	9	854
						EAST LEG						
6	353	0	0	4	0	0	1	0	0	1	0	365
5	371	0	0	4	0	0	2	0	0	0	0	382
5	465	0	0	5	0	0	1	0	0	0	0	476
11	285	0	0	4	0	0	2	0	0	2	0	304
10	221	0	0	9	0	0	3	0	0	0	0	243
6	181	0	0	7	0	0	1	0	0	0	0	195
6	190	0	0	5	0	0	4	0	0	2	0	207
0	183	0	0	4	0	0	0	0	0	0	0	187
49	2249	0	0	42	0	0	14	0	0	5	0	2359
						WEST LEG						
0	205	0	0	5	0	0	3	0	0	2	0	215
0	224	0	0	5	0	0	3	0	0	1	0	233
0	266	1	0	6	0	0	4	0	0	1	0	278
0	223	1	0	3	0	0	3	0	0	2	0	232
0	232	0	0	7	0	0	3	0	0	3	0	245
0	183	0	0	6	0	0	3	0	0	3	0	195
0	183	4	0	4	0	0	3	0	0	4	0	198
0	189	1	0	10	0	0	3	0	0	1	0	204
0	1705	7	0	46	0	0	25	0	0	17	0	1800

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 NB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 3

	Rt	Thru	Lt
Total	1		2
1st	0		0
2nd	0		1
3rd	0		0
4th	1		1

EAST LEG TOTAL: 839

	1st	2nd	3rd	4th	Total
Rt	3	3	5	6	17
Thru	192	202	207	221	822
Lt					

WEST LEG TOTAL: 957

	Total	1st	2nd	3rd	4th
Lt	1	0	0	1	0
Thru	956	253	241	231	231
Rt					

SOUTH LEG

TOTAL: 523

	Lt	Thru	Rt
1st	85		53
2nd	69		60
3rd	78		62
4th	71		45
Total	303		220

PEAK HOUR FACTORS

NORTH LEG = 0.38
SOUTH LEG = 0.93
EAST LEG = 0.92
WEST LEG = 0.95

ALL LEGS = 0.99

HOUR TOTAL: 2,322

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
4		0	Total
0		0	1st
2		0	2nd
2		0	3rd
0		0	4th

	1st	2nd	3rd	4th	Total
Rt	1	4	3	1	9
Thru	148	215	169	200	732
Lt					

Total	1st	2nd	3rd	4th	
2	0	0	1	1	Lt
787	153	230	212	192	Thru
					Rt

	Lt	Thru	Rt
1st	60		36
2nd	74		50
3rd	69		44
4th	65		44
Total	268		174

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
1		2	Total
0		0	1st
0		1	2nd
0		0	3rd
1		1	4th

	1st	2nd	3rd	4th	Total
Rt	3	3	5	6	17
Thru	192	202	207	221	822
Lt					

Total	1st	2nd	3rd	4th	
1	0	0	1	0	Lt
956	253	241	231	231	Thru
					Rt

	Lt	Thru	Rt
1st	85		53
2nd	69		60
3rd	78		62
4th	71		45
Total	303		220

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 NB RAMPS LA

EAST-WEST STREET : OSBORNE 05-31-12

BEGINNING TIME : 12:00PM PH= 1:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
2	0	0	0	0	0	0	0	0	0	0	0	2
2	0	0	0	0	0	0	0	0	0	0	0	2
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	1	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	0	0	0	0	0	0	0	0	0	2
5	0	2	0	0	0	0	0	0	0	0	0	7
						SOUTH LEG						
31	0	59	5	0	0	0	0	0	0	0	1	96
50	0	73	0	0	1	0	0	0	0	0	0	124
42	0	65	1	0	2	0	0	1	1	0	1	113
43	0	64	0	0	1	0	0	0	1	0	0	109
51	0	84	1	0	0	1	0	0	0	0	1	138
55	0	68	5	0	1	0	0	0	0	0	0	129
59	0	76	2	0	1	0	0	1	1	0	0	140
42	0	70	3	0	0	0	0	0	0	0	1	116
373	0	559	17	0	6	1	0	2	3	0	4	965
						EAST LEG						
1	137	0	0	7	0	0	1	0	0	3	0	149
4	200	0	0	13	0	0	2	0	0	0	0	219
3	166	0	0	1	0	0	1	0	0	1	0	172
1	194	0	0	5	0	0	0	0	0	1	0	201
3	189	0	0	2	0	0	0	0	0	1	0	195
3	189	0	0	9	0	0	0	0	0	4	0	205
5	200	0	0	6	0	0	1	0	0	0	0	212
6	216	0	0	3	0	0	1	0	0	1	0	227
26	1491	0	0	46	0	0	6	0	0	11	0	1580
						WEST LEG						
0	144	0	0	3	0	0	5	0	0	1	0	153
0	215	0	0	4	0	0	4	0	0	7	0	230
0	207	1	0	2	0	0	3	0	0	0	0	213
0	182	1	0	7	0	0	2	0	0	1	0	193
0	245	0	0	5	0	0	1	0	0	2	0	253
0	229	0	0	8	0	0	2	0	0	2	0	241
0	225	1	0	4	0	0	1	0	0	1	0	232
0	228	0	0	2	0	0	1	0	0	0	0	231
0	1675	3	0	35	0	0	19	0	0	14	0	1746

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: I-5 NB RAMPS
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 1

	Rt	Thru	Lt
Total	1		
1st	0		0
2nd	1		0
3rd	0		0
4th	0		0

EAST LEG TOTAL: 1,105

	1st	2nd	3rd	4th	Total
Rt	2	7	15	4	28
Thru	257	284	261	275	1077
Lt					

WEST LEG TOTAL: 1,341

	Total	1st	2nd	3rd	4th
Lt	3	1	1	0	1
Thru	1338	303	315	409	311
Rt					

SOUTH LEG

	Lt	Thru	Rt
1st	108		48
2nd	101		62
3rd	96		51
4th	107		43
Total	412		204

TOTAL: 616

PEAK HOUR FACTORS

NORTH LEG = 0.25
SOUTH LEG = 0.94
EAST LEG = 0.95
WEST LEG = 0.82

ALL LEGS = 0.92

HOUR TOTAL: 3,063

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
1		0	Total
0		0	1st
0		0	2nd
1		0	3rd
0		0	4th

	1st	2nd	3rd	4th	Total
Rt	1	5	4	2	12
Thru	255	251	244	257	1007
Lt					

Total	1st	2nd	3rd	4th	
1	0	0	0	1	Lt
1291	321	320	347	303	Thru
					Rt

	Lt	Thru	Rt
1st	69		38
2nd	89		46
3rd	95		44
4th	108		48
Total	361		176

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: I-5 NB RAMPS

EAST-WEST STREET: OSBORNE

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
2		0	Total
1		0	1st
0		0	2nd
0		0	3rd
1		0	4th

	1st	2nd	3rd	4th	Total
Rt	7	15	4	1	27
Thru	284	261	275	213	1033
Lt					

Total	1st	2nd	3rd	4th	
2	1	0	1	0	Lt
1335	315	409	311	300	Thru
					Rt

	Lt	Thru	Rt
1st	101		62
2nd	96		51
3rd	107		43
4th	60		42
Total	364		198

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : I-5 NB RAMPS LA

EAST-WEST STREET : OSBORNE 05-31-12

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	0	0	0	0	0	0	0	0	0	0	1
3	0	0	0	0	0	0	0	0	0	0	0	3
						SOUTH LEG						
37	0	66	1	0	3	0	0	0	0	0	0	107
45	0	87	1	0	2	0	0	0	0	0	0	135
42	0	94	2	0	1	0	0	0	0	0	0	139
47	0	107	1	0	1	0	0	0	0	0	0	156
60	0	99	1	0	1	1	0	0	0	0	1	163
49	0	94	2	0	1	0	0	0	0	0	1	147
42	0	106	0	0	1	0	0	0	1	0	0	150
42	0	57	0	0	2	0	0	0	0	0	1	102
364	0	710	8	0	12	1	0	0	1	0	3	1099
						EAST LEG						
1	249	0	0	4	0	0	1	0	0	1	0	256
5	243	0	0	5	0	0	1	0	0	2	0	256
4	236	0	0	5	0	0	2	0	0	1	0	248
2	245	0	0	9	0	0	1	0	0	2	0	259
7	272	0	0	9	0	0	2	0	0	1	0	291
15	253	0	0	7	0	0	1	0	0	0	0	276
4	265	0	0	5	0	0	3	0	0	2	0	279
1	205	0	0	5	0	0	1	0	0	2	0	214
39	1968	0	0	49	0	0	12	0	0	11	0	2079
						WEST LEG						
0	316	0	0	4	0	0	0	0	0	1	0	321
0	311	0	0	5	0	0	1	0	0	3	0	320
0	331	0	0	10	0	0	3	0	0	3	0	347
0	296	1	0	5	0	0	1	0	0	1	0	304
0	306	1	0	7	0	0	1	0	0	1	0	316
0	402	0	0	4	0	0	1	0	0	2	0	409
0	302	1	0	6	0	0	2	0	0	1	0	312
0	294	0	0	3	0	0	1	0	0	2	0	300
0	2558	3	0	44	0	0	10	0	0	14	0	2629

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
42: Osborne St

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	230	0	180	0	955	0	0	1500	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			1.00	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1559	1414			3438			4932	
Flt Permitted		0.89		0.75	0.98			1.00			1.00	
Satd. Flow (perm)		1575		1230	1387			3438			4932	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	6	0	6	274	0	214	0	1137	0	0	1786	30
RTOR Reduction (vph)	0	2	0	0	22	0	0	0	0	0	4	0
Lane Group Flow (vph)	0	10	0	247	219	0	0	1137	0	0	1812	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		17.0		17.0	17.0			20.0			20.0	
Effective Green, g (s)		17.0		17.0	17.0			20.0			20.0	
Actuated g/C Ratio		0.38		0.38	0.38			0.44			0.44	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		595		465	524			1528			2192	
v/s Ratio Prot								0.33			c0.37	
v/s Ratio Perm		0.01		c0.20	0.16							
v/c Ratio		0.02		0.53	0.42			0.74			0.83	
Uniform Delay, d1		8.8		10.9	10.3			10.4			11.0	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		4.3	2.4			2.0			2.7	
Delay (s)		8.8		15.2	12.8			12.4			13.7	
Level of Service		A		B	B			B			B	
Approach Delay (s)		8.8			14.0			12.4			13.7	
Approach LOS		A			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	45.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: Osborne St

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	305	0	220	0	955	0	0	820	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			1.00	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1633	1484			3438			4931	
Flt Permitted		0.89		0.75	0.97			1.00			1.00	
Satd. Flow (perm)		1577		1291	1452			3438			4931	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	5	0	5	308	0	222	0	965	0	0	828	15
RTOR Reduction (vph)	0	3	0	0	25	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	7	0	277	228	0	0	965	0	0	838	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		16.0		16.0	16.0			15.1			15.1	
Effective Green, g (s)		16.0		16.0	16.0			15.1			15.1	
Actuated g/C Ratio		0.41		0.41	0.41			0.39			0.39	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		645		528	594			1328			1904	
v/s Ratio Prot								c0.28			0.17	
v/s Ratio Perm		0.00		c0.21	0.16							
v/c Ratio		0.01		0.52	0.38			0.73			0.44	
Uniform Delay, d1		6.9		8.7	8.1			10.2			8.9	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		3.7	1.9			2.0			0.2	
Delay (s)		6.9		12.4	10.0			12.3			9.0	
Level of Service		A		B	A			B			A	
Approach Delay (s)		6.9			11.2			12.3			9.0	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	10.8	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	39.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: Osborne St

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	410	0	205	0	1340	0	0	1075	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.90			1.00			1.00	
Flt Protected		0.98		0.95	0.98			1.00			1.00	
Satd. Flow (prot)		1729		1633	1517			3438			4926	
Flt Permitted		0.88		0.75	0.91			1.00			1.00	
Satd. Flow (perm)		1552		1291	1396			3438			4926	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	0	5	446	0	223	0	1457	0	0	1168	33
RTOR Reduction (vph)	0	3	0	0	14	0	0	0	0	0	6	0
Lane Group Flow (vph)	0	7	0	348	307	0	0	1457	0	0	1195	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	5%	0%	0%	5%	0%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		17.0		17.0	17.0			24.6			24.6	
Effective Green, g (s)		17.0		17.0	17.0			24.6			24.6	
Actuated g/C Ratio		0.34		0.34	0.34			0.50			0.50	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		532		442	478			1705			2443	
v/s Ratio Prot								c0.42			0.24	
v/s Ratio Perm		0.00		c0.27	0.22							
v/c Ratio		0.01		0.79	0.64			0.85			0.49	
Uniform Delay, d1		10.8		14.7	13.7			10.9			8.3	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		13.2	6.5			4.4			0.2	
Delay (s)		10.8		27.9	20.2			15.4			8.5	
Level of Service		B		C	C			B			A	
Approach Delay (s)		10.8			24.2			15.4			8.5	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	14.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	49.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: Osborne St

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	230	0	180	0	1005	0	0	1500	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			0.99	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1559	1414			3282			4771	
Flt Permitted		0.89		0.75	0.97			1.00			1.00	
Satd. Flow (perm)		1577		1230	1387			3282			4771	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	6	0	6	274	0	214	0	1196	0	0	1786	89
RTOR Reduction (vph)	0	4	0	0	24	0	0	0	0	0	11	0
Lane Group Flow (vph)	0	8	0	247	217	0	0	1196	0	0	1864	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	10%	0%	0%	5%	67%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		18.0		18.0	18.0			24.0			24.0	
Effective Green, g (s)		18.0		18.0	18.0			24.0			24.0	
Actuated g/C Ratio		0.36		0.36	0.36			0.48			0.48	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		568		443	499			1575			2290	
v/s Ratio Prot								0.36			c0.39	
v/s Ratio Perm		0.01		c0.20	0.16							
v/c Ratio		0.01		0.56	0.43			0.76			0.81	
Uniform Delay, d1		10.3		12.8	12.1			10.6			11.1	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		5.0	2.7			2.2			2.3	
Delay (s)		10.3		17.8	14.9			12.8			13.4	
Level of Service		B		B	B			B			B	
Approach Delay (s)		10.3			16.4			12.8			13.4	
Approach LOS		B			B			B			B	

Intersection Summary			
HCM Average Control Delay	13.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	52.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: Osborne St

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	305	0	220	0	1005	0	0	820	65
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			0.99	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1633	1484			3282			4650	
Flt Permitted		0.89		0.75	0.97			1.00			1.00	
Satd. Flow (perm)		1577		1291	1452			3282			4650	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	5	0	5	308	0	222	0	1015	0	0	828	66
RTOR Reduction (vph)	0	3	0	0	21	0	0	0	0	0	23	0
Lane Group Flow (vph)	0	7	0	277	232	0	0	1015	0	0	871	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	10%	0%	0%	5%	77%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		16.0		16.0	16.0			15.4			15.4	
Effective Green, g (s)		16.0		16.0	16.0			15.4			15.4	
Actuated g/C Ratio		0.41		0.41	0.41			0.39			0.39	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		640		524	590			1283			1818	
v/s Ratio Prot								c0.31			0.19	
v/s Ratio Perm		0.00		c0.21	0.16							
v/c Ratio		0.01		0.53	0.39			0.79			0.48	
Uniform Delay, d1		7.0		8.8	8.3			10.6			9.0	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		3.8	2.0			3.4			0.2	
Delay (s)		7.0		12.6	10.2			14.0			9.2	
Level of Service		A		B	B			B			A	
Approach Delay (s)		7.0			11.5			14.0			9.2	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	11.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	39.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: Osborne St

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	410	0	205	0	1390	0	0	1075	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.90			1.00			0.99	
Flt Protected		0.98		0.95	0.98			1.00			1.00	
Satd. Flow (prot)		1729		1633	1517			3438			4708	
Flt Permitted		0.88		0.75	0.91			1.00			1.00	
Satd. Flow (perm)		1562		1291	1396			3438			4708	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	0	5	446	0	223	0	1511	0	0	1168	87
RTOR Reduction (vph)	0	3	0	0	12	0	0	0	0	0	15	0
Lane Group Flow (vph)	0	7	0	348	309	0	0	1511	0	0	1240	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	5%	0%	0%	5%	63%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		19.0		19.0	19.0			27.7			27.7	
Effective Green, g (s)		19.0		19.0	19.0			27.7			27.7	
Actuated g/C Ratio		0.35		0.35	0.35			0.51			0.51	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		543		448	485			1741			2384	
v/s Ratio Prot								c0.44			0.26	
v/s Ratio Perm		0.00		c0.27	0.22							
v/c Ratio		0.01		0.78	0.64			0.87			0.52	
Uniform Delay, d1		11.7		16.0	15.0			11.9			9.0	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		12.4	6.3			4.9			0.2	
Delay (s)		11.7		28.4	21.2			16.8			9.3	
Level of Service		B		C	C			B			A	
Approach Delay (s)		11.7			24.9			16.8			9.3	
Approach LOS		B			C			B			A	

Intersection Summary			
HCM Average Control Delay	15.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	54.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	69.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: Osborne St

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	250	0	195	0	1095	0	0	1635	80
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			0.99	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1559	1415			3282			4774	
Flt Permitted		0.89		0.75	0.97			1.00			1.00	
Satd. Flow (perm)		1571		1230	1385			3282			4774	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	6	0	6	298	0	232	0	1304	0	0	1946	95
RTOR Reduction (vph)	0	3	0	0	22	0	0	0	0	0	9	0
Lane Group Flow (vph)	0	9	0	268	240	0	0	1304	0	0	2032	0
Heavy Vehicles (%)	0%	0%	0%	10%	0%	10%	0%	10%	0%	0%	5%	67%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		19.0		19.0	19.0			28.0			28.0	
Effective Green, g (s)		19.0		19.0	19.0			28.0			28.0	
Actuated g/C Ratio		0.35		0.35	0.35			0.51			0.51	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		543		425	478			1671			2430	
v/s Ratio Prot								0.40			c0.43	
v/s Ratio Perm		0.01		c0.22	0.17							
v/c Ratio		0.02		0.63	0.50			0.78			0.84	
Uniform Delay, d1		11.8		15.1	14.3			11.0			11.5	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		6.9	3.7			2.4			2.7	
Delay (s)		11.9		22.0	18.0			13.4			14.2	
Level of Service		B		C	B			B			B	
Approach Delay (s)		11.9			20.0			13.4			14.2	
Approach LOS		B			C			B			B	

Intersection Summary			
HCM Average Control Delay	14.7	HCM Level of Service	B
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	55.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: Osborne St

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	330	0	240	0	1095	0	0	895	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.87			1.00			0.99	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1633	1483			3282			4654	
Flt Permitted		0.89		0.75	0.97			1.00			1.00	
Satd. Flow (perm)		1573		1291	1451			3282			4654	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	5	0	5	333	0	242	0	1106	0	0	904	71
RTOR Reduction (vph)	0	3	0	0	23	0	0	0	0	0	20	0
Lane Group Flow (vph)	0	7	0	300	252	0	0	1106	0	0	955	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	10%	0%	0%	5%	77%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		17.0		17.0	17.0			19.0			19.0	
Effective Green, g (s)		17.0		17.0	17.0			19.0			19.0	
Actuated g/C Ratio		0.39		0.39	0.39			0.43			0.43	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		608		499	561			1417			2010	
v/s Ratio Prot								c0.34			0.21	
v/s Ratio Perm		0.00		c0.23	0.17							
v/c Ratio		0.01		0.60	0.45			0.78			0.47	
Uniform Delay, d1		8.3		10.8	10.0			10.7			8.9	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		5.3	2.6			2.9			0.2	
Delay (s)		8.3		16.1	12.6			13.6			9.1	
Level of Service		A		B	B			B			A	
Approach Delay (s)		8.3			14.4			13.6			9.1	
Approach LOS		A			B			B			A	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	44.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
42: Osborne St

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	5	0	5	445	0	225	0	1515	0	0	1170	85
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0			4.0			4.0	
Lane Util. Factor		1.00		0.95	0.95			0.95			0.91	
Frt		0.93		1.00	0.90			1.00			0.99	
Flt Protected		0.98		0.95	0.99			1.00			1.00	
Satd. Flow (prot)		1729		1633	1516			3438			4714	
Flt Permitted		0.88		0.75	0.91			1.00			1.00	
Satd. Flow (perm)		1559		1291	1393			3438			4714	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	0	5	484	0	245	0	1647	0	0	1272	92
RTOR Reduction (vph)	0	3	0	0	9	0	0	0	0	0	14	0
Lane Group Flow (vph)	0	7	0	378	342	0	0	1647	0	0	1350	0
Heavy Vehicles (%)	0%	0%	0%	5%	0%	5%	0%	5%	0%	0%	5%	63%
Turn Type	Perm	NA		Perm	NA			NA			NA	
Protected Phases		6			2			4			8	
Permitted Phases	6			2								
Actuated Green, G (s)		21.0		21.0	21.0			31.0			31.0	
Effective Green, g (s)		21.0		21.0	21.0			31.0			31.0	
Actuated g/C Ratio		0.35		0.35	0.35			0.52			0.52	
Clearance Time (s)		4.0		4.0	4.0			4.0			4.0	
Vehicle Extension (s)		3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)		546		452	488			1776			2436	
v/s Ratio Prot								c0.48			0.29	
v/s Ratio Perm		0.00		c0.29	0.25							
v/c Ratio		0.01		0.84	0.70			0.93			0.55	
Uniform Delay, d1		12.7		17.9	16.8			13.5			9.8	
Progression Factor		1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2		0.0		16.6	8.1			8.9			0.3	
Delay (s)		12.7		34.5	24.9			22.3			10.1	
Level of Service		B		C	C			C			B	
Approach Delay (s)		12.7			29.9			22.3			10.1	
Approach LOS		B			C			C			B	

Intersection Summary			
HCM Average Control Delay	19.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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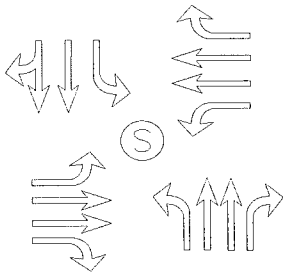
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	120	5%		120	10	130
EB THRU	840	5%		840	75	915
EB RIGHT	80	45%	**50**	130	10	140
WB LEFT	110	5%		110	10	120
WB THRU	1375	5%		1375	125	1500
WB RIGHT	170	5%		170	15	185
LAUREL CANYON BLVD						
NB LEFT	85	40%	**50**	135	10	145
NB THRU	605	5%		605	55	660
NB RIGHT	105	5%		105	10	115
SB LEFT	110	5%		110	10	120
SB THRU	335	5%		335	30	365
SB RIGHT	50	10%		50	5	55
TOTALS	**3985**		**100**	**4085**	**365**	**4450**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
OSBORNE STREET						
EB LEFT	90	5%		90	10	100
EB THRU	995	5%		995	90	1085
EB RIGHT	80	42%	**50**	130	10	140
WB LEFT	80	10%		80	5	85
WB THRU	690	5%		690	60	750
WB RIGHT	110	5%		110	10	120
LAUREL CANYON BLVD						
NB LEFT	80	42%	**50**	130	10	140
NB THRU	460	5%		460	40	500
NB RIGHT	90	5%		90	10	100
SB LEFT	75	5%		75	5	80
SB THRU	515	5%		515	45	560
SB RIGHT	90	5%		90	10	100
TOTALS	**3355**		**100**	**3455**	**305**	**3760**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

OSBORNE STREET

EB LEFT	95	5%		95	10	105
EB THRU	1315	5%		1315	120	1435
EB RIGHT	65	52%	**50**	115	10	125
WB LEFT	120	5%		120	10	130
WB THRU	850	5%		850	75	925
WB RIGHT	110	5%		110	10	120

LAUREL CANYON BLVD

NB LEFT	160	36%	**50**	210	20	230
NB THRU	1130	5%		1130	100	1230
NB RIGHT	120	5%		120	10	130
SB LEFT	75	5%		75	5	80
SB THRU	460	5%		460	40	500
SB RIGHT	75	5%		75	5	80
TOTALS	**4575**		**100**	**4675**	**415**	**5090**

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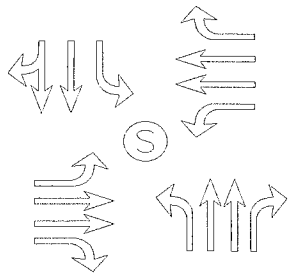
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	114	4	12	125	**0**	125	10	135
EB THRU	810	30	90	900	**0**	900	80	980
EB RIGHT	73	9	27	100	**150**	250	25	275
WB LEFT	102	6	18	120	**0**	120	10	130
WB THRU	1350	25	75	1425	**0**	1425	130	1555
WB RIGHT	164	5	15	180	**0**	180	15	195
LAUREL CANYON BLVD								
NB LEFT	84	2	6	90	**150**	240	20	260
NB THRU	600	7	21	620	**0**	620	55	675
NB RIGHT	97	6	18	115	**0**	115	10	125
SB LEFT	111	1	3	115	**0**	115	10	125
SB THRU	326	7	21	345	**0**	345	30	375
SB RIGHT	48	4	12	60	**0**	60	5	65
TOTALS	**3879**				**300**	**4495**	**400**	**4895**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	91	1	3	95	**0**	95	10	105
EB THRU	968	29	87	1055	**0**	1055	95	1150
EB RIGHT	78	4	12	90	**150**	240	20	260
WB LEFT	73	9	27	100	**0**	100	10	110
WB THRU	666	23	69	735	**0**	735	65	800
WB RIGHT	109	1	3	110	**0**	110	10	120
LAUREL CANYON BLVD								
NB LEFT	76	2	6	80	**150**	230	20	250
NB THRU	455	5	15	470	**0**	470	40	510
NB RIGHT	88	4	12	100	**0**	100	10	110
SB LEFT	73	4	12	85	**0**	85	5	90
SB THRU	515	1	3	520	**0**	520	45	565
SB RIGHT	83	6	18	100	**0**	100	10	110
TOTALS	**3275**				**300**	**3840**	**340**	**4180**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : OSBORNE STREET
N/S STREET : LAUREL CANYON BLVD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 43
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
OSBORNE STREET								
EB LEFT	89	4	12	100	**0**	100	10	110
EB THRU	1283	30	90	1375	**0**	1375	125	1500
EB RIGHT	57	9	27	85	**150**	235	20	255
WB LEFT	112	6	18	130	**0**	130	10	140
WB THRU	811	38	114	925	**0**	925	85	1010
WB RIGHT	105	5	15	120	**0**	120	10	130
LAUREL CANYON BLVD								
NB LEFT	157	1	3	160	**150**	310	30	340
NB THRU	1124	4	12	1135	**0**	1135	100	1235
NB RIGHT	117	5	15	130	**0**	130	10	140
SB LEFT	68	5	15	85	**0**	85	5	90
SB THRU	454	4	12	465	**0**	465	40	505
SB RIGHT	73	3	9	80	**0**	80	5	85
TOTALS	**4450**				**300**	**5090**	**450**	**5540**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 497

	Rt	Thru	Lt
Total	52	333	112
1st	11	77	35
2nd	10	89	27
3rd	20	107	33
4th	11	60	17

EAST LEG TOTAL: 1,652

	1st	2nd	3rd	4th	Total
Rt	34	42	45	48	169
Thru	328	346	431	270	1375
Lt	27	24	32	25	108

WEST LEG TOTAL: 1,040

	Total	1st	2nd	3rd	4th
Lt	118	25	26	36	31
Thru	840	183	221	214	222
Rt	82	30	22	22	8

SOUTH LEG

TOTAL: 796

	Lt	Thru	Rt
1st	24	164	22
2nd	16	168	22
3rd	24	159	28
4th	22	116	31
Total	86	607	103

PEAK HOUR FACTORS

NORTH LEG = 0.78
SOUTH LEG = 0.94
EAST LEG = 0.81
WEST LEG = 0.96

ALL LEGS = 0.87

HOUR TOTAL: 3,985

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 07:00AM-08:00AM DATE: 06-05-12

NORTH LEG

	Rt	Thru	Lt
Total	52	333	112
1st	11	77	35
2nd	10	89	27
3rd	20	107	33
4th	11	60	17

	1st	2nd	3rd	4th	Total
Rt	34	42	45	48	169
Thru	328	346	431	270	1375
Lt	27	24	32	25	108

	Total	1st	2nd	3rd	4th
Lt	118	25	26	36	31
Thru	840	183	221	214	222
Rt	82	30	22	22	8

	Lt	Thru	Rt
1st	24	164	22
2nd	16	168	22
3rd	24	159	28
4th	22	116	31
Total	86	607	103

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 08:00AM-09:00AM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
31	351	78	Total
6	126	20	1st
10	89	19	2nd
9	81	23	3rd
6	55	16	4th

	1st	2nd	3rd	4th	Total
Rt	31	33	29	26	119
Thru	224	166	177	159	726
Lt	18	23	19	31	91

Total	1st	2nd	3rd	4th	
89	21	23	26	19	Lt
869	266	194	187	222	Thru
64	13	14	21	16	Rt

	Lt	Thru	Rt
1st	11	177	7
2nd	23	116	12
3rd	20	144	23
4th	16	89	19
Total	70	526	61

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : OSBORNE 06-05-12

BEGINNING TIME : 07:00AM = PH

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
11	75	35	0	1	0	0	0	0	0	1	0	123
8	88	26	2	1	1	0	0	0	0	0	0	126
19	104	33	0	2	0	0	1	0	1	0	0	160
10	59	17	1	1	0	0	0	0	0	0	0	88
6	124	19	0	1	0	0	1	0	0	0	1	152
10	87	18	0	2	1	0	0	0	0	0	0	118
7	77	23	1	2	0	1	0	0	0	2	0	113
5	52	16	1	2	0	0	1	0	0	0	0	77
76	666	187	5	12	2	1	3	0	1	3	1	957
						SOUTH LEG						
21	162	23	1	1	0	0	1	1	0	0	0	210
21	167	16	0	0	0	1	1	0	0	0	0	206
27	156	23	1	1	0	0	0	1	0	2	0	211
28	115	22	1	1	0	1	0	0	1	0	0	169
6	176	11	1	0	0	0	1	0	0	0	0	195
10	112	22	2	2	0	0	1	0	0	1	1	151
22	143	20	1	1	0	0	0	0	0	0	0	187
19	89	16	0	0	0	0	0	0	0	0	0	124
154	1120	153	7	6	0	2	4	2	1	3	1	1453
						EAST LEG						
32	321	25	1	5	1	1	1	1	0	1	0	389
41	341	23	0	4	1	1	1	0	0	0	0	412
45	424	30	0	5	2	0	1	0	0	1	0	508
46	264	24	1	5	1	0	1	0	1	0	0	343
30	212	16	1	8	1	0	1	1	0	3	0	273
33	162	21	0	3	2	0	1	0	0	0	0	222
28	170	17	0	3	2	1	3	0	0	1	0	225
25	154	30	0	4	0	0	1	1	1	0	0	216
280	2048	186	3	37	10	3	10	3	2	6	0	2588
						WEST LEG						
29	175	24	0	4	1	1	2	0	0	2	0	238
20	214	26	1	4	0	0	2	0	1	1	0	269
20	208	35	1	4	1	1	1	0	0	1	0	272
4	213	29	1	5	1	2	2	0	1	2	1	261
12	256	21	1	4	0	0	1	0	0	5	0	300
12	181	22	1	6	0	1	4	1	0	3	0	231
19	180	25	1	4	0	1	1	0	0	2	1	234
13	213	19	0	7	0	1	1	0	2	1	0	257
129	1640	201	6	38	3	7	14	1	4	17	2	2062

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 682

Rt	Thru	Lt	
89	516	77	Total
19	133	14	1st
27	140	21	2nd
22	133	22	3rd
21	110	20	4th

EAST LEG TOTAL: 881

	1st	2nd	3rd	4th	Total
Rt	28	31	26	25	110
Thru	166	159	173	191	689
Lt	20	19	23	20	82

WEST LEG TOTAL: 1,171

Total	1st	2nd	3rd	4th	
92	26	27	19	20	Lt
997	249	255	249	244	Thru
82	23	22	16	21	Rt

SOUTH LEG

TOTAL: 630

	Lt	Thru	Rt
1st	16	119	26
2nd	23	116	22
3rd	19	111	25
4th	20	114	19
Total	78	460	92

PEAK HOUR FACTORS

NORTH LEG = 0.91
SOUTH LEG = 0.98
EAST LEG = 0.93
WEST LEG = 0.96

ALL LEGS = 0.98

HOUR TOTAL: 3,364

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 12:00PM-01:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
59	525	81	Total
14	109	13	1st
10	122	23	2nd
19	161	25	3rd
16	133	20	4th

	1st	2nd	3rd	4th	Total
Rt	26	31	33	36	126
Thru	122	191	133	169	615
Lt	22	26	22	20	90

Total	1st	2nd	3rd	4th	
88	16	22	19	31	Lt
796	155	239	214	188	Thru
80	23	16	22	19	Rt

	Lt	Thru	Rt
1st	16	99	26
2nd	23	114	31
3rd	22	123	25
4th	19	122	21
Total	80	458	103

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 01:00PM-02:00PM DATE: 06-05-12

NORTH LEG

Rt	Thru	Lt	
89	516	77	Total
19	133	14	1st
27	140	21	2nd
22	133	22	3rd
21	110	20	4th

	1st	2nd	3rd	4th	Total
Rt	28	31	26	25	110
Thru	166	159	173	191	689
Lt	20	19	23	20	82

Total	1st	2nd	3rd	4th	
92	26	27	19	20	Lt
997	249	255	249	244	Thru
82	23	22	16	21	Rt

	Lt	Thru	Rt
1st	16	119	26
2nd	23	116	22
3rd	19	111	25
4th	20	114	19
Total	78	460	92

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : OSBORNE 06-05-12

BEGINNING TIME : 12:00PM PH=1:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
14	108	12	0	0	0	0	0	1	0	1	0	136
10	120	22	0	2	1	0	0	0	0	0	0	155
18	161	25	1	0	0	0	0	0	0	0	0	205
16	132	20	0	0	0	0	1	0	0	0	0	169
17	132	12	0	0	1	1	0	0	1	1	1	166
26	140	19	1	0	1	0	0	1	0	0	0	188
21	133	22	0	0	0	0	0	0	1	0	0	177
19	110	20	0	0	0	1	0	0	1	0	0	151
141	1036	152	2	2	3	2	1	2	3	2	1	1347
						SOUTH LEG						
25	99	15	0	0	0	1	0	1	0	0	0	141
31	112	23	0	2	0	0	0	0	0	0	0	168
23	121	20	0	2	1	1	0	1	1	0	0	170
20	121	19	1	0	0	0	0	0	0	1	0	162
25	117	16	1	0	0	0	1	0	0	1	0	161
20	115	23	1	1	0	1	0	0	0	0	0	161
25	110	18	0	0	0	0	1	1	0	0	0	155
18	113	19	0	0	1	1	0	0	0	1	0	153
187	908	153	3	5	2	4	2	3	1	3	0	1271
						EAST LEG						
25	116	20	1	4	2	0	1	0	0	1	0	170
31	184	24	0	3	1	0	3	0	0	1	1	248
33	124	21	0	7	1	0	1	0	0	1	0	188
35	163	18	1	6	1	0	0	1	0	0	0	225
28	162	17	0	3	2	0	1	0	0	0	1	214
30	153	15	1	4	2	0	1	1	0	1	1	209
26	167	22	0	4	1	0	1	0	0	1	0	222
25	184	19	0	4	1	0	0	0	0	3	0	236
233	1253	156	3	35	11	0	8	2	0	8	3	1712
						WEST LEG						
20	148	16	1	2	0	1	5	0	1	0	0	194
15	232	22	1	3	0	0	3	0	0	1	0	277
19	206	18	2	4	0	0	3	1	1	1	0	255
19	179	31	0	3	0	0	3	0	0	3	0	238
22	242	25	0	4	1	0	2	0	1	1	0	298
20	247	27	1	6	0	1	2	0	0	0	0	304
16	241	19	0	5	0	0	1	0	0	2	0	284
20	238	20	1	4	0	0	2	0	0	0	0	285
151	1733	178	6	31	1	2	21	1	3	8	0	2135

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: LAUREL CANYON
EAST-WEST STREET: OSBORNE
JURISDICTION: LA

DATE: 06-05-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 607

	Rt	Thru	Lt
Total	76	458	73
1st	23	131	22
2nd	16	111	14
3rd	17	100	16
4th	20	116	21

EAST LEG

EAST LEG TOTAL: 1,077

	1st	2nd	3rd	4th	Total
Rt	29	28	31	22	110
Thru	188	203	238	220	849
Lt	25	29	31	33	118

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	93	22	26	23	22
Thru	1313	349	214	329	421
Rt	66	14	15	21	16

WEST LEG TOTAL: 1,472

SOUTH LEG

	Lt	Thru	Rt
1st	36	283	31
2nd	44	291	33
3rd	42	288	27
4th	36	266	31
Total	158	1128	122

TOTAL: 1,408

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.96
EAST LEG = 0.90
WEST LEG = 0.80

ALL LEGS = 0.93

HOUR TOTAL: 4,564

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 04:00PM-05:00PM DATE: 06-05-12

NORTH LEG

	Rt	Thru	Lt
Total	68	475	75
1st	19	111	16
2nd	10	122	23
3rd	23	131	22
4th	16	111	14

	1st	2nd	3rd	4th	Total
Rt	33	38	29	28	128
Thru	219	209	188	203	819
Lt	23	16	25	29	93

	Total	1st	2nd	3rd	4th
Lt	84	12	24	22	26
Thru	1208	323	322	349	214
Rt	68	16	23	14	15

	Lt	Thru	Rt
1st	33	222	26
2nd	42	271	29
3rd	36	283	31
4th	44	291	33
Total	155	1067	119

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: LAUREL CANYON

EAST-WEST STREET: OSBORNE

TIME: 05:00PM-06:00PM DATE: 06-05-12

NORTH LEG

	Rt	Thru	Lt
Total	67	448	73
1st	17	100	16
2nd	20	116	21
3rd	16	121	20
4th	14	111	16

	1st	2nd	3rd	4th	Total
Rt	31	22	24	20	97
Thru	238	220	241	178	877
Lt	31	33	28	24	116

	Total	1st	2nd	3rd	4th
Lt	82	23	22	16	21
Thru	1369	329	421	320	299
Rt	63	21	16	12	14

	Lt	Thru	Rt
1st	42	288	27
2nd	36	266	31
3rd	31	259	22
4th	26	263	19
Total	135	1076	99

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : LAUREL CANYON LA

EAST-WEST STREET : OSBORNE 06-05-12

BEGINNING TIME : 04:00PM PH = 4:30 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
19	110	15	0	1	0	0	0	0	0	0	1	146
10	122	22	0	0	0	0	0	1	0	0	0	155
22	129	21	0	1	0	0	1	0	1	0	1	176
16	111	13	0	0	0	0	0	1	0	0	0	141
16	99	16	1	0	0	0	0	0	0	1	0	133
19	115	18	0	1	1	1	0	1	0	0	1	157
16	121	20	0	0	0	0	0	0	0	0	0	157
12	111	14	0	0	0	1	0	1	1	0	1	141
130	918	139	1	3	1	2	1	4	2	1	4	1206
						SOUTH LEG						
25	220	32	0	1	0	0	1	0	1	0	1	281
29	271	41	0	0	0	0	0	1	0	0	0	342
30	281	36	1	1	0	0	0	0	0	1	0	350
31	291	44	1	0	0	0	0	0	1	0	0	368
26	286	42	0	1	0	1	1	0	0	0	0	357
30	266	35	0	0	0	0	0	0	1	0	1	333
20	259	31	2	0	0	0	0	0	0	0	0	312
18	263	24	0	0	0	0	0	1	1	0	1	308
209	2137	285	4	3	0	1	2	2	4	1	3	2651
						EAST LEG						
33	212	21	0	4	1	0	2	1	0	1	0	275
38	200	14	0	6	1	0	1	0	0	2	1	263
29	180	24	0	5	1	0	2	0	0	1	0	242
27	193	26	1	8	1	0	1	1	0	1	1	260
28	228	30	1	9	1	1	1	0	1	0	0	300
21	210	32	0	8	1	0	1	0	1	1	0	275
24	234	28	0	5	0	0	1	0	0	1	0	293
19	167	20	1	6	2	0	3	0	0	2	2	222
219	1624	195	3	51	8	1	12	2	2	9	4	2130
						WEST LEG						
12	317	11	2	4	0	1	1	1	1	1	0	351
23	313	24	0	6	0	0	1	0	0	2	0	369
10	341	21	3	6	1	0	1	0	1	1	0	385
13	206	24	1	6	0	1	0	1	0	2	1	255
20	322	22	1	3	0	0	3	0	0	1	1	373
14	414	22	0	5	0	1	2	0	1	0	0	459
10	313	15	2	4	1	0	1	0	0	2	0	348
14	291	21	0	5	0	0	2	0	0	1	0	334
116	2517	160	9	39	2	3	11	2	3	10	2	2874

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	110	335	50	85	605	105	120	840	80	110	1375	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3351		1719	3438	1538	1719	3438	1468	1719	3438	1538
Flt Permitted	0.18	1.00		0.35	1.00	1.00	0.10	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	332	3351		640	3438	1538	177	3438	1468	310	3438	1538
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	126	385	57	98	695	121	138	966	92	126	1580	195
RTOR Reduction (vph)	0	13	0	0	0	65	0	0	36	0	0	38
Lane Group Flow (vph)	126	429	0	98	695	56	138	966	56	126	1580	157
Heavy Vehicles (%)	5%	5%	10%	5%	5%	5%	5%	5%	10%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	25.8	21.8		25.8	21.8	21.8	46.0	41.0	41.0	52.0	44.0	44.0
Effective Green, g (s)	25.8	21.8		25.8	21.8	21.8	46.0	41.0	41.0	52.0	44.0	44.0
Actuated g/C Ratio	0.28	0.24		0.28	0.24	0.24	0.51	0.45	0.45	0.57	0.48	0.48
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	155	805		229	825	369	175	1552	663	302	1666	745
v/s Ratio Prot	c0.04	0.13		0.02	c0.20		c0.04	0.28		c0.04	c0.46	
v/s Ratio Perm	0.19			0.10		0.04	0.36		0.04	0.20		0.10
v/c Ratio	0.81	0.53		0.43	0.84	0.15	0.79	0.62	0.08	0.42	0.95	0.21
Uniform Delay, d1	28.9	30.1		24.9	32.9	27.2	19.1	19.0	14.2	11.4	22.3	13.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	26.7	2.5		1.3	10.2	0.9	20.6	0.8	0.1	0.9	11.9	0.1
Delay (s)	55.6	32.6		26.2	43.1	28.1	39.7	19.8	14.3	12.4	34.2	13.6
Level of Service	E	C		C	D	C	D	B	B	B	C	B
Approach Delay (s)		37.7			39.3			21.7			30.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	515	90	80	460	90	90	995	80	80	690	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3361		1719	3438	1538	1719	3438	1538	1641	3438	1538
Flt Permitted	0.44	1.00		0.28	1.00	1.00	0.26	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	790	3361		506	3438	1538	474	3438	1538	358	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	77	526	92	82	469	92	92	1015	82	82	704	112
RTOR Reduction (vph)	0	23	0	0	0	64	0	0	46	0	0	73
Lane Group Flow (vph)	77	595	0	82	469	28	92	1015	36	82	704	39
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	10%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	19.3	17.1		20.9	17.9	17.9	22.3	19.3	19.3	22.3	19.3	19.3
Effective Green, g (s)	19.3	17.1		20.9	17.9	17.9	22.3	19.3	19.3	22.3	19.3	19.3
Actuated g/C Ratio	0.33	0.29		0.36	0.31	0.31	0.38	0.33	0.33	0.38	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	296	984		243	1054	471	245	1136	508	203	1136	508
v/s Ratio Prot	0.01	c0.18		c0.02	0.14		0.02	c0.30		c0.02	0.20	
v/s Ratio Perm	0.08			0.10		0.02	0.12		0.02	0.13		0.03
v/c Ratio	0.26	0.61		0.34	0.44	0.06	0.38	0.89	0.07	0.40	0.62	0.08
Uniform Delay, d1	13.7	17.7		13.0	16.3	14.3	12.2	18.6	13.4	13.2	16.5	13.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	2.8		0.8	1.4	0.2	1.0	9.2	0.1	1.3	1.0	0.1
Delay (s)	14.2	20.5		13.8	17.6	14.5	13.1	27.8	13.5	14.5	17.5	13.5
Level of Service	B	C		B	B	B	B	C	B	B	B	B
Approach Delay (s)		19.8			16.7			25.6			16.7	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	16.0
Intersection Capacity Utilization	66.8%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/10/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	460	75	160	1130	120	95	1315	65	120	850	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3366		1719	3438	1538	1719	3438	1404	1719	3438	1538
Flt Permitted	0.15	1.00		0.24	1.00	1.00	0.17	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	279	3366		439	3438	1538	309	3438	1404	202	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	81	495	81	172	1215	129	102	1414	70	129	914	118
RTOR Reduction (vph)	0	14	0	0	0	40	0	0	19	0	0	38
Lane Group Flow (vph)	81	562	0	172	1215	89	102	1414	51	129	914	80
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	15%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	29.1	25.9		39.4	32.2	32.2	39.8	35.8	35.8	39.8	35.8	35.8
Effective Green, g (s)	29.1	25.9		39.4	32.2	32.2	39.8	35.8	35.8	39.8	35.8	35.8
Actuated g/C Ratio	0.32	0.28		0.43	0.35	0.35	0.44	0.39	0.39	0.44	0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	956		323	1214	543	197	1350	551	155	1350	604
v/s Ratio Prot	0.02	0.17		c0.06	c0.35		0.02	c0.41		c0.04	0.27	
v/s Ratio Perm	0.16			0.17		0.06	0.20		0.04	0.33		0.05
v/c Ratio	0.58	0.59		0.53	1.00	0.16	0.52	1.05	0.09	0.83	0.68	0.13
Uniform Delay, d1	24.9	28.1		17.6	29.5	20.3	17.2	27.7	17.5	22.4	22.9	17.7
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.7	2.6		1.7	26.0	0.6	2.3	37.9	0.1	30.0	1.4	0.1
Delay (s)	30.6	30.7		19.3	55.5	20.9	19.4	65.6	17.5	52.4	24.3	17.8
Level of Service	C	C		B	E	C	B	E	B	D	C	B
Approach Delay (s)		30.7			48.5			60.5			26.8	
Approach LOS		C			D			E			C	

Intersection Summary			
HCM Average Control Delay	44.9	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	91.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/13/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	110	335	50	135	605	105	120	840	130	110	1375	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3351		1289	3438	1538	1719	3438	1114	1719	3438	1538
Flt Permitted	0.20	1.00		0.32	1.00	1.00	0.10	1.00	1.00	0.17	1.00	1.00
Satd. Flow (perm)	362	3351		436	3438	1538	177	3438	1114	313	3438	1538
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	126	385	57	155	695	121	138	966	149	126	1580	195
RTOR Reduction (vph)	0	13	0	0	0	66	0	0	58	0	0	37
Lane Group Flow (vph)	126	429	0	155	695	55	138	966	91	126	1580	158
Heavy Vehicles (%)	5%	5%	10%	40%	5%	5%	5%	5%	45%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	24.0	20.0		26.0	21.0	21.0	46.0	41.0	41.0	52.0	44.0	44.0
Effective Green, g (s)	24.0	20.0		26.0	21.0	21.0	46.0	41.0	41.0	52.0	44.0	44.0
Actuated g/C Ratio	0.27	0.22		0.29	0.23	0.23	0.51	0.46	0.46	0.58	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	745		173	802	359	176	1566	507	306	1681	752
v/s Ratio Prot	0.04	0.13		c0.05	0.20		c0.04	0.28		c0.04	c0.46	
v/s Ratio Perm	0.18			c0.21		0.04	0.36		0.08	0.20		0.10
v/c Ratio	0.80	0.58		0.90	0.87	0.15	0.78	0.62	0.18	0.41	0.94	0.21
Uniform Delay, d1	29.7	31.2		29.9	33.2	27.4	18.7	18.6	14.5	11.1	21.8	13.1
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	24.8	3.2		39.9	12.1	0.9	20.1	0.7	0.2	0.9	10.7	0.1
Delay (s)	54.5	34.4		69.7	45.3	28.3	38.8	19.3	14.7	12.0	32.4	13.2
Level of Service	D	C		E	D	C	D	B	B	B	C	B
Approach Delay (s)		38.9			47.1			20.9			29.1	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/13/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	515	90	130	460	90	90	995	130	80	690	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3361		1271	3438	1538	1719	3438	1137	1641	3438	1538
Flt Permitted	0.44	1.00		0.28	1.00	1.00	0.26	1.00	1.00	0.21	1.00	1.00
Satd. Flow (perm)	790	3361		374	3438	1538	474	3438	1137	358	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	77	526	92	133	469	92	92	1015	133	82	704	112
RTOR Reduction (vph)	0	23	0	0	0	64	0	0	75	0	0	73
Lane Group Flow (vph)	77	595	0	133	469	28	92	1015	58	82	704	39
Heavy Vehicles (%)	5%	5%	5%	42%	5%	5%	5%	5%	42%	10%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	19.3	17.1		20.9	17.9	17.9	22.3	19.3	19.3	22.3	19.3	19.3
Effective Green, g (s)	19.3	17.1		20.9	17.9	17.9	22.3	19.3	19.3	22.3	19.3	19.3
Actuated g/C Ratio	0.33	0.29		0.36	0.31	0.31	0.38	0.33	0.33	0.38	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	296	984		180	1054	471	245	1136	376	203	1136	508
v/s Ratio Prot	0.01	0.18		c0.04	0.14		0.02	c0.30		c0.02	0.20	
v/s Ratio Perm	0.08			c0.23		0.02	0.12		0.05	0.13		0.03
v/c Ratio	0.26	0.61		0.74	0.44	0.06	0.38	0.89	0.15	0.40	0.62	0.08
Uniform Delay, d1	13.7	17.7		15.6	16.3	14.3	12.2	18.6	13.8	13.2	16.5	13.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	2.8		14.6	1.4	0.2	1.0	9.2	0.2	1.3	1.0	0.1
Delay (s)	14.2	20.5		30.3	17.6	14.5	13.1	27.8	14.0	14.5	17.5	13.5
Level of Service	B	C		C	B	B	B	C	B	B	B	B
Approach Delay (s)		19.8			19.6			25.2			16.7	
Approach LOS		B			B			C			B	

Intersection Summary			
HCM Average Control Delay	20.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	58.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/13/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	460	75	210	1130	120	95	1315	115	120	850	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3366		1327	3438	1538	1719	3438	1062	1719	3438	1538
Flt Permitted	0.16	1.00		0.24	1.00	1.00	0.17	1.00	1.00	0.11	1.00	1.00
Satd. Flow (perm)	281	3366		336	3438	1538	307	3438	1062	202	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	81	495	81	226	1215	129	102	1414	124	129	914	118
RTOR Reduction (vph)	0	14	0	0	0	40	0	0	34	0	0	38
Lane Group Flow (vph)	81	562	0	226	1215	89	102	1414	90	129	914	80
Heavy Vehicles (%)	5%	5%	5%	36%	5%	5%	5%	5%	52%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	29.0	25.8		39.8	32.6	32.6	39.8	35.8	35.8	39.8	35.8	35.8
Effective Green, g (s)	29.0	25.8		39.8	32.6	32.6	39.8	35.8	35.8	39.8	35.8	35.8
Actuated g/C Ratio	0.32	0.28		0.43	0.36	0.36	0.43	0.39	0.39	0.43	0.39	0.39
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	139	948		254	1224	547	195	1344	415	154	1344	601
v/s Ratio Prot	0.02	0.17		c0.10	c0.35		0.02	c0.41		c0.04	0.27	
v/s Ratio Perm	0.16			0.29		0.06	0.20		0.09	0.33		0.05
v/c Ratio	0.58	0.59		0.89	0.99	0.16	0.52	1.05	0.22	0.84	0.68	0.13
Uniform Delay, d1	25.1	28.4		19.9	29.4	20.2	17.4	27.9	18.6	22.7	23.1	17.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.1	2.7		29.1	24.0	0.6	2.5	39.5	0.3	30.9	1.4	0.1
Delay (s)	31.2	31.1		49.0	53.4	20.8	19.9	67.4	18.8	53.6	24.6	18.0
Level of Service	C	C		D	D	C	B	E	B	D	C	B
Approach Delay (s)		31.1			50.1			60.8			27.1	
Approach LOS		C			D			E			C	

Intersection Summary			
HCM Average Control Delay	45.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	91.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	91.7%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/15/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	120	365	55	145	660	115	130	915	140	120	1500	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3350		1289	3438	1538	1719	3438	1114	1719	3438	1538
Flt Permitted	0.20	1.00		0.28	1.00	1.00	0.10	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	362	3350		385	3438	1538	177	3438	1114	257	3438	1538
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	138	420	63	167	759	132	149	1052	161	138	1724	213
RTOR Reduction (vph)	0	13	0	0	0	66	0	0	57	0	0	38
Lane Group Flow (vph)	138	470	0	167	759	66	149	1052	104	138	1724	175
Heavy Vehicles (%)	5%	5%	10%	40%	5%	5%	5%	5%	45%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	24.0	20.0		26.0	21.0	21.0	45.8	40.8	40.8	52.2	44.0	44.0
Effective Green, g (s)	24.0	20.0		26.0	21.0	21.0	45.8	40.8	40.8	52.2	44.0	44.0
Actuated g/C Ratio	0.27	0.22		0.29	0.23	0.23	0.51	0.45	0.45	0.58	0.49	0.49
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	157	744		161	802	359	176	1559	505	282	1681	752
v/s Ratio Prot	0.04	0.14		c0.06	0.22		c0.05	0.31		c0.04	c0.50	
v/s Ratio Perm	0.20			c0.24		0.04	0.38		0.09	0.24		0.11
v/c Ratio	0.88	0.63		1.04	0.95	0.18	0.85	0.67	0.21	0.49	1.03	0.23
Uniform Delay, d1	31.4	31.7		31.1	33.9	27.6	20.1	19.4	14.8	12.1	23.0	13.3
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	38.6	4.0		81.1	21.1	1.1	29.4	1.2	0.2	1.3	28.7	0.2
Delay (s)	70.0	35.7		112.2	55.1	28.8	49.5	20.5	15.0	13.4	51.7	13.4
Level of Service	E	D		F	E	C	D	C	B	B	D	B
Approach Delay (s)		43.3			60.8			23.1			45.2	
Approach LOS		D			E			C			D	

Intersection Summary			
HCM Average Control Delay	42.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.98		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	86.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	120	365	55	145	660	115	130	915	140	120	1500	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3350		1173	3266	1538	1719	3438	1114	1719	3438	1538
Flt Permitted	0.29	1.00		0.20	0.95	1.00	0.10	1.00	1.00	0.14	1.00	1.00
Satd. Flow (perm)	518	3350		252	3093	1538	177	3438	1114	252	3438	1538
Peak-hour factor, PHF	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Adj. Flow (vph)	138	420	63	167	759	132	149	1052	161	138	1724	213
RTOR Reduction (vph)	0	13	0	0	0	62	0	0	57	0	0	30
Lane Group Flow (vph)	138	470	0	150	776	70	149	1052	104	138	1724	184
Heavy Vehicles (%)	5%	5%	10%	40%	5%	5%	5%	5%	45%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	21.0	17.0		29.0	29.0	21.0	44.8	40.8	40.8	53.0	45.0	45.0
Effective Green, g (s)	21.0	17.0		29.0	29.0	21.0	44.8	40.8	40.8	53.0	45.0	45.0
Actuated g/C Ratio	0.23	0.19		0.32	0.32	0.23	0.50	0.45	0.45	0.59	0.50	0.50
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	174	633		163	1012	359	157	1559	505	282	1719	769
v/s Ratio Prot	0.04	0.14		c0.08	c0.07		c0.04	0.31		0.04	c0.50	
v/s Ratio Perm	0.15			c0.21	0.18	0.05	0.43		0.09	0.24		0.12
v/c Ratio	0.79	0.74		0.92	0.77	0.19	0.95	0.67	0.21	0.49	1.00	0.24
Uniform Delay, d1	30.4	34.4		26.0	27.5	27.7	22.0	19.4	14.8	12.0	22.5	12.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	21.5	7.7		47.7	3.5	1.2	56.0	1.2	0.2	1.3	22.4	0.2
Delay (s)	51.8	42.1		73.7	31.0	28.9	78.0	20.5	15.0	13.3	44.9	12.9
Level of Service	D	D		E	C	C	E	C	B	B	D	B
Approach Delay (s)		44.3			36.8			26.2			39.5	
Approach LOS		D			D			C			D	

Intersection Summary			
HCM Average Control Delay	36.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.96		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	92.1%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/15/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	560	100	140	500	100	100	1085	140	85	750	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3360		1271	3438	1538	1719	3438	1137	1641	3438	1538
Flt Permitted	0.40	1.00		0.23	1.00	1.00	0.23	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	715	3360		307	3438	1538	409	3438	1137	344	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	82	571	102	143	510	102	102	1107	143	87	765	122
RTOR Reduction (vph)	0	24	0	0	0	72	0	0	73	0	0	73
Lane Group Flow (vph)	82	649	0	143	510	30	102	1107	70	87	765	49
Heavy Vehicles (%)	5%	5%	5%	42%	5%	5%	5%	5%	42%	10%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	20.0	16.9		21.8	17.8	17.8	23.2	20.1	20.1	23.2	20.1	20.1
Effective Green, g (s)	20.0	16.9		21.8	17.8	17.8	23.2	20.1	20.1	23.2	20.1	20.1
Actuated g/C Ratio	0.33	0.28		0.36	0.30	0.30	0.39	0.33	0.33	0.39	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	290	945		176	1018	456	225	1150	380	200	1150	514
v/s Ratio Prot	0.01	0.19		c0.05	0.15		c0.02	c0.32		0.02	0.22	
v/s Ratio Perm	0.08			c0.24		0.02	0.15		0.06	0.15		0.03
v/c Ratio	0.28	0.69		0.81	0.50	0.07	0.45	0.96	0.18	0.43	0.67	0.10
Uniform Delay, d1	14.1	19.2		15.6	17.5	15.2	12.6	19.6	14.2	14.0	17.1	13.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	4.1		24.0	1.8	0.3	1.5	18.1	0.2	1.5	1.5	0.1
Delay (s)	14.6	23.3		39.6	19.2	15.5	14.1	37.8	14.4	15.5	18.6	13.8
Level of Service	B	C		D	B	B	B	D	B	B	B	B
Approach Delay (s)		22.4			22.6			33.5			17.7	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	560	100	140	500	100	100	1085	140	85	750	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3360		1157	3258	1538	1719	3438	1137	1641	3438	1538
Flt Permitted	0.45	1.00		0.23	0.94	1.00	0.23	1.00	1.00	0.20	1.00	1.00
Satd. Flow (perm)	810	3360		279	3069	1538	409	3438	1137	344	3438	1538
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	82	571	102	143	510	102	102	1107	143	87	765	122
RTOR Reduction (vph)	0	24	0	0	0	72	0	0	73	0	0	73
Lane Group Flow (vph)	82	649	0	129	524	30	102	1107	70	87	765	49
Heavy Vehicles (%)	5%	5%	5%	42%	5%	5%	5%	5%	42%	10%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	20.0	16.9		21.8	21.8	17.8	23.2	20.1	20.1	23.2	20.1	20.1
Effective Green, g (s)	20.0	16.9		21.8	21.8	17.8	23.2	20.1	20.1	23.2	20.1	20.1
Actuated g/C Ratio	0.33	0.28		0.36	0.36	0.30	0.39	0.33	0.33	0.39	0.33	0.33
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	316	945		160	1126	456	225	1150	380	200	1150	514
v/s Ratio Prot	0.01	0.19		c0.05	0.03		c0.02	c0.32		0.02	0.22	
v/s Ratio Perm	0.07			c0.24	0.14	0.02	0.15		0.06	0.15		0.03
v/c Ratio	0.26	0.69		0.81	0.47	0.07	0.45	0.96	0.18	0.44	0.67	0.10
Uniform Delay, d1	14.0	19.2		15.5	14.7	15.2	12.6	19.6	14.2	14.0	17.1	13.8
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	4.1		24.8	0.3	0.3	1.5	18.1	0.2	1.5	1.5	0.1
Delay (s)	14.5	23.3		40.3	15.0	15.5	14.1	37.8	14.4	15.5	18.6	13.8
Level of Service	B	C		D	B	B	B	D	B	B	B	B
Approach Delay (s)		22.4			19.4			33.5			17.7	
Approach LOS		C			B			C			B	

Intersection Summary			
HCM Average Control Delay	24.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	60.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

8/15/2012

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	500	80	230	1230	130	105	1435	125	130	925	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3367		1327	3438	1538	1719	3438	1062	1719	3438	1538
Flt Permitted	0.16	1.00		0.21	1.00	1.00	0.12	1.00	1.00	0.12	1.00	1.00
Satd. Flow (perm)	281	3367		298	3438	1538	219	3438	1062	213	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	538	86	247	1323	140	113	1543	134	140	995	129
RTOR Reduction (vph)	0	14	0	0	0	39	0	0	33	0	0	39
Lane Group Flow (vph)	86	610	0	247	1323	101	113	1543	101	140	995	90
Heavy Vehicles (%)	5%	5%	5%	36%	5%	5%	5%	5%	52%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	Perm	pm+pt	NA	Perm	pm+pt	NA	Perm
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	29.0	25.8		39.8	32.6	32.6	40.0	35.0	35.0	38.0	34.0	34.0
Effective Green, g (s)	29.0	25.8		39.8	32.6	32.6	40.0	35.0	35.0	38.0	34.0	34.0
Actuated g/C Ratio	0.32	0.28		0.44	0.36	0.36	0.44	0.39	0.39	0.42	0.37	0.37
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	140	957		244	1234	552	179	1325	409	155	1287	576
v/s Ratio Prot	0.02	0.18		c0.11	c0.38		0.03	c0.45		c0.04	0.29	
v/s Ratio Perm	0.17			0.33		0.07	0.24		0.09	0.34		0.06
v/c Ratio	0.61	0.64		1.01	1.07	0.18	0.63	1.16	0.25	0.90	0.77	0.16
Uniform Delay, d1	25.1	28.4		21.5	29.1	20.0	18.1	27.9	18.9	24.8	25.0	18.9
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.8	3.2		60.8	47.3	0.7	7.1	82.7	0.3	44.9	3.0	0.1
Delay (s)	32.9	31.6		82.3	76.4	20.7	25.2	110.6	19.3	69.7	28.0	19.0
Level of Service	C	C		F	E	C	C	F	B	E	C	B
Approach Delay (s)		31.8			72.7			98.3			31.7	
Approach LOS		C			E			F			C	

Intersection Summary			
HCM Average Control Delay	66.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	98.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
43: Osborne St & Laurel Canyon

9/4/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	500	80	230	1230	130	105	1435	125	130	925	120
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95		0.91	0.91	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1719	3367		1208	3272	1538	1719	3438	1062	1719	3438	1538
Flt Permitted	0.16	1.00		0.15	0.94	1.00	0.12	1.00	1.00	0.09	1.00	1.00
Satd. Flow (perm)	285	3367		189	3083	1538	212	3438	1062	170	3438	1538
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	86	538	86	247	1323	140	113	1543	134	140	995	129
RTOR Reduction (vph)	0	12	0	0	0	16	0	0	21	0	0	34
Lane Group Flow (vph)	86	612	0	222	1348	124	113	1543	113	140	995	95
Heavy Vehicles (%)	5%	5%	5%	36%	5%	5%	5%	5%	52%	5%	5%	5%
Turn Type	pm+pt	NA		pm+pt	NA	pm+ov	pm+pt	NA	pm+ov	pm+pt	NA	pm+ov
Protected Phases	1	6		5	2	3	7	4	5	3	8	1
Permitted Phases	6			2		2	4		4	8		8
Actuated Green, G (s)	29.4	25.4		47.0	47.0	43.0	55.0	47.0	64.6	46.6	42.6	46.6
Effective Green, g (s)	29.4	25.4		47.0	47.0	43.0	55.0	47.0	64.6	46.6	42.6	46.6
Actuated g/C Ratio	0.27	0.23		0.43	0.43	0.39	0.50	0.43	0.59	0.42	0.39	0.42
Clearance Time (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	128	777		244	1348	657	221	1469	662	128	1331	707
v/s Ratio Prot	0.02	0.18		0.15	c0.16	0.01	0.04	c0.45	0.03	c0.04	0.29	0.00
v/s Ratio Perm	0.15			0.24	c0.27	0.07	0.22		0.08	0.42		0.06
v/c Ratio	0.67	0.79		0.91	1.00	0.19	0.51	1.05	0.17	1.09	0.75	0.13
Uniform Delay, d1	33.6	39.8		27.9	31.5	22.0	19.2	31.5	10.4	32.2	29.1	19.4
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	13.0	8.0		34.0	24.5	0.1	2.0	37.9	0.1	106.9	2.3	0.1
Delay (s)	46.6	47.7		61.9	56.0	22.2	21.1	69.4	10.5	139.1	31.4	19.5
Level of Service	D	D		E	E	C	C	E	B	F	C	B
Approach Delay (s)		47.6			54.0			62.0			42.1	
Approach LOS		D			D			E			D	

Intersection Summary			
HCM Average Control Delay	53.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	110.6%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

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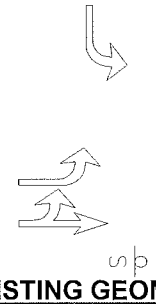
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
44
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	105	5%		105	10	115
EB THRU	5	15%		5	5	10
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WHEATLAND AVE						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	120	33%	**50**	170	15	185
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**230**		**50**	**280**	**30**	**310**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 44
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	75	5%		75	5	80
EB THRU	5	15%		5	5	10
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WHEATLAND AVE						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	60	45%	**50**	110	10	120
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**140**		**50**	**190**	**20**	**210**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 44
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
EB I-210 FWY RAMPS						
EB LEFT	100	5%		100	10	110
EB THRU	5	100%		5	5	10
EB RIGHT	0	0%		0	0	0
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
WHEATLAND AVE						
NB LEFT	0	0%		0	0	0
NB THRU	0	0%		0	0	0
NB RIGHT	0	0%		0	0	0
SB LEFT	85	40%	50	135	10	145
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**190**		**50**	**240**	**25**	**265**

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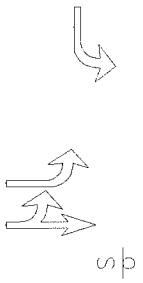
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 44
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	101	5	15	115	**0**	115	10	125
EB THRU	5	1	3	10	**0**	10	5	15
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WHEATLAND AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	117	3	9	125	**150**	275	25	300
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**223**				**150**	**400**	**40**	**440**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 44
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	71	4	12	85	**0**	85	5	90
EB THRU	5	1	3	10	**0**	10	5	15
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WHEATLAND AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	61	0	0	60	**150**	210	20	230
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**137**				**150**	**305**	**30**	**335**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : EB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 44
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
EB I-210 FWY RAMPS								
EB LEFT	98	1	3	100	**0**	100	10	110
EB THRU	0	2	6	5	**0**	5	5	10
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
WHEATLAND AVE								
NB LEFT	0	0	0	0	**0**	0	0	0
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	85	1	3	90	**150**	240	20	260
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**183**				**150**	**345**	**35**	**380**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 07:45AM

NORTH LEG

TOTAL: 120

	Rt	Thru	Lt
Total			120
1st			29
2nd			28
3rd			34
4th			29

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 112

	Total	1st	2nd	3rd	4th
Lt	106	32	20	27	27
Thru	6	0	3	1	2
Rt					

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG =
EAST LEG =
WEST LEG = 0.88

ALL LEGS = 0.94

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

HOUR TOTAL: 232

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
		119	Total
		30	1st
		35	2nd
		25	3rd
		29	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
91	14	20	25	32	Lt
4	1	2	1	0	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
		108	Total
		28	1st
		34	2nd
		29	3rd
		17	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
102	20	27	27	28	Lt
6	3	1	2	0	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 EB RAMPS 05-24-12

BEGINNING TIME : 07:00AM PH= 7:45AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	30	0	0	0	0	0	0	0	0	0	30
0	0	35	0	0	0	0	0	0	0	0	0	35
0	0	25	0	0	0	0	0	0	0	0	0	25
0	0	28	0	0	1	0	0	0	0	0	0	29
0	0	27	0	0	1	0	0	0	0	0	0	28
0	0	33	0	0	1	0	0	0	0	0	0	34
0	0	29	0	0	0	0	0	0	0	0	0	29
0	0	17	0	0	0	0	0	0	0	0	0	17
0	0	224	0	0	3	0	0	0	0	0	0	227
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
0	1	14	0	0	0	0	0	0	0	0	0	15
0	2	20	0	0	0	0	0	0	0	0	0	22
0	0	21	0	1	3	0	0	1	0	0	0	26
0	0	29	0	0	1	0	0	0	0	0	2	32
0	3	20	0	0	0	0	0	0	0	0	0	23
0	1	26	0	0	0	0	0	0	0	0	1	28
0	1	26	0	0	0	0	0	0	0	1	1	29
0	0	27	0	0	1	0	0	0	0	0	0	28
0	8	183	0	1	5	0	0	1	0	1	4	203

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 12:00PM

NORTH LEG

TOTAL: 61

Rt	Thru	Lt	
		61	Total
		9	1st
		20	2nd
		22	3rd
		10	4th

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
75	19	19	20	17	Lt
6	1	3	2	0	Thru
					Rt

WEST LEG TOTAL: 81

PEAK HOUR FACTORS

NORTH LEG = 0.69
SOUTH LEG =
EAST LEG =
WEST LEG = 0.92

ALL LEGS = 0.81

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

TOTAL: 0

SOUTH LEG

HOUR TOTAL: 142

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-24-12

NORTH LEG

		61	Total
		9	1st
		20	2nd
		22	3rd
		10	4th
Rt	Thru	Lt	

Rt					
Thru					
Lt					
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
75	19	19	20	17	Lt
6	1	3	2	0	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
		62	Total
		12	1st
		17	2nd
		21	3rd
		12	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
57	12	10	14	21	Lt
3	0	1	2	0	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 EB RAMPS 05-24-12

BEGINNING TIME : 12:00PM = PH

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	9	0	0	0	0	0	0	0	0	0	9
0	0	20	0	0	0	0	0	0	0	0	0	20
0	0	22	0	0	0	0	0	0	0	0	0	22
0	0	10	0	0	0	0	0	0	0	0	0	10
0	0	12	0	0	0	0	0	0	0	0	0	12
0	0	17	0	0	0	0	0	0	0	0	0	17
0	0	21	0	0	0	0	0	0	0	0	0	21
0	0	12	0	0	0	0	0	0	0	0	0	12
0	0	123	0	0	0	0	0	0	0	0	0	123
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
0	1	17	0	0	1	0	0	0	0	0	1	20
0	2	19	0	0	0	0	0	0	0	1	0	22
0	2	19	0	0	0	0	0	0	0	0	1	22
0	0	16	0	0	0	0	0	0	0	0	1	17
0	0	12	0	0	0	0	0	0	0	0	0	12
0	0	9	0	0	0	0	0	0	0	1	1	11
0	2	13	0	0	0	0	0	0	0	0	1	16
0	0	17	0	0	1	0	0	1	0	0	2	21
0	7	122	0	0	2	0	0	1	0	2	7	141

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 EB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 86

	Rt	Thru	Lt
Total			86
1st			20
2nd			24
3rd			23
4th			19

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 101

	Total	1st	2nd	3rd	4th
Lt	99	27	20	25	27
Thru	2	1	0	1	0
Rt					

SOUTH LEG

TOTAL: 0

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

PEAK HOUR FACTORS

NORTH LEG = 0.90
SOUTH LEG =
EAST LEG =
WEST LEG = 0.90

ALL LEGS = 0.95

HOUR TOTAL: 187

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
		64	Total
		19	1st
		17	2nd
		15	3rd
		13	4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
108	32	26	23	27	Lt
3	2	0	0	1	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 EB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-24-12

NORTH LEG

		86	Total
		20	1st
		24	2nd
		23	3rd
		19	4th
Rt	Thru	Lt	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
99	27	20	25	27	Lt
2	1	0	1	0	Thru
					Rt

	Lt	Thru	Rt
1st			
2nd			
3rd			
4th			
Total			

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 EB RAMPS 05-24-12

BEGINNING TIME : 04:00PM PH=5:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	19	0	0	0	0	0	0	0	0	0	19
0	0	15	0	0	1	0	0	1	0	0	0	17
0	0	13	0	0	1	0	0	0	0	0	1	15
0	0	13	0	0	0	0	0	0	0	0	0	13
0	0	20	0	0	0	0	0	0	0	0	0	20
0	0	24	0	0	0	0	0	0	0	0	0	24
0	0	23	0	0	0	0	0	0	0	0	0	23
0	0	18	0	0	1	0	0	0	0	0	0	19
0	0	145	0	0	3	0	0	1	0	0	1	150
						SOUTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
0	1	32	0	0	0	0	1	0	0	0	0	34
0	0	25	0	0	1	0	0	0	0	0	0	26
0	0	23	0	0	0	0	0	0	0	0	0	23
0	1	26	0	0	0	0	0	1	0	0	0	28
0	0	26	0	0	1	0	1	0	0	0	0	28
0	0	20	0	0	0	0	0	0	0	0	0	20
0	0	25	0	0	0	0	0	0	0	1	0	26
0	0	27	0	0	0	0	0	0	0	0	0	27
0	2	204	0	0	2	0	2	1	0	1	0	212

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Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	105	5	0	0	0	0	0	0	0	120	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	5	0	0
Movement Flow Rate	112	5	0	0	0	0	0	0	0	128	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1										Major 2	
Conflicting Flow Rate - All	255	255	-							0	0	-
Stage 1	255	255	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.135	-							-	0	-
Pot Capacity-1 Maneuver	-	673	-							-	-	-
Stage 1	-	673	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	673	-							-	-	-
Mov Capacity-2 Maneuver	-	673	-							-	-	-
Stage 1	-	673	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	75	5	0	0	0	0	0	0	0	60	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	0	0	0
Movement Flow Rate	93	6	0	0	0	0	0	0	0	74	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1									Major 2		
Conflicting Flow Rate - All	148	148	-							0	0	-
Stage 1	148	148	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.135	-							-	0	-
Pot Capacity-1 Maneuver	-	750	-							-	-	-
Stage 1	-	750	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	750	-							-	-	-
Mov Capacity-2 Maneuver	-	750	-							-	-	-
Stage 1	-	750	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	100	5	0	0	0	0	0	0	0	85	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	80	0	2	2	2	2	2	2	5	0	0
Movement Flow Rate	105	5	0	0	0	0	0	0	0	89	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor		Minor 1									Major 2	
Conflicting Flow Rate - All	179	179	-							0	0	-
Stage 1	179	179	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.72	-							-	0	-
Pot Capacity-1 Maneuver	-	626	-							-	-	-
Stage 1	-	626	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	626	-							-	-	-
Mov Capacity-2 Maneuver	-	626	-							-	-	-
Stage 1	-	626	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	75	5	0	0	0	0	0	0	0	60	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	0	0	0
Movement Flow Rate	93	6	0	0	0	0	0	0	0	74	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor		Minor 1								Major 2		
Conflicting Flow Rate - All	148	148	-							0	0	-
Stage 1	148	148	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.135	-							-	0	-
Pot Capacity-1 Maneuver	-	750	-							-	-	-
Stage 1	-	750	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	750	-							-	-	-
Mov Capacity-2 Maneuver	-	750	-							-	-	-
Stage 1	-	750	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	75	5	0	0	0	0	0	0	0	110	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	45	0	0
Movement Flow Rate	93	6	0	0	0	0	0	0	0	136	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1						Major 2		
Conflicting Flow Rate - All	272	272	-				0	0	-
Stage 1	272	272	-				0	0	-
Stage 2	0	0	-				0	0	-
Follow-up Headway	-	4.135	-				-	0	-
Pot Capacity-1 Maneuver	-	661	-				-	-	-
Stage 1	-	661	-				-	-	-
Stage 2	-	-	-				-	-	-
Mov Capacity-1 Maneuver	-	661	-				-	-	-
Mov Capacity-2 Maneuver	-	661	-				-	-	-
Stage 1	-	661	-				-	-	-
Stage 2	-	-	-				-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	100	5	0	0	0	0	0	0	0	135	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	80	0	2	2	2	2	2	2	40	0	0
Movement Flow Rate	105	5	0	0	0	0	0	0	0	142	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor		Minor 1									Major 2	
Conflicting Flow Rate - All	284	284	-							0	0	-
Stage 1	284	284	-							0	0	-
Stage 2	0	0	-							0	0	-
Follow-up Headway	-	4.72	-							-	0	-
Pot Capacity-1 Maneuver	-	556	-							-	-	-
Stage 1	-	556	-							-	-	-
Stage 2	-	-	-							-	-	-
Mov Capacity-1 Maneuver	-	556	-							-	-	-
Mov Capacity-2 Maneuver	-	556	-							-	-	-
Stage 1	-	556	-							-	-	-
Stage 2	-	-	-							-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	75	5	0	0	0	0	0	0	0	110	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	45	0	0
Movement Flow Rate	93	6	0	0	0	0	0	0	0	136	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor	Minor 1					Major 2		
Conflicting Flow Rate - All	272	272	-			0	0	-
Stage 1	272	272	-			0	0	-
Stage 2	0	0	-			0	0	-
Follow-up Headway	-	4.135	-			-	0	-
Pot Capacity-1 Maneuver	-	661	-			-	-	-
Stage 1	-	661	-			-	-	-
Stage 2	-	-	-			-	-	-
Mov Capacity-1 Maneuver	-	661	-			-	-	-
Mov Capacity-2 Maneuver	-	661	-			-	-	-
Stage 1	-	661	-			-	-	-
Stage 2	-	-	-			-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	80	5	0	0	0	0	0	0	0	120	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	5	15	0	2	2	2	2	2	2	45	0	0
Movement Flow Rate	99	6	0	0	0	0	0	0	0	148	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor		Minor 1								Major 2	
Conflicting Flow Rate - All	296	296	-						0	0	-
Stage 1	296	296	-						0	0	-
Stage 2	0	0	-						0	0	-
Follow-up Headway	-	4.135	-						-	0	-
Pot Capacity-1 Maneuver	-	645	-						-	-	-
Stage 1	-	645	-						-	-	-
Stage 2	-	-	-						-	-	-
Mov Capacity-1 Maneuver	-	645	-						-	-	-
Mov Capacity-2 Maneuver	-	645	-						-	-	-
Stage 1	-	645	-						-	-	-
Stage 2	-	-	-						-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Intersection	
Intersection Delay (sec/veh):	0

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	110	5	0	0	0	0	0	0	0	145	0	0
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		12			12			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles(%)	5	80	0	2	2	2	2	2	2	40	0	0
Movement Flow Rate	116	5	0	0	0	0	0	0	0	153	0	0
Number of Lanes	1	1	0	0	0	0	0	0	0	0	1	0

Major/Minor		Minor 1								Major 2	
Conflicting Flow Rate - All	305	305	-						0	0	-
Stage 1	305	305	-						0	0	-
Stage 2	0	0	-						0	0	-
Follow-up Headway	-	4.72	-						-	0	-
Pot Capacity-1 Maneuver	-	543	-						-	-	-
Stage 1	-	543	-						-	-	-
Stage 2	-	-	-						-	-	-
Mov Capacity-1 Maneuver	-	543	-						-	-	-
Mov Capacity-2 Maneuver	-	543	-						-	-	-
Stage 1	-	543	-						-	-	-
Stage 2	-	-	-						-	-	-

Approach	EB	SB
HCM Control Delay (s)	-	0
HCM LOS	-	A

Lane	EBLn1	EBLn2	SBL	SBT
Capacity (vph)	-	-		
HCM Control Delay (s)	-	-	-	-
HCM Lane VC Ratio	-	-	-	-
HCM Lane LOS	-	-	-	-
HCM 95th Percentile Queue (veh)	-	-	-	-

Hall & Foreman, Inc.

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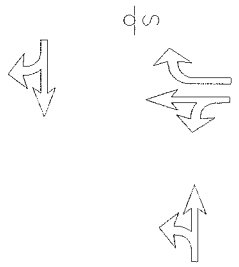
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
45
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	50%		5	5	10
WB THRU	0	0%		0	0	0
WB RIGHT	100	37%	**50**	150	15	165
WHEATLAND AVE						
NB LEFT	5	20%		5	5	10
NB THRU	100	5%		100	10	110
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	110	35%	**50**	160	15	175
SB RIGHT	65	5%		65	5	70
TOTALS	**385**		**100**	**485**	**55**	**540**

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Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
45
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	0%		5	5	10
WB THRU	5	0%		5	5	10
WB RIGHT	40	56%	**50**	90	10	100
WHEATLAND AVE						
NB LEFT	5	0%		5	5	10
NB THRU	55	10%		55	5	60
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	60	48%	**50**	110	10	120
SB RIGHT	55	5%		55	5	60
TOTALS	**225**		**100**	**325**	**45**	**370**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 45
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
WB I-210 FWY RAMPS						
EB LEFT	0	0%		0	0	0
EB THRU	0	0%		0	0	0
EB RIGHT	0	0%		0	0	0
WB LEFT	5	0%		5	5	10
WB THRU	0	0%		0	0	0
WB RIGHT	120	29%	**50**	170	15	185
WHEATLAND AVE						
NB LEFT	5	100%		5	5	10
NB THRU	95	5%		95	10	105
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	80	38%	**50**	130	10	140
SB RIGHT	105	0%		105	10	115
TOTALS	**410**		**100**	**510**	**55**	**565**

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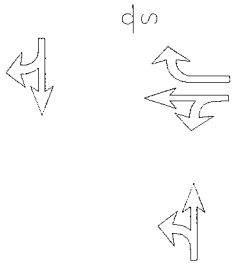
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 45
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	1	1	3	5	**0**	5	5	10
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	97	4	12	110	**150**	260	25	285
WHEATLAND AVE								
NB LEFT	4	1	3	5	**0**	5	5	10
NB THRU	94	4	12	105	**0**	105	10	115
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	106	3	9	115	**150**	265	25	290
SB RIGHT	63	4	12	75	**0**	75	5	80
TOTALS	**365**				**300**	**715**	**75**	**790**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 45
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	3	0	0	5	**0**	5	5	10
WB THRU	2	0	0	5	**0**	5	5	10
WB RIGHT	41	0	0	40	**150**	190	15	205
WHEATLAND AVE								
NB LEFT	3	0	0	5	**0**	5	5	10
NB THRU	49	5	15	65	**0**	65	5	70
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	60	1	3	65	**150**	215	20	235
SB RIGHT	53	3	9	60	**0**	60	5	65
TOTALS	**211**				**300**	**545**	**60**	**605**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : WB I-210 FWY RAMPS
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
45
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
WB I-210 FWY RAMPS								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	0	0	0	0	**0**	0	0	0
WB LEFT	4	0	0	5	**0**	5	5	10
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	120	0	0	120	**150**	270	25	295
WHEATLAND AVE								
NB LEFT	0	1	3	5	**0**	5	5	10
NB THRU	95	2	6	100	**0**	100	10	110
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	82	0	0	80	**150**	230	20	250
SB RIGHT	107	0	0	105	**0**	105	10	115
TOTALS	**408**				**300**	**715**	**75**	**790**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 117

	Rt	Thru	Lt
Total	56	61	
1st	6	12	
2nd	17	16	
3rd	6	19	
4th	27	14	

EAST LEG TOTAL: 46

	1st	2nd	3rd	4th	Total
Rt	4	13	7	17	41
Thru	0	1	0	1	2
Lt	0	2	0	1	3

WEST LEG TOTAL: 0

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

SOUTH LEG

TOTAL: 57

	Lt	Thru	Rt
1st	0	11	
2nd	0	10	
3rd	2	12	
4th	1	21	
Total	3	54	

PEAK HOUR FACTORS

NORTH LEG = 0.71
SOUTH LEG = 0.65
EAST LEG = 0.61
WEST LEG =

ALL LEGS = 0.67

HOUR TOTAL: 220

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 12:00PM-01:00PM DATE: 05-24-12

NORTH LEG

	Rt	Thru	Lt
Total	21	58	
1st	10	10	
2nd	9	19	
3rd	2	20	
4th	0	9	

	1st	2nd	3rd	4th	Total
Rt	6	7	2	0	15
Thru	1	0	0	1	2
Lt	0	1	1	1	3

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	1	19	
2nd	2	17	
3rd	1	19	
4th	2	15	
Total	6	70	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 01:00PM-02:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
56	61		Total
6	12		1st
17	16		2nd
6	19		3rd
27	14		4th

	1st	2nd	3rd	4th	Total
Rt	4	13	7	17	41
Thru	0	1	0	1	2
Lt	0	2	0	1	3

Total	1st	2nd	3rd	4th	
					Lt
					Thru
					Rt

	Lt	Thru	Rt
1st	0	11	
2nd	0	10	
3rd	2	12	
4th	1	21	
Total	3	54	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 WB RAMPS 05-24-12

BEGINNING TIME : 12:00PM PH = 1:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
9	9	0	1	1	0	0	0	0	0	0	0	20
9	18	0	0	1	0	0	0	0	0	0	0	28
2	20	0	0	0	0	0	0	0	0	0	0	22
0	9	0	0	0	0	0	0	0	0	0	0	9
4	12	0	2	0	0	0	0	0	0	0	0	18
17	16	0	0	0	0	0	0	0	0	0	0	33
6	19	0	0	0	0	0	0	0	0	0	0	25
26	13	0	1	0	0	0	0	0	0	1	0	41
73	116	0	4	2	0	0	0	0	0	1	0	196
						SOUTH LEG						
0	18	1	0	0	0	0	0	0	0	1	0	20
0	17	2	0	0	0	0	0	0	0	0	0	19
0	18	1	0	1	0	0	0	0	0	0	0	20
0	15	2	0	0	0	0	0	0	0	0	0	17
0	10	0	0	1	0	0	0	0	0	0	0	11
0	9	0	0	0	0	0	0	0	0	1	0	10
0	11	2	0	0	0	0	0	0	0	1	0	14
0	19	1	0	0	0	0	1	0	0	1	0	22
0	117	9	0	2	0	0	1	0	0	4	0	133
						EAST LEG						
6	1	0	0	0	0	0	0	0	0	0	0	7
7	0	1	0	0	0	0	0	0	0	0	0	8
2	0	1	0	0	0	0	0	0	0	0	0	3
0	1	1	0	0	0	0	0	0	0	0	0	2
4	0	0	0	0	0	0	0	0	0	0	0	4
13	1	2	0	0	0	0	0	0	0	0	0	16
7	0	0	0	0	0	0	0	0	0	0	0	7
17	1	1	0	0	0	0	0	0	0	0	0	19
56	4	6	0	0	0	0	0	0	0	0	0	66
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 08:00AM

NORTH LEG

TOTAL: 176

	Rt	Thru	Lt
Total	67	109	
1st	16	31	
2nd	20	35	
3rd	8	27	
4th	23	16	

EAST LEG TOTAL: 103

	1st	2nd	3rd	4th	Total
Rt	23	32	18	28	101
Thru	0	0	0	0	
Lt	0	1	1	0	2

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

PEAK HOUR FACTORS

NORTH LEG = 0.80
SOUTH LEG = 0.86
EAST LEG = 0.78
WEST LEG =

ALL LEGS = 0.81

	Lt	Thru	Rt
1st	1	20	
2nd	3	27	
3rd	0	22	
4th	1	29	
Total	5	98	

TOTAL: 103

SOUTH LEG

HOUR TOTAL: 382

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 07:00AM-08:00AM DATE: 05-24-12

NORTH LEG

	Rt	Thru	Lt
Total	67	117	
1st	19	31	
2nd	18	31	
3rd	13	30	
4th	17	25	

	1st	2nd	3rd	4th	Total
Rt	7	9	12	13	41
Thru	2	0	0	0	2
Lt	1	2	1	0	4

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	3	14	
2nd	0	20	
3rd	2	22	
4th	1	31	
Total	6	87	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 08:00AM-09:00AM DATE: 05-24-12

NORTH LEG

	Rt	Thru	Lt
Total	67	109	
1st	16	31	
2nd	20	35	
3rd	8	27	
4th	23	16	

	1st	2nd	3rd	4th	Total
Rt	23	32	18	28	101
Thru	0	0	0	0	0
Lt	0	1	1	0	2

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	1	20	
2nd	3	27	
3rd	0	22	
4th	1	29	
Total	5	98	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 WB RAMPS 05-24-12

BEGINNING TIME : 07:00AM PH= 8:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
18	31	0	1	0	0	0	0	0	0	0	0	50
18	30	0	0	1	0	0	0	0	0	0	0	49
13	28	0	0	2	0	0	0	0	0	0	0	43
17	25	0	0	0	0	0	0	0	0	0	0	42
15	29	0	1	2	0	0	0	0	0	0	0	47
19	34	0	1	1	0	0	0	0	0	0	0	55
8	27	0	0	0	0	0	0	0	0	0	0	35
21	16	0	1	0	0	0	0	0	1	0	0	39
129	220	0	4	6	0	0	0	0	1	0	0	360
						SOUTH LEG						
0	14	3	0	0	0	0	0	0	0	0	0	17
0	20	0	0	0	0	0	0	0	0	0	0	20
0	20	2	0	2	0	0	0	0	0	0	0	24
0	28	1	0	2	0	0	0	0	0	1	0	32
0	19	1	0	1	0	0	0	0	0	0	0	21
0	26	3	0	0	0	0	0	0	0	1	0	30
0	21	0	0	0	0	0	0	0	0	1	0	22
0	28	0	0	1	1	0	0	0	0	0	0	30
0	176	10	0	6	1	0	0	0	0	3	0	196
						EAST LEG						
6	2	1	1	0	0	0	0	0	0	0	0	10
9	0	2	0	0	0	0	0	0	0	0	0	11
11	0	1	1	0	0	0	0	0	0	0	0	13
13	0	0	0	0	0	0	0	0	0	0	0	13
22	0	0	1	0	0	0	0	0	0	0	0	23
32	0	0	0	0	1	0	0	0	0	0	0	33
18	0	1	0	0	0	0	0	0	0	0	0	19
25	0	0	3	0	0	0	0	0	0	0	0	28
136	2	5	6	0	1	0	0	0	0	0	0	150
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: I-210 WB RAMPS
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 189

	Rt	Thru	Lt
Total	107	82	
1st	32	21	
2nd	35	21	
3rd	22	22	
4th	18	18	

EAST LEG

EAST LEG TOTAL: 124

	1st	2nd	3rd	4th	Total
Rt	37	22	26	35	120
Thru	0	0	0	0	
Lt	1	1	1	1	4

WEST LEG

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

WEST LEG TOTAL: 0

SOUTH LEG

	Lt	Thru	Rt
1st	1	24	
2nd	0	20	
3rd	0	25	
4th	0	28	
Total	1	97	

TOTAL: 98

PEAK HOUR FACTORS

NORTH LEG = 0.84
SOUTH LEG = 0.88
EAST LEG = 0.82
WEST LEG =

ALL LEGS = 0.89

HOUR TOTAL: 411

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 04:00PM-05:00PM DATE: 05-24-12

NORTH LEG

	Rt	Thru	Lt
Total	71	65	
1st	16	18	
2nd	24	19	
3rd	20	15	
4th	11	13	

	1st	2nd	3rd	4th	Total
Rt	25	20	27	31	103
Thru	2	3	0	0	5
Lt	1	1	0	0	2

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	0	33	
2nd	0	26	
3rd	0	25	
4th	5	22	
Total	5	106	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: I-210 WB RAMPS

TIME: 05:00PM-06:00PM DATE: 05-24-12

NORTH LEG

	Rt	Thru	Lt
Total	107	82	
1st	32	21	
2nd	35	21	
3rd	22	22	
4th	18	18	

	1st	2nd	3rd	4th	Total
Rt	37	22	26	35	120
Thru	0	0	0	0	0
Lt	1	1	1	1	4

	Total	1st	2nd	3rd	4th
Lt					
Thru					
Rt					

	Lt	Thru	Rt
1st	1	24	
2nd	0	20	
3rd	0	25	
4th	0	28	
Total	1	97	

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SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : I-210 WB RAMPS 05-24-12

BEGINNING TIME : 04:00PM PH = 5:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
16	18	0	0	0	0	0	0	0	0	0	0	34
24	17	0	0	1	0	0	0	0	0	1	0	43
19	13	0	0	1	0	0	0	0	1	1	0	35
10	12	0	0	1	0	0	0	0	1	0	0	24
32	21	0	0	0	0	0	0	0	0	0	0	53
35	21	0	0	0	0	0	0	0	0	0	0	56
22	22	0	0	0	0	0	0	0	0	0	0	44
18	18	0	0	0	0	0	0	0	0	0	0	36
176	142	0	0	3	0	0	0	0	2	2	0	325
						SOUTH LEG						
0	33	0	0	0	0	0	0	0	0	0	0	33
0	26	0	0	0	0	0	0	0	0	0	0	26
0	24	0	0	1	0	0	0	0	0	0	0	25
0	22	5	0	0	0	0	0	0	0	0	0	27
0	22	0	0	1	1	0	0	0	0	1	0	25
0	20	0	0	0	0	0	0	0	0	0	0	20
0	25	0	0	0	0	0	0	0	0	0	0	25
0	28	0	0	0	0	0	0	0	0	0	0	28
0	200	5	0	2	1	0	0	0	0	1	0	209
						EAST LEG						
25	2	1	0	0	0	0	0	0	0	0	0	28
20	3	1	0	0	0	0	0	0	0	0	0	24
27	0	0	0	0	0	0	0	0	0	0	0	27
31	0	0	0	0	0	0	0	0	0	0	0	31
37	0	1	0	0	0	0	0	0	0	0	0	38
22	0	1	0	0	0	0	0	0	0	0	0	23
26	0	1	0	0	0	0	0	0	0	0	0	27
35	0	1	0	0	0	0	0	0	0	0	0	36
223	5	6	0	0	0	0	0	0	0	0	0	234
						WEST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0

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Intersection	
Intersection Delay (sec/veh):	2.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	100	5	100	0	0	110	65
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Heavy Vehicles(%)	2	2	2	50	0	5	20	5	0	0	5	5
Movement Flow Rate	0	0	0	7	0	149	7	149	0	0	164	97
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1				Major 1			Major 2	
Conflicting Flow Rate - All	377	425	149	261	0	-	-	0	0
Stage 1	164	164	0	0	0	-	-	0	0
Stage 2	213	261	0	0	0	-	-	0	0
Follow-up Headway	3.95	4	3.345	2.38	-	-	-	0	0
Pot Capacity-1 Maneuver	502	524	892	1203	-	-	-	-	-
Stage 1	737	766	-	-	-	-	-	-	-
Stage 2	692	696	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	520.9	892	1203	-	-	-	-	-
Mov Capacity-2 Maneuver	-	520.9	-	-	-	-	-	-	-
Stage 1	737	761.4	-	-	-	-	-	-	-
Stage 2	692	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	9.286	0.4	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	892		
HCM Control Delay (s)	8.011	0	-	9.8	-	-
HCM Lane VC Ratio	0.006	-	-	0.167	0	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th Percentile Queue (veh)	0.019	-	-	0.599	0	-

Intersection	
Intersection Delay (sec/veh):	1.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	5	40	5	55	0	0	60	55
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	2	2	2	0	0	0	0	10	0	0	5	5
Movement Flow Rate	0	0	0	6	6	49	6	68	0	0	74	68
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1				Major 1			Major 2	
Conflicting Flow Rate - All	188	222	68	142	0	-	-	0	0
Stage 1	80	80	0	0	0	-	-	0	0
Stage 2	108	142	0	0	0	-	-	0	0
Follow-up Headway	3.5	4	3.3	2.2	-	-	-	0	0
Pot Capacity-1 Maneuver	777	680	1006	1449	-	-	-	-	-
Stage 1	934	832	-	-	-	-	-	-	-
Stage 2	902	783	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	677.3	1006	1449	-	-	-	-	-
Mov Capacity-2 Maneuver	-	677.3	-	-	-	-	-	-	-
Stage 1	934	828.7	-	-	-	-	-	-	-
Stage 2	902	# 0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	6.64	0.6	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			~	1006		
HCM Control Delay (s)	7.495	0	~	8.8	-	-
HCM Lane VC Ratio	0.004	-	~	0.049	0	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th Percentile Queue (veh)	0.013	-	~	0.155	0	-

Intersection	
Intersection Delay (sec/veh):	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	120	5	95	0	0	80	105
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	2	2	2	0	0	0	80	5	0	0	0	0
Movement Flow Rate	0	0	0	6	0	135	6	107	0	0	90	118
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1				Major 1			Major 2	
Conflicting Flow Rate - All	267	326	107	208	0	-	-	0	0
Stage 1	118	118	0	0	0	-	-	0	0
Stage 2	149	208	0	0	0	-	-	0	0
Follow-up Headway	3.5	4	3.3	2.92	-	-	-	0	0
Pot Capacity-1 Maneuver	690	596	954	1008	-	-	-	-	-
Stage 1	891	802	-	-	-	-	-	-	-
Stage 2	858	734	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	592.4	954	1008	-	-	-	-	-
Mov Capacity-2 Maneuver	-	592.4	-	-	-	-	-	-	-
Stage 1	891	797.2	-	-	-	-	-	-	-
Stage 2	858	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	8.984	0.4	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	954		
HCM Control Delay (s)	8.591	0	-	9.4	-	-
HCM Lane VC Ratio	0.006	-	-	0.141	0	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th Percentile Queue (veh)	0.017	-	-	0.491	0	-

Intersection	
Intersection Delay (sec/veh):	3.5

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	150	5	100	0	0	160	65
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Heavy Vehicles(%)	2	2	2	50	0	37	20	5	0	0	35	5
Movement Flow Rate	0	0	0	7	0	224	7	149	0	0	239	97
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1				Major 1			Major 2	
Conflicting Flow Rate - All	451	500	149	336	0	-	-	0	0
Stage 1	164	164	0	0	0	-	-	0	0
Stage 2	287	336	0	0	0	-	-	0	0
Follow-up Headway	3.95	4	3.633	2.38	-	-	-	0	0
Pot Capacity-1 Maneuver	446	476	815	1130	-	-	-	-	-
Stage 1	737	766	-	-	-	-	-	-	-
Stage 2	628	645	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	472.7	815	1130	-	-	-	-	-
Mov Capacity-2 Maneuver	-	472.7	-	-	-	-	-	-	-
Stage 1	737	760.6	-	-	-	-	-	-	-
Stage 2	628	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	10.71	0.4	0
HCM LOS	B	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	815		
HCM Control Delay (s)	8.207	0	-	11.1	-	-
HCM Lane VC Ratio	0.007	-	-	0.275	0	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th Percentile Queue (veh)	0.02	-	-	1.119	0	-

Intersection	
Intersection Delay (sec/veh):	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	120	5	95	0	0	80	105
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	2	2	2	0	0	0	80	5	0	0	0	0
Movement Flow Rate	0	0	0	6	0	135	6	107	0	0	90	118
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1				Major 1			Major 2	
Conflicting Flow Rate - All	267	326	107	208	0	-	-	0	0
Stage 1	118	118	0	0	0	-	-	0	0
Stage 2	149	208	0	0	0	-	-	0	0
Follow-up Headway	3.5	4	3.3	2.92	-	-	-	0	0
Pot Capacity-1 Maneuver	690	596	954	1008	-	-	-	-	-
Stage 1	891	802	-	-	-	-	-	-	-
Stage 2	858	734	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	592.4	954	1008	-	-	-	-	-
Mov Capacity-2 Maneuver	-	592.4	-	-	-	-	-	-	-
Stage 1	891	797.2	-	-	-	-	-	-	-
Stage 2	858	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	8.984	0.4	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	954		
HCM Control Delay (s)	8.591	0	-	9.4	-	-
HCM Lane VC Ratio	0.006	-	-	0.141	0	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th Percentile Queue (veh)	0.017	-	-	0.491	0	-

Intersection	
Intersection Delay (sec/veh):	2.9

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	5	90	5	110	0	0	60	55
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	2	2	2	0	0	56	0	48	0	0	5	5
Movement Flow Rate	0	0	0	6	6	111	6	136	0	0	74	68
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1				Major 1			Major 2	
Conflicting Flow Rate - All	256	290	136	142	0	-	-	0	0
Stage 1	148	148	0	0	0	-	-	0	0
Stage 2	108	142	0	0	0	-	-	0	0
Follow-up Headway	3.5	4	3.804	2.2	-	-	-	0	0
Pot Capacity-1 Maneuver	701	624	786	1449	-	-	-	-	-
Stage 1	859	779	-	-	-	-	-	-	-
Stage 2	902	783	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	621.5	786	1449	-	-	-	-	-
Mov Capacity-2 Maneuver	-	621.5	-	-	-	-	-	-	-
Stage 1	859	775.9	-	-	-	-	-	-	-
Stage 2	902	# 0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	9.07	0.3	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			~	786		
HCM Control Delay (s)	7.495	0	~	10.3	-	-
HCM Lane VC Ratio	0.004	-	~	0.141	0	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th Percentile Queue (veh)	0.013	-	~	0.491	0	-

Intersection	
Intersection Delay (sec/veh):	3.7

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	165	5	110	0	0	175	70
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Heavy Vehicles(%)	2	2	2	50	0	37	20	5	0	0	35	5
Movement Flow Rate	0	0	0	7	0	246	7	164	0	0	261	104
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1				Major 1			Major 2	
Conflicting Flow Rate - All	492	545	164	366	0	-	-	0	0
Stage 1	179	179	0	0	0	-	-	0	0
Stage 2	313	366	0	0	0	-	-	0	0
Follow-up Headway	3.95	4	3.633	2.38	-	-	-	0	0
Pot Capacity-1 Maneuver	417	449	795	1100	-	-	-	-	-
Stage 1	723	755	-	-	-	-	-	-	-
Stage 2	607	626	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	445.9	795	1100	-	-	-	-	-
Mov Capacity-2 Maneuver	-	445.9	-	-	-	-	-	-	-
Stage 1	723	749.7	-	-	-	-	-	-	-
Stage 2	607	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	11.132	0.4	0
HCM LOS	B	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	795		
HCM Control Delay (s)	8.295	0	-	11.5	-	-
HCM Lane VC Ratio	0.007	-	-	0.31	0	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th Percentile Queue (veh)	0.02	-	-	1.321	0	-

Intersection	
Intersection Delay (sec/veh):	2.8

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	5	100	5	60	0	0	120	60
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81	0.81
Heavy Vehicles(%)	2	2	2	0	0	56	0	0	0	0	48	5
Movement Flow Rate	0	0	0	6	6	123	6	74	0	0	148	74
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1			Major 1			Major 2		
Conflicting Flow Rate - All	271	308	74	222	0	-	-	0	0
Stage 1	86	86	0	0	0	-	-	0	0
Stage 2	185	222	0	0	0	-	-	0	0
Follow-up Headway	3.5	4	3.804	2.2	-	-	-	0	0
Pot Capacity-1 Maneuver	686	609	858	1356	-	-	-	-	-
Stage 1	927	827	-	-	-	-	-	-	-
Stage 2	821	723	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	606	858	1356	-	-	-	-	-
Mov Capacity-2 Maneuver	-	606	-	-	-	-	-	-	-
Stage 1	927	822.9	-	-	-	-	-	-	-
Stage 2	821	# 0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	8.818	0.6	0
HCM LOS	A	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			~	858		
HCM Control Delay (s)	7.667	0	~	9.9	-	-
HCM Lane VC Ratio	0.005	-	~	0.144	0	-
HCM Lane LOS	A	-	-	A	-	-
HCM 95th Percentile Queue (veh)	0.014	-	~	0.501	0	-

Intersection	
Intersection Delay (sec/veh):	3.6

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Volume (vph)	0	0	0	5	0	185	5	105	0	0	140	115
Conflicting Peds.(#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Stop	Stop	Stop	Stop	Stop	Stop	Free	Free	Free	Free	Free	Free
Right Turn Channelized	None	None	None	None	None	None	None	None	None	None	None	None
Storage Length	0		0	0		0	0		0	0		0
Median Width		0			0			0			0	
Grade (%)		0%			0%			0%			0%	
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Heavy Vehicles(%)	2	2	2	0	0	29	80	5	0	0	38	0
Movement Flow Rate	0	0	0	6	0	208	6	118	0	0	157	129
Number of Lanes	0	0	0	0	1	1	0	1	0	0	1	0

Major/Minor	Minor 1		Major 1				Major 2		
Conflicting Flow Rate - All	351	416	118	287	0	-	-	0	0
Stage 1	129	129	9.2562142190012E61			-	-	0	0
Stage 2	222	287	2.9010676372401 87E-315			-	-	0	0
Follow-up Headway	3.5	4	3.561	2.92	-	-	-	0	0
Pot Capacity-1 Maneuver	608	530	864	934	-	-	-	-	-
Stage 1	880	793	-	-	-	-	-	-	-
Stage 2	785	678	-	-	-	-	-	-	-
Mov Capacity-1 Maneuver	-	526.8	864	934	-	-	-	-	-
Mov Capacity-2 Maneuver	-	526.8	-	-	-	-	-	-	-
Stage 1	880	788.2	-	-	-	-	-	-	-
Stage 2	785	0	-	-	-	-	-	-	-

Approach	WB	NB	SB
HCM Control Delay (s)	10.197	0.4	0
HCM LOS	B	A	A

Lane	NBL	NBT	WBLn1	WBLn2	SBT	SBR
Capacity (vph)			-	864		
HCM Control Delay (s)	8.878	0	-	10.5	-	-
HCM Lane VC Ratio	0.006	-	-	0.241	0	-
HCM Lane LOS	A	-	-	B	-	-
HCM 95th Percentile Queue (veh)	0.018	-	-	0.94	0	-

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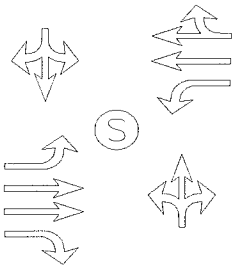
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
46
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	5	30%		5	5	10
EB THRU	195	5%		195	20	215
EB RIGHT	90	0%		90	10	100
WB LEFT	80	42%	**50**	130	10	140
WB THRU	220	5%		220	20	240
WB RIGHT	5	0%		5	5	10
WHEATLAND AVE						
NB LEFT	70	5%		70	5	75
NB THRU	10	0%		10	5	15
NB RIGHT	110	35%	**50**	160	15	175
SB LEFT	15	20%		15	5	20
SB THRU	15	0%		15	5	20
SB RIGHT	5	0%		5	5	10
TOTALS	**820**		**100**	**920**	**110**	**1030**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
46
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	10	0%		10	5	15
EB THRU	135	5%		135	10	145
EB RIGHT	35	5%		35	5	40
WB LEFT	65	49%	**50**	115	10	125
WB THRU	130	5%		130	10	140
WB RIGHT	20	0%		20	5	25
WHEATLAND AVE						
NB LEFT	40	0%		40	5	45
NB THRU	25	0%		25	5	30
NB RIGHT	50	58%	**50**	100	10	110
SB LEFT	5	0%		5	5	10
SB THRU	20	0%		20	5	25
SB RIGHT	15	0%		15	5	20
TOTALS	**550**		**100**	**650**	**80**	**730**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
46
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	170	5%		170	15	185
EB RIGHT	80	0%		80	5	85
WB LEFT	95	34%	**50**	145	15	160
WB THRU	215	5%		215	20	235
WB RIGHT	15	0%		15	5	20
WHEATLAND AVE						
NB LEFT	90	0%		90	10	100
NB THRU	25	0%		25	5	30
NB RIGHT	100	33%	**50**	150	15	165
SB LEFT	10	0%		10	5	15
SB THRU	20	0%		20	5	25
SB RIGHT	5	0%		5	5	10
TOTALS	**825**		**100**	**925**	**105**	**1030**

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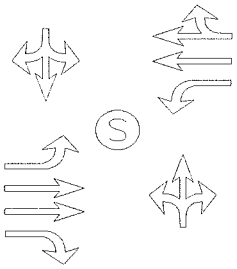
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
46
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	5	30%		5	5	10
EB THRU	195	5%		195	20	215
EB RIGHT	90	0%		90	10	100
WB LEFT	80	42%	**50**	130	10	140
WB THRU	220	5%		220	20	240
WB RIGHT	5	0%		5	5	10
WHEATLAND AVE						
NB LEFT	70	5%		70	5	75
NB THRU	10	0%		10	5	15
NB RIGHT	110	35%	**50**	160	15	175
SB LEFT	15	20%		15	5	20
SB THRU	15	0%		15	5	20
SB RIGHT	5	0%		5	5	10
TOTALS	**820**		**100**	**920**	**110**	**1030**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 46
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	10	0%		10	5	15
EB THRU	135	5%		135	10	145
EB RIGHT	35	5%		35	5	40
WB LEFT	65	49%	**50**	115	10	125
WB THRU	130	5%		130	10	140
WB RIGHT	20	0%		20	5	25
WHEATLAND AVE						
NB LEFT	40	0%		40	5	45
NB THRU	25	0%		25	5	30
NB RIGHT	50	58%	**50**	100	10	110
SB LEFT	5	0%		5	5	10
SB THRU	20	0%		20	5	25
SB RIGHT	15	0%		15	5	20
TOTALS	**550**		**100**	**650**	**80**	**730**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	DJ	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WHEATLAND AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 46
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	170	5%		170	15	185
EB RIGHT	80	0%		80	5	85
WB LEFT	95	34%	**50**	145	15	160
WB THRU	215	5%		215	20	235
WB RIGHT	15	0%		15	5	20
WHEATLAND AVE						
NB LEFT	90	0%		90	10	100
NB THRU	25	0%		25	5	30
NB RIGHT	100	33%	**50**	150	15	165
SB LEFT	10	0%		10	5	15
SB THRU	20	0%		20	5	25
SB RIGHT	5	0%		5	5	10
TOTALS	**825**		**100**	**925**	**105**	**1030**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 07:30AM

NORTH LEG

TOTAL: 31

	Rt	Thru	Lt
Total	1	16	14
1st	0	4	5
2nd	1	7	3
3rd	0	3	5
4th	0	2	1

EAST LEG

EAST LEG TOTAL: 306

	1st	2nd	3rd	4th	Total
Rt	0	2	1	1	4
Thru	43	65	52	61	221
Lt	21	18	20	22	81

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	7	2	1	3	1
Thru	197	62	68	30	37
Rt	92	21	24	20	27

WEST LEG TOTAL: 296

SOUTH LEG

	Lt	Thru	Rt
1st	4	0	28
2nd	13	3	33
3rd	24	4	24
4th	27	2	26
Total	68	9	111

TOTAL: 188

PEAK HOUR FACTORS

NORTH LEG = 0.70
SOUTH LEG = 0.85
EAST LEG = 0.90
WEST LEG = 0.80

ALL LEGS = 0.86

HOUR TOTAL: 821

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 07:00AM-08:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
1	32	17	Total
0	11	2	1st
0	10	7	2nd
0	4	5	3rd
1	7	3	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	0	2	2
Thru	29	39	43	65	176
Lt	16	12	21	18	67

Total	1st	2nd	3rd	4th	
3	0	0	2	1	Lt
218	36	52	62	68	Thru
94	25	24	21	24	Rt

	Lt	Thru	Rt
1st	6	3	15
2nd	7	3	20
3rd	4	0	28
4th	13	3	33
Total	30	9	96

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 08:00AM-09:00AM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
3	15	11	Total
0	3	5	1st
0	2	1	2nd
2	5	3	3rd
1	5	2	4th

	1st	2nd	3rd	4th	Total
Rt	1	1	4	2	8
Thru	52	61	33	20	166
Lt	20	22	9	15	66

Total	1st	2nd	3rd	4th	
4	3	1	0	0	Lt
146	30	37	41	38	Thru
83	20	27	21	15	Rt

	Lt	Thru	Rt
1st	24	4	24
2nd	27	2	26
3rd	10	1	33
4th	14	2	42
Total	75	9	125

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : FOOTHILL 05-24-12

BEGINNING TIME : 07:00AM PH: 7:30AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	11	2	0	0	0	0	0	0	0	0	0	13
0	10	7	0	0	0	0	0	0	0	0	0	17
0	4	4	0	0	1	0	0	0	0	0	0	9
1	7	1	0	0	1	0	0	0	0	0	1	11
0	3	5	0	0	0	0	0	0	0	0	0	8
0	2	1	0	0	0	0	0	0	0	0	0	3
2	5	3	0	0	0	0	0	0	0	0	0	10
1	5	2	0	0	0	0	0	0	0	0	0	8
4	47	25	0	0	2	0	0	0	0	0	1	79
						SOUTH LEG						
15	3	5	0	0	1	0	0	0	0	0	0	24
19	3	7	1	0	0	0	0	0	0	0	0	30
27	0	2	1	0	2	0	0	0	0	0	0	32
33	3	12	0	0	1	0	0	0	0	0	0	49
23	4	23	1	0	1	0	0	0	0	0	0	52
26	2	26	0	0	0	0	0	0	0	0	1	55
32	1	10	0	0	0	0	0	0	1	0	0	44
41	2	12	1	0	2	0	0	0	0	0	0	58
216	18	97	4	0	7	0	0	0	1	0	1	344
						EAST LEG						
0	24	16	0	4	0	0	1	0	0	0	0	45
0	37	11	0	2	1	0	0	0	0	0	0	51
0	41	21	0	1	0	0	0	0	0	1	0	64
2	61	17	0	3	1	0	1	0	0	0	0	85
1	50	17	0	1	3	0	0	0	0	1	0	73
1	56	22	0	3	0	0	2	0	0	0	0	84
4	29	8	0	4	1	0	0	0	0	0	0	46
2	19	13	0	0	1	0	0	0	0	1	1	37
10	317	125	0	18	7	0	4	0	0	3	1	485
						WEST LEG						
25	36	-1	0	0	1	0	0	0	0	0	0	61
24	47	0	0	5	0	0	0	0	0	0	0	76
21	62	0	0	0	1	0	0	0	0	0	1	85
24	63	1	0	5	0	0	0	0	0	0	0	93
20	28	3	0	1	0	0	0	0	0	1	0	53
27	34	1	0	3	0	0	0	0	0	0	0	65
21	37	0	0	3	0	0	0	0	0	1	0	62
15	36	0	0	1	0	0	1	0	0	0	0	53
177	343	4	0	18	2	0	1	0	0	2	1	548

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 39

	Rt	Thru	Lt
Total	14	19	6
1st	0	3	1
2nd	3	5	2
3rd	5	7	1
4th	6	4	2

EAST LEG TOTAL: 214

	1st	2nd	3rd	4th	Total
Rt	2	2	9	6	19
Thru	32	25	34	37	128
Lt	15	14	18	20	67

WEST LEG TOTAL: 182

	Total	1st	2nd	3rd	4th
Lt	10	1	1	4	4
Thru	136	32	27	44	33
Rt	36	10	9	11	6

SOUTH LEG

	Lt	Thru	Rt
1st	13	5	12
2nd	7	3	16
3rd	7	10	12
4th	11	6	8
Total	38	24	48

TOTAL: 110

PEAK HOUR FACTORS

NORTH LEG = 0.75
SOUTH LEG = 0.92
EAST LEG = 0.85
WEST LEG = 0.77

ALL LEGS = 0.84

HOUR TOTAL: 545

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 12:00PM-01:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
1	6	6	Total
0	1	0	1st
0	4	2	2nd
1	0	3	3rd
0	1	1	4th

	1st	2nd	3rd	4th	Total
Rt	1	4	0	5	10
Thru	25	36	39	28	128
Lt	8	19	14	12	53

Total	1st	2nd	3rd	4th	
3	0	0	1	2	Lt
105	19	24	38	24	Thru
37	7	14	13	3	Rt

	Lt	Thru	Rt
1st	6	3	13
2nd	7	8	15
3rd	10	5	11
4th	9	4	8
Total	32	20	47

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 01:00PM-02:00PM DATE: 05-24-12

NORTH LEG

	Rt	Thru	Lt
Total	14	19	6
1st	0	3	1
2nd	3	5	2
3rd	5	7	1
4th	6	4	2

	1st	2nd	3rd	4th	Total
Rt	2	2	9	6	19
Thru	32	25	34	37	128
Lt	15	14	18	20	67

	Total	1st	2nd	3rd	4th
Lt	10	1	1	4	4
Thru	136	32	27	44	33
Rt	36	10	9	11	6

	Lt	Thru	Rt
1st	13	5	12
2nd	7	3	16
3rd	7	10	12
4th	11	6	8
Total	38	24	48

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : FOOTHILL 05-24-12

BEGINNING TIME : 12:00PM PH: 1:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	1	0	0	0	0	0	0	0	0	0	0	1
0	4	2	0	0	0	0	0	0	0	0	0	6
1	0	3	0	0	0	0	0	0	0	0	0	4
0	1	1	0	0	0	0	0	0	0	0	0	2
0	3	1	0	0	0	0	0	0	0	0	0	4
3	5	2	0	0	0	0	0	0	0	0	0	10
5	7	1	0	0	0	0	0	0	0	0	0	13
6	4	2	0	0	0	0	0	0	0	0	0	12
15	25	12	0	0	0	0	0	0	0	0	0	52
						SOUTH LEG						
12	3	6	0	0	0	0	0	0	1	0	0	22
14	8	6	1	0	1	0	0	0	0	0	0	30
9	5	9	1	0	1	0	0	0	1	0	0	26
8	3	9	0	0	0	0	0	0	0	1	0	21
10	5	13	2	0	0	0	0	0	0	0	0	30
15	3	7	0	0	0	0	0	0	1	0	0	26
11	10	7	0	0	0	0	0	0	1	0	0	29
5	6	11	1	0	0	0	0	0	2	0	0	25
84	43	68	5	0	2	0	0	0	6	1	0	209
						EAST LEG						
1	22	4	0	2	3	0	0	0	0	1	1	34
4	35	19	0	1	0	0	0	0	0	0	0	59
0	38	12	0	1	2	0	0	0	0	0	0	53
5	28	12	0	0	0	0	0	0	0	0	0	45
2	30	13	0	2	1	0	0	1	0	0	0	49
2	23	13	0	2	1	0	0	0	0	0	0	41
9	32	16	0	2	2	0	0	0	0	0	0	61
6	34	19	0	2	1	0	1	0	0	0	0	63
29	242	108	0	12	10	0	1	1	0	1	1	405
						WEST LEG						
5	17	0	1	2	0	0	0	0	1	0	0	26
14	24	0	0	0	0	0	0	0	0	0	0	38
13	35	1	0	3	0	0	0	0	0	0	0	52
3	23	2	0	1	0	0	0	0	0	0	0	29
10	29	1	0	3	0	0	0	0	0	0	0	43
9	26	1	0	1	0	0	0	0	0	0	0	37
11	42	4	0	2	0	0	0	0	0	0	0	59
5	32	4	0	1	0	1	0	0	0	0	0	43
70	228	13	1	13	0	1	0	0	1	0	0	327

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WHEATLAND
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-24-12

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 30

	Rt	Thru	Lt
Total	1	21	8
1st	1	9	2
2nd	0	7	1
3rd	0	2	2
4th	0	3	3

EAST LEG

EAST LEG TOTAL: 327

	1st	2nd	3rd	4th	Total
Rt	4	3	5	5	17
Thru	53	69	51	41	214
Lt	28	24	23	21	96

WEST LEG

	Total	1st	2nd	3rd	4th
Lt		0	0	0	0
Thru	169	53	46	38	32
Rt	79	20	26	19	14

WEST LEG TOTAL: 248

SOUTH LEG

	Lt	Thru	Rt
1st	32	8	19
2nd	16	4	22
3rd	17	6	29
4th	25	5	32
Total	90	23	102

TOTAL: 215

PEAK HOUR FACTORS

NORTH LEG = 0.63
SOUTH LEG = 0.87
EAST LEG = 0.85
WEST LEG = 0.85

ALL LEGS = 0.90

HOUR TOTAL: 820

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 04:00PM-05:00PM DATE: 05-24-12

NORTH LEG

Rt	Thru	Lt	
0	3	7	Total
0	1	4	1st
0	0	0	2nd
0	1	2	3rd
0	1	1	4th

	1st	2nd	3rd	4th	Total
Rt	1	3	4	4	12
Thru	54	46	49	43	192
Lt	20	16	18	14	68

Total	1st	2nd	3rd	4th	
3	1	1	0	1	Lt
133	31	39	27	36	Thru
67	14	27	16	10	Rt

	Lt	Thru	Rt
1st	27	7	23
2nd	17	4	27
3rd	24	4	20
4th	34	4	24
Total	102	19	94

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WHEATLAND

EAST-WEST STREET: FOOTHILL

TIME: 05:00PM-06:00PM DATE: 05-24-12

NORTH LEG

	Rt	Thru	Lt
Total	1	21	8
1st	1	9	2
2nd	0	7	1
3rd	0	2	2
4th	0	3	3

	1st	2nd	3rd	4th	Total
Rt	4	3	5	5	17
Thru	53	69	51	41	214
Lt	28	24	23	21	96

	Total	1st	2nd	3rd	4th
Lt	0	0	0	0	0
Thru	169	53	46	38	32
Rt	79	20	26	19	14

	Lt	Thru	Rt
1st	32	8	19
2nd	16	4	22
3rd	17	6	29
4th	25	5	32
Total	90	23	102

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WHEATLAND LA

EAST-WEST STREET : FOOTHILL 05-24-12

BEGINNING TIME : 04:00PM PH: 5:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	1	4	0	0	0	0	0	0	0	0	0	5
0	0	0	0	0	0	0	0	0	0	0	0	0
0	1	2	0	0	0	0	0	0	0	0	0	3
0	1	1	0	0	0	0	0	0	0	0	0	2
1	9	2	0	0	0	0	0	0	0	0	0	12
0	7	1	0	0	0	0	0	0	0	0	0	8
0	2	2	0	0	0	0	0	0	0	0	0	4
0	3	3	0	0	0	0	0	0	0	0	0	6
1	24	15	0	0	0	0	0	0	0	0	0	40
						SOUTH LEG						
23	7	26	0	0	1	0	0	0	0	0	0	57
27	4	16	0	0	1	0	0	0	0	0	0	48
19	4	24	1	0	0	0	0	0	0	0	0	48
24	4	33	0	0	0	0	0	1	0	0	0	62
19	8	32	0	0	0	0	0	0	0	0	0	59
22	4	16	0	0	0	0	0	0	0	0	0	42
29	6	17	0	0	0	0	0	0	0	0	0	52
32	5	25	0	0	0	0	0	0	0	0	0	62
195	42	189	1	0	2	0	0	1	0	0	0	430
						EAST LEG						
1	52	20	0	2	0	0	0	0	0	0	0	75
3	44	15	0	2	1	0	0	0	0	0	0	65
4	46	17	0	2	0	0	0	0	0	1	1	71
4	42	14	0	1	0	0	0	0	0	0	0	61
4	50	28	0	3	0	0	0	0	0	0	0	85
3	69	24	0	0	0	0	0	0	0	0	0	96
5	47	23	0	2	0	0	0	0	0	2	0	79
5	39	21	0	1	0	0	1	0	0	0	0	67
29	389	162	0	13	1	0	1	0	0	3	1	599
						WEST LEG						
14	30	1	0	1	0	0	0	0	0	0	0	46
24	38	1	2	1	0	0	0	0	1	0	0	67
14	27	0	1	0	0	0	0	0	1	0	0	43
9	36	1	1	0	0	0	0	0	0	0	0	47
20	52	0	0	1	0	0	0	0	0	0	0	73
26	46	0	0	0	0	0	0	0	0	0	0	72
19	36	0	0	2	0	0	0	0	0	0	0	57
14	32	0	0	0	0	0	0	0	0	0	0	46
140	297	3	4	5	0	0	0	0	2	0	0	451

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	195	90	80	220	5	70	10	110	15	15	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.92			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.98	
Satd. Flow (prot)	1388	3438	1615	1719	3430			1642			1637	
Flt Permitted	0.59	1.00	1.00	0.61	1.00			0.90			0.89	
Satd. Flow (perm)	862	3438	1615	1104	3430			1504			1492	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	6	227	105	93	256	6	81	12	128	17	17	6
RTOR Reduction (vph)	0	0	82	0	5	0	0	58	0	0	3	0
Lane Group Flow (vph)	6	227	23	93	257	0	0	163	0	0	37	0
Heavy Vehicles (%)	30%	5%	0%	5%	5%	0%	5%	0%	5%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	7.7	7.7	7.7	7.7	7.7			19.0			19.0	
Effective Green, g (s)	7.7	7.7	7.7	7.7	7.7			19.0			19.0	
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22			0.55			0.55	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	191	763	358	245	761			824			817	
v/s Ratio Prot		0.07			0.08							
v/s Ratio Perm	0.01		0.01	c0.08				c0.11			0.02	
v/c Ratio	0.03	0.30	0.07	0.38	0.34			0.20			0.05	
Uniform Delay, d1	10.6	11.2	10.7	11.5	11.4			4.0			3.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.2	0.1	1.0	0.3			0.5			0.1	
Delay (s)	10.6	11.5	10.7	12.5	11.6			4.5			3.7	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		11.2			11.8			4.5			3.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	33.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	135	35	65	130	20	40	25	50	5	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.98			0.94			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1805	3438	1538	1641	3391			1650			1793	
Flt Permitted	0.64	1.00	1.00	0.65	1.00			0.92			0.98	
Satd. Flow (perm)	1214	3438	1538	1123	3391			1539			1761	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	12	161	42	77	155	24	48	30	60	6	24	18
RTOR Reduction (vph)	0	0	34	0	19	0	0	26	0	0	8	0
Lane Group Flow (vph)	12	161	8	77	160	0	0	112	0	0	40	0
Heavy Vehicles (%)	0%	5%	5%	10%	5%	0%	0%	0%	15%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	6.8	6.8	6.8	6.8	6.8			18.9			18.9	
Effective Green, g (s)	6.8	6.8	6.8	6.8	6.8			18.9			18.9	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20			0.56			0.56	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	245	694	310	227	684			863			988	
v/s Ratio Prot		0.05			0.05							
v/s Ratio Perm	0.01		0.01	c0.07				c0.07			0.02	
v/c Ratio	0.05	0.23	0.03	0.34	0.23			0.13			0.04	
Uniform Delay, d1	10.8	11.3	10.8	11.5	11.3			3.5			3.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.2	0.0	0.9	0.2			0.3			0.1	
Delay (s)	10.9	11.4	10.8	12.4	11.4			3.8			3.4	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		11.3			11.7			3.8			3.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.3	HCM Level of Service	A
HCM Volume to Capacity ratio	0.19		
Actuated Cycle Length (s)	33.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	30.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/10/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	170	80	95	215	15	90	25	100	10	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.94			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1805	3438	1615	1805	3415			1744			1835	
Flt Permitted	0.59	1.00	1.00	0.63	1.00			0.88			0.93	
Satd. Flow (perm)	1127	3438	1615	1202	3415			1568			1728	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	189	89	106	239	17	100	28	111	11	22	6
RTOR Reduction (vph)	0	0	69	0	13	0	0	50	0	0	3	0
Lane Group Flow (vph)	6	189	20	106	243	0	0	189	0	0	36	0
Heavy Vehicles (%)	0%	5%	0%	0%	5%	0%	0%	0%	0%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	7.7	7.7	7.7	7.7	7.7			19.0			19.0	
Effective Green, g (s)	7.7	7.7	7.7	7.7	7.7			19.0			19.0	
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22			0.55			0.55	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	250	763	358	267	758			859			946	
v/s Ratio Prot		0.05			0.07							
v/s Ratio Perm	0.01		0.01	c0.09				c0.12			0.02	
v/c Ratio	0.02	0.25	0.06	0.40	0.32			0.22			0.04	
Uniform Delay, d1	10.6	11.1	10.6	11.5	11.3			4.0			3.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.2	0.1	1.0	0.2			0.6			0.1	
Delay (s)	10.6	11.3	10.7	12.5	11.6			4.6			3.7	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		11.1			11.8			4.6			3.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	9.4	HCM Level of Service	A
HCM Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	34.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	39.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/13/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	195	90	130	220	5	70	10	160	15	15	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.91			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1388	3438	1615	1271	3430			1366			1637	
Flt Permitted	0.59	1.00	1.00	0.61	1.00			0.92			0.88	
Satd. Flow (perm)	862	3438	1615	816	3430			1270			1469	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	6	227	105	151	256	6	81	12	186	17	17	6
RTOR Reduction (vph)	0	0	76	0	4	0	0	91	0	0	3	0
Lane Group Flow (vph)	6	227	29	151	258	0	0	188	0	0	37	0
Heavy Vehicles (%)	30%	5%	0%	42%	5%	0%	5%	0%	35%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	10.2	10.2	10.2	10.2	10.2			19.2			19.2	
Effective Green, g (s)	10.2	10.2	10.2	10.2	10.2			19.2			19.2	
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27			0.51			0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	235	938	440	223	935			652			754	
v/s Ratio Prot		0.07			0.08							
v/s Ratio Perm	0.01		0.02	c0.18				c0.15			0.03	
v/c Ratio	0.03	0.24	0.07	0.68	0.28			0.29			0.05	
Uniform Delay, d1	10.0	10.6	10.1	12.1	10.7			5.2			4.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1	0.1	7.9	0.2			1.1			0.1	
Delay (s)	10.0	10.7	10.1	20.0	10.9			6.3			4.7	
Level of Service	B	B	B	C	B			A			A	
Approach Delay (s)		10.5			14.2			6.3			4.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	37.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/13/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	135	35	115	130	20	40	25	100	5	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.98			0.92			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1805	3438	1538	1211	3391			1277			1793	
Flt Permitted	0.64	1.00	1.00	0.65	1.00			0.94			0.97	
Satd. Flow (perm)	1214	3438	1538	829	3391			1212			1754	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	12	161	42	137	155	24	48	30	119	6	24	18
RTOR Reduction (vph)	0	0	31	0	18	0	0	57	0	0	9	0
Lane Group Flow (vph)	12	161	11	137	161	0	0	140	0	0	39	0
Heavy Vehicles (%)	0%	5%	5%	49%	5%	0%	0%	0%	58%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	9.5	9.5	9.5	9.5	9.5			19.2			19.2	
Effective Green, g (s)	9.5	9.5	9.5	9.5	9.5			19.2			19.2	
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26			0.52			0.52	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	314	890	398	215	878			634			918	
v/s Ratio Prot		0.05			0.05							
v/s Ratio Perm	0.01		0.01	c0.17				c0.12			0.02	
v/c Ratio	0.04	0.18	0.03	0.64	0.18			0.22			0.04	
Uniform Delay, d1	10.2	10.6	10.2	12.1	10.6			4.7			4.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.1	0.1	0.0	6.1	0.1			0.8			0.1	
Delay (s)	10.2	10.7	10.2	18.1	10.7			5.5			4.4	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		10.6			13.9			5.5			4.4	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	36.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/13/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	170	80	145	215	15	90	25	150	10	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.92			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1805	3438	1615	1347	3415			1454			1835	
Flt Permitted	0.59	1.00	1.00	0.63	1.00			0.90			0.92	
Satd. Flow (perm)	1127	3438	1615	897	3415			1328			1712	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	189	89	161	239	17	100	28	167	11	22	6
RTOR Reduction (vph)	0	0	65	0	12	0	0	81	0	0	3	0
Lane Group Flow (vph)	6	189	24	161	244	0	0	214	0	0	36	0
Heavy Vehicles (%)	0%	5%	0%	34%	5%	0%	0%	0%	33%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	10.0	10.0	10.0	10.0	10.0			19.2			19.2	
Effective Green, g (s)	10.0	10.0	10.0	10.0	10.0			19.2			19.2	
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27			0.52			0.52	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	303	924	434	241	918			685			884	
v/s Ratio Prot		0.05			0.07							
v/s Ratio Perm	0.01		0.01	c0.18				c0.16			0.02	
v/c Ratio	0.02	0.20	0.06	0.67	0.27			0.31			0.04	
Uniform Delay, d1	10.0	10.5	10.1	12.1	10.7			5.2			4.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1	0.1	6.8	0.2			1.2			0.1	
Delay (s)	10.0	10.6	10.1	19.0	10.9			6.4			4.5	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		10.5			14.0			6.4			4.5	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.5	HCM Level of Service	B
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	37.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	44.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	215	100	140	240	5	75	10	175	15	15	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	1.00			0.91			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.98	
Satd. Flow (prot)	1388	3438	1615	1271	3431			1363			1637	
Flt Permitted	0.58	1.00	1.00	0.60	1.00			0.91			0.87	
Satd. Flow (perm)	843	3438	1615	799	3431			1265			1460	
Peak-hour factor, PHF	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Adj. Flow (vph)	6	250	116	163	279	6	87	12	203	17	17	6
RTOR Reduction (vph)	0	0	84	0	4	0	0	100	0	0	3	0
Lane Group Flow (vph)	6	250	32	163	281	0	0	202	0	0	37	0
Heavy Vehicles (%)	30%	5%	0%	42%	5%	0%	5%	0%	35%	20%	5%	5%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	10.1	10.1	10.1	10.1	10.1			18.6			18.6	
Effective Green, g (s)	10.1	10.1	10.1	10.1	10.1			18.6			18.6	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28			0.51			0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	232	946	444	220	944			641			740	
v/s Ratio Prot		0.07			0.08							
v/s Ratio Perm	0.01		0.02	c0.20				c0.16			0.03	
v/c Ratio	0.03	0.26	0.07	0.74	0.30			0.31			0.05	
Uniform Delay, d1	9.7	10.4	9.8	12.1	10.5			5.3			4.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.2	0.1	12.6	0.2			1.3			0.1	
Delay (s)	9.8	10.5	9.9	24.7	10.7			6.6			4.7	
Level of Service	A	B	A	C	B			A			A	
Approach Delay (s)		10.3			15.8			6.6			4.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	36.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	41.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	145	40	125	140	20	45	25	110	5	20	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.98			0.92			0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.99			0.99	
Satd. Flow (prot)	1805	3438	1538	1211	3394			1272			1793	
Flt Permitted	0.63	1.00	1.00	0.64	1.00			0.93			0.97	
Satd. Flow (perm)	1200	3438	1538	819	3394			1203			1752	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	12	173	48	149	167	24	54	30	131	6	24	18
RTOR Reduction (vph)	0	0	35	0	18	0	0	64	0	0	9	0
Lane Group Flow (vph)	12	173	13	149	173	0	0	151	0	0	39	0
Heavy Vehicles (%)	0%	5%	5%	49%	5%	0%	0%	0%	58%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	10.1	10.1	10.1	10.1	10.1			19.2			19.2	
Effective Green, g (s)	10.1	10.1	10.1	10.1	10.1			19.2			19.2	
Actuated g/C Ratio	0.27	0.27	0.27	0.27	0.27			0.51			0.51	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	325	931	416	222	919			619			902	
v/s Ratio Prot		0.05			0.05							
v/s Ratio Perm	0.01		0.01	c0.18				c0.13			0.02	
v/c Ratio	0.04	0.19	0.03	0.67	0.19			0.24			0.04	
Uniform Delay, d1	10.0	10.4	10.0	12.1	10.5			5.0			4.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1	0.0	7.7	0.1			0.9			0.1	
Delay (s)	10.1	10.5	10.0	19.9	10.6			6.0			4.6	
Level of Service	B	B	B	B	B			A			A	
Approach Delay (s)		10.4			14.6			6.0			4.6	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	37.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
46: Wheatland Ave & Foothill Ave/Foothill Blvd

8/14/2012

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	185	85	160	235	15	100	25	165	10	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95			1.00			1.00	
Frt	1.00	1.00	0.85	1.00	0.99			0.92			0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1805	3438	1615	1347	3417			1452			1835	
Flt Permitted	0.58	1.00	1.00	0.62	1.00			0.89			0.91	
Satd. Flow (perm)	1104	3438	1615	883	3417			1317			1698	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	6	206	94	178	261	17	111	28	183	11	22	6
RTOR Reduction (vph)	0	0	65	0	12	0	0	96	0	0	3	0
Lane Group Flow (vph)	6	206	29	178	266	0	0	226	0	0	36	0
Heavy Vehicles (%)	0%	5%	0%	34%	5%	0%	0%	0%	33%	0%	0%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	11.8	11.8	11.8	11.8	11.8			17.9			17.9	
Effective Green, g (s)	11.8	11.8	11.8	11.8	11.8			17.9			17.9	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31			0.47			0.47	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0			4.0			4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	346	1076	505	276	1070			625			806	
v/s Ratio Prot		0.06			0.08							
v/s Ratio Perm	0.01		0.02	c0.20				c0.17			0.02	
v/c Ratio	0.02	0.19	0.06	0.64	0.25			0.36			0.04	
Uniform Delay, d1	8.9	9.5	9.1	11.1	9.6			6.3			5.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00			1.00			1.00	
Incremental Delay, d2	0.0	0.1	0.0	5.1	0.1			1.6			0.1	
Delay (s)	9.0	9.6	9.1	16.2	9.8			7.9			5.4	
Level of Service	A	A	A	B	A			A			A	
Approach Delay (s)		9.4			12.3			7.9			5.4	
Approach LOS		A			B			A			A	

Intersection Summary			
HCM Average Control Delay	10.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	37.7	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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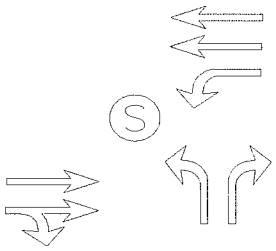
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
47
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	200	5%		200	20	220
EB RIGHT	115	34%	**50**	165	15	180
WB LEFT	440	5%		440	40	480
WB THRU	175	5%		175	15	190
WB RIGHT	0	0%		0	0	0
WENTWORTH STREET						
NB LEFT	50	53%	**50**	100	10	110
NB THRU	0	0%		0	0	0
NB RIGHT	225	5%		225	20	245
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1205**		**100**	**1305**	**120**	**1425**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
47
ROUTE
5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	165	5%		165	15	180
EB RIGHT	45	55%	**50**	95	10	105
WB LEFT	215	5%		215	20	235
WB THRU	155	5%		155	15	170
WB RIGHT	0	0%		0	0	0
WENTWORTH STREET						
NB LEFT	50	53%	**50**	100	10	110
NB THRU	0	0%		0	0	0
NB RIGHT	185	5%		185	15	200
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**815**		**100**	**915**	**85**	**1000**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 47
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
FOOTHILL BLVD						
EB LEFT	0	0%		0	0	0
EB THRU	200	5%		200	20	220
EB RIGHT	75	43%	**50**	125	10	135
WB LEFT	215	5%		215	20	235
WB THRU	295	5%		295	25	320
WB RIGHT	0	0%		0	0	0
WENTWORTH STREET						
NB LEFT	110	35%	**50**	160	15	175
NB THRU	0	0%		0	0	0
NB RIGHT	420	5%		420	40	460
SB LEFT	0	0%		0	0	0
SB THRU	0	0%		0	0	0
SB RIGHT	0	0%		0	0	0
TOTALS	**1315**		**100**	**1415**	**130**	**1545**

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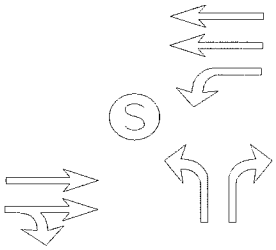
E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 47
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	196	3	9	205	**0**	205	20	225
EB RIGHT	112	3	9	120	**150**	270	25	295
WB LEFT	439	3	9	450	**0**	450	40	490
WB THRU	174	3	9	185	**0**	185	15	200
WB RIGHT	0	0	0	0	**0**	0	0	0
WENTWORTH STREET								
NB LEFT	51	1	3	55	**150**	205	20	225
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	215	8	24	240	**0**	240	20	260
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1187**				**300**	**1555**	**140**	**1695**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 47
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	161	5	15	175	**0**	175	15	190
EB RIGHT	44	2	6	50	**150**	200	20	220
WB LEFT	207	6	18	225	**0**	225	20	245
WB THRU	154	3	9	165	**0**	165	15	180
WB RIGHT	0	0	0	0	**0**	0	0	0
WENTWORTH STREET								
NB LEFT	48	2	6	55	**150**	205	20	225
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	180	3	9	190	**0**	190	15	205
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**794**				**300**	**1160**	**105**	**1265**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BLVD
N/S STREET : WENTWORTH STREET
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 47
ROUTE 5C, 6C, 7C, 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BLVD								
EB LEFT	0	0	0	0	**0**	0	0	0
EB THRU	197	1	3	200	**0**	200	20	220
EB RIGHT	73	2	6	80	**150**	230	20	250
WB LEFT	205	12	36	240	**0**	240	20	260
WB THRU	292	3	9	300	**0**	300	25	325
WB RIGHT	0	0	0	0	**0**	0	0	0
WENTWORTH STREET								
NB LEFT	108	2	6	115	**150**	265	25	290
NB THRU	0	0	0	0	**0**	0	0	0
NB RIGHT	415	3	9	425	**0**	425	40	465
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	0	0	0	0	**0**	0	0	0
SB RIGHT	0	0	0	0	**0**	0	0	0
TOTALS	**1290**				**300**	**1660**	**150**	**1810**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WENTWORTH
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG TOTAL: 619

	1st	2nd	3rd	4th	Total
Rt					
Thru	28	37	59	53	177
Lt	120	102	128	92	442

Total	1st	2nd	3rd	4th	
					Lt
199	51	55	58	35	Thru
115	30	28	40	17	Rt

WEST LEG TOTAL: 314

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.82
EAST LEG = 0.83
WEST LEG = 0.80

ALL LEGS = 0.84

	Lt	Thru	Rt
1st	4		38
2nd	15		69
3rd	15		58
4th	18		58
Total	52		223

TOTAL: 275

SOUTH LEG

HOUR TOTAL: 1,208

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	22	28	37	59	146
Lt	101	120	102	128	451

Total	1st	2nd	3rd	4th	
					Lt
208	44	51	55	58	Thru
124	26	30	28	40	Rt

	Lt	Thru	Rt
1st	5		22
2nd	4		38
3rd	15		69
4th	15		58
Total	39		187

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	53	60	46	27	186
Lt	92	73	72	86	323

Total	1st	2nd	3rd	4th	
					Lt
151	35	36	40	40	Thru
87	17	22	26	22	Rt

	Lt	Thru	Rt
1st	18		58
2nd	20		45
3rd	13		37
4th	15		44
Total	66		184

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WENTWORTH LA

EAST-WEST STREET : FOOTHILL 05-31-12

BEGINNING TIME : 07:00AM PH = 7:15 AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
22	0	5	0	0	0	0	0	0	0	0	0	27
36	0	3	2	0	0	0	0	1	0	0	0	42
67	0	15	2	0	0	0	0	0	0	0	0	84
54	0	15	2	0	0	2	0	0	0	0	0	73
58	0	18	0	0	0	0	0	0	0	0	0	76
43	0	18	1	0	0	1	0	1	0	0	1	65
37	0	13	0	0	0	0	0	0	0	0	0	50
43	0	13	1	0	1	0	0	0	0	0	1	59
360	0	100	8	0	1	3	0	2	0	0	2	476
						EAST LEG						
0	20	101	0	1	0	0	1	0	0	0	0	123
0	27	120	0	1	0	0	0	0	0	0	0	148
0	37	102	0	0	0	0	0	0	0	0	0	139
0	58	125	0	1	1	0	0	2	0	0	0	187
0	52	92	0	1	0	0	0	0	0	0	0	145
0	59	73	0	0	0	0	1	0	0	0	0	133
0	45	71	0	1	1	0	0	0	0	0	0	118
0	27	84	0	0	1	0	0	0	0	0	1	113
0	325	768	0	5	3	0	2	2	0	0	1	1106
						WEST LEG						
25	42	0	1	2	0	0	0	0	0	0	0	70
30	50	0	0	1	0	0	0	0	0	0	0	81
28	55	0	0	0	0	0	0	0	0	0	0	83
38	56	0	1	1	0	0	0	0	1	1	0	98
16	35	0	0	0	0	0	0	0	1	0	0	52
22	36	0	0	0	0	0	0	0	0	0	0	58
25	39	0	1	1	0	0	0	0	0	0	0	66
21	38	0	1	2	0	0	0	0	0	0	0	62
205	351	0	4	7	0	0	0	0	2	1	0	570

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WENTWORTH
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG

EAST LEG TOTAL: 370

	1st	2nd	3rd	4th	Total
Rt					
Thru	33	46	42	36	157
Lt	38	49	63	63	213

WEST LEG

	Total	1st	2nd	3rd	4th
Lt					
Thru	166	37	42	48	39
Rt	46	7	10	13	16

WEST LEG TOTAL: 212

SOUTH LEG

	Lt	Thru	Rt
1st	14		49
2nd	9		49
3rd	10		35
4th	17		50
Total	50		183

TOTAL: 233

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.87
EAST LEG = 0.88
WEST LEG = 0.87

ALL LEGS = 0.92

HOUR TOTAL: 815

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	38	48	43	36	165
Lt	47	48	53	54	202

	Total	1st	2nd	3rd	4th
Lt					
Thru	156	29	43	42	42
Rt	48	13	12	6	17

	Lt	Thru	Rt
1st	8		53
2nd	11		34
3rd	4		38
4th	13		47
Total	36		172

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	33	46	42	36	157
Lt	38	49	63	63	213

	Total	1st	2nd	3rd	4th
Lt					
Thru	166	37	42	48	39
Rt	46	7	10	13	16

	Lt	Thru	Rt
1st	14		49
2nd	9		49
3rd	10		35
4th	17		50
Total	50		183

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WENTWORTH LA

EAST-WEST STREET : FOOTHILL 05-31-12

BEGINNING TIME : 12:00PM PH = 1:00 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
51	0	7	1	0	1	1	0	0	0	0	0	61
31	0	10	2	0	0	0	0	0	1	0	1	45
37	0	4	0	0	0	1	0	0	0	0	0	42
45	0	12	1	0	1	0	0	0	1	0	0	60
48	0	13	0	0	0	1	0	0	0	0	1	63
47	0	8	0	0	0	1	0	0	1	0	1	58
35	0	10	0	0	0	0	0	0	0	0	0	45
50	0	17	0	0	0	0	0	0	0	0	0	67
344	0	81	4	0	2	4	0	0	3	0	3	441
						EAST LEG						
0	36	47	0	1	0	0	0	0	0	1	0	85
0	45	47	0	2	1	0	1	0	0	0	0	96
0	41	53	0	0	0	0	1	0	0	1	0	96
0	34	54	0	1	0	0	1	0	0	0	0	90
0	31	37	0	1	0	0	0	0	0	1	1	71
0	46	45	0	0	2	0	0	1	0	0	1	95
0	41	63	0	1	0	0	0	0	0	0	0	105
0	36	62	0	0	1	0	0	0	0	0	0	99
0	310	408	0	6	4	0	3	1	0	3	2	737
						WEST LEG						
13	27	0	0	0	0	0	2	0	0	0	0	42
10	39	0	0	3	0	1	1	0	1	0	0	55
6	41	0	0	1	0	0	0	0	0	0	0	48
15	41	0	1	0	0	0	0	0	1	1	0	59
7	36	0	0	0	0	0	1	0	0	0	0	44
9	39	0	0	2	0	0	1	0	1	0	0	52
12	47	0	0	1	0	1	0	0	0	0	0	61
16	39	0	0	0	0	0	0	0	0	0	0	55
88	309	0	1	7	0	2	5	0	3	1	0	416

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: WENTWORTH
EAST-WEST STREET: FOOTHILL
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 0

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

EAST LEG TOTAL: 512

	1st	2nd	3rd	4th	Total
Rt					
Thru	69	64	79	83	295
Lt	65	47	51	54	217

	Total	1st	2nd	3rd	4th
Lt					
Thru	198	52	51	51	44
Rt	75	15	21	21	18

WEST LEG TOTAL: 273

PEAK HOUR FACTORS

NORTH LEG =
SOUTH LEG = 0.92
EAST LEG = 0.93
WEST LEG = 0.95

ALL LEGS = 0.99

	Lt	Thru	Rt
1st	29		94
2nd	33		111
3rd	28		103
4th	20		110
Total	110		418

TOTAL: 528

SOUTH LEG

HOUR TOTAL: 1,313

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INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	41	53	56	69	219
Lt	36	60	46	65	207

	Total	1st	2nd	3rd	4th
Lt					
Thru	208	53	49	54	52
Rt	54	15	15	9	15

	Lt	Thru	Rt
1st	15		60
2nd	21		84
3rd	20		80
4th	29		94
Total	85		318

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: WENTWORTH

EAST-WEST STREET: FOOTHILL

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total			
1st			
2nd			
3rd			
4th			

	1st	2nd	3rd	4th	Total
Rt					
Thru	64	79	83	44	270
Lt	47	51	54	72	224

	Total	1st	2nd	3rd	4th
Lt					
Thru	193	51	51	44	47
Rt	71	21	21	18	11

	Lt	Thru	Rt
1st	33		111
2nd	28		103
3rd	20		110
4th	31		112
Total	112		436

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : WENTWORTH LA

EAST-WEST STREET : FOOTHILL 05-31-12

BEGINNING TIME : 04:00PM PH= 4:45 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						SOUTH LEG						
60	0	15	0	0	0	0	0	0	0	0	0	75
82	0	19	2	0	2	0	0	0	0	0	0	105
79	0	20	0	0	0	1	0	0	0	0	0	100
94	0	28	0	0	0	0	0	1	0	0	0	123
109	0	32	2	0	0	0	0	0	0	0	1	144
102	0	28	0	0	0	0	0	0	1	0	0	131
110	0	20	0	0	0	0	0	0	0	0	0	130
112	0	31	0	0	0	0	0	0	0	0	0	143
748	0	193	4	0	2	1	0	1	1	0	1	951
						EAST LEG						
0	40	35	0	1	1	0	0	0	0	0	0	77
0	51	57	0	0	1	0	0	1	0	2	1	113
0	54	43	0	2	0	0	0	2	0	0	1	102
0	68	63	0	1	2	0	0	0	0	0	0	134
0	63	43	0	1	0	0	0	3	0	0	1	111
0	79	47	0	0	1	0	0	3	0	0	0	130
0	82	52	0	0	1	0	1	1	0	0	0	137
0	43	71	0	0	0	0	1	1	0	0	0	116
0	480	411	0	5	6	0	2	11	0	2	3	920
						WEST LEG						
14	52	0	0	1	0	1	0	0	0	0	0	68
15	47	0	0	1	0	0	0	0	0	1	0	64
9	53	0	0	1	0	0	0	0	0	0	0	63
15	52	0	0	0	0	0	0	0	0	0	0	67
20	50	0	1	1	0	0	0	0	0	0	0	72
20	51	0	0	0	0	1	0	0	0	0	0	72
18	44	0	0	0	0	0	0	0	0	0	0	62
11	47	0	0	0	0	0	0	0	0	0	0	58
122	396	0	1	4	0	2	0	0	0	1	0	526

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
47: Wentworth St & Foothill Blvd

8/10/2012

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	200	115	440	175	50	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.95		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3250		1719	3438	1719	1538
Flt Permitted	1.00		0.53	1.00	0.95	1.00
Satd. Flow (perm)	3250		957	3438	1719	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	238	137	524	208	60	268
RTOR Reduction (vph)	55	0	0	0	0	195
Lane Group Flow (vph)	320	0	524	208	60	73
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	35.7		35.7	35.7	16.3	16.3
Effective Green, g (s)	35.7		35.7	35.7	16.3	16.3
Actuated g/C Ratio	0.60		0.60	0.60	0.27	0.27
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1934		569	2046	467	418
v/s Ratio Prot	0.10			0.06	0.03	
v/s Ratio Perm			c0.55			c0.05
v/c Ratio	0.17		0.92	0.10	0.13	0.17
Uniform Delay, d1	5.5		10.9	5.2	16.5	16.7
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0		20.4	0.0	0.6	0.9
Delay (s)	5.5		31.3	5.3	17.1	17.6
Level of Service	A		C	A	B	B
Approach Delay (s)	5.5			23.9	17.5	
Approach LOS	A			C	B	

Intersection Summary			
HCM Average Control Delay	17.6	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	46.9%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: Wentworth St & Foothill Blvd

8/10/2012

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	165	45	215	155	50	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.97		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3327		1719	3438	1719	1538
Flt Permitted	1.00		0.61	1.00	0.95	1.00
Satd. Flow (perm)	3327		1103	3438	1719	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	49	234	168	54	201
RTOR Reduction (vph)	35	0	0	0	0	99
Lane Group Flow (vph)	193	0	234	168	54	102
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	10.7		10.7	10.7	19.3	19.3
Effective Green, g (s)	10.7		10.7	10.7	19.3	19.3
Actuated g/C Ratio	0.28		0.28	0.28	0.51	0.51
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	937		311	968	873	781
v/s Ratio Prot	0.06			0.05	0.03	
v/s Ratio Perm			c0.21			c0.07
v/c Ratio	0.21		0.75	0.17	0.06	0.13
Uniform Delay, d1	10.4		12.4	10.3	4.8	4.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		9.9	0.1	0.1	0.3
Delay (s)	10.5		22.3	10.4	4.9	5.3
Level of Service	B		C	B	A	A
Approach Delay (s)	10.5			17.3	5.2	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	12.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	38.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: Wentworth St & Foothill Blvd

8/10/2012

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	200	75	215	295	110	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.96		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	3297		1719	3438	1719	1538
Flt Permitted	1.00		0.58	1.00	0.95	1.00
Satd. Flow (perm)	3297		1051	3438	1719	1538
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	202	76	217	298	111	424
RTOR Reduction (vph)	51	0	0	0	0	233
Lane Group Flow (vph)	227	0	217	298	111	191
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	12.1		12.1	12.1	16.4	16.4
Effective Green, g (s)	12.1		12.1	12.1	16.4	16.4
Actuated g/C Ratio	0.33		0.33	0.33	0.45	0.45
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1093		348	1140	772	691
v/s Ratio Prot	0.07			0.09	0.06	
v/s Ratio Perm			c0.21			c0.12
v/c Ratio	0.21		0.62	0.26	0.14	0.28
Uniform Delay, d1	8.8		10.3	8.9	5.9	6.3
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		3.5	0.1	0.4	1.0
Delay (s)	8.9		13.7	9.1	6.3	7.3
Level of Service	A		B	A	A	A
Approach Delay (s)	8.9			11.0	7.1	
Approach LOS	A			B	A	

Intersection Summary			
HCM Average Control Delay	9.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.42		
Actuated Cycle Length (s)	36.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: Wentworth St & Foothill Blvd

8/13/2012

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	200	165	440	175	100	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.93		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2850		1719	3438	1180	1538
Flt Permitted	1.00		0.50	1.00	0.95	1.00
Satd. Flow (perm)	2850		904	3438	1180	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	238	196	524	208	119	268
RTOR Reduction (vph)	76	0	0	0	0	199
Lane Group Flow (vph)	358	0	524	208	119	69
Heavy Vehicles (%)	5%	34%	5%	5%	53%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	38.2		38.2	38.2	16.1	16.1
Effective Green, g (s)	38.2		38.2	38.2	16.1	16.1
Actuated g/C Ratio	0.61		0.61	0.61	0.26	0.26
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1748		554	2108	305	397
v/s Ratio Prot	0.13			0.06	c0.10	
v/s Ratio Perm			c0.58			0.05
v/c Ratio	0.20		0.95	0.10	0.39	0.17
Uniform Delay, d1	5.3		11.1	5.0	19.1	17.9
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		25.2	0.0	3.7	1.0
Delay (s)	5.4		36.3	5.0	22.8	18.9
Level of Service	A		D	A	C	B
Approach Delay (s)	5.4			27.4	20.1	
Approach LOS	A			C	C	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	62.3	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	165	95	215	155	100	185
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.95		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2768		1719	3438	1180	1538
Flt Permitted	1.00		0.58	1.00	0.95	1.00
Satd. Flow (perm)	2768		1047	3438	1180	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	179	103	234	168	109	201
RTOR Reduction (vph)	74	0	0	0	0	100
Lane Group Flow (vph)	208	0	234	168	109	101
Heavy Vehicles (%)	5%	55%	5%	5%	53%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	10.6		10.6	10.6	18.8	18.8
Effective Green, g (s)	10.6		10.6	10.6	18.8	18.8
Actuated g/C Ratio	0.28		0.28	0.28	0.50	0.50
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	785		297	974	593	773
v/s Ratio Prot	0.08			0.05	c0.09	
v/s Ratio Perm			c0.22			0.07
v/c Ratio	0.27		0.79	0.17	0.18	0.13
Uniform Delay, d1	10.4		12.4	10.1	5.1	5.0
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2		12.9	0.1	0.7	0.3
Delay (s)	10.6		25.3	10.2	5.8	5.3
Level of Service	B		C	B	A	A
Approach Delay (s)	10.6			19.0	5.5	
Approach LOS	B			B	A	

Intersection Summary			
HCM Average Control Delay	12.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	37.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	35.1%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: Wentworth St & Foothill Blvd

8/13/2012

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	200	125	215	295	160	420
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.94		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2845		1719	3438	1337	1538
Flt Permitted	1.00		0.55	1.00	0.95	1.00
Satd. Flow (perm)	2845		1002	3438	1337	1538
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	202	126	217	298	162	424
RTOR Reduction (vph)	84	0	0	0	0	235
Lane Group Flow (vph)	244	0	217	298	162	189
Heavy Vehicles (%)	5%	43%	5%	5%	35%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	12.2		12.2	12.2	16.2	16.2
Effective Green, g (s)	12.2		12.2	12.2	16.2	16.2
Actuated g/C Ratio	0.34		0.34	0.34	0.45	0.45
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	954		336	1152	595	684
v/s Ratio Prot	0.09			0.09	0.12	
v/s Ratio Perm			c0.22			c0.12
v/c Ratio	0.26		0.65	0.26	0.27	0.28
Uniform Delay, d1	8.8		10.3	8.8	6.4	6.4
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		4.2	0.1	1.1	1.0
Delay (s)	8.9		14.5	8.9	7.5	7.4
Level of Service	A		B	A	A	A
Approach Delay (s)	8.9			11.3	7.4	
Approach LOS	A			B	A	

Intersection Summary			
HCM Average Control Delay	9.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	36.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: Wentworth St & Foothill Blvd

8/14/2012

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	220	180	480	190	110	245
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.93		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2852		1719	3438	1180	1538
Flt Permitted	1.00		0.48	1.00	0.95	1.00
Satd. Flow (perm)	2852		868	3438	1180	1538
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	262	214	571	226	131	292
RTOR Reduction (vph)	79	0	0	0	0	220
Lane Group Flow (vph)	397	0	571	226	131	72
Heavy Vehicles (%)	5%	34%	5%	5%	53%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	41.0		41.0	41.0	16.0	16.0
Effective Green, g (s)	41.0		41.0	41.0	16.0	16.0
Actuated g/C Ratio	0.63		0.63	0.63	0.25	0.25
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1799		548	2169	290	379
v/s Ratio Prot	0.14			0.07	c0.11	
v/s Ratio Perm			c0.66			0.05
v/c Ratio	0.22		1.04	0.10	0.45	0.19
Uniform Delay, d1	5.1		12.0	4.7	20.8	19.4
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		49.8	0.0	5.0	1.1
Delay (s)	5.2		61.8	4.8	25.8	20.5
Level of Service	A		E	A	C	C
Approach Delay (s)	5.2			45.6	22.1	
Approach LOS	A			D	C	

Intersection Summary			
HCM Average Control Delay	28.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.88		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: Wentworth St & Foothill Blvd

8/14/2012

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	180	105	235	170	110	200
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.94		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2764		1719	3438	1180	1538
Flt Permitted	1.00		0.56	1.00	0.95	1.00
Satd. Flow (perm)	2764		1019	3438	1180	1538
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	114	255	185	120	217
RTOR Reduction (vph)	75	0	0	0	0	121
Lane Group Flow (vph)	235	0	255	185	120	96
Heavy Vehicles (%)	5%	55%	5%	5%	53%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	13.1		13.1	13.1	16.8	16.8
Effective Green, g (s)	13.1		13.1	13.1	16.8	16.8
Actuated g/C Ratio	0.35		0.35	0.35	0.44	0.44
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	955		352	1188	523	682
v/s Ratio Prot	0.09			0.05	c0.10	
v/s Ratio Perm			c0.25			0.06
v/c Ratio	0.25		0.72	0.16	0.23	0.14
Uniform Delay, d1	8.9		10.8	8.6	6.5	6.3
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		7.2	0.1	1.0	0.4
Delay (s)	9.0		18.0	8.6	7.6	6.7
Level of Service	A		B	A	A	A
Approach Delay (s)	9.0			14.1	7.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM Average Control Delay	10.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	37.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	37.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
47: Wentworth St & Foothill Blvd

8/14/2012

Movement	EBT	EBR	WBL	WBT	NEL	NER
Lane Configurations						
Volume (vph)	220	135	235	320	175	460
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0	4.0	4.0	4.0
Lane Util. Factor	0.95		1.00	0.95	1.00	1.00
Frt	0.94		1.00	1.00	1.00	0.85
Flt Protected	1.00		0.95	1.00	0.95	1.00
Satd. Flow (prot)	2850		1719	3438	1337	1538
Flt Permitted	1.00		0.54	1.00	0.95	1.00
Satd. Flow (perm)	2850		973	3438	1337	1538
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	222	136	237	323	177	465
RTOR Reduction (vph)	89	0	0	0	0	262
Lane Group Flow (vph)	269	0	237	323	177	203
Heavy Vehicles (%)	5%	43%	5%	5%	35%	5%
Turn Type	NA		Perm	NA	NA	Perm
Protected Phases	4			8	2	
Permitted Phases			8			2
Actuated Green, G (s)	12.9		12.9	12.9	16.2	16.2
Effective Green, g (s)	12.9		12.9	12.9	16.2	16.2
Actuated g/C Ratio	0.35		0.35	0.35	0.44	0.44
Clearance Time (s)	4.0		4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0		3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	991		338	1195	584	672
v/s Ratio Prot	0.09			0.09	c0.13	
v/s Ratio Perm			c0.24			0.13
v/c Ratio	0.27		0.70	0.27	0.30	0.30
Uniform Delay, d1	8.7		10.4	8.7	6.8	6.8
Progression Factor	1.00		1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1		6.4	0.1	1.3	1.2
Delay (s)	8.9		16.9	8.8	8.1	7.9
Level of Service	A		B	A	A	A
Approach Delay (s)	8.9			12.2	8.0	
Approach LOS	A			B	A	

Intersection Summary			
HCM Average Control Delay	9.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.48		
Actuated Cycle Length (s)	37.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	45.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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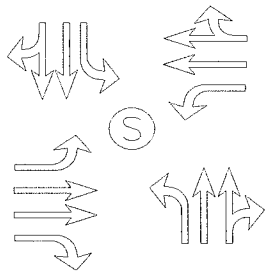
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
48
ROUTE
8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	65	5%	**0**	65	5	70
EB THRU	515	15%	**0**	515	45	560
EB RIGHT	110	5%	**0**	110	10	120
WB LEFT	115	5%	**0**	115	10	125
WB THRU	650	20%	**0**	650	60	710
WB RIGHT	105	39%	**50**	155	15	170
SAN FERNANDO ROAD						
NB LEFT	250	10%	**0**	250	25	275
NB THRU	210	30%	**0**	210	20	230
NB RIGHT	60	5%	**0**	60	5	65
SB LEFT	125	43%	**50**	175	15	190
SB THRU	325	20%	**0**	325	30	355
SB RIGHT	70	10%	**0**	70	5	75
TOTALS	**2600**		**100**	**2700**	**245**	**2945**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 48
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	80	15%	**0**	80	5	85
EB THRU	380	15%	**0**	380	35	415
EB RIGHT	185	5%	**0**	185	15	200
WB LEFT	175	5%	**0**	175	15	190
WB THRU	355	40%	**0**	355	30	385
WB RIGHT	100	37%	**50**	150	15	165
SAN FERNANDO ROAD						
NB LEFT	315	5%	**0**	315	30	345
NB THRU	185	30%	**0**	185	15	200
NB RIGHT	135	10%	**0**	135	10	145
SB LEFT	60	54%	**50**	110	10	120
SB THRU	220	35%	**0**	220	20	240
SB RIGHT	70	10%	**0**	70	5	75
TOTALS	**2260**		**100**	**2360**	**205**	**2565**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 48
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
TUXFORD STREET						
EB LEFT	30	10%	**0**	30	5	35
EB THRU	570	10%	**0**	570	50	620
EB RIGHT	145	5%	**0**	145	15	160
WB LEFT	80	5%	**0**	80	5	85
WB THRU	430	10%	**0**	430	40	470
WB RIGHT	130	35%	**50**	180	15	195
SAN FERNANDO ROAD						
NB LEFT	330	5%	**0**	330	30	360
NB THRU	580	5%	**0**	580	50	630
NB RIGHT	65	10%	**0**	65	5	70
SB LEFT	90	39%	**50**	140	15	155
SB THRU	275	5%	**0**	275	25	300
SB RIGHT	40	5%	**0**	40	5	45
TOTALS	**2765**		**100**	**2865**	**260**	**3125**

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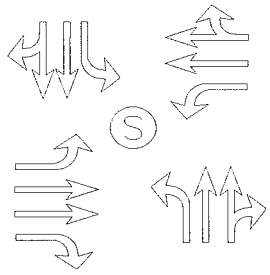
E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
48
ROUTE
8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	60	4	12	70	**0**	70	5	75
EB THRU	448	67	201	650	**0**	650	60	710
EB RIGHT	102	8	24	125	**0**	125	10	135
WB LEFT	108	5	15	125	**0**	125	10	135
WB THRU	518	131	393	910	**0**	910	80	990
WB RIGHT	96	8	24	120	**150**	270	25	295
SAN FERNANDO ROAD								
NB LEFT	221	31	93	315	**0**	315	30	345
NB THRU	147	65	195	340	**0**	340	30	370
NB RIGHT	57	2	6	65	**0**	65	5	70
SB LEFT	100	24	72	170	**150**	320	30	350
SB THRU	263	60	180	445	**0**	445	40	485
SB RIGHT	66	6	18	85	**0**	85	5	90
TOTALS	**2186**				**300**	**3720**	**330**	**4050**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 48
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	67	13	39	105	**0**	105	10	115
EB THRU	316	64	192	510	**0**	510	45	555
EB RIGHT	177	9	27	205	**0**	205	20	225
WB LEFT	166	11	33	200	**0**	200	20	220
WB THRU	206	151	453	660	**0**	660	60	720
WB RIGHT	97	5	15	110	**150**	260	25	285
SAN FERNANDO ROAD								
NB LEFT	302	13	39	340	**0**	340	30	370
NB THRU	126	60	180	305	**0**	305	25	330
NB RIGHT	123	12	36	160	**0**	160	15	175
SB LEFT	53	9	27	80	**150**	230	20	250
SB THRU	147	71	213	360	**0**	360	30	390
SB RIGHT	62	8	24	85	**0**	85	5	90
TOTALS	**1842**				**300**	**3420**	**305**	**3725**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : TUXFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 48
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
TUXFORD STREET								
EB LEFT	27	3	9	35	**0**	35	5	40
EB THRU	511	57	171	680	**0**	680	60	740
EB RIGHT	134	9	27	160	**0**	160	15	175
WB LEFT	75	5	15	90	**0**	90	10	100
WB THRU	388	44	132	520	**0**	520	45	565
WB RIGHT	116	16	48	165	**150**	315	30	345
SAN FERNANDO ROAD								
NB LEFT	322	9	27	350	**0**	350	30	380
NB THRU	540	38	114	655	**0**	655	60	715
NB RIGHT	61	5	15	75	**0**	75	5	80
SB LEFT	66	23	69	135	**150**	285	25	310
SB THRU	254	20	60	315	**0**	315	30	345
SB RIGHT	36	2	6	40	**0**	40	5	45
TOTALS	**2530**				**300**	**3520**	**320**	**3840**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 519

	Rt	Thru	Lt
Total	72	323	124
1st	19	78	29
2nd	22	65	27
3rd	25	62	31
4th	6	118	37

EAST LEG

EAST LEG TOTAL: 866

	1st	2nd	3rd	4th	Total
Rt	27	34	19	24	104
Thru	159	173	187	130	649
Lt	22	26	18	47	113

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	64	14	17	23	10
Thru	515	126	152	146	91
Rt	110	27	30	18	35

WEST LEG TOTAL: 689

SOUTH LEG

	Lt	Thru	Rt
1st	49	55	24
2nd	55	45	22
3rd	38	55	4
4th	110	57	9
Total	252	212	59

TOTAL: 523

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.74
EAST LEG = 0.93
WEST LEG = 0.87

ALL LEGS = 0.96

HOUR TOTAL: 2,597

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
82	274	109	Total
16	69	22	1st
19	78	29	2nd
22	65	27	3rd
25	62	31	4th

	1st	2nd	3rd	4th	Total
Rt	19	27	34	19	99
Thru	133	159	173	187	652
Lt	18	22	26	18	84

Total	1st	2nd	3rd	4th	
69	15	14	17	23	Lt
538	114	126	152	146	Thru
97	22	27	30	18	Rt

	Lt	Thru	Rt
1st	43	39	18
2nd	49	55	24
3rd	55	45	22
4th	38	55	4
Total	185	194	68

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	73	353	106
1st	6	118	37
2nd	21	79	22
3rd	27	88	26
4th	19	68	21

	1st	2nd	3rd	4th	Total
Rt	24	14	7	19	64
Thru	130	127	139	135	531
Lt	47	21	24	25	117

	Total	1st	2nd	3rd	4th
Lt	67	10	23	9	25
Thru	420	91	115	113	101
Rt	126	35	31	35	25

	Lt	Thru	Rt
1st	110	57	9
2nd	42	41	29
3rd	81	44	24
4th	33	47	12
Total	266	189	74

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : TUXFORD 05-31-12

BEGINNING TIME : 07:00AM PH=7:45 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
13	58	13	3	2	0	0	4	4	0	5	5	107
19	64	24	0	5	0	0	3	2	0	6	3	126
18	50	20	2	3	0	0	5	1	2	7	6	114
24	50	26	1	4	0	0	3	2	0	5	3	118
5	99	30	1	5	0	0	7	3	0	7	4	161
20	63	19	1	4	0	0	7	1	0	5	2	122
26	74	20	1	4	0	0	5	2	0	5	4	141
18	53	17	1	5	0	0	4	1	0	6	3	108
143	511	169	10	32	0	0	38	16	2	46	30	997
						SOUTH LEG						
17	35	33	0	2	0	0	2	5	1	0	5	100
24	37	43	0	6	0	0	5	3	0	7	3	128
21	35	46	0	6	0	0	2	4	1	2	5	122
4	35	29	0	7	0	0	7	2	0	6	7	97
8	40	103	0	6	0	0	4	2	1	7	5	176
29	27	38	0	5	0	0	4	1	0	5	3	112
24	32	76	0	4	0	0	3	1	0	5	4	149
12	36	29	0	3	0	0	2	1	0	6	3	92
139	277	397	0	39	0	0	29	19	3	38	35	976
						EAST LEG						
17	100	12	0	8	0	2	12	3	0	13	3	170
26	131	22	0	3	0	0	13	0	1	12	0	208
28	140	26	4	2	0	2	16	0	0	15	0	233
18	151	15	1	4	0	0	19	1	0	13	2	224
24	96	45	0	4	0	0	17	1	0	13	1	201
14	106	19	0	4	0	0	8	0	0	9	2	162
6	121	24	0	4	0	0	6	0	1	8	0	170
17	118	24	1	3	0	1	5	0	0	9	1	179
150	963	187	6	32	0	5	96	5	2	92	9	1547
						WEST LEG						
21	95	15	0	5	0	0	7	0	1	7	0	151
24	106	12	0	4	1	1	8	1	2	8	0	167
30	145	16	0	2	0	0	2	1	0	3	0	199
17	124	23	0	5	0	0	7	0	1	10	0	187
31	73	9	0	3	1	1	8	0	3	7	0	136
30	101	21	0	5	1	0	4	1	1	5	0	169
35	99	9	0	3	0	0	6	0	0	5	0	157
25	91	25	0	2	0	0	5	0	0	3	0	151
213	834	130	0	29	3	2	47	3	8	48	0	1317

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 01:00PM

NORTH LEG

TOTAL: 350

Rt	Thru	Lt	
70	218	62	Total
17	74	11	1st
25	45	23	2nd
14	48	13	3rd
14	51	15	4th

EAST LEG

EAST LEG TOTAL: 636

	1st	2nd	3rd	4th	Total
Rt	22	32	20	28	102
Thru	84	92	75	106	357
Lt	45	37	39	56	177

WEST LEG

Total	1st	2nd	3rd	4th	
80	20	30	14	16	Lt
380	96	98	79	107	Thru
186	44	37	47	58	Rt

WEST LEG TOTAL: 646

SOUTH LEG

	Lt	Thru	Rt
1st	79	42	22
2nd	84	32	37
3rd	70	57	35
4th	82	55	41
Total	315	186	135

TOTAL: 636

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.89
EAST LEG = 0.84
WEST LEG = 0.89

ALL LEGS = 0.90

HOUR TOTAL: 2,268

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	73	190	91
1st	27	56	13
2nd	11	34	24
3rd	10	55	26
4th	25	45	28

	1st	2nd	3rd	4th	Total
Rt	26	21	22	18	87
Thru	83	87	68	91	329
Lt	27	21	24	18	90

	Total	1st	2nd	3rd	4th
Lt	70	22	25	7	16
Thru	357	89	72	88	108
Rt	104	32	31	19	22

	Lt	Thru	Rt
1st	76	58	12
2nd	97	33	25
3rd	77	73	21
4th	78	44	25
Total	328	208	83

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	70	218	62
1st	17	74	11
2nd	25	45	23
3rd	14	48	13
4th	14	51	15

	1st	2nd	3rd	4th	Total
Rt	22	32	20	28	102
Thru	84	92	75	106	357
Lt	45	37	39	56	177

	Total	1st	2nd	3rd	4th
Lt	80	20	30	14	16
Thru	380	96	98	79	107
Rt	186	44	37	47	58

	Lt	Thru	Rt
1st	79	42	22
2nd	84	32	37
3rd	70	57	35
4th	82	55	41
Total	315	186	135

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : TUXFORD 05-31-12

BEGINNING TIME : 12:00PM PM = 1:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
9	41	6	5	5	2	5	6	3	8	4	2	96
0	17	22	0	6	0	7	6	1	4	5	1	69
1	37	24	1	5	1	4	6	1	4	7	0	91
21	28	27	0	7	0	2	6	1	2	4	0	98
13	55	10	2	7	1	1	7	0	1	5	0	102
23	27	21	1	10	1	0	4	0	1	4	1	93
13	33	10	0	4	1	1	6	1	0	5	1	75
13	32	12	0	6	1	0	7	1	1	6	1	80
93	270	132	9	50	7	20	48	8	21	40	6	704
						SOUTH LEG						
4	42	69	5	8	0	0	4	2	3	4	5	146
19	22	91	5	4	0	0	4	1	1	3	5	155
20	55	74	0	7	0	1	4	0	0	7	3	171
25	25	76	0	4	0	0	7	1	0	8	1	147
19	28	77	3	3	0	0	5	1	0	6	1	143
33	16	82	2	4	1	1	7	0	1	5	1	153
32	42	66	1	5	1	1	4	1	1	6	2	162
39	40	77	1	3	1	1	6	1	0	6	3	178
191	270	612	17	38	3	4	41	7	6	45	21	1255
						EAST LEG						
23	44	20	1	3	3	1	19	2	1	17	2	136
21	53	13	0	4	2	0	17	1	0	13	5	129
22	33	20	0	5	1	0	13	0	0	17	3	114
16	56	16	2	3	1	0	15	0	0	17	1	127
21	50	43	1	5	0	0	16	0	0	13	2	151
32	49	36	0	6	1	0	19	0	0	18	0	161
20	40	37	0	7	1	0	12	0	0	16	1	134
24	67	50	2	7	1	0	16	0	2	16	5	190
179	392	235	6	40	10	1	127	3	3	127	19	1142
						WEST LEG						
30	68	18	1	3	1	0	10	2	1	8	1	143
30	48	19	0	4	2	0	11	3	1	9	1	128
16	65	2	1	5	1	0	8	2	2	10	2	114
19	88	13	3	3	1	0	6	0	0	11	2	146
41	77	18	0	5	1	0	7	0	3	7	1	160
34	83	27	2	4	1	0	3	1	1	8	1	165
46	65	9	1	6	3	0	2	1	0	6	1	140
56	91	13	0	0	0	0	11	1	2	5	2	181
272	585	119	8	30	10	0	58	10	10	64	11	1177

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: TUXFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 401

Rt	Thru	Lt	
38	274	89	Total
12	55	21	1st
6	98	20	2nd
13	78	27	3rd
7	43	21	4th

EAST LEG TOTAL: 644

	1st	2nd	3rd	4th	Total
Rt	38	23	42	29	132
Thru	111	114	111	96	432
Lt	12	19	24	25	80

WEST LEG TOTAL: 741

Total	1st	2nd	3rd	4th	
30	4	7	11	8	Lt
568	133	131	161	143	Thru
143	31	36	29	47	Rt

SOUTH LEG

TOTAL: 975

	Lt	Thru	Rt
1st	74	151	20
2nd	84	142	12
3rd	83	129	18
4th	90	156	16
Total	331	578	66

PEAK HOUR FACTORS

NORTH LEG = 0.81
SOUTH LEG = 0.93
EAST LEG = 0.91
WEST LEG = 0.92

ALL LEGS = 0.95

HOUR TOTAL: 2,761

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	34	276	89
1st	6	65	19
2nd	10	58	29
3rd	12	55	21
4th	6	98	20

	1st	2nd	3rd	4th	Total
Rt	24	23	38	23	108
Thru	83	79	111	114	387
Lt	20	21	12	19	72

	Total	1st	2nd	3rd	4th
Lt	44	17	16	4	7
Thru	478	83	131	133	131
Rt	125	24	34	31	36

	Lt	Thru	Rt
1st	74	95	9
2nd	70	112	12
3rd	74	151	20
4th	84	142	12
Total	302	500	53

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: TUXFORD

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
40	213	91	Total
13	78	27	1st
7	43	21	2nd
5	48	23	3rd
15	44	20	4th

	1st	2nd	3rd	4th	Total
Rt	42	29	26	19	116
Thru	111	96	95	71	373
Lt	24	25	23	22	94

Total	1st	2nd	3rd	4th	
33	11	8	7	7	Lt
597	161	143	149	144	Thru
155	29	47	45	34	Rt

	Lt	Thru	Rt
1st	83	129	18
2nd	90	156	16
3rd	72	100	5
4th	80	130	15
Total	325	515	54

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : TUXFORD 05-31-12

BEGINNING TIME : 04:00PM PM = 4:30 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
5	59	6	1	3	3	0	1	8	0	2	2	90
9	53	16	1	0	4	0	1	7	0	4	2	97
11	51	9	1	3	4	0	1	8	0	0	0	88
5	92	15	0	3	3	0	0	1	1	3	1	124
13	71	24	0	6	1	0	0	1	0	1	1	118
7	40	18	0	1	0	0	1	1	0	1	2	71
5	43	18	0	5	2	0	0	2	0	0	1	76
14	41	18	1	3	0	0	0	1	0	0	1	79
69	450	124	4	24	17	0	4	29	1	11	10	743
						SOUTH LEG						
8	88	71	0	2	1	0	1	2	1	4	0	178
11	102	61	1	4	3	0	5	2	0	1	4	194
20	146	72	0	2	1	0	1	0	0	2	1	245
11	132	82	0	7	2	0	1	0	1	2	0	238
16	118	78	2	8	3	0	0	0	0	3	2	230
14	144	90	0	9	0	1	2	0	1	1	0	262
2	93	68	2	4	2	1	2	1	0	1	1	177
13	125	74	0	4	0	2	0	1	0	1	5	225
95	948	596	5	40	12	4	12	6	3	15	13	1749
						EAST LEG						
20	62	16	2	5	1	1	5	1	1	11	2	127
20	61	21	1	4	0	1	6	0	1	8	0	123
33	101	11	4	7	1	1	0	0	0	3	0	161
20	100	16	2	7	2	0	1	1	1	6	0	156
38	100	23	0	4	1	1	3	0	3	4	0	177
25	87	25	3	6	0	0	1	0	1	2	0	150
21	84	23	1	4	0	1	3	0	3	4	0	144
16	59	21	0	5	1	1	3	0	2	4	0	112
193	654	156	13	42	6	6	22	2	12	42	2	1150
						WEST LEG						
22	69	16	1	2	0	1	5	1	0	7	0	124
28	111	14	4	8	0	1	7	1	1	5	1	181
29	117	3	1	7	0	1	4	1	0	5	0	168
33	121	7	1	4	0	0	3	0	2	3	0	174
27	144	10	1	6	0	0	7	1	1	4	0	201
45	129	7	0	7	1	0	3	0	2	4	0	198
44	138	7	0	4	0	1	3	0	0	4	0	201
33	130	7	0	6	0	0	5	0	1	3	0	185
261	959	71	8	44	1	4	37	4	7	35	1	1432

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	515	110	115	650	105	250	210	60	125	325	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3139	1538	1719	2980		1641	2804		1504	2972	
Flt Permitted	0.35	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	641	3139	1538	1719	2980		1641	2804		1504	2972	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	68	536	115	120	677	109	260	219	62	130	339	73
RTOR Reduction (vph)	0	0	69	0	20	0	0	38	0	0	27	0
Lane Group Flow (vph)	68	536	46	120	766	0	260	243	0	130	385	0
Heavy Vehicles (%)	5%	15%	5%	5%	20%	10%	10%	30%	5%	20%	20%	10%
Turn Type	Perm	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases		4	5	3	8		5	2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)	14.8	14.8	25.8	5.0	23.8		11.0	22.6		6.3	17.9	
Effective Green, g (s)	14.8	14.8	25.8	5.0	23.8		11.0	22.6		6.3	17.9	
Actuated g/C Ratio	0.23	0.23	0.40	0.08	0.37		0.17	0.35		0.10	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	147	718	708	133	1096		279	979		146	822	
v/s Ratio Prot		0.17	0.01	0.07	c0.26		c0.16	0.09		0.09	c0.13	
v/s Ratio Perm	0.11		0.02									
v/c Ratio	0.46	0.75	0.06	0.90	0.70		0.93	0.25		0.89	0.47	
Uniform Delay, d1	21.5	23.2	12.0	29.6	17.4		26.5	15.0		28.9	19.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	4.2	0.0	49.4	2.0		36.0	0.6		43.7	1.9	
Delay (s)	23.8	27.4	12.0	79.0	19.4		62.5	15.6		72.6	21.4	
Level of Service	C	C	B	E	B		E	B		E	C	
Approach Delay (s)		24.6			27.3			38.1			33.6	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	64.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	380	185	175	355	100	315	185	135	60	220	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3139	1538	1719	2639		1719	2782		1570	2698	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3139	1538	1719	2639		1719	2782		1570	2698	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	89	422	206	194	394	111	350	206	150	67	244	78
RTOR Reduction (vph)	0	0	119	0	34	0	0	90	0	0	40	0
Lane Group Flow (vph)	89	422	87	194	471	0	350	266	0	67	282	0
Heavy Vehicles (%)	15%	15%	5%	5%	40%	5%	5%	30%	10%	15%	35%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	5.5	15.1	31.7	9.9	19.5		16.6	30.2		4.1	17.7	
Effective Green, g (s)	5.5	15.1	31.7	9.9	19.5		16.6	30.2		4.1	17.7	
Actuated g/C Ratio	0.07	0.20	0.42	0.13	0.26		0.22	0.40		0.05	0.24	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	115	629	729	226	683		379	1116		85	634	
v/s Ratio Prot	0.06	0.13	0.03	c0.11	c0.18		c0.20	0.10		0.04	c0.10	
v/s Ratio Perm			0.03									
v/c Ratio	0.77	0.67	0.12	0.86	0.69		0.92	0.24		0.79	0.45	
Uniform Delay, d1	34.3	27.8	13.3	32.0	25.2		28.7	14.9		35.2	24.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.0	2.8	0.1	26.0	2.9		27.7	0.5		37.0	2.3	
Delay (s)	61.3	30.6	13.4	58.1	28.1		56.4	15.4		72.2	26.9	
Level of Service	E	C	B	E	C		E	B		E	C	
Approach Delay (s)		29.5			36.4			35.8			34.7	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	75.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	570	145	80	430	130	330	580	65	90	275	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3282	1538	1719	3168		1719	3370		1444	3373	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3282	1538	1719	3168		1719	3370		1444	3373	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	600	153	84	453	137	347	611	68	95	289	42
RTOR Reduction (vph)	0	0	84	0	42	0	0	12	0	0	17	0
Lane Group Flow (vph)	32	600	69	84	548	0	347	667	0	95	314	0
Heavy Vehicles (%)	10%	10%	5%	5%	10%	10%	5%	5%	10%	25%	5%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	1.5	16.4	29.5	3.1	18.0		13.1	23.0		7.2	17.1	
Effective Green, g (s)	1.5	16.4	29.5	3.1	18.0		13.1	23.0		7.2	17.1	
Actuated g/C Ratio	0.02	0.25	0.45	0.05	0.27		0.20	0.35		0.11	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	37	819	784	81	868		343	1180		158	878	
v/s Ratio Prot	0.02	c0.18	0.02	c0.05	0.17		c0.20	c0.20		0.07	0.09	
v/s Ratio Perm			0.03									
v/c Ratio	0.86	0.73	0.09	1.04	0.63		1.01	0.57		0.60	0.36	
Uniform Delay, d1	32.0	22.6	10.4	31.3	20.9		26.3	17.3		27.9	19.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	94.6	3.4	0.0	110.5	1.5		51.6	2.0		6.3	1.1	
Delay (s)	126.6	26.0	10.4	141.8	22.4		77.9	19.3		34.2	21.0	
Level of Service	F	C	B	F	C		E	B		C	C	
Approach Delay (s)		27.1			37.3			39.1			23.9	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	33.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	65.7	Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	515	110	115	650	155	250	210	60	175	325	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3139	1538	1719	2835		1641	2804		1262	2972	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3139	1538	1719	2835		1641	2804		1262	2972	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	68	536	115	120	677	161	260	219	62	182	339	73
RTOR Reduction (vph)	0	0	66	0	29	0	0	37	0	0	26	0
Lane Group Flow (vph)	68	536	49	120	809	0	260	244	0	182	386	0
Heavy Vehicles (%)	5%	15%	5%	5%	20%	39%	10%	30%	5%	43%	20%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	3.1	17.7	29.7	5.5	20.1		12.0	19.0		11.0	18.0	
Effective Green, g (s)	3.1	17.7	29.7	5.5	20.1		12.0	19.0		11.0	18.0	
Actuated g/C Ratio	0.04	0.26	0.43	0.08	0.29		0.17	0.27		0.16	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	77	803	749	137	823		285	770		201	773	
v/s Ratio Prot	0.04	0.17	0.01	c0.07	c0.29		c0.16	0.09		0.14	c0.13	
v/s Ratio Perm			0.02									
v/c Ratio	0.88	0.67	0.07	0.88	0.98		0.91	0.32		0.91	0.50	
Uniform Delay, d1	32.9	23.1	11.6	31.5	24.4		28.1	19.9		28.6	21.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	64.2	2.1	0.0	41.9	27.0		31.3	1.1		38.0	2.3	
Delay (s)	97.1	25.2	11.6	73.5	51.4		59.4	21.0		66.6	24.1	
Level of Service	F	C	B	E	D		E	C		E	C	
Approach Delay (s)		29.8			54.1			39.5			37.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	41.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	69.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	80	380	185	175	355	150	315	185	135	110	220	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3139	1538	1719	2479		1719	2782		1172	2698	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3139	1538	1719	2479		1719	2782		1172	2698	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	89	422	206	194	394	167	350	206	150	122	244	78
RTOR Reduction (vph)	0	0	117	0	61	0	0	105	0	0	40	0
Lane Group Flow (vph)	89	422	89	194	500	0	350	251	0	122	282	0
Heavy Vehicles (%)	15%	15%	5%	5%	40%	37%	5%	30%	10%	54%	35%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	5.5	15.7	32.3	9.9	20.1		16.6	22.5		10.9	16.8	
Effective Green, g (s)	5.5	15.7	32.3	9.9	20.1		16.6	22.5		10.9	16.8	
Actuated g/C Ratio	0.07	0.21	0.43	0.13	0.27		0.22	0.30		0.15	0.22	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	115	657	744	227	664		380	835		170	604	
v/s Ratio Prot	0.06	0.13	0.03	c0.11	c0.20		c0.20	0.09		0.10	c0.10	
v/s Ratio Perm			0.03									
v/c Ratio	0.77	0.64	0.12	0.85	0.75		0.92	0.30		0.72	0.47	
Uniform Delay, d1	34.1	27.1	12.8	31.8	25.2		28.6	20.2		30.6	25.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.0	2.2	0.1	25.5	4.8		27.3	0.9		13.5	2.6	
Delay (s)	61.2	29.2	12.9	57.3	30.0		55.8	21.1		44.1	27.8	
Level of Service	E	C	B	E	C		E	C		D	C	
Approach Delay (s)		28.5			37.0			38.3			32.3	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	34.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.72		
Actuated Cycle Length (s)	75.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	59.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	570	145	80	430	180	330	580	65	140	275	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3282	1538	1719	2940		1719	3370		1299	3373	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3282	1538	1719	2940		1719	3370		1299	3373	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	600	153	84	453	189	347	611	68	147	289	42
RTOR Reduction (vph)	0	0	84	0	67	0	0	12	0	0	17	0
Lane Group Flow (vph)	32	600	69	84	575	0	347	667	0	147	314	0
Heavy Vehicles (%)	10%	10%	5%	5%	10%	35%	5%	5%	10%	39%	5%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	1.5	16.5	29.6	3.1	18.1		13.1	21.8		8.4	17.1	
Effective Green, g (s)	1.5	16.5	29.6	3.1	18.1		13.1	21.8		8.4	17.1	
Actuated g/C Ratio	0.02	0.25	0.45	0.05	0.28		0.20	0.33		0.13	0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	37	823	785	81	809		342	1117		166	877	
v/s Ratio Prot	0.02	0.18	0.02	c0.05	c0.20		c0.20	c0.20		0.11	0.09	
v/s Ratio Perm			0.03									
v/c Ratio	0.86	0.73	0.09	1.04	0.71		1.01	0.60		0.89	0.36	
Uniform Delay, d1	32.0	22.6	10.4	31.3	21.5		26.3	18.3		28.2	19.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	94.6	3.3	0.0	110.5	3.0		52.4	2.4		38.7	1.1	
Delay (s)	126.6	25.9	10.4	141.9	24.4		78.8	20.7		66.9	21.0	
Level of Service	F	C	B	F	C		E	C		E	C	
Approach Delay (s)		27.0			38.0			40.3			35.1	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	35.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.71		
Actuated Cycle Length (s)	65.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	61.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	70	560	120	125	710	170	275	230	65	190	355	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3139	1538	1719	2835		1641	2804		1262	2973	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3139	1538	1719	2835		1641	2804		1262	2973	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	73	583	125	130	740	177	286	240	68	198	370	78
RTOR Reduction (vph)	0	0	67	0	26	0	0	32	0	0	22	0
Lane Group Flow (vph)	73	583	58	130	891	0	286	276	0	198	426	0
Heavy Vehicles (%)	5%	15%	5%	5%	20%	39%	10%	30%	5%	43%	20%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	4.0	21.3	36.9	8.7	26.0		15.6	18.6		15.0	18.0	
Effective Green, g (s)	4.0	21.3	36.9	8.7	26.0		15.6	18.6		15.0	18.0	
Actuated g/C Ratio	0.05	0.27	0.46	0.11	0.33		0.20	0.23		0.19	0.23	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	86	840	790	188	926		322	655		238	672	
v/s Ratio Prot	0.04	0.19	0.01	c0.08	c0.31		c0.17	0.10		0.16	c0.14	
v/s Ratio Perm			0.02									
v/c Ratio	0.85	0.69	0.07	0.69	0.96		0.89	0.42		0.83	0.63	
Uniform Delay, d1	37.5	26.2	11.9	34.2	26.3		31.2	25.9		31.1	27.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	50.3	2.5	0.0	10.5	20.8		24.2	2.0		21.3	4.5	
Delay (s)	87.8	28.7	11.9	44.6	47.1		55.4	27.9		52.4	32.3	
Level of Service	F	C	B	D	D		E	C		D	C	
Approach Delay (s)		31.5			46.8			41.1			38.5	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	79.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	69.7%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	415	200	190	385	165	345	200	145	120	240	75
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.94		1.00	0.96	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3139	1538	1719	2479		1719	2782		1172	2697	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3139	1538	1719	2479		1719	2782		1172	2697	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	94	461	222	211	428	183	383	222	161	133	267	83
RTOR Reduction (vph)	0	0	106	0	59	0	0	114	0	0	38	0
Lane Group Flow (vph)	94	461	116	211	552	0	383	269	0	133	312	0
Heavy Vehicles (%)	15%	15%	5%	5%	40%	37%	5%	30%	10%	54%	35%	10%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	6.1	14.9	33.9	11.1	19.9		19.0	22.0		11.4	14.4	
Effective Green, g (s)	6.1	14.9	33.9	11.1	19.9		19.0	22.0		11.4	14.4	
Actuated g/C Ratio	0.08	0.20	0.45	0.15	0.26		0.25	0.29		0.15	0.19	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	127	620	773	253	654		433	812		177	515	
v/s Ratio Prot	0.06	0.15	0.04	c0.12	c0.22		c0.22	0.10		0.11	c0.12	
v/s Ratio Perm			0.04									
v/c Ratio	0.74	0.74	0.15	0.83	0.84		0.88	0.33		0.75	0.61	
Uniform Delay, d1	33.9	28.5	12.2	31.3	26.3		27.1	20.9		30.6	27.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.5	4.8	0.1	20.4	9.7		18.9	1.1		16.4	2.0	
Delay (s)	54.4	33.3	12.3	51.7	36.0		46.0	22.0		47.0	29.9	
Level of Service	D	C	B	D	D		D	C		D	C	
Approach Delay (s)		29.8			40.0			34.0			34.6	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	34.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	63.5%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
48: San Fernando Rd & Tuxford St

9/3/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	620	160	85	470	195	360	630	70	155	300	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	3282	1538	1719	2942		1719	3370		1299	3371	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	3282	1538	1719	2942		1719	3370		1299	3371	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	653	168	89	495	205	379	663	74	163	316	47
RTOR Reduction (vph)	0	0	86	0	60	0	0	12	0	0	17	0
Lane Group Flow (vph)	37	653	82	89	640	0	379	725	0	163	346	0
Heavy Vehicles (%)	10%	10%	5%	5%	10%	35%	5%	5%	10%	39%	5%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	7	4	5	3	8		5	2		1	6	
Permitted Phases			4									
Actuated Green, G (s)	1.6	18.2	35.0	4.0	20.6		16.8	22.5		11.3	17.0	
Effective Green, g (s)	1.6	18.2	35.0	4.0	20.6		16.8	22.5		11.3	17.0	
Actuated g/C Ratio	0.02	0.25	0.49	0.06	0.29		0.23	0.31		0.16	0.24	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	36	830	833	96	842		401	1053		204	796	
v/s Ratio Prot	0.02	0.20	0.02	c0.05	c0.22		c0.22	c0.22		0.13	0.10	
v/s Ratio Perm			0.03									
v/c Ratio	1.03	0.79	0.10	0.93	0.76		0.95	0.69		0.80	0.43	
Uniform Delay, d1	35.2	25.1	10.0	33.9	23.4		27.1	21.7		29.3	23.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	158.4	5.0	0.1	67.8	4.1		31.0	3.7		19.3	1.7	
Delay (s)	193.6	30.1	10.0	101.7	27.5		58.1	25.4		48.5	25.1	
Level of Service	F	C	B	F	C		E	C		D	C	
Approach Delay (s)		33.2			35.9			36.5			32.4	
Approach LOS		C			D			D			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	72.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	65.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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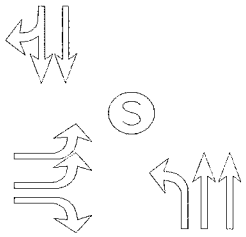
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
LANKERSHIM BLVD						
EB LEFT	225	15%		225	20	245
EB THRU	0	0%		0	0	0
EB RIGHT	35	20%		35	5	40
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
SAN FERNANDO ROAD						
NB LEFT	50	15%		50	5	55
NB THRU	260	29%	**50**	310	30	340
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	445	24%	**50**	495	45	540
SB RIGHT	470	15%		470	40	510
TOTALS	**1485**		**100**	**1585**	**145**	**1730**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
LANKERSHIM BLVD						
EB LEFT	275	10%		275	25	300
EB THRU	0	0%		0	0	0
EB RIGHT	60	25%		60	5	65
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
SAN FERNANDO ROAD						
NB LEFT	55	25%		55	5	60
NB THRU	285	28%	**50**	335	30	365
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	305	27%	**50**	355	30	385
SB RIGHT	280	10%		280	25	305
TOTALS	**1260**		**100**	**1360**	**120**	**1480**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
LANKERSHIM BLVD						
EB LEFT	550	5%		550	50	600
EB THRU	0	0%		0	0	0
EB RIGHT	55	15%		55	5	60
WB LEFT	0	0%		0	0	0
WB THRU	0	0%		0	0	0
WB RIGHT	0	0%		0	0	0
SAN FERNANDO ROAD						
NB LEFT	80	15%		80	5	85
NB THRU	620	12%	**50**	670	60	730
NB RIGHT	0	0%		0	0	0
SB LEFT	0	0%		0	0	0
SB THRU	310	23%	**50**	360	30	390
SB RIGHT	360	5%		360	30	390
TOTALS	**1975**		**100**	**2075**	**180**	**2255**

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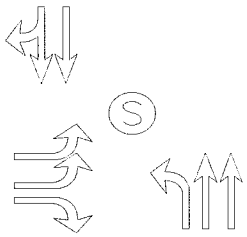
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
LANKERSHIM BLVD								
EB LEFT	189	36	108	295	**0**	295	25	320
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	27	6	18	45	**0**	45	5	50
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
SAN FERNANDO ROAD								
NB LEFT	43	7	21	65	**0**	65	5	70
NB THRU	226	35	105	330	**150**	480	45	525
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	379	66	198	575	**150**	725	65	790
SB RIGHT	395	76	228	625	**0**	625	55	680
TOTALS	**1259**				**300**	**2235**	**200**	**2435**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
LANKERSHIM BLVD								
EB LEFT	241	32	96	335	**0**	335	30	365
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	47	14	42	90	**0**	90	10	100
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
SAN FERNANDO ROAD								
NB LEFT	42	13	39	80	**0**	80	5	85
NB THRU	246	39	117	365	**150**	515	45	560
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	258	45	135	395	**150**	545	50	595
SB RIGHT	255	25	75	330	**0**	330	30	360
TOTALS	**1089**				**300**	**1895**	**170**	**2065**

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TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : LANKERSHIM BLVD
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 49
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
LANKERSHIM BLVD								
EB LEFT	511	38	114	625	**0**	625	55	680
EB THRU	0	0	0	0	**0**	0	0	0
EB RIGHT	48	8	24	70	**0**	70	5	75
WB LEFT	0	0	0	0	**0**	0	0	0
WB THRU	0	0	0	0	**0**	0	0	0
WB RIGHT	0	0	0	0	**0**	0	0	0
SAN FERNANDO ROAD								
NB LEFT	65	13	39	105	**0**	105	10	115
NB THRU	573	45	135	710	**150**	860	75	935
NB RIGHT	0	0	0	0	**0**	0	0	0
SB LEFT	0	0	0	0	**0**	0	0	0
SB THRU	281	28	84	365	**150**	515	45	560
SB RIGHT	338	20	60	400	**0**	400	35	435
TOTALS	**1816**				**300**	**2575**	**225**	**2800**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: LANKERSHIM
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:30AM

NORTH LEG

TOTAL: 916

	Rt	Thru	Lt
Total	471	445	
1st	126	83	
2nd	125	108	
3rd	121	147	
4th	99	107	

EAST LEG

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	225	47	81	55	42
Thru					
Rt	33	10	8	5	10

WEST LEG TOTAL: 258

SOUTH LEG

	Lt	Thru	Rt
1st	12	78	
2nd	12	64	
3rd	19	57	
4th	7	62	
Total	50	261	

TOTAL: 311

PEAK HOUR FACTORS

NORTH LEG = 0.85
SOUTH LEG = 0.86
EAST LEG =
WEST LEG = 0.72

ALL LEGS = 0.92

HOUR TOTAL: 1,485

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	465	338	
1st	101	69	
2nd	113	78	
3rd	126	83	
4th	125	108	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	200	33	39	47	81
Thru					
Rt	38	9	11	10	8

	Lt	Thru	Rt
1st	8	43	
2nd	10	54	
3rd	12	78	
4th	12	64	
Total	42	239	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
368	469		Total
121	147		1st
99	107		2nd
84	121		3rd
64	94		4th

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

Total	1st	2nd	3rd	4th	
209	55	42	59	53	Lt
					Thru
31	5	10	6	10	Rt

	Lt	Thru	Rt
1st	19	57	
2nd	7	62	
3rd	7	57	
4th	11	65	
Total	44	241	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : LANKERSHIM 05-31-12

BEGINNING TIME : 07:00AM PH = 7:30 AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
93	56	0	5	5	0	2	3	0	1	5	0	170
102	69	0	7	4	0	3	2	0	1	3	0	191
105	64	0	18	15	0	2	4	0	1	0	0	209
105	89	0	15	10	0	4	7	0	1	2	0	233
102	129	0	13	7	0	6	9	0	0	2	0	268
83	97	0	10	5	0	4	4	0	2	1	0	206
74	111	0	8	6	0	2	4	0	0	0	0	205
56	89	0	6	0	0	2	4	0	0	1	0	158
720	704	0	82	52	0	25	37	0	6	14	0	1640
						SOUTH LEG						
0	36	6	0	4	1	0	2	1	0	1	0	51
0	46	8	0	5	0	0	1	2	0	2	0	64
0	69	9	0	5	0	0	3	3	0	1	0	90
0	56	10	0	6	1	0	1	1	0	1	0	76
0	51	19	0	3	0	0	2	0	0	1	0	76
0	50	5	0	4	0	0	5	1	0	3	1	69
0	51	4	0	3	0	0	2	2	0	1	1	64
0	59	8	0	2	0	0	3	2	0	1	1	76
0	418	69	0	32	2	0	19	12	0	11	3	566
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
7	0	31	1	0	1	1	0	1	0	0	0	42
10	0	34	1	0	3	0	0	2	0	0	0	50
7	0	37	1	0	5	1	0	4	1	0	1	57
7	0	74	1	0	3	0	0	2	0	0	2	89
5	0	45	0	0	5	0	0	4	0	0	1	60
8	0	33	0	0	2	1	0	5	1	0	2	52
6	0	52	0	0	2	0	0	2	0	0	3	65
10	0	49	0	0	2	0	0	2	0	0	0	63
60	0	355	4	0	23	3	0	22	2	0	9	478

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: LANKERSHIM
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 583

	Rt	Thru	Lt
Total	280	303	
1st	85	73	
2nd	69	73	
3rd	60	87	
4th	66	70	

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 334

	Total	1st	2nd	3rd	4th
Lt	273	82	75	67	49
Thru					
Rt	61	21	17	15	8

SOUTH LEG

TOTAL: 340

	Lt	Thru	Rt
1st	19	79	
2nd	9	64	
3rd	13	67	
4th	14	75	
Total	55	285	

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.87
EAST LEG =
WEST LEG = 0.81

ALL LEGS = 0.88

HOUR TOTAL: 1,257

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	274	277	
1st	67	69	
2nd	53	62	
3rd	85	73	
4th	69	73	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	288	55	76	82	75
Thru					
Rt	66	16	12	21	17

	Lt	Thru	Rt
1st	16	83	
2nd	9	58	
3rd	19	79	
4th	9	64	
Total	53	284	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	256	277	
1st	60	87	
2nd	66	70	
3rd	64	63	
4th	66	57	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	263	67	49	69	78
Thru					
Rt	38	15	8	7	8

	Lt	Thru	Rt
1st	13	67	
2nd	14	75	
3rd	13	71	
4th	11	75	
Total	51	288	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : LANKERSHIM 05-31-12

BEGINNING TIME : 12:00PM PH = 12:30 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
59	56	0	3	10	0	3	3	0	2	0	0	136
47	53	0	3	3	0	3	3	0	0	3	0	115
80	63	0	3	6	0	1	3	0	1	1	0	158
59	61	0	9	8	0	1	0	0	0	4	0	142
57	77	0	2	5	0	1	4	0	0	1	0	147
59	57	0	6	10	0	1	2	0	0	1	0	136
52	47	0	8	9	0	2	5	0	2	2	0	127
52	47	0	9	7	0	3	3	0	2	0	0	123
465	461	0	43	58	0	15	23	0	7	12	0	1084
						SOUTH LEG						
0	72	13	0	4	0	0	3	3	0	4	0	99
0	45	7	0	9	0	0	0	2	0	4	0	67
0	67	14	0	8	2	0	3	1	0	1	2	98
0	49	5	0	10	3	0	3	1	0	2	0	73
0	62	13	0	3	0	0	1	0	0	1	0	80
0	68	10	0	4	1	0	2	2	0	1	1	89
0	64	9	0	3	3	0	4	1	0	0	0	84
0	64	8	0	6	1	0	3	2	0	2	0	86
0	491	79	0	47	10	0	19	12	0	15	3	676
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
16	0	50	0	0	4	0	0	0	0	0	1	71
11	0	67	0	0	7	1	0	1	0	0	1	88
15	0	72	1	0	10	2	0	0	3	0	0	103
13	0	66	1	0	7	2	0	1	1	0	1	92
14	0	64	1	0	2	0	0	1	0	0	0	82
5	0	39	2	0	9	0	0	1	1	0	0	57
7	0	59	0	0	8	0	0	1	0	0	1	76
4	0	66	1	0	6	1	0	6	2	0	0	86
85	0	483	6	0	53	6	0	11	7	0	4	655

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: LANKERSHIM
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:15PM

NORTH LEG

TOTAL: 667

	Rt	Thru	Lt
Total	358	309	
1st	77	69	
2nd	101	72	
3rd	92	85	
4th	88	83	

EAST LEG TOTAL: 0

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

WEST LEG TOTAL: 605

	Total	1st	2nd	3rd	4th
Lt	549	123	140	145	141
Thru					
Rt	56	18	13	15	10

SOUTH LEG

TOTAL: 696

	Lt	Thru	Rt
1st	16	150	
2nd	20	164	
3rd	19	152	
4th	23	152	
Total	78	618	

PEAK HOUR FACTORS

NORTH LEG = 0.94
SOUTH LEG = 0.95
EAST LEG =
WEST LEG = 0.95

ALL LEGS = 0.96

HOUR TOTAL: 1,968

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	367	305	
1st	97	79	
2nd	77	69	
3rd	101	72	
4th	92	85	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	538	130	123	140	145
Thru					
Rt	57	11	18	13	15

	Lt	Thru	Rt
1st	19	151	
2nd	16	150	
3rd	20	164	
4th	19	152	
Total	74	617	

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: LANKERSHIM

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	312	255	
1st	88	83	
2nd	69	57	
3rd	71	54	
4th	84	61	

	1st	2nd	3rd	4th	Total
Rt					
Thru					
Lt					

	Total	1st	2nd	3rd	4th
Lt	506	141	140	131	94
Thru					
Rt	43	10	9	7	17

	Lt	Thru	Rt
1st	23	152	
2nd	15	160	
3rd	15	133	
4th	15	124	
Total	68	569	

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : LANKERSHIM 05-31-12

BEGINNING TIME : 04:00PM PH = 4:15 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
92	69	0	2	5	0	3	2	0	0	3	0	176
71	60	0	2	2	0	1	4	0	3	3	0	146
96	67	0	2	2	0	3	2	0	0	1	0	173
88	77	0	4	6	0	0	0	0	0	2	0	177
83	77	0	1	4	0	3	1	0	1	1	0	171
63	48	0	2	5	0	3	4	0	1	0	0	126
69	50	0	0	2	0	1	2	0	1	0	0	125
75	57	0	2	3	0	2	1	0	5	0	0	145
637	505	0	15	29	0	16	16	0	11	10	0	1239
						SOUTH LEG						
0	143	17	0	6	1	0	1	1	0	1	0	170
0	137	12	0	5	2	0	4	2	0	4	0	166
0	156	17	0	4	1	0	2	2	0	2	0	184
0	141	17	0	7	1	0	2	1	0	2	0	171
0	139	19	0	5	2	0	5	1	0	3	1	175
0	143	11	0	13	2	0	3	2	0	1	0	175
0	126	13	0	2	0	0	3	2	0	2	0	148
0	118	12	0	4	1	0	2	2	0	0	0	139
0	1103	118	0	46	10	0	22	13	0	15	1	1328
						EAST LEG						
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
0	0	0	0	0	0	0	0	0	0	0	0	0
						WEST LEG						
9	0	122	0	0	4	1	0	4	1	0	0	141
14	0	115	3	0	3	1	0	4	0	0	1	141
12	0	128	1	0	6	0	0	4	0	0	2	153
13	0	136	1	0	4	1	0	3	0	0	2	160
9	0	132	0	0	4	1	0	3	0	0	2	151
7	0	129	2	0	5	0	0	4	0	0	2	149
6	0	122	0	0	3	1	0	4	0	0	2	138
15	0	85	2	0	5	0	0	4	0	0	0	111
85	0	969	9	0	34	5	0	30	1	0	11	1144

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
49: Lankershim Blvd & San Fernando

8/10/2012

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	225	35	445	470	50	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.92		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3045	1346	2897		1570	3139
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3045	1346	2897		0	3139
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	38	484	511	54	283
RTOR Reduction (vph)	0	17	228	0	0	0
Lane Group Flow (vph)	245	21	767	0	54	283
Heavy Vehicles (%)	15%	20%	15%	15%	15%	15%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	18.9	18.9	18.9		7.2	7.2
Effective Green, g (s)	18.9	18.9	18.9		7.2	7.2
Actuated g/C Ratio	0.55	0.55	0.55		0.21	0.21
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1688	746	1606		331	663
v/s Ratio Prot	0.08		c0.26		0.03	c0.09
v/s Ratio Perm		0.02				
v/c Ratio	0.15	0.03	0.48		0.16	0.43
Uniform Delay, d1	3.7	3.4	4.6		11.0	11.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	1.0		0.2	0.4
Delay (s)	3.9	3.5	5.6		11.2	12.1
Level of Service	A	A	A		B	B
Approach Delay (s)	3.8		5.6			12.0
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	6.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	34.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	47.2%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
49: Lankershim Blvd & San Fernando

8/10/2012

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	275	60	305	280	55	285
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3183	1292	2976		1444	3139
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3183	1292	2976		0	3139
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	312	68	347	318	62	324
RTOR Reduction (vph)	0	33	154	0	0	0
Lane Group Flow (vph)	312	35	511	0	62	324
Heavy Vehicles (%)	10%	25%	15%	10%	25%	15%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	18.2	18.2	18.2		9.0	9.0
Effective Green, g (s)	18.2	18.2	18.2		9.0	9.0
Actuated g/C Ratio	0.52	0.52	0.52		0.26	0.26
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1646	668	1539		369	803
v/s Ratio Prot	0.10		c0.17		0.04	c0.10
v/s Ratio Perm		0.03				
v/c Ratio	0.19	0.05	0.33		0.17	0.40
Uniform Delay, d1	4.6	4.2	5.0		10.2	10.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	0.6		0.2	0.3
Delay (s)	4.8	4.4	5.5		10.4	11.2
Level of Service	A	A	A		B	B
Approach Delay (s)	4.7		5.5			11.1
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	38.6%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
49: Lankershim Blvd & San Fernando

8/10/2012

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	550	55	310	360	80	620
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.92		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3335	1404	3093		1570	3438
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3335	1404	3093		0	3438
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	573	57	323	375	83	646
RTOR Reduction (vph)	0	32	211	0	0	0
Lane Group Flow (vph)	573	25	487	0	83	646
Heavy Vehicles (%)	5%	15%	10%	5%	15%	5%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	16.1	16.1	16.1		12.7	12.7
Effective Green, g (s)	16.1	16.1	16.1		12.7	12.7
Actuated g/C Ratio	0.44	0.44	0.44		0.35	0.35
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1459	614	1353		542	1186
v/s Ratio Prot	c0.17		0.16		0.05	c0.19
v/s Ratio Perm		0.02				
v/c Ratio	0.39	0.04	0.36		0.15	0.54
Uniform Delay, d1	7.0	5.9	6.9		8.3	9.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.1	0.7		0.1	0.5
Delay (s)	7.8	6.1	7.7		8.5	10.2
Level of Service	A	A	A		A	B
Approach Delay (s)	7.7		7.7			10.0
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	8.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	36.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
49: Lankershim Blvd & San Fernando

8/13/2012

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	225	35	495	470	50	310
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3045	1346	2797		1570	2798
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3045	1346	2797		0	2798
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	245	38	538	511	54	337
RTOR Reduction (vph)	0	19	253	0	0	0
Lane Group Flow (vph)	245	19	796	0	54	337
Heavy Vehicles (%)	15%	20%	24%	15%	15%	29%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	17.9	17.9	17.9		9.6	9.6
Effective Green, g (s)	17.9	17.9	17.9		9.6	9.6
Actuated g/C Ratio	0.50	0.50	0.50		0.27	0.27
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1535	679	1410		425	757
v/s Ratio Prot	0.08		c0.28		0.03	c0.12
v/s Ratio Perm		0.01				
v/c Ratio	0.16	0.03	0.56		0.13	0.45
Uniform Delay, d1	4.7	4.4	6.1		9.8	10.7
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.2	0.1	1.6		0.1	0.4
Delay (s)	5.0	4.5	7.7		9.9	11.2
Level of Service	A	A	A		A	B
Approach Delay (s)	4.9		7.7			11.0
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	48.5%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
49: Lankershim Blvd & San Fernando

8/13/2012

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	275	60	355	280	55	335
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3183	1292	2821		1444	2820
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3183	1292	2821		0	2820
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	312	68	403	318	62	381
RTOR Reduction (vph)	0	35	163	0	0	0
Lane Group Flow (vph)	312	33	558	0	62	381
Heavy Vehicles (%)	10%	25%	27%	10%	25%	28%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	17.2	17.2	17.2		10.2	10.2
Effective Green, g (s)	17.2	17.2	17.2		10.2	10.2
Actuated g/C Ratio	0.49	0.49	0.49		0.29	0.29
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1547	628	1371		416	813
v/s Ratio Prot	0.10		c0.20		0.04	c0.14
v/s Ratio Perm		0.03				
v/c Ratio	0.20	0.05	0.41		0.15	0.47
Uniform Delay, d1	5.2	4.8	5.8		9.4	10.4
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	0.9		0.2	0.4
Delay (s)	5.5	5.0	6.7		9.5	10.8
Level of Service	A	A	A		A	B
Approach Delay (s)	5.4		6.7			10.6
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	7.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.43		
Actuated Cycle Length (s)	35.4	Sum of lost time (s)	8.0
Intersection Capacity Utilization	40.0%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
49: Lankershim Blvd & San Fernando

8/13/2012

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	550	55	360	360	80	670
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3335	1404	2929		1570	3223
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3335	1404	2929		0	3223
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	573	57	375	375	83	698
RTOR Reduction (vph)	0	33	214	0	0	0
Lane Group Flow (vph)	573	24	536	0	83	698
Heavy Vehicles (%)	5%	15%	23%	5%	15%	12%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	16.1	16.1	16.1		13.4	13.4
Effective Green, g (s)	16.1	16.1	16.1		13.4	13.4
Actuated g/C Ratio	0.43	0.43	0.43		0.36	0.36
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1432	603	1258		561	1152
v/s Ratio Prot	0.17		c0.18		0.05	c0.22
v/s Ratio Perm		0.02				
v/c Ratio	0.40	0.04	0.43		0.15	0.61
Uniform Delay, d1	7.4	6.2	7.5		8.2	9.9
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.8	0.1	1.1		0.1	0.9
Delay (s)	8.2	6.3	8.5		8.3	10.8
Level of Service	A	A	A		A	B
Approach Delay (s)	8.0		8.5			10.5
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	9.1	HCM Level of Service	A
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	37.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
49: Lankershim Blvd & San Fernando

8/15/2012

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	245	40	540	510	55	340
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3045	1346	2798		1570	2798
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3045	1346	2798		0	2798
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	266	43	587	554	60	370
RTOR Reduction (vph)	0	22	282	0	0	0
Lane Group Flow (vph)	266	21	859	0	60	370
Heavy Vehicles (%)	15%	20%	24%	15%	15%	29%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	17.3	17.3	17.3		9.9	9.9
Effective Green, g (s)	17.3	17.3	17.3		9.9	9.9
Actuated g/C Ratio	0.49	0.49	0.49		0.28	0.28
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1497	662	1375		442	787
v/s Ratio Prot	0.09		c0.31		0.04	c0.13
v/s Ratio Perm		0.02				
v/c Ratio	0.18	0.03	0.62		0.14	0.47
Uniform Delay, d1	5.0	4.6	6.6		9.5	10.5
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.1	2.2		0.1	0.4
Delay (s)	5.2	4.7	8.7		9.6	10.9
Level of Service	A	A	A		A	B
Approach Delay (s)	5.2		8.7			10.7
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	8.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	35.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	51.6%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
49: Lankershim Blvd & San Fernando

8/15/2012

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	300	65	385	305	60	365
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3183	1292	2821		1444	2820
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3183	1292	2821		0	2820
Peak-hour factor, PHF	0.88	0.88	0.88	0.88	0.88	0.88
Adj. Flow (vph)	341	74	438	347	68	415
RTOR Reduction (vph)	0	39	183	0	0	0
Lane Group Flow (vph)	341	35	602	0	68	415
Heavy Vehicles (%)	10%	25%	27%	10%	25%	28%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	16.8	16.8	16.8		10.7	10.7
Effective Green, g (s)	16.8	16.8	16.8		10.7	10.7
Actuated g/C Ratio	0.47	0.47	0.47		0.30	0.30
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1506	611	1335		435	850
v/s Ratio Prot	0.11		c0.21		0.05	c0.15
v/s Ratio Perm		0.03				
v/c Ratio	0.23	0.06	0.45		0.16	0.49
Uniform Delay, d1	5.5	5.1	6.3		9.1	10.2
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	0.3	0.2	1.1		0.2	0.4
Delay (s)	5.9	5.2	7.4		9.3	10.6
Level of Service	A	A	A		A	B
Approach Delay (s)	5.8		7.4			10.4
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	7.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	35.5	Sum of lost time (s)	8.0
Intersection Capacity Utilization	42.3%	ICU Level of Service	A
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
49: Lankershim Blvd & San Fernando

8/15/2012

Movement	NBL	NBR	SET	SER	NWL	NWT
Lane Configurations						
Volume (vph)	600	60	390	390	85	730
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0
Lane Util. Factor	0.97	1.00	0.95		1.00	0.95
Frt	1.00	0.85	0.93		1.00	1.00
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	3335	1404	2929		1570	3223
Flt Permitted	0.95	1.00	1.00		0.00	1.00
Satd. Flow (perm)	3335	1404	2929		0	3223
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	625	62	406	406	89	760
RTOR Reduction (vph)	0	36	234	0	0	0
Lane Group Flow (vph)	625	26	578	0	89	760
Heavy Vehicles (%)	5%	15%	23%	5%	15%	12%
Turn Type	NA	Perm	NA		pm+pt	NA
Protected Phases	2!		6!		3	8
Permitted Phases		2			8	
Actuated Green, G (s)	16.1	16.1	16.1		13.9	13.9
Effective Green, g (s)	16.1	16.1	16.1		13.9	13.9
Actuated g/C Ratio	0.42	0.42	0.42		0.37	0.37
Clearance Time (s)	4.0	4.0	4.0		4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	1413	595	1241		574	1179
v/s Ratio Prot	0.19		c0.20		0.06	c0.24
v/s Ratio Perm		0.02				
v/c Ratio	0.44	0.04	0.47		0.16	0.64
Uniform Delay, d1	7.8	6.4	7.9		8.1	10.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	1.0	0.1	1.3		0.1	1.2
Delay (s)	8.8	6.6	9.1		8.2	11.2
Level of Service	A	A	A		A	B
Approach Delay (s)	8.6		9.1			10.9
Approach LOS	A		A			B

Intersection Summary			
HCM Average Control Delay	9.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	38.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

! Phase conflict between lane groups.

c Critical Lane Group

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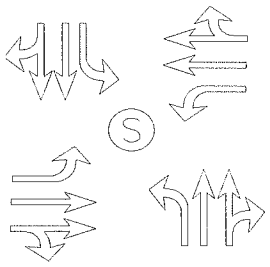
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	60	15%		60	5	65
EB THRU	355	5%		355	30	385
EB RIGHT	75	20%		75	5	80
WB LEFT	220	10%		220	20	240
WB THRU	635	5%		635	55	690
WB RIGHT	55	15%		55	5	60
SAN FERNANDO ROAD						
NB LEFT	35	30%		35	5	40
NB THRU	290	23%	**50**	340	30	370
NB RIGHT	80	25%		80	5	85
SB LEFT	65	15%		65	5	70
SB THRU	610	12%	**50**	660	60	720
SB RIGHT	85	30%		85	5	90
TOTALS	**2565**		**100**	**2665**	**230**	**2895**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	60	0%		60	5	65
EB THRU	320	5%		320	30	350
EB RIGHT	40	5%		40	5	45
WB LEFT	125	5%		125	10	135
WB THRU	320	15%		320	30	350
WB RIGHT	55	5%		55	5	60
SAN FERNANDO ROAD						
NB LEFT	50	15%		50	5	55
NB THRU	375	16%	**50**	425	40	465
NB RIGHT	95	5%		95	10	105
SB LEFT	65	5%		65	5	70
SB THRU	335	22%	**50**	385	35	420
SB RIGHT	45	0%		45	5	50
TOTALS	**1885**		**100**	**1985**	**185**	**2170**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	26-Jun-12	VV.110264.0000	3 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
SHELDON STREET						
EB LEFT	125	15%		125	10	135
EB THRU	560	5%		560	50	610
EB RIGHT	65	20%		65	5	70
WB LEFT	165	15%		165	15	180
WB THRU	405	5%		405	35	440
WB RIGHT	100	25%		100	10	110
SAN FERNANDO ROAD						
NB LEFT	115	5%		115	10	125
NB THRU	975	10%	**50**	1025	90	1115
NB RIGHT	160	10%		160	15	175
SB LEFT	75	25%		75	5	80
SB THRU	595	12%	**50**	645	60	705
SB RIGHT	30	45%		30	5	35
TOTALS	**3370**		**100**	**3470**	**310**	**3780**

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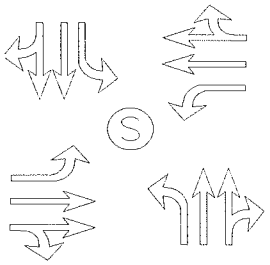
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	50	8	24	75	**0**	75	5	80
EB THRU	343	13	39	380	**0**	380	35	415
EB RIGHT	61	13	39	100	**0**	100	10	110
WB LEFT	202	17	51	255	**0**	255	25	280
WB THRU	615	18	54	670	**0**	670	60	730
WB RIGHT	44	9	27	70	**0**	70	5	75
SAN FERNANDO ROAD								
NB LEFT	26	11	33	60	**0**	60	5	65
NB THRU	261	27	81	340	**150**	490	45	535
NB RIGHT	57	21	63	120	**0**	120	10	130
SB LEFT	56	9	27	85	**0**	85	5	90
SB THRU	587	23	69	655	**150**	805	70	875
SB RIGHT	57	26	78	135	**0**	135	10	145
TOTALS	**2359**				**300**	**3245**	**285**	**3530**

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	61	0	0	60	**0**	60	5	65
EB THRU	295	23	69	365	**0**	365	35	400
EB RIGHT	39	1	3	40	**0**	40	5	45
WB LEFT	118	6	18	135	**0**	135	10	145
WB THRU	278	43	129	405	**0**	405	35	440
WB RIGHT	54	1	3	55	**0**	55	5	60
SAN FERNANDO ROAD								
NB LEFT	41	7	21	60	**0**	60	5	65
NB THRU	353	22	66	420	**150**	570	50	620
NB RIGHT	91	2	6	95	**0**	95	10	105
SB LEFT	64	1	3	65	**0**	65	5	70
SB THRU	299	34	102	400	**150**	550	50	600
SB RIGHT	43	0	0	45	**0**	45	5	50
TOTALS	**1736**				**300**	**2445**	**220**	**2665**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : SHELDON STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 50
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
SHELDON STREET								
EB LEFT	125	15%	0	125	**0**	125	10	135
EB THRU	560	5%	0	560	**0**	560	50	610
EB RIGHT	65	20%	1	65	**0**	65	5	70
WB LEFT	165	15%	0	165	**0**	165	15	180
WB THRU	405	5%	0	405	**0**	405	35	440
WB RIGHT	100	25%	1	100	**0**	100	10	110
SAN FERNANDO ROAD								
NB LEFT	115	5%	0	115	**0**	115	10	125
NB THRU	975	10%	0	975	**150**	1125	100	1225
NB RIGHT	160	10%	0	160	**0**	160	15	175
SB LEFT	75	25%	1	75	**0**	75	5	80
SB THRU	595	12%	0	595	**150**	745	65	810
SB RIGHT	30	45%	1	30	**0**	30	5	35
TOTALS	**3370**				**300**	**3670**	**325**	**3995**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 758

	Rt	Thru	Lt
Total	83	610	65
1st	19	122	13
2nd	25	133	18
3rd	22	201	17
4th	17	154	17

EAST LEG

EAST LEG TOTAL: 905

	1st	2nd	3rd	4th	Total
Rt	12	11	16	14	53
Thru	167	153	172	141	633
Lt	48	51	63	57	219

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	58	10	10	25	13
Thru	356	67	71	89	129
Rt	74	8	11	31	24

WEST LEG TOTAL: 488

SOUTH LEG

	Lt	Thru	Rt
1st	8	55	19
2nd	15	58	12
3rd	7	92	21
4th	7	83	26
Total	37	288	78

TOTAL: 403

PEAK HOUR FACTORS

NORTH LEG = 0.79
SOUTH LEG = 0.84
EAST LEG = 0.90
WEST LEG = 0.73

ALL LEGS = 0.84

HOUR TOTAL: 2,554

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	76	571	62
1st	10	115	14
2nd	19	122	13
3rd	25	133	18
4th	22	201	17

	1st	2nd	3rd	4th	Total
Rt	9	12	11	16	48
Thru	132	167	153	172	624
Lt	36	48	51	63	198

	Total	1st	2nd	3rd	4th
Lt	50	5	10	10	25
Thru	293	66	67	71	89
Rt	57	7	8	11	31

	Lt	Thru	Rt
1st	8	49	14
2nd	8	55	19
3rd	15	58	12
4th	7	92	21
Total	38	254	66

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
47	571	62	Total
17	154	17	1st
7	157	16	2nd
13	147	13	3rd
10	113	16	4th

	1st	2nd	3rd	4th	Total
Rt	14	13	13	17	57
Thru	141	108	88	129	466
Lt	57	44	44	30	175

Total	1st	2nd	3rd	4th	
33	13	4	7	9	Lt
351	129	65	65	92	Thru
58	24	7	13	14	Rt

	Lt	Thru	Rt
1st	7	83	26
2nd	17	75	16
3rd	14	70	11
4th	18	66	25
Total	56	294	78

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : SHELDON 05-31-12

BEGINNING TIME : 07:00AM PM 7:15 AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
6	106	12	1	5	0	1	2	1	2	2	1	139
14	116	12	2	4	0	1	2	0	2	0	1	154
17	128	18	0	3	0	5	1	0	3	1	0	176
18	196	15	0	4	0	1	1	1	3	0	1	240
8	147	11	1	5	1	1	1	5	7	1	0	188
2	148	7	0	4	0	0	5	3	5	0	6	180
8	142	8	0	2	0	0	2	0	5	1	5	173
9	110	11	0	2	0	1	1	0	0	0	5	139
82	1093	94	4	29	1	10	15	10	27	5	19	1389
						SOUTH LEG						
6	41	6	1	2	1	6	5	1	1	1	0	71
15	44	6	0	5	1	3	5	1	1	1	0	82
8	53	12	0	1	0	4	4	1	0	0	2	85
13	87	5	0	1	1	3	4	1	5	0	0	120
21	77	3	0	3	0	5	3	1	0	0	3	116
14	63	16	0	4	0	2	3	1	0	5	0	108
9	62	13	0	5	0	2	3	1	0	0	0	95
23	57	17	0	6	0	2	3	1	0	0	0	109
109	484	78	1	27	3	27	30	8	7	7	5	786
						EAST LEG						
8	127	30	1	2	5	0	1	1	0	2	0	177
9	162	45	3	5	3	0	0	0	0	0	0	227
6	152	50	2	0	0	1	0	1	2	1	0	215
15	163	52	1	5	5	0	3	1	0	1	5	251
14	138	55	0	3	2	0	0	0	0	0	0	212
13	104	41	0	4	0	0	0	3	0	0	0	165
8	82	44	0	2	0	0	4	0	5	0	0	145
17	117	29	0	2	1	0	5	0	0	5	0	176
90	1045	346	7	23	16	1	13	6	7	9	5	1568
						WEST LEG						
1	61	1	6	5	2	0	0	1	0	0	1	78
0	63	9	0	0	0	5	4	1	3	0	0	85
11	67	9	0	0	0	0	0	1	0	4	0	92
29	84	23	0	0	0	2	5	1	0	0	1	145
21	129	9	0	0	0	3	0	4	0	0	0	166
5	60	4	0	0	0	2	5	0	0	0	0	76
11	65	7	0	0	0	2	0	0	0	0	0	85
14	91	9	0	0	0	0	0	0	0	1	0	115
92	620	71	6	5	2	14	14	8	3	5	2	842

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 12:00PM

NORTH LEG

TOTAL: 441

	Rt	Thru	Lt
Total	43	333	65
1st	4	96	20
2nd	16	85	8
3rd	10	89	20
4th	13	63	17

EAST LEG

EAST LEG TOTAL: 500

	1st	2nd	3rd	4th	Total
Rt	11	9	17	18	55
Thru	83	87	73	78	321
Lt	35	27	34	28	124

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	61	13	17	15	16
Thru	318	89	76	80	73
Rt	40	11	10	7	12

WEST LEG TOTAL: 419

SOUTH LEG

	Lt	Thru	Rt
1st	15	90	15
2nd	6	94	24
3rd	19	90	29
4th	8	101	25
Total	48	375	93

TOTAL: 516

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.93
EAST LEG = 0.97
WEST LEG = 0.93

ALL LEGS = 0.97

HOUR TOTAL: 1,876

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	43	333	65
1st	4	96	20
2nd	16	85	8
3rd	10	89	20
4th	13	63	17

	1st	2nd	3rd	4th	Total
Rt	11	9	17	18	55
Thru	83	87	73	78	321
Lt	35	27	34	28	124

	Total	1st	2nd	3rd	4th
Lt	61	13	17	15	16
Thru	318	89	76	80	73
Rt	40	11	10	7	12

	Lt	Thru	Rt
1st	15	90	15
2nd	6	94	24
3rd	19	90	29
4th	8	101	25
Total	48	375	93

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
49	342	62	Total
13	82	15	1st
10	97	13	2nd
12	88	19	3rd
14	75	15	4th

	1st	2nd	3rd	4th	Total
Rt	18	16	15	12	61
Thru	70	69	79	85	303
Lt	34	31	46	23	134

Total	1st	2nd	3rd	4th	
46	11	12	9	14	Lt
313	73	82	84	74	Thru
49	10	17	11	11	Rt

	Lt	Thru	Rt
1st	13	97	14
2nd	10	92	18
3rd	24	95	15
4th	10	85	27
Total	57	369	74

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : SHELDON 05-31-12

BEGINNING TIME : 12:00PM 2PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
4	89	20	0	2	0	0	1	0	0	4	0	120
16	79	8	0	2	0	0	2	0	0	2	0	109
10	75	20	0	5	0	0	3	0	0	6	0	119
13	56	16	0	5	1	0	2	0	0	0	0	93
12	81	15	1	1	0	0	0	0	0	0	0	110
9	92	13	0	1	0	0	2	0	1	2	0	120
11	83	18	0	2	1	0	1	0	1	2	0	119
14	67	15	0	4	0	0	2	0	0	2	0	104
89	622	125	1	22	2	0	13	0	2	18	0	894
						SOUTH LEG						
15	82	13	0	5	0	0	1	2	0	2	0	120
24	90	4	0	0	0	0	3	0	0	1	2	124
29	81	16	0	5	2	0	3	0	0	1	1	138
23	100	8	0	0	0	1	1	0	1	0	0	134
13	93	12	1	3	0	0	1	1	0	0	0	124
18	88	10	0	1	0	0	0	0	0	3	0	120
15	80	14	0	5	9	0	4	0	0	6	1	134
26	82	7	0	2	2	1	0	0	0	1	1	122
163	696	84	1	21	13	2	13	3	1	14	5	1016
						EAST LEG						
10	73	34	0	5	0	1	2	1	0	3	0	129
9	81	27	0	1	0	0	0	0	0	5	0	123
17	55	30	0	2	1	0	3	0	0	13	3	124
18	69	27	0	2	0	0	3	0	0	4	1	124
17	68	34	0	0	0	1	2	0	0	0	0	122
16	64	31	0	1	0	0	1	0	0	3	0	116
12	67	46	2	3	0	1	2	0	0	7	0	140
9	80	22	1	0	0	2	0	1	0	5	0	120
108	557	251	3	14	1	5	13	2	0	40	4	998
						WEST LEG						
10	84	13	1	2	0	0	2	0	0	1	0	113
10	74	17	0	0	0	0	0	0	0	2	0	103
7	69	15	0	3	0	0	2	0	0	6	0	102
12	68	16	0	0	0	0	2	0	0	3	0	101
10	72	10	0	1	0	0	0	0	0	0	1	94
17	78	12	0	0	0	0	1	0	0	3	0	111
9	70	8	1	4	1	0	1	0	1	9	0	104
10	73	13	0	1	0	0	0	1	1	0	0	99
85	588	104	2	11	1	0	8	1	2	24	1	827

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: SHELDON
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 703

	Rt	Thru	Lt
Total	32	596	75
1st	9	140	20
2nd	11	233	10
3rd	4	125	25
4th	8	98	20

EAST LEG

EAST LEG TOTAL: 668

	1st	2nd	3rd	4th	Total
Rt	26	19	31	24	100
Thru	80	91	110	122	403
Lt	36	45	48	36	165

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	123	38	24	30	31
Thru	558	143	141	112	162
Rt	67	15	15	18	19

WEST LEG TOTAL: 748

SOUTH LEG

	Lt	Thru	Rt
1st	23	230	26
2nd	34	252	46
3rd	35	246	42
4th	22	246	47
Total	114	974	161

TOTAL: 1,249

PEAK HOUR FACTORS

NORTH LEG = 0.69
SOUTH LEG = 0.94
EAST LEG = 0.88
WEST LEG = 0.88

ALL LEGS = 0.91

HOUR TOTAL: 3,368

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
59	645	71	Total
19	96	23	1st
20	176	18	2nd
9	140	20	3rd
11	233	10	4th

	1st	2nd	3rd	4th	Total
Rt	18	19	26	19	82
Thru	94	95	80	91	360
Lt	44	33	36	45	158

Total	1st	2nd	3rd	4th	
102	18	22	38	24	Lt
508	110	114	143	141	Thru
62	17	15	15	15	Rt

	Lt	Thru	Rt
1st	31	196	34
2nd	20	254	40
3rd	23	230	26
4th	34	252	46
Total	108	932	146

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: SHELDON

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
45	428	69	Total
4	125	25	1st
8	98	20	2nd
19	115	12	3rd
14	90	12	4th

	1st	2nd	3rd	4th	Total
Rt	31	24	17	11	83
Thru	110	122	67	92	391
Lt	48	36	30	37	151

Total	1st	2nd	3rd	4th	
101	30	31	13	27	Lt
522	112	162	119	129	Thru
57	18	19	9	11	Rt

	Lt	Thru	Rt
1st	35	246	42
2nd	22	246	47
3rd	23	232	45
4th	20	183	24
Total	100	907	158

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : SHELDON 05-31-12

BEGINNING TIME : 04:00PM PH= 4:30PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
17	84	22	1	9	1	0	2	0	1	1	0	138
19	171	18	0	4	0	0	0	0	1	1	0	214
7	131	19	0	6	0	0	1	0	2	2	1	169
9	226	7	0	5	0	0	0	1	2	2	2	254
1	119	22	0	0	0	0	3	0	3	3	3	154
0	88	10	4	5	5	0	0	0	4	5	5	126
13	108	4	4	5	5	0	0	0	2	2	3	146
6	79	0	1	6	2	2	3	5	5	2	5	116
72	1006	102	10	40	13	2	9	6	20	18	19	1317
						SOUTH LEG						
34	191	30	0	5	0	0	0	0	0	0	1	261
36	243	17	1	2	2	0	6	0	3	3	1	314
24	224	22	1	5	1	1	1	0	0	0	0	279
44	248	33	0	4	1	0	0	0	2	0	0	332
41	242	34	0	2	1	1	0	0	0	2	0	323
37	240	20	0	3	1	5	2	0	5	1	1	315
41	214	15	2	3	4	2	5	3	0	10	1	300
18	172	12	2	3	2	2	5	3	2	3	3	227
275	1774	183	6	27	12	11	19	6	12	19	7	2351
						EAST LEG						
15	87	41	2	3	3	1	4	0	0	0	0	156
14	87	32	2	2	1	2	4	0	1	2	0	147
22	72	31	4	5	1	0	1	3	0	2	1	142
14	86	37	2	2	4	1	1	2	2	2	2	155
25	106	41	0	2	2	3	2	2	3	0	3	189
15	119	35	0	0	0	5	1	1	4	2	0	182
5	55	23	5	9	6	6	3	1	1	0	0	114
5	86	31	1	3	3	2	2	1	3	1	2	140
115	698	271	16	26	20	20	18	10	14	9	8	1225
						WEST LEG						
15	106	11	0	2	1	2	2	1	0	0	5	145
12	113	17	2	0	1	0	0	3	1	1	1	151
14	139	32	0	0	1	0	1	4	1	3	1	196
9	131	18	0	3	0	3	4	3	3	3	3	180
17	111	27	0	0	3	1	1	0	0	0	0	160
13	157	27	2	2	0	3	2	2	1	1	2	212
8	118	11	0	1	2	1	0	0	0	0	0	141
6	116	17	2	5	2	1	2	5	2	6	3	167
94	991	160	6	13	10	11	12	18	8	14	15	1352

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	65	610	85	35	290	80	60	355	75	220	635	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3280		1388	3085		1570	3267		1641	3372	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3280		1388	3085		1570	3267		1641	3372	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	77	726	101	42	345	95	71	423	89	262	756	65
RTOR Reduction (vph)	0	16	0	0	37	0	0	28	0	0	10	0
Lane Group Flow (vph)	77	811	0	42	403	0	71	484	0	262	811	0
Heavy Vehicles (%)	15%	5%	30%	30%	10%	25%	15%	5%	20%	10%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	3.1	19.8		2.3	19.0		3.8	14.9		11.1	22.2	
Effective Green, g (s)	3.1	19.8		2.3	19.0		3.8	14.9		11.1	22.2	
Actuated g/C Ratio	0.05	0.31		0.04	0.30		0.06	0.23		0.17	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	76	1013		50	914		93	759		284	1168	
v/s Ratio Prot	c0.05	c0.25		0.03	0.13		0.05	0.15		c0.16	c0.24	
v/s Ratio Perm												
v/c Ratio	1.01	0.80		0.84	0.44		0.76	0.64		0.92	0.69	
Uniform Delay, d1	30.5	20.3		30.7	18.2		29.7	22.2		26.1	18.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	106.9	6.6		70.9	1.5		30.3	1.8		33.5	1.8	
Delay (s)	137.4	27.0		101.6	19.8		60.0	23.9		59.6	19.8	
Level of Service	F	C		F	B		E	C		E	B	
Approach Delay (s)		36.4			26.9			28.3			29.5	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	64.1	Sum of lost time (s)	8.0
Intersection Capacity Utilization	60.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	65	335	45	50	375	95	60	320	40	125	320	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	3259		1570	3334		1805	3381		1719	3110	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	3259		1570	3334		1805	3381		1719	3110	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	345	46	52	387	98	62	330	41	129	330	57
RTOR Reduction (vph)	0	16	0	0	34	0	0	17	0	0	24	0
Lane Group Flow (vph)	67	375	0	52	451	0	62	354	0	129	363	0
Heavy Vehicles (%)	5%	10%	0%	15%	5%	5%	0%	5%	5%	5%	15%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	2.1	17.9		2.1	17.9		3.1	11.6		5.2	13.7	
Effective Green, g (s)	2.1	17.9		2.1	17.9		3.1	11.6		5.2	13.7	
Actuated g/C Ratio	0.04	0.34		0.04	0.34		0.06	0.22		0.10	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	68	1105		62	1130		106	743		169	807	
v/s Ratio Prot	c0.04	0.12		0.03	c0.14		0.03	0.10		c0.08	c0.12	
v/s Ratio Perm												
v/c Ratio	0.99	0.34		0.84	0.40		0.58	0.48		0.76	0.45	
Uniform Delay, d1	25.3	13.0		25.2	13.3		24.2	18.0		23.2	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	103.3	0.8		60.1	1.1		8.0	0.5		18.3	0.4	
Delay (s)	128.7	13.9		85.3	14.4		32.2	18.4		41.5	16.8	
Level of Service	F	B		F	B		C	B		D	B	
Approach Delay (s)		30.7			21.3			20.4			23.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	47.4%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	595	30	115	975	160	125	560	65	165	405	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1444	3352		1719	3343		1570	3335		1570	3215	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1444	3352		1719	3343		1570	3335		1570	3215	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	654	33	126	1071	176	137	615	71	181	445	110
RTOR Reduction (vph)	0	5	0	0	18	0	0	12	0	0	29	0
Lane Group Flow (vph)	82	682	0	126	1229	0	137	674	0	181	526	0
Heavy Vehicles (%)	25%	5%	45%	5%	5%	10%	15%	5%	20%	15%	5%	25%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	5.0	26.5		8.3	29.8		8.7	16.0		9.0	16.3	
Effective Green, g (s)	5.0	26.5		8.3	29.8		8.7	16.0		9.0	16.3	
Actuated g/C Ratio	0.07	0.35		0.11	0.39		0.11	0.21		0.12	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	95	1172		188	1314		180	704		186	691	
v/s Ratio Prot	0.06	0.20		c0.07	c0.37		0.09	c0.20		c0.12	0.16	
v/s Ratio Perm												
v/c Ratio	0.86	0.58		0.67	0.94		0.76	0.96		0.97	0.76	
Uniform Delay, d1	35.1	20.1		32.4	22.1		32.5	29.6		33.3	27.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	50.8	2.1		9.0	13.6		17.1	23.7		57.8	5.0	
Delay (s)	85.9	22.2		41.5	35.6		49.7	53.3		91.0	32.9	
Level of Service	F	C		D	D		D	D		F	C	
Approach Delay (s)		29.0			36.2			52.7			47.2	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	40.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	75.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	65	660	85	35	340	80	60	355	75	220	635	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3111		1388	2843		1570	3267		1641	3372	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3111		1388	2843		1570	3267		1641	3372	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	77	786	101	42	405	95	71	423	89	262	756	65
RTOR Reduction (vph)	0	13	0	0	28	0	0	26	0	0	9	0
Lane Group Flow (vph)	77	874	0	42	472	0	71	486	0	262	812	0
Heavy Vehicles (%)	15%	12%	30%	30%	23%	25%	15%	5%	20%	10%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	3.8	22.8		2.3	21.3		3.8	15.1		12.6	23.9	
Effective Green, g (s)	3.8	22.8		2.3	21.3		3.8	15.1		12.6	23.9	
Actuated g/C Ratio	0.06	0.33		0.03	0.31		0.06	0.22		0.18	0.35	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	87	1031		46	880		87	717		301	1171	
v/s Ratio Prot	c0.05	c0.28		0.03	0.17		0.05	0.15		c0.16	c0.24	
v/s Ratio Perm												
v/c Ratio	0.89	0.85		0.91	0.54		0.82	0.68		0.87	0.69	
Uniform Delay, d1	32.3	21.4		33.2	19.7		32.2	24.6		27.3	19.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	59.7	8.6		99.4	2.3		42.3	2.6		22.9	1.8	
Delay (s)	92.0	30.0		132.5	22.0		74.4	27.2		50.2	21.1	
Level of Service	F	C		F	C		E	C		D	C	
Approach Delay (s)		34.9			30.6			32.9			28.1	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	31.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.75		
Actuated Cycle Length (s)	68.8	Sum of lost time (s)	8.0
Intersection Capacity Utilization	62.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	65	385	45	50	425	95	60	320	40	125	320	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2969		1570	3080		1805	3381		1719	3110	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	2969		1570	3080		1805	3381		1719	3110	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	67	397	46	52	438	98	62	330	41	129	330	57
RTOR Reduction (vph)	0	14	0	0	30	0	0	17	0	0	24	0
Lane Group Flow (vph)	67	429	0	52	506	0	62	354	0	129	363	0
Heavy Vehicles (%)	5%	22%	0%	15%	16%	5%	0%	5%	5%	5%	15%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	2.1	17.9		2.1	17.9		3.1	11.6		5.2	13.7	
Effective Green, g (s)	2.1	17.9		2.1	17.9		3.1	11.6		5.2	13.7	
Actuated g/C Ratio	0.04	0.34		0.04	0.34		0.06	0.22		0.10	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	68	1007		62	1044		106	743		169	807	
v/s Ratio Prot	c0.04	0.14		0.03	c0.16		0.03	0.10		c0.08	c0.12	
v/s Ratio Perm												
v/c Ratio	0.99	0.43		0.84	0.48		0.58	0.48		0.76	0.45	
Uniform Delay, d1	25.3	13.5		25.2	13.8		24.2	18.0		23.2	16.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	103.3	1.3		60.1	1.6		8.0	0.5		18.3	0.4	
Delay (s)	128.7	14.8		85.3	15.4		32.2	18.4		41.5	16.8	
Level of Service	F	B		F	B		C	B		D	B	
Approach Delay (s)		29.8			21.6			20.4			23.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	52.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	48.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	75	645	30	115	1025	160	125	560	65	165	405	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1444	3160		1719	3215		1570	3335		1570	3215	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1444	3160		1719	3215		1570	3335		1570	3215	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	82	709	33	126	1126	176	137	615	71	181	445	110
RTOR Reduction (vph)	0	4	0	0	14	0	0	10	0	0	24	0
Lane Group Flow (vph)	82	738	0	126	1288	0	137	676	0	181	531	0
Heavy Vehicles (%)	25%	12%	45%	5%	10%	10%	15%	5%	20%	15%	5%	25%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	6.0	34.0		11.0	39.0		10.5	18.0		11.0	18.5	
Effective Green, g (s)	6.0	34.0		11.0	39.0		10.5	18.0		11.0	18.5	
Actuated g/C Ratio	0.07	0.38		0.12	0.43		0.12	0.20		0.12	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	1194		210	1393		183	667		192	661	
v/s Ratio Prot	c0.06	0.23		0.07	c0.40		0.09	c0.20		c0.12	0.17	
v/s Ratio Perm												
v/c Ratio	0.85	0.62		0.60	0.92		0.75	1.01		0.94	0.80	
Uniform Delay, d1	41.6	22.7		37.4	24.1		38.5	36.0		39.2	34.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	48.1	2.4		4.8	11.8		15.4	38.4		48.4	7.0	
Delay (s)	89.7	25.1		42.2	35.9		53.8	74.4		87.6	41.0	
Level of Service	F	C		D	D		D	E		F	D	
Approach Delay (s)		31.6			36.5			71.0			52.5	
Approach LOS		C			D			E			D	

Intersection Summary			
HCM Average Control Delay	46.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	70	720	95	40	375	85	65	385	80	240	690	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.97		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	3109		1388	2845		1570	3269		1641	3371	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	3109		1388	2845		1570	3269		1641	3371	
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	83	857	113	48	446	101	77	458	95	286	821	71
RTOR Reduction (vph)	0	13	0	0	26	0	0	24	0	0	9	0
Lane Group Flow (vph)	83	957	0	48	521	0	77	529	0	286	883	0
Heavy Vehicles (%)	15%	12%	30%	30%	23%	25%	15%	5%	20%	10%	5%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	5.4	25.1		3.1	22.8		4.6	15.9		14.1	25.4	
Effective Green, g (s)	5.4	25.1		3.1	22.8		4.6	15.9		14.1	25.4	
Actuated g/C Ratio	0.07	0.34		0.04	0.31		0.06	0.21		0.19	0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	114	1052		58	874		97	701		312	1154	
v/s Ratio Prot	c0.05	c0.31		0.03	0.18		0.05	0.16		c0.17	c0.26	
v/s Ratio Perm												
v/c Ratio	0.73	0.91		0.83	0.60		0.79	0.76		0.92	0.77	
Uniform Delay, d1	33.7	23.5		35.3	21.8		34.3	27.3		29.5	21.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.6	13.0		59.9	3.0		34.6	4.6		30.1	3.1	
Delay (s)	54.2	36.5		95.2	24.8		69.0	32.0		59.6	24.8	
Level of Service	D	D		F	C		E	C		E	C	
Approach Delay (s)		37.9			30.5			36.5			33.3	
Approach LOS		D			C			D			C	

Intersection Summary			
HCM Average Control Delay	34.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	74.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	66.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	70	420	50	55	465	105	65	350	45	135	350	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	2969		1570	3080		1805	3380		1719	3110	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	2969		1570	3080		1805	3380		1719	3110	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	72	433	52	57	479	108	67	361	46	139	361	62
RTOR Reduction (vph)	0	14	0	0	30	0	0	17	0	0	24	0
Lane Group Flow (vph)	72	471	0	57	557	0	67	390	0	139	399	0
Heavy Vehicles (%)	5%	22%	0%	15%	16%	5%	0%	5%	5%	5%	15%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	2.9	19.5		2.2	18.8		3.2	12.4		5.1	14.3	
Effective Green, g (s)	2.9	19.5		2.2	18.8		3.2	12.4		5.1	14.3	
Actuated g/C Ratio	0.05	0.35		0.04	0.34		0.06	0.22		0.09	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	90	1049		63	1049		105	759		159	806	
v/s Ratio Prot	c0.04	0.16		0.04	c0.18		0.04	0.12		c0.08	c0.13	
v/s Ratio Perm												
v/c Ratio	0.80	0.45		0.90	0.53		0.64	0.51		0.87	0.50	
Uniform Delay, d1	25.9	13.7		26.4	14.7		25.4	18.8		24.7	17.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	38.2	1.4		79.7	1.9		12.0	0.6		37.5	0.5	
Delay (s)	64.1	15.1		106.1	16.6		37.5	19.3		62.2	17.9	
Level of Service	E	B		F	B		D	B		E	B	
Approach Delay (s)		21.4			24.5			21.9			28.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	24.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	55.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	52.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
50: Sheldon St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	80	705	35	125	1115	175	135	610	70	180	440	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frt	1.00	0.99		1.00	0.98		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1444	3157		1719	3215		1570	3336		1570	3213	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1444	3157		1719	3215		1570	3336		1570	3213	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	88	775	38	137	1225	192	148	670	77	198	484	121
RTOR Reduction (vph)	0	4	0	0	14	0	0	9	0	0	25	0
Lane Group Flow (vph)	88	809	0	137	1403	0	148	738	0	198	580	0
Heavy Vehicles (%)	25%	12%	45%	5%	10%	10%	15%	5%	20%	15%	5%	25%
Turn Type	Prot	NA		Prot	NA		Prot	NA		Prot	NA	
Protected Phases	1	6		5	2		7	4		3	8	
Permitted Phases												
Actuated Green, G (s)	6.0	34.4		9.6	38.0		10.0	19.0		11.0	20.0	
Effective Green, g (s)	6.0	34.4		9.6	38.0		10.0	19.0		11.0	20.0	
Actuated g/C Ratio	0.07	0.38		0.11	0.42		0.11	0.21		0.12	0.22	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	96	1207		183	1357		174	704		192	714	
v/s Ratio Prot	0.06	0.26		c0.08	c0.44		0.09	c0.22		c0.13	0.18	
v/s Ratio Perm												
v/c Ratio	0.92	0.67		0.75	1.03		0.85	1.05		1.03	0.81	
Uniform Delay, d1	41.8	23.1		39.0	26.0		39.3	35.5		39.5	33.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	64.7	3.0		15.4	33.6		30.7	47.1		73.4	7.0	
Delay (s)	106.5	26.1		54.4	59.6		70.0	82.6		112.9	40.2	
Level of Service	F	C		D	E		E	F		F	D	
Approach Delay (s)		33.9			59.2			80.5			58.1	
Approach LOS		C			E			F			E	

Intersection Summary			
HCM Average Control Delay	58.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.03		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	83.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

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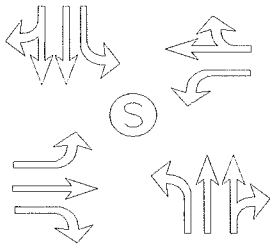
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	35	5%		35	5	40
EB THRU	300	5%		300	25	325
EB RIGHT	105	39%	**50**	155	15	170
WB LEFT	55	20%		55	5	60
WB THRU	145	5%		145	15	160
WB RIGHT	20	5%		20	5	25
SAN FERNANDO ROAD						
NB LEFT	50	60%	**50**	100	10	110
NB THRU	240	5%		240	20	260
NB RIGHT	90	15%		90	10	100
SB LEFT	40	10%		40	5	45
SB THRU	635	5%		635	55	690
SB RIGHT	70	5%		70	5	75
TOTALS	**1785**		**100**	**1885**	**175**	**2060**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	35	10%		35	5	40
EB THRU	180	10%		180	15	195
EB RIGHT	45	62%	**50**	95	10	105
WB LEFT	70	10%		70	5	75
WB THRU	150	15%		150	15	165
WB RIGHT	45	15%		45	5	50
SAN FERNANDO ROAD						
NB LEFT	50	58%	**50**	100	10	110
NB THRU	345	10%		345	30	375
NB RIGHT	70	25%		70	5	75
SB LEFT	65	5%		65	5	70
SB THRU	330	5%		330	30	360
SB RIGHT	55	5%		55	5	60
TOTALS	**1440**		**100**	**1540**	**140**	**1680**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						
BRANFORD STREET						
EB LEFT	90	15%		90	10	100
EB THRU	385	15%		385	35	420
EB RIGHT	105	36%	**50**	155	15	170
WB LEFT	125	10%		125	10	135
WB THRU	285	15%		285	25	310
WB RIGHT	105	5%		105	10	115
SAN FERNANDO ROAD						
NB LEFT	170	27%	**50**	220	20	240
NB THRU	820	5%		820	75	895
NB RIGHT	130	5%		130	10	140
SB LEFT	100	10%		100	10	110
SB THRU	530	10%		530	50	580
SB RIGHT	115	5%		115	10	125
TOTALS	**2960**		**100**	**3060**	**280**	**3340**

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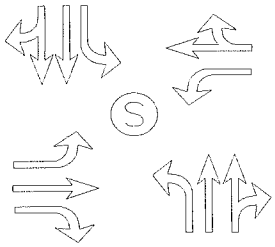
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	33	2	6	40	**0**	40	5	45
EB THRU	283	15	45	330	**0**	330	30	360
EB RIGHT	94	11	33	125	**150**	275	25	300
WB LEFT	44	12	36	80	**0**	80	5	85
WB THRU	134	10	30	165	**0**	165	15	180
WB RIGHT	18	1	3	20	**0**	20	5	25
SAN FERNANDO ROAD								
NB LEFT	42	10	30	70	**150**	220	20	240
NB THRU	226	16	48	275	**0**	275	25	300
NB RIGHT	79	12	36	115	**0**	115	10	125
SB LEFT	36	4	12	50	**0**	50	5	55
SB THRU	596	39	117	715	**0**	715	65	780
SB RIGHT	65	3	9	75	**0**	75	5	80
TOTALS	**1650**				**300**	**2360**	**215**	**2575**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	32	4	12	45	**0**	45	5	50
EB THRU	157	21	63	220	**0**	220	20	240
EB RIGHT	35	10	30	65	**150**	215	20	235
WB LEFT	63	6	18	80	**0**	80	5	85
WB THRU	132	19	57	190	**0**	190	15	205
WB RIGHT	37	6	18	55	**0**	55	5	60
SAN FERNANDO ROAD								
NB LEFT	42	8	24	65	**150**	215	20	235
NB THRU	312	35	105	415	**0**	415	35	450
NB RIGHT	55	16	48	105	**0**	105	10	115
SB LEFT	63	3	9	70	**0**	70	5	75
SB THRU	312	19	57	370	**0**	370	35	405
SB RIGHT	54	3	9	65	**0**	65	5	70
TOTALS	**1294**				**300**	**2045**	**180**	**2225**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	MC	3-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : BRANFORD STREET
N/S STREET : SAN FERNANDO ROAD
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 51
ROUTE 8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
BRANFORD STREET								
EB LEFT	77	14	42	120	**0**	120	10	130
EB THRU	336	51	153	490	**0**	490	45	535
EB RIGHT	99	4	12	110	**150**	260	25	285
WB LEFT	109	14	42	150	**0**	150	15	165
WB THRU	241	46	138	380	**0**	380	35	415
WB RIGHT	101	2	6	105	**0**	105	10	115
SAN FERNANDO ROAD								
NB LEFT	164	7	21	185	**150**	335	30	365
NB THRU	772	50	150	920	**0**	920	85	1005
NB RIGHT	129	3	9	140	**0**	140	15	155
SB LEFT	89	10	30	120	**0**	120	10	130
SB THRU	483	45	135	620	**0**	620	55	675
SB RIGHT	112	3	9	120	**0**	120	10	130
TOTALS	**2712**				**300**	**3760**	**345**	**4105**

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INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 07:30AM

NORTH LEG

TOTAL: 743

	Rt	Thru	Lt
Total	68	635	40
1st	18	149	6
2nd	18	193	15
3rd	14	170	11
4th	18	123	8

EAST LEG

EAST LEG TOTAL: 219

	1st	2nd	3rd	4th	Total
Rt	6	6	3	4	19
Thru	33	59	21	31	144
Lt	16	14	12	14	56

WEST LEG

	Total	1st	2nd	3rd	4th
Lt	35	3	13	12	7
Thru	298	48	105	79	66
Rt	105	21	43	23	18

WEST LEG TOTAL: 438

SOUTH LEG

	Lt	Thru	Rt
1st	16	45	14
2nd	19	73	38
3rd	9	67	21
4th	8	57	18
Total	52	242	91

TOTAL: 385

PEAK HOUR FACTORS

NORTH LEG = 0.82
SOUTH LEG = 0.74
EAST LEG = 0.69
WEST LEG = 0.68

ALL LEGS = 0.75

HOUR TOTAL: 1,785

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 07:00AM-08:00AM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
61	580	31	Total
11	109	5	1st
14	129	5	2nd
18	149	6	3rd
18	193	15	4th

	1st	2nd	3rd	4th	Total
Rt	5	5	6	6	22
Thru	17	31	33	59	140
Lt	13	13	16	14	56

Total	1st	2nd	3rd	4th	
24	2	6	3	13	Lt
214	22	39	48	105	Thru
99	16	19	21	43	Rt

	Lt	Thru	Rt
1st	9	39	12
2nd	13	44	12
3rd	16	45	14
4th	19	73	38
Total	57	201	76

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 08:00AM-09:00AM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	48	521	40
1st	14	170	11
2nd	18	123	8
3rd	9	115	9
4th	7	113	12

	1st	2nd	3rd	4th	Total
Rt	3	4	8	11	26
Thru	21	31	42	31	125
Lt	12	14	13	19	58

	Total	1st	2nd	3rd	4th
Lt	38	12	7	7	12
Thru	244	79	66	39	60
Rt	80	23	18	18	21

	Lt	Thru	Rt
1st	9	67	21
2nd	8	57	18
3rd	12	50	21
4th	8	57	15
Total	37	231	75

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : BRANFORD 05-31-12

BEGINNING TIME : 07:00AM PH= 7:30AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
9	103	4	1	4	1	0	1	0	1	1	0	125
14	123	5	0	5	0	0	0	0	0	1	0	148
18	140	5	0	5	1	0	1	0	0	3	0	173
17	184	15	1	6	0	0	1	0	0	2	0	226
12	161	8	1	7	0	0	2	2	1	0	1	195
18	111	8	0	7	0	0	2	0	0	3	0	149
9	103	5	0	6	2	0	4	2	0	2	0	133
7	101	12	0	8	0	0	1	0	0	3	0	132
104	1026	62	3	48	4	0	12	4	2	15	1	1281
						SOUTH LEG						
11	36	8	1	2	1	0	0	0	0	1	0	60
10	38	13	2	4	0	0	1	0	0	1	0	69
13	43	14	0	2	1	1	0	1	0	0	0	75
34	70	18	3	3	0	0	0	0	1	0	1	130
16	59	5	2	6	2	3	1	1	0	1	1	97
16	54	5	0	3	3	1	0	0	1	0	0	83
16	45	7	2	4	5	3	0	0	0	1	0	83
9	43	3	3	9	5	2	2	0	1	3	0	80
125	388	73	13	33	17	10	4	2	3	7	2	677
						EAST LEG						
5	15	11	0	1	1	0	0	1	0	1	0	35
5	28	10	0	2	2	0	1	1	0	0	0	49
6	31	15	0	2	0	0	0	1	0	0	0	55
5	58	13	1	1	0	0	0	1	0	0	0	79
3	15	6	0	2	4	0	1	1	0	3	1	36
4	30	10	0	0	3	0	0	1	0	1	0	49
5	39	11	2	1	0	1	0	1	0	2	1	63
6	22	14	3	4	3	1	4	1	1	1	1	61
39	238	90	6	13	13	2	6	8	1	8	3	427
						WEST LEG						
16	19	2	0	2	0	0	1	0	0	0	0	40
19	36	6	0	1	0	0	0	0	0	2	0	64
20	47	3	0	1	0	0	0	0	1	0	0	72
40	103	12	2	1	1	1	1	0	0	0	0	161
21	73	11	2	2	0	0	0	0	0	4	1	114
13	60	7	3	1	0	2	0	0	0	5	0	91
12	34	5	2	1	2	3	3	0	1	1	0	64
17	50	9	2	5	3	2	4	0	0	1	0	93
158	422	55	11	14	6	8	9	0	2	13	1	699

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 12:30PM

NORTH LEG

TOTAL: 454

Rt	Thru	Lt	
57	331	66	Total
16	101	22	1st
13	66	14	2nd
16	83	16	3rd
12	81	14	4th

EAST LEG TOTAL: 263

	1st	2nd	3rd	4th	Total
Rt	10	9	17	7	43
Thru	33	30	40	48	151
Lt	13	12	20	24	69

WEST LEG TOTAL: 259

Total	1st	2nd	3rd	4th	
36	8	12	9	7	Lt
178	40	44	42	52	Thru
45	10	6	17	12	Rt

SOUTH LEG

TOTAL: 468

	Lt	Thru	Rt
1st	12	88	16
2nd	13	91	20
3rd	13	92	15
4th	12	76	20
Total	50	347	71

PEAK HOUR FACTORS

NORTH LEG = 0.82
SOUTH LEG = 0.94
EAST LEG = 0.83
WEST LEG = 0.91

ALL LEGS = 0.95

HOUR TOTAL: 1,444

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 12:00PM-01:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	65	312	68
1st	17	68	13
2nd	19	77	19
3rd	16	101	22
4th	13	66	14

	1st	2nd	3rd	4th	Total
Rt	13	14	10	9	46
Thru	48	35	33	30	146
Lt	20	21	13	12	66

	Total	1st	2nd	3rd	4th
Lt	33	7	6	8	12
Thru	171	36	51	40	44
Rt	32	10	6	10	6

	Lt	Thru	Rt
1st	19	78	16
2nd	12	85	16
3rd	12	88	16
4th	13	91	20
Total	56	342	68

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 01:00PM-02:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	65	298	45
1st	16	83	16
2nd	12	81	14
3rd	21	82	8
4th	16	52	7

	1st	2nd	3rd	4th	Total
Rt	17	7	12	3	39
Thru	40	48	41	24	153
Lt	20	24	16	14	74

	Total	1st	2nd	3rd	4th
Lt	38	9	7	14	8
Thru	187	42	52	46	47
Rt	41	17	12	4	8

	Lt	Thru	Rt
1st	13	92	15
2nd	12	76	20
3rd	10	91	11
4th	11	70	19
Total	46	329	65

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : BRANFORD 05-31-12

BEGINNING TIME : 12:00PM PH: 12:30PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
14	62	10	3	5	2	0	0	1	0	1	0	98
17	72	19	2	3	0	0	2	0	0	0	0	115
15	98	21	1	3	0	0	0	1	0	0	0	139
11	61	14	1	4	0	1	1	0	0	0	0	93
16	81	15	0	1	1	0	0	0	0	1	0	115
12	72	13	0	7	0	0	0	0	0	2	1	107
20	74	7	1	6	0	0	0	0	0	2	1	111
15	43	5	1	7	1	0	1	0	0	1	1	75
120	563	104	9	36	4	1	4	2	0	7	3	853
						SOUTH LEG						
11	71	15	3	5	2	1	0	1	1	2	1	113
14	80	11	2	1	1	0	0	0	0	4	0	113
9	76	9	3	9	2	1	3	0	3	0	1	116
17	87	10	2	2	3	1	0	0	0	2	0	124
12	81	12	3	9	0	0	2	0	0	0	1	120
17	68	11	2	7	1	0	0	0	1	1	0	108
9	86	8	2	5	0	0	0	0	0	0	2	112
17	64	7	1	5	4	0	0	0	1	1	0	100
106	613	83	18	43	13	3	5	1	6	10	5	906
						EAST LEG						
12	42	16	1	3	3	0	1	0	0	2	1	81
12	28	16	0	3	1	1	1	3	1	3	1	70
10	29	13	0	2	0	0	1	0	0	1	0	56
9	30	10	0	0	1	0	0	0	0	0	1	51
15	35	16	2	4	2	0	1	1	0	0	1	77
3	38	24	2	6	0	0	3	0	2	1	0	79
12	34	14	0	2	0	0	3	0	0	2	2	69
3	20	11	0	3	1	0	0	1	0	1	1	41
76	256	120	5	23	8	1	10	5	3	10	7	524
						WEST LEG						
7	26	7	3	5	0	0	2	0	0	3	0	53
5	40	5	1	5	1	0	4	0	0	2	0	63
8	33	5	0	4	3	1	1	0	1	2	0	58
3	40	11	3	0	1	0	3	0	0	1	0	62
13	37	9	3	4	0	1	1	0	0	0	0	68
11	47	7	0	3	0	1	1	0	0	1	0	71
3	39	12	1	4	2	0	1	0	0	2	0	64
6	35	8	2	5	0	0	7	0	0	0	0	63
56	297	64	13	30	7	3	20	0	1	11	0	502

Prepared by Newport Traffic Studies

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: SAN FERNANDO
EAST-WEST STREET: BRANFORD
JURISDICTION: LA

DATE: 05-31-12

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 742

Rt	Thru	Lt	
115	528	99	Total
29	168	35	1st
27	95	13	2nd
26	105	15	3rd
33	160	36	4th

EAST LEG

EAST LEG TOTAL: 513

	1st	2nd	3rd	4th	Total
Rt	43	14	17	29	103
Thru	51	74	71	91	287
Lt	55	13	19	36	123

WEST LEG

Total	1st	2nd	3rd	4th	
91	33	12	11	35	Lt
387	107	58	80	142	Thru
103	49	12	11	31	Rt

WEST LEG TOTAL: 581

SOUTH LEG

	Lt	Thru	Rt
1st	19	259	24
2nd	45	164	27
3rd	37	190	21
4th	70	209	60
Total	171	822	132

TOTAL: 1,125

PEAK HOUR FACTORS

NORTH LEG = 0.80
SOUTH LEG = 0.83
EAST LEG = 0.82
WEST LEG = 0.70

ALL LEGS = 0.79

HOUR TOTAL: 2,961

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 04:00PM-05:00PM DATE: 05-31-12

NORTH LEG

	Rt	Thru	Lt
Total	87	518	82
1st	17	94	13
2nd	26	136	25
3rd	15	120	9
4th	29	168	35

	1st	2nd	3rd	4th	Total
Rt	6	20	17	43	86
Thru	67	53	77	51	248
Lt	26	37	32	55	150

	Total	1st	2nd	3rd	4th
Lt	80	12	15	20	33
Thru	313	62	92	52	107
Rt	108	13	35	11	49

	Lt	Thru	Rt
1st	17	188	26
2nd	29	246	26
3rd	23	247	28
4th	19	259	24
Total	88	940	104

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: SAN FERNANDO

EAST-WEST STREET: BRANFORD

TIME: 05:00PM-06:00PM DATE: 05-31-12

NORTH LEG

Rt	Thru	Lt	
106	453	70	Total
27	95	13	1st
26	105	15	2nd
33	160	36	3rd
20	93	6	4th

	1st	2nd	3rd	4th	Total
Rt	14	17	29	8	68
Thru	74	71	91	60	296
Lt	13	19	36	7	75

Total	1st	2nd	3rd	4th	
72	12	11	35	14	Lt
328	58	80	142	48	Thru
66	12	11	31	12	Rt

	Lt	Thru	Rt
1st	45	164	27
2nd	37	190	21
3rd	70	209	60
4th	41	155	22
Total	193	718	130

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : SAN FERNANDO LA

EAST-WEST STREET : BRANFORD 05-31-12

BEGINNING TIME : 04:00PM PH = 4:45 PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
14	76	9	2	5	0	0	6	1	1	7	3	124
26	124	24	0	3	0	0	2	1	0	7	0	187
13	100	7	2	3	0	0	7	0	0	10	2	144
28	154	32	0	5	0	0	4	1	1	5	2	232
27	85	11	0	3	1	0	4	0	0	3	1	135
25	95	12	0	5	1	0	3	2	1	2	0	146
32	149	34	0	2	0	0	5	1	1	4	1	229
20	84	5	0	3	1	0	3	0	0	3	0	119
185	867	134	4	29	3	0	34	6	4	41	9	1316
						SOUTH LEG						
26	176	16	0	2	0	0	5	0	0	5	1	231
25	235	26	0	4	0	1	4	1	0	3	2	301
27	231	21	0	6	0	0	5	1	1	5	1	298
24	243	18	0	3	0	0	6	0	0	7	1	302
25	153	42	1	2	1	1	4	1	0	5	1	236
21	179	37	0	3	0	0	6	0	0	2	0	248
59	197	67	0	4	1	1	4	1	0	4	1	339
22	148	40	0	2	1	0	2	0	0	3	0	218
229	1562	267	1	26	3	3	36	4	1	34	7	2173
						EAST LEG						
6	59	26	0	2	0	0	2	0	0	4	0	99
20	40	37	0	3	0	0	5	0	0	5	0	110
17	60	32	0	7	0	0	4	0	0	6	0	126
41	38	50	0	5	2	2	5	2	0	3	1	149
14	65	10	0	3	1	0	2	0	0	4	2	101
17	63	17	0	2	1	0	3	0	0	3	1	107
29	75	32	0	5	2	0	6	2	0	5	0	156
7	50	7	0	3	0	1	3	0	0	4	0	75
151	450	211	0	30	6	3	30	4	0	34	4	923
						WEST LEG						
12	52	5	0	2	0	1	5	6	0	3	1	87
34	82	13	0	3	0	0	3	1	1	4	1	142
11	41	16	0	3	1	0	5	1	0	3	2	83
48	92	27	0	4	1	0	7	2	1	4	3	189
11	45	9	0	2	1	1	6	1	0	5	1	82
10	68	10	0	4	0	0	6	0	1	2	1	102
30	131	31	0	3	1	1	4	1	0	4	2	208
12	36	12	0	6	0	0	3	2	0	3	0	74
168	547	123	0	27	4	3	39	14	3	28	11	967

Prepared by Newport Traffic Studies

HCM Signalized Intersection Capacity Analysis
51: SAN FERNANDO RD & BRANFORD ST

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	300	105	55	145	20	50	240	90	40	635	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.96		1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1719	1810	1468	1504	1776		1504	3214		1641	3387	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	1810	1468	1504	1776		1504	3214		1641	3387	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	47	400	140	73	193	27	67	320	120	53	847	93
RTOR Reduction (vph)	0	0	48	0	8	0	0	60	0	0	13	0
Lane Group Flow (vph)	47	400	92	73	212	0	67	380	0	53	927	0
Heavy Vehicles (%)	5%	5%	10%	20%	5%	5%	20%	5%	15%	10%	5%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	2.7	16.1	19.0	2.9	16.3		2.9	20.4		2.7	20.2	
Effective Green, g (s)	2.7	16.1	19.0	2.9	16.3		2.9	20.4		2.7	20.2	
Actuated g/C Ratio	0.05	0.28	0.33	0.05	0.28		0.05	0.35		0.05	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	80	502	581	75	498		75	1128		76	1178	
v/s Ratio Prot	0.03	c0.22	0.01	c0.05	0.12		c0.04	0.12		0.03	c0.27	
v/s Ratio Perm			0.05									
v/c Ratio	0.59	0.80	0.16	0.97	0.43		0.89	0.34		0.70	0.79	
Uniform Delay, d1	27.2	19.5	13.9	27.6	17.1		27.4	13.9		27.3	17.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.6	8.6	0.1	94.2	0.6		68.3	0.8		24.3	3.5	
Delay (s)	37.7	28.0	14.0	121.8	17.7		95.8	14.7		51.6	20.6	
Level of Service	D	C	B	F	B		F	B		D	C	
Approach Delay (s)		25.5			43.6			25.4			22.2	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	26.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	58.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	55.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: SAN FERNANDO RD & BRANFORD ST

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	180	45	70	150	45	50	345	70	65	330	55
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1641	1727	1346	1641	1595		1570	3126		1719	3364	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1641	1727	1346	1641	1595		1570	3126		1719	3364	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	37	189	47	74	158	47	53	363	74	68	347	58
RTOR Reduction (vph)	0	0	34	0	19	0	0	25	0	0	20	0
Lane Group Flow (vph)	37	189	13	74	186	0	53	412	0	68	385	0
Heavy Vehicles (%)	10%	10%	20%	10%	15%	15%	15%	10%	25%	5%	5%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	1.6	11.3	13.8	3.0	12.7		2.5	17.4		2.5	17.4	
Effective Green, g (s)	1.6	11.3	13.8	3.0	12.7		2.5	17.4		2.5	17.4	
Actuated g/C Ratio	0.03	0.23	0.27	0.06	0.25		0.05	0.35		0.05	0.35	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	52	389	477	98	404		78	1084		86	1166	
v/s Ratio Prot	0.02	0.11	0.00	c0.05	c0.12		0.03	c0.13		c0.04	0.11	
v/s Ratio Perm			0.01									
v/c Ratio	0.71	0.49	0.03	0.76	0.46		0.68	0.38		0.79	0.33	
Uniform Delay, d1	24.1	16.9	13.3	23.2	15.9		23.5	12.3		23.6	12.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	36.8	1.0	0.0	27.6	0.8		21.0	1.0		37.6	0.2	
Delay (s)	60.9	17.9	13.3	50.9	16.7		44.5	13.4		61.2	12.3	
Level of Service	E	B	B	D	B		D	B		E	B	
Approach Delay (s)		22.9			25.8			16.7			19.3	
Approach LOS		C			C			B			B	

Intersection Summary			
HCM Average Control Delay	20.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.44		
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: SAN FERNANDO RD & BRANFORD ST

7/31/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	90	385	105	125	285	105	170	820	130	100	530	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frt	1.00	1.00	0.85	1.00	0.96		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1570	1652	1538	1641	1623		1719	3367		1641	3220	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1570	1652	1538	1641	1623		1719	3367		1641	3220	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	114	487	133	158	361	133	215	1038	165	127	671	146
RTOR Reduction (vph)	0	0	35	0	15	0	0	14	0	0	20	0
Lane Group Flow (vph)	114	487	98	158	479	0	215	1189	0	127	797	0
Heavy Vehicles (%)	15%	15%	5%	10%	15%	5%	5%	5%	5%	10%	10%	5%
Turn Type	Prot	NA	pm+ov	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2	3	1	6		3	8		7	4	
Permitted Phases			2									
Actuated Green, G (s)	7.0	27.6	39.6	9.0	29.6		12.0	30.0		7.0	25.0	
Effective Green, g (s)	7.0	27.6	39.6	9.0	29.6		12.0	30.0		7.0	25.0	
Actuated g/C Ratio	0.08	0.31	0.44	0.10	0.33		0.13	0.33		0.08	0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	123	509	748	165	536		230	1127		128	898	
v/s Ratio Prot	0.07	0.29	0.02	c0.10	c0.30		c0.13	c0.35		0.08	0.25	
v/s Ratio Perm			0.05									
v/c Ratio	0.93	0.96	0.13	0.96	0.89		0.93	1.06		0.99	0.89	
Uniform Delay, d1	41.0	30.4	14.8	40.1	28.5		38.4	29.8		41.3	31.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	58.3	28.9	0.1	56.9	17.2		41.3	42.6		76.9	12.6	
Delay (s)	99.4	59.4	14.9	97.0	45.7		79.8	72.4		118.1	43.6	
Level of Service	F	E	B	F	D		E	E		F	D	
Approach Delay (s)		57.5			58.1			73.5			53.6	
Approach LOS		E			E			E			D	

Intersection Summary			
HCM Average Control Delay	62.7	HCM Level of Service	E
HCM Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	89.6	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: BRANFORD ST & SAN FERNANDO RD

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	40	635	70	100	240	90	35	300	155	55	145	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1641	3387		1128	3214		1719	1810	1162	1504	1776	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1641	3387		1128	3214		1719	1810	1162	1504	1776	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	53	847	93	133	320	120	47	400	207	73	193	27
RTOR Reduction (vph)	0	12	0	0	52	0	0	0	36	0	7	0
Lane Group Flow (vph)	53	928	0	133	388	0	47	400	171	73	213	0
Heavy Vehicles (%)	10%	5%	5%	60%	5%	15%	5%	5%	39%	20%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	3.6	24.6		9.8	30.8		3.0	18.4	28.2	4.0	19.4	
Effective Green, g (s)	3.6	24.6		9.8	30.8		3.0	18.4	28.2	4.0	19.4	
Actuated g/C Ratio	0.05	0.34		0.13	0.42		0.04	0.25	0.39	0.05	0.27	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	81	1145		152	1360		71	457	514	83	473	
v/s Ratio Prot	0.03	c0.27		c0.12	0.12		0.03	c0.22	0.04	c0.05	0.12	
v/s Ratio Perm									0.10			
v/c Ratio	0.65	0.81		0.88	0.29		0.66	0.88	0.33	0.88	0.45	
Uniform Delay, d1	34.0	22.0		30.9	13.8		34.4	26.1	15.7	34.2	22.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	17.4	6.3		38.8	0.5		20.8	16.8	0.4	59.7	0.7	
Delay (s)	51.4	28.2		69.7	14.3		55.2	42.9	16.1	93.8	22.9	
Level of Service	D	C		E	B		E	D	B	F	C	
Approach Delay (s)		29.5			27.2			35.3			40.6	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	31.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	72.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	57.8%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: BRANFORD ST & SAN FERNANDO RD

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	65	330	55	100	345	70	35	180	95	70	150	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.97		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3364		1142	3126		1641	1727	997	1641	1595	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	3364		1142	3126		1641	1727	997	1641	1595	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	347	58	105	363	74	37	189	100	74	158	47
RTOR Reduction (vph)	0	19	0	0	23	0	0	0	71	0	19	0
Lane Group Flow (vph)	68	386	0	105	414	0	37	189	29	74	186	0
Heavy Vehicles (%)	5%	5%	5%	58%	10%	25%	10%	10%	62%	10%	15%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	3.3	22.0		5.9	24.6		1.4	10.7	16.6	3.0	12.3	
Effective Green, g (s)	3.3	22.0		5.9	24.6		1.4	10.7	16.6	3.0	12.3	
Actuated g/C Ratio	0.06	0.38		0.10	0.43		0.02	0.19	0.29	0.05	0.21	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	98	1285		117	1335		40	321	357	85	341	
v/s Ratio Prot	0.04	0.11		c0.09	c0.13		0.02	0.11	0.01	c0.05	c0.12	
v/s Ratio Perm									0.02			
v/c Ratio	0.69	0.30		0.90	0.31		0.92	0.59	0.08	0.87	0.55	
Uniform Delay, d1	26.7	12.4		25.6	10.9		28.0	21.4	14.9	27.1	20.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	19.2	0.6		52.1	0.6		112.0	2.8	0.1	57.0	1.8	
Delay (s)	45.8	13.0		77.7	11.5		140.1	24.2	15.0	84.1	21.9	
Level of Service	D	B		E	B		F	C	B	F	C	
Approach Delay (s)		17.7			24.3			34.5			38.4	
Approach LOS		B			C			C			D	

Intersection Summary

HCM Average Control Delay	26.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	43.7%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: BRANFORD ST & SAN FERNANDO RD

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	100	530	115	220	820	130	90	385	155	125	285	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1641	3220		1421	3367		1570	1652	1188	1641	1623	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1641	3220		1421	3367		1570	1652	1188	1641	1623	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	127	671	146	278	1038	165	114	487	196	158	361	133
RTOR Reduction (vph)	0	20	0	0	14	0	0	0	28	0	14	0
Lane Group Flow (vph)	127	797	0	278	1189	0	114	487	168	158	480	0
Heavy Vehicles (%)	10%	10%	5%	27%	5%	5%	15%	15%	36%	10%	15%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	8.0	22.0		17.0	31.0		7.0	26.0	43.0	9.0	28.0	
Effective Green, g (s)	8.0	22.0		17.0	31.0		7.0	26.0	43.0	9.0	28.0	
Actuated g/C Ratio	0.09	0.24		0.19	0.34		0.08	0.29	0.48	0.10	0.31	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	146	787		268	1160		122	477	620	164	505	
v/s Ratio Prot	0.08	0.25		c0.20	c0.35		0.07	0.29	0.05	c0.10	c0.30	
v/s Ratio Perm									0.09			
v/c Ratio	0.87	1.01		1.04	1.02		0.93	1.02	0.27	0.96	0.95	
Uniform Delay, d1	40.5	34.0		36.5	29.5		41.3	32.0	14.1	40.3	30.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	38.6	35.1		65.0	32.9		60.9	46.6	0.2	59.0	27.5	
Delay (s)	79.0	69.1		101.5	62.4		102.2	78.6	14.3	99.3	57.8	
Level of Service	E	E		F	E		F	E	B	F	E	
Approach Delay (s)		70.5			69.7			66.2			67.8	
Approach LOS		E			E			E			E	

Intersection Summary			
HCM Average Control Delay	68.9	HCM Level of Service	E
HCM Volume to Capacity ratio	0.95		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: BRANFORD ST & SAN FERNANDO RD

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	45	690	75	110	260	100	40	325	170	60	160	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99		1.00	0.96		1.00	1.00	0.85	1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1641	3388		1128	3210		1719	1810	1162	1504	1779	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1641	3388		1128	3210		1719	1810	1162	1504	1779	
Peak-hour factor, PHF	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Adj. Flow (vph)	60	920	100	147	347	133	53	433	227	80	213	27
RTOR Reduction (vph)	0	10	0	0	47	0	0	0	35	0	5	0
Lane Group Flow (vph)	60	1010	0	147	433	0	53	433	192	80	235	0
Heavy Vehicles (%)	10%	5%	5%	60%	5%	15%	5%	5%	39%	20%	5%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	4.2	29.6		11.0	36.4		3.6	21.6	32.6	5.0	23.0	
Effective Green, g (s)	4.2	29.6		11.0	36.4		3.6	21.6	32.6	5.0	23.0	
Actuated g/C Ratio	0.05	0.36		0.13	0.44		0.04	0.26	0.39	0.06	0.28	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	83	1205		149	1404		74	470	511	90	492	
v/s Ratio Prot	0.04	c0.30		c0.13	0.13		0.03	c0.24	0.05	c0.05	0.13	
v/s Ratio Perm									0.12			
v/c Ratio	0.72	0.84		0.99	0.31		0.72	0.92	0.38	0.89	0.48	
Uniform Delay, d1	38.9	24.6		36.0	15.2		39.3	30.0	18.0	38.8	25.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.5	7.0		69.1	0.6		27.9	23.5	0.5	59.2	0.7	
Delay (s)	65.4	31.6		105.1	15.8		67.2	53.5	18.5	98.0	25.8	
Level of Service	E	C		F	B		E	D	B	F	C	
Approach Delay (s)		33.5			36.7			43.4			43.9	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	38.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.89		
Actuated Cycle Length (s)	83.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: Branford St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	70	360	60	110	375	75	40	195	105	75	165	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3365		1142	3129		1641	1727	997	1641	1594	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1719	3365		1142	3129		1641	1727	997	1641	1594	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	379	63	116	395	79	42	205	111	79	174	53
RTOR Reduction (vph)	0	20	0	0	25	0	0	0	74	0	19	0
Lane Group Flow (vph)	74	422	0	116	449	0	42	205	37	79	208	0
Heavy Vehicles (%)	5%	5%	5%	58%	10%	25%	10%	10%	62%	10%	15%	15%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	3.3	19.3		6.0	22.0		1.4	13.1	19.1	3.0	14.7	
Effective Green, g (s)	3.3	19.3		6.0	22.0		1.4	13.1	19.1	3.0	14.7	
Actuated g/C Ratio	0.06	0.34		0.10	0.38		0.02	0.23	0.33	0.05	0.26	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	99	1131		119	1199		40	394	401	86	408	
v/s Ratio Prot	0.04	0.13		c0.10	c0.14		0.03	0.12	0.01	c0.05	c0.13	
v/s Ratio Perm									0.03			
v/c Ratio	0.75	0.37		0.97	0.37		1.05	0.52	0.09	0.92	0.51	
Uniform Delay, d1	26.6	14.5		25.6	12.7		28.0	19.4	13.2	27.1	18.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	26.1	0.9		74.0	0.9		157.5	1.2	0.1	69.7	1.1	
Delay (s)	52.7	15.4		99.6	13.6		185.5	20.6	13.3	96.8	19.4	
Level of Service	D	B		F	B		F	C	B	F	B	
Approach Delay (s)		20.8			30.5			37.7			39.3	
Approach LOS		C			C			D			D	

Intersection Summary			
HCM Average Control Delay	30.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	46.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
51: Branford St & San Fernando Rd

7/31/2013

Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Volume (vph)	110	580	125	240	895	140	100	420	170	135	310	115
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.97		1.00	0.98		1.00	1.00	0.85	1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1641	3221		1421	3368		1570	1652	1188	1641	1623	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1641	3221		1421	3368		1570	1652	1188	1641	1623	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	139	734	158	304	1133	177	127	532	215	171	392	146
RTOR Reduction (vph)	0	15	0	0	10	0	0	0	24	0	11	0
Lane Group Flow (vph)	139	877	0	304	1300	0	127	532	192	171	527	0
Heavy Vehicles (%)	10%	10%	5%	27%	5%	5%	15%	15%	36%	10%	15%	5%
Turn Type	Prot	NA		Prot	NA		Prot	NA	pm+ov	Prot	NA	
Protected Phases	1	6		5	2		7	4	5	3	8	
Permitted Phases									4			
Actuated Green, G (s)	10.0	32.0		24.0	46.0		10.0	36.0	60.0	12.0	38.0	
Effective Green, g (s)	10.0	32.0		24.0	46.0		10.0	36.0	60.0	12.0	38.0	
Actuated g/C Ratio	0.08	0.27		0.20	0.38		0.08	0.30	0.50	0.10	0.32	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	137	859		284	1291		131	496	634	164	514	
v/s Ratio Prot	0.08	0.27		c0.21	c0.39		0.08	0.32	0.06	c0.10	c0.32	
v/s Ratio Perm									0.10			
v/c Ratio	1.01	1.02		1.07	1.01		0.97	1.07	0.30	1.04	1.03	
Uniform Delay, d1	55.0	44.0		48.0	37.0		54.8	42.0	17.7	54.0	41.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	80.8	36.0		73.3	26.7		68.3	61.3	0.3	82.0	46.3	
Delay (s)	135.8	80.0		121.3	63.7		123.2	103.3	17.9	136.0	87.3	
Level of Service	F	E		F	E		F	F	B	F	F	
Approach Delay (s)		87.5			74.5			85.2			99.1	
Approach LOS		F			E			F			F	

Intersection Summary			
HCM Average Control Delay	84.0	HCM Level of Service	F
HCM Volume to Capacity ratio	0.99		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

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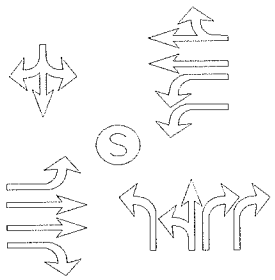
SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
52
ROUTE
9

CONDITION DIAGRAMS



EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

FOOTHILL BOULEVARD

EB LEFT	5	5%	0	5	5	10
EB THRU	235	20%	0	235	20	255
EB RIGHT	255	5%	0	255	25	280
WB LEFT	960	5%	0	960	85	1045
WB THRU	1135	5%	0	1135	100	1235
WB RIGHT	5	5%	0	5	5	10

IRWINDALE AVE

NB LEFT	385	5%	0	385	35	420
NB THRU	35	95%	50	85	5	90
NB RIGHT	390	5%	0	390	35	425
SB LEFT	5	5%	0	5	5	10
SB THRU	20	100%	50	70	5	75
SB RIGHT	5	25%	0	5	5	10
TOTALS	**3435**		**100**	**3535**	**330**	**3865**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 52
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

FOOTHILL BOULEVARD

EB LEFT	10	5%	**0**	10	5	15
EB THRU	385	5%	**0**	385	35	420
EB RIGHT	210	5%	**0**	210	20	230
WB LEFT	1065	5%	**0**	1065	95	1160
WB THRU	355	5%	**0**	355	30	385
WB RIGHT	5	5%	**0**	5	5	10

IRWINDALE AVE

NB LEFT	320	5%	**0**	320	30	350
NB THRU	40	75%	**50**	90	10	100
NB RIGHT	865	5%	**0**	865	80	945
SB LEFT	5	50%	**0**	5	5	10
SB THRU	45	80%	**50**	95	10	105
SB RIGHT	5	15%	**0**	5	5	10
TOTALS	**3310**		**100**	**3410**	**330**	**3740**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 52
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #						

FOOTHILL BOULEVARD

EB LEFT	5	5%	**0**	5	5	10
EB THRU	1645	5%	**0**	1645	150	1795
EB RIGHT	680	5%	**0**	680	60	740
WB LEFT	785	5%	**0**	785	70	855
WB THRU	380	5%	**0**	380	35	415
WB RIGHT	5	5%	**0**	5	5	10

IRWINDALE AVE

NB LEFT	270	5%	**0**	270	25	295
NB THRU	20	75%	**50**	70	5	75
NB RIGHT	590	5%	**0**	590	55	645
SB LEFT	5	5%	**0**	5	5	10
SB THRU	20	75%	**50**	70	5	75
SB RIGHT	5	5%	**0**	5	5	10
TOTALS	**4410**		**100**	**4510**	**425**	**4935**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	1 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : AM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION
52
ROUTE
9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BOULEVARD								
EB LEFT	3	0	0	5	**0**	5	5	10
EB THRU	193	41	123	315	**0**	315	30	345
EB RIGHT	250	7	21	270	**0**	270	25	295
WB LEFT	958	2	6	965	**0**	965	85	1050
WB THRU	1124	10	30	1155	**0**	1155	105	1260
WB RIGHT	1	0	0	5	**0**	5	5	10
IRWINDALE AVE								
NB LEFT	373	14	42	415	**0**	415	35	450
NB THRU	2	32	96	100	**150**	250	25	275
NB RIGHT	372	19	57	430	**0**	430	40	470
SB LEFT	0	0	0	5	**0**	5	5	10
SB THRU	1	19	57	60	**150**	210	20	230
SB RIGHT	3	1	3	5	**0**	5	5	10
TOTALS	**3280**				**300**	**4030**	**385**	**4415**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	2 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : MID-DAY PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 52
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BOULEVARD								
EB LEFT	11	0	0	10	**0**	10	5	15
EB THRU	373	11	33	405	**0**	405	35	440
EB RIGHT	201	11	33	235	**0**	235	20	255
WB LEFT	1063	0	0	1065	**0**	1065	95	1160
WB THRU	345	8	24	370	**0**	370	35	405
WB RIGHT	4	0	0	5	**0**	5	5	10
IRWINDALE AVE								
NB LEFT	306	14	42	350	**0**	350	30	380
NB THRU	22	17	51	75	**150**	225	20	245
NB RIGHT	817	48	144	960	**0**	960	85	1045
SB LEFT	2	2	6	10	**0**	10	5	15
SB THRU	18	27	81	100	**150**	250	25	275
SB RIGHT	6	1	3	10	**0**	10	5	15
TOTALS	**3168**				**300**	**3895**	**365**	**4260**

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
TURN MOVEMENT SUMMARY	TM	26-Sep-13	VV.110264.0000	3 OF 3

E/W STREET : FOOTHILL BOULEVARD
N/S STREET : IRWINDALE AVE
CONDITION : PM PEAK HOUR

PROJECTED YEAR:
PROJECTED GROWTH PER YEAR:

INTERSECTION 52
ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

TURN MOVEMENTS

CONDITION	EXISTING AUTO TRAFFIC	EXISTING TRUCK TRAFFIC	PCE TRUCK VOLUME	PCE TRAFFIC NUMBERS	PCE PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC
SCENERIO #								
FOOTHILL BOULEVARD								
EB LEFT	3	0	0	5	**0**	5	5	10
EB THRU	1643	0	0	1645	**0**	1645	150	1795
EB RIGHT	676	2	6	680	**0**	680	60	740
WB LEFT	781	2	6	785	**0**	785	70	855
WB THRU	369	10	30	400	**0**	400	35	435
WB RIGHT	3	0	0	5	**0**	5	5	10
IRWINDALE AVE								
NB LEFT	270	1	3	275	**0**	275	25	300
NB THRU	17	1	3	20	**150**	170	15	185
NB RIGHT	572	19	57	630	**0**	630	55	685
SB LEFT	2	0	0	5	**0**	5	5	10
SB THRU	15	3	9	25	**150**	175	15	190
SB RIGHT	2	0	0	5	**0**	5	5	10
TOTALS	**4353**				**300**	**4780**	**445**	**5225**

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE AVE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: IRWINDALE

DATE: 09-25-13

PEAK HOUR: 07:00AM

NORTH LEG

TOTAL: 24

	Rt	Thru	Lt
Total	4	20	
1st	1	2	0
2nd	0	5	0
3rd	2	11	0
4th	1	2	0

EAST LEG TOTAL: 2,095

	1st	2nd	3rd	4th	Total
Rt	0	0	1	0	1
Thru	366	329	240	199	1134
Lt	260	279	232	189	960

	Total	1st	2nd	3rd	4th
Lt	3	0	2	1	0
Thru	234	37	55	61	81
Rt	257	57	58	77	65

WEST LEG TOTAL: 494

PEAK HOUR FACTORS

NORTH LEG = 0.46
SOUTH LEG = 0.94
EAST LEG = 0.84
WEST LEG = 0.85

ALL LEGS = 0.91

	Lt	Thru	Rt
1st	97	9	90
2nd	105	7	103
3rd	81	12	117
4th	104	6	81
Total	387	34	391

TOTAL: 812

SOUTH LEG

HOUR TOTAL: 3,425

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE AVE — IRWINDALE

EAST-WEST STREET : FOOTHILL BLVD — 09-25-13

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	0	0	0	0	0	0	1	0	1	1	0	3
0	0	0	0	2	0	0	2	0	0	1	0	5
2	1	0	0	0	0	0	0	0	0	10	0	13
1	0	0	0	0	0	0	2	0	0	0	0	3
1	2	0	0	0	0	0	0	0	0	1	0	4
1	0	0	0	0	0	0	0	0	0	0	0	1
0	0	0	0	0	0	0	1	0	0	2	0	3
0	1	0	0	0	0	0	0	0	0	4	0	5
5	4	0	0	2	0	0	6	0	1	19	0	37
						SOUTH LEG						
89	0	94	0	0	0	1	0	3	0	9	0	196
100	0	98	0	0	7	0	2	0	3	5	0	215
108	2	79	1	0	0	4	2	1	4	8	1	210
75	0	102	3	1	1	3	3	0	0	2	1	191
74	2	112	0	0	1	0	2	1	5	2	0	199
199	0	103	2	3	0	2	1	0	3	3	0	316
188	0	117	1	0	0	2	3	0	2	4	1	318
131	0	71	4	0	1	7	0	7	8	2	0	231
964	4	776	11	4	10	19	13	12	25	35	3	1876
						EAST LEG						
0	366	258	0	0	1	0	0	1	0	0	0	626
0	324	279	0	0	0	0	5	0	0	0	0	608
1	237	232	0	2	0	0	1	0	0	0	0	473
0	197	189	0	0	0	0	1	0	0	1	0	388
0	235	187	0	1	0	0	0	0	0	0	0	423
0	238	181	0	0	0	1	3	0	0	0	0	423
0	196	196	0	9	3	0	0	0	0	0	0	404
0	122	185	0	5	0	0	1	0	0	0	0	313
1	1915	1707	0	17	4	1	11	1	0	1	0	3658
						WEST LEG						
55	26	0	2	7	0	0	4	0	0	0	0	94
54	40	2	1	10	0	3	4	0	0	1	0	115
77	49	1	0	5	0	0	7	0	0	0	0	139
64	78	0	1	0	0	0	3	0	0	0	0	146
47	89	2	0	3	0	0	3	0	0	0	0	144
47	105	0	9	2	0	0	0	0	0	0	0	163
101	166	4	3	3	0	1	1	0	0	0	0	279
54	61	0	3	0	1	0	0	0	0	0	0	119
499	614	9	19	30	1	4	22	0	0	1	0	1199

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 07:00AM-08:00AM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
4	20	0	Total
1	2	0	1st
0	5	0	2nd
2	11	0	3rd
1	2	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	0	1	0	1
Thru	366	329	240	199	1134
Lt	260	279	232	189	960

Total	1st	2nd	3rd	4th	
3	0	2	1	0	Lt
234	37	55	61	81	Thru
257	57	58	77	65	Rt

	Lt	Thru	Rt
1st	97	9	90
2nd	105	7	103
3rd	81	12	117
4th	104	6	81
Total	387	34	391

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 08:00AM-09:00AM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
2	11	0	Total
1	3	0	1st
1	0	0	2nd
0	3	0	3rd
0	5	0	4th

	1st	2nd	3rd	4th	Total
Rt	0	1	0	0	1
Thru	236	241	205	128	810
Lt	187	181	199	185	752

Total	1st	2nd	3rd	4th	
7	2	0	4	1	Lt
433	95	107	170	61	Thru
265	47	56	105	57	Rt

	Lt	Thru	Rt
1st	114	6	79
2nd	103	7	206
3rd	118	7	193
4th	79	2	150
Total	414	22	628

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE AVE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: IRWINDALE

DATE: 09-25-13

PEAK HOUR: 12:15PM

NORTH LEG

TOTAL: 56

Rt	Thru	Lt	
7	45	4	Total
3	18	2	1st
4	14	1	2nd
0	6	1	3rd
0	7	0	4th

EAST LEG TOTAL: 1,420

	1st	2nd	3rd	4th	Total
Rt	2	0	1	1	4
Thru	120	84	72	77	353
Lt	332	302	240	189	1063

Total	1st	2nd	3rd	4th	
11	2	2	4	3	Lt
384	107	121	73	83	Thru
212	61	48	46	57	Rt

WEST LEG TOTAL: 607

PEAK HOUR FACTORS

NORTH LEG = 0.61
SOUTH LEG = 0.84
EAST LEG = 0.78
WEST LEG = 0.89

ALL LEGS = 0.82

	Lt	Thru	Rt
1st	100	15	251
2nd	92	14	248
3rd	64	6	178
4th	64	4	188
Total	320	39	865

TOTAL: 1,224

SOUTH LEG

HOUR TOTAL: 3,307

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE AVE IRWINDALE

EAST-WEST STREET : FOOTHILL BLVD 09-25-13

BEGINNING TIME : 12:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
3	0	2	0	0	0	0	3	0	0	6	0	14
3	12	0	0	1	0	0	1	2	0	4	0	23
3	0	1	0	0	0	1	4	0	0	10	0	19
0	1	1	0	0	0	0	1	0	0	4	0	7
0	5	0	0	0	0	0	0	0	0	2	0	7
4	4	0	0	0	0	0	1	0	0	3	0	12
0	0	1	0	0	0	0	1	0	0	2	0	4
0	1	1	0	0	0	0	1	0	0	0	0	3
13	23	6	0	1	0	1	12	2	0	31	0	89
						SOUTH LEG						
191	1	52	0	0	2	3	0	1	1	5	1	257
244	9	97	0	0	1	2	0	0	5	6	2	366
239	8	91	0	0	0	3	0	0	6	6	1	354
165	3	56	2	0	4	5	1	4	6	2	0	248
169	2	62	2	0	1	10	1	1	7	1	0	256
75	1	66	5	0	0	2	2	0	6	8	1	166
195	3	55	2	0	0	6	0	1	11	0	0	273
112	2	81	5	0	0	4	2	1	6	2	1	216
1390	29	560	16	0	8	35	6	8	48	30	6	2136
						EAST LEG						
0	56	165	1	2	0	0	0	0	0	2	0	226
2	120	332	0	0	0	0	0	0	0	0	0	454
0	80	302	0	0	0	0	3	0	0	1	0	386
1	71	240	0	1	0	0	0	0	0	0	0	313
1	74	189	0	3	0	0	0	0	0	0	0	267
0	74	202	0	2	0	0	0	0	0	1	0	279
1	86	242	0	1	0	0	0	0	0	0	0	330
1	51	157	0	1	0	1	0	0	1	0	0	212
6	6121	829	1	10	0	1	3	0	1	4	0	2467
						WEST LEG						
33	67	1	0	3	0	0	0	0	1	0	0	105
58	106	2	0	1	0	0	0	0	3	0	0	170
41	120	2	0	1	0	5	0	0	2	0	0	171
46	68	4	0	2	0	0	2	0	0	1	0	123
56	79	3	0	4	0	1	0	0	0	0	0	143
49	90	1	0	0	0	0	0	0	0	0	0	140
51	78	1	0	2	0	0	0	0	0	2	0	134
28	71	0	0	2	0	1	0	0	0	0	0	102
362	679	14	0	15	0	7	2	0	6	3	0	1088

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 12:00PM-01:00PM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
10	47	6	Total
3	9	2	1st
3	18	2	2nd
4	14	1	3rd
0	6	1	4th

	1st	2nd	3rd	4th	Total
Rt	1	2	0	1	4
Thru	60	120	84	72	336
Lt	165	332	302	240	1039

Total	1st	2nd	3rd	4th	
9	1	2	2	4	Lt
371	70	107	121	73	Thru
189	34	61	48	46	Rt

	Lt	Thru	Rt
1st	56	6	195
2nd	100	15	251
3rd	92	14	248
4th	64	6	178
Total	312	41	872

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 01:00PM-02:00PM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
4	20	2	Total
0	7	0	1st
4	8	0	2nd
0	3	1	3rd
0	2	1	4th

	1st	2nd	3rd	4th	Total
Rt	1	0	1	3	5
Thru	77	77	87	52	293
Lt	189	202	242	157	790

Total	1st	2nd	3rd	4th	
5	3	1	1	0	Lt
328	83	90	82	73	Thru
186	57	49	51	29	Rt

	Lt	Thru	Rt
1st	64	4	188
2nd	67	11	88
3rd	56	3	214
4th	83	6	127
Total	270	24	617

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: IRWINDALE AVE
EAST-WEST STREET: FOOTHILL BLVD
JURISDICTION: IRWINDALE

DATE: 09-25-13

PEAK HOUR: 05:00PM

NORTH LEG

TOTAL: 23

Rt	Thru	Lt	
2	19	2	Total
0	3	0	1st
2	5	0	2nd
0	8	0	3rd
0	3	2	4th

EAST LEG TOTAL: 1,165

	1st	2nd	3rd	4th	Total
Rt	1	2	0	0	3
Thru	104	114	101	60	379
Lt	163	229	237	154	783

Total	1st	2nd	3rd	4th	
3	1	0	1	1	Lt
1643	416	404	339	484	Thru
678	194	158	154	172	Rt

WEST LEG TOTAL: 2,324

PEAK HOUR FACTORS

NORTH LEG = 0.72
SOUTH LEG = 0.89
EAST LEG = 0.84
WEST LEG = 0.88

ALL LEGS = 0.96

	Lt	Thru	Rt
1st	60	12	125
2nd	71	4	152
3rd	66	2	142
4th	74	0	172
Total	271	18	591

TOTAL: 880

SOUTH LEG

HOUR TOTAL: 4,392

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : IRWINDALE AVE — IRWINDALE

EAST-WEST STREET : FOOTHILL BLVD — 09-25-13

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
0	9	1	0	0	0	0	0	0	0	0	0	10
0	5	0	0	0	0	0	0	0	0	0	0	5
0	8	2	0	0	0	0	0	0	0	0	0	10
0	5	3	0	0	0	0	0	0	0	0	0	8
0	2	0	0	0	0	0	0	0	0	1	0	3
2	4	0	0	0	0	0	0	0	0	1	0	7
0	7	0	0	0	0	0	0	0	0	1	0	8
0	3	2	0	0	0	0	0	0	0	0	0	5
2	43	8	0	0	0	0	0	0	0	3	0	56
						SOUTH LEG						
138	0	56	1	0	1	3	0	2	8	0	0	209
142	3	54	0	0	0	0	0	0	5	0	0	204
162	5	87	4	0	0	0	0	0	2	0	0	260
136	0	93	0	0	0	0	1	0	4	1	0	235
119	12	59	2	0	0	1	0	0	3	0	1	197
147	4	71	1	0	0	2	0	0	2	0	0	227
136	1	66	2	0	0	3	0	0	1	1	0	210
170	0	74	0	0	0	2	0	0	0	0	0	246
1150	25	560	10	0	1	11	1	2	25	2	1	1788
						EAST LEG						
0	58	198	1	7	1	0	5	0	0	2	0	272
0	86	181	0	0	0	0	4	0	0	0	0	271
0	82	216	0	6	0	0	1	0	0	1	0	306
1	89	178	0	4	2	0	5	1	0	0	0	280
1	102	163	0	0	0	0	0	0	0	2	0	268
2	113	227	0	1	2	0	0	0	0	0	0	345
0	96	237	0	4	0	0	1	0	0	0	0	338
0	58	154	0	2	0	0	0	0	0	0	0	214
4	684	1554	1	24	5	0	16	1	0	5	0	2294
						WEST LEG						
130	302	1	0	1	0	0	0	0	0	0	0	434
137	345	2	0	0	0	0	0	0	0	0	0	484
113	319	0	0	3	0	0	0	0	0	0	0	435
115	328	1	0	0	0	0	0	0	0	0	0	444
192	416	1	2	0	0	0	0	0	0	0	0	611
158	404	0	0	0	0	0	0	0	0	0	0	562
154	339	1	0	0	0	0	0	0	0	0	0	494
172	484	1	0	0	0	0	0	0	0	0	0	657
1171	2937	7	2	4	0	0	0	0	0	0	0	4121

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 04:00PM-05:00PM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
0	27	6	Total
0	9	1	1st
0	5	0	2nd
0	8	2	3rd
0	5	3	4th

	1st	2nd	3rd	4th	Total
Rt	1	0	0	1	2
Thru	72	90	90	98	350
Lt	199	181	216	181	777

Total	1st	2nd	3rd	4th	
4	1	2	0	1	Lt
1298	303	345	322	328	Thru
495	130	137	113	115	Rt

	Lt	Thru	Rt
1st	59	0	150
2nd	54	3	147
3rd	87	5	168
4th	93	2	140
Total	293	10	605

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: IRWINDALE AVE

EAST-WEST STREET: FOOTHILL BLVD

TIME: 05:00PM-06:00PM DATE: 09-25-13

NORTH LEG

Rt	Thru	Lt	
2	19	2	Total
0	3	0	1st
2	5	0	2nd
0	8	0	3rd
0	3	2	4th

	1st	2nd	3rd	4th	Total
Rt	1	2	0	0	3
Thru	104	114	101	60	379
Lt	163	229	237	154	783

Total	1st	2nd	3rd	4th	
3	1	0	1	1	Lt
1643	416	404	339	484	Thru
678	194	158	154	172	Rt

	Lt	Thru	Rt
1st	60	12	125
2nd	71	4	152
3rd	66	2	142
4th	74	0	172
Total	271	18	591

Prepared by NEWPORT TRAFFIC STUDIES

HCM Signalized Intersection Capacity Analysis
52: Irwindale Ave & Foothill Blvd

9/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	235	255	960	1135	5	385	35	390	5	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)	1719	3008	1538	3335	3436		1633	1448	2707		1086	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	0.74	1.00		0.96	
Satd. Flow (perm)	1719	3008	1538	3335	3436		1266	1114	2707		1045	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	258	280	1055	1247	5	423	38	429	5	22	5
RTOR Reduction (vph)	0	0	219	0	0	0	0	0	171	0	4	0
Lane Group Flow (vph)	5	258	61	1055	1252	0	228	233	258	0	28	0
Heavy Vehicles (%)	5%	20%	5%	5%	5%	5%	5%	95%	5%	5%	95%	25%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.7	14.7	14.7	23.2	37.2		17.1	17.1	40.3		17.1	
Effective Green, g (s)	0.7	14.7	14.7	23.2	37.2		17.1	17.1	40.3		17.1	
Actuated g/C Ratio	0.01	0.22	0.22	0.35	0.56		0.26	0.26	0.60		0.26	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	18	660	337	1155	1908		323	284	1790		267	
v/s Ratio Prot	0.00	0.09		c0.32	c0.36				0.05			
v/s Ratio Perm			0.04				0.18	c0.21	0.05		0.03	
v/c Ratio	0.28	0.39	0.18	0.91	0.66		0.71	0.82	0.14		0.11	
Uniform Delay, d1	32.9	22.3	21.3	20.9	10.4		22.7	23.5	5.8		19.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	8.3	0.4	0.3	11.0	0.8		12.2	22.6	0.0		0.8	
Delay (s)	41.2	22.7	21.5	31.9	11.2		34.9	46.1	5.9		19.9	
Level of Service	D	C	C	C	B		C	D	A		B	
Approach Delay (s)		22.3			20.7			23.8			19.9	
Approach LOS		C			C			C			B	

Intersection Summary			
HCM Average Control Delay	21.7	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
52: Irwindale Ave & Foothill Blvd

9/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	385	210	1065	355	5	320	40	865	5	45	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		1.00	
Satd. Flow (prot)	1719	3438	1538	3335	3431		1633	1526	2707		1205	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.79	0.78	1.00		0.97	
Satd. Flow (perm)	1719	3438	1538	3335	3431		1358	1243	2707		1175	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	12	470	256	1299	433	6	390	49	1055	6	55	6
RTOR Reduction (vph)	0	0	195	0	1	0	0	0	48	0	5	0
Lane Group Flow (vph)	12	470	61	1299	438	0	218	221	1007	0	62	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	45%	5%	50%	60%	15%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	18.2	18.2	30.0	47.4		16.0	16.0	46.0		16.0	
Effective Green, g (s)	0.8	18.2	18.2	30.0	47.4		16.0	16.0	46.0		16.0	
Actuated g/C Ratio	0.01	0.24	0.24	0.39	0.62		0.21	0.21	0.60		0.21	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	18	821	367	1313	2134		285	261	1776		247	
v/s Ratio Prot	0.01	c0.14		c0.39	0.13				c0.22			
v/s Ratio Perm			0.04				0.16	c0.18	0.15		0.05	
v/c Ratio	0.67	0.57	0.17	0.99	0.21		0.76	0.85	0.57		0.25	
Uniform Delay, d1	37.6	25.6	23.0	22.9	6.2		28.3	28.9	9.1		25.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	66.1	1.0	0.2	22.0	0.0		17.6	27.3	0.4		2.4	
Delay (s)	103.7	26.5	23.2	45.0	6.3		45.9	56.2	9.5		27.5	
Level of Service	F	C	C	D	A		D	E	A		C	
Approach Delay (s)		26.6			35.2			21.7			27.5	
Approach LOS		C			D			C			C	

Intersection Summary			
HCM Average Control Delay	28.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	76.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	67.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
52: Irwindale Ave & Foothill Blvd

9/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1645	680	785	380	5	270	20	590	5	20	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.96	1.00		0.99	
Satd. Flow (prot)	1719	3438	1538	3335	3432		1633	1648	2707		1485	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	0.73	1.00		0.96	
Satd. Flow (perm)	1719	3438	1538	3335	3432		1267	1261	2707		1431	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	5	1714	708	818	396	5	281	21	615	5	21	5
RTOR Reduction (vph)	0	0	210	0	1	0	0	0	9	0	4	0
Lane Group Flow (vph)	5	1714	498	818	400	0	149	153	606	0	27	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	5%	15%	5%
Parking (#/hr)											0	
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	51.2	51.2	24.0	74.4		16.0	16.0	40.0		16.0	
Effective Green, g (s)	0.8	51.2	51.2	24.0	74.4		16.0	16.0	40.0		16.0	
Actuated g/C Ratio	0.01	0.50	0.50	0.23	0.72		0.16	0.16	0.39		0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	13	1706	763	776	2474		196	196	1154		222	
v/s Ratio Prot	0.00	c0.50		c0.25	0.12				c0.12			
v/s Ratio Perm			0.32				0.12	c0.12	0.10		0.02	
v/c Ratio	0.38	1.00	0.65	1.05	0.16		0.76	0.78	0.53		0.12	
Uniform Delay, d1	51.0	26.0	19.4	39.6	4.5		41.8	41.9	24.3		37.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	17.9	22.9	2.0	47.5	0.0		23.8	25.9	0.4		1.1	
Delay (s)	68.8	48.9	21.4	87.1	4.6		65.6	67.8	24.7		38.7	
Level of Service	E	D	C	F	A		E	E	C		D	
Approach Delay (s)		40.9			60.0			38.6			38.7	
Approach LOS		D			E			D			D	

Intersection Summary			
HCM Average Control Delay	45.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	103.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
52: Irwindale Ave & Foothill Blvd

9/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	235	255	960	1135	5	385	85	390	5	70	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		1.00	
Satd. Flow (prot)	1719	3008	1538	3335	3436		1633	1277	2707		988	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.74	0.78	1.00		0.98	
Satd. Flow (perm)	1719	3008	1538	3335	3436		1275	1029	2707		975	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	5	258	280	1055	1247	5	423	93	429	5	77	5
RTOR Reduction (vph)	0	0	225	0	0	0	0	0	138	0	3	0
Lane Group Flow (vph)	5	258	55	1055	1252	0	254	262	291	0	84	0
Heavy Vehicles (%)	5%	20%	5%	5%	5%	5%	5%	95%	5%	5%	100%	25%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.7	15.3	15.3	26.5	41.1		24.1	24.1	50.6		24.1	
Effective Green, g (s)	0.7	15.3	15.3	26.5	41.1		24.1	24.1	50.6		24.1	
Actuated g/C Ratio	0.01	0.20	0.20	0.34	0.53		0.31	0.31	0.65		0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	15	591	302	1134	1813		394	318	1897		302	
v/s Ratio Prot	0.00	0.09		c0.32	c0.36				0.05			
v/s Ratio Perm			0.04				0.20	c0.25	0.06		0.09	
v/c Ratio	0.33	0.44	0.18	0.93	0.69		0.64	0.82	0.15		0.28	
Uniform Delay, d1	38.4	27.5	26.1	24.8	13.7		23.2	24.9	5.3		20.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	12.7	0.5	0.3	13.2	1.2		7.9	20.9	0.0		2.3	
Delay (s)	51.0	28.0	26.4	38.0	14.8		31.1	45.9	5.4		22.6	
Level of Service	D	C	C	D	B		C	D	A		C	
Approach Delay (s)		27.4			25.4			23.5			22.6	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	25.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	77.9	Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
52: Irwindale Ave & Foothill Blvd

9/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	385	210	1065	355	5	320	90	865	5	95	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		1.00	
Satd. Flow (prot)	1719	3438	1538	3335	3431		1633	1301	2707		1073	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.63	0.72	1.00		0.99	
Satd. Flow (perm)	1719	3438	1538	3335	3431		1083	961	2707		1060	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	12	470	256	1299	433	6	390	110	1055	6	116	6
RTOR Reduction (vph)	0	0	203	0	1	0	0	0	23	0	2	0
Lane Group Flow (vph)	12	470	53	1299	438	0	242	258	1032	0	126	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	75%	5%	50%	80%	15%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	19.2	19.2	36.0	54.4		25.0	25.0	61.0		25.0	
Effective Green, g (s)	0.8	19.2	19.2	36.0	54.4		25.0	25.0	61.0		25.0	
Actuated g/C Ratio	0.01	0.21	0.21	0.39	0.59		0.27	0.27	0.66		0.27	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	15	716	320	1302	2024		294	261	1908		287	
v/s Ratio Prot	0.01	c0.14		c0.39	0.13				c0.21			
v/s Ratio Perm			0.03				0.22	c0.27	0.17		0.12	
v/c Ratio	0.80	0.66	0.17	1.00	0.22		0.82	0.99	0.54		0.44	
Uniform Delay, d1	45.6	33.5	29.9	28.1	8.9		31.5	33.5	8.2		27.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	132.2	2.2	0.2	24.2	0.1		22.3	52.9	0.3		4.8	
Delay (s)	177.8	35.7	30.2	52.3	8.9		53.8	86.3	8.5		32.6	
Level of Service	F	D	C	D	A		D	F	A		C	
Approach Delay (s)		36.1			41.3			28.5			32.6	
Approach LOS		D			D			C			C	

Intersection Summary			
HCM Average Control Delay	35.3	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
52: Irwindale Ave & Foothill Blvd

9/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	5	1645	680	785	380	5	270	70	590	5	70	5
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		1.00	
Satd. Flow (prot)	1719	3438	1538	3335	3432		1633	1318	2707		1015	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.66	0.74	1.00		0.98	
Satd. Flow (perm)	1719	3438	1538	3335	3432		1139	1006	2707		1000	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	5	1714	708	818	396	5	281	73	615	5	73	5
RTOR Reduction (vph)	0	0	152	0	1	0	0	0	9	0	3	0
Lane Group Flow (vph)	5	1714	556	818	400	0	171	183	606	0	80	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	75%	5%	5%	75%	5%
Parking (#/hr)											0	
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	51.2	51.2	23.0	73.4		17.0	17.0	40.0		17.0	
Effective Green, g (s)	0.8	51.2	51.2	23.0	73.4		17.0	17.0	40.0		17.0	
Actuated g/C Ratio	0.01	0.50	0.50	0.22	0.71		0.16	0.16	0.39		0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	13	1706	763	743	2441		188	166	1154		165	
v/s Ratio Prot	0.00	c0.50		c0.25	0.12				0.12			
v/s Ratio Perm			0.36				0.15	c0.18	0.11		0.08	
v/c Ratio	0.38	1.00	0.73	1.10	0.16		0.91	1.10	0.53		0.49	
Uniform Delay, d1	51.0	26.0	20.5	40.1	4.9		42.3	43.1	24.3		39.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	17.9	22.9	3.5	64.1	0.0		45.5	99.9	0.4		10.0	
Delay (s)	68.8	48.9	24.0	104.2	4.9		87.8	143.0	24.7		49.1	
Level of Service	E	D	C	F	A		F	F	C		D	
Approach Delay (s)		41.7			71.6			58.2			49.1	
Approach LOS		D			E			E			D	

Intersection Summary			
HCM Average Control Delay	53.0	HCM Level of Service	D
HCM Volume to Capacity ratio	1.05		
Actuated Cycle Length (s)	103.2	Sum of lost time (s)	12.0
Intersection Capacity Utilization	93.9%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
52: Irwindale Ave & Foothill Blvd

9/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	255	280	1045	1235	10	420	90	425	10	75	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		0.99	
Satd. Flow (prot)	1719	3008	1538	3335	3434		1633	1286	2707		1024	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.69	0.75	1.00		0.96	
Satd. Flow (perm)	1719	3008	1538	3335	3434		1193	991	2707		989	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	11	280	308	1148	1357	11	462	99	467	11	82	11
RTOR Reduction (vph)	0	0	250	0	0	0	0	0	88	0	5	0
Lane Group Flow (vph)	11	280	58	1148	1368	0	273	288	379	0	99	0
Heavy Vehicles (%)	5%	20%	5%	5%	5%	5%	5%	95%	5%	5%	100%	25%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	16.7	16.7	32.2	48.1		28.1	28.1	60.3		28.1	
Effective Green, g (s)	0.8	16.7	16.7	32.2	48.1		28.1	28.1	60.3		28.1	
Actuated g/C Ratio	0.01	0.19	0.19	0.36	0.54		0.32	0.32	0.68		0.32	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	15	564	289	1207	1856		377	313	1956		312	
v/s Ratio Prot	0.01	0.09		c0.34	c0.40				0.07			
v/s Ratio Perm			0.04				0.23	c0.29	0.07		0.10	
v/c Ratio	0.73	0.50	0.20	0.95	0.74		0.72	0.92	0.19		0.32	
Uniform Delay, d1	44.0	32.4	30.5	27.6	15.6		27.0	29.4	5.3		23.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	103.2	0.7	0.3	15.6	1.6		11.5	34.0	0.0		2.7	
Delay (s)	147.2	33.1	30.9	43.2	17.2		38.5	63.4	5.4		25.8	
Level of Service	F	C	C	D	B		D	E	A		C	
Approach Delay (s)		34.0			29.1			30.4			25.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	89.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
52: Irwindale Ave & Foothill Blvd

9/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	420	230	1160	385	10	350	100	945	10	105	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		1.00	
Satd. Flow (prot)	1719	3438	1538	3335	3425		1633	1299	2707		1085	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.60	0.69	1.00		0.97	
Satd. Flow (perm)	1719	3438	1538	3335	3425		1025	921	2707		1055	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	18	512	280	1415	470	12	427	122	1152	12	128	12
RTOR Reduction (vph)	0	0	225	0	2	0	0	0	12	0	4	0
Lane Group Flow (vph)	18	512	55	1415	480	0	265	284	1140	0	148	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	75%	5%	50%	80%	15%
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	1.6	18.1	18.1	36.0	52.5		26.0	26.0	62.0		26.0	
Effective Green, g (s)	1.6	18.1	18.1	36.0	52.5		26.0	26.0	62.0		26.0	
Actuated g/C Ratio	0.02	0.20	0.20	0.39	0.57		0.28	0.28	0.67		0.28	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	30	676	302	1304	1952		289	260	1940		298	
v/s Ratio Prot	0.01	c0.15		c0.42	0.14				0.23			
v/s Ratio Perm			0.04				0.26	c0.31	0.19		0.14	
v/c Ratio	0.60	0.76	0.18	1.09	0.25		0.92	1.09	0.59		0.50	
Uniform Delay, d1	44.9	34.9	30.8	28.0	9.9		32.0	33.0	8.1		27.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	28.3	4.9	0.3	51.4	0.1		35.3	82.7	0.5		5.8	
Delay (s)	73.2	39.8	31.1	79.5	10.0		67.3	115.7	8.6		33.4	
Level of Service	E	D	C	E	A		E	F	A		C	
Approach Delay (s)		37.5			61.8			35.6			33.4	
Approach LOS		D			E			D			C	

Intersection Summary			
HCM Average Control Delay	46.8	HCM Level of Service	D
HCM Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	92.1	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
52: Irwindale Ave & Foothill Blvd

9/26/2013

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	1795	740	855	415	10	295	75	645	10	75	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Lane Util. Factor	1.00	0.95	1.00	0.97	0.95		0.95	0.95	0.88		1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85		0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.97	1.00		0.99	
Satd. Flow (prot)	1719	3438	1538	3335	3426		1633	1321	2707		1044	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.59	0.67	1.00		0.96	
Satd. Flow (perm)	1719	3438	1538	3335	3426		1010	909	2707		1011	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	1870	771	891	432	10	307	78	672	10	78	10
RTOR Reduction (vph)	0	0	143	0	1	0	0	0	7	0	3	0
Lane Group Flow (vph)	10	1870	628	891	441	0	187	198	665	0	95	0
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	75%	5%	5%	75%	5%
Parking (#/hr)											0	
Turn Type	Prot	NA	Perm	Prot	NA		Perm	NA	pm+ov	Perm	NA	
Protected Phases	5	2		1	6			8	1		4	
Permitted Phases			2				8		8	4		
Actuated Green, G (s)	0.8	68.2	68.2	30.0	97.4		23.0	23.0	53.0		23.0	
Effective Green, g (s)	0.8	68.2	68.2	30.0	97.4		23.0	23.0	53.0		23.0	
Actuated g/C Ratio	0.01	0.51	0.51	0.23	0.73		0.17	0.17	0.40		0.17	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0		4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0		3.0	
Lane Grp Cap (vph)	10	1760	787	751	2505		174	157	1158		175	
v/s Ratio Prot	0.01	c0.54		c0.27	0.13				c0.13			
v/s Ratio Perm			0.41				0.19	c0.22	0.12		0.09	
v/c Ratio	1.00	1.06	0.80	1.19	0.18		1.07	1.26	0.57		0.54	
Uniform Delay, d1	66.2	32.5	26.8	51.6	5.5		55.1	55.1	31.3		50.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	284.6	40.3	5.6	97.1	0.0		89.5	158.6	0.7		11.5	
Delay (s)	350.8	72.8	32.4	148.7	5.6		144.6	213.7	32.0		61.8	
Level of Service	F	E	C	F	A		F	F	C		E	
Approach Delay (s)		62.1			101.2			85.9			61.8	
Approach LOS		E			F			F			E	

Intersection Summary			
HCM Average Control Delay	77.1	HCM Level of Service	E
HCM Volume to Capacity ratio	1.09		
Actuated Cycle Length (s)	133.2	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.8%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Hall & Foreman, Inc.

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APPENDIX C: FREEWAY SEGMENT CAPACITY ANALYSIS WORKSHEETS

Devil's Gate Reservoir Sediment Removal and Management Project

Los Angeles County, California

TRAFFIC IMPACT ANALYSIS

Prepared by:

Hall & Foreman, Inc.

14297 Cajon Street #101
Victorville, CA 92392
Telephone: (760) 524-9100 Fax: (760) 524-9101

September 23, 2013

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Berkshire Place and Windsor Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5570	7%	50	5620	8%	500	6120	8%
MID	3510	18%	50	3560	19%	315	3875	19%
PM	4335	12%	50	4385	13%	390	4775	13%
WESTBOUND								
AM	3365	1%	50	3415	3%	305	3720	3%
MID	2460	5%	50	2510	7%	220	2730	7%
PM	4060	2%	50	4110	3%	365	4475	3%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1466	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1517	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1517	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.0	mi/h
Number of lanes, N	4	
Density, D	21.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3510	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	924	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	956	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	956	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4335	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1141	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1209	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1209	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	4	
Density, D	16.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5620	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1479	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1538	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1538	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	4	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3560	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	937	v
Trucks and buses	19	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	1026	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1026	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4385	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1154	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1229	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1229	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	4	
Density, D	16.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5620	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1479	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1538	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1538	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	4	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3875	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1020	v
Trucks and buses	19	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	1117	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1117	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	14.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4775	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1257	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1338	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1338	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	4	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3365	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	886	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	890	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	890	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	11.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2460	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	647	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	664	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	664	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	8.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4060	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1068	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1095	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1095	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3415	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	899	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	912	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	912	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2510	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	661	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	684	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	684	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	9.1	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4110	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1082	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1098	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1098	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3720	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	979	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	994	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	994	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2730	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	718	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	744	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	744	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	9.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Berkshire Place/Windsor Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4475	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1178	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1219	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1219	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	4	
Density, D	16.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Windsor Avenue and Lincoln Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5715	1%	**50**	5765	2%	515	6280	2%
MID	3650	3%	**50**	3700	5%	330	4030	5%
PM	4400	2%	**50**	4450	3%	395	4845	3%
WESTBOUND								
AM	3780	12%	**50**	3830	13%	340	4170	13%
MID	3635	19%	**50**	3685	20%	325	4010	20%
PM	5610	11%	**50**	5660	12%	505	6165	12%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5715	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1504	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1511	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1511	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.1	mi/h
Number of lanes, N	4	
Density, D	21.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3650	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	961	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	975	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	975	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4400	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1158	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1169	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1169	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5765	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1517	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1532	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1532	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.9	mi/h
Number of lanes, N	4	
Density, D	21.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3700	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	974	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	998	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	998	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4450	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1171	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1189	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1189	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	4	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6280	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1653	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1669	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1669	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	4	
Density, D	23.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1061	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1087	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1087	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.5	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4845	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1275	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1294	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1294	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	4	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3780	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	995	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1005	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1005	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3635	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	957	v
Trucks and buses	19	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	1047	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1047	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5610	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1476	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1558	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1558	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.6	mi/h
Number of lanes, N	4	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3830	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1008	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1073	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1073	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3685	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	970	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1067	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1067	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5660	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1489	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1579	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1579	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.3	mi/h
Number of lanes, N	4	
Density, D	22.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4170	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1097	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1169	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1169	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4010	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1055	v
Trucks and buses	20	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.909	
Driver population factor, fp	1.00	
Flow rate, vp	1161	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1161	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Windsor Avenue/Lincoln Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6165	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1622	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1720	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1720	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.3	mi/h
Number of lanes, N	4	
Density, D	24.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Mountain Street and SR-134 Interchange

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5520	5%	**50**	5570	6%	495	6065	6%
MID	3495	11%	**50**	3545	13%	315	3860	13%
PM	4100	7%	**50**	4150	8%	370	4520	8%
WESTBOUND								
AM	4775	2%	**50**	4825	3%	430	5255	3%
MID	3905	11%	**50**	3955	12%	350	4305	12%
PM	5615	6%	**50**	5665	7%	505	6170	7%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5520	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1453	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1489	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1489	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.4	mi/h
Number of lanes, N	4	
Density, D	20.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3495	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	920	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	970	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	970	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4100	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1079	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1117	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1117	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	14.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1466	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1510	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1510	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.1	mi/h
Number of lanes, N	4	
Density, D	20.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3545	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	933	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	961	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	961	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4150	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1092	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1136	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1136	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	15.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6065	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1596	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1644	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1644	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.4	mi/h
Number of lanes, N	4	
Density, D	23.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3860	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1016	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1082	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1082	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4520	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1189	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1237	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1237	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	4	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4775	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1257	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1015	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1015	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	13.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3905	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1028	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	867	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	867	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	11.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone:
E-mail:
Fax:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5615	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1478	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1218	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1218	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	5	
Density, D	16.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4825	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1270	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1031	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1031	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	13.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3955	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1041	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	883	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	883	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	11.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5665	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1491	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1234	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1234	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	5	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

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Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5255	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1383	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1123	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1123	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	5	
Density, D	15.0	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

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Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4305	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1133	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	961	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	961	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	12.8	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Mountain Street/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6170	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1624	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1344	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1344	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	5	
Density, D	18.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Figueroa Street and San Rafael Avenue

FREEWAY : SR-134

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5970	0%	**50**	6020	1%	535	6555	1%
MID	5610	0%	**50**	5660	1%	505	6165	1%
PM	6725	0%	**50**	6775	1%	605	7380	1%
WESTBOUND								
AM	7980	3%	**50**	8030	4%	720	8750	4%
MID	5605	5%	**50**	5655	6%	505	6160	6%
PM	7375	4%	**50**	7425	5%	665	8090	5%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5970	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1571	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1257	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1257	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.3	mi/h
Number of lanes, N	5	
Density, D	16.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5610	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1476	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1181	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1181	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	5	
Density, D	15.8	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6725	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1770	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1416	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1416	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	5	
Density, D	19.4	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6020	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1584	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1274	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1274	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	5	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5660	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1489	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1198	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1198	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	5	
Density, D	16.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6775	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1783	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1433	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1433	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	5	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6555	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1725	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1387	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1387	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.3	mi/h
Number of lanes, N	5	
Density, D	18.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6165	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1622	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1304	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1304	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	5	
Density, D	17.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7380	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1942	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1561	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1561	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.5	mi/h
Number of lanes, N	5	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7980	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2100	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1705	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1705	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.5	mi/h
Number of lanes, N	5	
Density, D	24.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5605	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1475	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1209	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1209	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	5	
Density, D	16.2	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7375	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1941	v
Trucks and buses		%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1553	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1553	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.6	mi/h
Number of lanes, N	5	
Density, D	21.7	pc/mi/ln
Level of service, LOS	C	

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E-mail:
Fax:

Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2113	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1724	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1724	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.2	mi/h
Number of lanes, N	5	
Density, D	24.9	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5655	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1488	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1226	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1226	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	5	
Density, D	16.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7425	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1954	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1602	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1602	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.0	mi/h
Number of lanes, N	5	
Density, D	22.6	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8750	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2303	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1879	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1879	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.4	mi/h
Number of lanes, N	5	
Density, D	28.3	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6160	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1621	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1336	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1336	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.8	mi/h
Number of lanes, N	5	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	Figueroa Street/San Rafael Ave
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8090	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2129	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1746	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1746	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.8	mi/h
Number of lanes, N	5	
Density, D	25.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : San Rafael Avenue and I-210 Interchange

FREEWAY : SR-134

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	7415	0%	**50**	7465	1%	665	8130	1%
MID	6630	0%	**50**	6680	1%	595	7275	1%
PM	8085	0%	**50**	8135	1%	730	8865	1%
WESTBOUND								
AM	7470	10%	**50**	7520	11%	670	8190	11%
MID	5215	10%	**50**	5265	8%	470	5735	8%
PM	7100	10%	**50**	7150	10%	640	7790	10%

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7415	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1951	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1561	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1561	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.5	mi/h
Number of lanes, N	5	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6630	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1745	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1396	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1396	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.3	mi/h
Number of lanes, N	5	
Density, D	19.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6725	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1770	v
Trucks and buses	0	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	1.000	
Driver population factor, fp	1.00	
Flow rate, vp	1416	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1416	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	5	
Density, D	19.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6020	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1584	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1274	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1274	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	5	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6680	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1758	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1413	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1413	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	5	
Density, D	19.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8135	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2141	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1721	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1721	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.2	mi/h
Number of lanes, N	5	
Density, D	24.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8130	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2139	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1720	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1720	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.3	mi/h
Number of lanes, N	5	
Density, D	24.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7275	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1914	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1539	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1539	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	5	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8865	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2333	v
Trucks and buses	1	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.995	
Driver population factor, fp	1.00	
Flow rate, vp	1876	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1876	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.5	mi/h
Number of lanes, N	5	
Density, D	28.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7470	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1966	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1651	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1651	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.3	mi/h
Number of lanes, N	5	
Density, D	23.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5215	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1372	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1153	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1153	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	5	
Density, D	15.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7100	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1868	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1569	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1569	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.4	mi/h
Number of lanes, N	5	
Density, D	22.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7520	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1979	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1670	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1670	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	5	
Density, D	23.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5265	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1386	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1169	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1169	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	5	
Density, D	15.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7150	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1882	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1588	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1588	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	5	
Density, D	22.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8190	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2155	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1819	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1819	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.6	mi/h
Number of lanes, N	5	
Density, D	26.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5735	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1509	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1274	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1274	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	5	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Rafael Ave/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7790	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2050	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1730	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1730	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.1	mi/h
Number of lanes, N	5	
Density, D	25.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-134 Interchange and Lake Avenue

FREEWAY : I-210

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	9270	1%	**50**	9320	2%	835	10155	2%
MID	9100	5%	**50**	9150	5%	820	9970	5%
PM	9575	4%	**50**	9625	4%	860	10485	4%
WESTBOUND								
AM	9710	3%	**50**	9760	3%	875	10635	3%
MID	7420	8%	**50**	7470	9%	670	8140	9%
PM	8400	12%	**50**	8450	13%	755	9205	13%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9270	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2439	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1971	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1971	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.6	mi/h
Number of lanes, N	5	
Density, D	30.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9100	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2395	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2021	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2021	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.5	mi/h
Number of lanes, N	5	
Density, D	31.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9575	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2520	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	2096	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2096	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.7	mi/h
Number of lanes, N	5	
Density, D	34.0	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9320	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2453	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1992	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1992	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.1	mi/h
Number of lanes, N	5	
Density, D	31.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9150	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2408	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2042	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2042	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.0	mi/h
Number of lanes, N	5	
Density, D	32.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9625	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2533	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2118	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2118	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.2	mi/h
Number of lanes, N	5	
Density, D	34.6	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	10155	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2672	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2170	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2170	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	59.8	mi/h
Number of lanes, N	5	
Density, D	36.3	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9970	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2624	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2225	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2225	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	58.4	mi/h
Number of lanes, N	5	
Density, D	38.1	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	10485	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2759	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	2307	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2307	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	56.1	mi/h
Number of lanes, N	5	
Density, D	41.1	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9710	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2555	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2075	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2075	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	62.2	mi/h
Number of lanes, N	5	
Density, D	33.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7420	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1953	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1625	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1625	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.7	mi/h
Number of lanes, N	5	
Density, D	23.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8400	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2211	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1875	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1875	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.5	mi/h
Number of lanes, N	5	
Density, D	28.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9760	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2568	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2086	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2086	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.9	mi/h
Number of lanes, N	5	
Density, D	33.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7470	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1966	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1643	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1643	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.4	mi/h
Number of lanes, N	5	
Density, D	23.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8450	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2224	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1895	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1895	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.1	mi/h
Number of lanes, N	5	
Density, D	28.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	10635	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2799	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2273	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2273	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	57.1	mi/h
Number of lanes, N	5	
Density, D	39.8	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8140	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2142	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1791	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1791	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.1	mi/h
Number of lanes, N	5	
Density, D	26.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-134/Lake Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9205	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2422	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2064	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2064	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	62.5	mi/h
Number of lanes, N	5	
Density, D	33.0	pc/mi/ln
Level of service, LOS	D	

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Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : I-605 Interchange and Irwindale Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5515	2%	**50**	5565	3%	495	6060	3%
MID	5200	4%	**50**	5250	5%	470	5720	5%
PM	5615	4%	**50**	5665	5%	505	6170	5%
WESTBOUND								
AM	7070	5%	**50**	7120	5%	635	7755	5%
MID	6825	4%	**50**	6875	5%	615	7490	5%
PM	7520	6%	**50**	7570	7%	675	8245	7%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5515	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1451	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1173	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1173	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	5	
Density, D	15.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5200	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1368	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1117	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1117	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	5	
Density, D	14.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5615	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1478	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1206	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1206	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	5	
Density, D	16.2	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5565	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1464	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1189	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1189	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	5	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5250	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1382	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1133	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1133	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	5	
Density, D	15.1	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5665	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1491	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1222	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1222	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	5	
Density, D	16.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6060	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1595	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1295	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1295	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	5	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5720	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1505	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1234	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1234	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	5	
Density, D	16.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6170	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1624	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1331	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1331	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.8	mi/h
Number of lanes, N	5	
Density, D	18.0+	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7070	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1861	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1526	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1526	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.9	mi/h
Number of lanes, N	5	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6825	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1796	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1466	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1466	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.6	mi/h
Number of lanes, N	5	
Density, D	20.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7520	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1979	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1631	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1631	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.6	mi/h
Number of lanes, N	5	
Density, D	23.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Freeway/Direction:	I-210/WB
From/To:	I-605/Irwindale Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7120	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1874	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1536	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1536	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	5	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

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Flow Inputs and Adjustments

Volume, V	6875	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1809	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1484	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1484	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.4	mi/h
Number of lanes, N	5	
Density, D	20.5	pc/mi/ln
Level of service, LOS	C	

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Flow Inputs and Adjustments

Volume, V	7570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1992	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1649	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1649	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.3	mi/h
Number of lanes, N	5	
Density, D	23.4	pc/mi/ln
Level of service, LOS	C	

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Flow Inputs and Adjustments

Volume, V	7755	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2041	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1673	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1673	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	5	
Density, D	23.9	pc/mi/ln
Level of service, LOS	C	

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Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7490	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1971	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1616	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1616	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.8	mi/h
Number of lanes, N	5	
Density, D	22.8	pc/mi/ln
Level of service, LOS	C	

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Flow Inputs and Adjustments

Volume, V	8245	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2170	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1797	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1797	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.0	mi/h
Number of lanes, N	5	
Density, D	26.4	pc/mi/ln
Level of service, LOS	D	

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Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Irwindale Avenue and Azusa Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	6225	4%	50	6275	5%	560	6835	5%
MID	6660	4%	50	6710	5%	600	7310	5%
PM	6265	7%	50	6315	8%	565	6880	8%
WESTBOUND								
AM	6715	4%	50	6765	4%	605	7370	4%
MID	6630	4%	50	6680	4%	595	7275	4%
PM	8500	4%	50	8550	4%	765	9315	4%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
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Flow Inputs and Adjustments

Volume, V	6225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1638	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1337	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1337	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	5	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

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From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6660	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1753	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1430	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1430	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.0	mi/h
Number of lanes, N	5	
Density, D	19.6	pc/mi/ln
Level of service, LOS	C	

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Flow Inputs and Adjustments

Volume, V	6265	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1649	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1365	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1365	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	5	
Density, D	18.6	pc/mi/ln
Level of service, LOS	C	

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Flow Inputs and Adjustments

Volume, V	6275	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1651	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1354	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1354	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	5	
Density, D	18.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Flow Inputs and Adjustments

Volume, V	6710	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1766	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1448	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1448	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.8	mi/h
Number of lanes, N	5	
Density, D	19.9	pc/mi/ln
Level of service, LOS	C	

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Flow Inputs and Adjustments

Volume, V	6315	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1662	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1383	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1383	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.4	mi/h
Number of lanes, N	5	
Density, D	18.8	pc/mi/ln
Level of service, LOS	C	

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Flow Inputs and Adjustments

Volume, V	6835	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1799	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1475	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1475	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	5	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7310	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1924	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1577	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1577	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.3	mi/h
Number of lanes, N	5	
Density, D	22.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6880	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1811	v
Trucks and buses	8	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.962	
Driver population factor, fp	1.00	
Flow rate, vp	1506	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1506	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.2	mi/h
Number of lanes, N	5	
Density, D	20.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6835	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1799	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1475	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1475	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	5	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6715	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1767	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1442	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1442	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.8	mi/h
Number of lanes, N	5	
Density, D	19.8	pc/mi/ln
Level of service, LOS	C	

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HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6630	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1745	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1424	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1424	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.0	mi/h
Number of lanes, N	5	
Density, D	19.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8500	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2237	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1825	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1825	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.5	mi/h
Number of lanes, N	5	
Density, D	27.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6765	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1780	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1453	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1453	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.7	mi/h
Number of lanes, N	5	
Density, D	20.0	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6680	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1758	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1434	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1434	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	5	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8550	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2250	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1836	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1836	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.3	mi/h
Number of lanes, N	5	
Density, D	27.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7370	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1939	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1583	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1583	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	5	
Density, D	22.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7275	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1914	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1562	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1562	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.5	mi/h
Number of lanes, N	5	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Irwindale Avenue/Azusa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9315	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2451	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2000	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2000	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.9	mi/h
Number of lanes, N	5	
Density, D	31.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Foothill Boulevard and Berkshire Avenue

FREEWAY : I-210

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	5570	10%	**50**	5620	11%	500	6120	11%
MID	3560	10%	**50**	3610	11%	320	3930	11%
PM	4175	10%	**50**	4225	11%	375	4600	11%
WESTBOUND								
AM	3705	11%	**50**	3755	12%	335	4090	12%
MID	3645	17%	**50**	3695	19%	330	4025	19%
PM	5765	9%	**50**	5815	10%	520	6335	10%

ote: Asterick (*) denotes value calculated from Caltrans data

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1466	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1539	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1539	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	4	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3560	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	937	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	984	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	984	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4175	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1099	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1154	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1154	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5620	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1479	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1560	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1560	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.5	mi/h
Number of lanes, N	4	
Density, D	21.8	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions.
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3610	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	950	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1002	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1002	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.4	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1112	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1173	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1173	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.7	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6120	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1611	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1699	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1699	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.6	mi/h
Number of lanes, N	4	
Density, D	24.4	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3930	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1034	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1091	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1091	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4600	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1211	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1277	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1277	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	4	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3705	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	975	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1029	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1029	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.7	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3645	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	959	v
Trucks and buses	17	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.922	
Driver population factor, fp	1.00	
Flow rate, vp	1041	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1041	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5765	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1517	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1585	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1585	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	4	
Density, D	22.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3755	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	988	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1047	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1047	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3695	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	972	v
Trucks and buses	19	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	1065	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1065	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5815	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1530	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1607	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1607	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.9	mi/h
Number of lanes, N	4	
Density, D	22.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4090	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1076	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1141	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1141	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	15.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4025	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1059	v
Trucks and buses	19	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.913	
Driver population factor, fp	1.00	
Flow rate, vp	1160	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1160	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Berkshire A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6335	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1667	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1750	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1750	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.8	mi/h
Number of lanes, N	4	
Density, D	25.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-2 Interchange and Angeles Crest Highway

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	N/D	N/D	**50**	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	**50**	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	**50**	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	3450	5%	**50**	3500	7%	310	3810	7%
MID	3305	11%	**50**	3355	13%	295	3650	13%
PM	5495	5%	**50**	5545	6%	495	6040	6%

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3450	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	908	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	931	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	931	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3305	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	870	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	918	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	918	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5495	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1446	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1482	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1482	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.4	mi/h
Number of lanes, N	4	
Density, D	20.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3500	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	921	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	953	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	953	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3355	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	883	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	940	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	940	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5545	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1459	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1503	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1503	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.2	mi/h
Number of lanes, N	4	
Density, D	20.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3810	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1003	v
Trucks and buses	7	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.966	
Driver population factor, fp	1.00	
Flow rate, vp	1038	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1038	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3650	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	961	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1023	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1023	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-2/Angeles Crest Highway
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6040	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1589	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	1637	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1637	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.5	mi/h
Number of lanes, N	4	
Density, D	23.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Mountain Street and I-210 Interchange

FREEWAY : SR-2

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND								
AM	2590	10%	**50**	2640	12%	235	2875	12%
MID	5200	10%	**50**	5250	11%	470	5720	11%
PM	5610	10%	**50**	5660	11%	505	6165	11%
SOUTHBOUND								
AM	6015	10%	**50**	6065	11%	540	6605	11%
MID	2095	10%	**50**	2145	12%	190	2335	12%
PM	2790	10%	**50**	2840	12%	250	3090	12%

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2590	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	682	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	573	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	573	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	7.6	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5200	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1368	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1149	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1149	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	5	
Density, D	15.4	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5610	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1476	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1240	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1240	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	5	
Density, D	16.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2640	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	695	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	589	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	589	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	7.9	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5250	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1382	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1166	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1166	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	5	
Density, D	15.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5660	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1489	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1257	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1257	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.3	mi/h
Number of lanes, N	5	
Density, D	16.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2875	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	757	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	642	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	642	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	5	
Density, D	8.6	pc/mi/ln
Level of service, LOS	A	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5720	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1505	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1270	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1270	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	5	
Density, D	17.1	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/NB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6165	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1622	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1369	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1369	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	5	
Density, D	18.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6015	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1583	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1662	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1662	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.1	mi/h
Number of lanes, N	4	
Density, D	23.7	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2095	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	551	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	579	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	579	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	7.7	pc/mi/ln
Level of service, LOS	A	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2790	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	734	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	771	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	771	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.3	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6065	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1596	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1684	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1684	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.8	mi/h
Number of lanes, N	4	
Density, D	24.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2145	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	564	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	598	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	598	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	8.0	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2840	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	747	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	792	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	792	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.6	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6605	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1738	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1834	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1834	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.3	mi/h
Number of lanes, N	4	
Density, D	27.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2335	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	614	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	651	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	651	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	8.7	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	Mountain Street/I-210 FWY
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3090	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	813	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	862	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	862	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	11.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-134 Interchange and Mountain Street

FREEWAY : SR-2

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
SOUTHBOUND								
AM	6475	10%	50	6525	11%	585	7110	11%
MID	2580	10%	50	2630	12%	230	2860	12%
PM	3235	10%	50	3285	11%	290	3575	11%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6475	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1704	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1789	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1789	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.1	mi/h
Number of lanes, N	4	
Density, D	26.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2580	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	679	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	713	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	713	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	9.5	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3235	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	851	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	894	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	894	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	11.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6525	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1717	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1812	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1812	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.7	mi/h
Number of lanes, N	4	
Density, D	26.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2630	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	692	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	734	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	734	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	9.8	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3285	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	864	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	912	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	912	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7110	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1871	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1974	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1974	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.5	mi/h
Number of lanes, N	4	
Density, D	30.6	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2860	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	753	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	798	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	798	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.6	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-2/SB
From/To:	SR-134/Mountain Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3575	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	941	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	993	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	993	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-2 Interchange and Figueroa Avenue

FREEWAY : SR-134

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	6030	10%	**50**	6080	11%	545	6625	11%
MID	6245	10%	**50**	6295	11%	560	6855	11%
PM	6905	10%	**50**	6955	11%	620	7575	11%
WESTBOUND								
AM	6300	2%	**50**	6350	3%	565	6915	3%
MID	5035	2%	**50**	5085	3%	455	5540	3%
PM	6325	2%	**50**	6375	3%	570	6945	3%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1587	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1333	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1333	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.8	mi/h
Number of lanes, N	5	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6245	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1643	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1380	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1380	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.4	mi/h
Number of lanes, N	5	
Density, D	18.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6905	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1817	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1526	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1526	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.9	mi/h
Number of lanes, N	5	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6080	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1600	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1350	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1350	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	5	
Density, D	18.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6295	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1657	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1398	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1398	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.2	mi/h
Number of lanes, N	5	
Density, D	19.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6955	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1830	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1537	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1537	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.8	mi/h
Number of lanes, N	5	
Density, D	21.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6625	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1743	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1471	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1471	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	5	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6855	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1804	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1523	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1523	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.0	mi/h
Number of lanes, N	5	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7575	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1993	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1682	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1682	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.9	mi/h
Number of lanes, N	5	
Density, D	24.1	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6300	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1658	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1340	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1340	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	5	
Density, D	18.2	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5035	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1325	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1071	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1071	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	5	
Density, D	14.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6325	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1664	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	1345	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1345	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	5	
Density, D	18.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6350	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1671	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1357	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1357	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	5	
Density, D	18.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5085	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1338	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1087	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1087	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	5	
Density, D	14.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6375	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1678	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1362	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1362	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	5	
Density, D	18.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6915	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1820	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1478	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1478	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	5	
Density, D	20.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5540	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1458	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1184	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1184	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.6	mi/h
Number of lanes, N	5	
Density, D	15.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	SR-2/Figueroa Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6945	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1828	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1484	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1484	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.4	mi/h
Number of lanes, N	5	
Density, D	20.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Glendale Avenue and SR-2 Interchange

FREEWAY : SR-134

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	6490	10%	50	6540	11%	585	7125	11%
MID	7175	10%	50	7225	11%	645	7870	11%
PM	8435	10%	50	8485	11%	760	9245	11%
WESTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6490	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1708	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1435	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1435	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	5	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7175	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1888	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1586	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1586	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	5	
Density, D	22.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8435	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2220	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1865	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1865	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.7	mi/h
Number of lanes, N	5	
Density, D	28.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6540	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1721	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1453	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1453	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.7	mi/h
Number of lanes, N	5	
Density, D	20.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7225	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1901	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1605	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1605	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.9	mi/h
Number of lanes, N	5	
Density, D	22.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions.
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8485	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2233	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1885	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1885	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.3	mi/h
Number of lanes, N	5	
Density, D	28.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7125	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1875	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1583	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1583	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	5	
Density, D	22.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7870	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2071	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1748	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1748	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.8	mi/h
Number of lanes, N	5	
Density, D	25.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	Glendale Avenue/SR-2
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9245	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2433	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2053	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2053	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	62.7	mi/h
Number of lanes, N	5	
Density, D	32.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : San Fernando Street and Pacific Avenue

FREEWAY : SR-134

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	7185	10%	50	7235	11%	645	7880	11%
MID	6960	10%	50	7010	11%	625	7635	11%
PM	7455	10%	50	7505	11%	670	8175	11%
WESTBOUND								
AM	8330	10%	50	8380	11%	750	9130	11%
MID	6055	10%	50	6105	11%	545	6650	11%
PM	6470	10%	50	6520	11%	580	7100	11%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7185	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1891	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1985	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1985	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.3	mi/h
Number of lanes, N	4	
Density, D	30.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6960	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1832	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1923	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1923	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	65.6	mi/h
Number of lanes, N	4	
Density, D	29.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7455	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1962	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2060	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2060	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	62.6	mi/h
Number of lanes, N	4	
Density, D	32.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7235	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1904	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2009	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2009	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.7	mi/h
Number of lanes, N	4	
Density, D	31.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7010	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1845	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1946	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1946	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	65.1	mi/h
Number of lanes, N	4	
Density, D	29.9	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7505	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1975	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2084	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2084	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	62.0	mi/h
Number of lanes, N	4	
Density, D	33.6	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7880	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2074	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2188	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2188	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	59.4	mi/h
Number of lanes, N	4	
Density, D	36.8	pc/mi/ln
Level of service, LOS	E	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7635	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2009	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2120	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2120	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.1	mi/h
Number of lanes, N	4	
Density, D	34.7	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/EB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8175	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2151	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2270	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2270	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	57.1	mi/h
Number of lanes, N	4	
Density, D	39.7	pc/mi/ln
Level of service, LOS	E	

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Operational Analysis

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Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8330	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2192	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1841	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1841	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.2	mi/h
Number of lanes, N	5	
Density, D	27.4	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6055	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1593	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1338	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1338	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	5	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6470	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1703	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1430	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1430	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.0	mi/h
Number of lanes, N	5	
Density, D	19.6	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

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Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8380	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2205	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1861	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1861	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	66.8	mi/h
Number of lanes, N	5	
Density, D	27.9	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
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Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6105	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1607	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1356	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1356	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	5	
Density, D	18.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6520	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1716	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1448	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1448	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.8	mi/h
Number of lanes, N	5	
Density, D	19.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9130	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2403	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2028	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2028	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.3	mi/h
Number of lanes, N	5	
Density, D	32.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6650	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1750	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1477	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1477	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	5	
Density, D	20.4	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	San Fernando/Pacific Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7100	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1868	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1577	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	5	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1577	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.3	mi/h
Number of lanes, N	5	
Density, D	22.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : I-5 Interchange and San Fernando Street

FREEWAY : SR-134

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	6370	10%	50	6420	11%	575	6995	11%
MID	5000	10%	50	5050	11%	450	5500	11%
PM	8385	10%	50	8435	11%	755	9190	11%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6370	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1676	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1760	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1760	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.6	mi/h
Number of lanes, N	4	
Density, D	25.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5000	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1316	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1382	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1382	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.4	mi/h
Number of lanes, N	4	
Density, D	18.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8385	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2207	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2317	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2317	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.8	mi/h
Number of lanes, N	4	
Density, D	41.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6420	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1689	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1782	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1782	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.2	mi/h
Number of lanes, N	4	
Density, D	26.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5050	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1329	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1402	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1402	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.2	mi/h
Number of lanes, N	4	
Density, D	19.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8435	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2220	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2342	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2342	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.1	mi/h
Number of lanes, N	4	
Density, D	42.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6995	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1841	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1942	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1942	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	65.2	mi/h
Number of lanes, N	4	
Density, D	29.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5500	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1447	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1527	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1527	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.9	mi/h
Number of lanes, N	4	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-134/WB
From/To:	I-5/San Fernando Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9190	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2418	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2551	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2551	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	48.4	mi/h
Number of lanes, N	4	
Density, D	52.7	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Western Avenue and SR-134 Interchange

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	6450	9%	50	6500	10%	580	7080	10%
MID	7095	12%	50	7145	13%	640	7785	13%
PM	6995	12%	50	7045	12%	630	7675	12%
NORTHBOUND								
AM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6450	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1697	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1774	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1774	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.4	mi/h
Number of lanes, N	4	
Density, D	25.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7095	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1867	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1979	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1979	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.4	mi/h
Number of lanes, N	4	
Density, D	30.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6995	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1841	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1951	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1951	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	65.0	mi/h
Number of lanes, N	4	
Density, D	30.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6500	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1711	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1796	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1796	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.0	mi/h
Number of lanes, N	4	
Density, D	26.4	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7145	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1880	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2002	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2002	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	63.9	mi/h
Number of lanes, N	4	
Density, D	31.3	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7045	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1854	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1965	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1965	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.7	mi/h
Number of lanes, N	4	
Density, D	30.4	pc/mi/ln
Level of service, LOS	D	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7080	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1863	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1956	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1956	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.9	mi/h
Number of lanes, N	4	
Density, D	30.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014.
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7785	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2049	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2182	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2182	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	59.5	mi/h
Number of lanes, N	4	
Density, D	36.7	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Western Avenue/SR-134
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7675	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2020	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2141	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2141	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	60.6	mi/h
Number of lanes, N	4	
Density, D	35.3	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Roscoe Boulevard and Hollywood Way

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	5990	10%	50	6040	11%	540	6580	11%
MID	4960	10%	50	5010	11%	445	5455	11%
PM	4625	10%	50	4675	11%	415	5090	11%
NORTHBOUND								
AM	5490	4%	50	5540	5%	495	6035	5%
MID	6030	4%	50	6080	5%	545	6625	5%
PM	6570	3%	50	6620	4%	590	7210	4%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5990	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1576	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1655	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1655	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.3	mi/h
Number of lanes, N	4	
Density, D	23.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4960	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1305	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1371	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1371	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	4	
Density, D	18.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4625	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1217	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1278	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1278	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.1	mi/h
Number of lanes, N	4	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6040	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1589	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1677	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1677	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.9	mi/h
Number of lanes, N	4	
Density, D	24.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5010	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1318	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1391	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1391	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.3	mi/h
Number of lanes, N	4	
Density, D	19.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4675	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1230	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1298	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1298	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	4	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6580	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1732	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1827	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1827	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.4	mi/h
Number of lanes, N	4	
Density, D	27.1	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5455	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1436	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1514	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1514	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.1	mi/h
Number of lanes, N	4	
Density, D	21.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5090	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1339	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1413	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1413	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	4	
Density, D	19.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5490	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1445	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1474	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1474	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.5	mi/h
Number of lanes, N	4	
Density, D	20.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1587	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1619	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1619	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.8	mi/h
Number of lanes, N	4	
Density, D	22.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6570	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1729	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1755	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1755	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.7	mi/h
Number of lanes, N	4	
Density, D	25.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5540	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1458	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1494	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1494	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.3	mi/h
Number of lanes, N	4	
Density, D	20.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6080	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1600	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1640	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1640	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.5	mi/h
Number of lanes, N	4	
Density, D	23.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6620	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1742	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1777	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1777	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.3	mi/h
Number of lanes, N	4	
Density, D	26.0+	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6035	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1588	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1628	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1628	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.6	mi/h
Number of lanes, N	4	
Density, D	23.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6625	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1743	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1787	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1787	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.1	mi/h
Number of lanes, N	4	
Density, D	26.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Roscoe Boulevard/Hollywood Way
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7210	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1897	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1935	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1935	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	65.3	mi/h
Number of lanes, N	4	
Density, D	29.6	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-170 Interchange and Sheldon Street

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	N/D	N/D	N/D	N/D	N/D	N/D
NORTHBOUND								
AM	4950	10%	50	5000	11%	445	5445	11%
MID	5445	9%	50	5495	10%	490	5985	10%
PM	4755	4%	50	4805	5%	430	5235	5%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4950	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1303	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1368	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1368	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.5	mi/h
Number of lanes, N	4	
Density, D	18.6	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5445	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1433	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1497	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1497	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.3	mi/h
Number of lanes, N	4	
Density, D	20.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4755	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1251	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1276	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1276	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	4	
Density, D	17.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5000	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1316	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1388	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1388	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.3	mi/h
Number of lanes, N	4	
Density, D	18.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5495	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1446	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1526	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1526	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.9	mi/h
Number of lanes, N	4	
Density, D	21.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4805	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1264	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1296	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1296	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.0	mi/h
Number of lanes, N	4	
Density, D	17.5	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5445	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1433	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1512	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1512	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.1	mi/h
Number of lanes, N	4	
Density, D	21.0	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5985	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1575	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1654	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1654	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.3	mi/h
Number of lanes, N	4	
Density, D	23.5	pc/mi/ln
Level of service, LOS	C	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-170/Sheldon Street
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5235	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1378	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	1412	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1412	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.1	mi/h
Number of lanes, N	4	
Density, D	19.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Branford Street and SR-170 Interchange

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	12595	3%	50	12645	3%	1135	13780	3%
MID	8420	5%	50	8470	5%	760	9230	5%
PM	9245	3%	50	9295	4%	830	10125	4%
NORTHBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	12595	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	3314	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	3364	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	3364	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	13.1	mi/h
Number of lanes, N	4	
Density, D	256.1	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8420	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2216	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2271	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2271	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	57.1	mi/h
Number of lanes, N	4	
Density, D	39.8	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9245	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2433	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2469	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2469	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	51.1	mi/h
Number of lanes, N	4	
Density, D	48.3	pc/mi/ln
Level of service, LOS	F	

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	12645	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	3328	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	3378	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	3378	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	12.4	mi/h
Number of lanes, N	4	
Density, D	272.4	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8470	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2229	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2285	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2285	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	56.7	mi/h
Number of lanes, N	4	
Density, D	40.3	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9295	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2446	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2495	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2495	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	50.3	mi/h
Number of lanes, N	4	
Density, D	49.6	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	13780	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	3626	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	3681	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	3681	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S		mi/h
Number of lanes, N	4	
Density, D		pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9230	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2429	v
Trucks and buses	5	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.976	
Driver population factor, fp	1.00	
Flow rate, vp	2490	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2490	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	50.4	mi/h
Number of lanes, N	4	
Density, D	49.4	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	BranfordStreet/SR-170
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	10125	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2664	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2718	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2718	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	42.3	mi/h
Number of lanes, N	4	
Density, D	64.2	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Montrose Avenue and SR-2 Interchange

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Wheatland Avenue and Sunland Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	4735	3%	50	4785	4%	425	5210	4%
MID	2670	13%	50	2720	15%	240	2960	15%
PM	3650	6%	50	3700	18%	330	4030	18%
WESTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4735	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1246	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1265	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1265	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.2	mi/h
Number of lanes, N	4	
Density, D	17.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2670	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	703	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	748	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	748	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.0	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3650	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	961	v
Trucks and buses	6	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.971	
Driver population factor, fp	1.00	
Flow rate, vp	989	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	989	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4785	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1259	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1284	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1284	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.1	mi/h
Number of lanes, N	4	
Density, D	17.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2720	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	716	v
Trucks and buses	15	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.930	
Driver population factor, fp	1.00	
Flow rate, vp	769	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	769	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	10.3	pc/mi/ln
Level of service, LOS	A	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3700	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	974	v
Trucks and buses	18	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.917	
Driver population factor, fp	1.00	
Flow rate, vp	1061	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1061	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5210	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1371	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1398	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1398	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.2	mi/h
Number of lanes, N	4	
Density, D	19.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	2960	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	779	v
Trucks and buses	15	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.930	
Driver population factor, fp	1.00	
Flow rate, vp	837	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	837	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	11.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Wheatland Avenue/Sunland Avenu
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1061	v
Trucks and buses	18	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.917	
Driver population factor, fp	1.00	
Flow rate, vp	1156	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1156	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.7	mi/h
Number of lanes, N	4	
Density, D	15.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Foothill Boulevard and Wheatland Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	4405	9%	50	4455	10%	395	4850	10%
MID	3430	11%	50	3480	12%	310	3790	12%
PM	4850	13%	50	4900	14%	435	5335	14%
WESTBOUND								
AM	4080	3%	50	4130	4%	365	4495	4%
MID	3480	10%	50	3530	11%	315	3845	11%
PM	6690	3%	50	6740	4%	600	7340	4%

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4405	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1159	v
Trucks and buses	9	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.957	
Driver population factor, fp	1.00	
Flow rate, vp	1211	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1211	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	4	
Density, D	16.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3430	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	903	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	952	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	952	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4850	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1276	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	1359	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1359	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.6	mi/h
Number of lanes, N	4	
Density, D	18.5	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4455	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1172	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1231	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1231	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	4	
Density, D	16.5	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3480	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	916	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	971	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	971	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4900	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1289	v
Trucks and buses	14	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.935	
Driver population factor, fp	1.00	
Flow rate, vp	1380	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1380	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.4	mi/h
Number of lanes, N	4	
Density, D	18.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4850	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1276	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1340	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1340	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.7	mi/h
Number of lanes, N	4	
Density, D	18.2	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3790	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	997	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1057	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1057	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/EB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5335	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1404	v
Trucks and buses	14	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.935	
Driver population factor, fp	1.00	
Flow rate, vp	1502	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1502	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.2	mi/h
Number of lanes, N	4	
Density, D	20.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4080	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1074	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1090	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1090	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3480	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	916	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	962	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	962	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.8	pc/mi/ln
Level of service, LOS	B	

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6690	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1761	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	1787	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1787	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	68.1	mi/h
Number of lanes, N	4	
Density, D	26.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Exisiting + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4130	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1087	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1109	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1109	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.9	mi/h
Number of lanes, N	4	
Density, D	14.8	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Exisiting + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3530	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	929	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	980	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	980	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.1	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Exisiting + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6740	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1774	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1809	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1809	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.8	mi/h
Number of lanes, N	4	
Density, D	26.7	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
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Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4495	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1183	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1207	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1207	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.5	mi/h
Number of lanes, N	4	
Density, D	16.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3845	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1012	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1067	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1067	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	14.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	Foothill Boulevard/Wheatland A
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7340	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1932	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	1970	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1970	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	64.6	mi/h
Number of lanes, N	4	
Density, D	30.5	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-118 Interchange and Foothill Boulevard

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	0	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	0	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	0	N/D	50	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	4030	11%	50	4080	12%	365	4445	12%
MID	3330	11%	50	3380	12%	300	3680	12%
PM	5640	11%	50	5690	12%	510	6200	12%

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4030	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1061	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1119	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1119	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	15.0	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3330	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	876	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	925	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	925	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.3	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5640	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1484	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1566	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1566	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.5	mi/h
Number of lanes, N	4	
Density, D	21.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4080	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1074	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1138	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1138	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.8	mi/h
Number of lanes, N	4	
Density, D	15.2	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3380	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	889	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	943	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	943	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	12.6	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5690	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1497	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1587	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1587	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	4	
Density, D	22.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	4445	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1170	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1240	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1240	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	74.4	mi/h
Number of lanes, N	4	
Density, D	16.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3680	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	968	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1027	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1027	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	75.0	mi/h
Number of lanes, N	4	
Density, D	13.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-210/WB
From/To:	SR-118/Foothill Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6200	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1632	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	1729	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1729	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.1	mi/h
Number of lanes, N	4	
Density, D	25.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Glen Oaks Blvd and SR-118 Interchange

FREEWAY : SR-118

PROJECTED YEAR:

PROJECTED GROWTH PER YEAR:

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : I-210 Interchange and San Fernando Avenue

FREEWAY : SR-118

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND								
AM	0	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	0	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	0	N/D	50	N/D	N/D	N/D	N/D	N/D
WESTBOUND								
AM	6215	10%	50	6265	11%	560	6825	11%
MID	3550	10%	50	3600	11%	320	3920	11%
PM	5690	10%	50	5740	11%	510	6250	11%

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6215	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1636	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2290	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2290	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	56.6	mi/h
Number of lanes, N	3	
Density, D	40.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3550	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	934	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1308	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1308	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.9	mi/h
Number of lanes, N	3	
Density, D	17.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5690	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1497	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2096	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2096	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.7	mi/h
Number of lanes, N	3	
Density, D	34.0	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6265	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1649	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2319	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2319	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.7	mi/h
Number of lanes, N	3	
Density, D	41.6	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3600	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	947	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1333	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1333	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.8	mi/h
Number of lanes, N	3	
Density, D	18.1	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	5740	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1511	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2125	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2125	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.0	mi/h
Number of lanes, N	3	
Density, D	34.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6825	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1796	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2526	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2526	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	49.2	mi/h
Number of lanes, N	3	
Density, D	51.3	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	3920	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1032	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1451	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1451	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.7	mi/h
Number of lanes, N	3	
Density, D	19.9	pc/mi/ln
Level of service, LOS	C	

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Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	SR-118/WB
From/To:	I-210/ San Fernando Avenue
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	6250	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1645	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	2314	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	3	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2314	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.9	mi/h
Number of lanes, N	3	
Density, D	41.4	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : SR-118 Interchange and Van Nuys Blvd

FREEWAY : I-5

PROJECTED YEAR : SEGMENT

PROJECTED GROWTH PER YEAR : 4.50%

ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	9070	10%	50	9120	10%	815	9935	10%
MID	7105	10%	50	7155	11%	640	7795	11%
PM	7810	10%	50	7860	11%	705	8565	11%
NORTHBOUND								
AM	7985	2%	50	8035	3%	720	8755	3%
MID	8340	3%	50	8390	4%	750	9140	4%
PM	8505	3%	50	8555	4%	765	9320	4%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7985	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2101	v
Trucks and buses	2	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.990	
Driver population factor, fp	1.00	
Flow rate, vp	2122	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2122	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	61.1	mi/h
Number of lanes, N	4	
Density, D	34.8	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8340	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2195	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2228	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2228	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	58.3	mi/h
Number of lanes, N	4	
Density, D	38.2	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8505	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2238	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2272	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2272	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	57.1	mi/h
Number of lanes, N	4	
Density, D	39.8	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8035	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2114	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2146	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2146	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	60.5	mi/h
Number of lanes, N	4	
Density, D	35.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8390	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2208	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2252	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2252	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	57.6	mi/h
Number of lanes, N	4	
Density, D	39.1	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8555	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2251	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2296	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2296	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	56.4	mi/h
Number of lanes, N	4	
Density, D	40.7	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8755	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2304	v
Trucks and buses	3	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.985	
Driver population factor, fp	1.00	
Flow rate, vp	2339	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2339	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.2	mi/h
Number of lanes, N	4	
Density, D	42.4	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9140	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2405	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2453	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2453	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	51.6	mi/h
Number of lanes, N	4	
Density, D	47.5	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9320	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2453	v
Trucks and buses	4	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.980	
Driver population factor, fp	1.00	
Flow rate, vp	2502	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2502	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	50.0	mi/h
Number of lanes, N	4	
Density, D	50.0	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9070	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2387	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1671	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1671	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	70.0	mi/h
Number of lanes, N	6	
Density, D	23.9	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7105	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1870	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1309	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1309	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.9	mi/h
Number of lanes, N	6	
Density, D	17.7	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

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Phone: Fax:
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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7810	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2055	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1439	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1439	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.9	mi/h
Number of lanes, N	6	
Density, D	19.7	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9120	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2400	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1680	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1680	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	69.9	mi/h
Number of lanes, N	6	
Density, D	24.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7155	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	1883	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1324	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1324	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	73.8	mi/h
Number of lanes, N	6	
Density, D	17.9	pc/mi/ln
Level of service, LOS	B	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7860	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2068	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1455	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1455	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.7	mi/h
Number of lanes, N	6	
Density, D	20.0	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

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E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9935	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2614	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	1830	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1830	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	67.4	mi/h
Number of lanes, N	6	
Density, D	27.2	pc/mi/ln
Level of service, LOS	D	

Overall results are not computed when free-flow speed is less than 55 mph.

HCS 2010: Basic Freeway Segments Release 6.3

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Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7795	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2051	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1443	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1443	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	72.8	mi/h
Number of lanes, N	6	
Density, D	19.8	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/SB
From/To:	SR-118/Van Nuys Boulevard
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8565	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2254	v
Trucks and buses	11	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.948	
Driver population factor, fp	1.00	
Flow rate, vp	1585	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	6	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	1585	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	71.2	mi/h
Number of lanes, N	6	
Density, D	22.3	pc/mi/ln
Level of service, LOS	C	

Overall results are not computed when free-flow speed is less than 55 mph.

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
FWY SEGMENT SUMMARY	TM	23-Sep-13	VV.110264.0000	1 OF 1

SEGMENT NAME : Terra Bella Street and Osborne Street

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

SEGMENT ROUTE

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND								
AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
NORTHBOUND								
AM	7985	12%	50	8035	12%	720	8755	12%
MID	8340	13%	50	8390	13%	750	9140	13%
PM	8505	10%	50	8555	10%	765	9320	10%

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	7985	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2101	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2227	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2227	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	58.3	mi/h
Number of lanes, N	4	
Density, D	38.2	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8340	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2195	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2337	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2337	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	55.2	mi/h
Number of lanes, N	4	
Density, D	42.3	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8505	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2238	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2350	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2350	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	54.8	mi/h
Number of lanes, N	4	
Density, D	42.9	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8035	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2114	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2241	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2241	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	58.0	mi/h
Number of lanes, N	4	
Density, D	38.7	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8390	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2208	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2351	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2351	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	54.8	mi/h
Number of lanes, N	4	
Density, D	42.9	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8555	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2251	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2364	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2364	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	54.4	mi/h
Number of lanes, N	4	
Density, D	43.5	pc/mi/ln
Level of service, LOS	E	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	AM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	8755	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2304	v
Trucks and buses	12	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.943	
Driver population factor, fp	1.00	
Flow rate, vp	2442	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2442	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	52.0	mi/h
Number of lanes, N	4	
Density, D	47.0	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	MID Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9140	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2405	v
Trucks and buses	13	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.939	
Driver population factor, fp	1.00	
Flow rate, vp	2562	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2562	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	48.0	mi/h
Number of lanes, N	4	
Density, D	53.4	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

Phone: Fax:
E-mail:

Operational Analysis

Analyst:	TM
Agency or Company:	Hall & Foreman, Inc.
Date Performed:	8/11/2012
Analysis Time Period:	PM Peak Hour
Freeway/Direction:	I-5/NB
From/To:	Terra Bella Street/Osborne St
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Flow Inputs and Adjustments

Volume, V	9320	veh/h
Peak-hour factor, PHF	0.95	
Peak 15-min volume, v15	2453	v
Trucks and buses	10	%
Recreational vehicles	0	%
Terrain type:	Level	
Grade	-	%
Segment length	-	mi
Trucks and buses PCE, ET	1.5	
Recreational vehicle PCE, ER	1.2	
Heavy vehicle adjustment, fHV	0.952	
Driver population factor, fp	1.00	
Flow rate, vp	2575	pc/h/ln

Speed Inputs and Adjustments

Lane width	12.0	ft
Right-side lateral clearance	6.0	ft
Total ramp density, TRD	0.75	ramps/mi
Number of lanes, N	4	
Free-flow speed:	Base	
FFS or BFFS	75.4	mi/h
Lane width adjustment, fLW	0.0	mi/h
Lateral clearance adjustment, fLC	0.0	mi/h
TRD adjustment	2.5	mi/h
Free-flow speed, FFS	72.9	mi/h

LOS and Performance Measures

Flow rate, vp	2575	pc/h/ln
Free-flow speed, FFS	72.9	mi/h
Average passenger-car speed, S	47.5	mi/h
Number of lanes, N	4	
Density, D	54.2	pc/mi/ln
Level of service, LOS	F	

Overall results are not computed when free-flow speed is less than 55 mph.

I-210 EB Main Line Volume

From SR-118 to Azusa Ave

October, 2011

Date / Time	Osborne Foothill	Wheatland Ave	Angeles Crest Hwy	Berkshire Place	Arroyo Blvd	Lincoln Ave	Mountain St	EB SR-134 to WB I-210	Lake Ave	San Gabriel River (EB I-605 to WB I-210)	Irwindale Ave	Azusa Ave
	PM 7.73	PM 9.3	PM 19.78	PM 21.39	PM 22.30	PM 23.00	PM 23.90	PM 24.49	PM 26.12	PM 37.39	PM 38.21	PM 39.62
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/6/2011 0:00	783	445	341	348	328	496	865	738	1587	927	1454	1171
10/6/2011 1:00	678	313	250	261	263	628	919	718	1201	617	949	720
10/6/2011 2:00	591	307	209	223	216	805	874	663	1008	531	795	616
10/6/2011 3:00	614	276	241	246	239	420	851	652	937	575	754	609
10/6/2011 4:00	957	531	456	446	414	642	1000	875	1341	1085	1211	1012
10/6/2011 5:00	1901	1186	1178	1168	1189	1288	1896	1795	2468	2790	2464	1979
10/6/2011 6:00	2814	2689	2953	2789	2841	2604	3115	3688	5257	4670	4353	3660
10/6/2011 7:00	4403	4733	5274	4963	5359	4882	5522	5115	8683	5517	6226	5597
10/6/2011 8:00	3727	3952	5333	5572	5713	5007	5378	4439	9269	5285	6147	5527
10/6/2011 9:00	3125	2775	3674	4147	4360	3822	4252	4152	7792	4786	5686	5055
10/6/2011 10:00	3005	2254	2838	3290	3356	3005	3322	3781	7475	4630	5403	4640
10/6/2011 11:00	2634	2059	2502	2857	2959	2827	3177	3501	7544	4650	5702	5241
10/6/2011 12:00	2628	2211	2827	3014	3049	2810	3164	3853	8168	4738	6170	5573
10/6/2011 13:00	2840	2270	2743	2881	3024	2788	3101	3690	8212	4884	6590	6068
10/6/2011 14:00	3432	2669	3407	3509	3651	3347	3496	4140	9098	5201	6658	6314
10/6/2011 15:00	4029	2965	3715	4066	4195	3844	4008	4102	8748	5441	5912	6175
10/6/2011 16:00	4638	3312	3608	3905	4027	3513	3722	4304	8788	5613	6175	6267
10/6/2011 17:00	4851	3650	4059	4334	4402	3929	4099	4265	9577	5506	5856	6120
10/6/2011 18:00	4319	3206	3651	3804	3730	3399	3566	4324	9347	5011	6267	6315
10/6/2011 19:00	2979	2200	2618	2758	2738	2596	2828	3497	8372	4135	6360	5937
10/6/2011 20:00	2021	1639	1537	1740	1672	1624	1877	2232	6180	3346	5505	5017
10/6/2011 21:00	1757	1264	1328	1616	1608	1483	1702	2082	5483	3001	4600	4155
10/6/2011 22:00	1414	1058	1020	1205	1184	1136	1352	1690	4419	2435	3682	3222
10/6/2011 23:00	1171	669	648	685	661	737	879	1107	2978	1593	2386	2014

I-210 EB Truck Volume

From SR-118 to Azusa Ave

October, 2011

Date / Time	Osborne Foothill	Wheatland Ave	Angeles Crest Hwy	Berkshire Place	Arroyo Blvd	Lincoln Ave	Mountain St	EB SR-134 to WB I-210	Lake Ave	San Gabriel River	Irwindale Ave	Azusa Ave
	PM 8.0	PM 9.5	PM 19.78	PM 21.58	PM 22.60	PM 23.14	PM 23.79	PM 24.49	PM 26.47	PM 37.39	PM 38.30	PM 40.0
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/6/2011 0:00	73	101	74	82	55	19	123	228	96	39	116	82
10/6/2011 1:00	62	78	79	87	60	49	111	188	109	35	21	61
10/6/2011 2:00	69	78	60	68	46	19	98	163	79	33	19	64
10/6/2011 3:00	63	79	66	66	55	31	78	124	107	39	50	72
10/6/2011 4:00	82	141	132	151	106	127	318	286	169	87	90	75
10/6/2011 5:00	203	199	185	238	113	286	511	361	182	213	59	113
10/6/2011 6:00	296	136	168	299	70	368	975	341	206	226	81	161
10/6/2011 7:00	432	133	182	403	45	445	785	105	269	121	338	236
10/6/2011 8:00	393	145	196	390	55	479	258	95	317	96	262	228
10/6/2011 9:00	346	238	314	509	163	607	362	410	445	124	49	175
10/6/2011 10:00	356	321	361	565	208	610	451	440	654	196	244	174
10/6/2011 11:00	304	286	282	460	125	522	303	407	229	190	265	173
10/6/2011 12:00	290	296	346	567	153	602	443	453	414	196	273	194
10/6/2011 13:00	341	358	408	616	142	656	412	354	402	195	244	199
10/6/2011 14:00	366	348	366	627	125	674	401	438	603	200	286	239
10/6/2011 15:00	468	303	356	552	99	671	370	344	911	216	244	305
10/6/2011 16:00	593	277	328	557	121	675	379	439	1010	230	299	319
10/6/2011 17:00	608	214	267	527	76	624	290	359	1040	225	459	309
10/6/2011 18:00	572	231	316	530	112	584	330	532	992	200	352	313
10/6/2011 19:00	370	243	258	412	78	467	297	318	365	135	158	192
10/6/2011 20:00	251	211	230	329	82	370	237	201	160	99	104	204
10/6/2011 21:00	206	164	215	278	90	326	205	225	101	99	94	175
10/6/2011 22:00	194	174	187	260	100	307	245	333	144	96	88	139
10/6/2011 23:00	142	164	134	177	74	197	175	263	142	55	78	117

I-210 EB Off & On Ramps Traffic Volume

From SR-118 to Irwindale Ave

October, 2011

Date / Time	Osborne St		Wheatland Ave		Berkshire Place		Arroyo Blvd		Irwindale Ave		
		PM 8.0		PM 9.5	PM 21.58	PM 21.58	PM 22.62	PM 22.62			
	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	
10/6/2011 0:00		n/d		2	5	6	n/d	n/d	n/l		
10/6/2011 1:00		n/d		3	0	29	n/d	n/d	n/l		
10/6/2011 2:00		n/d		4	1	6	n/d	n/d	n/l		
10/6/2011 3:00		n/d		3	1	7	n/d	n/d	n/l		
10/6/2011 4:00		n/d		15	7	3	n/d	n/d	n/l		
10/6/2011 5:00		n/d		24	44	13	n/d	n/d	n/l		
10/6/2011 6:00		n/d		92	232	40	n/d	n/d	n/l		
10/6/2011 7:00		n/d		135	593	231	n/d	n/d	n/l		
10/6/2011 8:00		n/d		105	349	153	n/d	n/d	n/l		
10/6/2011 9:00		n/d		78	200	122	n/d	n/d	n/l		
10/6/2011 10:00		n/d		77	123	122	n/d	n/d	n/l		
10/6/2011 11:00		n/d		84	131	213	n/d	n/d	n/l		
10/6/2011 12:00		n/d		78	187	152	n/d	n/d	n/l		
10/6/2011 13:00		n/d		79	125	119	n/d	n/d	n/l		
10/6/2011 14:00		n/d		86	246	193	n/d	n/d	n/l		
10/6/2011 15:00		n/d		62	286	309	n/d	n/d	n/l		
10/6/2011 16:00		n/d		78	163	312	n/d	n/d	n/l		
10/6/2011 17:00		n/d		99	252	409	n/d	n/d	n/l		
10/6/2011 18:00		n/d		73	221	271	n/d	n/d	n/l		
10/6/2011 19:00		n/d		40	132	153	n/d	n/d	n/l		
10/6/2011 20:00		n/d		32	89	81	n/d	n/d	n/l		
10/6/2011 21:00		n/d		25	68	95	n/d	n/d	n/l		
10/6/2011 22:00		n/d		33	37	55	n/d	n/d	n/l		
10/6/2011 23:00		n/d		13	16	19	n/d	n/d	n/l		

I-210 WB Main Line Volume

From Azusa Ave to SR-118

October, 2011

Date / Time	Osborne Foothill	Wheatland Ave	Angeles Crest Hwy	Berkshire Place	Arroyo Blvd	Lincoln Ave	Mountain St	EB SR-134 to WB I-210	Lake Ave	San Gabriel River (EB I-605 to WB I-210)	Irwindale Ave	Azusa Ave
	PM 7.73	PM 9.3	PM 19.78	PM 21.39	PM 22.30	PM 23.00	PM 23.90	PM 24.49	PM 26.12	PM 37.39	PM 38.21	PM 39.62
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/6/2011 0:00	575	444	385	346	339	314	1430	835	852	1249	920	1756
10/6/2011 1:00	453	295	311	273	267	340	1048	762	636	1146	685	1466
10/6/2011 2:00	416	273	244	230	219	229	902	648	536	1118	633	1262
10/6/2011 3:00	454	293	258	244	263	269	514	703	710	1240	1068	1317
10/6/2011 4:00	750	591	589	577	576	576	1243	1070	1729	2518	3010	1760
10/6/2011 5:00	1760	1714	1474	1500	1487	1518	2257	2069	5174	5738	6919	2945
10/6/2011 6:00	2737	2621	2240	2268	2171	2398	3539	3022	8124	6164	8037	4644
10/6/2011 7:00	4028	4078	3394	3706	3364	3781	4873	4774	9710	4209	7068	6595
10/6/2011 8:00	3814	3794	3449	3697	3358	3648	3923	4740	8932	3734	6901	6715
10/6/2011 9:00	3063	3011	2954	3173	2942	3222	3473	3809	8171	4406	6655	5256
10/6/2011 10:00	2901	2705	2801	2988	2784	2971	3299	3355	7672	5272	6871	5310
10/6/2011 11:00	2715	2545	2522	2769	2564	2770	3125	3326	6615	5134	6574	5368
10/6/2011 12:00	2616	2506	2655	2944	2159	2957	3380	3314	6851	5294	6598	5869
10/6/2011 13:00	2936	2849	2910	3214	2165	3224	3619	3345	6973	5249	6698	5946
10/6/2011 14:00	3332	3482	3306	3643	2462	3635	4195	3907	7421	5384	6826	6632
10/6/2011 15:00	4313	4934	4087	4326	3042	4407	4957	4591	7626	5858	7029	8141
10/6/2011 16:00	5102	6048	4851	4942	3545	4950	5721	4958	8126	6173	7251	8500
10/6/2011 17:00	5642	6691	5496	5765	4059	5611	6374	5614	8402	6190	7521	8401
10/6/2011 18:00	4837	5560	4391	4678	3333	4595	5376	4862	7716	5391	6587	8456
10/6/2011 19:00	3022	3423	3029	3155	2116	3107	3796	3460	5729	3668	5249	5442
10/6/2011 20:00	1957	2036	2004	2106	1530	2199	2762	2611	4371	2737	4242	6347
10/6/2011 21:00	1627	1617	1879	1794	1275	1918	2437	2302	4017	2696	4031	5050
10/6/2011 22:00	1339	1269	1401	1345	1197	1395	1767	1885	2836	2647	3207	3948
10/6/2011 23:00	989	864	798	784	508	831	1065	1297	1636	1629	2030	2788

I-210 WB Truck Volume

From Azusa Ave to SR-118

October, 2011

Date / Time	Osborne Foothill	Wheatland Ave	Angeles Crest Hwy	Berkshire Place	Arroyo Blvd	Lincoln Ave	Mountain St	EB SR-134 to WB I-210	Lake Ave	San Gabriel River	Irwindale Ave	Azusa Ave
	PM 8.0	PM 9.5	PM 19.78	PM 21.58	PM 22.60	PM 23.14	PM 23.79	PM 24.49	PM 26.47	PM 37.39	PM 38.30	PM 40.0
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/6/2011 0:00	73	101	74	82	55	19	123	228	96	39	116	82
10/6/2011 1:00	62	78	79	87	60	49	111	188	109	35	21	61
10/6/2011 2:00	69	78	60	68	46	19	98	163	79	33	19	64
10/6/2011 3:00	63	79	66	66	55	31	78	124	107	39	50	72
10/6/2011 4:00	82	141	132	151	106	127	318	286	169	87	90	75
10/6/2011 5:00	203	199	185	238	113	286	511	361	182	213	59	113
10/6/2011 6:00	296	136	168	299	70	368	975	341	206	226	81	161
10/6/2011 7:00	432	133	182	403	45	445	785	105	269	121	338	236
10/6/2011 8:00	393	145	196	390	55	479	258	95	317	96	262	228
10/6/2011 9:00	346	238	314	509	163	607	362	410	445	124	49	175
10/6/2011 10:00	356	321	361	565	208	610	451	440	654	196	244	174
10/6/2011 11:00	304	286	282	460	125	522	303	407	229	190	265	173
10/6/2011 12:00	290	296	346	567	153	602	443	453	414	196	273	194
10/6/2011 13:00	341	358	408	616	142	656	412	354	402	195	244	199
10/6/2011 14:00	366	348	366	627	125	674	401	438	603	200	286	239
10/6/2011 15:00	468	303	356	552	99	671	370	344	911	216	244	305
10/6/2011 16:00	593	277	328	557	121	675	379	439	1010	230	299	319
10/6/2011 17:00	608	214	267	527	76	624	290	359	1040	225	459	309
10/6/2011 18:00	572	231	316	530	112	584	330	532	992	200	352	313
10/6/2011 19:00	370	243	258	412	78	467	297	318	365	135	158	192
10/6/2011 20:00	251	211	230	329	82	370	237	201	160	99	104	204
10/6/2011 21:00	206	164	215	278	90	326	205	225	101	99	94	175
10/6/2011 22:00	194	174	187	260	100	307	245	333	144	96	88	139
10/6/2011 23:00	142	164	134	177	74	197	175	263	142	55	78	117

I-210 WB Off & On Ramps Traffic Volume

From Azusa Ave to SR-118

October, 2011

Date / Time	Osborne St		Wheatland Ave		Berkshire Place		Arroyo Blvd		Irwindale Ave		Azusa Ave
	PM 7.73		PM 9.61		PM 21.39	PM 21.68	PM 22.60	PM 22.27		PM 38.21	PM 39.91
	Off Ramp	On Ramp	Off Ramp	On Ramp	Off Ramp	On Ramp	Off Ramp	On Ramp	Off Ramp	On Ramp	On Ramp
10/6/2011 0:00	n/d		5		2	9	n/l	n/d		n/d	n/d
10/6/2011 1:00	n/d		3		4	4	n/l	n/d		n/d	n/d
10/6/2011 2:00	n/d		1		13	2	n/l	n/d		n/d	n/d
10/6/2011 3:00	n/d		4		21	4	n/l	n/d		n/d	n/d
10/6/2011 4:00	n/d		21		110	12	n/l	n/d		n/d	n/d
10/6/2011 5:00	n/d		24		225	83	n/l	n/d		n/d	n/d
10/6/2011 6:00	n/d		55		328	614	n/l	n/d		n/d	n/d
10/6/2011 7:00	n/d		106		338	207	n/l	n/d		n/d	n/d
10/6/2011 8:00	n/d		59		191	148	n/l	n/d		n/d	n/d
10/6/2011 9:00	n/d		52		131	119	n/l	n/d		n/d	n/d
10/6/2011 10:00	n/d		63		125	187	n/l	n/d		n/d	n/d
10/6/2011 11:00	n/d		57		135	206	n/l	n/d		n/d	n/d
10/6/2011 12:00	n/d		80		122	155	n/l	n/d		n/d	n/d
10/6/2011 13:00	n/d		59		156	263	n/l	n/d		n/d	n/d
10/6/2011 14:00	n/d		105		182	572	n/l	n/d		n/d	n/d
10/6/2011 15:00	n/d		113		140	451	n/l	n/d		n/d	n/d
10/6/2011 16:00	n/d		147		211	510	n/l	n/d		n/d	n/d
10/6/2011 17:00	n/d		111		166	369	n/l	n/d		n/d	n/d
10/6/2011 18:00	n/d		97		126	302	n/l	n/d		n/d	n/d
10/6/2011 19:00	n/d		60		81	85	n/l	n/d		n/d	n/d
10/6/2011 20:00	n/d		46		61	114	n/l	n/d		n/d	n/d
10/6/2011 21:00	n/d		37		34	41	n/l	n/d		n/d	n/d
10/6/2011 22:00	n/d		20		13	12	n/l	n/d		n/d	n/d
10/6/2011 23:00	n/d		20		13	12	n/l	n/d		n/d	n/d

Interchange Connector Volume
SR-134 & I-5, SR-134 & I-210
October, 2011

Date / Time	EB SR-134 to SB I-5	WB SR-134 to SB I-5	WB SR-134 to NB I-5	NB I-5 to EB SR-134	NB I-5 to WB SR-134	SB I-5 to EB SR-134		EB SR-134 to WB I-210	EB I-210 to WB SR-134		
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		Flow (veh/hr)	Flow (veh/hr)		
10/6/2011 0:00	328	115	314	N/D	342	N/D		N/D	N/D		
10/6/2011 1:00	211	66	228	N/D	184	N/D		N/D	N/D		
10/6/2011 2:00	155	85	167	N/D	143	N/D		N/D	N/D		
10/6/2011 3:00	140	65	206	N/D	143	N/D		N/D	N/D		
10/6/2011 4:00	245	180	325	N/D	323	N/D		N/D	N/D		
10/6/2011 5:00	576	381	876	N/D	1074	N/D		N/D	N/D		
10/6/2011 6:00	1574	909	1668	N/D	1678	N/D		N/D	N/D		
10/6/2011 7:00	2832	1402	2505	N/D	2790	N/D		N/D	N/D		
10/6/2011 8:00	2872	1090	2795	N/D	2879	N/D		N/D	N/D		
10/6/2011 9:00	2644	883	2718	N/D	2661	N/D		N/D	N/D		
10/6/2011 10:00	2127	882	2206	N/D	2362	N/D		N/D	N/D		
10/6/2011 11:00	2162	824	1804	N/D	2282	N/D		N/D	N/D		
10/6/2011 12:00	2301	851	1872	N/D	2623	N/D		N/D	N/D		
10/6/2011 13:00	2368	814	1901	N/D	2447	N/D		N/D	N/D		
10/6/2011 14:00	2630	783	2279	N/D	2397	N/D		N/D	N/D		
10/6/2011 15:00	2638	850	2352	N/D	2501	N/D		N/D	N/D		
10/6/2011 16:00	2973	894	2755	N/D	2465	N/D		N/D	N/D		
10/6/2011 17:00	2986	1096	2640	N/D	2757	N/D		N/D	N/D		
10/6/2011 18:00	2917	850	2199	N/D	2528	N/D		N/D	N/D		
10/6/2011 19:00	2308	698	2206	N/D	2506	N/D		N/D	N/D		
10/6/2011 20:00	1643	539	1563	N/D	1749	N/D		N/D	N/D		
10/6/2011 21:00	1620	510	1093	N/D	1753	N/D		N/D	N/D		
10/6/2011 22:00	1175	364	959	N/D	1234	N/D		N/D	N/D		
10/6/2011 23:00	639	202	729	N/D	718	N/D		N/D	N/D		
Total (vh/hr/day):	42064	15333	38360	N/D	42539	N/D		N/D	N/D		

Interchange Connector Volume

I-210 & SR-2, I-210 & SR-118

October, 2011

Date / Time	EB I-210 to SB SR-2	WB I-210 to SB SR-2	EB/NB SR-2 to WB I-210	EB/NB SR-2 to EB I-210		EB I-210 to WB SR-118	WB I-210 to WB-SR-118	EB SR-118 to WB I-210	EB SR-118 to EB I-210		
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		
10/6/2011 0:00	143	40	N/D	58		N/D	N/D	N/D	N/D		
10/6/2011 1:00	92	36	N/D	27		N/D	N/D	N/D	N/D		
10/6/2011 2:00	84	18	N/D	17		N/D	N/D	N/D	N/D		
10/6/2011 3:00	91	22	N/D	7		N/D	N/D	N/D	N/D		
10/6/2011 4:00	252	52	N/D	21		N/D	N/D	N/D	N/D		
10/6/2011 5:00	979	248	N/D	37		N/D	N/D	N/D	N/D		
10/6/2011 6:00	3084	710	N/D	186		N/D	N/D	N/D	N/D		
10/6/2011 7:00	4531	1486	N/D	527		N/D	N/D	N/D	N/D		
10/6/2011 8:00	3960	1399	N/D	479		N/D	N/D	N/D	N/D		
10/6/2011 9:00	2766	1022	N/D	305		N/D	N/D	N/D	N/D		
10/6/2011 10:00	1852	689	N/D	289		N/D	N/D	N/D	N/D		
10/6/2011 11:00	1497	723	N/D	312		N/D	N/D	N/D	N/D		
10/6/2011 12:00	1322	658	N/D	367		N/D	N/D	N/D	N/D		
10/6/2011 13:00	1433	638	N/D	377		N/D	N/D	N/D	N/D		
10/6/2011 14:00	1387	641	N/D	561		N/D	N/D	N/D	N/D		
10/6/2011 15:00	1727	806	N/D	629		N/D	N/D	N/D	N/D		
10/6/2011 16:00	1767	870	N/D	692		N/D	N/D	N/D	N/D		
10/6/2011 17:00	1909	868	N/D	787		N/D	N/D	N/D	N/D		
10/6/2011 18:00	1919	792	N/D	704		N/D	N/D	N/D	N/D		
10/6/2011 19:00	1173	523	N/D	484		N/D	N/D	N/D	N/D		
10/6/2011 20:00	737	330	N/D	351		N/D	N/D	N/D	N/D		
10/6/2011 21:00	630	436	N/D	299		N/D	N/D	N/D	N/D		
10/6/2011 22:00	466	257	N/D	183		N/D	N/D	N/D	N/D		
10/6/2011 23:00	304	118	N/D	120		N/D	N/D	N/D	N/D		
Total (vh/hr/day):	34105	13382	N/D	7819		N/D	N/D	N/D	N/D		

I-5 SB Main Line Volume

From SR-118 to SR-134

October, 2010

Date / Time	Western Ave	Hollywood way	Sheldon St	Bradford St	Osborne St	Van Nuys Blvd
	PM 144.23	PM 148.85	PM 152.41	PM 153.49	PM 154.04	PM 155.12
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/21/2010 0:00	1387	903	876	1300	1503	1680
10/21/2010 1:00	793	647	626	909	1201	1416
10/21/2010 2:00	800	641	577	875	1164	1374
10/21/2010 3:00	942	828	892	1347	1569	1730
10/21/2010 4:00	1684	1569	1801	2887	2885	2912
10/21/2010 5:00	3877	3884	4479	8207	7531	7061
10/21/2010 6:00	7112	6264	6713	12165	10821	9536
10/21/2010 7:00	6448	6777	6954	12597	10985	9071
10/21/2010 8:00	6081	5923	6781	11469	10174	8537
10/21/2010 9:00	6236	5832	5981	10526	9472	8292
10/21/2010 10:00	6291	5114	5482	9061	8319	7542
10/21/2010 11:00	6425	4966	5225	8516	7303	7044
10/21/2010 12:00	6397	4911	4959	8057	6347	6805
10/21/2010 13:00	6041	4208	4428	7258	6802	6290
10/21/2010 14:00	7095	5403	5280	8420	7600	7106
10/21/2010 15:00	7290	5280	5377	8949	8338	7650
10/21/2010 16:00	6997	5063	5544	9246	8435	7811
10/21/2010 17:00	6506	5091	5112	8935	8317	7534
10/21/2010 18:00	6109	4328	4656	8371	7771	7000
10/21/2010 19:00	5465	3644	3659	6127	5557	5214
10/21/2010 20:00	4492	2924	3051	4900	4562	4438
10/21/2010 21:00	4036	2665	2788	4597	4248	4130
10/21/2010 22:00	3471	2265	2268	3711	3621	3493
10/21/2010 23:00	2201	1619	1524	2531	2602	2626

I-5 SB Truck Volume

From SR-118 to SR-134

October, 2010

Date / Time	Western Ave	Hollywood way	Sheldon St	Bradford St	Osborne St	Van Nuys Blvd
	PM 144.23	PM 148.85	PM 152.41	PM 153.49	PM 154.04	PM 155.12
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/21/2010 0:00	286	179	196	180	77	97
10/21/2010 1:00	187	147	162	146	64	98
10/21/2010 2:00	165	148	142	146	63	99
10/21/2010 3:00	193	166	217	203	124	96
10/21/2010 4:00	322	224	319	262	159	96
10/21/2010 5:00	528	407	510	434	505	157
10/21/2010 6:00	773	432	550	572	906	194
10/21/2010 7:00	602	420	432	365	1034	222
10/21/2010 8:00	634	377	454	109	723	158
10/21/2010 9:00	763	522	522	446	561	174
10/21/2010 10:00	881	501	685	491	462	151
10/21/2010 11:00	889	469	672	462	316	138
10/21/2010 12:00	820	476	628	425	211	130
10/21/2010 13:00	755	388	453	140	887	213
10/21/2010 14:00	883	433	580	386	397	147
10/21/2010 15:00	787	433	532	343	407	123
10/21/2010 16:00	821	377	480	288	431	143
10/21/2010 17:00	799	365	412	289	402	126
10/21/2010 18:00	772	303	420	289	420	122
10/21/2010 19:00	666	311	391	266	262	124
10/21/2010 20:00	553	282	386	236	177	118
10/21/2010 21:00	535	291	355	234	182	115
10/21/2010 22:00	478	284	337	224	103	97
10/21/2010 23:00	406	257	289	241	108	97

I-5 Off & On Ramps Traffic Volume

For SB I-5

October, 2010

Date / Time	WB Osborne St 2		EB Osborne St		Sunland Blvd		Roscoe Blvd		Branford St	
	PM 154.04	PM 154.04		PM 153.87		PM 150.15		PM 148.80		
	Off Ramp (Lanes 1)	On Ramp (Lanes 1)		On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)		On Ramp (Lanes 1)		On Ramp (Lanes 1)
10/21/2010 0:00	45	n/d		24	n/d	64		28		n/l
10/21/2010 1:00	30	n/d		11	n/d	32		13		n/l
10/21/2010 2:00	20	n/d		9	n/d	33		31		n/l
10/21/2010 3:00	40	n/d		20	n/d	56		34		n/l
10/21/2010 4:00	46	n/d		45	n/d	89		78		n/l
10/21/2010 5:00	168	n/d		151	n/d	255		271		n/l
10/21/2010 6:00	195	n/d		271	n/d	360		463		n/l
10/21/2010 7:00	168	n/d		354	n/d	513		789		n/l
10/21/2010 8:00	180	n/d		312	n/d	439		591		n/l
10/21/2010 9:00	177	n/d		221	n/d	385		455		n/l
10/21/2010 10:00	110	n/d		186	n/d	349		394		n/l
10/21/2010 11:00	135	n/d		183	n/d	382		381		n/l
10/21/2010 12:00	120	n/d		193	n/d	406		387		n/l
10/21/2010 13:00	128	n/d		186	n/d	381		371		n/l
10/21/2010 14:00	100	n/d		174	n/d	433		442		n/l
10/21/2010 15:00	110	n/d		194	n/d	424		444		n/l
10/21/2010 16:00	120	n/d		159	n/d	408		420		n/l
10/21/2010 17:00	205	n/d		220	n/d	374		468		n/l
10/21/2010 18:00	355	n/d		167	n/d	369		330		n/l
10/21/2010 19:00	264	n/d		160	n/d	278		256		n/l
10/21/2010 20:00	193	n/d		122	n/d	265		208		n/l
10/21/2010 21:00	143	n/d		102	n/d	202		147		n/l
10/21/2010 22:00	114	n/d		101	n/d	170		121		n/l
10/21/2010 23:00	89	n/d		36	n/d	102		80		n/l

I-5 NB Main Line Volume
From SR-134 to SR-118
October, 2010

Date / Time	Western Ave	Hollywood way	Sheldon St	Bradford St	Osborne St		Van Nuys Blvd
	PM 144.4	PM 149.04	PM 152.47	PM 153.55	PM 154.18		PM 155.18
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		Flow (veh/hr)
10/21/2010 0:00	1284	1329	1065	898	1536	1188	2724
10/21/2010 1:00	817	923	721	630	994	1187	2181
10/21/2010 2:00	1325	820	565	638	769	1201	1970
10/21/2010 3:00	1500	980	644	952	699	1269	1968
10/21/2010 4:00	1989	1421	1085	1944	1226	1295	2521
10/21/2010 5:00	3595	2933	2434	5542	2864	1343	4207
10/21/2010 6:00	5327	4252	3756	8340	4586	1250	5836
10/21/2010 7:00	6883	5492	4951	8319	6769	1218	7987
10/21/2010 8:00	7533	5214	4480	7384	5879	1033	6912
10/21/2010 9:00	6547	4595	4012	6856	4818	1109	5927
10/21/2010 10:00	6229	4990	4271	6100	5183	949	6132
10/21/2010 11:00	5577	5022	4450	5657	5240	818	6058
10/21/2010 12:00	5475	4964	4434	5330	5550	756	6306
10/21/2010 13:00	5751	5504	4443	4643	5727	949	6676
10/21/2010 14:00	6092	6029	5446	5607	7298	1044	8342
10/21/2010 15:00	6078	6247	4831	6012	7293	1371	8664
10/21/2010 16:00	5875	6572	4757	6088	7295	1209	8504
10/21/2010 17:00	6098	5774	4507	5789	6901	1310	8211
10/21/2010 18:00	6122	5040	4494	5360	6617	1262	7879
10/21/2010 19:00	6224	5162	4307	3928	6176	1074	7250
10/21/2010 20:00	5046	4719	4209	3219	5774	1080	6854
10/21/2010 21:00	4327	4136	3680	3046	4837	883	5720
10/21/2010 22:00	3278	3181	2877	2414	3876	946	4822
10/21/2010 23:00	2202	2090	1682	1634	2492	1105	3597

I-5 NB Truck Volume
From SR-134 to SR-118
October, 2010

Date / Time	Western Ave	Hollywood way	Sheldon St	Bradford St	Osborne St	Van Nuys Blvd
	PM 144.4	PM 149.04	PM 152.47	PM 153.55	PM 154.18	PM 155.18
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
10/21/2010 0:00	131	125	179	132	279	113
10/21/2010 1:00	160	96	119	99	200	105
10/21/2010 2:00	183	90	122	90	208	103
10/21/2010 3:00	122	110	149	127	316	103
10/21/2010 4:00	248	150	218	129	368	107
10/21/2010 5:00	344	197	390	106	527	150
10/21/2010 6:00	264	212	445	79	647	169
10/21/2010 7:00	589	241	507	14	930	196
10/21/2010 8:00	383	264	540	8	823	171
10/21/2010 9:00	574	297	603	97	840	152
10/21/2010 10:00	532	319	631	151	836	148
10/21/2010 11:00	412	303	702	169	900	161
10/21/2010 12:00	341	281	666	142	793	173
10/21/2010 13:00	177	286	389	112	870	203
10/21/2010 14:00	141	253	494	109	1045	273
10/21/2010 15:00	30	224	210	61	894	305
10/21/2010 16:00	37	200	87	25	831	287
10/21/2010 17:00	94	166	113	30	822	275
10/21/2010 18:00	10	339	115	36	873	252
10/21/2010 19:00	114	172	216	75	756	243
10/21/2010 20:00	324	163	359	78	640	224
10/21/2010 21:00	491	166	355	96	539	178
10/21/2010 22:00	233	158	323	97	441	153
10/21/2010 23:00	342	149	258	139	367	145

I-5 Off & On Ramps Traffic Volume
For NB I-5
October, 2010

Date / Time	EB Osborne St 1		WB Osborne St 2		Sunland Blvd		Branford St	
		PM 154.0		PM 154.18	PM 150.21	PM 150.35		
	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	On Ramp (Lanes 1)	Off Ramp (Lanes 1)	
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (Veh/Hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	
10/21/2010 0:00	n/l	46	n/l	42	116	69	n/l	
10/21/2010 1:00	n/l	19	n/l	33	43	34	n/l	
10/21/2010 2:00	n/l	14	n/l	25	48	42	n/l	
10/21/2010 3:00	n/l	34	n/l	34	48	35	n/l	
10/21/2010 4:00	n/l	80	n/l	62	93	80	n/l	
10/21/2010 5:00	n/l	239	n/l	220	229	227	n/l	
10/21/2010 6:00	n/l	397	n/l	381	316	337	n/l	
10/21/2010 7:00	n/l	586	n/l	514	369	550	n/l	
10/21/2010 8:00	n/l	414	n/l	316	360	399	n/l	
10/21/2010 9:00	n/l	274	n/l	276	291	346	n/l	
10/21/2010 10:00	n/l	262	n/l	250	320	324	n/l	
10/21/2010 11:00	n/l	276	n/l	285	355	318	n/l	
10/21/2010 12:00	n/l	254	n/l	324	390	369	n/l	
10/21/2010 13:00	n/l	379	n/l	369	399	440	n/l	
10/21/2010 14:00	n/l	423	n/l	349	433	436	n/l	
10/21/2010 15:00	n/l	450	n/l	454	494	471	n/l	
10/21/2010 16:00	n/l	462	n/l	454	567	408	n/l	
10/21/2010 17:00	n/l	476	n/l	475	621	349	n/l	
10/21/2010 18:00	n/l	446	n/l	414	523	309	n/l	
10/21/2010 19:00	n/l	364	n/l	273	496	330	n/l	
10/21/2010 20:00	n/l	220	n/l	262	334	257	n/l	
10/21/2010 21:00	n/l	226	n/l	162	285	227	n/l	
10/21/2010 22:00	n/l	135	n/l	133	247	191	n/l	
10/21/2010 23:00	n/l	76	n/l	64	133	95	n/l	

From San Fernando Rd to Glenoaks Blvd & February, 2011			
Date / Time	(EB SR-118) San Fernando Rd		(WB SR-118) San Fernando Rd
	PM 45.83		PM 45.83
Hour	Flow (veh/hr)		Flow (veh/hr)
10/6/2011 0:00	572		367
10/6/2011 1:00	330		240
10/6/2011 2:00	251		213
10/6/2011 3:00	278		363
10/6/2011 4:00	406		780
10/6/2011 5:00	1220		2498
10/6/2011 6:00	2947		4358
10/6/2011 7:00	5094		6214
10/6/2011 8:00	4919		4626
10/6/2011 9:00	3177		3561
10/6/2011 10:00	2764		3296
10/6/2011 11:00	2605		2959
10/6/2011 12:00	2981		3111
10/6/2011 13:00	3125		3127
10/6/2011 14:00	4108		3551
10/6/2011 15:00	4745		4520
10/6/2011 16:00	5141		5091
10/6/2011 17:00	5665		5688
10/6/2011 18:00	5094		4985
10/6/2011 19:00	3877		3170
10/6/2011 20:00	2790		2131
10/6/2011 21:00	2459		1787
10/6/2011 22:00	1764		1412
10/6/2011 23:00	1142		748

Interchange Connector Volume

SR-134 & I-5, SR-134 & I-210

MAY, 2011

Date / Time	EB SR-134 to SB I-5	WB SR-134 to SB I-5	WB SR-134 to NB I-5	NB I-5 to EB SR-134	NB I-5 to WB SR-134	SB I-5 to EB SR-134		EB SR-134 to WB I-210	EB I-210 to WB SR-134		
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		Flow (veh/hr)	Flow (veh/hr)		
5/11/2011 0:00	n/d	113	n/d	n/d	326	n/d		n/d	n/d		
5/11/2011 1:00	n/d	61	n/d	n/d	177	n/d		n/d	n/d		
5/11/2011 2:00	n/d	75	n/d	n/d	151	n/d		n/d	n/d		
5/11/2011 3:00	n/d	61	n/d	n/d	162	n/d		n/d	n/d		
5/11/2011 4:00	n/d	162	n/d	n/d	328	n/d		n/d	n/d		
5/11/2011 5:00	n/d	416	n/d	n/d	988	n/d		n/d	n/d		
5/11/2011 6:00	n/d	919	n/d	n/d	1820	n/d		n/d	n/d		
5/11/2011 7:00	n/d	1312	n/d	n/d	2898	n/d		n/d	n/d		
5/11/2011 8:00	n/d	1079	n/d	n/d	2926	n/d		n/d	n/d		
5/11/2011 9:00	n/d	880	n/d	n/d	2578	n/d		n/d	n/d		
5/11/2011 10:00	n/d	827	n/d	n/d	2493	n/d		n/d	n/d		
5/11/2011 11:00	n/d	726	n/d	n/d	2391	n/d		n/d	n/d		
5/11/2011 12:00	n/d	837	n/d	n/d	2491	n/d		n/d	n/d		
5/11/2011 13:00	n/d	775	n/d	n/d	2490	n/d		n/d	n/d		
5/11/2011 14:00	n/d	769	n/d	n/d	2345	n/d		n/d	n/d		
5/11/2011 15:00	n/d	845	n/d	n/d	2478	n/d		n/d	n/d		
5/11/2011 16:00	n/d	818	n/d	n/d	2477	n/d		n/d	n/d		
5/11/2011 17:00	n/d	995	n/d	n/d	2754	n/d		n/d	n/d		
5/11/2011 18:00	n/d	906	n/d	n/d	2412	n/d		n/d	n/d		
5/11/2011 19:00	n/d	712	n/d	n/d	2182	n/d		n/d	n/d		
5/11/2011 20:00	n/d	516	n/d	n/d	1815	n/d		n/d	n/d		
5/11/2011 21:00	n/d	504	n/d	n/d	1738	n/d		n/d	n/d		
5/11/2011 22:00	n/d	375	n/d	n/d	1236	n/d		n/d	n/d		
5/11/2011 23:00	n/d	228	n/d	n/d	633	n/d		n/d	n/d		

Interchange Connector Volume

From SR-134 & SR-2

MAY, 2011

Date / Time	EB SR-134 to SB SR-2	EB SR-134 to NB SR-2	WB SR-134 to SB SR-2	WB SR-134 to NB SR-2		SB SR-2 to EB-SR-134	SB SR-2 to WB SR-134	EB/NB SR-2 to EB SR-134	EB/NB SR-2 to WB SR-134		
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)		
5/11/2011 0:00	68	219	125	N/D		N/D	N/D	234	102		
5/11/2011 1:00	46	106	89	N/D		N/D	N/D	134	71		
5/11/2011 2:00	43	58	57	N/D		N/D	N/D	89	45		
5/11/2011 3:00	38	33	97	N/D		N/D	N/D	64	34		
5/11/2011 4:00	78	38	154	N/D		N/D	N/D	124	72		
5/11/2011 5:00	221	125	468	N/D		N/D	N/D	271	181		
5/11/2011 6:00	528	395	1126	N/D		N/D	N/D	666	534		
5/11/2011 7:00	912	1268	1072	N/D		N/D	N/D	1431	664		
5/11/2011 8:00	779	1222	804	N/D		N/D	N/D	1543	645		
5/11/2011 9:00	620	953	905	N/D		N/D	N/D	1059	719		
5/11/2011 10:00	525	941	831	N/D		N/D	N/D	962	595		
5/11/2011 11:00	506	1104	783	N/D		N/D	N/D	957	625		
5/11/2011 12:00	543	1233	757	N/D		N/D	N/D	946	732		
5/11/2011 13:00	549	1366	740	N/D		N/D	N/D	1057	712		
5/11/2011 14:00	650	1612	804	N/D		N/D	N/D	1330	760		
5/11/2011 15:00	727	1765	880	N/D		N/D	N/D	1387	850		
5/11/2011 16:00	766	1994	955	N/D		N/D	N/D	1586	965		
5/11/2011 17:00	812	2372	1179	N/D		N/D	N/D	1656	998		
5/11/2011 18:00	755	1998	1077	N/D		N/D	N/D	1627	791		
5/11/2011 19:00	598	1524	728	N/D		N/D	N/D	1190	695		
5/11/2011 20:00	408	1273	641	N/D		N/D	N/D	860	533		
5/11/2011 21:00	308	1052	572	N/D		N/D	N/D	775	526		
5/11/2011 22:00	248	665	397	N/D		N/D	N/D	629	355		
5/11/2011 23:00	173	418	264	N/D		N/D	N/D	365	243		

SR-134 WB Main Line Volume

From Orange Grove Blvd to I-5

MAY, 2011

Date / Time	San Fernando St	Pacific Ave	Glendale Ave	Figueroa Ave	San Rafeal Ave	Orange Grove Blvd
	PM 5.98	PM 6.52	PM 7.67	PM 11.47	PM 12.25	PM 12.76
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
5/11/2011 0:00	1289	1073	768	881	844	810
5/11/2011 1:00	938	703	428	572	502	481
5/11/2011 2:00	844	657	328	484	353	367
5/11/2011 3:00	890	658	400	561	478	523
5/11/2011 4:00	1266	1246	915	900	1022	1083
5/11/2011 5:00	2544	3240	2979	2344	3253	3211
5/11/2011 6:00	4520	5977	5779	4347	6157	5969
5/11/2011 7:00	6167	8332	8635	6112	7981	7638
5/11/2011 8:00	6370	8113	8405	6298	7811	7392
5/11/2011 9:00	6064	7338	7412	5502	6755	6406
5/11/2011 10:00	5032	6330	5935	5013	5602	5366
5/11/2011 11:00	4736	5892	5458	4757	5140	4899
5/11/2011 12:00	4612	6057	5376	4811	5291	4996
5/11/2011 13:00	4537	5745	5158	4646	5090	4766
5/11/2011 14:00	5003	6008	5514	5037	5607	5042
5/11/2011 15:00	5251	6423	6027	5610	6246	5758
5/11/2011 16:00	5384	6415	5958	5690	6561	6061
5/11/2011 17:00	5245	6469	6488	6323	7377	6710
5/11/2011 18:00	4661	5780	5468	5414	6306	5795
5/11/2011 19:00	3922	4862	4363	4330	4758	4412
5/11/2011 20:00	3394	4348	3607	3704	3988	3602
5/11/2011 21:00	3209	4188	3345	3563	3804	3413
5/11/2011 22:00	2727	3145	2507	2582	2644	2426
5/11/2011 23:00	1870	1820	1399	1650	1538	1416

SR-134 WBTruck Volume
MAY, 2011

Date / Time	Figueroa Ave	San Rafael Ave
	PM 11.47	PM 12.25
Hour	Flow (veh/hr)	Flow (veh/hr)
5/11/2011 0:00	20	64
5/11/2011 1:00	7	42
5/11/2011 2:00	6	49
5/11/2011 3:00	7	73
5/11/2011 4:00	16	116
5/11/2011 5:00	50	215
5/11/2011 6:00	95	254
5/11/2011 7:00	126	276
5/11/2011 8:00	119	299
5/11/2011 9:00	108	329
5/11/2011 10:00	106	280
5/11/2011 11:00	101	252
5/11/2011 12:00	106	271
5/11/2011 13:00	100	273
5/11/2011 14:00	116	267
5/11/2011 15:00	121	253
5/11/2011 16:00	121	258
5/11/2011 17:00	133	306
5/11/2011 18:00	120	243
5/11/2011 19:00	102	171
5/11/2011 20:00	87	155
5/11/2011 21:00	84	168
5/11/2011 22:00	73	79
5/11/2011 23:00	57	59

SR-134 WB Off & On Ramps Traffic Volume
MAY, 2011

Date / Time	Figueroa St	
	PM 11.47	PM 11.49
	Off Ramp (Lanes 1)	On Ramp (Lanes 1)
Hour	Flow (veh/hr)	Flow (Veh/Hr)
5/18/2010 0:00	42	n/d
5/18/2010 1:00	27	n/d
5/18/2010 2:00	16	n/d
5/18/2010 3:00	14	n/d
5/18/2010 4:00	23	n/d
5/18/2010 5:00	62	n/d
5/18/2010 6:00	133	n/d
5/18/2010 7:00	281	n/d
5/18/2010 8:00	262	n/d
5/18/2010 9:00	251	n/d
5/18/2010 10:00	232	n/d
5/18/2010 11:00	287	n/d
5/18/2010 12:00	265	n/d
5/18/2010 13:00	283	n/d
5/18/2010 14:00	288	n/d
5/18/2010 15:00	377	n/d
5/18/2010 16:00	371	n/d
5/18/2010 17:00	429	n/d
5/18/2010 18:00	323	n/d
5/18/2010 19:00	263	n/d
5/18/2010 20:00	232	n/d
5/18/2010 21:00	186	n/d
5/18/2010 22:00	150	n/d
5/18/2010 23:00	82	n/d

SR-134 EB Main Line Volume

From I-5 to Orange Grove Blvd

MAY, 2011

Date / Time	San Fernando St	Pacific Ave	Glendale Ave	Figueroa Ave	San Rafeal Ave	Orange Grove Blvd
	PM 5.98	PM 6.52	PM 7.67	PM 11.47	PM 12.25	PM 12.76
Hour	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)	Flow (veh/hr)
5/11/2011 0:00	1157	987	1138	696	938	735
5/11/2011 1:00	671	556	684	419	570	452
5/11/2011 2:00	464	397	513	323	446	332
5/11/2011 3:00	347	338	427	262	412	330
5/11/2011 4:00	557	545	655	462	655	536
5/11/2011 5:00	1443	1249	1533	1123	1552	1233
5/11/2011 6:00	3774	3063	3574	2924	3595	2890
5/11/2011 7:00	7051	5543	6466	5682	7073	5510
5/11/2011 8:00	7183	5293	6488	5970	7416	5791
5/11/2011 9:00	6151	4634	5569	4536	5610	4241
5/11/2011 10:00	5583	4404	5245	4104	4976	3964
5/11/2011 11:00	5747	4602	5541	4139	5183	3997
5/11/2011 12:00	6074	4951	6004	4404	5423	4102
5/11/2011 13:00	6367	5385	6370	4759	5654	4388
5/11/2011 14:00	6958	5868	7175	5609	6629	5252
5/11/2011 15:00	7283	6353	7818	6294	7264	5580
5/11/2011 16:00	7328	6288	7996	6405	7249	5686
5/11/2011 17:00	7345	6589	8433	6725	8084	6077
5/11/2011 18:00	7455	6617	8058	6496	7510	5726
5/11/2011 19:00	6389	5447	6554	4984	5908	4541
5/11/2011 20:00	5065	4267	5088	3537	4291	3310
5/11/2011 21:00	4392	3584	4560	2973	3820	2899
5/11/2011 22:00	3416	2818	3380	2344	2870	2220
5/11/2011 23:00	2138	1794	2140	1318	1715	1336

SR-134 EB Truck Volume
MAY, 2011

Date / Time	Figueroa Ave	San Rafael Ave
	PM 11.52	PM 12.45
Hour	Flow (veh/hr)	Flow (veh/hr)
5/11/2011 0:00	0	0
5/11/2011 1:00	0	1
5/11/2011 2:00	0	3
5/11/2011 3:00	0	5
5/11/2011 4:00	0	0
5/11/2011 5:00	0	0
5/11/2011 6:00	0	0
5/11/2011 7:00	0	0
5/11/2011 8:00	0	0
5/11/2011 9:00	0	0
5/11/2011 10:00	0	0
5/11/2011 11:00	0	0
5/11/2011 12:00	0	0
5/11/2011 13:00	0	0
5/11/2011 14:00	0	0
5/11/2011 15:00	0	0
5/11/2011 16:00	0	0
5/11/2011 17:00	0	0
5/11/2011 18:00	1	0
5/11/2011 19:00	0	0
5/11/2011 20:00	0	0
5/11/2011 21:00	0	0
5/11/2011 22:00	0	0
5/11/2011 23:00	0	0

SR-134 EB Off & On Ramps Traffic Volume
MAY, 2011

Date / Time	Figueroa St	
	PM 11.42	PM 11.52
	Off Ramp (Lanes 1)	On Ramp (Lanes 1)
Hour	Flow (veh/hr)	Flow (veh/hr)
5/18/2010 0:00	23	n/d
5/18/2010 1:00	13	n/d
5/18/2010 2:00	16	n/d
5/18/2010 3:00	12	n/d
5/18/2010 4:00	7	n/d
5/18/2010 5:00	18	n/d
5/18/2010 6:00	96	n/d
5/18/2010 7:00	289	n/d
5/18/2010 8:00	322	n/d
5/18/2010 9:00	217	n/d
5/18/2010 10:00	195	n/d
5/18/2010 11:00	176	n/d
5/18/2010 12:00	194	n/d
5/18/2010 13:00	192	n/d
5/18/2010 14:00	245	n/d
5/18/2010 15:00	296	n/d
5/18/2010 16:00	352	n/d
5/18/2010 17:00	384	n/d
5/18/2010 18:00	330	n/d
5/18/2010 19:00	264	n/d
5/18/2010 20:00	155	n/d
5/18/2010 21:00	142	n/d
5/18/2010 22:00	117	n/d
5/18/2010 23:00	104	n/d

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

APPENDIX D: FREEWAY RAMP CAPACITY ANALYSIS WORKSHEETS

Devil's Gate Reservoir Sediment Removal and Management Project

Los Angeles County, California

TRAFFIC IMPACT ANALYSIS

TUSTIN

SANTA CLARITA

TEMECULA

VICTORVILLE

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September 23, 2013

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Berkshire Place

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 1

ROUTE 1E,1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND DIVERGE

Mainline AM	5570	7%	50	5620	8%	500	6120	8%
Mainline MID	3510	18%	50	3560	19%	315	3875	19%
Mainline PM	4335	12%	50	4385	13%	390	4775	13%
Ramp AM	415	1%	50	465	12%	35	500	12%
Ramp MID	155	4%	50	205	27%	15	220	27%
Ramp PM	260	0%	50	310	16%	25	335	16%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5570	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	415	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5570		415			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1466		109			v
Trucks and buses	7		1			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.966	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6068	439	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2893 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6068	9600	No
$v_{FO} = v_F - v_R$	5629	9600	No
v_R	439	2000	No
v_3 or v_{av34}	1587 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2893 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2893	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 17.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.468	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = 74.5	mph
Space mean speed for all vehicles,	S = 64.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3510	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	155	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3510		155			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	924		41			v
Trucks and buses	18		4			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.917	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4027	166	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1849 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4027	9600	No
$v_{FO} = v_F - v_R$	3861	9600	No
v_R	166	2000	No
v_3 or v_{av34}	1089 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1849 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1849	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 8.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.443	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_O = 76.4	mph
Space mean speed for all vehicles,	S = 66.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4335	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	260	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4335		260			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1141		68			v
Trucks and buses	12		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4837	274	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2263 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4837	9600	No
$v_{FO} = v_F - v_R$	4563	9600	No
v_R	274	2000	No
v_3 or v_{av34}	1287 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2263 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2263	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 11.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.453	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = 75.7	mph
Space mean speed for all vehicles,	S = 65.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5620	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	465	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5620		465			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1479		122			v
Trucks and buses	8		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.962	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6152	519	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2975 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6152	9600	No
$v_{FO} = v_F - v_R$	5633	9600	No
v_R	519	2000	No
v_3 or v_{av34}	1588 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2975 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2975	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 18.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.475	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_O = 74.5	mph
Space mean speed for all vehicles,	S = 64.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3560	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	205	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3560		205			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	937		54			v
Trucks and buses	19		27			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.913	0.881	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4103	245	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1927 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4103	9600	No
$v_{FO} = v_F - v_R$	3858	9600	No
v_R	245	2000	No
v_3 or v_{av34}	1088 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1927 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1927	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 9.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.450

Space mean speed in ramp influence area, S_R = 57.4 mph

Space mean speed in outer lanes, S_O = 76.4 mph

Space mean speed for all vehicles, S = 66.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4385	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	310	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4385		310			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1154		82			v
Trucks and buses	13		16			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.939	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4916	352	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2342 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4916	9600	No
$v_{FO} = v_F - v_R$	4564	9600	No
v_R	352	2000	No
v_3 or v_{av34}	1287 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2342 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2342	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 12.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.460	
Space mean speed in ramp influence area,	S_R = 57.1	mph
Space mean speed in outer lanes,	S_O = 75.7	mph
Space mean speed for all vehicles,	S = 65.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6120	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	500	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6120		500			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1611		132			v
Trucks and buses	8		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.962	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6700	558	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3236 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6700	9600	No
$v_{FO} = v_F - v_R$	6142	9600	No
v_R	558	2000	No
v_3 or v_{av34}	1732 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3236 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3236	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.478	
Space mean speed in ramp influence area,	S_R = 56.6	mph
Space mean speed in outer lanes,	S_O = 73.9	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3875	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	220	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3875		220			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1020		58			v
Trucks and buses	19		27			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.913	0.881	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4466	263	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2096 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4466	9600	No
$v_{FO} = v_F - v_R$	4203	9600	No
v_R	263	2000	No
v_3 or v_{av34}	1185 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2096 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2096	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 10.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.452	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = 76.1	mph
Space mean speed for all vehicles,	S = 66.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4775	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	335	vph
Length of first accel/decel lane	1310	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4775		335			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1257		88			v
Trucks and buses	13		16			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.939	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5353	381	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2549 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5353	9600	No
$v_{FO} = v_F - v_R$	4972	9600	No
v_R	381	2000	No
v_3 or v_{av34}	1402 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2549 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2549	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 14.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.462	
Space mean speed in ramp influence area,	S_R = 57.1	mph
Space mean speed in outer lanes,	S_O = 75.2	mph
Space mean speed for all vehicles,	S = 65.3	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Berkshire Place
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 2
ROUTE 1E,1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND MERGE

Mainline AM	3365	12%	50	3415	13%	305	3720	13%
Mainline MID	3515	18%	50	3565	19%	315	3880	19%
Mainline PM	5585	9%	50	5635	10%	505	6140	10%
Ramp AM	350	2%	50	400	14%	30	430	14%
Ramp MID	220	2%	50	270	20%	20	290	20%
Ramp PM	475	1%	50	525	10%	45	570	10%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3365	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	350	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3365	350		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	886	92		v
Trucks and buses	12	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.943	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3755	372	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.171 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 643 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4127	9600	No
v_3 or v_{av34}	1556 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1502 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4127	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.267	
Space mean speed in ramp influence area,	S_R = 62.5	mph
Space mean speed in outer lanes,	S_O = 67.7	mph
Space mean speed for all vehicles,	S = 65.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3515	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	220	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3515	220		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	925	58		v
Trucks and buses	18	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.917	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4033	234	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.189 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 760 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4267	9600	No
v_3 or v_{av34}	1636 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1613		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4267	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.266	
Space mean speed in ramp influence area,	S_R = 62.6	mph
Space mean speed in outer lanes,	S_O = 67.4	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5585	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	475	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5585	475		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1470	125		v
Trucks and buses	9	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.957	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6144	503	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.155 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 952 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6647	9600	No
v_3 or v_{av34}	2596 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2457 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6647	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.316	
Space mean speed in ramp influence area,	S_R = 61.1	mph
Space mean speed in outer lanes,	S_O = 65.2	mph
Space mean speed for all vehicles,	S = 63.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3415	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	400	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3415	400		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	899	105		v
Trucks and buses	13	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.939	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3828	451	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.161 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 618 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4279	9600	No
v_3 or v_{av34}	1605 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1531 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4279	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.270	
Space mean speed in ramp influence area,	S_R = 62.5	mph
Space mean speed in outer lanes,	S_O = 67.7	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3565	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	270	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3565	270		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	938	71		v
Trucks and buses	19	20		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.913	0.909	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4109	313	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.179 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 734 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4422	9600	No
v_3 or v_{av34}	1687 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1643 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4422	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.269	
Space mean speed in ramp influence area,	S_R = 62.5	mph
Space mean speed in outer lanes,	S_O = 67.4	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5635	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5635	525		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1483	138		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6228	580	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.145 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 905 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6808	9600	No
v_3 or v_{av34}	2661 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 2491		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6808	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.325	
Space mean speed in ramp influence area,	S_R = 60.9	mph
Space mean speed in outer lanes,	S_O = 65.1	mph
Space mean speed for all vehicles,	S = 63.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3720	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	430	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3720	430		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	979	113		v
Trucks and buses	13	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.939	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4170	484	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.157 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 656 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4654	9600	No
v_3 or v_{av34}	1757 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1668 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4654	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.275	
Space mean speed in ramp influence area,	S_R = 62.3	mph
Space mean speed in outer lanes,	S_O = 67.3	mph
Space mean speed for all vehicles,	S = 64.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3880	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	290	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3880	290		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1021	76		v
Trucks and buses	19	20		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.913	0.909	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4472	336	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.176 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 786 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4808	9600	No
v_3 or v_{av34}	1843 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1788 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4808	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.274	
Space mean speed in ramp influence area,	S_R = 62.3	mph
Space mean speed in outer lanes,	S_O = 67.0	mph
Space mean speed for all vehicles,	S = 64.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6140	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	570	vph
Length of first accel/decel lane	1140	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6140	570		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1616	150		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6786	630	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.139 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 944 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7416	9600	No
v_3 or v_{av34}	2921 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2714 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7416	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.352	
Space mean speed in ramp influence area,	S_R = 60.2	mph
Space mean speed in outer lanes,	S_O = 64.5	mph
Space mean speed for all vehicles,	S = 62.4	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Berkshire Place

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 3

ROUTE 1A,1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND MERGE

Mainline AM	5155	7%	50	5205	8%	465	5670	8%
Mainline MID	3355	19%	50	3405	20%	300	3705	20%
Mainline PM	4075	13%	50	4125	14%	365	4490	14%
Ramp AM	265	2%	50	315	17%	25	340	17%
Ramp MID	135	3%	50	185	29%	10	195	29%
Ramp PM	405	0%	50	455	11%	35	490	11%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5155	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	265	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5155	265		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1357	70		v
Trucks and buses	7	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5616	282	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.183 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1025 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5898	9600	No
v_3 or v_{av34}	2295 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2246 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5898	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.370	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = 65.7	mph
Space mean speed for all vehicles,	S = 63.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3355	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	135	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3355	135		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	883	36		v
Trucks and buses	19	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.913	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3867	144	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.200 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 773 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4011	9600	No
v_3 or v_{av34}	1547 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1546 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4011	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.342	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_O = 67.6	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4075	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	405	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4075	405		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1072	107		v
Trucks and buses	13	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.939	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4568	426	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.165 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 752 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4994	9600	No
v_3 or v_{av34}	1908 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1827 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4994	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.358	
Space mean speed in ramp influence area,	S_R = 60.0	mph
Space mean speed in outer lanes,	S_0 = 66.9	mph
Space mean speed for all vehicles,	S = 63.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5205	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	315	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5205	315		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1370	83		v
Trucks and buses	8	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5698	360	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.173 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 985 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6058	9600	No
v_3 or v_{av34}	2356 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2279 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6058	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.376	
Space mean speed in ramp influence area,	S_R = 59.5	mph
Space mean speed in outer lanes,	S_0 = 65.6	mph
Space mean speed for all vehicles,	S = 62.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3405	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	185	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3405	185		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	896	49		v
Trucks and buses	20	29		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.909	0.873	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3943	223	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.190 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 749 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4166	9600	No
v_3 or v_{av34}	1597 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 1577 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4166	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.345	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_O = 67.5	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4125	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	455	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4125	455		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1086	120		v
Trucks and buses	14	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.935	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4646	505	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.155 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 719 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5151	9600	No
v_3 or v_{av34}	1963 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1858 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5151	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.362	
Space mean speed in ramp influence area,	S_R = 59.9	mph
Space mean speed in outer lanes,	S_O = 66.8	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5670	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	340	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5670	340		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1492	89		v
Trucks and buses	8	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6207	388	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.169 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1051 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6595	9600	No
v_3 or v_{av34}	2578 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2482 (Equation 13-15, 13-16, 18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6595	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 27.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.390	
Space mean speed in ramp influence area,	S_R = 59.1	mph
Space mean speed in outer lanes,	S_0 = 65.1	mph
Space mean speed for all vehicles,	S = 62.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3705	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	195	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3705	195		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	975	51		v
Trucks and buses	20	29		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.909	0.873	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4290	235	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.188 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 808 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4525	9600	No
v_3 or v_{av34}	1741 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1716 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4525	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.348	
Space mean speed in ramp influence area,	S_R = 60.2	mph
Space mean speed in outer lanes,	S_O = 67.2	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Berkshire Place On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4490	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4490	490		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1182	129		v
Trucks and buses	14	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.935	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5057	544	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.150 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 758 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5601	9600	No
v_3 or v_{av34}	2149 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2022 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5601	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.372	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = 66.3	mph
Space mean speed for all vehicles,	S = 63.1	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Berkshire Place

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 4

ROUTE 1A,1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND DIVERGE

Mainline AM	3705	11%	50	3755	12%	335	4090	12%
Mainline MID	3645	17%	50	3695	18%	330	4025	18%
Mainline PM	5765	9%	50	5815	10%	520	6335	10%
Ramp AM	340	1%	50	390	14%	30	420	14%
Ramp MID	130	2%	50	180	29%	10	190	29%
Ramp PM	180	1%	50	230	23%	15	245	23%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3705	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	340	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3705		340			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	975		89			v
Trucks and buses	11		1			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4115	360	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1997 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4115	9600	No
$v_{FO} = v_F - v_R$	3755	9600	No
v_R	360	2000	No
v_3 or v_{av34}	1059 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1997 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1997	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.460	
Space mean speed in ramp influence area,	S_R = 57.1	mph
Space mean speed in outer lanes,	S_O = 76.6	mph
Space mean speed for all vehicles,	S = 65.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3645	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	130	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3645		130			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	959		34			v
Trucks and buses	17		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.922	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4163	138	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1893 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4163	9600	No
$v_{FO} = v_F - v_R$	4025	9600	No
v_R	138	2000	No
v_3 or v_{av34}	1135 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1893 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1893	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.440

Space mean speed in ramp influence area, S_R = 57.7 mph

Space mean speed in outer lanes, S_O = 76.3 mph

Space mean speed for all vehicles, S = 66.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5765	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	180	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5765		180			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1517		47			v
Trucks and buses	9		1			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.957	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6342	190	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2872 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6342	9600	No
$v_{FO} = v_F - v_R$	6152	9600	No
v_R	190	2000	No
v_3 or v_{av34}	1735 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2872 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2872	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.445	
Space mean speed in ramp influence area,	S_R = 57.5	mph
Space mean speed in outer lanes,	S_O = 73.9	mph
Space mean speed for all vehicles,	S = 65.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3755	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	390	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3755		390			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	988		103			v
Trucks and buses	12		14			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4190	439	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2074 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4190	9600	No
$v_{FO} = v_F - v_R$	3751	9600	No
v_R	439	2000	No
v_3 or v_{av34}	1058 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2074 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2074	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.468	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = 76.6	mph
Space mean speed for all vehicles,	S = 65.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3695	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	180	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3695		180			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	972		47			v
Trucks and buses	18		29			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.917	0.873	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4240	217	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1971 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4240	9600	No
$v_{FO} = v_F - v_R$	4023	9600	No
v_R	217	2000	No
v_3 or v_{av34}	1134 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1971 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1971	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.448	
Space mean speed in ramp influence area,	S_R = 57.5	mph
Space mean speed in outer lanes,	S_O = 76.3	mph
Space mean speed for all vehicles,	S = 66.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6335	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	245	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6335		245			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1667		64			v
Trucks and buses	10		23			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7002	288	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3215 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7002	9600	No
$v_{FO} = v_F - v_R$	6714	9600	No
v_R	288	2000	No
v_3 or v_{av34}	1893 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3215 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3215	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.454	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = 73.3	mph
Space mean speed for all vehicles,	S = 65.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4090	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	420	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4090		420			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1076		111			v
Trucks and buses	12		14			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4564	473	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2257 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4564	9600	No
$v_{FO} = v_F - v_R$	4091	9600	No
v_R	473	2000	No
v_3 or v_{av34}	1153 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2257 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2257	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.471	
Space mean speed in ramp influence area,	S_R = 56.8	mph
Space mean speed in outer lanes,	S_O = 76.2	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4025	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	190	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4025		190			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1059		50			v
Trucks and buses	18		29			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.917	0.873	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4618	229	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2143 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4618	9600	No
$v_{FO} = v_F - v_R$	4389	9600	No
v_R	229	2000	No
v_3 or v_{av34}	1237 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2143 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2143	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.449	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = 75.9	mph
Space mean speed for all vehicles,	S = 66.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Berkshire Place Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6335	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	245	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6335		245			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1667		64			v
Trucks and buses	10		23			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7002	288	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3215 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7002	9600	No
$v_{FO} = v_F - v_R$	6714	9600	No
v_R	288	2000	No
v_3 or v_{av34}	1893 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3215 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3215	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.454	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = 73.3	mph
Space mean speed for all vehicles,	S = 65.0	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Windsor Avenue/Arroyo Boulevard

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 5

ROUTE 1F, 1H

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND DIVERGE								
Mainline AM	5715	1%	50	5765	2%	515	6280	2%
Mainline MID	3650	3%	50	3700	5%	330	4030	5%
Mainline PM	4400	2%	50	4450	3%	395	4845	3%
Ramp AM	660	0%	50	710	7%	60	770	7%
Ramp MID	380	0%	50	430	12%	35	465	12%
Ramp PM	705	0%	50	755	7%	65	820	7%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5715	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5715		660			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1504		174			v
Trucks and buses	1		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.995	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6046	695	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3028 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6046	9600	No
$v_{FO} = v_F - v_R$	5351	9600	No
v_R	695	2000	No
v_3 or v_{av34}	1509 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3028 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3028	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.491	
Space mean speed in ramp influence area,	S_R = 56.3	mph
Space mean speed in outer lanes,	S_O = 74.8	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3650	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	380	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3650		380			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	961		100			v
Trucks and buses	3		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3900	400	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1926 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3900	9600	No
$v_{FO} = v_F - v_R$	3500	9600	No
v_R	400	2000	No
v_3 or v_{av34}	987 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1926 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1926	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.464	
Space mean speed in ramp influence area,	S_R = 57.0	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 65.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4400	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	705	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4400		705			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1158		186			v
Trucks and buses	2		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.990	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4678	742	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2458 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4678	9600	No
$v_{FO} = v_F - v_R$	3936	9600	No
v_R	742	2000	No
v_3 or v_{av34}	1110 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2458 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2458	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.495	
Space mean speed in ramp influence area,	S_R = 56.1	mph
Space mean speed in outer lanes,	S_O = 76.4	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5765	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5765		710			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1517		187			v
Trucks and buses	2		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.990	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6129	774	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3109 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6129	9600	No
$v_{FO} = v_F - v_R$	5355	9600	No
v_R	774	2000	No
v_3 or v_{av34}	1510 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3109 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3109	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.498	
Space mean speed in ramp influence area,	S_R = 56.1	mph
Space mean speed in outer lanes,	S_O = 74.8	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3700	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	430	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3700		430			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	974		113			v
Trucks and buses	5		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3992	480	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2011 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3992	9600	No
$v_{FO} = v_F - v_R$	3512	9600	No
v_R	480	2000	No
v_3 or v_{av34}	990 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2011 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2011	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.471	
Space mean speed in ramp influence area,	S_R = 56.8	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4450	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	755	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4450		755			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1171		199			v
Trucks and buses	3		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4754	823	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2537 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4754	9600	No
$v_{FO} = v_F - v_R$	3931	9600	No
v_R	823	2000	No
v_3 or v_{av34}	1108 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2537 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2537	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.502

Space mean speed in ramp influence area, S_R = 55.9 mph

Space mean speed in outer lanes, S_O = 76.4 mph

Space mean speed for all vehicles, S = 63.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6280	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	770	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6280		770			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1653		203			v
Trucks and buses	2		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.990	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6677	839	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3384 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6677	9600	No
$v_{FO} = v_F - v_R$	5838	9600	No
v_R	839	2000	No
v_3 or v_{av34}	1646 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3384 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3384	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 33.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.504	
Space mean speed in ramp influence area,	S_R = 55.9	mph
Space mean speed in outer lanes,	S_O = 74.3	mph
Space mean speed for all vehicles,	S = 63.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4030	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	465	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4030		465			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1061		122			v
Trucks and buses	5		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4348	519	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2188 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4348	9600	No
$v_{FO} = v_F - v_R$	3829	9600	No
v_R	519	2000	No
v_3 or v_{av34}	1080 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2188 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2188	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.475

Space mean speed in ramp influence area, S_R = 56.7 mph

Space mean speed in outer lanes, S_O = 76.5 mph

Space mean speed for all vehicles, S = 65.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4845	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	820	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4845		820			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1275		216			v
Trucks and buses	3		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5177	893	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2761 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5177	9600	No
$v_{FO} = v_F - v_R$	4284	9600	No
v_R	893	2000	No
v_3 or v_{av34}	1208 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2761 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2761	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.0- pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.508	
Space mean speed in ramp influence area,	S_R = 55.8	mph
Space mean speed in outer lanes,	S_0 = 76.0	mph
Space mean speed for all vehicles,	S = 63.7	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Windsor Avenue/Arroyo Boulevard

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 6

ROUTE 1F,1G

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND MERGE

Mainline AM	3365	1%	50	3415	3%	305	3720	3%
Mainline MID	2460	5%	50	2510	7%	220	2730	7%
Mainline PM	4060	2%	50	4110	3%	365	4475	3%
Ramp AM	575	0%	50	625	8%	50	675	8%
Ramp MID	330	4%	50	380	16%	30	410	16%
Ramp PM	550	1%	50	600	9%	50	650	9%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3365	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3365	575		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	886	151		v
Trucks and buses	1	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.995	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3560	605	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.142 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 506 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4165	9600	No
v_3 or v_{av34}	1527 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1424 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4165	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.351	
Space mean speed in ramp influence area,	S_R = 60.2	mph
Space mean speed in outer lanes,	S_O = 68.0	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2460	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	330	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2460	330		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	647	87		v
Trucks and buses	5	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2654	354	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.174 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 461 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3008	9600	No
v_3 or v_{av34}	1096 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1061		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3008	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 16.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.337	
Space mean speed in ramp influence area,	S_R = 60.6	mph
Space mean speed in outer lanes,	S_O = 68.9	mph
Space mean speed for all vehicles,	S = 64.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4060	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	550	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4060	550		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1068	145		v
Trucks and buses	2	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.990	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4316	582	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.145 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 626 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4898	9600	No
v_3 or v_{av34}	1845 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1726 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4898	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.360	
Space mean speed in ramp influence area,	S_R = 59.9	mph
Space mean speed in outer lanes,	S_O = 67.1	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3415	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	625	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3415	625		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	899	164		v
Trucks and buses	3	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3649	684	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.132 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 483 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4333	9600	No
v_3 or v_{av34}	1583 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1459		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4333	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.354	
Space mean speed in ramp influence area,	S_R = 60.1	mph
Space mean speed in outer lanes,	S_O = 67.9	mph
Space mean speed for all vehicles,	S = 63.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2510	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	380	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2510	380		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	661	100		v
Trucks and buses	7	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2735	432	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.164 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 448 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3167	9600	No
v_3 or v_{av34}	1143 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1094 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3167	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.339	
Space mean speed in ramp influence area,	S_R = 60.5	mph
Space mean speed in outer lanes,	S_0 = 68.8	mph
Space mean speed for all vehicles,	S = 64.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4110	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	600	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4110	600		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1082	158		v
Trucks and buses	3	9		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4391	660	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.135 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 594 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5051	9600	No
v_3 or v_{av34}	1898 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1756		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5051	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.365	
Space mean speed in ramp influence area,	S_R = 59.8	mph
Space mean speed in outer lanes,	S_O = 67.1	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3720	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	675	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3720	675		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	979	178		v
Trucks and buses	3	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3975	739	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.125 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 499 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4714	9600	No
v_3 or v_{av34}	1738 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1590		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4714	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.361	
Space mean speed in ramp influence area,	S_R = 59.9	mph
Space mean speed in outer lanes,	S_O = 67.5	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2730	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	410	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2730	410		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	718	108		v
Trucks and buses	7	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2974	466	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.160 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 475 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3440	9600	No
v_3 or v_{av34}	1249 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 1189 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3440	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.341	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_O = 68.6	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4475	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	650	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4475	650		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1178	171		v
Trucks and buses	3	9		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4781	715	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.128 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 614 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5496	9600	No
v_3 or v_{av34}	2083 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1912 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5496	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.375	
Space mean speed in ramp influence area,	S_R = 59.5	mph
Space mean speed in outer lanes,	S_O = 66.6	mph
Space mean speed for all vehicles,	S = 63.0	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Windsor Avenue/Arroyo Boulevard

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 7

ROUTE 1B,1C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND MERGE

Mainline AM	5055	1%	50	5105	2%	455	5560	2%
Mainline MID	3270	4%	50	3320	5%	295	3615	5%
Mainline PM	3695	2%	50	3745	3%	335	4080	3%
Ramp AM	435	0%	50	485	11%	40	525	11%
Ramp MID	310	1%	50	360	15%	30	390	15%
Ramp PM	430	0%	50	480	10%	40	520	10%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5055	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	435	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5055	435		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1330	114		v
Trucks and buses	1	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.995	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5348	458	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.161 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 859 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5806	9600	No
v_3 or v_{av34}	2244 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2139 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5806	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 16.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.272	
Space mean speed in ramp influence area,	S_R = 62.4	mph
Space mean speed in outer lanes,	S_O = 66.0	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3270	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	310	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp	0	vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3270		310		0		vph
Peak-hour factor, PHF	0.95		0.95		0.90		
Peak 15-min volume, v15	861		82		0		v
Trucks and buses	4		1		0		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.980	0.995	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3511	328	0	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.177 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 621 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3839	9600	No
v_3 or v_{av34}	1445 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1404		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3839	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 9.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.242	
Space mean speed in ramp influence area,	S_R = 63.2	mph
Space mean speed in outer lanes,	S_O = 68.0	mph
Space mean speed for all vehicles,	S = 65.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3695	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	430	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3695	430		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	972	113		v
Trucks and buses	2	0		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.990	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3928	453	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.161 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 633 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4381	9600	No
v_3 or v_{av34}	1647 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1571 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4381	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.249	
Space mean speed in ramp influence area,	S_R = 63.0	mph
Space mean speed in outer lanes,	S_O = 67.6	mph
Space mean speed for all vehicles,	S = 65.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5105	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5105	485		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1343	128		v
Trucks and buses	2	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.990	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5427	539	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.150 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 816 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5966	9600	No
v_3 or v_{av34}	2305 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 2170 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5966	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.278	
Space mean speed in ramp influence area,	S_R = 62.2	mph
Space mean speed in outer lanes,	S_O = 65.9	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3320	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3320	360		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	874	95		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3582	407	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.167 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 598 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3989	9600	No
v_3 or v_{av34}	1492 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1432		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3989	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 10.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.244	
Space mean speed in ramp influence area,	S_R = 63.2	mph
Space mean speed in outer lanes,	S_O = 67.9	mph
Space mean speed for all vehicles,	S = 65.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3745	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	480	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3745	480		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	986	126		v
Trucks and buses	3	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4001	531	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.151 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 606 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4532	9600	No
v_3 or v_{av34}	1697 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1600 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4532	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.252	
Space mean speed in ramp influence area,	S_R = 62.9	mph
Space mean speed in outer lanes,	S_O = 67.5	mph
Space mean speed for all vehicles,	S = 65.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5560	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp	0	vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5560		525		0	vph
Peak-hour factor, PHF	0.95		0.95		0.90	
Peak 15-min volume, v15	1463		138		0	v
Trucks and buses	2		11		0	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.990	0.948	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5911	583	0	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.145 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 857 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6494	9600	No
v_3 or v_{av34}	2527 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2364 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6494	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.294	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_O = 65.4	mph
Space mean speed for all vehicles,	S = 63.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3615	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	390	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3615	390		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	951	103		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3900	441	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.163 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 634 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4341	9600	No
v_3 or v_{av34}	1633 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1560		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4341	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 11.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.248	
Space mean speed in ramp influence area,	S_R = 63.0	mph
Space mean speed in outer lanes,	S_O = 67.6	mph
Space mean speed for all vehicles,	S = 65.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Windsor Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4080	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	520	vph
Length of first accel/decel lane	1450	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4080	520		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1074	137		v
Trucks and buses	3	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.985	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4359	575	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.146 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 636 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4934	9600	No
v_3 or v_{av34}	1861 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1743 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4934	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.259	
Space mean speed in ramp influence area,	S_R = 62.7	mph
Space mean speed in outer lanes,	S_0 = 67.1	mph
Space mean speed for all vehicles,	S = 65.0	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Windsor Avenue/Arroyo Boulevard

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 8

ROUTE 1B,1D

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND DIVERGE

Mainline AM	3365	1%	50	3415	3%	305	3720	3%
Mainline MID	2460	5%	50	2510	7%	220	2730	7%
Mainline PM	4060	2%	50	4110	3%	365	4475	3%
Ramp AM	580	1%	50	630	8%	50	680	8%
Ramp MID	200	2%	50	250	21%	20	270	21%
Ramp PM	435	0%	50	485	11%	40	525	11%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3365	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	580	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3365		580			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	886		153			v
Trucks and buses	1		1			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.995	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3560	614	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1898 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3560	9600	No
$v_{FO} = v_F - v_R$	2946	9600	No
v_R	614	2000	No
v_3 or v_{av34}	831 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1898 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1898	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 8.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.483

Space mean speed in ramp influence area, S_R = 56.5 mph

Space mean speed in outer lanes, S_0 = 76.8 mph

Space mean speed for all vehicles, S = 64.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2460	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	200	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2460		200			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	647		53			v
Trucks and buses	5		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2654	213	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1277 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2654	9600	No
$v_{FO} = v_F - v_R$	2441	9600	No
v_R	213	2000	No
v_3 or v_{av34}	688 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1277 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1277	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 3.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.447	
Space mean speed in ramp influence area,	S_R = 57.5	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 66.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4060	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	435	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4060		435			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1068		114			v
Trucks and buses	2		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.990	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4316	458	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2140 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4316	9600	No
$v_{FO} = v_F - v_R$	3858	9600	No
v_R	458	2000	No
v_3 or v_{av34}	1088 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2140 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2140	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 11.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.469	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = 76.4	mph
Space mean speed for all vehicles,	S = 65.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3415	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	630	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3415		630			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	899		166			v
Trucks and buses	3		8			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3649	690	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1980 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3649	9600	No
$v_{FO} = v_F - v_R$	2959	9600	No
v_R	690	2000	No
v_3 or v_{av34}	834 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1980 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1980	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 9.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.490

Space mean speed in ramp influence area, S_R = 56.3 mph

Space mean speed in outer lanes, S_O = 76.8 mph

Space mean speed for all vehicles, S = 64.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2510	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	250	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2510		250			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	661		66			v
Trucks and buses	7		21			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.966	0.905	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2735	291	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1357 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2735	9600	No
$v_{FO} = v_F - v_R$	2444	9600	No
v_R	291	2000	No
v_3 or v_{av34}	689 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 1357 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1357	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 4.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.454	
Space mean speed in ramp influence area,	S_R = 57.3	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 65.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4110	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4110		485			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1082		128			v
Trucks and buses	3		11			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4391	539	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2218 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4391	9600	No
$v_{FO} = v_F - v_R$	3852	9600	No
v_R	539	2000	No
v_3 or v_{av34}	1086 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2218 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2218	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 11.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.477

Space mean speed in ramp influence area, S_R = 56.7 mph

Space mean speed in outer lanes, S_O = 76.5 mph

Space mean speed for all vehicles, S = 65.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3720	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	680	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3720		680			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	979		179			v
Trucks and buses	3		8			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3975	744	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2153 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3975	9600	No
$v_{FO} = v_F - v_R$	3231	9600	No
v_R	744	2000	No
v_3 or v_{av34}	911 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2153 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2153	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 11.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.495	
Space mean speed in ramp influence area,	S_R = 56.1	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2730	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	270	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	2730		270			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	718		71			v
Trucks and buses	7		21			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.966	0.905	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2974	314	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1474 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	2974	9600	No
$v_{FO} = v_F - v_R$	2660	9600	No
v_R	314	2000	No
v_3 or v_{av34}	750 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1474 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1474	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 5.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.456	
Space mean speed in ramp influence area,	S_R = 57.2	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 65.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Windsor Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4475	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1300	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4475		525			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1178		138			v
Trucks and buses	3		11			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4781	583	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2413 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4781	9600	No
$v_{FO} = v_F - v_R$	4198	9600	No
v_R	583	2000	No
v_3 or v_{av34}	1184 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2413 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2413	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 13.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.480

Space mean speed in ramp influence area, S_R = 56.5 mph

Space mean speed in outer lanes, S_O = 76.1 mph

Space mean speed for all vehicles, S = 64.8 mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 9
ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND DIVERGE

Mainline AM	5115	2%	50	5165	3%	460	5625	3%
Mainline MID	4140	11%	50	4190	12%	375	4565	12%
Mainline PM	4325	8%	50	4375	9%	390	4765	9%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
10
ROUTE
2A, 2B,3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
11
ROUTE
2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND SR-134 MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 12
ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND SR-134 DIVERGE

Mainline AM	5790	10%	50	5840	11%	520	6360	11%
Mainline MID	5250	10%	50	5300	11%	475	5775	11%
Mainline PM	6075	10%	50	6125	11%	545	6670	11%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Figueroa Street/Scholl Canyon Road

FREEWAY : SR-134

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 13

ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND DIVERGE

Mainline AM	6300	2%	50	6350	1%	565	6915	1%
Mainline MID	5035	2%	50	5085	1%	455	5540	1%
Mainline PM	6325	2%	50	6375	1%	570	6945	1%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Figueroa Street/Scholl Canyon Road

FREEWAY : SR-134

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 14

ROUTE 4A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND MERGE

Mainline AM	5565	10%	50	5615	11%	500	6115	11%
Mainline MID	5300	10%	50	5350	11%	475	5825	11%
Mainline PM	6215	10%	50	6265	11%	560	6825	11%
Ramp AM	335	1%	50	385	14%	30	415	14%
Ramp MID	290	9%	50	340	23%	25	365	23%
Ramp PM	320	4%	50	370	17%	30	400	17%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5565	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	335	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5565	335		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1464	88		v
Trucks and buses	10	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6151	354	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.174 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 811 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5029	9400	No
v_3 or v_{av34}	1932 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1870 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5029	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.357	
Space mean speed in ramp influence area,	S_R = 56.8	mph
Space mean speed in outer lanes,	S_O = 61.8	mph
Space mean speed for all vehicles,	S = 59.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5300	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	290	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp	0	vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5300		290		0	vph
Peak-hour factor, PHF	0.95		0.95		0.90	
Peak 15-min volume, v15	1395		76		0	v
Trucks and buses	10				0	%
Recreational vehicles	0		0		0	%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%	0.00	%
Length	0.00	mi	0.00	mi	0.00	mi
Trucks and buses PCE, ET	1.5		1.5		1.5	
Recreational vehicle PCE, ER	1.2		1.2		1.2	

Heavy vehicle adjustment, fHV	0.952	0.995	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	5858	307	0	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.179 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 799 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4760	9400	No
v_3 or v_{av34}	1827 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1781 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4760	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.352	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = 62.0	mph
Space mean speed for all vehicles,	S = 59.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6215	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	320	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6215	320		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1636	84		v
Trucks and buses	10	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6869	344	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.175 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 877 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5359	9400	No
v_3 or v_{av34}	2069 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2006 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5359	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.362	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_0 = 61.4	mph
Space mean speed for all vehicles,	S = 59.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5615	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	385	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5615	385		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1478	101		v
Trucks and buses	11	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6236	434	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.164 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 775 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5174	9400	No
v_3 or v_{av34}	1982 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1896 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5174	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.361	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_O = 61.7	mph
Space mean speed for all vehicles,	S = 59.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5350	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	340	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5350	340		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1408	89		v
Trucks and buses	11			%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5941	383	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.170 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 767 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4899	9400	No
v_3 or v_{av34}	1874 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1806 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4899	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.356	
Space mean speed in ramp influence area,	S_R = 56.8	mph
Space mean speed in outer lanes,	S_O = 61.9	mph
Space mean speed for all vehicles,	S = 59.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6265	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	370	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6265	370		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1649	97		v
Trucks and buses	11			%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6957	434	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.164 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 831 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5513	9400	No
v_3 or v_{av34}	2124 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2031 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5513	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.367	
Space mean speed in ramp influence area,	S_R = 56.6	mph
Space mean speed in outer lanes,	S_O = 61.3	mph
Space mean speed for all vehicles,	S = 59.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6115	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	415	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6115	415		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1609	109		v
Trucks and buses	11	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6791	467	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.159 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1083 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7258	9600	No
v_3 or v_{av34}	2854 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2716 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7258	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.415	
Space mean speed in ramp influence area,	S_R = 58.4	mph
Space mean speed in outer lanes,	S_O = 64.5	mph
Space mean speed for all vehicles,	S = 61.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5825	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	365	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5825	365		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1533	96		v
Trucks and buses	11			%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6469	411	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.166 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1077 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6880	9600	No
v_3 or v_{av34}	2696 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2587 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6880	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 28.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.399	
Space mean speed in ramp influence area,	S_R = 58.8	mph
Space mean speed in outer lanes,	S_O = 64.8	mph
Space mean speed for all vehicles,	S = 62.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6825	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	400	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6825	400		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1796	105		v
Trucks and buses	11	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7579	457	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.161 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1218 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8036	9600	No
v_3 or v_{av34}	3180 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 3031 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8036	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 32.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	M_S = 0.449	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_O = 63.6	mph
Space mean speed for all vehicles,	S = 60.8	mph

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
15
ROUTE
2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND I-210 MERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-134
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 16
ROUTE 2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	4775	2%	50	4825	3%	430	5255	3%
Mainline MID	3905	11%	50	3955	12%	350	4305	12%
Mainline PM	5615	6%	50	5665	7%	505	6170	7%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Irwindale Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 17

ROUTE 2A, 2B, 3, 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND DIVERGE

Mainline AM	6225	4%	50	6275	5%	560	6835	5%
Mainline MID	6660	4%	50	6710	5%	600	7310	5%
Mainline PM	6265	7%	50	6315	8%	565	6880	8%
Ramp AM	1120	8%	50	1170	11%	100	1270	11%
Ramp MID	960	10%	50	1010	14%	85	1095	14%
Ramp PM	765	1%	50	815	7%	70	885	7%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6225	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1120	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6225		1120			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1638		295			v
Trucks and buses	4		8			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6684	1226	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2385 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5682	9600	No
$v_{FO} = v_F - v_R$	4456	9600	No
v_R	1226	4000	No
v_3 or v_{av34}	1648 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2385 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2385	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -2.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.538	
Space mean speed in ramp influence area,	S_R = 54.9	mph
Space mean speed in outer lanes,	S_O = 74.3	mph
Space mean speed for all vehicles,	S = 64.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6660	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	960	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6660		960			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1753		253			v
Trucks and buses	4		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7151	1061	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2273 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5721	9600	No
$v_{FO} = v_F - v_R$	4660	9600	No
v_R	1061	4000	No
v_3 or v_{av34}	1724 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 2288 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2288	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -3.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.523	
Space mean speed in ramp influence area,	S_R = 55.3	mph
Space mean speed in outer lanes,	S_O = 74.0	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6265	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	765	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6265		765			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1649		201			v
Trucks and buses	7		1			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.966	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6826	809	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2107 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5803	9600	No
$v_{FO} = v_F - v_R$	4994	9600	No
v_R	809	4000	No
v_3 or v_{av34}	1848 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2321 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2321	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -2.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.501	
Space mean speed in ramp influence area,	S_R = 56.0	mph
Space mean speed in outer lanes,	S_O = 73.9	mph
Space mean speed for all vehicles,	S = 65.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6275	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1170	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6275		1170			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1651		308			v
Trucks and buses	5		11			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6770	1299	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2458 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5755	9600	No
$v_{FO} = v_F - v_R$	4456	9600	No
v_R	1299	4000	No
v_3 or v_{av34}	1648 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2458 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2458	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -1.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.545	
Space mean speed in ramp influence area,	S_R = 54.7	mph
Space mean speed in outer lanes,	S_O = 74.3	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6710	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1010	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6710		1010			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1766		266			v
Trucks and buses	5		14			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7240	1138	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2348 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5792	9600	No
$v_{FO} = v_F - v_R$	4654	9600	No
v_R	1138	4000	No
v_3 or v_{av34}	1722 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2348 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2348	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -2.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.530	
Space mean speed in ramp influence area,	S_R = 55.1	mph
Space mean speed in outer lanes,	S_O = 74.0	mph
Space mean speed for all vehicles,	S = 65.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6315	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	815	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6315		815			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1662		214			v
Trucks and buses	8		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.962	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6913	888	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2185 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5877	9600	No
$v_{FO} = v_F - v_R$	4989	9600	No
v_R	888	4000	No
v_3 or v_{av34}	1846 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2350 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2350	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -2.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.508

Space mean speed in ramp influence area, S_R = 55.8 mph

Space mean speed in outer lanes, S_O = 73.8 mph

Space mean speed for all vehicles, S = 65.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6835	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1270	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6835		1270			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1799		334			v
Trucks and buses	5		11			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7375	1410	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2577 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5900	9600	No
$v_{FO} = v_F - v_R$	4490	9600	No
v_R	1410	4000	No
v_3 or v_{av34}	1661 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2577 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2577	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -0.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.555	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_O = 74.2	mph
Space mean speed for all vehicles,	S = 64.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7310	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1095	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7310		1095			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1924		288			v
Trucks and buses	5		14			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7887	1233	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2553 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6310	9600	No
$v_{FO} = v_F - v_R$	5077	9600	No
v_R	1233	4000	No
v_3 or v_{av34}	1878 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2553 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2553	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -0.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.539	
Space mean speed in ramp influence area,	S_R = 54.9	mph
Space mean speed in outer lanes,	S_O = 73.4	mph
Space mean speed for all vehicles,	S = 64.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Irwindale Avenue Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6880	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	885	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6880		885			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1811		233			v
Trucks and buses	8		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.962	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7532	964	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2280 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6026	9600	No
$v_{FO} = v_F - v_R$	5062	9600	No
v_R	964	4000	No
v_3 or v_{av34}	1873 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2410 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2410	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -2.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.515	
Space mean speed in ramp influence area,	S_R = 55.6	mph
Space mean speed in outer lanes,	S_O = 73.6	mph
Space mean speed for all vehicles,	S = 65.2	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Irwindale Ave
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
18
ROUTE
2A, 3

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND LOOP MERGE

Mainline AM	7070	5%	50	7120	5%	635	7755	5%
Mainline MID	6825	4%	50	6875	5%	690	7565	5%
Mainline PM	7520	6%	50	7570	7%	675	8245	7%
Ramp AM	585	8%	50	635	15%	55	690	15%
Ramp MID	420	12%	50	470	21%	40	510	21%
Ramp PM	475	3%	50	525	13%	45	570	13%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7070	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	585	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7070	585		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1861	154		v
Trucks and buses	5	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7628	640	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.138 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 752 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6095	9600	No
v_3 or v_{av34}	2351 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2182 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6095	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.282	
Space mean speed in ramp influence area,	S_R = 62.1	mph
Space mean speed in outer lanes,	S_O = 65.9	mph
Space mean speed for all vehicles,	S = 64.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6825	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	420	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6825	420		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1796	111		v
Trucks and buses	4	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7328	469	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.159 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 852 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5819	9600	No
v_3 or v_{av34}	2249 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 2140 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5819	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 16.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.269	
Space mean speed in ramp influence area,	S_R = 62.5	mph
Space mean speed in outer lanes,	S_O = 66.0	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7520	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	475	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7520	475		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1979	125		v
Trucks and buses	6	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8153	508	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.154 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 900 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6338	9600	No
v_3 or v_{av34}	2465 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2332 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6338	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.283	
Space mean speed in ramp influence area,	S_R = 62.1	mph
Space mean speed in outer lanes,	S_O = 65.5	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7120	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	635	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7120	635		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1874	167		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7682	719	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.128 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 703 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6212	9600	No
v_3 or v_{av34}	2395 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2197 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6212	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.288	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_O = 65.9	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6875	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	470	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6875	470		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1809	124		v
Trucks and buses	5	21		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.905	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7418	547	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.149 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 809 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5963	9600	No
v_3 or v_{av34}	2303 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2166 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5963	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.275	
Space mean speed in ramp influence area,	S_R = 62.3	mph
Space mean speed in outer lanes,	S_O = 65.9	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7570	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7570	525		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1992	138		v
Trucks and buses	7	13		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8247	589	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.144 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 850 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6486	9600	No
v_3 or v_{av34}	2523 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 2358 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6486	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.290	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_O = 65.4	mph
Space mean speed for all vehicles,	S = 63.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7755	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	690	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7755	690		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2041	182		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8367	781	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.120 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 719 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6764	9600	No
v_3 or v_{av34}	2632 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2393 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6764	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.309	
Space mean speed in ramp influence area,	S_R = 61.3	mph
Space mean speed in outer lanes,	S_O = 65.3	mph
Space mean speed for all vehicles,	S = 63.4	mph

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7565	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	510	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7565	510		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1991	134		v
Trucks and buses	5	21		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.905	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8162	593	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.144 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 838 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6429	9600	No
v_3 or v_{av34}	2499 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2334 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6429	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.289	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_O = 65.5	mph
Space mean speed for all vehicles,	S = 63.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Loop On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8245	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	570	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8245	570		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2170	150		v
Trucks and buses	7	13		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8983	639	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.138 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 894 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7122	9600	No
v_3 or v_{av34}	2794 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2593 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7122	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.315	
Space mean speed in ramp influence area,	S_R = 61.2	mph
Space mean speed in outer lanes,	S_0 = 64.8	mph
Space mean speed for all vehicles,	S = 63.1	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Irwindale Ave

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 19

ROUTE 9

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND SLIP MERGE

Mainline AM	7655	5%	50	7705	6%	690	8395	6%
Mainline MID	7245	5%	50	7295	5%	650	7945	5%
Mainline PM	7995	6%	50	8045	7%	720	8765	7%
Ramp AM	610	10%	50	660	16%	55	715	16%
Ramp MID	545	7%	50	595	15%	50	645	15%
Ramp PM	475	2%	50	525	11%	45	570	11%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7655	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	610	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7655	610		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2014	161		v
Trucks and buses	5	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8259	674	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.134 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 789 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6580	9600	No
v_3 or v_{av34}	2558 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 2362 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6580	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.297	
Space mean speed in ramp influence area,	S_R = 61.7	mph
Space mean speed in outer lanes,	S_O = 65.4	mph
Space mean speed for all vehicles,	S = 63.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7245	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	545	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7245	545		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1907	143		v
Trucks and buses	5	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7817	594	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.144 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 802 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6184	9600	No
v_3 or v_{av34}	2394 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2236 (Equation 13-15, 16-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6184	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.282	
Space mean speed in ramp influence area,	S_R = 62.1	mph
Space mean speed in outer lanes,	S_O = 65.8	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7995	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	475	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7995	475		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2104	125		v
Trucks and buses	6	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8668	505	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.155 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 954 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6673	9600	No
v_3 or v_{av34}	2607 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 2467		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6673	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.292	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_O = 65.1	mph
Space mean speed for all vehicles,	S = 63.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7705	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7705	660		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2028	174		v
Trucks and buses	6	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, f_{HV}	0.971	0.926	
Driver population factor, f_P	1.00	1.00	
Flow rate, v_p	8354	750	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.124 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 741 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6724	9600	No
v_3 or v_{av34}	2616 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2389 (Equation 13-15, 16-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6724	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.306	
Space mean speed in ramp influence area,	S_R = 61.4	mph
Space mean speed in outer lanes,	S_O = 65.3	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7295	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	595	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7295	595		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1920	157		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7871	673	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.134 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 752 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6301	9600	No
v_3 or v_{av34}	2438 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 2251 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6301	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.289	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_O = 65.7	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8045	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8045	525		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2117	138		v
Trucks and buses	7	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8765	583	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.145 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 908 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6848	9600	No
v_3 or v_{av34}	2678 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2506 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6848	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.302	
Space mean speed in ramp influence area,	S_R = 61.6	mph
Space mean speed in outer lanes,	S_O = 65.0	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8395	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	715	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8395	715		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2209	188		v
Trucks and buses	6	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9102	813	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.116 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 767 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7415	9600	No
v_3 or v_{av34}	2917 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2640 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7415	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.339	
Space mean speed in ramp influence area,	S_R = 60.5	mph
Space mean speed in outer lanes,	S_O = 64.7	mph
Space mean speed for all vehicles,	S = 62.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7945	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	645	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7945	645		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2091	170		v
Trucks and buses	5	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8572	730	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.127 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 768 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6802	9600	No
v_3 or v_{av34}	2652 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2428 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6802	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.308	
Space mean speed in ramp influence area,	S_R = 61.4	mph
Space mean speed in outer lanes,	S_O = 65.2	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.41

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	9/23/2013
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Irwindale Avenue Slip On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8765	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	570	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8765	570		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2307	150		v
Trucks and buses	7	11		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9549	633	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.139 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 978 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7682	9600	No
v_3 or v_{av34}	3035 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2819 (Equation 13-15, 13-16, 18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7682	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.339	
Space mean speed in ramp influence area,	S_R = 60.5	mph
Space mean speed in outer lanes,	S_O = 64.2	mph
Space mean speed for all vehicles,	S = 62.5	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : First Street/Azusa Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 20

ROUTE 2B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND MERGE

Mainline AM	6715	4%	50	6765	4%	605	7370	4%
Mainline MID	6630	4%	50	6680	4%	595	7275	4%
Mainline PM	8500	4%	50	8550	4%	765	9315	4%
Ramp AM	865	2%	50	915	8%	80	995	8%
Ramp MID	360	4%	50	410	16%	30	440	16%
Ramp PM	400	2%	50	450	12%	35	485	12%

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6715	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	865	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6715	865		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1767	228		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7210	920	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.103 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 541 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6184	9600	No
v_3 or v_{av34}	2361 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2105 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6184	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.321	
Space mean speed in ramp influence area,	S_R = 61.0	mph
Space mean speed in outer lanes,	S_O = 66.1	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6630	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6630	360		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1745	95		v
Trucks and buses	4	4		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.980	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7119	387	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.169 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 881 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5584	9600	No
v_3 or v_{av34}	2158 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2078 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5584	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.286	
Space mean speed in ramp influence area,	S_R = 62.0	mph
Space mean speed in outer lanes,	S_O = 66.2	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8500	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	400	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8500	400		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2237	105		v
Trucks and buses	4	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9126	425	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.165 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1091 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7051	9600	No
v_3 or v_{av34}	2767 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2650 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7051	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.325	
Space mean speed in ramp influence area,	S_R = 60.9	mph
Space mean speed in outer lanes,	S_0 = 64.6	mph
Space mean speed for all vehicles,	S = 63.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing +Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6765	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	915	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6765	915		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1780	241		v
Trucks and buses	4	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7263	1002	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.093 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 491 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6304	9600	No
v_3 or v_{av34}	2405 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2120 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6304	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.329	
Space mean speed in ramp influence area,	S_R = 60.8	mph
Space mean speed in outer lanes,	S_O = 66.1	mph
Space mean speed for all vehicles,	S = 63.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6680	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	410	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	6680	410		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1758	108		v
Trucks and buses	4	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7172	466	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.160 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 835 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5702	9600	No
v_3 or v_{av34}	2200 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2094 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5702	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.291	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_O = 66.1	mph
Space mean speed for all vehicles,	S = 64.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8550	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	450	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8550	450		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2250	118		v
Trucks and buses	4	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9180	502	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.155 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1036 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7182	9600	No
v_3 or v_{av34}	2822 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2672 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7182	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.334	
Space mean speed in ramp influence area,	S_R = 60.7	mph
Space mean speed in outer lanes,	S_O = 64.6	mph
Space mean speed for all vehicles,	S = 62.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7370	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	995	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7370	995		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1939	262		v
Trucks and buses	4	8		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7913	1089	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.082 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 462 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6747	9600	No
v_3 or v_{av34}	2598 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 2263 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6747	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.352	
Space mean speed in ramp influence area,	S_R = 60.1	mph
Space mean speed in outer lanes,	S_O = 65.7	mph
Space mean speed for all vehicles,	S = 62.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7275	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	440	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7275	440		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1914	116		v
Trucks and buses	4	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7811	500	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.155 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 867 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6085	9600	No
v_3 or v_{av34}	2359 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 2234		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6085	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.301	
Space mean speed in ramp influence area,	S_R = 61.6	mph
Space mean speed in outer lanes,	S_O = 65.8	mph
Space mean speed for all vehicles,	S = 63.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	First Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	9315	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	1150	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	9315	485		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2451	128		v
Trucks and buses	4	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	10001	541	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.150 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1126 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	8042	9600	No
v_3 or v_{av34}	3187 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 3000 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	8042	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.375	
Space mean speed in ramp influence area,	S_R = 59.5	mph
Space mean speed in outer lanes,	S_O = 63.7	mph
Space mean speed for all vehicles,	S = 61.8	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
21
ROUTE
2A, 4B,5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	3450	5%	50	3500	7%	310	3810	7%
Mainline MID	3350	11%	50	3400	12%	300	3700	12%
Mainline PM	5495	5%	50	5545	6%	495	6040	6%
Ramp AM	1485	10%	50	1535	13%	135	1670	13%
Ramp MID	660	10%	50	710	16%	60	770	16%
Ramp PM	870	10%	50	920	15%	80	1000	15%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3450	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1485	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3450		1485			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	908		391			v
Trucks and buses	5		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3722	1641	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2182 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3722	9600	No
$v_{FO} = v_F - v_R$	2081	9600	No
v_R	1641	4000	No
v_3 or v_{av34}	770 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2182 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2182	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -14.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.576

Space mean speed in ramp influence area, S_R = 53.9 mph

Space mean speed in outer lanes, S_O = 76.8 mph

Space mean speed for all vehicles, S = 61.5 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3350	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3350		660			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	882		174			v
Trucks and buses	11		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3720	729	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1507 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3720	9600	No
$v_{FO} = v_F - v_R$	2991	9600	No
v_R	729	4000	No
v_3 or v_{av34}	1106 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1507 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1507	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -20.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.494	
Space mean speed in ramp influence area,	S_R = 56.2	mph
Space mean speed in outer lanes,	S_O = 76.4	mph
Space mean speed for all vehicles,	S = 66.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5495	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	870	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5495		870			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1446		229			v
Trucks and buses	5		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.976	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5929	962	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2253 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5929	9600	No
$v_{FO} = v_F - v_R$	4967	9600	No
v_R	962	4000	No
v_3 or v_{av34}	1838 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2371 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2371	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -13.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.515	
Space mean speed in ramp influence area,	S_R = 55.6	mph
Space mean speed in outer lanes,	S_O = 73.8	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3500	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1535	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3500		1535			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	921		404			v
Trucks and buses	7		13			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.966	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3813	1721	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2265 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3813	9600	No
$v_{FO} = v_F - v_R$	2092	9600	No
v_R	1721	4000	No
v_3 or v_{av34}	774 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2265 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2265	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -14.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.583	
Space mean speed in ramp influence area,	S_R = 53.7	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 61.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3400	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3400		710			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	895		187			v
Trucks and buses	12		16			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3794	807	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1584 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3794	9600	No
$v_{FO} = v_F - v_R$	2987	9600	No
v_R	807	4000	No
v_3 or v_{av34}	1105 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1584 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1584	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -19.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.501	
Space mean speed in ramp influence area,	S_R = 56.0	mph
Space mean speed in outer lanes,	S_O = 76.4	mph
Space mean speed for all vehicles,	S = 66.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5545	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	920	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5545		920			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1459		242			v
Trucks and buses	6		15			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.971	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6012	1041	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2333 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6012	9600	No
$v_{FO} = v_F - v_R$	4971	9600	No
v_R	1041	4000	No
v_3 or v_{av34}	1839 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2404 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2404	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -12.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.522	
Space mean speed in ramp influence area,	S_R = 55.4	mph
Space mean speed in outer lanes,	S_0 = 73.7	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3810	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1670	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3810		1670			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1003		439			v
Trucks and buses	7		13			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.966	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4151	1872	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2465 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4151	9600	No
$v_{FO} = v_F - v_R$	2279	9600	No
v_R	1872	4000	No
v_3 or v_{av34}	843 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2465 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2465	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -12.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.596	
Space mean speed in ramp influence area,	S_R = 53.3	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 60.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3700	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	770	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3700		770			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	974		203			v
Trucks and buses	12		16			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4128	875	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1721 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4128	9600	No
$v_{FO} = v_F - v_R$	3253	9600	No
v_R	875	4000	No
v_3 or v_{av34}	1203 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1721 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1721	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -18.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.507	
Space mean speed in ramp influence area,	S_R = 55.8	mph
Space mean speed in outer lanes,	S_O = 76.0	mph
Space mean speed for all vehicles,	S = 66.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	SB SR-2 Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6040	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1000	vph
Length of first accel/decel lane	1400	ft
Length of second accel/decel lane	1400	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6040		1000			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1589		263			v
Trucks and buses	6		15			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.971	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6549	1132	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2540 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6549	9600	No
$v_{FO} = v_F - v_R$	5417	9600	No
v_R	1132	4000	No
v_3 or v_{av34}	2004 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2619 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2619	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = -11.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.530	
Space mean speed in ramp influence area,	S_R = 55.2	mph
Space mean speed in outer lanes,	S_O = 73.0	mph
Space mean speed for all vehicles,	S = 64.7	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : SR-2
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 22
ROUTE 2B, 4B,5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND MERGE								
Mainline AM	5335	4%	50	5385	5%	480	5865	5%
Mainline MID	3405	11%	50	3455	12%	305	3760	12%
Mainline PM	4060	7%	50	4110	8%	365	4475	8%
Ramp AM	525	10%	50	575	18%	45	620	18%
Ramp MID	560	10%	50	610	17%	50	660	17%
Ramp PM	785	10%	50	835	15%	70	905	15%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5520	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5520		525			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1453		138			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6101	580	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1778 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5186	9400	No
$v_{FO} = v_F - v_R$	4606	9400	No
v_R	580	4000	No
v_3 or v_{av34}	1704 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2074 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2074	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.480

Space mean speed in ramp influence area, S_R = 54.0 mph

Space mean speed in outer lanes, S_0 = 69.1 mph

Space mean speed for all vehicles, S = 62.1 mph

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5200	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	560	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5200		560			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1368		147			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5747	619	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1728 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4885	9400	No
$v_{FO} = v_F - v_R$	4266	9400	No
v_R	619	4000	No
v_3 or v_{av34}	1578 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1954 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1954	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.484	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = 69.5	mph
Space mean speed for all vehicles,	S = 62.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5610	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	785	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5610		785			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1476		207			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6201	868	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2013 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5271	9400	No
$v_{FO} = v_F - v_R$	4403	9400	No
v_R	868	4000	No
v_3 or v_{av34}	1629 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2108 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2108	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.506	
Space mean speed in ramp influence area,	S_R = 53.4	mph
Space mean speed in outer lanes,	S_O = 69.0	mph
Space mean speed for all vehicles,	S = 61.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5570	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5570		575			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1466		151			v
Trucks and buses	11		18			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6186	660	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1856 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5259	9400	No
$v_{FO} = v_F - v_R$	4599	9400	No
v_R	660	4000	No
v_3 or v_{av34}	1701 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2103 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2103	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.487	
Space mean speed in ramp influence area,	S_R = 53.8	mph
Space mean speed in outer lanes,	S_O = 69.1	mph
Space mean speed for all vehicles,	S = 62.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5250	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	610	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5250		610			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1382		161			v
Trucks and buses	11		17			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5830	697	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1804 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4956	9400	No
$v_{FO} = v_F - v_R$	4259	9400	No
v_R	697	4000	No
v_3 or v_{av34}	1576 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1982 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1982	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.491	
Space mean speed in ramp influence area,	S_R = 53.7	mph
Space mean speed in outer lanes,	S_0 = 69.4	mph
Space mean speed for all vehicles,	S = 62.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5660	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	835	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5660		835			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1489		220			v
Trucks and buses	11		15			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6286	945	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2089 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5344	9400	No
$v_{FO} = v_F - v_R$	4399	9400	No
v_R	945	4000	No
v_3 or v_{av34}	1627 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2137 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2137	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.513	
Space mean speed in ramp influence area,	S_R = 53.2	mph
Space mean speed in outer lanes,	S_O = 69.0	mph
Space mean speed for all vehicles,	S = 61.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6065	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	620	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6065		620			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1596		163			v
Trucks and buses	11		18			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6735	711	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2015 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5725	9400	No
$v_{FO} = v_F - v_R$	5014	9400	No
v_R	711	4000	No
v_3 or v_{av34}	1855 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2290 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2290	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.492

Space mean speed in ramp influence area, S_R = 53.7 mph

Space mean speed in outer lanes, S_O = 68.5 mph

Space mean speed for all vehicles, S = 61.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5720	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5720		660			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1505		174			v
Trucks and buses	11		17			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6352	754	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1962 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5400	9400	No
$v_{FO} = v_F - v_R$	4646	9400	No
v_R	754	4000	No
v_3 or v_{av34}	1719 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2160 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2160	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.496

Space mean speed in ramp influence area, S_R = 53.6 mph

Space mean speed in outer lanes, S_O = 68.9 mph

Space mean speed for all vehicles, S = 61.8 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/NB
Junction:	EB I-210 OFF RAMP
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6165	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	905	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6165		905			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1622		238			v
Trucks and buses	11		15			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6846	1024	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2271 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5820	9400	No
$v_{FO} = v_F - v_R$	4796	9400	No
v_R	1024	4000	No
v_3 or v_{av34}	1774 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2328 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2328	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.520

Space mean speed in ramp influence area, S_R = 53.0 mph

Space mean speed in outer lanes, S_O = 68.4 mph

Space mean speed for all vehicles, S = 61.3 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4530	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1485	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4530	1485		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1192	391		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5007	1641	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2779 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6648	7050	No
v_3 or v_{av34}	2228 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2861 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6648	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.463	
Space mean speed in ramp influence area,	S_R = 54.4	mph
Space mean speed in outer lanes,	S_O = 59.1	mph
Space mean speed for all vehicles,	S = 55.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1435	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1435	660		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	378	174		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1586	729	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 880 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2315	7050	No
v_3 or v_{av34}	706 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 906 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2315	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = -0.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.131	
Space mean speed in ramp influence area,	S_R = 62.0	mph
Space mean speed in outer lanes,	S_0 = 64.4	mph
Space mean speed for all vehicles,	S = 62.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1920	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	870	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1920	870		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	505	229		v
Trucks and buses	10	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2122	962	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1178 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3084	7050	No
v_3 or v_{av34}	944 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1212 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3084	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 3.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.145	
Space mean speed in ramp influence area,	S_R = 61.7	mph
Space mean speed in outer lanes,	S_0 = 63.5	mph
Space mean speed for all vehicles,	S = 62.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4580	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1535	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4580	1535		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1205	404		v
Trucks and buses	11	13		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5086	1721	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2823 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6807	7050	No
v_3 or v_{av34}	2263 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2906 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6807	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.510	
Space mean speed in ramp influence area,	S_R = 53.3	mph
Space mean speed in outer lanes,	S_O = 59.0	mph
Space mean speed for all vehicles,	S = 55.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1485	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	710	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1485	710		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	391	187		v
Trucks and buses	13	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.939	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1665	807	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 924 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2472	7050	No
v_3 or v_{av34}	741 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	

If yes, v_{12A} = 951 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2472	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 0.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.134	
Space mean speed in ramp influence area,	S_R = 61.9	mph
Space mean speed in outer lanes,	S_0 = 64.2	mph
Space mean speed for all vehicles,	S = 62.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1970	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	920	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1970	920		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	518	242		v
Trucks and buses	12	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.943	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2198	1041	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1220 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3239	7050	No
v_3 or v_{av34}	978 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1256 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3239	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 4.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.150	
Space mean speed in ramp influence area,	S_R = 61.6	mph
Space mean speed in outer lanes,	S_O = 63.4	mph
Space mean speed for all vehicles,	S = 62.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	4990	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1670	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4990	1670		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1313	439		v
Trucks and buses	11	13		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.939	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5542	1872	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 3076 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7414	7050	Yes
v_3 or v_{av34}	2466 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 3166 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7414	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.712	
Space mean speed in ramp influence area,	S_R = 48.6	mph
Space mean speed in outer lanes,	S_0 = 58.0	mph
Space mean speed for all vehicles,	S = 51.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	1615	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	770	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	1615	770		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	425	203		v
Trucks and buses	13	16		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.939	0.926	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	1811	875	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1005 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	2686	7050	No
v_3 or v_{av34}	806 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1034 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	2686	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 1.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.137	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_0 = 64.0	mph
Space mean speed for all vehicles,	S = 62.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-2/SB
Junction:	WB I-210 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	3	
Free-flow speed on freeway	65.0	mph
Volume on freeway	2145	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1000	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2145	1000		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	564	263		v
Trucks and buses	12	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.943	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2393	1132	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.555 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1328 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3525	7050	No
v_3 or v_{av34}	1065 pc/h	(Equation 13-14 or 17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1367 (Equation 13-15, 13-16, 18, or 19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3525	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 5.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	M_S = 0.158	
Space mean speed in ramp influence area,	S_R = 61.4	mph
Space mean speed in outer lanes,	S_O = 63.1	mph
Space mean speed for all vehicles,	S = 61.9	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
23
ROUTE
2B, 4B,5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

SOUTHBOUND MERGE

Mainline AM	4530	10%	50	4580	11%	410	4990	11%
Mainline MID	1435	10%	50	1485	13%	130	1615	13%
Mainline PM	1920	10%	50	1970	12%	175	2145	12%
Ramp AM	1485	10%	50	1535	13%	135	1670	13%
Ramp MID	660	10%	50	710	16%	60	770	16%
Ramp PM	870	10%	50	920	15%	80	1000	15%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5335	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5335	525		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1404	138		v
Trucks and buses	4	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.980	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5728	580	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.145 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 832 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6308	9600	No
v_3 or v_{av34}	2448 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2291 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6308	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.285	
Space mean speed in ramp influence area,	S_R = 62.0	mph
Space mean speed in outer lanes,	S_O = 65.6	mph
Space mean speed for all vehicles,	S = 63.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3405	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	560	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3405	560		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	896	147		v
Trucks and buses	11	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3781	619	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.140 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 531 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4400	9600	No
v_3 or v_{av34}	1625 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1512 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4400	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 12.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.249	
Space mean speed in ramp influence area,	S_R = 63.0	mph
Space mean speed in outer lanes,	S_O = 67.7	mph
Space mean speed for all vehicles,	S = 65.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4060	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	785	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4060	785		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1068	207		v
Trucks and buses	7	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.966	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4423	868	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.109 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 483 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5291	9600	No
v_3 or v_{av34}	1970 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1769		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5291	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 16.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.270	
Space mean speed in ramp influence area,	S_R = 62.4	mph
Space mean speed in outer lanes,	S_O = 67.0	mph
Space mean speed for all vehicles,	S = 64.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5385	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5385	575		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1417	151		v
Trucks and buses	5	18		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5810	660	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.135 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 786 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6470	9600	No
v_3 or v_{av34}	2512 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2324 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6470	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.293	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_O = 65.5	mph
Space mean speed for all vehicles,	S = 63.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3455	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	610	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3455	610		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	909	161		v
Trucks and buses	12	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.943	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3855	697	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.131 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 504 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4552	9600	No
v_3 or v_{av34}	1675 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 1542		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4552	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.253	
Space mean speed in ramp influence area,	S_R = 62.9	mph
Space mean speed in outer lanes,	S_O = 67.6	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4110	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	835	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4110	835		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1082	220		v
Trucks and buses	8	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4499	945	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.100 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 448 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5444	9600	No
v_3 or v_{av34}	2025 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1799 (Equation 13-15, 13-16, 18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5444	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 17.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.277	
Space mean speed in ramp influence area,	S_R = 62.3	mph
Space mean speed in outer lanes,	S_O = 66.9	mph
Space mean speed for all vehicles,	S = 64.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5865	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	620	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5865	620		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1543	163		v
Trucks and buses	5	18		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6328	711	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.129 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 816 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7039	9600	No
v_3 or v_{av34}	2756 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2531 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7039	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.316	
Space mean speed in ramp influence area,	S_R = 61.2	mph
Space mean speed in outer lanes,	S_O = 65.0	mph
Space mean speed for all vehicles,	S = 63.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3760	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	660	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3760	660		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	989	174		v
Trucks and buses	12	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.943	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4195	754	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.124 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 518 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4949	9600	No
v_3 or v_{av34}	1838 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1678 (Equation 13-15, 13-16, 18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4949	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 14.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.260	
Space mean speed in ramp influence area,	S_R = 62.7	mph
Space mean speed in outer lanes,	S_O = 67.3	mph
Space mean speed for all vehicles,	S = 64.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	NB SR-2 On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4475	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	905	vph
Length of first accel/decel lane	1500	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4475	905		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1178	238		v
Trucks and buses	8	15		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.962	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4899	1024	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.090 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 440 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5923	9600	No
v_3 or v_{av34}	2229 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1959 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5923	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.293	
Space mean speed in ramp influence area,	S_R = 61.8	mph
Space mean speed in outer lanes,	S_O = 66.5	mph
Space mean speed for all vehicles,	S = 64.0	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : SR-2

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 24

ROUTE 2B, 4B,5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND DIVERGE								
Mainline AM	5520	10%	50	5570	11%	495	6065	11%
Mainline MID	5200	10%	50	5250	11%	470	5720	11%
Mainline PM	5610	10%	50	5660	11%	505	6165	11%
Ramp AM	670	10%	50	720	14%	60	780	14%
Ramp MID	560	10%	50	610	17%	50	660	17%
Ramp PM	785	10%	50	835	15%	70	905	15%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 25
ROUTE 2B, 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

SOUTHBOUND DIVERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2

FREEWAY : SR-134

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 26

ROUTE 2B, 4B,5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

NORTHBOUND MERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	1220	10%	50	1270	14%	110	1380	14%
Ramp MID	1610	10%	50	1660	13%	145	1805	13%
Ramp PM	2370	10%	50	2420	12%	215	2635	12%

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 27
ROUTE 2B, 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND MERGE

Mainline AM	4675	10%	50	4725	15%	420	5145	15%
Mainline MID	4740	10%	50	4790	16%	425	5215	16%
Mainline PM	4725	10%	50	4775	18%	425	5200	18%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 28
ROUTE 2B, 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	6300	10%	50	6350	11%	565	6915	11%
Mainline MID	5035	10%	50	5085	11%	455	5540	11%
Mainline PM	6325	10%	50	6375	11%	570	6945	11%
Ramp AM	1070	10%	50	1120	15%	95	1215	15%
Ramp MID	740	10%	50	790	27%	65	855	27%
Ramp PM	1180	10%	50	1230	23%	105	1335	23%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6300	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1070	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6300		1070			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1658		282			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6963	1183	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2414 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5919	9400	No
$v_{FO} = v_F - v_R$	4736	9400	No
v_R	1183	4000	No
v_3 or v_{av34}	1752 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2414 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2414	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.534

Space mean speed in ramp influence area, S_R = 52.7 mph

Space mean speed in outer lanes, S_0 = 68.4 mph

Space mean speed for all vehicles, S = 61.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5035	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	740	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5035		740			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1325		195			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5565	818	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1835 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4731	9400	No
$v_{FO} = v_F - v_R$	3913	9400	No
v_R	818	4000	No
v_3 or v_{av34}	1448 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1892 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	1892	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.502	
Space mean speed in ramp influence area,	S_R = 53.5	mph
Space mean speed in outer lanes,	S_O = 69.7	mph
Space mean speed for all vehicles,	S = 62.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6325	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1180	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6325		1180			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1664		311			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6991	1304	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2510 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5943	9400	No
$v_{FO} = v_F - v_R$	4639	9400	No
v_R	1304	4000	No
v_3 or v_{av34}	1716 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2510 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2510	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.545

Space mean speed in ramp influence area, S_R = 52.5 mph

Space mean speed in outer lanes, S_O = 68.5 mph

Space mean speed for all vehicles, S = 60.7 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6350	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1120	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6350		1120			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1671		295			v
Trucks and buses	11		15			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7052	1267	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2404 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5642	9400	No
$v_{FO} = v_F - v_R$	4375	9400	No
v_R	1267	4000	No
v_3 or v_{av34}	1619 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2404 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2404	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.542	
Space mean speed in ramp influence area,	S_R = 52.5	mph
Space mean speed in outer lanes,	S_0 = 68.9	mph
Space mean speed for all vehicles,	S = 60.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5085	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	790	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5085		790			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1338		208			v
Trucks and buses	11		27			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.881	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5647	944	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1947 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4800	9400	No
$v_{FO} = v_F - v_R$	3856	9400	No
v_R	944	4000	No
v_3 or v_{av34}	1426 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1947 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1947	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.513

Space mean speed in ramp influence area, S_R = 53.2 mph

Space mean speed in outer lanes, S_O = 69.6 mph

Space mean speed for all vehicles, S = 61.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6375	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1230	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6375		1230			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1678		324			v
Trucks and buses	11		23			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7080	1444	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2541 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5664	9400	No
$v_{FO} = v_F - v_R$	4220	9400	No
v_R	1444	4000	No
v_3 or v_{av34}	1561 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2541 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2541	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.558	
Space mean speed in ramp influence area,	S_R = 52.2	mph
Space mean speed in outer lanes,	S_O = 69.1	mph
Space mean speed for all vehicles,	S = 60.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6915	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1215	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6915		1215			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1820		320			v
Trucks and buses	11		15			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.930	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7679	1375	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2615 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6144	9400	No
$v_{FO} = v_F - v_R$	4769	9400	No
v_R	1375	4000	No
v_3 or v_{av34}	1764 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2615 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2615	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.552

Space mean speed in ramp influence area, S_R = 52.3 mph

Space mean speed in outer lanes, S_O = 68.3 mph

Space mean speed for all vehicles, S = 60.4 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5540	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	855	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5540		855			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1458		225			v
Trucks and buses	11		27			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.881	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6152	1022	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2116 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5230	9400	No
$v_{FO} = v_F - v_R$	4208	9400	No
v_R	1022	4000	No
v_3 or v_{av34}	1557 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2116 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2116	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 22.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.520	
Space mean speed in ramp influence area,	S_R = 53.0	mph
Space mean speed in outer lanes,	S_O = 69.1	mph
Space mean speed for all vehicles,	S = 61.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/WB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6945	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	1335	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6945		1335			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1828		351			v
Trucks and buses	11		23			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7713	1567	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2764 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6171	9400	No
$v_{FO} = v_F - v_R$	4604	9400	No
v_R	1567	4000	No
v_3 or v_{av34}	1703 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2764 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2764	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.569	
Space mean speed in ramp influence area,	S_R = 51.9	mph
Space mean speed in outer lanes,	S_0 = 68.6	mph
Space mean speed for all vehicles,	S = 60.0	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Figueroa Street/Scholl Canyon Road

FREEWAY : SR-134

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 29

ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND DIVERGE

Mainline AM	5970	10%	50	6020	11%	535	6555	11%
Mainline MID	5610	10%	50	5660	11%	505	6165	11%
Mainline PM	6725	10%	50	6775	11%	605	7380	11%
Ramp AM	405	3%	50	455	14%	35	490	14%
Ramp MID	310	9%	50	360	21%	30	390	21%
Ramp PM	510	0%	50	560	9%	45	605	9%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5970	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	405	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp	0	vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	5970		405		0		vph
Peak-hour factor, PHF	0.95		0.95		0.90		
Peak 15-min volume, v15	1571		107		0		v
Trucks and buses	10		3		0		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.952	0.985	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	6598	433	0	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2690 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5609	9400	No
$v_{FO} = v_F - v_R$	5176	9400	No
v_R	433	2000	No
v_3 or v_{av34}	1459 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2690 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2690	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 27.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.467	
Space mean speed in ramp influence area,	S_R = 54.3	mph
Space mean speed in outer lanes,	S_O = 69.5	mph
Space mean speed for all vehicles,	S = 61.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5610	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	310	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5610		310			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1476		82			v
Trucks and buses	10		9			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6201	341	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2490 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5271	9400	No
$v_{FO} = v_F - v_R$	4930	9400	No
v_R	341	2000	No
v_3 or v_{av34}	1390 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2490 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2490	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 25.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.459	
Space mean speed in ramp influence area,	S_R = 54.5	mph
Space mean speed in outer lanes,	S_O = 69.8	mph
Space mean speed for all vehicles,	S = 61.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6725	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	510	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6725		510			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1770		134			v
Trucks and buses	10		0			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	1.000	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7433	537	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2896 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5947	9400	No
$v_{FO} = v_F - v_R$	5410	9400	No
v_R	537	2000	No
v_3 or v_{av34}	1525 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2896 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2896	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.476

Space mean speed in ramp influence area, S_R = 54.0 mph

Space mean speed in outer lanes, S_O = 69.3 mph

Space mean speed for all vehicles, S = 60.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6020	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	455	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6020		455			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1584		120			v
Trucks and buses	11		14			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6685	512	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2767 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5683	9400	No
$v_{FO} = v_F - v_R$	5171	9400	No
v_R	512	2000	No
v_3 or v_{av34}	1458 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2767 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2767	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.474	
Space mean speed in ramp influence area,	S_R = 54.1	mph
Space mean speed in outer lanes,	S_O = 69.5	mph
Space mean speed for all vehicles,	S = 61.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	5660	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	360	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5660		360			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1489		95			v
Trucks and buses	11					%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6286	405	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2558 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5344	9400	No
$v_{FO} = v_F - v_R$	4939	9400	No
v_R	405	2000	No
v_3 or v_{av34}	1393 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2558 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2558	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.464	
Space mean speed in ramp influence area,	S_R = 54.3	mph
Space mean speed in outer lanes,	S_O = 69.8	mph
Space mean speed for all vehicles,	S = 61.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6775	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	560	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6775		560			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1783		147			v
Trucks and buses	11		9			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7524	616	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2972 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6020	9400	No
$v_{FO} = v_F - v_R$	5404	9400	No
v_R	616	2000	No
v_3 or v_{av34}	1524 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2972 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2972	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.483	
Space mean speed in ramp influence area,	S_R = 53.9	mph
Space mean speed in outer lanes,	S_O = 69.3	mph
Space mean speed for all vehicles,	S = 60.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6555	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	490	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6555		490			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1725		129			v
Trucks and buses	11					%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7280	547	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2848 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5824	9400	No
$v_{FO} = v_F - v_R$	5277	9400	No
v_R	547	2000	No
v_3 or v_{av34}	1488 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2848 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2848	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.477	
Space mean speed in ramp influence area,	S_R = 54.0	mph
Space mean speed in outer lanes,	S_O = 69.4	mph
Space mean speed for all vehicles,	S = 60.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6165	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	390	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6165		390			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1622		103			v
Trucks and buses	11		21			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.905	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6846	454	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2794 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5820	9400	No
$v_{FO} = v_F - v_R$	5366	9400	No
v_R	454	2000	No
v_3 or v_{av34}	1513 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2794 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2794	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 28.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.469

Space mean speed in ramp influence area, S_R = 54.2 mph

Space mean speed in outer lanes, S_O = 69.3 mph

Space mean speed for all vehicles, S = 61.1 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/10/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	Figueroa Street Off-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7380	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	605	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7380		605			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1942		159			v
Trucks and buses	11		9			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8196	666	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3234 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6557	9400	No
$v_{FO} = v_F - v_R$	5891	9400	No
v_R	666	2000	No
v_3 or v_{av34}	1661 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3234 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3234	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.488	
Space mean speed in ramp influence area,	S_R = 53.8	mph
Space mean speed in outer lanes,	S_O = 68.7	mph
Space mean speed for all vehicles,	S = 60.4	mph

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Figueroa Street/Scholl Canyon Road

FREEWAY : SR-134

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 30

ROUTE 4B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND MERGE								
Mainline AM	6580	10%	50	6630	1%	590	7220	1%
Mainline MID	5320	10%	50	5370	1%	480	5850	1%
Mainline PM	6755	10%	50	6805	1%	610	7415	1%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
31
ROUTE
5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND DIVERGE

Mainline AM	5230	10%	50	5280	13%	470	5750	13%
Mainline MID	4295	10%	50	4345	13%	385	4730	13%
Mainline PM	5145	10%	50	5195	13%	465	5660	13%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-2

FREEWAY : SR-134

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 32

ROUTE 5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND DIVERGE

Mainline AM	6675	10%	50	6725	11%	600	7325	11%
Mainline MID	7000	10%	50	7050	11%	630	7680	11%
Mainline PM	7905	10%	50	7955	11%	710	8665	11%
Ramp AM	2000	10%	50	2050	12%	180	2230	12%
Ramp MID	2260	10%	50	2310	12%	205	2515	12%
Ramp PM	3180	10%	50	3230	11%	285	3515	11%

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6675	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2000	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6675		2000			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1757		526			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7378	2211	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3171 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5903	9400	No
$v_{FO} = v_F - v_R$	3692	9400	No
v_R	2211	4000	No
v_3 or v_{av34}	1366 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3171 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3171	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 9.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable, D_S = 0.627

Space mean speed in ramp influence area, S_R = 50.6 mph

Space mean speed in outer lanes, S_O = 69.9 mph

Space mean speed for all vehicles, S = 58.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7000	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2260	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7000		2260			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1842		595			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7737	2498	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3458 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6190	9400	No
$v_{FO} = v_F - v_R$	3692	9400	No
v_R	2498	4000	No
v_3 or v_{av34}	1366 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3458 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3458	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 11.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.653	
Space mean speed in ramp influence area,	S_R = 50.0	mph
Space mean speed in outer lanes,	S_O = 69.9	mph
Space mean speed for all vehicles,	S = 57.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7905	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	3180	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7905		3180			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2080		837			v
Trucks and buses	10		10			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8737	3515	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4418 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6990	9400	No
$v_{FO} = v_F - v_R$	3475	9400	No
v_R	3515	4000	No
v_3 or v_{av34}	1286 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 4418 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4418	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable, D_S = 0.744

Space mean speed in ramp influence area, S_R = 47.9 mph

Space mean speed in outer lanes, S_O = 70.2 mph

Space mean speed for all vehicles, S = 54.2 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	6725	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2050	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6725		2050			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1770		539			v
Trucks and buses	11		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7468	2287	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3246 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	5975	9400	No
$v_{FO} = v_F - v_R$	3688	9400	No
v_R	2287	4000	No
v_3 or v_{av34}	1364 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3246 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3246	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 9.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence A

Speed Estimation

Intermediate speed variable,	D_S = 0.634	
Space mean speed in ramp influence area,	S_R = 50.4	mph
Space mean speed in outer lanes,	S_O = 69.9	mph
Space mean speed for all vehicles,	S = 57.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7050	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2310	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7050		2310			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1855		608			v
Trucks and buses	11		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7829	2577	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3536 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6264	9400	No
$v_{FO} = v_F - v_R$	3687	9400	No
v_R	2577	4000	No
v_3 or v_{av34}	1364 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3536 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3536	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 12.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.660	
Space mean speed in ramp influence area,	S_R = 49.8	mph
Space mean speed in outer lanes,	S_O = 69.9	mph
Space mean speed for all vehicles,	S = 56.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7955	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	3230	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7955		3230			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2093		850			v
Trucks and buses	11		11			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8834	3587	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4492 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7068	9400	No
$v_{FO} = v_F - v_R$	3481	9400	No
v_R	3587	4000	No
v_3 or v_{av34}	1288 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 4492 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4492	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable, D_S = 0.751

Space mean speed in ramp influence area, S_R = 47.7 mph

Space mean speed in outer lanes, S_O = 70.2 mph

Space mean speed for all vehicles, S = 54.0 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7325	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2230	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7325		2230			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1928		587			v
Trucks and buses	11		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8135	2488	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3533 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6508	9400	No
$v_{FO} = v_F - v_R$	4020	9400	No
v_R	2488	4000	No
v_3 or v_{av34}	1487 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3533 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3533	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 12.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.652	
Space mean speed in ramp influence area,	S_R = 50.0	mph
Space mean speed in outer lanes,	S_O = 69.4	mph
Space mean speed for all vehicles,	S = 57.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7680	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	2515	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7680		2515			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2021		662			v
Trucks and buses	11		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8529	2806	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3851 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6824	9400	No
$v_{FO} = v_F - v_R$	4018	9400	No
v_R	2806	4000	No
v_3 or v_{av34}	1486 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3851 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3851	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 14.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.681	
Space mean speed in ramp influence area,	S_R = 49.3	mph
Space mean speed in outer lanes,	S_O = 69.4	mph
Space mean speed for all vehicles,	S = 56.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	SR-134/EB
Junction:	NB SR-2 Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	8665	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	3515	vph
Length of first accel/decel lane	1250	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	8665		3515			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2280		925			v
Trucks and buses	11		11			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.948	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9623	3904	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.260 Using Equation 0

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 4891 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7699	9400	No
$v_{FO} = v_F - v_R$	3795	9400	No
v_R	3904	4000	No
v_3 or v_{av34}	1404 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 4891 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	4891	4400	Yes

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.779	
Space mean speed in ramp influence area,	S_R = 47.1	mph
Space mean speed in outer lanes,	S_0 = 69.7	mph
Space mean speed for all vehicles,	S = 53.4	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 33
ROUTE 5B, 6B,7B,8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND SR-134 DIVERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	2880	10%	50	2930	12%	260	3190	12%
Ramp MID	2625	10%	50	2675	12%	235	2910	12%
Ramp PM	2755	10%	50	2805	12%	250	3055	12%

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 34
ROUTE 5B, 6B,7B,8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND SR-134 MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	2870	10%	50	2920	12%	260	3180	12%
Ramp MID	2630	10%	50	2680	12%	235	2915	12%
Ramp PM	2985	10%	50	3035	11%	270	3305	11%

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5

FREEWAY : SR-134

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 35

ROUTE 5B, 6B, 7B,8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND I-5 MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	2900	10%	50	2950	12%	260	3210	12%
Ramp MID	2490	10%	50	2540	12%	225	2765	12%
Ramp PM	2755	10%	50	2805	12%	250	3055	12%

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-134

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
36
ROUTE
5B, 6B, 7B, 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND I-5 DIVERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Roscoe Boulevard/Glen Oaks Boulevard

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 37

ROUTE 5B,6B,7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND DIVERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	285	6%	50	335	20%	25	360	20%
Ramp MID	295	5%	50	345	15%	25	370	15%
Ramp PM	630	3%	50	680	8%	55	735	8%

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Roscoe Boulevard/Glen Oaks Boulevard

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 38

ROUTE 5B,6B,7B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	600	2%	50	650	10%	55	705	10%
Ramp MID	370	4%	50	420	15%	35	455	15%
Ramp PM	405	3%	50	455	14%	35	490	14%

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Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	28-Aug-13	VV.110264.0000	1 OF 1

STREET : Branford Street

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 39

ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

SOUTHBOUND MERGE

Mainline AM	12595	3%	50	12645	3%	1135	13780	3%
Mainline MID	8420	5%	50	8470	5%	760	9230	5%
Mainline PM	9245	3%	50	9295	4%	830	10125	4%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	28-Aug-13	VV.110264.0000	1 OF 1

STREET : Branford Street
FREEWAY : I-5

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 40
ROUTE 8A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

NORTHBOUND DIVERGE

Mainline AM	8320	0%	50	8370	1%	750	9120	1%
Mainline MID	5605	2%	50	5655	3%	505	6160	3%
Mainline PM	6090	0%	50	6140	1%	550	6690	1%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Wheatland Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 41

ROUTE 5C,6C,7C,8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	4080	3%	50	4130	4%	365	4495	4%
Mainline MID	3480	10%	50	3530	11%	315	3845	11%
Mainline PM	6690	3%	50	6740	4%	600	7340	4%
Ramp AM	70	7%	50	120	46%	5	125	46%
Ramp MID	65	5%	50	115	46%	5	120	46%
Ramp PM	110	1%	50	160	32%	10	170	32%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4080	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	70	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4080		70			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1074		18			v
Trucks and buses	3		7			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4359	76	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1943 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4359	9600	No
$v_{FO} = v_F - v_R$	4283	9600	No
v_R	76	2000	No
v_3 or v_{av34}	1208 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1943 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1943	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.435	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = 76.0	mph
Space mean speed for all vehicles,	S = 66.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3480	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	65	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3480		65			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	916		17			v
Trucks and buses	10		5			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.952	0.976	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3846	70	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1716 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3846	9600	No
$v_{FO} = v_F - v_R$	3776	9600	No
v_R	70	2000	No
v_3 or v_{av34}	1065 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1716 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1716	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.434	
Space mean speed in ramp influence area,	S_R = 57.8	mph
Space mean speed in outer lanes,	S_O = 76.5	mph
Space mean speed for all vehicles,	S = 66.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6690	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	110	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6690		110			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1761		29			v
Trucks and buses	3		1			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.985	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7148	116	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3182 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7148	9600	No
$v_{FO} = v_F - v_R$	7032	9600	No
v_R	116	2000	No
v_3 or v_{av34}	1983 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3182 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3182	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.438	
Space mean speed in ramp influence area,	S_R = 57.7	mph
Space mean speed in outer lanes,	S_O = 73.0	mph
Space mean speed for all vehicles,	S = 65.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4130	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	120	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4130		120			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1087		32			v
Trucks and buses	4		46			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.813	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4434	155	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2021 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4434	9600	No
$v_{FO} = v_F - v_R$	4279	9600	No
v_R	155	2000	No
v_3 or v_{av34}	1206 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2021 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2021	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.442	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_0 = 76.0	mph
Space mean speed for all vehicles,	S = 66.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3530	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	115	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3530		115			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	929		30			v
Trucks and buses	11		46			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.813	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3920	149	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1793 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3920	9600	No
$v_{FO} = v_F - v_R$	3771	9600	No
v_R	149	2000	No
v_3 or v_{av34}	1063 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1793 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1793	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.441	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_O = 76.5	mph
Space mean speed for all vehicles,	S = 66.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6740	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	160	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6740		160			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1774		42			v
Trucks and buses	4		32			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.862	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7237	195	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3265 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7237	9600	No
$v_{FO} = v_F - v_R$	7042	9600	No
v_R	195	2000	No
v_3 or v_{av34}	1986 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3265 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3265	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.446	
Space mean speed in ramp influence area,	S_R = 57.5	mph
Space mean speed in outer lanes,	S_0 = 72.9	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4495	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	125	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4495		125			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1183		33			v
Trucks and buses	4		46			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.813	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4826	162	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2196 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4826	9600	No
$v_{FO} = v_F - v_R$	4664	9600	No
v_R	162	2000	No
v_3 or v_{av34}	1315 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2196 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2196	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.443	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_O = 75.6	mph
Space mean speed for all vehicles,	S = 66.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3845	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	120	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3845		120			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1012		32			v
Trucks and buses	11		46			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.813	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4270	155	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1949 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4270	9600	No
$v_{FO} = v_F - v_R$	4115	9600	No
v_R	155	2000	No
v_3 or v_{av34}	1160 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1949 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1949	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.442	
Space mean speed in ramp influence area,	S_R = 57.6	mph
Space mean speed in outer lanes,	S_O = 76.2	mph
Space mean speed for all vehicles,	S = 66.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Wheatland Avenue Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7340	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	170	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7340		170			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1932		45			v
Trucks and buses	4		32			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.980	0.862	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7881	208	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3553 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7881	9600	No
$v_{FO} = v_F - v_R$	7673	9600	No
v_R	208	2000	No
v_3 or v_{av34}	2164 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3553 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3553	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.447	
Space mean speed in ramp influence area,	S_R = 57.5	mph
Space mean speed in outer lanes,	S_O = 72.3	mph
Space mean speed for all vehicles,	S = 64.8	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Wheatland Avenue

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 42

ROUTE 5C,6C,7C,8C

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND MERGE

Mainline AM	4735	10%	50	4785	10%	425	5210	10%
Mainline MID	2670	10%	50	2720	10%	240	2960	10%
Mainline PM	3650	10%	50	3700	10%	330	4030	10%
Ramp AM	125	3%	50	175	31%	10	185	31%
Ramp MID	65	2%	50	115	44%	5	120	44%
Ramp PM	90	3%	50	140	38%	10	150	38%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4735	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	125	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4735	125		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1246	33		v
Trucks and buses	10	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5233	134	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.201 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1052 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5367	9600	No
v_3 or v_{av34}	2090 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2093 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5367	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.357	
Space mean speed in ramp influence area,	S_R = 60.0	mph
Space mean speed in outer lanes,	S_O = 66.1	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2670	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	65	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2670	65		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	703	17		v
Trucks and buses	10	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	2951	69	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 617 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3020	9600	No
v_3 or v_{av34}	1167 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1180 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3020	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.335	
Space mean speed in ramp influence area,	S_R = 60.6	mph
Space mean speed in outer lanes,	S_O = 68.6	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3650	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	90	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3650	90		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	961	24		v
Trucks and buses	10	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4034	96	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.206 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 830 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4130	9600	No
v_3 or v_{av34}	1602 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1613 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4130	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.343	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_O = 67.4	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4785	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	175	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4785	175		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1259	46		v
Trucks and buses	10	31		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.866	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5289	213	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.191 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1011 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5502	9600	No
v_3 or v_{av34}	2139 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2115 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5502	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.361	
Space mean speed in ramp influence area,	S_R = 59.9	mph
Space mean speed in outer lanes,	S_O = 66.1	mph
Space mean speed for all vehicles,	S = 63.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3680	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	140	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3680	140		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	968	37		v
Trucks and buses	10	44		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.820	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4067	180	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.195 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 794 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4247	9600	No
v_3 or v_{av34}	1636 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1626 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4247	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.345	
Space mean speed in ramp influence area,	S_R = 60.3	mph
Space mean speed in outer lanes,	S_O = 67.4	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5015	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	175	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5015	175		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1320	46		v
Trucks and buses	10	38		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.840	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5543	219	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.190 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1056 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5762	9600	No
v_3 or v_{av34}	2243 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2217 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5762	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 24.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.366	
Space mean speed in ramp influence area,	S_R = 59.8	mph
Space mean speed in outer lanes,	S_O = 65.8	mph
Space mean speed for all vehicles,	S = 63.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5210	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	185	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	5210	185		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1371	49		v
Trucks and buses	10	31		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.866	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5758	225	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.190 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 1092 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5983	9600	No
v_3 or v_{av34}	2333 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2303 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5983	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.370	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = 65.6	mph
Space mean speed for all vehicles,	S = 62.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	2960	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	120	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	2960	120		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	779	32		v
Trucks and buses	10	44		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.820	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3272	154	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.199 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 650 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3426	9600	No
v_3 or v_{av34}	1311 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1308 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3426	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 16.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.338	
Space mean speed in ramp influence area,	S_R = 60.5	mph
Space mean speed in outer lanes,	S_0 = 68.3	mph
Space mean speed for all vehicles,	S = 64.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Wheatland Avenue On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4030	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	150	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4030	150		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1061	39		v
Trucks and buses	10	38		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.840	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4454	188	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.194 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 865 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4642	9600	No
v_3 or v_{av34}	1794 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12} /2 Yes

If yes, v_{12A} = 1781 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4642	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.349	
Space mean speed in ramp influence area,	S_R = 60.2	mph
Space mean speed in outer lanes,	S_O = 67.0	mph
Space mean speed for all vehicles,	S = 63.9	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Foothill Boulevard/Osborne Street

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 43

ROUTE 5A, 6A, 7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	4030	11%	50	4080	12%	365	4445	12%
Mainline MID	3330	11%	50	3380	12%	300	3680	12%
Mainline PM	5640	11%	50	5690	12%	510	6200	12%
Ramp AM	230	3%	50	280	20%	20	300	20%
Ramp MID	150	11%	50	200	33%	15	215	33%
Ramp PM	320	3%	50	370	16%	30	400	16%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4030	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4030		485			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1061		128			v
Trucks and buses	11		3			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4475	518	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2243 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4475	9600	No
$v_{FO} = v_F - v_R$	3957	9600	No
v_R	518	2000	No
v_3 or v_{av34}	1116 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2243 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2243	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 23.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.475	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_O = 76.3	mph
Space mean speed for all vehicles,	S = 65.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3330	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	235	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp	0	vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp	1000	ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp		
Volume, V (vph)	3330		235		0		vph
Peak-hour factor, PHF	0.95		0.95		0.90		
Peak 15-min volume, v15	876		62		0		v
Trucks and buses	11		7		0		%
Recreational vehicles	0		0		0		%
Terrain type:	Level		Level				
Grade	0.00	%	0.00	%	0.00	%	
Length	0.00	mi	0.00	mi	0.00	mi	
Trucks and buses PCE, ET	1.5		1.5		1.5		
Recreational vehicle PCE, ER	1.2		1.2		1.2		

Heavy vehicle adjustment, fHV	0.948	0.966	1.000	
Driver population factor, fP	1.00	1.00	1.00	
Flow rate, vp	3698	256	0	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1757 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3698	9600	No
$v_{FO} = v_F - v_R$	3442	9600	No
v_R	256	2000	No
v_3 or v_{av34}	970 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1757 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1757	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 19.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	D_S = 0.451	
Space mean speed in ramp influence area,	S_R = 57.4	mph
Space mean speed in outer lanes,	S_0 = 76.8	mph
Space mean speed for all vehicles,	S = 66.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5640	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	295	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5640		295			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1484		78			v
Trucks and buses	11		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6263	314	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2908 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6263	9600	No
$v_{FO} = v_F - v_R$	5949	9600	No
v_R	314	2000	No
v_3 or v_{av34}	1677 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2908 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2908	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.456	
Space mean speed in ramp influence area,	S_R = 57.2	mph
Space mean speed in outer lanes,	S_O = 74.1	mph
Space mean speed for all vehicles,	S = 65.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing +Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4080	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	535	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4080		535			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1074		141			v
Trucks and buses	12		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4552	597	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2321 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4552	9600	No
$v_{FO} = v_F - v_R$	3955	9600	No
v_R	597	2000	No
v_3 or v_{av34}	1115 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2321 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2321	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 24.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.482	
Space mean speed in ramp influence area,	S_R = 56.5	mph
Space mean speed in outer lanes,	S_O = 76.3	mph
Space mean speed for all vehicles,	S = 64.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing +Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3380	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	285	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3380		285			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	889		75			v
Trucks and buses	12		23			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3771	334	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1833 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	3771	9600	No
$v_{FO} = v_F - v_R$	3437	9600	No
v_R	334	2000	No
v_3 or v_{av34}	969 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1833 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1833	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 20.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.458	
Space mean speed in ramp influence area,	S_R = 57.2	mph
Space mean speed in outer lanes,	S_O = 76.8	mph
Space mean speed for all vehicles,	S = 65.8	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing +Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	5690	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	345	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	5690		345			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1497		91			v
Trucks and buses	12		17			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6349	394	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2990 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6349	9600	No
$v_{FO} = v_F - v_R$	5955	9600	No
v_R	394	2000	No
v_3 or v_{av34}	1679 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2990 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2990	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 30.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.463	
Space mean speed in ramp influence area,	S_R = 57.0	mph
Space mean speed in outer lanes,	S_O = 74.1	mph
Space mean speed for all vehicles,	S = 65.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4445	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	580	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	4445		580			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1170		153			v
Trucks and buses	12		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4960	647	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2527 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4960	9600	No
$v_{FO} = v_F - v_R$	4313	9600	No
v_R	647	2000	No
v_3 or v_{av34}	1216 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2527 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2527	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 26.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.486	
Space mean speed in ramp influence area,	S_R = 56.4	mph
Space mean speed in outer lanes,	S_0 = 75.9	mph
Space mean speed for all vehicles,	S = 64.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3680	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	305	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	3680		305			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	968		80			v
Trucks and buses	12		23			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4106	358	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 1992 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	4106	9600	No
$v_{FO} = v_F - v_R$	3748	9600	No
v_R	358	2000	No
v_3 or v_{av34}	1057 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 1992 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	1992	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 21.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	D_S = 0.460	
Space mean speed in ramp influence area,	S_R = 57.1	mph
Space mean speed in outer lanes,	S_O = 76.6	mph
Space mean speed for all vehicles,	S = 65.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/WB
Junction:	Foothill Boulevard Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6200	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	370	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6200		370			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1632		97			v
Trucks and buses	12		17			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	6918	423	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3255 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6918	9600	No
$v_{FO} = v_F - v_R$	6495	9600	No
v_R	423	2000	No
v_3 or v_{av34}	1831 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3255 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3255	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.2 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.466	
Space mean speed in ramp influence area,	S_R = 57.0	mph
Space mean speed in outer lanes,	S_O = 73.5	mph
Space mean speed for all vehicles,	S = 64.7	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Foothill Boulevard/Osborne Street

FREEWAY : I-210

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 44

ROUTE 5A,6A,7A

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND MERGE								
Mainline AM	3950	10%	50	4000	11%	355	4355	11%
Mainline MID	3105	10%	50	3155	11%	280	3435	11%
Mainline PM	4435	10%	50	4485	11%	400	4885	11%
Ramp AM	485	4%	50	535	12%	45	580	12%
Ramp MID	235	7%	50	285	23%	20	305	23%
Ramp PM	295	2%	50	345	16%	25	370	16%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3950	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	485	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3950	485		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1039	128		v
Trucks and buses	10	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%		%
Length	mi	mi		mi
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4366	518	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.153 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 668 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4884	9600	No
v_3 or v_{av34}	1849 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1746 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4884	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 22.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.359	
Space mean speed in ramp influence area,	S_R = 60.0	mph
Space mean speed in outer lanes,	S_O = 67.1	mph
Space mean speed for all vehicles,	S = 63.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3105	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	235	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3105	235		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	817	62		v
Trucks and buses	10	7		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.966	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3432	256	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.186 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 638 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3688	9600	No
v_3 or v_{av34}	1397 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1372 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3688	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.341	
Space mean speed in ramp influence area,	S_R = 60.5	mph
Space mean speed in outer lanes,	S_O = 68.1	mph
Space mean speed for all vehicles,	S = 64.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4435	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	295	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4435	295		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1167	78		v
Trucks and buses	10	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4902	314	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.179 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 875 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5216	9600	No
v_3 or v_{av34}	2013 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1960 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5216	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.359	
Space mean speed in ramp influence area,	S_R = 60.0	mph
Space mean speed in outer lanes,	S_O = 66.5	mph
Space mean speed for all vehicles,	S = 63.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4000	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	535	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4000	535		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1053	141		v
Trucks and buses	11	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4442	597	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.143 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 636 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5039	9600	No
v_3 or v_{av34}	1903 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1776 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5039	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.363	
Space mean speed in ramp influence area,	S_R = 59.8	mph
Space mean speed in outer lanes,	S_O = 67.0	mph
Space mean speed for all vehicles,	S = 63.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3155	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	285	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3155	285		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	830	75		v
Trucks and buses	11	23		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3504	334	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.176 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 617 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	3838	9600	No
v_3 or v_{av34}	1443 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1401 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	3838	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 18.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.343	
Space mean speed in ramp influence area,	S_R = 60.4	mph
Space mean speed in outer lanes,	S_O = 68.0	mph
Space mean speed for all vehicles,	S = 64.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4485	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	345	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4485	345		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1180	91		v
Trucks and buses	11	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4981	394	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.169 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 840 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5375	9600	No
v_3 or v_{av34}	2070 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1992 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5375	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 23.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.363	
Space mean speed in ramp influence area,	S_R = 59.8	mph
Space mean speed in outer lanes,	S_O = 66.4	mph
Space mean speed for all vehicles,	S = 63.3	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4355	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	580	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4355	580		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1146	153		v
Trucks and buses	11	12		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	4836	647	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.137 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 662 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5483	9600	No
v_3 or v_{av34}	2087 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1934 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5483	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.373	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = 66.6	mph
Space mean speed for all vehicles,	S = 63.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	3435	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	305	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	3435	305		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	904	80		v
Trucks and buses	11	23		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.897	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	3815	358	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.173 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 660 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	4173	9600	No
v_3 or v_{av34}	1577 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 1526 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	4173	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 20.0+ pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.347	
Space mean speed in ramp influence area,	S_R = 60.3	mph
Space mean speed in outer lanes,	S_O = 67.7	mph
Space mean speed for all vehicles,	S = 64.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-210/EB
Junction:	Foothill Boulevard On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	4	
Free-flow speed on freeway	70.0	mph
Volume on freeway	4885	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-flow speed on ramp	35.0	mph
Volume on ramp	370	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	4885	370		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1286	97		v
Trucks and buses	11	17		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.948	0.922	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	5425	423	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.165 Using Equation 4

$v_{12} = v_F (P_{FM})$ = 895 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	5848	9600	No
v_3 or v_{av34}	2265 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2170 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	5848	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 25.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence C

Speed Estimation

Intermediate speed variable,	M_S = 0.373	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = 65.9	mph
Space mean speed for all vehicles,	S = 62.9	mph

Hall & Foreman, Inc.

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-118
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
45
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND DIVERGE								
Mainline AM	4650	10%	50	4700	11%	420	5120	11%
Mainline MID	3640	10%	50	3690	11%	330	4020	11%
Mainline PM	6075	10%	50	6125	11%	545	6670	11%
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : SR-118
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
46
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND MERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : SR-118
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
47
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
WESTBOUND MERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : SR-118
FREEWAY : I-210

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
48
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
EASTBOUND DIVERGE								
Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-118

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
49
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

WESTBOUND SR-118 DIVERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

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SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-118

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 50
ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

EASTBOUND SR-118 MERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-118

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
51
ROUTE
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

SOUTHBOUND I-5 MERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

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Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Interchange	TM	20-Sep-13	VV.110264.0000	1 OF 1

FREEWAY : I-5
FREEWAY : SR-118

PROJECTED YEAR :
PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION
52
8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								

NORTHBOUND I-5 DIVERGE

Mainline AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Mainline PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp AM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp MID	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D
Ramp PM	N/D	N/D	50	N/D	N/D	N/D	N/D	N/D

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax
Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax
Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax
Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Osborne Street

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 53

ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
SOUTHBOUND MERGE								
Mainline AM	10815	10%	50	10865	10%	975	11840	10%
Mainline MID	7500	5%	50	7550	6%	675	8225	6%
Mainline PM	8230	5%	50	8280	6%	740	9020	6%
Ramp AM	355	14%	50	405	24%	30	435	24%
Ramp MID	760	3%	50	810	9%	70	880	9%
Ramp PM	1085	0%	50	1135	5%	100	1235	5%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	10815	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1200	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	10815	1200		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2846	316		v
Trucks and buses	10	2		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	11953	1276	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1976 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	10729	9400	Yes
v_3 or v_{av34}	3738 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		Yes	
Is v_3 or v_{av34} > 1.5 v_{12}/2		Yes	
If yes, v_{12A} = 3781		(Equation 13-15, 13-16, 13-18, or 13-19)	

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	10729	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 30.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.783	
Space mean speed in ramp influence area,	S_R = 47.0	mph
Space mean speed in outer lanes,	S_O = 55.3	mph
Space mean speed for all vehicles,	S = 51.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7500	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	385	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7500	385		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1974	101		v
Trucks and buses	5	3		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8092	411	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1209 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6197	9400	No
v_3 or v_{av34}	2288 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2314 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6197	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.0 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.229	
Space mean speed in ramp influence area,	S_R = 59.7	mph
Space mean speed in outer lanes,	S_O = 60.6	mph
Space mean speed for all vehicles,	S = 60.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	8230	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	500	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8230	500		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2166	132		v
Trucks and buses	5	1		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.976	0.995	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8880	529	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1333 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6909	9400	No
v_3 or v_{av34}	2523 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2552 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6909	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.255	
Space mean speed in ramp influence area,	S_R = 59.1	mph
Space mean speed in outer lanes,	S_O = 59.9	mph
Space mean speed for all vehicles,	S = 59.6	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	10865	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1250	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	10865	1250		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2859	329		v
Trucks and buses	10	6		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.971	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	12009	1355	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1987 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	10864	9400	Yes
v_3 or v_{av34}	3761 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 3803 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	10864	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 31.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 0.848	
Space mean speed in ramp influence area,	S_R = 45.5	mph
Space mean speed in outer lanes,	S_O = 55.2	mph
Space mean speed for all vehicles,	S = 50.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	7550	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	435	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	7550	435		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	1987	114		v
Trucks and buses	6	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8186	490	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1223 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6343	9400	No
v_3 or v_{av34}	2315 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2341 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6343	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 13.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.236	
Space mean speed in ramp influence area,	S_R = 59.6	mph
Space mean speed in outer lanes,	S_O = 60.5	mph
Space mean speed for all vehicles,	S = 60.1	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	8280	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	550	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8280	550		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2179	145		v
Trucks and buses	6	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8977	608	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1354 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7085	9400	No
v_3 or v_{av34}	2561 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2590 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7085	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 16.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.265	
Space mean speed in ramp influence area,	S_R = 58.9	mph
Space mean speed in outer lanes,	S_0 = 59.8	mph
Space mean speed for all vehicles,	S = 59.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	11840	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	1360	vph
Length of first accel/dècel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	11840	1360		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	3116	358		v
Trucks and buses	10	6		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.952	0.971	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	13086	1475	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 2212 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	12061	9400	Yes
v_3 or v_{av34}	4187 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 4234 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	12061	4600	Yes

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 35.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence F

Speed Estimation

Intermediate speed variable,	M_S = 1.346	
Space mean speed in ramp influence area,	S_R = 34.0	mph
Space mean speed in outer lanes,	S_0 = 53.2	mph
Space mean speed for all vehicles,	S = 42.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	8225	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	470	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	8225	470		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2164	124		v
Trucks and buses	6	14		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.935	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8918	529	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1341 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	6947	9400	No
v_3 or v_{av34}	2538 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2567 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	6947	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 15.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.256	
Space mean speed in ramp influence area,	S_R = 59.1	mph
Space mean speed in outer lanes,	S_0 = 59.9	mph
Space mean speed for all vehicles,	S = 59.5	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Merge Analysis

Analyst:	TM
Agency/Co.:	Hall & Foreman, Inc.
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/SB
Junction:	Osborne Street On-Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Merge	
Number of lanes in freeway	5	
Free-flow speed on freeway	65.0	mph
Volume on freeway	9020	vph

On Ramp Data

Side of freeway	Right	
Number of lanes in ramp	2	
Free-flow speed on ramp	35.0	mph
Volume on ramp	595	vph
Length of first accel/decel lane	1080	ft
Length of second accel/decel lane	0	ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent Ramp		vph
Position of adjacent Ramp		
Type of adjacent Ramp		
Distance to adjacent Ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway	Ramp	Adjacent Ramp	
Volume, V (vph)	9020	595		vph
Peak-hour factor, PHF	0.95	0.95		
Peak 15-min volume, v15	2374	157		v
Trucks and buses	6	10		%
Recreational vehicles	0	0		%
Terrain type:	Level	Level		
Grade	%	%	%	
Length	mi	mi	mi	
Trucks and buses PCE, ET	1.5	1.5		
Recreational vehicle PCE, ER	1.2	1.2		

Heavy vehicle adjustment, fHV	0.971	0.952	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9780	658	pcph

Estimation of V12 Merge Areas

L_{EQ} = (Equation 13-6 or 13-7)

P_{FM} = 0.209 Using Equation 0

$v_{12} = v_F (P_{FM})$ = 1522 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
v_{FO}	7938	9400	No
v_3 or v_{av34}	2879 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? Yes

Is v_3 or v_{av34} > 1.5 v_{12}/2 Yes

If yes, v_{12A} = 2912 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Merge Influence Area

	Actual	Max Desirable	Violation?
v_{12A}	7938	4600	No

Level of Service Determination (if not F)

Density, $D_R = 5.475 + 0.00734\, v_R + 0.0078\, v_{12} - 0.00627\, L_A$ = 19.5 pc/mi/ln

Level of service for ramp-freeway junction areas of influence B

Speed Estimation

Intermediate speed variable,	M_S = 0.308	
Space mean speed in ramp influence area,	S_R = 57.9	mph
Space mean speed in outer lanes,	S_O = 58.9	mph
Space mean speed for all vehicles,	S = 58.5	mph

Hall & Foreman, Inc.

Engineering • Surveying • Planning • Landscape Architecture

SUBJECT	BY	DATE	JOB NO.	SHEET OF
Volume	TM	20-Sep-13	VV.110264.0000	1 OF 1

STREET : Osborne Street

FREEWAY : I-5

PROJECTED YEAR :

PROJECTED GROWTH PER YEAR : 4.50%

INTERSECTION 54

ROUTE 8B

CONDITION DIAGRAMS

EXISTING GEOMETRICS

CONDITION	EXISTING TRAFFIC	TRUCK PERCENTAGE	PROJECT TRAFFIC	EXISTING + PROJECT TRAFFIC	TRUCK PERCENTAGE	GROWTH TRAFFIC	PROJECT CONDITIONS YEAR 2014 TRAFFIC	TRUCK PERCENTAGE
SCENERIO #								
NORTHBOUND DIVERGE								
Mainline AM	6770	14%	50	6820	14%	610	7430	14%
Mainline MID	7300	14%	50	7350	15%	655	8005	15%
Mainline PM	7295	11%	50	7345	12%	655	8000	12%
Ramp AM	410	8%	50	460	18%	35	495	18%
Ramp MID	525	2%	50	575	11%	45	620	11%
Ramp PM	615	1%	50	665	9%	55	720	9%

Tustin Office: 714.665.4500 Tel/ 714.665.4501 Fax

Santa Clarita Office: 661.284.7400 Tel/ 661.284.7401 Fax

Victorville Office: 760.524.9100 Tel/ 760.524.9101 Fax

Temecula Office: 951.294.9300 Tel/ 951.294.9301 Fax

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6770	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	410	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6770		410			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1782		108			v
Trucks and buses	14		8			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.935	0.962	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7625	449	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2913 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6100	9600	No
$v_{FO} = v_F - v_R$	5651	9600	No
v_R	449	2000	No
v_3 or v_{av34}	1593 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 2913 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2913	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.468	
Space mean speed in ramp influence area,	S_R = 56.9	mph
Space mean speed in outer lanes,	S_O = 74.5	mph
Space mean speed for all vehicles,	S = 64.9	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7300	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	525	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7300		525			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1921		138			v
Trucks and buses	14		3			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.935	0.985	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8222	561	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3184 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6578	9600	No
$v_{FO} = v_F - v_R$	6017	9600	No
v_R	561	2000	No
v_3 or v_{av34}	1697 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3184 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3184	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.6 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.478	
Space mean speed in ramp influence area,	S_R = 56.6	mph
Space mean speed in outer lanes,	S_O = 74.1	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7295	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	615	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7295		615			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1920		162			v
Trucks and buses	11		2			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.948	0.990	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8101	654	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3195 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6481	9600	No
$v_{FO} = v_F - v_R$	5827	9600	No
v_R	654	2000	No
v_3 or v_{av34}	1643 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3195 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3195	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 31.7 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.487	
Space mean speed in ramp influence area,	S_R = 56.4	mph
Space mean speed in outer lanes,	S_O = 74.3	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	6820	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	460	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	6820		460			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1795		121			v
Trucks and buses	14		18			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.935	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	7681	528	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 2977 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6145	9600	No
$v_{FO} = v_F - v_R$	5617	9600	No
v_R	528	2000	No
v_3 or v_{av34}	1584 pc/h	(Equation 13-14 or 13-17)	
Is v_3 or v_{av34} > 2700 pc/h?		No	
Is v_3 or v_{av34} > 1.5 v_{12}/2		No	

If yes, v_{12A} = 2977 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	2977	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 29.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.476	
Space mean speed in ramp influence area,	S_R = 56.7	mph
Space mean speed in outer lanes,	S_0 = 74.5	mph
Space mean speed for all vehicles,	S = 64.7	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7350	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	575	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7350		575			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1934		151			v
Trucks and buses	15		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.930	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8317	642	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3263 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6654	9600	No
$v_{FO} = v_F - v_R$	6012	9600	No
v_R	642	2000	No
v_3 or v_{av34}	1695 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3263 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3263	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.3 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.486	
Space mean speed in ramp influence area,	S_R = 56.4	mph
Space mean speed in outer lanes,	S_O = 74.1	mph
Space mean speed for all vehicles,	S = 64.2	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Existing + Project Conditions
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7345	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	665	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7345		665			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1933		175			v
Trucks and buses	12		9			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8195	732	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3271 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6556	9600	No
$v_{FO} = v_F - v_R$	5824	9600	No
v_R	732	2000	No
v_3 or v_{av34}	1642 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3271 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3271	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.4 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.494	
Space mean speed in ramp influence area,	S_R = 56.2	mph
Space mean speed in outer lanes,	S_O = 74.3	mph
Space mean speed for all vehicles,	S = 64.0	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	AM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	7430	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	495	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	7430		495			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	1955		130			v
Trucks and buses	14		18			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.935	0.917	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8369	568	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3240 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	6696	9600	No
$v_{FO} = v_F - v_R$	6128	9600	No
v_R	568	2000	No
v_3 or v_{av34}	1728 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3240 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3240	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 32.1 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.479	
Space mean speed in ramp influence area,	S_R = 56.6	mph
Space mean speed in outer lanes,	S_O = 74.0	mph
Space mean speed for all vehicles,	S = 64.4	mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	MID Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8005	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	620	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	8005		620			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2107		163			v
Trucks and buses	15		12			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.930	0.943	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	9058	692	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3550 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7247	9600	No
$v_{FO} = v_F - v_R$	6555	9600	No
v_R	692	2000	No
v_3 or v_{av34}	1848 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3550 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3550	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.8 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable, D_S = 0.490

Space mean speed in ramp influence area, S_R = 56.3 mph

Space mean speed in outer lanes, S_O = 73.5 mph

Space mean speed for all vehicles, S = 63.9 mph

HCS 2010: Freeway Merge and Diverge Segments Release 6.3

Phone: Fax:
E-mail:

Diverge Analysis

Analyst:	TM
Agency/Co.:	Hall& Foreman, Inc
Date performed:	8/11/2012
Analysis time period:	PM Peak Hour
Freeway/Dir of Travel:	I-5/NB
Junction:	Osborne Street Off- Ramp
Jurisdiction:	Caltrans
Analysis Year:	Project Conditions Year 2014
Description: VV.110264	

Freeway Data

Type of analysis	Diverge	
Number of lanes in freeway	5	
Free-flow speed on freeway	70.0	mph
Volume on freeway	8000	vph

Off Ramp Data

Side of freeway	Right	
Number of lanes in ramp	1	
Free-Flow speed on ramp	35.0	mph
Volume on ramp	720	vph
Length of first accel/decel lane	0	ft
Length of second accel/decel lane		ft

Adjacent Ramp Data (if one exists)

Does adjacent ramp exist?	No	
Volume on adjacent ramp		vph
Position of adjacent ramp		
Type of adjacent ramp		
Distance to adjacent ramp		ft

Conversion to pc/h Under Base Conditions

Junction Components	Freeway		Ramp		Adjacent Ramp	
Volume, V (vph)	8000		720			vph
Peak-hour factor, PHF	0.95		0.95			
Peak 15-min volume, v15	2105		189			v
Trucks and buses	12		9			%
Recreational vehicles	0		0			%
Terrain type:	Level		Level			
Grade	0.00	%	0.00	%		%
Length	0.00	mi	0.00	mi		mi
Trucks and buses PCE, ET	1.5		1.5			
Recreational vehicle PCE, ER	1.2		1.2			

Heavy vehicle adjustment, fHV	0.943	0.957	
Driver population factor, fP	1.00	1.00	
Flow rate, vp	8926	792	pcph

Estimation of V12 Diverge Areas

L_{EQ} = (Equation 13-12 or 13-13)

P_{FD} = 0.436 Using Equation 8

$v_{12} = v_R + (v_F - v_R) P_{FD}$ = 3560 pc/h

Capacity Checks

	Actual	Maximum	LOS F?
$v_{Fi} = v_F$	7141	9600	No
$v_{FO} = v_F - v_R$	6349	9600	No
v_R	792	2000	No
v_3 or v_{av34}	1790 pc/h	(Equation 13-14 or 13-17)	

Is v_3 or v_{av34} > 2700 pc/h? No

Is v_3 or v_{av34} > 1.5 v_{12}/2 No

If yes, v_{12A} = 3560 (Equation 13-15, 13-16, 13-18, or 13-19)

Flow Entering Diverge Influence Area

	Actual	Max Desirable	Violation?
v_{12}	3560	4400	No

Level of Service Determination (if not F)

Density, $D_R = 4.252 + 0.0086\, v_{12} - 0.009\, L_D$ = 34.9 pc/mi/ln

Level of service for ramp-freeway junction areas of influence D

Speed Estimation

Intermediate speed variable,	D_S = 0.499	
Space mean speed in ramp influence area,	S_R = 56.0	mph
Space mean speed in outer lanes,	S_O = 73.7	mph
Space mean speed for all vehicles,	S = 63.7	mph