4.0 ENVIRONMENTAL IMPACT ANALYSIS
I. NOISE

1. INTRODUCTION

The section analyzes the potential noise and vibration impacts that would result from the Project. The analysis describes the existing noise environment within the Project area, estimates future noise and vibration levels at surrounding land uses resulting from construction and operation of the Project, identifies the potential for significant impacts, and provides mitigation measures to address significant impacts. In addition, an evaluation of the potential cumulative noise impacts of the Project and related projects is also provided. Supporting data and analysis for the analysis presented in this section, including a Helistop Relocation Noise Impact Study (AES, 2016), are provided in Appendix H of this Draft EIR.

2. ENVIRONMENTAL SETTING

a. Noise and Vibration Basics

(1) Noise

Noise is most often defined as unwanted sound. Although sound can be easily measured, the perception of sound is subjective and the physical response to sound complicates the analysis of its impact on people. People judge the relative magnitude of sound sensation in subjective terms such as "noisiness" or "loudness." Sound pressure magnitude is measured and quantified using a logarithmic ratio of pressures, the scale of which gives the level of sound in decibels (dB). The human hearing system is not equally sensitive to sound at all frequencies. Therefore, to approximate this human, frequency-dependent response, the A-weighted filter system is used to adjust measured sound levels. The A-weighted sound level is expressed in "dBA." This scale de-emphasizes low frequencies to which human hearing is less sensitive and focuses on mid- to high-range frequencies. The range of human hearing is approximately 3 to 140 dBA, with 110 dBA considered intolerable or painful to the human ear. A comparison of types of commonly experienced environmental noise is provided in **Figure 4.I-1,** *Common Noise Levels*.

Although the A-weighted scale accounts for the range of people's response, and therefore, is commonly used to quantify individual event or general community sound levels, the degree of annoyance or other response effects also depends on several other perceptibility factors. These factors include:

- Ambient (background) sound level
- Magnitude of sound event with respect to the background noise level
- Duration of the sound event
- Number of event occurrences and their repetitiveness
- Time of day that the event occurs

People judge the relative magnitude of sound sensation by subjective terms such as "loudness" or "noisiness." That is, in a non-controlled environment a change in sound level of 3 dB is considered "just perceptible," a change in sound level of 5 dB is considered "clearly noticeable, and a change in 10 dB is recognized as "twice as loud".[1]

In an outdoor environment, sound levels attenuate (i.e., diminish) with distance. Such attenuation is called "distance loss" or "geometric spreading" and is based on the source configuration, point source or line source. For a point source, the rate of sound attenuation is, usually, 6 dB per doubling of distance from the noise source. For example, a sound level of 50 dBA at a distance of 25 feet from the noise source would attenuate to 44 dBA at a distance of 50 feet. For a line source, such as a constant flow of traffic on a roadway, the rate of sound attenuation is 3 dB per doubling of distance.[2] In addition, structures (e.g., buildings and solid walls) and natural topography (e.g., hills) that obstruct the line-of-sight between a noise source and a receptor further reduce the noise level if the receptor is located within the "shadow" of the obstruction, such as behind a sound wall. This type of sound attenuation is known as "barrier insertion loss." If a receptor is located behind the wall but still has a view of the source (i.e., line-of-sight not fully blocked), some barrier insertion loss would still occur, however to a lesser extent. Additionally, a receptor located on the same side of the wall as a noise source may actually experience an increase in the perceived noise level as the wall reflects noise back to the receptor, thereby compounding the noise. Noise barriers can provide noise level reductions ranging from approximately 5 dBA (where the barrier just breaks the line-of-sight between the source and receiver) to an upper range of 20 dBA with a more substantial barrier.[3]

Community noise levels usually change continuously during the day. The equivalent sound level (L_{eq}) is normally used to describe community noise. The L_{eq} is the equivalent steady-state A-weighted sound level that would contain the same acoustical energy as the time-varying A-weighted sound level during the same time interval. For intermittent noise sources, the maximum noise level (L_{max}) is normally used to represent the maximum noise level measured during the measurement. Maximum and minimum noise levels, as compared to the L_{eq}, are a function of the characteristics of the noise source. As an example, sources such as generators have maximum and minimum noise levels that are similar to L_{eq} since noise levels for steady-state noise sources do not substantially fluctuate. However, as another example, vehicular noise levels along local roadways result in substantially different minimum and maximum noise levels when compared to the L_{eq} since noise levels fluctuate during pass-by events. The County of Los Angeles Noise Ordinance uses the L_{eq} for evaluation of noise violation.

To assess noise levels over a given 24-hour time period, the Community Noise Equivalent Level (CNEL) descriptor is used in land use planning. CNEL is the time average of all A-weighted sound levels for a 24-hour period with a 10 dBA adjustment (upward) added to the sound levels which occur in the night (10:00 P.M. to 7:00 A.M.) and a 5 dBA adjustment (upward) added to the sound levels which occur in the evening (7:00 P.M. to 10:00 P.M.). These penalties attempt to account for increased human sensitivity to noise during the quieter nighttime periods, particularly where sleep is the most probable activity. CNEL has been adopted by the State of California to define the community noise environment for development of a community noise element of a General Plan and is also used by County for land use planning in the County's Noise Element of the General Plan.[4]

1 *Engineering Noise Control, Bies & Hansen, 1988.*

2 *Caltrans, Technical Noise Supplement (TeNS), 2013.*

3 *Ibid.*

4 *State of California, General Plan Guidelines, 2002.*

Noise Level (dBA)	Common Indoor Noise Levels	Common Outdoor Noise Levels
110	Rock Band	
100	Inside Subway Train	Jet Flyover @ 1,000 feet Gas Lawn Mower @ 3 feet
90	Food Blender @ 3 feet	Diesel Truck @ 50 feet Noisy Urban Daytime
80	Garbage Disposal @ 3 feet Shouting @ 3 feet	
70	Vacuum Cleaner @ 10 feet	Gas Lawn Mower @ 100 feet Commercial Area
60	Normal Speech @ 3 feet Large	Heavy Traffic @ 300 feet
50	Dishwasher next room	Quiet Urban Daytime
40	Small Theater/Conference Room (background)	Quiet Urban Nightime Quiet Suburban Nightime
30	Library Bedroom at Night	
20	Concert Hall (background) Broadcast & Recording Studio	Quiet Rural Nightime
10		
0	Threshold of Hearing	

This page intentionally blank.

(2) Vibration

Vibration is an oscillatory motion through a solid medium in which the motion's amplitude can be described in terms of displacement, velocity, or acceleration. The response of humans, buildings, and equipment to vibration is more accurately described using velocity or acceleration.[5] Vibration amplitudes are usually described as either peak, as in peak particle velocity (PPV). The peak level represents the maximum instantaneous peak of the vibration signal. In addition, vibrations can be measured in the vertical, horizontal longitudinal, or horizontal transverse directions. Ground vibrations are most often greatest in the vertical direction.[6] Therefore, the analysis of ground-borne vibration associated with the Project is addressed in the vertical direction. Typically, ground-borne vibration generated by man-made activities attenuates rapidly with distance from the source of the vibration. Man-made vibration issues are therefore usually confined to short distances (i.e., 50 feet or less) from the source.

b. Existing Conditions

(1) Noise-Sensitive Receptor Locations

Some land uses are considered more sensitive to noise than others due to the amount of noise exposure and the types of activities typically involved at the receptor location. The *County of Los Angeles' 2006 CEQA Thresholds Guide* states that residences, schools, motels and hotels, libraries, religious institutions, hospitals, nursing homes, and parks are generally more sensitive to noise than commercial and industrial land uses. Existing noise sensitive uses within 500 feet of the Medical Center Campus include the following:

- The Harbor-UCLA Medical Center Employee Children's Center (Child Care Center) and a multi-family residential apartment complex, Harbor Cove Villa, are located on Carson Street just west of the intersection with Vermont Avenue.
- The area north of Carson Street is a predominantly single-family residential neighborhood.
- Vermont Avenue, the southern half of the block facing the Medical Center Campus, at 219th Street, is developed with a condominium complex, Torrance Park Villas, and mobile home parks, Starlite Trailer Park and Rainbow Mobile Home Park.
- Single-Family and multi-family residential neighborhoods border the Medical Center Campus to the south, across 220th Street, as well as to the west, across Normandie Avenue within the Harbor City community of Los Angeles.
- Halldale Avenue Elementary School is located at the southwest corner of Normandie Avenue and 216th Street. White Middle School is located at the southeast corner of Figueroa Street and West 220th Street.

(2) Ambient Noise Levels

The predominant noise source surrounding the Medical Center Campus is roadway noise from Carson Street to the north, Vermont Avenue to the east, and Normandie Avenue to the west. Secondary noise sources include general residential and commercial-related activities, such as loading dock/delivery truck activities, trash compaction, and refuse service activities.

---

[5] *Federal Transit Authority, Transit Noise and Vibration Impact Assessment, Final Report, page 7-3, May 2006.*

[6] *California Department of Transportation, Transportation Related Earthborne Vibrations, page 4, February 2002.*

Measured Noise Levels – Existing Conditions

Ambient noise measurements were made at six locations, representing the nearby noise-sensitive land uses in the vicinity of the Medical Center Campus as indicated on **Figure 4.I-2,** *Noise Measurement Locations*. Long-term measurements were conducted at locations R1 and R5 for 2 days and short-term noise measurements were made at locations R2 through R4 and R6. Ambient sound measurements were conducted from Wednesday, October 29, through Friday, October 31, 2014 to characterize the existing noise environment during weekdays in the Project vicinity.

The ambient noise measurements were conducted using the Larson-Davis 820 Precision Integrated SLM. The Larson-Davis 820 SLM is a Type 1 standard instrument as defined in the American National Standard Institute (ANSI) S1.4. All instruments were calibrated and operated according to the applicable manufacturer specification. The microphone was placed at a height of 5 feet above the local grade, at the following locations as shown in Figure 4.I-2:

- Measurement Location R1: This measurement location represents the existing noise environment of the Medical Center Campus site along Central Drive. The noise measuring device (sound level meter) was placed approximately 200 feet north from the northwest corner of 220th Street and Central Drive.

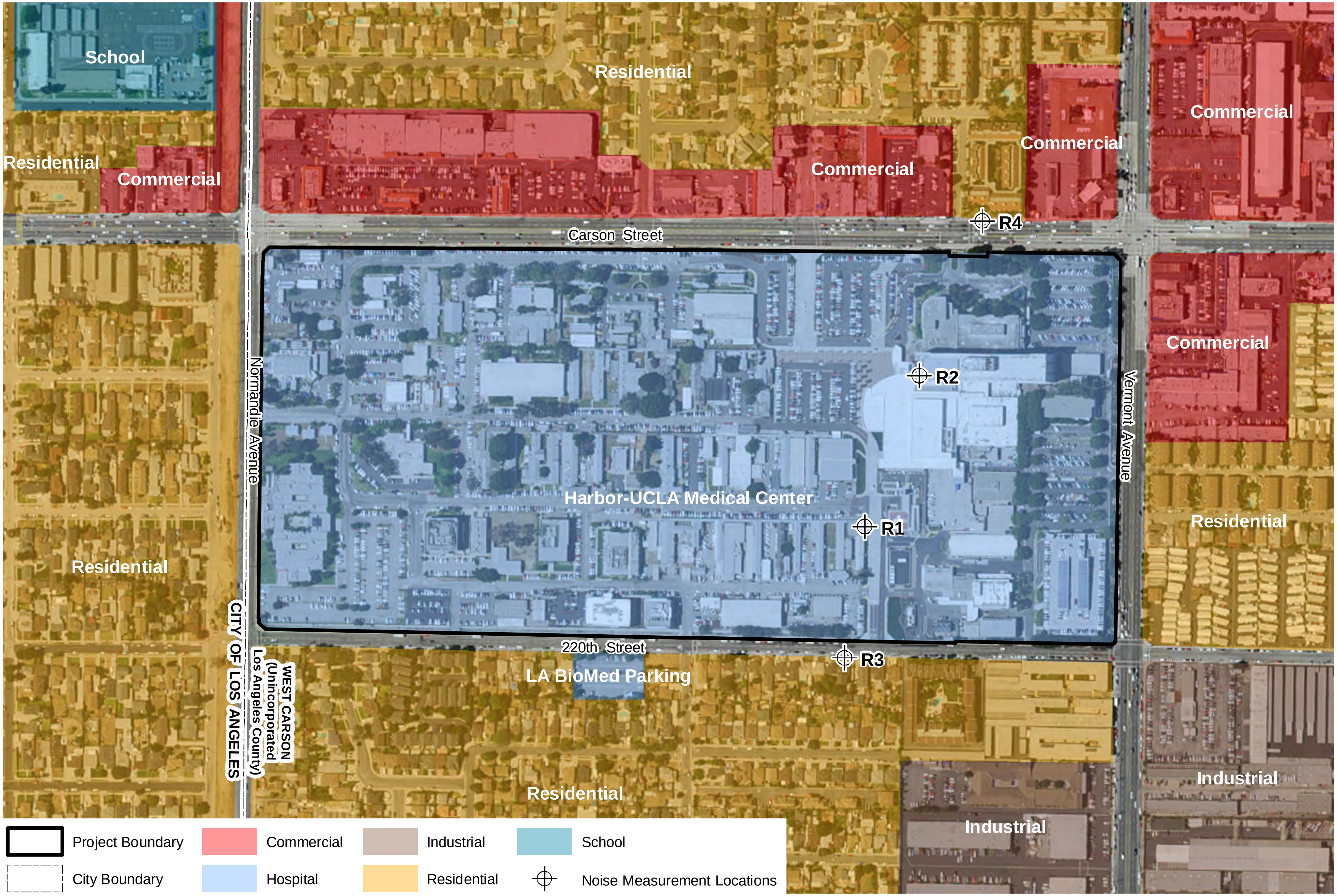
- Measurement Location R2: This measurement location represents the existing noise environment of the Medical Center Campus. The sound level meter was placed on the southwestern corner of the Existing Hospital tower.

- Measurement Location R3: This measurement location represents the existing noise environment of the Child Care Center and single and multi-family residential uses along West 220th Street, south of the Medical Center Campus. The sound level meter was placed along West 220th Street approximately 150 feet east from the northeastern corner of 220th Street and Central Drive.

- Measurement Location R4: This measurement location represents the existing noise environment of the multi-family residential uses along Carson Street. The sound level meter was placed along Carson Street approximately 300 feet west from the northwestern corner of Carson Street and Vermont Avenue.

- Measurement Location R5: This measurement location represents the existing noise environment of the single-family residential and mobile home uses along Vermont Avenue. The sound level meter was placed along Vermont Avenue approximately 250 feet north from the northwest corner of Vermont Avenue and 220th Street.

- Measurement Location R6: This measurement location represents the existing noise environment of the single-family residential uses along Normandie Avenue, north of 220th Street and Halldale Avenue Elementary School located at southwest corner of Normandie Avenue and 216th Street. The sound level meter was placed along Normandie Avenue approximately 350 feet north from the northwestern corner of Normandie Avenue and 220th Street.



Noise Measurement Locations

Harbor-UCLA Medical Center Master Plan

Source: Microsoft, 2010 (Aerial); PCR Services Corporation, 2014.

FIGURE

4.I-2

This page intentionally blank.

A summary of noise measurement data is provided in **Table 4.I-1,** *Summary of Ambient Noise Measurements*. As shown in Table 4.I-1, the existing ambient daytime and nighttime noise levels at all of the noise-sensitive residential receptors measured already exceed the County's Exterior Noise Standard for residential areas of 50 dBA during the daytime and 45 dBA during the nighttime. The ambient noise levels in the immediate Project vicinity are representative of a noisy urban area.

Table 4.I-1

Summary of Ambient Noise Measurements

Location, Duration, Existing Land Uses and, Date of Measurements	Measured Ambient Noise Levels,[a] (dBA) Daytime (7 A.M. to 10 P.M.) Hourly L_{eq}	Nighttime (10 P.M. to 7 A.M.) Hourly L_{eq}
R1		
10/29/14 (partial 8 hours)/ Wednesday	56 – 58	55 – 56
10/30/14 (full 24 hours)/ Thursday	56 – 67	51 – 57
10/31/14 (partial 8 hours)/ Friday	58 – 67	52 – 57
R2		
10/29/14 12 P.M. to 1 P.M./ Wednesday	56	N/A
R3		
10/29/14 11 A.M. to 12 P.M./ Wednesday	66	N/A
R4		
10/29/14 10 A.M. to 11 A.M./ Wednesday	69	N/A
R5		
10/29/14 (partial 8 hours)/ Wednesday	65 – 73	61 – 65
10/30/14 (full 24 hours)/ Thursday	64 – 73	58 – 69
10/31/14 (partial 8 hours)/ Friday	67	58 – 71
R6		
10/29/14 11 A.M. to 12 P.M./ Wednesday	67	N/A

[a] *Detailed measured noise data, including hourly L_{eq} levels, are included in Appendix H of this Draft EIR.*

Source: ESA PCR, 2016.

Measured Noise Levels – Existing Helicopter Noise

In addition, ambient noise measurements were conducted at seven off-site noise sensitive (residential and school uses) receptors in the vicinity of the Project site and the proposed helicopter flight paths, to quantify the existing noise environment, which are provided in the Helistop Relocation Noise Impact Study (AES 2016), attached as Appendix H of this EIR. **Figure 4.I-3**, *Ambient Noise Measurement Locations – Helicopter Operations,* (Figure 2 of the Study) shows the noise measurement locations in relation to the existing Helistop. At each of the measurement locations, two short-term (15-minute) noise readings were made, one during daytime period and one during nighttime period. The ambient noise measurements were conducted on March 10 and May 25, 2016, between the hours of 11 a.m. and 2 p.m. (daytime period) and 10 p.m. and 12 a.m. (nighttime period). Noise measurements were conducted using the Quest 2900 Integrated Sound Level Meter (SLM). The Quest 2900 SLM is a Type 2 standard instrument as defined in the American National Standard Institute (ANSI) S1.4; SLMs were calibrated and operated according to the manufacturer's written specifications. The SLM microphone was placed five feet above the local grade during measurements.

Table 4.I-2, *Measured Ambient Noise Levels,* presents the measured ambient noise levels in the vicinity and within the Project site.

Table 4.I-2

Measured Ambient Noise Levels

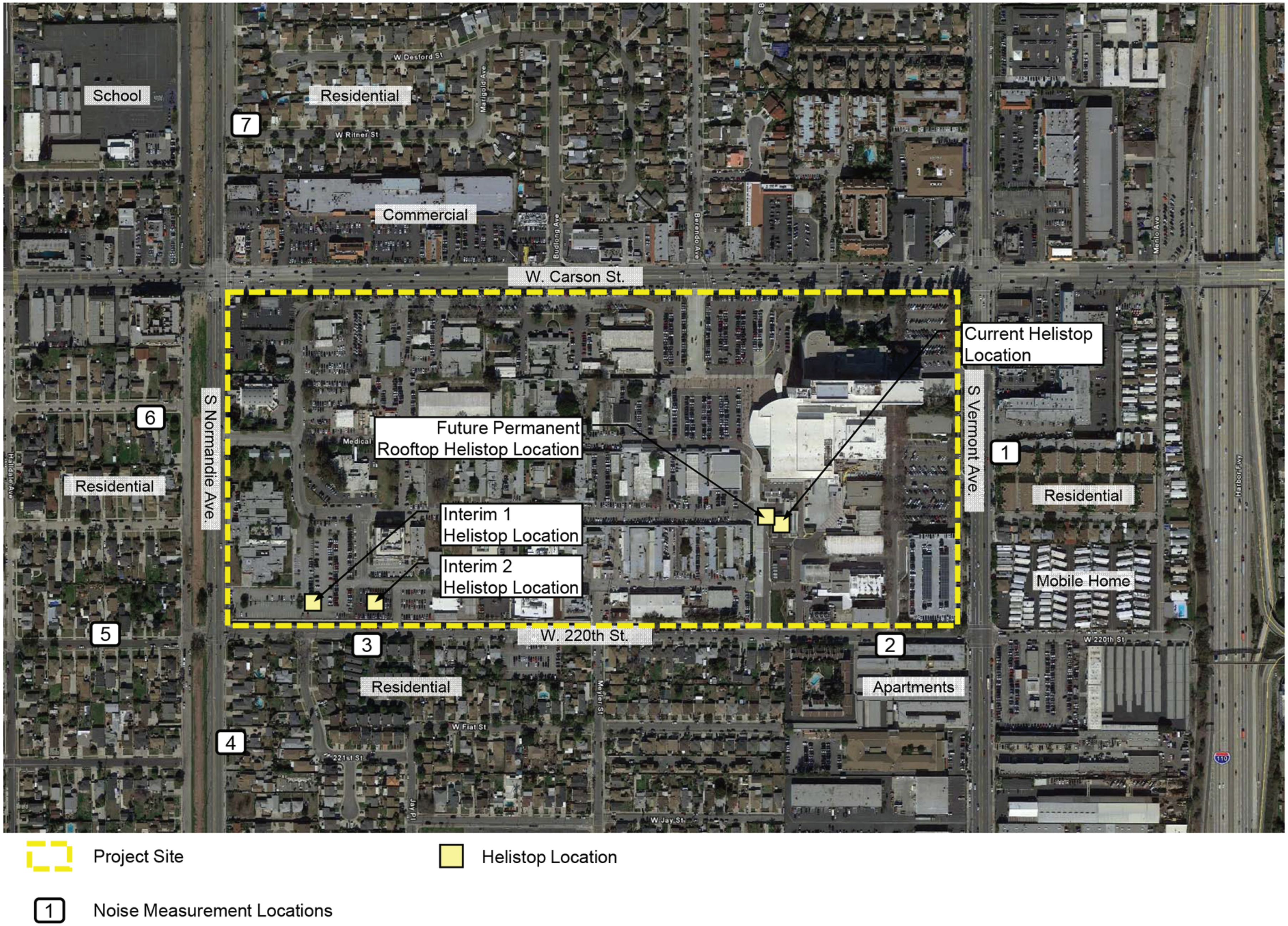
Location	Nearby Noise Sensitive Land Uses	Measured Noise Levels,[a] L_{eq} (dBA)		CNEL,[b] (dBA)
		Daytime (7 a.m. to 10 p.m.)	Nighttime (10 p.m. to 7 a.m.)	
R1: Multi-family residential use at the northeast corner of Vermont Avenue and 219th Street	Residential	68.3	64.9	70.5
R2: Multi-family residential use on 220th Street, approximately 200 feet west of Vermont Avenue	Residential	66.2	57.2	65.6
R3: Single-family residential use on 220th Street, approximately 230 feet east of Mariposa Avenue	Residential	63.3	58.0	64.3
R4: Single-family residential use on east side of Normandie Avenue, approximately 150 feet south of 220th Street	Residential	70.5	63.5	70.7
R5: Single-family residential use on north side of 220th Street, approximately 230 feet west of Normandie Avenue	Residential	51.4	47.3	53.1
R6: Single-family residential use on south side of 218th Street, approximately 90 feet west of Normandie Avenue	Residential	57.0	48.1	56.4
R7: Single-family residential use on east side of Normandie Avenue, just north of Ritner Street. This measurement location also represents the Halldale Elementary School located on the west side of Normandie Avenue	Residential/School	64.8	56.9	64.4

[a] *Detailed measured noise data, including hourly L_{eq} levels, are included in Appendix A of the Noise Study, provided in Appendix H of this Draft EIR.*
[b] *Estimated based on the short-term measurements following the FTA guidelines.*

Source: Acoustical Engineering Services, Inc., 2016.

Detailed noise measurement data, including time of measurements, field notes, and approximate locations are provided in an appendix to the Helistop Relocation Noise Impact Study, which is provided in Appendix H of this Draft EIR. Based on field observation and measured sound data, the current ambient noise environment in the vicinity of the Project Site is controlled primarily by vehicular traffic on nearby local roadways, and to a lesser extent by occasional aircraft flyovers, and other typical urban noise.

In addition to the ambient noise measurements, noise levels associated with the existing Helistop operations were calculated using information provided by the hospital's helicopter landing logs. Existing helicopter operation related noise contours were calculated using the FAA Integrated Noise Model (INM) Version 7.0d. The INM input information include: three dimensional flight tracks for departure and approach, helicopter flight



Ambient Noise Measurement Locations – Helicopter Operations

Harbor-UCLA Medical Center Master Plan

Source: Acoustical Engineering services, Inc., 2016.

FIGURE 4.I-3

This page intentionally blank.

procedures, number and type of helicopters, and daily operations (number of flights by hours). INM calculates helicopter operations-related CNEL, L_{max} and sound exposure level (SEL) at a particular receptor location. Detailed information for the helistop operations including: helicopter operations (i.e., numbers and types of helicopters), helicopter flight tracks, and helicopter flight procedures (i.e., speed, elevation, and distance) are defined in the Helistop Relocation Noise Impact Study, provided in Appendix H of this Draft EIR.

The existing Helistop is located on the roof level of a single-story structure, approximately 15 feet above the local grade elevation at 43 feet above mean sea level (MSL), within the HUCLAMC campus. There are four flight tracks/paths (under the current condition) that the helicopter would utilized for approach (to the hospital) and depart (from the hospital), as shown on **Figure 4.I-4**, *Helicopter Operations CNEL Noise Contour – Existing Helistop Location*. As indicated, two flight paths generally follow west (from the Helistop) and turn north and south follow Normandie Avenue and two flight paths to the northeast and southeast. The noise analysis assumed even distribution for helicopter operations for the four flight paths (i.e., one-fourth for each flight path), because the need for an air ambulance can arise from any direction.

Figure 4.I-4 shows the CNEL noise contours generated by the helicopter operations at the existing Helistop. As shown on Figure 4.I-4, the highest CNEL noise contour is CNEL 65 dBA, which lies within the hospital campus.

Table 4.I-3, *Summary of Helistop Noise Analysis – Existing Helistop Conditions,* presents the predicted helicopter CNEL levels at the Project receptor locations based on the existing helicopter operations.

Table 4.I-3

Summary of Helistop Noise Analysis – Existing Helistop Conditions

Location	Land Use Descriptions	Diagonal Distance from Helistop,[a] Feet	Predicted Existing Helicopter Noise Levels, [b] CNEL (dBA) "A"	Measured Ambient Noise Levels without Helicopter (from Table 3) Operations,[c] CNEL (dBA) "B"	Ambient Noise Levels + Helicopster Noise Levels,[d] CNEL (dBA) "C=A+B"
R1	Residential	800	47.6	70.5	70.5
R2	Residential	570	50.0	65.6	65.7
R3	Residential	1480	41.3	64.3	64.3
R4	Residential	2100	38.0	70.7	70.7
R5	Residential	2380	35.8	53.1	53.2
R6	Residential	2230	35.4	56.4	56.4
R7	Residential/ School[e]	2380	33.5	64.4	64.6

[a] *Estimated diagonal distances using Google Earth Map. Distances are estimated from the center of the existing Helistop to the sidewalk adjoining the receptor locations.*
[b] *Due to helicopter operations only.*
[c] *Measured ambient noise levels without helicopter operations.*
[d] *Calculation Methodologies are provided in Appendix C of the Noise Impact Study, which is provided in Appendix H of this Draft EIR.*
[e] *Halldale Elementary School located on the west side of Normandie Avenue and north of 216th Street.*

Source: Acoustical Engineering Services, Inc., 2016.

As indicated in Table 4.I-3, the predicted helicopter CNEL levels are significantly lower than that of the existing measured ambient noise levels (non-helicopter noise). Also, included in Table 4.I-3 (last column) are the existing ambient noise levels plus the estimated noise levels from the helicopter operations. The results show that the existing helicopter CNEL levels has no impact on the current ambient sound environment at the off-site noise sensitive uses.

In addition to the CNEL noise analysis, INM calculates the single-event (single helicopter) noise level in terms of SEL and L_{max}. The single-event noise analysis provides the maximum noise level that would be generated by a single helicopter arriving or departing on the identified flight paths, regardless of the number of flights per day. The twin engine Sikorsky S-70 helicopter represents the majority of the current helicopter landings, approximately 39 percent of the total operations, and also generates the highest sound level. Therefore, the Sikorsky S-70 helicopter noise signature was used for the single-event noise analysis.

Table 4.I-4, *Helicopter Single-Event Noise Levels – Existing Helistop Conditions,* presents the predicted SEL and L_{max} levels from the Sikorsky S-70 at the Project's offsite noise receptor locations.

Table 4.I-4

Helicopter Single-Event Noise Levels – Existing Helistop Conditions

Location	Land Use Descriptions	Diagonal Distance from Helistop,[a] Feet	Predicted Helicopter (S-70) Single-Event Levels, SEL/L_{max} (dBA)
R1	Residential	800	100.8/85.4
R2	Residential	570	102.9/86.5
R3	Residential	1480	96.9/84.1
R4	Residential	2100	94,2/82.7
R5	Residential	2380	91.9/81.8
R6	Residential	2230	90.7/81.8
R7	Residential/School[b]	2380	88.1/79.5

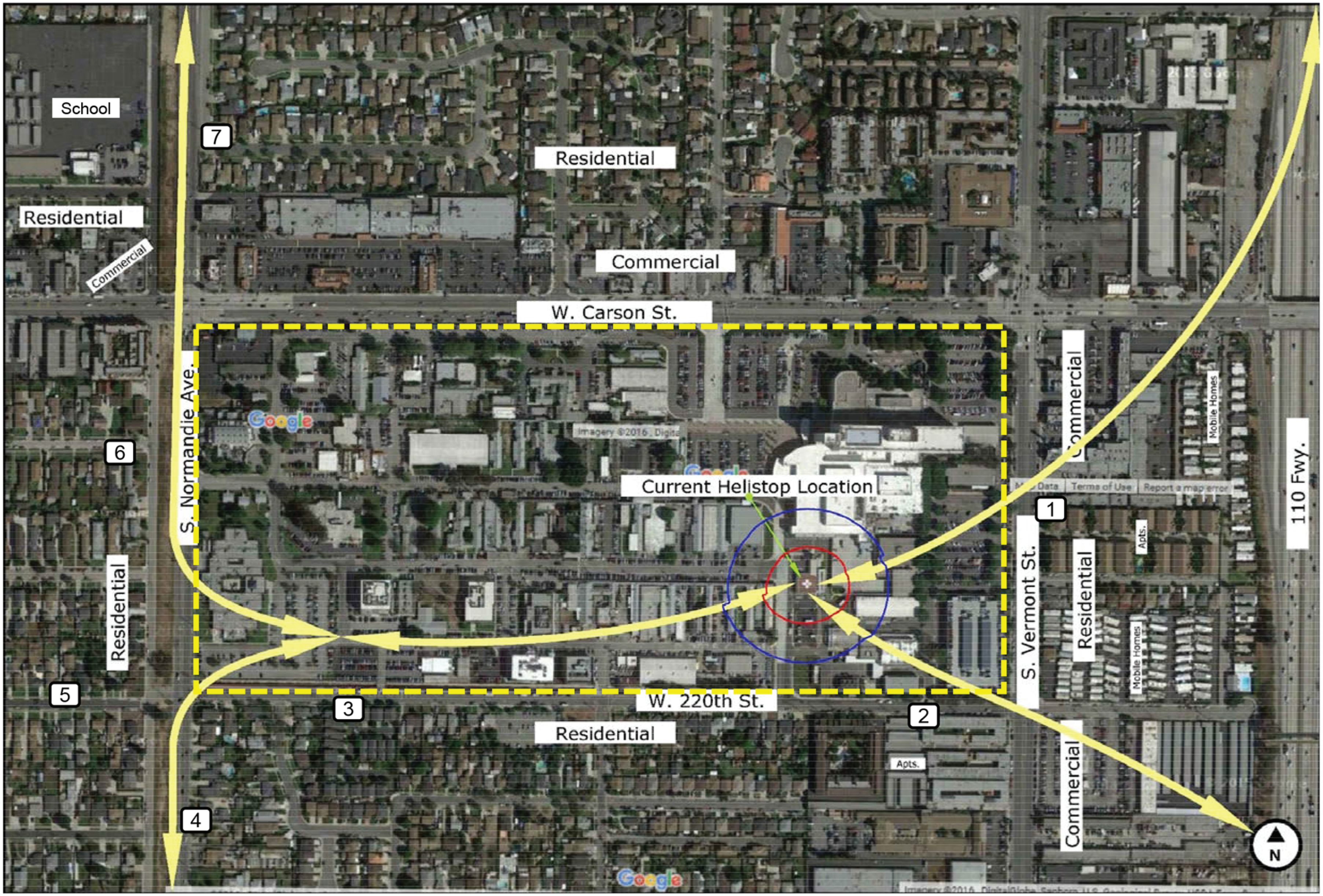
[a] *Diagonal distances using Google Earth Map. Distances are from the center of the existing Helistop to the sidewalk adjoining the receptor locations.*
[b] *Halldale Elementary School located on the west side of Normandie Avenue and north of 216th Street.*

Source: Acoustical Engineering Services, Inc, 2016.

As indicated in Table 4.I-4, the predicted noise levels ranged from 79.5 dBA L_{max} (88.1 dBA SEL) at receptor R7 to 86.5 dBA L_{max} (102.9 dBA SEL) at receptor R2. Note: SEL represents the total sound energy during a single noise event normalized to a 1 second period; therefore, SEL is generally higher than L_{max}.

Modeled Noise Conditions – Traffic Noise

To further characterize the Project area's ambient noise environment, the CNEL noise levels attributed to existing traffic on local roadways was calculated using a noise prediction model which was developed based on calculation methodologies provided in the Caltrans Technical Noise Supplement (TeNS) document and



Project Site
Flight Paths
Noise Contours: 60 CNEL
65 CNEL
1 Noise Measurement Locations

Helicopter Operations CNEL Noise Contour – Existing Helistop Location

FIGURE **4.I-4**

Harbor-UCLA Medical Center Master Plan

Source: Acoustical Engineering services, Inc., 2016.

PCR

This page intentionally blank.

traffic data provided by the Project traffic consultant.[7] [8] The roadway noise calculation procedures provided in the Caltrans TeNS are consistent with Federal Highway Administration RD-77-108 roadway noise prediction methodologies. This methodology, considered an industry standard, allows for the definition of roadway configurations, barrier information (if any), and receiver locations.

A traffic model calibration test was performed to establish the noise prediction model's accuracy. The road segments included in the calibration test were along Carson Street, between Normandie Avenue and Vermont Avenue and Normandie Avenue, between Carson Street and 220th Street. At the noted location, a 15-minute noise recording was made concurrent with logging of actual traffic volumes and auto fleet mix (i.e., standard automobile, medium duty truck, or heavy duty truck). The traffic counts were entered into the noise model along with the observed speed, lane configuration, and distance to the roadway to calculate the traffic noise levels. The results of the traffic noise model calibration are provided in **Table 4.I-5**, *Traffic Noise Model Calibration Results*. As indicated, the noise model results are within less than 1 dBA of the measured noise levels, which is within the industry standard tolerance of the noise prediction model. Therefore, the Project specific traffic noise prediction model is considered accurate and reflective of the Project's physical setting.

Table 4.I-5

Traffic Noise Model Calibration Results

Road Segment/ Noise Measurements Locations	Traffic Counts during noise readings, 15-minutes			Measured Traffic Noise Levels, L_{eq} (dBA)	Project Traffic Noise Model Predicted Noise Levels, L_{eq} (dBA)	Difference between Predicted and Measured Levels, dBA
	Autos	Medium Trucks [a]	Heavy Trucks [b]			
Carson Street	485	8	4	68.7	69.3	-0.6
Normandie Avenue	206	4	1	67.0	67.8	-0.8

[a] *Medium Truck – 2 axle trucks based on field observations.*

[b] *Heavy Truck – 3 or more axle trucks and buses based on field observations.*

Source: ESA PCR, 2016.

Because the monitoring data validates the use of a Project-specific traffic noise prediction model, the ambient noise environment of the Project vicinity can be characterized by 24-hour CNEL levels attributable to existing traffic on local roadways. As indicated in **Table 4.I-6**, *Predicted Existing Vehicular Traffic Noise Levels*, the calculated CNEL (at a distance of 25 feet from the roadway right-of-way) from actual existing traffic volumes on the analyzed roadway segments ranged from 56.1 dBA to 70.9 dBA for residential areas, hospital uses, schools, and commercial areas.

[7] *The roadway noise calculation procedures provided in TeNS are consistent with Federal Highway Administration RD-77-108 "industry standard" roadway noise prediction methodologies.*

[8] *Traffic Impact Analysis Report for the Harbor-UCLA Medical Center Master Plan Project, Fehr & Peers, March 2016.*

Table 4.I-6

Predicted Existing Vehicular Traffic Noise Levels

Roadway Segment	Adjacent Land Use	Existing Noise Exposure Compatibility [b] Category	Existing CNEL (dBA) at Referenced Distances from Roadway Right-of-Way [a] 25 Feet
Carson Street			
Between Western Avenue and Normandie Avenue	Residential/ Commercial	Normally Unacceptable	70.6
Between Normandie Avenue and Budlong Avenue	Commercial/ Hospital	Normally Unacceptable	70.6
Between Budlong Avenue and Berendo Avenue	Commercial/ Hospital	Normally Unacceptable	70.5
Between Berendo Avenue and Medical Center Drive	Residential/ Hospital	Normally Unacceptable	70.6
Between Medical Center Drive and Vermont Avenue	Residential/ Hospital	Normally Unacceptable	70.9
220th Street			
Between Western Avenue and Normandie Avenue	Residential	Conditionally Acceptable	60.6
Between Normandie and Myler Street	Residential/ Commercial	Conditionally Acceptable	62.7
Between Myler Street and Vermont Avenue	Residential/ Commercial	Conditionally Acceptable	63.7
East of Figueroa Street	Residential	Conditionally Acceptable	67.5
Figueroa Street			
South of 220th Street	Residential/ School	Conditionally Acceptable	69.3
223rd Street			
Between Western Avenue and Normandie Avenue	Residential	Conditionally Acceptable	69.6
Between Normandie Avenue and Myler Street	Residential/ School	Conditionally Acceptable	69.8
Between Myler Street and Vermont Avenue	Residential/ Commercial	Conditionally Acceptable	69.7
Between Vermont Avenue and I-110 SB Ramps	Residential	Normally Unacceptable	70.6
Between I-110 SB Ramps and Figueroa Street	Residential/ Commercial	Normally Unacceptable	70.5
Western Avenue			
Between Carson Street and 220th Street	Residential/ Commercial	Normally Unacceptable	70.5
Between 220th Street and 223rd Street	Residential/ Commercial	Normally Unacceptable	70.6
Between 223rd Street and Sepulveda Boulevard	Residential/ Commercial	Normally Unacceptable	70.7

Table 4.I-6 (Continued)

Predicted Existing Vehicular Traffic Noise Levels

Roadway Segment	Adjacent Land Use	Existing Noise Exposure Compatibility [b] Category	Existing CNEL (dBA) at Referenced Distances from Roadway Right-of-Way [a] 25 Feet
Myler Street			
Between 220th Street and 223rd Street	Residential/ School	Conditionally Acceptable	60.6
Normandie Avenue			
Between Torrance Boulevard and Carson Street	Residential/ Commercial	Conditionally Acceptable	69.0
Between Carson Street and 220th Street	Residential/ Hospital	Conditionally Acceptable	68.8
Between 220th Street and 223rd Street	Residential	Conditionally Acceptable	68.5
Budlong Avenue			
North of Carson Street	Residential	Normally Acceptable	56.2
Berendo Avenue			
North of Carson Street	Residential	Normally Acceptable	57.3
Vermont Avenue			
Between Torrance Boulevard and Carson Street	Residential/ Commercial	Normally Unacceptable	70.1
Between Carson Street and 220th Street	Residential/ Hospital	Normally Unacceptable	70.4
Between 220th Street and 223rd Street	Residential/ Commercial	Normally Unacceptable	70.0
Medical Center Drive			
North of Carson Street	Residential	Normally Acceptable	56.1

[a] *Calculated based on existing traffic volumes.*
[b] *Based on noise levels at 25 feet distance from the roadway and residential uses if residential uses are shown along roadways.*

Source: ESA PCR, 2016.

(3) Vibration-Sensitive Receptor Locations

Typically, ground-borne vibration generated by man-made activities (i.e., rail and roadway traffic, mechanical equipment and typical construction equipment) diminishes rapidly as the distance from the source of the vibration become greater. The Federal Transit Administration (FTA) uses a screening distance of 100 feet for high vibration sensitive buildings (e.g., hospital with vibration sensitive equipment) and 50 feet for residential uses. When vibration sensitive uses are located within those distances from a Medical Center Campus, vibration impact analysis is required. There are no residential uses that are located within the area of potential (within 50 feet) for perceptible vibration due to short-term construction and long-term project operations. Multi- and single-family residential uses are located approximately 55 feet south of the Medical Center Campus across 220th Street.

(4) Ground-Borne Vibration Environment

Based on field observations, the only source of ground-borne vibration in the Project vicinity is vehicular travel (refuse trucks, delivery trucks, and transit buses) on local roadways. According to the FTA technical study's "Federal Transit Administration; Transit Noise and Vibration Impacts Assessments," typical road traffic induced vibration levels are unlikely to be perceptible by people. In part, FTA indicates "it is unusual for vibration from traffic including buses and trucks to be perceptible, even in location close to major roadways."[9] Therefore, FTA published vibration data are utilized in describing the existing ground vibration environment in the vicinity of the Medical Center Campus. As the Medical Center Campus is located within 50 feet of two major roadways; Sunset Boulevard to the north and Crescent Heights Boulevard to the east. It is likely the site is exposed to ground vibration level of 0.004 inches per second PPV. As discussed below, this vibration level is considered below perception threshold of 0.04 inches per second (PPV).

c. Regulatory Framework

Many government agencies have established noise standards and guidelines to protect citizens from potential hearing damage and various other adverse physiological and social effects associated with noise and ground-borne vibration. Policies and/or standards such as those of the FTA, the California Department of Transportation (Caltrans) and regulations in the County of Los Angeles General Plan Noise Element, and the County of Los Angeles Municipal Code (Municipal Code) would be applicable to the Project. No regional regulations are applicable to the assessment of noise and vibration impacts.

(1) Federal

A technical discussion of construction activity-related vibration is provided in Section 12.2 of FTA publication titled "Transit Noise and Vibration Impacts Assessments," April 1995. As described therein, a ground-borne vibration level of 0.2 inch-per-second PPV should be considered as damage threshold criterion for structures deemed "fragile," and a ground-borne vibration level of 0.12 inch-per-second PPV should be considered as damage criterion for structures deemed "extremely fragile," such as historic buildings. Please also see discussion of State vibration standards below, which are based, in part, on FTA criteria.

The Federal Aviation Administration (FAA) established the aircraft noise analysis methodology and significance threshold that are applicable to federally funded projects that have an aviation noise component. Title 14 of the Code of Federal Regulations (CFR), and specifically Part 150, *Airport Noise Compatibility Planning*, provides guidelines for land use compatibility around airports. Part 150 states that in general, residential uses are not compatible within the 65 dBA L_{dn} contour or above, and that all types of land uses are compatible in areas below 65 dBA L_{dn} (65 dBA CNEL for projects in California). In addition, the FAA's Order 1050.1E, *Environmental Impacts: Policies and Procedures*, establishes a screening threshold of a 1.5 dBA L_{dn} (or 1.5 dBA CNEL for projects in California) increase in noise in any sensitive area located within the 65 dBA L_{dn} (or 65 dBA CNEL for projects in California) contour. In practice, it has been found that unless a proposed airport or heliport project will cause at least by a 1.5 dB increase within the 65 dBA CNEL or greater area, a 3 dB or greater (i.e., audible) increase in the 60-65 dBA CNEL area, impacts will not occur (Federal Interagency Committee on Noise, *Federal Agency Review of Selected Airport Noise Analysis Issues*, August 1992).

[9] *Federal Transit Administration "Transit Noise and Vibration Impact Assessment", Chapter 7, 2006.*

While the FAA has not established a standard compatibility criterion for the A-weighted single-event noise metrics, such as SEL or L_{max}, previous research performed by the FAA and others, examines the correlation between single-event noise levels and prediction of "annoyance" due to speech or sleep interference. The Federal Interagency Committee on Aircraft Noise (FICAN), *Effects of Aviation Noise on Awakenings from Sleep, June, 1997* analyzed several sleep studies regarding the relationship between the single event noise metric, SEL and sleep disturbance as measured by the number of awakenings. According to the FICAN reports, up to 10 percent of the people could experience sleep disturbance from aircraft noise when the indoor noise environment reaches a level of 81 dBA SEL (FICAN, "Effects of Aviation Noise on Awakening from Sleep", June 1997).

(2) State

(a) Noise Standards

The State Department of Health Services has established guidelines for community noise compatibility for land use in assessing the compatibility of various land use types with a range of noise levels. CNEL guidelines for specific land uses are classified into four categories: (1) "normally acceptable," (2) "conditionally acceptable," (3) "normally unacceptable," and (4) "clearly unacceptable." As shown in **Table 4.I-7,** *Land Use Compatibility for Community Noise*, a CNEL value of 70 dBA is the upper limit of what is considered a "conditionally acceptable" noise environment for hotel uses.

The airport noise regulations found in CCR Title 21, Section 5000 et seq. are administered by the Division of Aeronautics within Caltrans. Under these regulations, civilian airports are required to ensure compatible land uses within the 65 dBA CNEL contour produced by their aircraft operations. Caltrans also has adopted the 65 dBA CNEL threshold as the maximum acceptable exterior noise exposure for residential land uses affected by noise generated at helistops.

(b) Vibration Standards

Caltrans has produced a guidance manual for evaluating potential vibration impacts ("Transportation- and Construction-Induced Vibration Guidance Manual" dated June 2004). The manual provides thresholds for potential impacts on human comfort and damage to buildings, as well as guidance for reducing potential vibration impacts and addressing vibration issues. The manual gathers data from multiple sources, including the FTA. Tables 4, 5, and 6 of the manual provide criteria for identifying potential annoyance from vibration activity, as measured in inches per second PPV. The values range in value. For example, 0.035 inches per second PPV is identified as a level that is "distinctly" or "barely" perceptible, and 0.08/0.1 is identified as "readily" or "strongly" perceptible. Levels above this range are levels that begin to annoy human beings. Tables 9 through 15 of the manual provide criteria for identifying potential damage to buildings. Again, the values vary greatly depending on assumptions and the types and conditions of buildings considered. Per those guidelines, buildings that are extremely old and fragile can be subject to damage from vibration levels as low as 0.1 inches per second. Generally, the levels for well-constructed, more substantial buildings fall in the range of 1.0 to 2.0 inches per second PPV. Notably, Table 10 of the manual, based on FTA data, provides a conservative estimate for well-constructed buildings of 0.5 inches per second PPV, while Tables 9, 14, and 15 of the manual assign the 0.5 standard to residential structures and some older buildings, and levels of 1.0 to 2.0 inches per second PPV for newer, more substantial, better-engineered buildings.

Table 4.I-7

Land Use Compatibility for Community Noise
(California Department of Public Health Criteria)

	Community Noise Exposure CNEL, dBA			
Land Use	**Normally Acceptable**	**Conditionally Acceptable**	**Normally Unacceptable**	**Clearly Unacceptable**
Single-Family, Duplex, Mobile Homes	50 to 60	55 to 70	70 to 75	Above 70
Multi-Family Homes	50 to 65	60 to 70	70 to 75	Above 70
Schools, Libraries, Churches, Hospitals, Nursing Homes	50 to 70	60 to 70	70 to 80	Above 80
Transient Lodging—Motels, Hotels	50 to 65	60 to 70	70 to 80	Above 80
Auditoriums, Concert Halls, Amphitheaters	—	50 to 70	—	Above 65
Sports Arena, Outdoor Spectator Sports	—	50 to 75	—	Above 70
Playgrounds, Neighborhood Parks	50 to 70	—	67 to 75	Above 72
Golf Courses, Riding Stables, Water Recreation, Cemeteries	50 to 75	—	70 to 80	Above 80
Office Buildings, Business and Professional Commercial	50 to 70	67 to 77	Above 75	—
Industrial, Manufacturing, Utilities, Agriculture	50 to 75	70 to 80	Above 75	—

Normally Acceptable: Specified land use is satisfactory, based upon the assumption that any buildings involved are of normal conventional construction without any special noise insulation requirements.
Conditionally Acceptable: New construction or development should be undertaken only after a detailed analysis of the noise reduction requirements is made and needed noise insulation features included in the design. Conventional construction, but with closed windows and fresh air supply systems or air conditioning will normally suffice.
Normally Unacceptable: New construction or development should generally be discouraged. If new construction or development does proceed, a detailed analysis of the noise reduction requirements must be made and needed noise insulation features included in the design.
Clearly Unacceptable: New construction or development should generally not be undertaken.

Source: Office of Noise Control, California Department of Public Health.

(3) Local

(a) Los Angeles County General Plan Noise Element

The overall purpose of the Noise Element of a General Plan is to protect people from the harmful and annoying effects of exposure to excessive noise. The Los Angeles County Noise Element focuses on noise issues associated with transportation, including airports, highways, and railroads.

The County has adapted the Table 4.I-7, Land Use Compatibility for Community Noise, to develop the County's exterior noise standards, discussed below.

(b) Los Angeles County Code (LACC)

The County of Los Angeles Noise Restrictions are provided in Chapter 12.08, Noise Control of the LACC. Chapter 12.08 provides procedures and criteria for the measurement of the sound level of "offending" noise sources.

The LACC outlines exterior noise standards for four noise zones based on land use type: noise-sensitive areas, residential properties, commercial properties, and industrial properties. The County's maximum exterior noise standards set forth in LACC Section 12.08.390 are provided in **Table 4.I-8,** *Los Angeles County Presumed Ambient Noise Levels*. For residential-zoned areas, the presumed ambient noise level is 50 dBA during the daytime and 45 dBA during the nighttime. The following standards are used to evaluate compliance:

Table 4.I-8

Los Angeles County Presumed Ambient Noise Levels

Noise Zone	Zone	Daytime Hours (7 A.M. to 10 P.M.) dBA (L_{eq})	Nighttime Hours (10 P.M. to 7 A.M.) dBA (L_{eq})
I	Noise-sensitive area	45	45
II	Residential	50	45
III	Commercial	60	55
IV	Industrial	70	70

Source: LACC, Section 12.08.390.

- Standard No. 1: Exterior noise cannot exceed levels set forth in Table 4.I-5 for a cumulative period of more than 30 minutes in any hour.
- Standard No. 2: Exterior noise cannot exceed levels set forth in Table 4.I-5 plus 5 dBA for a cumulative period of more than 15 minutes in any hour.
- Standard No. 3: Exterior noise cannot exceed levels set forth in Table 4.I-5 plus 10 dBA for a cumulative period of more than 5 minutes in any hour.
- Standard No. 4: Exterior noise cannot exceed levels set forth in Table 4.I-5 plus 15 dBA for a cumulative period of more than one minute in any hour.
- Standard No. 5: Exterior noise cannot exceed levels set forth in Table 4.I-5 plus 20 dBA at any time.

If ambient noise levels exceed the exterior noise levels in Table 4.I-5, then the aforementioned standards can be adjusted by substituting relevant noise levels in Table 4.I-5 with the following ambient measurements:

- Standard No. 6: Ambient L50, the noise level exceeded 50% of the time over an hour period.
- Standard No. 7: Ambient L25, the noise level exceeded 25% of the time over an hour period.
- Standard No. 8: Ambient L8.3, the noise level exceeded 8.3% of the time over an hour period.

- Standard No. 9: Ambient L1.7, the noise level exceeded 1.7% of the time over an hour period.
- Standard No. 10: Ambient L0, the maximum noise level over an hour period.

LACC Section 12.08.440 prohibits construction between the hours of 7:00 P.M. and 7:00 A.M. and at any time on Sundays or holidays, given that it creates a noise disturbance across a residential or commercial real-property line. **Table 4.I-9,** *Los Angeles County Permissible Construction Equipment Noise at Receptor*, outlines the maximum noise levels permissible by construction equipment at affected buildings depending on land use. These noise thresholds pertain to two timeframes: daytime hours from 7:00 A.M. to 8:00 P.M. daily (except Sundays and holidays) and nighttime hours from 8:00 P.M. to 7:00 A.M. daily (or all day Sundays and holidays).

Table 4.I-9

Los Angeles County Permissible Construction Equipment Noise at Receptor

Equipment Type	Receptor Type	Daytime Hours (7 A.M. to 8 P.M.) dBA (L_{eq})	Nighttime Hours (8 P.M. to 7 A.M.) dBA (L_{eq})
Mobile short-term operation (less than 10 days)	Single-family Residential	75	60
	Multi-family Residential	80	64
	Semiresidential/Commercial	85	70
	Business Structures	85	85
Stationary long-term operation (more than 10 days)	Single-family Residential	60	50
	Multi-family Residential	65	55
	Semiresidential/Commercial	70	60

Source: LACC , Section 12.08.440.

The County Noise Ordinance states that noise levels caused by any air-conditioning or refrigeration equipment shall not exceed the levels identified in **Table 4.I-10**, *County of Los Angeles Residential Air-Conditioning and Refrigeration Equipment Standards.*

The County Noise Ordinance Section 12.08.350 provides a presumed perception threshold of 0.01 inch-per second RMS; however, this applies to ground-borne vibrations from long-term operational activities, such as surface traffic, and not to short-term activities such as construction. Therefore, the 0.01 inch-per second RMS vibration criteria is used in connection with the Project's operation-related vibration impacts. The vibration level of 0.01 inch-per second RMS is equivalent to 0.04 inches per second PPV.

Table 4.I-10

County of Los Angeles Residential Air-Conditioning and Refrigeration Equipment Standards

Measurement Location	Units Installed Before 1-1-80 dBA	Units Installed On or After 1-1-80 dBA
Any point on neighboring property line, 5 feet above grade level, no closer than 3 feet from any wall.	60	55
Center of neighboring patio, 5 feet above grade level, no closer than 3 feet from any wall.	55	50
Outside the neighboring living area window nearest the equipment location, not more than 3 feet from the window opening, but at least 3 feet from any other surface.	55	50

Source: County of Los Angeles Ordinance, No. 11743, LACC, Section 12.08.530.

3. PROJECT IMPACTS

a. Methodology

(1) On-Site Construction Noise

On-site construction noise impacts were evaluated by determining the noise levels generated by the different types of construction activity, calculating the construction-related noise level at nearby sensitive receptor locations, and comparing these construction-related noise levels to existing ambient noise levels (i.e., noise levels without construction noise). More, specifically, the following steps were undertaken to assess construction-period noise impacts.

1. Ambient noise levels at surrounding sensitive receptor locations were estimated based on field measurement data (see Table 4.I-1);

2. Typical noise levels for each type of construction equipment were obtained from the Federal Highway Administration (FHWA) roadway construction noise model (RCNM);

3. Distances between construction site locations (noise source) and surrounding sensitive receptors were measured using Project architectural drawings, Google Earth, and site plans;

4. The construction noise level was then calculated, in terms of hourly L_{eq}, for sensitive receptor locations based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance; and

5. Construction noise levels were then compared to the construction noise significance thresholds identified below.

(2) Off-Site Roadway Noise (Construction and Operation)

Roadway noise impacts have been evaluated using the Caltrans TeNS methodology based on the roadway traffic volume data provided in the Traffic Impact Study prepared for the Project. This methodology allows for the definition of roadway configurations, barrier information (if any), and receiver locations. Roadway noise attributable to project development was calculated and compared to baseline noise levels that would occur under the "without project" condition.

(3) Stationary Point-Source Noise (Operation)

Stationary point-source noise impacts have been evaluated by identifying the noise levels generated by outdoor stationary noise sources such as rooftop mechanical equipment and loading dock activities, calculating the hourly L_{eq} noise level from each noise source at surrounding sensitive receiver property line locations, and comparing such noise levels to existing ambient noise levels. More specifically, the following steps were undertaken to calculate outdoor stationary point-source noise impacts:

1. Ambient noise levels at surrounding sensitive receptor locations were estimated based on field measurement data (see Table 4.I-1);
2. Distances between stationary noise sources and surrounding sensitive receptor locations were measured using project architectural drawings, Google Earth, and site plans;
3. Stationary-source noise levels were then calculated for each sensitive receptor location based on the standard point source noise-distance attenuation factor of 6.0 dBA for each doubling of distance;
4. Noise level increases were compared to the stationary source noise significance thresholds identified below; and
5. For outdoor mechanical equipment, the maximum allowable noise emissions from any and all outdoor mechanical equipment were specified such that noise levels would not exceed the significance threshold identified below.

(4) Ground-Borne Vibration (Construction and Operation)

Ground-borne vibration impacts were evaluated by identifying potential vibration sources, measuring the distance between vibration sources and surrounding structure locations, and making a significance determination based on the significance thresholds described below.

(5) Helicopter Noise

Helicopter noise impacts were evaluated by predicting the CNEL levels due to helicopter operations at the two proposed interim helistop locations (Interim 1 Helistop and Interim 2 Helistop), and at the Future permanent Helistop location; comparing these against current CNEL levels at the current Helistop location and determining the increase; and comparing the increases to the applicable CNEL and L_{max} significance thresholds. The significance threshold for the helicopter operations related noise impact is based on projected changes in noise levels (increases) from existing to the future conditions, with consideration of existing ambient noise environments and the regulatory framework described above. The applicable significance threshold with respect to helicopter operation per FAA and Caltrans is provided in terms of CNEL. In addition to the CNEL threshold, a single-event noise level significance threshold is recommended in terms of L_{max}. As discussed above with respect to the community noise assessment, changes in noise levels of less than 3 dBA are generally not discernable to most people, while changes greater than 5 dBA L_{max} are readily noticeable and would be considered a significant increase (Bies & Hansen*, Engineering Noise Control,* 1988). Therefore, the significance threshold for the single-event noise level (in L_{max}) is utilized by evaluating the incremental change from the existing with that of the future helicopter operations.

b. Significance Thresholds

The potential for noise impacts is based on thresholds derived from Los Angeles County Department of Regional Planning Initial Study Checklist screening questions, which are based in part on Appendix G of the State CEQA Guidelines. These questions are as follows:

Noise. Would the project result in:

a) Exposure of persons to, or generation of, noise levels in excess of standards established in the County General Plan or noise ordinance(Los Angeles County Code, Title 12, Chapter 12.08), or applicable standards of other agencies?

b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?

c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from parking areas?

d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project, including noise from amplified sound systems?

e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?

f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?

Significance thresholds have been developed based on these factors and the applicable regulatory requirements, as presented below.

(1) Construction Noise

Since the Project construction period would have a duration of more than 10 days and would not occur between the hours of 7:00 P.M. and 7:00 A.M. Monday through Saturday, or at any time on Sundays and holidays (consistent with provisions of the LACC), noise during construction would have a significant impact if it would:

NOISE-1 Result in construction equipment noise exceeding 60 dBA, L_{eq} at single-family residences and mobile homes; 65 dBA, L_{eq} at multi-family residences; or 70 dBA, L_{eq} at transient lodging.

NOISE-2 Result in off-site Project construction traffic noise exceeding 75 dBA, L_{eq} at single-family residences and mobile homes; 80 dBA, L_{eq} at multi-family residences; or 85 dBA, L_{eq} at transient lodging.

(2) Operational Noise

Noise during operation would have a significant impact if it would:

NOISE-3 Increase ambient noise levels by 5 dBA CNEL or more at a land use currently experiencing "normally acceptable" or "conditionally acceptable" noise levels; or increase ambient noise levels by 3 dBA CNEL or more at a land use currently experiencing "normally unacceptable" or "clearly unacceptable" noise levels; or result in helicopter operations that generate noise levels in excess of 65 dBA CNEL at a sensitive land use and increase ambient noise levels by 1.5 dBA CNEL or more; or, for a single helicopter operation, generate an incremental noise increase of 5 dBA L_{max} or more, compared to existing helicopter operations, at a sensitive land use.

NOISE-4 Result in non-roadway-related noise, such as building mechanical/electrical equipment or the use of outdoor amenity spaces, which exceeds ambient noise levels at noise-sensitive uses, in violation of the County Noise Ordinance.

In addition, the LACC provides guidance for calculation of short-term annoying sounds of the type that could be generated within a project's parking structure. Accordingly, the Project would have a potentially significant impact on Noise if it would:

NOISE-5 Result in maximum noise (L_{max}) generated from the operation of the parking structure (e.g., car alarms) exceeding the average (L_{eq}) ambient noise level by 10 dBA.

(3) Ground-Borne Vibration

Vibration would have a significant impact if it would:

NOISE-6 Result in Project construction activities causing ground-borne vibration levels to exceed the applicable building damage threshold of 0.5 inch-per-second PPV at the nearest residential buildings.

NOISE-7 Result in Project construction and operation activities causing ground-borne vibration levels to exceed the human annoyance threshold, 0.04-inch-per-second PPV, at nearby sensitive land uses.

c. Project Characteristics or Design Features

(1) Project Characteristics

All outdoor mechanical building and electrical equipment would be designed to meet the requirements of LACC, Section 12.08.530.

(2) Project Design Features

In addition to compliance with LACC requirements in future construction, the following Project Design Features would be implemented to reduce Project-generated noise and were incorporated into analytical assumptions prior to the determination of potential impacts.

PDF-NOISE-1: The Project contractor(s) will equip all construction equipment, fixed and mobile, with properly operating and maintained noise mufflers, consistent with manufacturers' standards.

PDF-NOISE-2: On-site construction equipment staging area shall be located as far as feasible from sensitive uses/hospital patient buildings.

PDF-NOISE-3: Engine idling from construction equipment such as bulldozers and haul trucks shall be limited near sensitive uses/patient buildings.

PDF-NOISE-4: Engine idling from construction equipment such as bulldozers and haul trucks shall be limited, to the extent feasible.

PDF NOISE-5: Effective noise barriers will be designed and erected as needed to shield on-site uses from excessive construction-related noise.

PDF NOISE-6: To reduce the potential for construction-related vibration effects to on-site operating rooms or other vibration sensitive medical uses (such as laboratories), the Project contractor(s) shall perform appropriate study of the potential for peak particle velocities to reach or exceed 0.008 inches per second PPV whenever construction involving the use of heavy duty equipment is planned within 125 feet of such an on-site medical use. If, based on site-specific conditions, this study indicates potential for detrimental effects, strategies to minimize the effects shall be incorporated into the construction plan.

PDF-NOISE-7: As required by LACC, an acoustical analysis of the mechanical plans of the proposed buildings will be prepared by a qualified acoustical engineer, prior to issuance of building permits, to ensure that all mechanical equipment would be designed to meet noise limits in Table 4.I-6.

d. Analysis of Project Impacts

(1) Construction

(a) On-site Construction Noise

Threshold NOISE-1: Would Project construction equipment noise exceed 60 dBA, L_{eq} at single-family residences; 65 dBA, L_{eq} at multi-family residences; or 70 dBA, L_{eq} at transient lodging?

Impact Statement NOISE -1 *On-site construction noise associated with the Project would increase noise levels at nearby residential uses in excess of established thresholds. Therefore, impacts would be significant without implementation of mitigation measures.*

Noise impacts from construction activities are generally a function of the noise generated by construction equipment, equipment locations, the sensitivity of nearby land uses, and the timing and duration of the noise-generating activities. Individual construction phases will typically be undertaken in four stages: (1) demolition; (2) grading; (3) building construction; and (4) paving. Each stage involves the use of different kinds of construction equipment and, therefore, has its own distinct noise characteristics. Demolition typically involves the use of excavator, tractor/loader/backhoe, concrete saw, dozer, water truck, and loader. Grading typically involves the use of drill water truck, dozer, tractor/loader/backhoe, and grader. Building construction typically involves the use of crane, forklift, welder, tractor/loader/backhoe, air compressor, and water truck. Paving typically involves the use of tractor/loader/backhoe, concrete mixer truck, roller, paver, and trencher. The Project would be constructed using typical construction techniques.

Project construction would require the use of mobile heavy equipment with high noise level characteristics. Individual pieces of construction equipment that would be used for Project construction produce maximum noise levels of 74 dBA to 85 dBA at a reference distance of 50 feet from the noise source, as shown in **Table 4.I-11**, *Construction Equipment Noise Levels*. These maximum noise levels would occur when equipment is operating under full power conditions. However, equipment used on construction sites often operate under less than full power conditions, or part power as shown in the first column in Table 4.I-8. As shown in Table 4.I-8, the part power percentage (%) of construction equipment is based on the Construction Noise Control Specification developed for the Central Artery/Tunnel project in Boston.[10] To more accurately characterize construction-period noise levels, the average (Hourly L_{eq}) noise level associated with each construction stage is calculated based on the quantity, type, and usage factors for each type of equipment that would be used during each construction stage and are typically attributable to multiple pieces of equipment operating simultaneously.

Construction noise levels were estimated based on an industry standard sound attenuation rate of 6 dB per doubling of distance for point sources (e.g., construction equipment). Within the analysis, all construction equipment was assumed to operate simultaneously at the construction area nearest to potentially affected residential receptors. These assumptions represent a worst-case noise scenario as construction activities would routinely be spread throughout the construction site further away from noise sensitive receptors. In addition, noise from different construction stages, which have the potential to occur simultaneously were added together to provide a composite construction noise level. A summary of the construction noise impacts at the nearby sensitive receptors is provided in **Table 4.I-12,** *Estimate of Maximum Construction Noise Levels(L_{eq}) at Off-Site Sensitive Receptor Locations*. Detailed noise calculations for construction activities are provided in Appendix H of this EIR.

[10] *Federal Highway Administration, Roadway Construction Noise Model User's Guide, 2006.*

Table 4.I-11

Construction Equipment Noise Levels

Equipment	Estimated Usage Factor, %	Typical Noise Level at 50 feet from Equipment, dBA (L_{max})
Air Compressor	50	78
Concrete Mixer Truck	40	79
Chain Saw	20	85
Cranes	40	81
Dozer	40	82
Excavator	40	81
Forklift	10	75
Grader	40	85
Rubber Tired Loader	40	79
Other Equipment (Trencher)	50	85
Paver	50	77
Roller	20	80
Tractor/Loader/Backhoe	25	80
Water Truck	10	80
Welder	40	74

Source: FHWA Roadway Construction Noise Model User's Guide, 2006.

As shown in Table 4.I-12, construction noise levels would exceed the Project's significance threshold at the following receptor location

- R3 during the following construction phases: Phase C, Phase 2, Phase 3, Phase 5, Phase 6, and Phase LA Biomed;
- R4 during construction Phase 4; and
- R5 during construction phases: Phase 2, Phase 4, and Phase 5.

As such, construction-period noise impacts would be significant. Mitigation measures are therefore prescribed to reduce construction noise impacts to these sensitive noise receptors, as presented below in subsection 4. *Mitigation Measures*, below.

Table 4.I-12

Estimate of Maximum Construction Noise Levels (L_{eq}) at Off-Site Sensitive Receiver Locations

Construction Phases	Noise Sensitive Receptor	Nearest Distance between Receptor and Construction Site, feet	Estimated Maximum Construction Noise Levels at the Noise Sensitive Receptor by Construction Phase,[a] Hourly L_{eq} (dBA)	Project's Significance Threshold (dBA)	Exceeds Significance threshold?
Phase C	R3: South of the Medical Center Campus	80	85	60	Yes
	R4 [b]: North of the Medical Center Campus	1,300	46	65	No
	R5 [b]: East of the Medical Center Campus	1,100	47	60	No
	R6 [b]: West of the Medical Center Campus	1,500	45	60	No
Phase 1	R3 [b]: South of the Medical Center Campus	750	44	60	No
	R4 [b]: North of the Medical Center Campus	350	66	65	No
	R5 [c]: East of the Medical Center Campus	1,200	45	60	No
	R6 [b]: West of the Medical Center Campus	1,000	47	60	No
Phase 2	R3 [c]: South of the Medical Center Campus	350	62	60	Yes
	R4 [b]: North of the Medical Center Campus	750	46	65	No
	R5 [c]: East of the Medical Center Campus	345	62	60	Yes
	R6 [b]: West of the Medical Center Campus	2,200	31	60	No
Phase 3	R3 [c]: South of the Medical Center Campus	215	70	60	Yes
	R4 [c]: North of the Medical Center Campus	750	59	65	No
	R5 [c]: East of the Medical Center Campus	850	53	60	No
	R6 [b]: West of the Medical Center Campus	1,450	43	60	No
Phase 4	R3 [c]: South of the Medical Center Campus	560	58	60	No
	R4: North of the Medical Center Campus	200	72	65	Yes
	R5: East of the Medical Center Campus	160	74	60	Yes
	R6 [b]: West of the Medical Center Campus	2,000	37	60	No

Table 4.I-12 (Continued)

Estimate of Maximum Construction Noise Levels (L_{eq}) at Off-Site Sensitive Receiver Locations

Construction Phases	Noise Sensitive Receptor	Nearest Distance between Receptor and Construction Site, feet	Estimated Maximum Construction Noise Levels at the Noise Sensitive Receptor by Construction Phase,[a] Hourly L_{eq} (dBA)	Project's Significance Threshold (dBA)	Exceeds Significance threshold?
Phase 5	R3: South of the Medical Center Campus	55	83	60	Yes
	R4[b]: North of the Medical Center Campus	600	53	65	No
	R5: East of the Medical Center Campus	110	77	60	Yes
	R6[b]: West of the Medical Center Campus	2,500	35	60	No
Phase 6	R3: South of the Medical Center Campus	70	83	60	Yes
	R4[c]: North of the Medical Center Campus	400	63	65	No
	R5[b]: East of the Medical Center Campus	1,700	40	60	No
	R6: West of the Medical Center Campus	170	75	60	No
Phase LA Biomed	R3: South of the Medical Center Campus	65	82	60	Yes
	R4[c]: North of the Medical Center Campus	1,200	42	65	No
	R5[b]: East of the Medical Center Campus	1,400	40	60	No
	R6: West of the Medical Center Campus	1,100	52	60	No

[a] *Estimated construction noise levels represent the worst-case condition when all noise generators are located closest to the receptors and are not expected to last the entire construction duration.*

[b] *Receptors are fully shielded from the construction site by existing off-site buildings.*

[c] *Receptors are partially shielded from the construction site by existing off-site buildings.*

Source: ESA PCR, 2016

(b) Off-Site Construction Activities

Threshold NOISE-2 Would Project construction traffic noise exceed 75 dBA, L_{eq} at single-family residences and mobile homes; 80 dBA, L_{eq} at multi-family residences; or 85 dBA, L_{eq} at transient lodging?

Impact Statement NOISE-2: *Off-site construction traffic would not exceed the significance thresholds at off-site noise sensitive receptor locations. Impacts to off-site sensitive receptors would be less than significant.*

There would be material delivery truck trips throughout the construction period. The truck haul routes will comply with the approved truck routes designated within the County. Trucks traveling to and from the Medical Center Campus must travel along the designated truck route. Trucks are expected to travel on Carson Street, 220th Street, Vermont Street, and Figueroa Street to access the Harbor Freeway (I-110).

The Project's truck trips would result in a total noise level (exiting plus project trucks) of approximately 61.9 dBA, L_{eq} at 25 feet distance along Carson Street, 62.8 dBA along 220th Street, 61.5 dBA along Vermont Street, and 61.9 dBA along Figueroa Street. The noise levels by truck trips would be below the significance thresholds of 75 dBA, L_{eq} at single-family residences and mobile homes; 80 dBA, L_{eq} at multi-family residences; or 85 dBA, L_{eq} at transit lodging. Therefore, impacts would be less than significant.

(c) On-Site Sensitive Receptors

As discussed above, construction activities would temporarily increase the existing ambient noise in close proximity of the construction site within the Project areas. The on-site hospital uses are sensitive receptors, but effects of the Project itself on these included receptors are not considered a project impact to the environment under CEQA. Nonetheless, due to the sensitive on-site receptors, the potential for noise to affect on-site receptors is presented in this Draft EIR. The on-site hospital uses are noise-sensitive. At various times throughout the construction of the Master Plan Project, use of heavy duty construction equipment could be closer than 100 feet to occupied on-site patient rooms and it would increase the ambient noise levels at on-site noise sensitive uses. PDF-NOISE-2, PDF-NOISE-3, and PDF-NOISE-4 are designed to minimize the generation of on-site noise to the extent feasible. PDF NOISE-5 has been included to ensure appropriate noise barriers are designed and erected when construction is planned within close proximity to existing on-site noise-sensitive uses to minimize effects to on-site hospital uses. However, the upper floors (i.e. above 2nd floor) of the existing hospital buildings would not experience the same noise reductions as the result of the noise barriers since the proposed barrier would not block the line of sight between the construction site and upper floors of the existing hospital buildings. Therefore, detailed acoustical studies should be conducted prior to the construction phases.

(2) Operation

Threshold NOISE-3: Would the Project increase ambient noise levels by 5 dBA CNEL or more at a land use currently experiencing noise levels characterized as "normally acceptable" or "conditionally acceptable"; or increase ambient noise levels by 3 dBA CNEL or more at a land use currently experiencing "normally unacceptable" or "clearly unacceptable" noise levels? Would helicopter operations generate noise levels in excess of 65 dBA CNEL at a sensitive land use and increase ambient noise levels by 1.5 dBA CNEL or more? Would maximum noise levels from a single helicopter operation cause an incremental noise increase of 5 dBA L_{max} or more, compared to existing helicopter operations, at a sensitive land use?

Impact Statement NOISE-3: *Project implementation would increase noise levels at adjacent noise-sensitive receptors in the Project area as the result of increased Project traffic, but traffic would not exceed established noise thresholds at those receptors and impacts would be less than significant. Helicopter activity associated with use of the proposed Interim 1 and 2 Helistops would exceed established thresholds at sensitive land uses, which is a significant, although temporary and periodic, impact. Project-related noise from helicopter activity associated with use of the permanent helistop, following Master Plan Project buildout, would be less than significant.*

(i) Impacts Under Existing Traffic Baseline Conditions

Future roadway noise levels were calculated along various arterial segments adjacent to the Medical Center Campus. Roadway noise attributable to project development was calculated using the traffic noise model previously described and was compared to baseline noise levels that would occur under the "No Project" condition.

Project impacts are shown in **Table 4.I-13**, *Off-Site Traffic Noise Impacts- Project Build Out.* As indicated, the maximum increase in project-related traffic noise levels over existing traffic noise levels would be 0.7 dBA, CNEL, which would occur along 220th Street, between Myler Street and Vermont Avenue. This increase in sound level would be well below a "clearly noticeable" increase of 5.0 dBA, CNEL in an area characterized by conditionally acceptable noise levels (see Table 4.I-4),[11] and the increase in sound level would be substantially lower at the remaining roadway segments analyzed. The project-related noise increases would be less than the threshold and therefore less than significant, and no mitigation measures would be required.

(ii) Impacts Under Future Traffic Baseline Conditions

Future roadway noise levels were calculated along various arterial segments adjacent to the Project Site and compared to 2021 baseline traffic noise levels assuming implementation of the cumulative projects. Project impacts are shown in **Table 4.I-14**, *Off-Site Traffic Noise Impacts – Future 2030 Area-Wide Growth with Project.* As indicated therein, the maximum increase attributable to Project-related traffic would be 0.6 dBA CNEL along 220th Street between Myler Street and Vermont Avenue. This would be below the "clearly noticeable" increase threshold of 5.0 dBA CNEL applicable to land uses experiencing normally acceptable noise levels (see Table 4.H-4),[12] and the increase in noise would be substantially lower at the remaining roadway segments analyzed. Project-related noise increases, when measured against the 2030 with Area-Wide Growth conditions, would therefore be less than significant.

Noise would be substantially lower at the remaining roadway segments analyzed. Project-related noise increases, when measured against the 2030 with Area-Wide Growth conditions, would therefore be less than significant.

(iii) Impacts from Helicopter Operations

As part of the Master Plan Project, a permanent new Helistop would be located on the rooftop of the New Hospital Tower. However, as previously discussed, following demolition of the existing helistop and prior to construction of the New Hospital Tower and permanent new Helistop, two interim helistops would be constructed for temporary use. The Interim 1 Helistop is proposed in the existing Harbor-UCLA Professional Building parking lot near the southwestern corner of the Medical Center Campus, and the Interim 2 Helistop would be located in the LA BioMed surface parking lot, approximately 230 feet east of the Interim 1 Helistop location. Pads for both helistops would be raised approximately 10 feet above the adjacent grade. The helicopter flight paths for the Interim 1 Helistop and Interim 2 Helistop locations are illustrated on **Figure 4.I-5**, *Helistop Operation CNEL Noise Contour – Interim 1 Helistop Location*, and **Figure 4.I-6,** *Helistop Operation CNEL Noise Contour – Interim 2 Helistop Location*, respectively. This noise analysis assumes that future helicopter operations would be similar to helicopter operations under existing conditions, as

[11] *Engineering Noise Control, Bies & Hansen, 1988.*

[12] *Engineering Noise Control, Bies & Hansen, 1988.*

Table 4.I-13

Off-Site Traffic Noise Impacts – Project Build Out Conditions

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway, CNEL (dBA)			
	Existing [a] (A)	Existing with Project Build Out [b] (B)	Project Increment (B - A)	Exceed Threshold?
Carson Street				
Between Western Avenue and Normandie Avenue	70.6	70.7	0.1	No
Between Normandie Avenue and Budlong Avenue	70.6	70.7	0.1	No
Between Budlong Avenue and Berendo Avenue	70.5	70.7	0.2	No
Between Berendo Avenue and Medical Center Drive	70.6	71.0	0.4	No
Between Medical Center Drive and Vermont Avenue	70.9	71.3	0.4	No
220th Street				
Between Western Avenue and Normandie Avenue	60.6	60.9	0.3	No
Between Normandie and Myler Street	62.7	63.2	0.5	No
Between Myler Street and Vermont Avenue	63.7	64.4	0.7	No
East of Figueroa Street	67.5	68.0	0.5	No
Figueroa Street				
South of 220th Street	69.3	69.4	0.1	No
223rd Street				
Between Western Avenue and Normandie Avenue	69.6	69.7	0.1	No
Between Normandie Avenue and Myler Street	69.8	69.9	0.1	No
Between Myler Street and Vermont Avenue	69.7	69.8	0.1	No
Between Vermont Avenue and I-110 SB Ramps	70.6	70.9	0.3	No
Between I-110 SB Ramps and Figueroa Street	70.5	70.7	0.2	No
Western Avenue				
Between Carson Street and 220th Street	70.5	70.5	0.0	No
Between 220th Street and 223rd Street	70.6	70.6	0.0	No
Between 223rd Street and Sepulveda Boulevard	70.7	70.7	0.0	No
Myler Street				
Between 220th Street and 223rd Street	60.6	61.2	0.6	No
Normandie Avenue				
Between Torrance Boulevard and Carson Street	69.0	69.2	0.2	No
Between Carson Street and 220th Street	68.8	69.1	0.3	No
Between 220th Street and 223rd Street	68.5	68.7	0.2	No
Budlong Avenue				
North of Carson Street	56.2	56.2	0.0	No
Berendo Avenue				
North of Carson Street	57.3	57.3	0.0	No

Table 4.I-13 (Continued)

Off-Site Traffic Noise Impacts – Project Build Out Conditions

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway, CNEL (dBA)			
	Existing [a] (A)	Existing with Project Build Out [b] (B)	Project Increment (B - A)	Exceed Threshold?
Vermont Avenue				
Between Torrance Boulevard and Carson Street	70.1	70.2	0.1	No
Between Carson Street and 220th Street	70.4	70.6	0.2	No
Between 220th Street and 223rd Street	70.0	70.3	0.3	No
Medical Center Drive				
North of Carson Street	56.1	56.1	0.0	No

[a] Existing data is taken from Table 4.I-1.

Source: ESA PCR, 2016.

Table 4.I-14

Off-Site Traffic Noise Levels – Future 2030 Area-Wide Growth with Project

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway, CNEL (dBA)			
	Future No Project (2030 Area Wide Growth) (A)	Future with Project (2030 Area Wide Growth)[a] (B)	Future Project Increment (B-A)	Exceed Threshold?
Carson Street				
Between Western Avenue and Normandie Avenue	71.7	71.8	0.1	No
Between Normandie Avenue and Budlong Avenue	71.8	71.9	0.1	No
Between Budlong Avenue and Berendo Avenue	71.8	72.0	0.2	No
Between Berendo Avenue and Medical Center Drive	71.8	72.1	0.3	No
Between Medical Center Drive and Vermont Avenue	71.8	72.1	0.3	No
220th Street				
Between Western Avenue and Normandie Avenue	61.1	61.4	0.3	No
Between Normandie and Myler Street	63.2	63.6	0.4	No

Table 4.I-14 (Continued)

Off-Site Traffic Noise Levels – Future 2030 Area-Wide Growth with Project

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway, CNEL (dBA) Future No Project (2030 Area Wide Growth) (A)	Future with Project (2030 Area Wide Growth)[a] (B)	Future Project Increment (B-A)	Exceed Threshold?
Between Myler Street and Vermont Avenue	64.2	64.8	0.6	No
East of Figueroa Street	68.1	68.6	0.5	No
Figueroa Street				
South of 220th Street	69.9	70.1	0.2	No
223rd Street				No
Between Western Avenue and Normandie Avenue	70.2	70.2	0.0	No
Between Normandie Avenue and Myler Street	70.4	70.5	0.1	No
Between Myler Street and Vermont Avenue	70.3	70.4	0.1	No
Between Vermont Avenue and I-110 SB Ramps	71.2	71.5	0.3	No
Between I-110 SB Ramps and Figueroa Street	71.1	71.3	0.2	No
Western Avenue				
Between Carson Street and 220th Street	71.0	71.1	0.1	No
Between 220th Street and 223rd Street	71.2	71.2	0.0	No
Between 223rd Street and Sepulveda Boulevard	71.3	71.3	0.0	No
Myler Street				
Between 220th Street and 223rd Street	61.1	61.6	0.5	No
Normandie Avenue				
Between Torrance Boulevard and Carson Street	69.5	69.7	0.2	No
Between Carson Street and 220th Street	69.4	69.6	0.2	No
Between 220th Street and 223rd Street	69.1	69.2	0.1	No

Table 4.I-14 (Continued)

Off-Site Traffic Noise Levels – Future 2030 Area-Wide Growth with Project

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway, CNEL (dBA)		Future Project Increment (B-A)	Exceed Threshold?
	Future No Project (2030 Area Wide Growth) (A)	Future with Project (2030 Area Wide Growth)[a] (B)		
Budlong Avenue				
North of Carson Street	56.7	56.7	0.0	No
Berendo Avenue				
North of Carson Street	57.8	57.8	0.0	No
Vermont Avenue				
Between Torrance Boulevard and Carson Street	70.7	70.8	0.1	No
Between Carson Street and 220th Street	70.9	71.1	0.2	No
Between 220th Street and 223rd Street	70.6	70.8	0.2	No
Medical Center Drive				
North of Carson Street	56.6	56.6	0.0	No

[a] *Include future growth plus related (cumulative) projects and proposed project traffic.*

Source: ESA PCR, 2016.

discussed in the Helistop Relocation Noise Impact Study provided in Appendix H of this Draft EIR. Figure 4.I-5 shows the calculated CNEL noise contours generated by the helicopter operations at the Interim 1 Helistop location. As shown on Figure 4.I-5, the 65 CNEL noise contour would extend just beyond the southern property line of the Medical Center Campus.

Table 4.I-15, *Helicopter Noise Analysis – Interim 1 Helistop Locations,* summarizes the predicted noise levels in CNEL for helicopter operations at the Interim 1 Helistop location.

As shown in Table 4.I-15, the predicted CNEL levels due to the helicopter operations at the Interim 1 Helistop location ranged from 37.0 dBA CNEL at receptors R1 and R2 to 58.6 dBA CNEL at receptor R3. Compared with the current Helistop, these predicted CNEL levels for the Interim 1 Helistop would result in a higher CNEL level at receptors (R3 through R7). Also included in Table 4.I-15 are the ambient noise levels

Table 4.I-15

Helicopter Noise Analysis – Interim 1 Helistop Locations

		Existing Conditions			Future Conditions		
Location	Longitudinal Distance from Interim 1 Helistop,[a] Feet	Existing Measured Ambient Noise Levels, CNEL (dBA) "A"	Existing Helicopter Operation CNEL (dBA) "B"	Existing Ambient With Existing Helicopter Operation, CNEL (dBA) "C=A+B"	Future Helicopter Operations Noise Levels, CNEL (dBA) "D"	Ambient With Future Helicopter Operations, CNEL (dBA) "E=A+D"	Increase in Ambient Noise Levels due to Future Helicopter Operations (dBA) "F=E-C"
R1	2470	70.5	47.6	70.5	37.0	70.5	0.0
R2	2040	65.6	50.0	65.7	37.0	65.6	-0.1
R3	260	64.3	41.3	64.3	58.6	65.3	1.0
R4	580	70.7	38.0	70.7	53.6	70.8	0.1
R5	700	53.1	35.8	53.2	47.1	54.1	0.9
R6	870	56.4	35.4	56.4	46.6	56.8	0.4
R7	1710	64.6	33.5	64.6	38.8	64.6	0.0

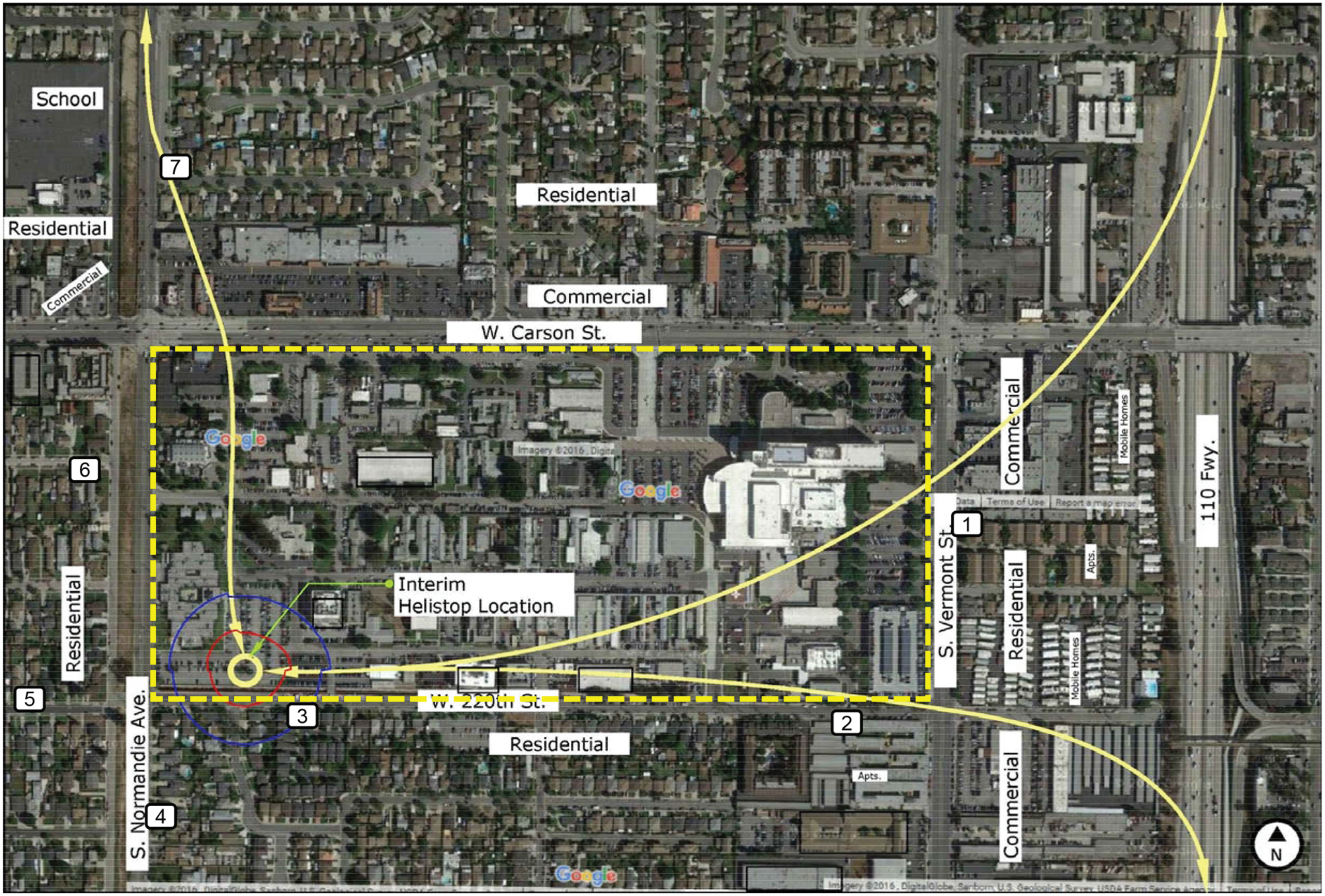
[a] *Estimated diagonal distances using Google Earth Map. Distances are from the center of the Interim 1 Helistop to the sidewalk adjoining the receptor locations.*

Source: Acoustical Engineering Services, Inc., 2016.

with helicopter operations under both existing and future conditions at the Interim 1 Helistop location. As indicated in Table 4.I-15, future helicopter operations would result in a maximum increase of 0.1 dBA CNEL at receptor R4 to 1.0 dBA CNEL at receptor R3 (with no increase in helicopter noise levels at receptors R1, R2 and R7). The estimated increase would be below the Project's significance threshold of 1.5 dBA CNEL.

Table 4.I-16, *Helicopter Single-Event Noise Impacts – Interim 1 Helistop,* presents the predicted helicopter single-event noise levels at R1 through R7 under the existing and the Interim 1 Helistop location in SEL and L_{max}. SEL levels are provided for informational purposes only, as the County does not have criteria as relates to SEL levels. A single helicopter operational event would generate noise levels at receptors in the vicinity of the Helistop, which could result in awakening based on the 1997 FICAN study. However, helicopter nighttime operations would be minimal, approximately 1.8 events per month.

As indicated in Table 4.I-16, the predicted L_{max} due to the helicopter (i.e., Sikorsky S-70) operation at the Interim 1 Helistop location would result in an increase of 2.7 dBA L_{max} (at receptor R4) to 5.6 dBA L_{max} (at receptor R3), as compared with the existing conditions. The estimated L_{max} increase would exceed the Project's significance threshold of 5.0 dBA L_{max} at receptor R3. Therefore, the relocation of the existing Helistop to the Interim 1 Helistop location would result in a significant impact, which would be temporary while the permanent Helistop is constructed on the rooftop of the New Hospital Tower.



Project Site

Flight Paths

Noise Contours: 60 CNEL

65 CNEL

1 Noise Measurement Locations

PCR

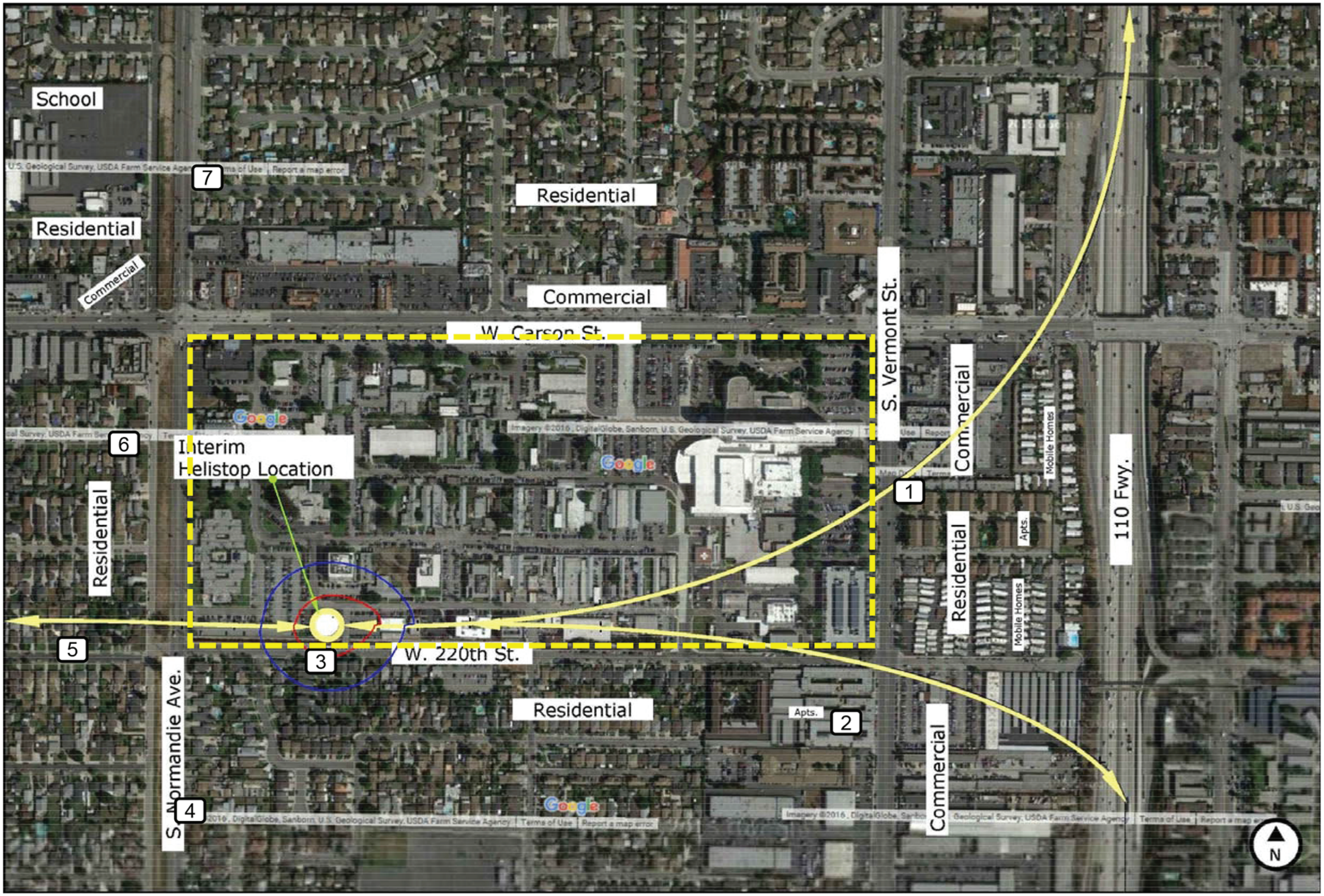
Helistop Operation CNEL Noise Contour – Interim 1 Helistop Location

Harbor-UCLA Medical Center Master Plan

Source: Acoustical Engineering services, Inc., 2016.

FIGURE

4.I-5



Project Site

Flight Paths

Noise Contours: 60 CNEL

65 CNEL

1 Noise Measurement Locations

PCR

Helistop Operation CNEL Noise Contour – Interim 2 Helistop Location

Harbor-UCLA Medical Center Master Plan

Source: Acoustical Engineering services, Inc., 2016.

FIGURE

4.I-6

Table 4.I-16

Helicopter Single-Event Noise Impacts – Interim 1 Helistop

Location	Longitudinal Distance from Interim 1 Helistop,[a] Feet	Land Use Descriptions	Predicted Helicopter (S-70) Single-Event Levels, SEL/L_{max} (dBA) Existing Helistop	Interim 1 Helistop	Increase in Noise Levels from Existing to Future Conditions, SEL/L_{max} (dBA)
R1	2470	Residential	100.8/85.4	92.1/81.4	-8.7/-4.0
R2	2040	Residential	102.9/86.5	90.6/81.2	-12.3/-5.3
R3	260	Residential	96.9/84.1	112.4/89.7	15.5/5.6
R4	580	Residential	94.2/82.7	107.0/85.4	12.8/2.7
R5	700	Residential	91.9/81.8	100.3/81.6	8.4/-0.2
R6	870	Residential	90.7/81.8	101.4/85.5	10.7/3.7
R7	1710	Residential/School	88.1/79.5	93.9/83.7	5.8/4.2

[a] *Estimated diagonal distances using Google Earth Map. Distances are from the center of the Interim 1 Helistop to the sidewalk adjoining the receptor locations.*

Source: Acoustical Engineering Services, Inc., 2016.

The calculated CNEL noise contours generated by helicopter operations at the proposed Interim 2 Helistop location are provided on Figure 4.I-6. As shown on Figure 4.I-6, the 65 CNEL noise contour would extend just beyond the southern property line of the Medical Center Campus.

Table 4.I-17, *Helicopter Noise Analysis – Interim 2 Helistop Locations*, presents the predicted helicopter noise levels in CNEL with the helicopter operations at the Interim 2 Helistop location.

As shown in Table 4.I-17, the predicted CNEL levels due to the helicopter operations at the Interim 2 Helistop location ranged from 35.6 dBA CNEL at receptor R7 to 63.7 dBA CNEL at receptor R3. Similar to the Interim 1 Helistop location, the predicted helicopter CNEL levels (from the Interim 2 Helistop location) would result in higher CNEL levels at receptors (R3 through R7). When considering the ambient noise levels with the helicopter operations under both existing and future conditions at the Interim 2 Helistop location, future helicopter operations would result in a maximum increase of 0.2 dBA CNEL at receptor R6 to 2.7 dBA CNEL at receptor R3 (with no increase in helicopter noise levels at receptors R1, R2, R4 and R7). The estimated increase of 2.7 dBA CNEL would exceed the Project's significance threshold increase of 1.5 dBA CNEL at receptor R3. Therefore, the impact would be significant, albeit temporary and periodic, lasting only until implementation of the future permanent Helistop on the New Hospital Tower rooftop.

Table 4.I-18, *Helicopter Single-Event Noise Impacts – Interim 2 Helistop,* presents the predicted helicopter single-event noise levels under the existing and the Interim 2 Helistop location.

As indicated in Table 4.I-18, the predicted L_{max} due to the helicopter operation at the Interim 2 Helistop location would result in an increase of 0.3 dBA L_{max} (at receptors R4 and R5) to 15.4 dBA L_{max} (at receptor R3, directly south of the Interim 2 Helistop), as compared to the existing conditions. The estimated L_{max} increase would exceed the Project's significance threshold of 5.0 dBA L_{max} at receptor R3. Therefore, noise impacts

Table 4.I-17

Helicopter Noise Analysis – Interim 2 Helistop Locations

		Existing Conditions			Future Conditions		
Location	**Longitudinal Distance from Interim 1 Helistop,[a] Feet**	**Existing Measured Ambient Noise Levels, CNEL (dBA) "A"**	**Existing Helicopter Operation CNEL (dBA) "B"**	**Existing Ambient With Existing Helicopter Operation, CNEL (dBA) "C=A+B"**	**Future Helicopter Operations Noise Levels, CNEL (dBA) "D"**	**Ambient With Future Helicopter Operations, CNEL (dBA) "E=A+D"**	**Increase in Ambient Noise Levels due to Future Helicopter Operations (dBA) "F=E-C"**
R1	2250	70.5	47.6	70.5	38.0	70.5	0.0
R2	1820	65.6	50.0	65.7	38.3	65.6	-0.1
R3	130	64.3	41.3	64.3	63.7	67.0	2.7
R4	720	70.7	38.0	70.7	50.2	70.7	0.0
R5	930	53.1	35.8	53.2	45.3	53.8	0.6
R6	1030	56.4	35.4	56.4	43.3	56.6	0.2
R7	1765	64.6	33.5	64.6	35.6	64.6	0.0

[a] *Estimated diagonal distances using Google Earth Map. Distances are from the center of the Interim 2 Helistop to the sidewalk adjoining the receptor locations.*

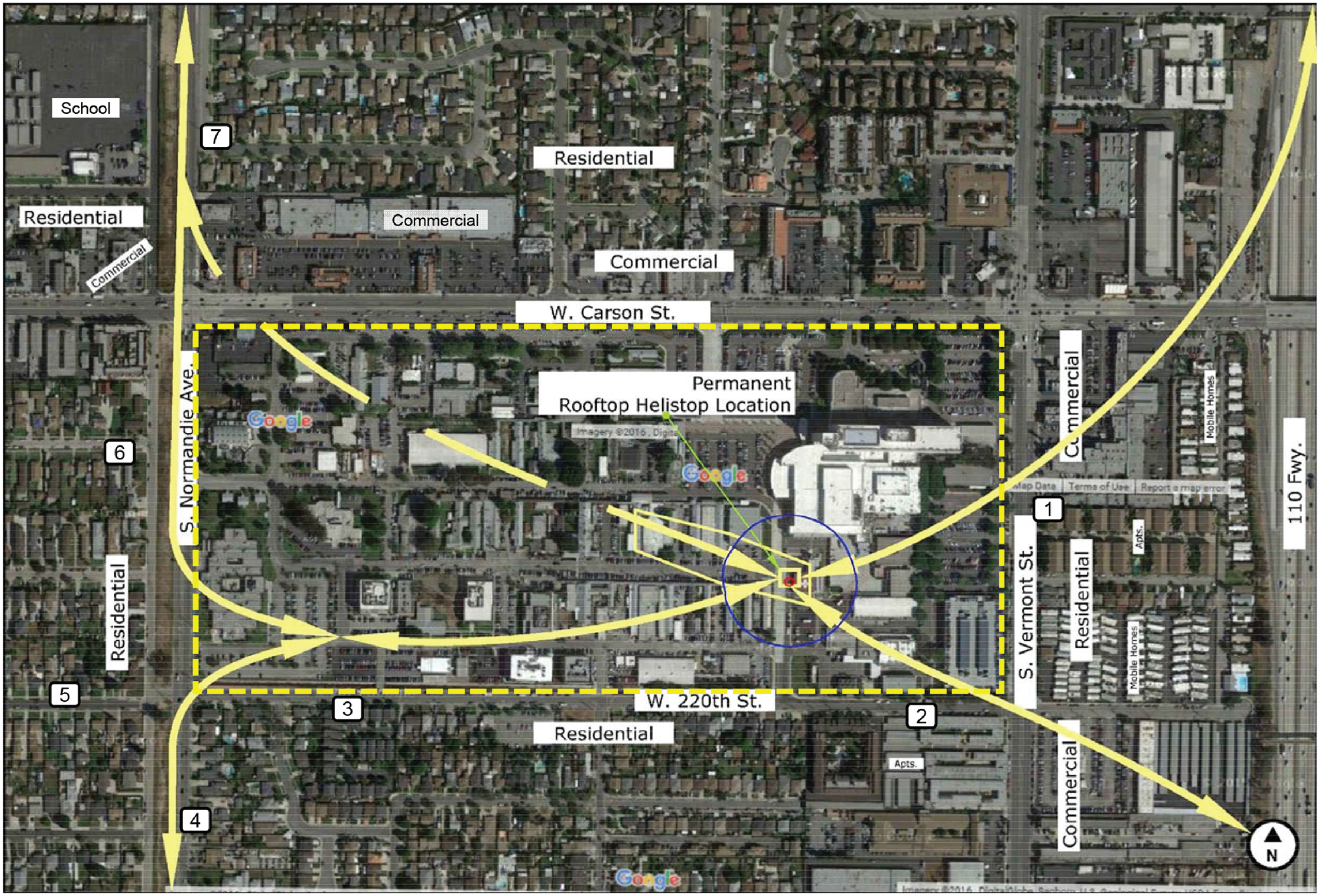
Source: Acoustical Engineering Services, Inc., 2016.

associated with the relocation to the existing Helistop to the Interim 2 Helistop location would result in a significant impact, which would be temporary while the permanent Helistop is constructed at the roof level of the future hospital building. However, there are no feasible mitigation measures to reduce the increase at receptor R3 below the level of significance. Therefore, the impact would be significant and unavoidable; however, impacts would be temporary, lasting only until the implementation of the future permanent Helistop location.

The permanent Helistop would be located at the roof level of the future hospital building, approximately 133 feet above local grade. **Figure 4.I-7**, *Helistop Operation Noise Contour – Permanent Rooftop Helistop,* shows the helicopter flight paths with the future permanent helistop. The future helicopter operations (i.e., number of flights per day) are assumed to be similar to the existing conditions. The calculated CNEL noise contours generated by the future helicopter operations are illustrated on Figure 4.I-7. As shown on Figure 4.I-7, the 60 and 65 dBA CNEL noise contour falls within the medical campus.

Table 4.I-19, *Helicopter Noise Analysis – Permanent Rooftop Helistop,* presents the predicted helicopter noise levels in CNEL with the helicopter operations at the future permanent helistop location.

As shown in Table 4.I-19, the predicted CNEL levels due to the helicopter operations ranged from 35.1 dBA CNEL at receptor R7 to 49.8 dBA CNEL at receptor R2. Similar to the existing conditions, the future predicted helicopter noise levels in term of CNEL would be lower than that of the existing measured ambient noise levels (non-helicopter noise). Included in Table 4.I.19 are the ambient noise levels plus helicopter operations under both existing and future conditions. As indicated therein, the future helicopter operations would not



Project Site
Flight Paths
Noise Contours:
60 CNEL
1 Noise Measurement Locations
65 CNEL

PCR

Helistop Operation Noise Contour – Permanent Rooftop Helistop

Harbor-UCLA Medical Center Master Plan
Source: Acoustical Engineering services, Inc., 2016.

FIGURE
4.I-7

This page intentionally blank.

Table 4.I-18

Helicopter Single-Event Noise Impacts – Interim 2 Helistop

Location	Longitudinal Distance from Interim 2 Helistop,[a] Feet	Land Use Descriptions	Predicted Helicopter (S-70) Single-Event Levels, SEL/L_{max} (dBA)		Increase in Noise Levels from Existing to Future Conditions, SEL/L_{max} (dBA)
			Existing Helistop	Interim 1 Helistop	
R1	2250	Residential	100.8/85.4	93.0/83.4	-7.8/-2.0
R2	1820	Residential	102.9/86.5	91.7/83.9	-11.2/-2.6
R3	130	Residential	96.9/84.1	117.7/99.5	20.8/15.4
R4	720	Residential	94.2/82.7	105.0/83.0	10.8/0.3
R5	930	Residential	91.9/81.8	101.2/82.1	9.3/0.3
R6	1030	Residential	90.7/81.8	96.0/79.2	5.3/-2.6
R7	1765	Residential/School	88.1/79.5	88.2/79.3	0.1/-0.2

[a] *Estimated diagonal distances using Google Earth Map. Distances are from the center of the Interim 2 Helistop to the sidewalk adjoining the receptor locations.*

Source: Acoustical Engineering Services, Inc., 2016.

result in an increase (in terms of CNEL), as compared to the existing conditions, and therefore, would be below the Project's significance threshold of 1.5 dBA CNEL.

Table 4.I-20, *Helicopter Single-Event Noise Impacts – Permanent Rooftop Helistop,* presents the predicted helicopter single-event noise levels under the existing and the future permanent location.

As indicated in Table 4.I-20, the predicted L_{max} due to the helicopter under the future conditions would result in a lower noise level, compared to existing conditions. As such, noise impacts associated with the proposed helicopter relocation to the future location (roof top of the future hospital building) would be less than significant.

Threshold NOISE-4: Would Project-related operational (i.e., non-roadway) noise sources such as building mechanical/electrical equipment or outdoor amenity spaces exceed ambient noise levels at noise sensitive uses, thus causing a violation of the County Noise Ordinance?

***Impact Statement NOISE-4**: Project implementation would not increase noise levels at adjacent noise-sensitive receptors in the Project vicinity. Therefore, impacts would be less than significant.*

(i) Fixed Mechanical Equipment

The operation of mechanical equipment such as air conditioners, fans, and related equipment may generate audible noise levels. These types of equipment would be used on the Medical Center Campus. Mechanical equipment would typically be located on rooftops or within buildings, shielded from nearby land uses to attenuate noise and avoid conflicts with adjacent uses. In addition, to ensure compliance with noise limitation requirements of the LACC shown in Table 4.I-7, PDF-NOISE-7 requires an acoustical analysis of the

Table 4.I-19

Helicopter Noise Analysis – Permanent Rooftop Helistop

		Existing Conditions			Future Conditions		
Location	**Longitudinal Distance from Interim 1 Helistop,[a] Feet**	**Existing Measured Ambient Noise Levels, CNEL (dBA) "A"**	**Existing Helicopter Operation CNEL (dBA) "B"**	**Existing Ambient With Existing Helicopter Operation, CNEL (dBA) "C=A+B"**	**Future Helicopter Operations Noise Levels, CNEL (dBA) "D"**	**Ambient With Future Helicopter Operations, CNEL (dBA) "E=A+D"**	**Increase in Ambient Noise Levels due to Future Helicopter Operations (dBA) "F=E-C"**
R1	850	70.5	47.6	70.5	47.4	70.5	0.0
R2	620	65.6	50.0	65.7	49.8	65.7	0.0
R3	1440	64.3	41.3	64.3	41.9	64.3	0.0
R4	2060	70.7	38.0	70.7	38.3	70.7	0.0
R5	2340	53.1	35.8	53.2	36.1	53.2	0.0
R6	2185	56.4	35.4	56.4	36.8	56.4	0.0
R7	2330	64.6	33.5	64.6	35.1	64.6	0.0

[a] *Estimated diagonal distances using Google Earth Map. Distances are from the nearest edge of the permanent Helistop to the sidewalk adjoining the receptor locations.*

Source: Acoustical Engineering Services, Inc., 2016.

mechanical plans of the proposed building so that all mechanical equipment would be designed with appropriate noise control devices, such as sound attenuators, acoustics louvers, or sound screen/ parapet walls. Therefore, operation of mechanical equipment would not exceed the Project thresholds of significance and impacts would be less than significant.

(ii) Loading Dock and Refuse Collection Areas

The Project would incorporate new Materials and Waste Management facilities including a loading dock. The new loading dock and Waste Management Center would be located at the back of the New Hospital Tower, with the new storeroom located on the lower level of the tower.

Loading dock and refuse service-related activities such as truck movements/idling and loading/unloading operations would generate noise levels that have a potential to adversely impact adjacent land uses during long-term Project operations. Based on measured noise levels, delivery trucks (at loading dock) and trash compactors (from refuse collection) would generate noise levels of approximately 71 dBA (L_{eq}) and 66 dBA (L_{eq}) at 50 feet distance, respectively.

The nearest noise-sensitive use, the single and multi-family residential uses on along 220th Street (R3), is approximately 200 feet south of the proposed loading dock and Waste Management Center. The Central Plat building would partially block the line-of-sight between the noise source and sound receptor locations. Based on a noise level source strength of 71 dBA at a reference distance of 50 feet, and accounting for barrier-insertion loss (minimum 5 dBA insertion loss), loading dock noise would be 54 dBA and would not

Table 4.I-20

Helicopter Single-Event Noise Impacts – Permanent Rooftop Helistop

Location	Longitudinal Distance from Permanent Rooftop Helistop,[a] Feet	Land Use Descriptions	Predicted Helicopter (S-70) Single-Event Levels, L_{max} (dBA)		Increase in Noise Levels from Existing to Future Conditions, Permanent Conditions, L_{max} (dBA)
			Existing Helistop	Permanent Rooftop Helistop	
R1	850	Residential	100.8/85.4	101.0/83.8	0.2/-1.6
R2	620	Residential	102.9/86.5	103.0/84.2	0.1/-2.3
R3	1440	Residential	96.9/84.1	97.4/82.9	0.5/-1.2
R4	2060	Residential	94.2/82.7	94.3/81.5	0.1/-1.2
R5	2340	Residential	91.9/81.8	90.5/80.8	-1.4/-1.0
R6	2185	Residential	90.7/81.8	93.3/80.8	2.6/-1.0
R7	2330	Residential/School	88.1/79.5	89.0/79.0	0.9/-0.5

[a] *Estimated diagonal distances using Google Earth Map. Distances are from the center of the permanent Helistop to the sidewalk adjoining the receptor locations.*

Source: Acoustical Engineering Services, Inc., 2016.

exceed the significance threshold of the ambient noise level of 66 dBA at the receptor locations, R3. As such, impacts to surrounding uses would be less than significant.

(iii) Composite Noise Level Impacts from Proposed Project Operations

Primary noise sources associated with the proposed Project would include traffic on nearby roadways, on-site mechanical equipment, on-site loading dock/waste management center, and parking areas. An evaluation of noise from all the Project's noise sources (i.e., composite noise level) was conducted to conservatively ascertain the potential maximum Project-related noise level increase that may occur at the noise-sensitive receptor locations included in this analysis. The overall sound environment at the areas surrounding the project is comprised of contributions from each individual noise source associated with the typical daily operation of the Project.

Based on a review of the noise-sensitive receptors and the project noise sources, the only noise-sensitive location wherein composite noise impacts could occur is single- and multi-family residences (R3). Due to a combination of distance and the presence of intervening structures that would serve as noise barriers, the predominant Project noise source that could potentially affect the other noise-sensitive locations is roadway noise.

Based on the traffic noise analysis above, Project -generated traffic is expected to increase the traffic-related noise by a maximum of 0.7 dBA (CNEL) along 220th Street, between Myler Street and Vermont Avenue, which is represented by the receptor R3. Noise associated with activities in parking structures and at the loading docks and refuse collection transference would increase the overall ambient noise levels by 0.3 dBA at the receptor location R3. Mechanical related noise is expected to be the maximum 50 dBA as shown in Table 4.I-7, which would not increase the ambient noise level of 66 dBA at R3 since, according to industry engineering references, a 16 dB difference between two noise sources results in an increase of 0.1 dBA to the composite noise level of the two sources.[13] Overall, relative to the existing noise environment, the Project is estimated to increase the ambient noise level at the nearest noise-sensitive receptor R3, but by a less than the threshold of significance of 5 dBA. Composite noise level increases at all other receptor locations are expected to be less than significant as well, given their distance from the Medical Center Campus and the presence of intervening structures. As such, the composite noise level impact due to the proposed Project's future operations would be less than significant.

Threshold NOISE-5 Would the maximum noise (L_{max}) generated from the operation of the parking structure (e.g., car alarms) exceed the average (L_{eq}) ambient noise level by 10 dBA?

Impact Statement NOISE-5: *Project implementation, including noise from the parking structure, would increase noise levels at adjacent noise-sensitive receptors in the Project vicinity. However, Project-related noise generation would not exceed established thresholds and therefore impacts would be less than significant.*

Currently, large parking lots are generally distributed along the Medical Center Campus perimeter, with smaller lots located throughout the Medical Center Campus interior. Parking is also allowed on one or both sides of most internal roadways. Nonetheless incidental on-street parking also occurs in areas not officially designated as parking areas, as shown in Figure 2-5.

With implementation of the Master Plan Project, parking structures would be built. The new parking structures would be located in the southeastern corner of the Harbor-UCLA Medical Center Campus, north of New Hospital Tower, the east end of the Medical Center Campus, and immediately north of the proposed new Central Plan. These proposed new/modified parking structures and lots would not bring parking areas into closer proximity to nearby residential uses. Because the distance between the parking areas and the nearest residential uses would generally be unchanged from current conditions, the parking lot related noise impacts at the offsite receptors would be consistent with the existing ambient noise levels and would not exceed the significance threshold of the average ambient noise level by 10 dBA. As such, impacts would be less than significant.

(3) Vibration

Threshold NOISE 6: Would Project construction activities cause ground-borne vibration levels to exceed the applicable building damage threshold of 0.5 inch-per-second PPV at the nearest residential buildings?

Impact Statement NOISE-6: *Construction activities would result in sporadic, temporary vibration effects adjacent to the Project area. However, ground-borne vibration levels would not exceed established thresholds. Thus, construction vibration impacts would be less than significant and no mitigation measures are required.*

Construction activities can generate varying degrees of ground vibration, depending on the construction procedures and the construction equipment used. The operation of construction equipment generates

[13] *Engineering Noise Control, Bies & Hansen, 1988.*

vibrations that spread through the ground and diminish in amplitude with distance from the source. The effect on buildings located in the vicinity of the construction site often varies depending on soil type, ground strata, and construction characteristics of the receptor buildings. Impacts from vibration can range from no perceptible effects at the lowest vibration levels, to low rumbling sounds and perceptible vibration at moderate levels, to slight damage at the highest levels. Ground-borne vibration from construction activities rarely reach levels that damage structures. The FTA has published standard vibration velocities for construction equipment operations. The PPV for construction equipment pieces anticipated to be used during Project construction are listed in **Table 4.I-21**, *Typical Vibration Velocities for Potential Project Construction Equipment*.

Table 4.I-21

Typical Vibration Velocities for the Project Construction Equipment

	Reference Vibration Velocity Levels at 25 ft, inch/second	Vibration Velocity Levels at 55 ft, inch/second
Equipment	PPV[a,b]	PPV[a,b]
Large bulldozer	0.089	0.027
Loaded trucks	0.076	0.023

[a] *PPV=Peak particle velocity.*
[b] *FTA's "Transit Noise and Vibration Impact Assessment", Table 12-2.*

Source: USDOT Federal Transit Administration, 2005.

The construction of the Project would generate ground-borne construction vibration during demolition, shoring and excavation, and large bulldozer operation. Based on the vibration data provided in Table 4.I-21, vibration velocities from operation of construction equipment would range from approximately 0.076 to 0.089 inches per second PPV at 25 feet from the source of activity. As shown previously in Table 4.I-12, the nearest off-site residential structures are the single- and multi-family residential buildings, R3, located approximately 55 feet south of the construction site during Phase 5.

As shown in Table 4.I-21, the maximum vibration velocities to which receptors could be exposed ranges from 0.01 to 0.027 inches per second PPV. As this value is considerably lower than the 0.5 inches per second PPV significance threshold regarding potential building damage for older residential buildings, vibration impacts associated with construction would be less than significant at the nearest residential building.

Due to the sensitivity of on-site receptors, the potential for noise to affect on-site receptors is presented in this Draft EIR. On-site hospital uses, such as surgical suites, are vibration-sensitive. At various times throughout the construction of the Master Plan, use of heavy duty construction equipment could be as close as 100 feet to occupied on-site operating rooms. The vibration velocity of a large bulldozer generates 0.89 inches per second PPV at 25 feet from the equipment. If a large bulldozer operates within 125 feet of an operating room, the operating room would be exposed to vibration levels of 0.008 inches per second PPV (the level established for the protection of operating rooms and other uses with sensitive equipment and systems). With implementation of PDF Noise-6, which would ensure appropriate site-specific studies are conducted and additional noise reduction practices implemented as necessary, impacts would be less than significant even when construction is planned within 125 feet of on-site vibration-sensitive uses.

Threshold NOISE-7: Would Project construction and operational activities cause ground-borne vibration levels to exceed 0.04 inch per second PPV at nearby residential uses?

Impact Statement NOISE-7*: Project implementation would not generate excessive vibration levels to nearby sensitive receptors. Thus, construction and long-term vibration impacts would be less than significant and no mitigation measures are required.*

As discussed above, the nearest residential uses, R3 would be exposed to maximum vibration velocities during construction of approximately 0.027 inches per second PPV. As this value is lower than the 0.04 inches per second PPV significance threshold for human perception, vibration impacts associated with construction would be less than significant at the nearest residential building.

Operation of the Project would include typical commercial-grade stationary mechanical and electrical equipment such as air handling units, condenser units, and exhaust fans, which would produce vibration. In addition, the primary sources of transient vibration would include passenger vehicle circulation within the parking area activity. Ground-borne vibration generated by each of the above-mentioned activities would be similar to existing sources (i.e., traffic on adjacent roadways) adjacent to the Medical Center Campus. Maximum potential vibration levels from all Project operational sources at the closest off-site buildings would be up to 0.01 inches per second PPV[14] and would be less than the significance threshold of 0.04 inches per second PPV for perceptibility. As such, vibration impacts associated with operation of the Project would be below the significance threshold and impacts would be less than significant.

e. Cumulative Impacts

The geographic context for the analysis of cumulative noise impacts depends on the impact being analyzed. Noise is by definition a localized phenomenon, and significantly reduces in magnitude as the distance from the source increases. As such, only projects and growth due to occur in the immediate project area would be likely to contribute to cumulative noise impacts.

As discussed in Section 3.0, General Description of Environmental Setting, of this EIR, there are 26 related projects in the surrounding areas. The closet related projects situated approximately 1,300 feet from the Medical Center Campus, including Related Project No. 2 – 1028 W 223rd Street, Condos. All other related projects are 2,600 feet or more from the proposed Project.

(1) Construction Noise

Noise from construction of the proposed Project and related projects would be localized, thereby potentially affecting areas within 500 feet from each of the construction sites. Due to distance attenuation of projects more than 1,000 feet from each other and intervening structures, construction noise from one site would not result in a noticeable increase in noise at sensitive receptors near the other site, which would preclude a

[14] *Transportation Related Earthborne Vibrations, California Department of Transportation, February 2002.*

cumulative noise impact. As such, cumulative impacts associated with construction noise would be less than significant.

(2) Operation

Cumulative operational noise impacts would occur primarily as a result of increased traffic on local roadways due to the Project and other projects within the Medical Center Campus. Therefore, cumulative traffic-generated noise impacts have been assessed based on the contribution of the Project to the future cumulative base traffic volumes in the project vicinity. The noise levels associated with cumulative base traffic volumes without the project, and cumulative base traffic volumes with the project are identified in **Table 4.I-22**, *Off-Site Traffic Noise Levels – Future 2030 with Area-Wide Growth*. Noise level increases in the Project area would reach a maximum of 1.5 dBA CNEL along Carson Street, between Budlong Avenue and Medical Center Drive, which would not exceed the Project's 3 dBA significance threshold. As such, roadway noise impacts due to cumulative traffic volumes would be less than significant.

Table 4.I-22

Off-Site Traffic Noise Levels – Future 2030 with Area-Wide Growth

	Calculated Traffic Noise Levels at 25 feet from Roadway, CNEL (dBA)			
Roadway Segment	**Existing (A)**	**Future with Project (2030 Area Wide Growth)[a] (B)**	**Cumulative Increment (B-A)**	**Exceed Threshold?**
Carson Street				
Between Western Avenue and Normandie Avenue	70.6	71.8	1.2	No
Between Normandie Avenue and Budlong Avenue	70.6	71.9	1.3	No
Between Budlong Avenue and Berendo Avenue	70.5	72.0	1.5	No
Between Berendo Avenue and Medical Center Drive	70.6	72.1	1.5	No
Between Medical Center Drive and Vermont Avenue	70.9	72.1	1.2	No
220th Street				
Between Western Avenue and Normandie Avenue	60.6	61.4	0.8	No
Between Normandie and Myler Street	62.7	63.6	0.9	No
Between Myler Street and Vermont Avenue	63.7	64.8	1.1	No
East of Figueroa Street	67.5	68.6	1.1	No
Figueroa Street				
South of 220th Street	69.3	70.1	0.8	No

Table 4.I-22 (Continued)

Off-Site Traffic Noise Levels – Future 2030 with Area-Wide Growth

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway, CNEL (dBA)		Cumulative Increment (B-A)	Exceed Threshold?
	Existing (A)	Future with Project (2030 Area Wide Growth)[a] (B)		
223rd Street				No
Between Western Avenue and Normandie Avenue	69.6	70.2	0.6	No
Between Normandie Avenue and Myler Street	69.8	70.5	0.7	No
Between Myler Street and Vermont Avenue	69.7	70.4	0.7	No
Between Vermont Avenue and I-110 SB Ramps	70.6	71.5	0.9	No
Between I-110 SB Ramps and Figueroa Street	70.5	71.3	0.8	No
Western Avenue				
Between Carson Street and 220th Street	70.5	71.1	0.6	No
Between 220th Street and 223rd Street	70.6	71.2	0.6	No
Between 223rd Street and Sepulveda Boulevard	70.7	71.3	0.6	No
Myler Street				
Between 220th Street and 223rd Street	60.6	61.6	1.0	No
Normandie Avenue				
Between Torrance Boulevard and Carson Street	69.0	69.7	0.7	No
Between Carson Street and 220th Street	68.8	69.6	0.8	No
Between 220th Street and 223rd Street	68.5	69.2	0.7	No
Budlong Avenue				
North of Carson Street	56.2	56.7	0.5	No

Table 4.I-22 (Continued)

Off-Site Traffic Noise Levels – Future 2030 with Area-Wide Growth

Roadway Segment	Calculated Traffic Noise Levels at 25 feet from Roadway, CNEL (dBA) Existing (A)	Future with Project (2030 Area Wide Growth)[a] (B)	Cumulative Increment (B-A)	Exceed Threshold?
Berendo Avenue				
North of Carson Street	57.3	57.8	0.5	No
Vermont Avenue				
Between Torrance Boulevard and Carson Street	70.1	70.8	0.7	No
Between Carson Street and 220th Street	70.4	71.1	0.7	No
Between 220th Street and 223rd Street	70.0	70.8	0.8	No
Medical Center Drive				
North of Carson Street	56.1	56.6	0.5	No

[a] *Include future growth plus related (cumulative) projects and proposed project traffic.*

Source: ESA PCR, 2016.

LACC provisions that limit stationary-source noise from items such as roof-top mechanical equipment, noise levels would be less than significant at the property line for each related project. For this reason, on-site noise produced by any related project would not be additive to project-related noise levels. As the project's composite stationary-source impacts would be less than significant, composite stationary-source noise impacts attributable to cumulative development would also be less than significant.

(3) Ground-Borne Vibration

Due to the rapid attenuation characteristics of ground-borne vibration and distance of the related projects to the Project, there is no potential for a cumulative construction- or operational-period impact with respect to ground-borne vibration.

(4) Helicopter Noise

In addition to cumulative operational noise impacts from increased vehicle traffic (discussed under (b) above), potential cumulative operational noise impacts could occur as a result of increased air traffic in the local air space due to the Project and other air traffic in proximity to the Medical Center Campus. However, there are no facilities similar to the project (i.e., with helicopter traffic) proposed in proximity to the Medical Center Campus. As such, noise impacts due to cumulative helicopter air traffic would be less than significant.

4. MITIGATION MEASURES

The following mitigation measures address the potential significant noise impacts from the proposed Project.

a. Construction Noise and Vibration

Construction-related activities on the Medical Center Campus have the potential to result in significant impacts at nearby sensitive receptors. Thus, the following mitigation measures are required to minimize construction-related noise and vibration impacts:

(1) Noise **Mitigation Measure NOISE-1:** Temporary noise barriers shall be used to block the line-of-site between the construction equipment and noise-sensitive receptors during project construction, as follows:

- Provide a temporary 15-foot tall noise barrier capable of achieving a 15 dB reduction along the southern boundary of the Project construction site to reduce construction noise at the single- and multi-family residential uses across 220th Street during Phase C, Phase 2, Phase 3, Phase 5, Phase 6, and Phase LA Biomed.
- Provide a temporary 15-foot tall noise barrier capable of achieving a 15 dB reduction along the northern boundaries of the Project construction site to reduce construction noise at the multi-family residential uses across Carson Street during Phase 4.
- Provide a temporary 15-foot tall noise barrier capable of achieving a 15 dB reduction along the northern boundary of the Project construction site to reduce construction noise at the single-family residential uses across Vermont Avenue during Phase 2, Phase 4, and Phase 5.

(2) Vibration

No mitigation measures are necessary.

b. Operational Noise and Vibration

(1) Noise

No mitigation measures are necessary.

(2) Vibration

No mitigation measures are necessary.

(3) Helicopter

The noise impacts associated with the proposed interim helistops would result in a significant temporary and periodic impact. No mitigation measures are feasible to reduce the temporary and periodic helicopter noise associated with operation of the interim helistops. The proposed permanent helistop that would be located on the roof top of the proposed future hospital building would result in a less than significant permanent impact. Therefore, once the permanent helistop is operational, the significant temporary and periodic impact associated with the interim helistop would no longer occur.

5. LEVEL OF SIGNIFICANCE AFTER MITIGATION

a. Construction

The temporary sound barriers prescribed in Mitigation Measure NOISE-1 can achieve a noise reduction of 15 dBA or more in areas where the line-of-sight between construction-period noise sources and off-site receptor locations is obstructed. Therefore, the construction-period L_{eq} would be reduced to below the 60 dBA significance threshold at the south of the Medical Center Campus, Location R3 and the east of the Medical Center Campus, Location R5 and the 65 dBA significance threshold at north of the Medical Center Campus, Location R4. However, even with implementation of the mitigation measure, construction-related noise could reach up to approximately 85 dBA at the multi-family residential uses across 220th Street during Phase C, Phase 5, and Phase 6. As this will exceed the significance threshold of 60 dBA, construction noise impacts would be significant and unavoidable at the single- and multi-family residential uses across 220th Street, during Phase C, Phase 5, and Phase 6.b. Operation

Temporary helicopter operations associated with use of the Interim 1 Helistop and Interim 2 Helistop would result in significant and unavoidable, albeit temporary and periodic, impacts at receptor R3. There are no feasible mitigation measures to reduce the noise increases caused by the use of these interim helistops below the level of significance at receptor R3. Therefore, the impacts of temporary use of the Interim 1 Helistop and Interim 2 Helistop would be significant and unavoidable. However, impacts would last only until completion of the permanent Helistop location on the rooftop of the proposed New Hospital Tower. Noise impacts associated with use of the permanent Helistop would be less than significant.

Operation of the Project would result in less than significant traffic-related noise and vibration impacts on off-site noise sensitive receptors and no mitigation is required.

This page intentionally blank.