FINAL
FEASIBILITY STUDY REPORT
FOR
ENGINEERED EARTHEN-BOTTOM FLOOD CONTROL CHANNELS
LOCATED WITHIN THE
MALIBU CREEK AND DOMINGUEZ CHANNEL WATERSHEDS

MAINTAINED AND OPERATED BY THE
LOS ANGELES COUNTY FLOOD CONTROL DISTRICT

IN COMPLIANCE WITH THE

WASTE DISCHARGE REQUIREMENTS
FILE NUMBER 99-011-2010WDR

PREPARED FOR:

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California Regional Water Quality Control Board
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September 2016

FEASIBILITY STUDY

TECHNICAL ASSESSMENT REPORT
FOR ENGINEERED EARTH-BOTTOM FLOOD CONTROL CHANNELS LOCATED WITHIN THE MALIBU CREEK AND DOMINGUEZ CHANNEL WATERSHEDS

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INTRODUCTION

On February 4, 2010, the Los Angeles Regional Water Quality Control Board (Regional Board) issued a Waste Discharge Requirements (WDR) Order No. R4-2010-0021 to the Los Angeles County Flood Control District (LACFCD), authorizing the maintenance of earth-bottom flood control channels located within the County of Los Angeles. Prior to this WDR, the Regional Board had issued a Section 401 Certification to the LACFCD to maintain 100 earth-bottom channel reaches located throughout the County. This WDR expired on February 3, 2015. On February 12, 2015, in lieu of a standard 5-year term WDR, the Regional Board issued a one-year WDR (Order No. R4-2015-0032), which expired on February 11, 2016. A new WDR (Order No. R4-2015-0032-A1) was issued on February 12, 2016, with a July 20, 2018 expiration date.

The earth-bottom channels are an important component of the LACFCD's statutory mission, which in addition to flood control, is to infiltrate water for future beneficial use. Such channels must be regularly maintained to ensure that their flood control capacity is not impaired.

The WDR requires that a Feasibility Study (FS) be conducted by watershed on each of the earth-bottom (sometimes referred to as "soft-bottom") channel reaches that are included in the WDR. The goal of the FS is to determine whether "a potential may exist for native vegetation to remain within the soft-bottom portion of the channel or if additional hydraulic capacity is needed" (WDR, Condition 45). This condition recognizes both the opportunity for additional native vegetation to remain, or to replace non-native vegetation and the need to ensure that flood control requirements are met.

To meet the WDR's requirement for a technical assessment report and recommendations, a Technical Assessment Report and Recommendations (TAR&R) Report has been prepared for the Malibu Creek and Dominguez Channel Watersheds, which consists of this Final Recommendations Summary (Recommendations) as well as Appendix A, the Biological Technical Assessment report prepared by BonTerra Psomas, dated June 2015, plus appendices and exhibits (Biological Report); Appendix B, the Hydraulic Analysis Technical Assessment report prepared by WEST Consultants, an LACFCD consultant, dated March 2016, plus appendices (Hydraulic Report); and Appendix C, the Water Quality Monitoring Report (Monitoring Report). The TAR&R was performed subject to the approved Study Workplan (SW) which includes stakeholders' comments. A public meeting was held on May 25, 2016, to present and discuss the findings of this study and to allow the stakeholders and the public to provide feedback. A list of questions received from stakeholders at this meeting and respective answers are provided in Appendix D (Public Comments and Questions).
The WDR covers maintenance of eleven earth-bottom channels in the Malibu Creek

and Dominguez Channel Watersheds (Reaches 26, 27, 28, 29, 32, 33, 34, 35, 36, 37, and 38).

The hydraulic analysis for Wilmington Drain (Reach 27) was conducted as part of the stream restoration project by City of Los Angeles. The City of Los Angeles obtained all the necessary regulatory permits from the Regional Board, the CDFW, and the US Army Corps of Engineers to construct the project. Reach 27 was not separately analyzed by LACFCD as part of this FS. The mitigation plan and long-term maintenance plan prepared by the City of Los Angeles has not been approved by CDFW. LACFCD and City of Los Angeles are currently working together with CDFW to update these plans for this reach. The hydraulic characteristics of Reach 27 are influenced by these two plans. Upon approval of these plans LACFCD will provide the hydraulic analysis.

TECHNICAL ASSESSMENTS

Pursuant to the SW, the TAR&R employed an analytical approach that involved first ranking the earth-bottom channel reaches from high to low according to their biological value. These rankings were determined by biological surveys conducted by BonTerra Psomas, an LACFCD consultant, and are discussed in the Biological Report. In the Hydraulic Report, WEST Consultants, an LACFCD consultant, analyzed the hydraulic capacity within each reach under various vegetation scenarios.

A list of those reaches which had capacity for additional vegetation or the replacement of non-native with native vegetation was then reviewed by BonTerra Psomas for the development of specific vegetation management recommendations.

BonTerra Psomas subsequently provided those detailed biological recommendations for further hydraulic analysis by WEST Consultants. The biological recommendations were also evaluated by LACFCD maintenance personnel for potential impacts on maintenance activities.

RECOMMENDATIONS

EARTH-BOTTOM CHANNELS WITH CAPACITY FOR ADDITIONAL/REPLACEMENT NATIVE VEGETATION

Segments of Reaches 29, 32, 33 and 35 in the Malibu Creek watershed, were identified by the Hydraulic Report as having the capacity to contain additional native vegetation or the replacement of non-native with native vegetation.

These reaches are presented below in sequential order along with the recommendations for additional native vegetation and/or replacement of non-native vegetation. Aerial maps showing these reaches and the areas of additional/replacement native vegetation are included in Appendix A.

Malibu Creek Watershed:

Reach 29, Las Virgenes Creek - Within the herbaceous vegetation on the left bank, plant two (2) valley oaks (Quercus lobata) and five (5) blue elderberry (Sambucus nigra) at edge of right-of-way (about 100 to 125 feet away from concrete levee).

Reach 32, Stokes Canyon Channel – This Reach only has additional capacity upstream of the private bridge. The structure of the channel precludes permanent vegetation on the invert or banks immediately next to the ageing wire and pipe revetment structure. The right bank (or north bank) is cleared and used for maintenance activities. The left bank (or south bank) has some vegetation (e.g., young oaks) growing in a couple of locations. These areas could support more vegetation. Plant at least 20 young coast live oaks (Quercus agrifolia) on the south bank between the bridge and the most upstream end of the Reach.

Reach 33, Medea Creek (PD T1378) – This Reach only has capacity downstream of Thousand Oaks Blvd. No additional vegetation is recommended in the upstream portion of this Reach above Thousand Oaks Blvd. It is recommended that the cattails downstream of Thousand Oaks Blvd be allowed to naturally expand throughout this downstream area. If overgrowth occurs over time, the vegetation at this location may need to be trimmed back every so often.

Reach 35, Medea Creek (under Route 101) – This Reach is directly beneath U.S. Highway 101, which is not a suitable location to allow additional native vegetation and/or replacement of non-native with native vegetation. In addition, research has shown that LACFCD does not have right of way to maintain this reach.

LACFCD plans to remove a portion of this reach from the approved list of soft bottom channels to be maintained by LACFCD. The portion to be removed begins at the centerline of Route 101 to the southerly edge of the Roadside Drive overpass.

EARTH-BOTTOM CHANNELS LACKING CAPACITY FOR ADDITIONAL NATIVE VEGETATION

The following six earth-bottom channel reaches were identified in the Hydraulic Report as either having insufficient capacity to allow for additional native vegetation or insufficient capacity to allow current vegetated areas to remain:

Malibu Creek Watershed: 28, 34, 36, 37, and 38

The LACFCD is transferring the fee title right of way and appurtenant flood control facilities for Medea Creek (Reach 34) to the City of Agoura Hills.

The City of Agoura Hills developed the Medea Creek Restoration Project, which involves the naturalization of a 425-foot-long concrete segment of Medea Creek, including the

restoration of approximately 1.25 acres of riparian habitat and the installation of trail improvements and educational signage. Upon transfer, LACFCD will remove this reach from the approved list of soft bottom channels to be maintained by LACFCD.

Dominguez Channel Watershed: 26

No change in the current maintenance clearance practices is recommended for these reaches. Aerial maps of reaches are included in Appendix A.

WATER QUALITY MONITORING

As required by Condition 49 of the WDR, water quality (WQ) monitoring was conducted during annual maintenance clearing of certain earth-bottom channel reaches in 2014-15 and 2015-16. Included as Appendix C is a tabular representation of the WQ monitoring results along with a discussion of those results and recommendations for future maintenance activities.

MITIGATION MEASURES

Condition 51 of the WDR requires that the recommendations concerning earth-bottom channel clearance "shall also include suggested schedules of vegetation removal frequency in order to ensure the maximum habitat preservation, consistent with necessary flood control, is achieved." These schedules are already in place, and are dictated primarily by the need to protect nesting birds and other species. The LACFCD has employed BonTerra Psomas to monitor the channel clearance activities so as to avoid impacts to such species. BonTerra Psomas also has advised on ways to leave, maintain, and protect trees and other vegetation within a number of the channel reaches to the extent practicable when flood control and vector issues permit. In addition, invasive, exotic, and non-native vegetation is also removed during annual maintenance to ensure that native vegetation is preserved. These mitigation measures are ongoing, and are reflected in the biological and annual mitigation reports available on the LACFCD website. In addition, the LACFCD has mitigated impacts from its annual earth-bottom channel maintenance activities since the late 1990s, when it established 62.7 acres of habitat in the Big Tujunga Wash Mitigation Bank as mitigation for the clearance of vegetation in channels.

CONCLUSION

The LACFCD has completed the required FS analyses for the earth-bottom channel reaches that it maintains located within the Malibu Creek and Dominguez Channel Watersheds. As discussed above, allowing additional native vegetation and/or replacement of non-native with native vegetation is recommended for the following three earth-bottom reaches in the Malibu Creek watershed: 29, 32, and portions of 33. Reach 35, although identified by the Hydraulic Report as having capacity for additional vegetation, is located under a bridge which is not a suitable location to allow additional native vegetation and/or replacement of non-native with native vegetation. Additionally, LACFCD does not have right of way to maintain this reach.

APPENDIX A

BIOLOGICAL TECHNICAL ASSESSMENT REPORT

BonTerra PSOMAS

Biological Technical Assessment

Malibu Creek and Dominguez Watersheds Feasibility Study

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SECTION 1.0 INTRODUCTION

This Biological Technical Assessment Report (Report) has been prepared to satisfy requirements of Waste Discharge Requirement Order No. R4-2010-0021 (WDR) adopted by the California Regional Water Quality Control Board (RWQCB), Los Angeles Region, on February 4, 2010, for the Soft-Bottom Flood Control Channels Project maintained by the Los Angeles County Flood Control District (LACFCD). The WDR requires that a Feasibility Study be conducted for all watersheds containing soft-bottom channel (SBC) reaches that are maintained by the LACFCD. As required by the WDR, the first Feasibility Study was conducted for the 24 SBC reaches in the Los Angeles River Watershed. The nine SBC reaches in the San Gabriel Watershed comprised the second Feasibility Study. This Feasibility Study combines two SBC reaches in the Dominguez Channel Watershed with nine SBC reaches in the Malibu Creek Watershed. These 11 SBC reaches are listed and described below in Table 1.

As stated in the WDR (Condition 45), the purpose of the Feasibility Study is to provide an "on-going assessment of channel conditions and hydraulic capacity" in order to "determine where a potential may exist for native vegetation to remain within the soft-bottom portion of the channel or if additional hydraulic capacity is needed". As required by the WDR (Condition 48), a Work Plan was prepared and submitted (LACFCD February 2013) to the RWQCB that provided proposed study methods for the Feasibility Study, including an "assessment of biological functions and values of these reaches" so that "comparisons of habitat type, maturity and extent of native or invasive plants can be made between reaches". The WDR (Condition 50) requires that the LACFCD "include an assessment of the biological function and values for each reach".

This Report assesses the biological function and values for each SBC reach, as required by the WDR (Condition 50). The results of this assessment are incorporated into the final recommendations which identify those SBC reaches that can sustain additional vegetation and/or replacement of non-native with native vegetation without affecting the reaches' hydraulic capacity.

TABLE 1
BIOLOGICAL TECHNICAL ASSESSMENT REPORT
ELEVEN SOFT-BOTTOM CHANNEL REACHES
MALIBU CREEK AND DOMINGUEZ CHANNEL WATERSHEDS

Reach No.	Reach Name	Reach Limits		Reach Length (ft)	Area (acres)
		Upstream	Downstream		
Dominguez Channel Watershed					
26	Tributary to Dominguez Channel Project No. 74	500 ft u/s of Artesia Blvd	400 ft d/s of Artesia Blvd	900	0.35
27	Wilmington Drain	110 Freeway	Pacific Coast Highway	3,584	7.87
Malibu Creek Watershed					
28	Triunfo Creek (PD T2200)	384 ft u/s of Mulholland Highway	D/s edge of Mulholland Highway	474	2.30
29	Las Virgenes Creek (PD T1684) Main Channel Inlet	Los Angeles/Ventura County Boundary	3006 ft u/s of Thousand Oaks Blvd	371	1.16
32	Stokes Canyon Channel (PD T043)	Intersection of Quad Sheet blue line with the eastern boundary of Section 6, Township 1S, Range 17W	1600 ft u/s of intersection of Mulholland Hwy and Stokes Canyon Road	2,255	1.40

TABLE 1
BIOLOGICAL TECHNICAL ASSESSMENT REPORT
ELEVEN SOFT-BOTTOM CHANNEL REACHES
MALIBU CREEK AND DOMINGUEZ CHANNEL WATERSHEDS

Reach No.	Reach Name	Reach Limits		Reach Length (ft)	Area (acres)
		Upstream	Downstream		
33	Medea Creek (PD T1378 u.2)	731 ft u/s of Thousand Oaks Blvd	215 ft d/s of Thousand Oaks Blvd	946	0.69
34	Medea Creek (PD T1005) Main Channel Outlet	535 ft d/s of Kanan	940 ft d/s of Kanan	405	0.19
35	Medea Creek Main Channel Inlet – under Route 101	98 ft u/s of u/s side of Roadside Drive	13 ft u/s of u/s side of Roadside Drive	85	0.14
36	Cheseboro Main Channel Inlet	100 ft u/s of Driver Ave	44 ft u/s of Driver Ave	56	0.08
37	Medea Creek/Cheseboro Creek Inlet	614 ft d/s of Agoura Road	784 ft d/s of Agoura Road	170	0.47
38	Lindero Main Channel Outlet	83 ft d/s of Agoura Road	270 ft d/s of Agoura Road	187	0.19

ft: feet; u/s: upstream; d/s: downstream; Ave: Avenue; Blvd: Boulevard; PD: Private Developer
Source: LACFCD as provided in WDR Order No. R4-2010-0021

SECTION 2.0 LITERATURE REVIEW

A literature review was conducted to review and update existing information gathered through the SBC maintenance program about plant and wildlife species that (1) have been afforded special status by federal, State, and local resource agencies and organizations and (2) have potential to occur in the Malibu Creek and Dominguez Channel Watersheds.

Sources reviewed include the following: (1) special status species lists from the California Department of Fish and Wildlife (CDFW), the U.S. Fish and Wildlife Service, and the California Native Plant Society (CNPS); (2) the U.S. Geological Survey's Inglewood, Long Beach, and Torrance 7.5-minute quadrangles for the Dominguez Channel Watershed and the Calabasas, Canoga Park, Malibu Beach, Point Dume, and Thousand Oaks 7.5-minute quadrangles for the Malibu Creek Watershed in the CDFW's California Natural Diversity Database (CNDDB) (CDFW 2013) and the CNPS' Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2013); (3) the most recent *Federal Register* listing package and critical habitat determination for each federally listed Endangered or Threatened species potentially occurring in the Malibu Creek and Dominguez Channel Watersheds; (4) the CDFW Annual Report on the status of California's listed Threatened and Endangered plants and wildlife; and (5) other biological studies conducted in the Malibu Creek and Dominguez Channel Watersheds that were relevant to this Report, including those conducted previously by BonTerra Psomas for the LACFCD.

The information gathered during the literature search, including the above CNDDB database searches, was used by biologists to develop appropriate survey methods.

SECTION 3.0 BIOLOGICAL SURVEYS

Biological surveys for plant and wildlife species were performed at each of the 11 SBC reaches (see Table 1). The survey area for each of the 11 SBC reaches included habitats in the channel and on the adjacent channel banks. Where necessary, the survey area included a buffer area outside the dimensions listed in Table 1. Most of the surveys were conducted in the spring and summer seasons prior to the LACFCD's annual maintenance activities, which are performed during the fall. The surveys at each of these 11 SBC reaches included mapping of vegetation types; focused searches for special status species including Threatened and Endangered plant and wildlife species; and summer season bird surveys. In addition, migratory bird surveys were conducted at Reach 26 (Project 74) in the Dominguez Channel Watershed and Reach 28 (Triunfo Creek) in the Malibu Creek Watershed. The methods used to complete these surveys are described below.

3.1 VEGETATION MAPPING SURVEYS

Nine vegetation types and four other areas were identified during the vegetation mapping surveys of the SBC reaches described in this Report (Table 2). Mapping of the vegetation types was completed simultaneously with the summer season bird surveys and the final focused plant surveys conducted in 2013 for each of these SBC reaches. Recent aerial photographs at a scale of 1 inch = 500 feet were used to map vegetation types. Nomenclature for the vegetation types identified in these surveys generally follows the *List of Vegetation Alliances and Associations, Vegetation Classification and Mapping Program* (CDFW 2010). The vegetation types identified in the surveys generally reflect the vegetation shown on the aerial maps along the alignment of each SBC reach. The exception is Reach 32 (Stokes Canyon Channel) where the canopy of trees rooted outside the channel cover parts of the channel on the aerial maps. In those parts of Reach 32, the vegetation on the invert of the channel was mapped rather than the canopy of trees rooted outside the channel. For those SBC reaches with unclear boundaries, the survey area for vegetation mapping was greater than some of the SBC reach dimensions listed in Table 1. The vegetation maps for each SBC reach are included in Appendix A.

TABLE 2
VEGETATION TYPES

Vegetation Type	**Reach Numbers**
coastal sage scrub	29
California buckwheat scrub	29
coyote brush scrub	33
willow riparian	26, 27, 28, 29, 32, 33, 34, 36, 37, 38
willow riparian/ornamental	26
western sycamore	26, 28, 33
annual grassland	32, 33, 38
freshwater marsh	26, 27, 28, 32, 33, 34, 35, 38
ruderal	26, 27, 28, 29, 33
Non-Vegetation Type	**Reach Numbers**
unvegetated wash	27, 28, 32, 35
open water	26, 28, 29, 33, 34, 35, 37, 38
disturbed	27, 35
developed	26, 27, 28, 32, 34, 37, 38

3.1.1 DESCRIPTION OF VEGETATION TYPES

Coastal sage scrub is present in the southeastern portion of Reach 29. Coastal sage scrub is dominated by California buckwheat (*Eriogonum fasciculatum*) with coyote bush (*Baccharis pilularis*), western ragweed (*Ambrosia psilostachya*), and non-native weedy species such as red brome (*Bromus madritensis* ssp. *rubens*), white sweetclover (*Melilotus alba*), yellow star-thistle (*Centaurea solstitialis*), and shortpod mustard (*Hirschfeldia incana*).

California buckwheat scrub is present next to the coastal sage scrub vegetation type in the southeastern portion of Reach 29. California buckwheat scrub is a monotypic stand of California buckwheat. Two valley oak tree saplings (*Quercus lobata*) were found in this vegetation type at Reach 29.

Coyote brush scrub is present in the northwestern corner of Reach 33. Coyote brush scrub is a monotypic stand of coyote bush (*Baccharis salicifolia*).

Willow riparian is present in various amounts and densities at Reaches 26, 27, 28, 29, 32, 33, 34, 36, 37, and 38. Reach 36 is dominated entirely by willow riparian vegetation. Willow riparian is dominated by willow trees (*Salix* spp.) including arroyo willow (*Salix lasiolepis*), red willow (*Salix laevigata*), Goodding's black willow (*Salix googdingii*), and narrow-leaved willow (*Salix exigua*). The understory vegetation consists of herbaceous species such as mugwort (*Artemisia douglasiana*), umbrella-sedge (*Cyperus* sp.), cattails (*Typha* sp.), smilo grass (*Stipa miliacea*), Italian thistle (*Carduus pycnocephalus*), and ripgut grass (*Bromus diandrus*).

Willow riparian/ornamental occurs throughout the Reach 26 survey area. In Reach 26, the willow riparian/ornamental vegetation type is co-dominated by mature Goodding's black willows and ash trees (*Fraxinus* sp.).

Western sycamore is present in small amounts at Reaches 26, 28, and 33. Western sycamore is composed of stands of western sycamore trees (*Platanus racemosa*) with understory shrub species such as coyote bush and understory herbaceous species including western ragweed, smilo grass, and ripgut grass.

Freshwater marsh is present in the survey areas of Reaches 26, 27, 28, 32, 33, 34, 35, and 38. Freshwater marsh is generally dominated at these SBC reaches by cattails, but bulrushes (*Schoenoplectus* sp.) are also present, such as at Reach 27. Freshwater marsh vegetation at these SBC reaches also includes herbaceous species such as broad-leaved peppergrass (*Lepidium latifolium*), water speedwell (*Veronica anagallis-aquatica*), water cress (*Nasturtium officinale [Rorippa nasturtium-aquaticum]*), and yellow waterweed (*Ludwigia peploides*).

Annual grassland occurs in Reaches 32, 33, and 38. Annual grassland vegetation is dominated by annual grass species including perennial ryegrass (*Festuca perennis [Lolium perenne]*), ripgut grass, red brome, oat (*Avena* sp.), and rattail fescue (*Fesuca myuros [Vulpia m. var. myuros]*) at these SBC reaches.

Ruderal vegetation is present in Reach 26, 27, 28, 29, and 33. Ruderal vegetation generally consists of non-native herbaceous species. This vegetation type is characteristic of areas that have been previously disturbed and now consist primarily of weedy species that are well-adapted to disturbed conditions. Species observed throughout the ruderal areas of these SBC reaches include yellow star-thistle, shortpod mustard, sweet fennel (*Foeniculum vulgare*), telegraph weed (*Heterotheca grandiflora*), red brome, ripgut grass, annual beard grass (*Polypogon monspeliensis*), white sweetclover, smilo grass, barnyard grass (*Echinochloa crus-galli*), lamb's quarters (*Chenopodium album*), sticktight (*Bidens frondosa*), garland daisy

(*Glebionis coronaria [Chrysanthemum coronarium]*), Russian knapweed (*Acroptilon repens*) (Reach 26), and western ragweed.

Unvegetated wash is present in Reaches 27, 28, 32, and 35. Unvegetated wash is not a vegetation type, but is delineated as a mapping unit on the vegetation maps. The vegetation mapping of Reach 27 (Wilmington Drain) was conducted simultaneously with clearing of non-native vegetation for the Proposition O project being implemented by the City of Los Angeles Department of Public Works. As a result, large areas of Reach 27 were cleared of vegetation and identified as unvegetated wash for this Report. Within Reaches 28, 32, and 35, unvegetated wash generally occurs along the low-flow channel where water had evaporated and vegetation had not yet begun to grow.

Open water is present in Reaches 26, 28, 29, 33, 34, 35, 37, and 38. Open water is not a vegetation type but is delineated as a mapping unit on the vegetation maps. Open water typically consists of flowing or ponding fresh water in the center of the SBC reaches. These areas generally contain little to no vegetation.

Disturbed areas are present in Reaches 27 and 35. These areas consist of dirt roads or other areas of exposed soil where regular man-made activities prevent vegetation from becoming established. A disturbed area is not a vegetation type but is delineated as a mapping unit on the vegetation maps.

Developed areas occur in Reaches 26, 27, 28, 32, 34, 37, and 28. Developed areas are not a vegetation type but are delineated as mapping units on the vegetation maps. In the SBC reaches, developed areas are generally structures such as grouted riprap and concrete slabs. These structures support minimal vegetation, if any.

3.2 SPECIAL STATUS PLANT SURVEYS

Focused surveys for special status plant species are conducted on a periodic basis for the over 100 SBC reaches maintained by the LACFCD, including the Malibu Creek and Dominguez Channel Watersheds. These special status plant species surveys for the SBC reaches covered by this Report are discussed in more detail below.

Habitat assessments for federally and/or State-listed special status plant species were conducted for the LACFCD's SBC maintenance program in 2002. These surveys found no potentially suitable habitat for the federally and State-listed Endangered slender-horned spineflower (*Dodecahema leptoceras*) in the Malibu Creek and Dominguez Channel Watersheds (BonTerra 2002). The federally and State-listed Endangered Nevin's barberry (*Berberis nevinii*), a large and conspicuous shrub that can be identified year-round, was not present at any of the SBC reaches (including Reaches 28, 32, and 38 of the Malibu Creek Watershed) which were identified as having potentially suitable habitat during the 2002 habitat assessments (BonTerra 2002). The focused plant surveys conducted in 2003 concluded that no additional surveys were recommended in the SBC reaches as long as the existing maintenance plan and associated access routes were followed (BonTerra 2003).

As part of this Report, focused surveys for special status plant species were performed in 2013 at each of the 11 SBC reaches in the Malibu Creek and Dominguez Channel Watersheds by BonTerra Psomas Senior Biologists Jennifer Pareti and Brian Daniels and Consulting Botanist Sandra Leatherman.

The survey dates and personnel are listed below in Table 3. Each SBC reach was surveyed twice during 2013 except for Reach 27, where construction for the City of Los Angeles

Department of Public Work's Proposition O project prevented performance of the second survey scheduled in August.

TABLE 3
FOCUSED PLANT SURVEY DATES AND PERSONNEL

Reach No.	Survey 1		Survey 2		Survey 3	
	Dates	Personnel	Dates	Personnel	Dates	Personnel
26	April 17, 2013	JP, BD, SL	June 5, 2013	JP, SL	August 22, 2013	JP, SL
27	April 17, 2013	JP, BD, SL	June 5, 2013	JP, SL	N/A	N/A
28	April 10, 2013	JP, SL	May 28, 2013	JP, SL	August 8, 2013	JP, SL
29	April 10, 2013	JP, SL	May 28, 2013	JP, SL	August 6, 2013	JP, SL
32	April 10, 2013	JP, SL	May 22, 2013	JP, SL	August 8, 2013	JP, SL
33	April 8, 2013	JP, SL	May 22, 2013	JP, SL	August 6, 2013	JP, SL
34	April 8, 2013	JP, SL	May 22, 2013	JP, SL	August 6, 2013	JP, SL
35	April 8, 2013	JP, SL	May 22, 2013	JP, SL	August 8, 2013	JP, SL
36	April 8, 2013	JP, SL	May 28, 2013	JP, SL	August 6, 2013	JP, SL
37	April 8, 2013	JP, SL	May 28, 2013	JP, SL	August 12, 2013	JP, SL
38	April 8, 2013	JP, SL	May 28, 2013	JP, SL	August 12, 2013	JP, SL

BonTerra Psomas senior biologists: Jennifer Pareti (JP) and Brian Daniels (BD); Leatherman BioConsulting Senior Botanist Sandra Leatherman (SL).

Source: BonTerra 2014.

No special status plant species were observed in the 11 SBC reaches in the Malibu Creek and Dominguez Channel Watersheds. The results of the focused plant survey are included in Appendix B.

3.3 SPECIAL STATUS WILDLIFE SURVEYS

Focused surveys for special status wildlife species are conducted on a regular basis for the over 100 SBC reaches managed by the LACFCD. Table 4 provides a summary of these surveys performed at the SBC reaches discussed in this Report. These special status wildlife species surveys are discussed in more detail below.

TABLE 4
FOCUSED SURVEY RESULTS SUMMARY FOR WILDLIFE

Reach Number	Reach Name	Santa Ana Sucker	Arroyo Toad	California Red-Legged Frog	Southwestern Willow Flycatcher	Least Bell's Vireo
Dominguez Channel Watershed						
26	Tributary to Dominguez Channel Project No. 74	N/A	N/A	N/A	N/A	N/A
27	Wilmington Drain	N/A	N/A	N/A	FS: 2002, 2003, 2005, 2007, 2009, 2011, 2013 (negative survey results)	FS: 2002, 2003, 2005, and 2009 (negative survey results); 2007, 2011, 2013, and 2015 (1 territory – solitary male).

TABLE 4
FOCUSED SURVEY RESULTS SUMMARY FOR WILDLIFE

Reach Number	Reach Name	Santa Ana Sucker	Arroyo Toad	California Red-Legged Frog	Southwestern Willow Flycatcher	Least Bell's Vireo
Malibu Creek Watershed						
28	Triunfo Creek (PD T2200)	N/A	N/A	N/A.	FS: 2002, 2003, 2005, 2007, 2009, 2011, 2013, and 2015 (negative survey results)	FS: 2002, 2003, 2005, 2007, 2009, 2011, 2013, and 2015 (negative survey results)
29	Las Virgenes Creek (PD T1684) Main Channel Inlet	N/A	N/A	N/A	N/A	N/A
32	Stokes Cyn Channel (PD T043)	N/A	N/A	N/A	N/A	N/A
33	Medea Creek (PD T1378 u.2)	N/A	N/A	N/A	N/A	N/A
34	Medea Creek (PD T1005) Main Channel Outlet	N/A	N/A	N/A.	FS: 2002 (negative survey results)	FS: 2002 (negative survey results)
35	Medea Creek Main Channel Inlet – under Route 101	N/A	N/A	N/A	N/A	N/A
36	Cheseboro Main Channel Inlet	N/A	N/A	N/A	N/A	N/A
37	Medea Creek/Cheseboro Creek Inlet	N/A	N/A	N/A	FS: 2009 (negative survey results)	FS: 2009 (negative survey results)
38	Lindero Main Channel Outlet	N/A	N/A	N/A	FS: 2009 (negative survey results)	FS: 2009 (negative survey results)

FS: focused survey (survey areas include a 500-foot buffer); N/A: Not Applicable (no suitable habitat and/or outside known range);

Source: BonTerra 2002, 2003, 2005, 2007, 2009, 2011, 2013, and 2015.

As required by the regulatory permits, annual focused (pre-clearing) surveys for the State- and federally listed Endangered unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) and federally listed Threatened Santa Ana sucker (*Catostomus santaanae*) are conducted in those SBC reaches with appropriate habitat. None of the 11 SBC reaches surveyed for this Report support potentially suitable habitat for the unarmored threespine stickleback or Santa Ana sucker (BonTerra 2002).

Habitat assessments were conducted in 2002 for the federally listed Endangered arroyo toad (*Anaxyrus californicus*) and federally listed Threatened California red-legged frog (*Rana draytonii*) at those LACFCD SBC reaches within the known range of the species. These surveys found no suitable habitat for the California red-legged frog at any of the SBC reaches and concluded that no further surveys for the species were required (BonTerra 2002). Potential habitat for the arroyo toad was identified at some SBC reaches in the Santa Clara River Watershed, but not the Malibu Creek or Dominguez Channel Watersheds. Therefore, no

surveys for the California red-legged frog or arroyo toad have been conducted at any of the SBC reaches addressed in this Report.

Focused surveys for the southwestern willow flycatcher (*Empidonax traillii extimus*) and least Bell's vireo (*Vireo bellii pusillus*), which are both State- and federally listed Endangered Species, have been conducted at those SBC reaches in the Malibu Creek and Dominguez Channel Watersheds that contain potentially suitable habitat for these two bird species (see Table 4). Focused surveys were conducted in 2002, 2003, 2005, 2007, 2009, 2011, 2013, and 2015 at Reaches 27 and 28. A territorial male least Bell's vireo was present in Reach 27 (Wilmington Drain) in 2007, 2011, and 2013, but a breeding pair has not yet been detected at this SBC reach. Reach 34 (Medea Creek [PD T1278 u. 2]) was included in the 2002 focused surveys, but development of adjacent properties eliminated upland habitats necessary for least Bell's vireo breeding at this narrow SBC reach. Therefore, focused surveys were discontinued at Reach 34 after the 2002 breeding season. Focused surveys were conducted for these two bird species in 2009 at Reaches 37 (Medea Creek/Cheseboro Creek Inlet) and 38 (Lindero Main Channel Outlet), but the results were negative and indicated further surveys for these two bird species were not warranted at these two SBC reaches due to insufficient amounts of suitable habitat. The most recently completed 2015 focused survey report for these two species prepared for the LACFCD's SBC maintenance program is included as Appendix C.

3.4 SUMMER SEASON BIRD SURVEYS

In conjunction with the plant surveys discussed above, summer season surveys for birds were conducted at each of the 11 SBC reaches. These surveys focused on detecting and identifying all the birds using the habitats in these 11 SBC reaches (Table 5). These surveys were conducted by BonTerra Psomas Senior Biologist/Ornithologist Brian E. Daniels on July 12 and 16, 2013. Since these surveys were performed after the spring migration season, most of the bird species recorded can be assumed to be breeding or potentially breeding in or near the SBC reach in which they were observed.

TABLE 5
RESULTS OF SUMMER SEASON BIRD SURVEYS

SPECIES	Reach Numbers										
	26	27	28	29	32	33	34	35	36	37	38
mallard (*Anas platyrhynchos*)	-	-	-	-	-	2	1	1	-	4	-
snowy egret (*Egretta thula*)	1	-	-	-	-	-	-	-	-	-	-
black-crowned night-heron (*Nycticorax nycticorax*)	-	-	-	-	-	1	-	-	-	-	
Cooper's hawk (*Accipiter cooperii*)	-	-	-	2	-	-	-	-	-	1	-
red-shouldered hawk (*Buteo lineatus*)	-	1	1	-	-	-	-	-	-	-	-
killdeer (*Charadrius vociferous*)	-	-	-	-	-	-	1	-	-	1	-
mourning dove (*Zenaida macroura*)	-	-	2	-	-	-	2	-	-	1	-
black-chinned hummingbird (*Archilochus alexandri*)	-	-	-	-	1	-	-	-	-	-	-
Anna's hummingbird (*Calypte anna*)	-	-	1	-	-	-	1	-	-	-	-
Allen's/rufous hummingbird (*Selasphorus sasin* or *rufus*)	-	-	2	-	-	-	1	-	-	-	-
acorn woodpecker (*Melanerpes formicivorus*)	-	-	-	-	-	-	-	-	-	1	-
Nuttall's woodpecker (*Picoides nuttallii*)	-	-	1	-	-	-	1	-	-	1	-
black phoebe (*Sayornis nigricans*)	-	-	-	-	-	1	1	1	1	-	-

TABLE 5
RESULTS OF SUMMER SEASON BIRD SURVEYS

SPECIES	Reach Numbers										
	26	**27**	**28**	**29**	**32**	**33**	**34**	**35**	**36**	**37**	**38**
ash-throated flycatcher (*Myiarchus cinerascens*)	-	-	-	-	-	-	1	-	-	-	1
Cassin's kingbird (*Tyrannus vociferans*)	-	-	-	-	-	-	1	-	-	-	-
western scrub-jay (*Aphelocoma californica*)	-	-	3	-	-	-	-	-	-	-	1
American crow (*Corvus brachyrhynchos*)	1	-	-	-	-	2	1	-	-	-	-
northern rough-winged swallow (*Stelgidopteryx serripennis*)	-	-	-	-	-	-	-	-	1	-	-
barn swallow (*Hirundo rustica*)	-	2	-	-	-	-	-	-	-	-	-
oak titmouse (*Baeolophus inornatus*) [2]	-	-	-	-	2	-	2	-	2	1	1
bushtit (*Psaltriparus minimus*)	-	10	-	-	-	-	-	-	-	-	-
white-breasted nuthatch (*Sitta carolinensis*)	-	-	1	-	-	-	1	-	1	-	1
house wren (*Troglodytes aedon*)	-	-	-	-	-	-	-	-	-	-	2
Bewick's wren (*Thryomanes bewickii*)	-	-	1	-	-	-	3	-	3	-	-
California thrasher (*Toxostoma redivivum*)	-	-	-	-	1	-	-	-	-	-	-
northern mockingbird (*Mimus polyglottos*)	-	1	-	-	-	-	2	-	-	-	-
common yellowthroat (*Geothlypis trichas*)	-	-	2	1	3	-	-	-	-	-	1
yellow warbler (*Setophaga petechia*) [a]	-	-	-	-	-	-	1	-	-	-	-
spotted towhee (*Pipilo maculatus*)	-	-	4	-	-	1	3	-	-	-	1
California towhee (*Melozone crissalis*) [b]	-	1	1	-	1	-	-	-	2	-	-
song sparrow (*Melospiza melodia*)	-	1	2	1	1	-	1	-	-	-	2
black-headed grosbeak (*Pheucticus melanocephalus*) [b]	-	-	2	-	-	-	-	-	-	-	-
hooded oriole (*Icterus cucullatus*)	-	2	-	-	-	-	-	-	-	-	1
Bullock's oriole (*Icterus bullockii*)	-	2	2	-	-	-	-	-	-	-	-
house finch (*Haemorhous mexicanus*)	2	4	5	2	-	2	1	-	1	-	1
lesser goldfinch (*Spinus psaltria*)	2	2	6	-	1	3	-	-	1	-	-
American goldfinch (*Spinus tristis*)	-	1	-	-	-	-	-	-	-	-	-
house sparrow (*Passer domesticus*)[c]	1	-	-	-	-	-	-	-	-	-	-
scaly-breasted munia (*Lonchura punctulata*)[c]	-	2	-	-	-	-	-	-	-	-	-
TOTAL SPECIES	**5**	**12**	**16**	**4**	**7**	**7**	**18**	**2**	**8**	**7**	**10**
TOTAL INDIVIDUALS	**7**	**29**	**36**	**6**	**10**	**12**	**25**	**2**	**12**	**10**	**12**

[a] Listed as a California Bird Species of Special Concern (Shuford and Gardali 2008)
[b] On the Los Angeles County Bird Watchlist (Los Angeles County Sensitive Bird Species Working Group 2009)[c] Introduced non-native species with established breeding population in California.

The presence of water in SBC reaches, especially during the summer, can be an important component of high quality habitat for birds. Surface water was present during the survey at all SBC reaches in this Report except for Reaches 27 (Wilmington Drain), 32 (Stokes Canyon Channel), and 36 (Cheseboro Main Channel Inlet). Surface water would typically be present at Reach 27 during the summer, but this SBC reach was drained for implementation of the City of Los Angeles Department of Public Works' Proposition O project. Because of its larger size (see Table 1), Reach 27 often supports a variety of water birds (e.g., ducks and egrets, among others) when surface water is present. The other SBC reaches in this Report are generally too small, with or without surface water, to support concentrations of water birds.

The highest species totals were recorded at Reaches 28 (Triunfo Creek) and 34 (Medea Creek [PD T1005] Main Channel Outlet) with 36 and 25 species, respectively. Reach 27 (Wilmington Drain) was third highest with 12 species, but this total would have been higher, probably much higher, if not for implementation of the City of Los Angeles Department of Public Works' Proposition O project. Although not detected during this survey, Reach 27 supported a solitary (unpaired) male least Bell's vireo in 2013 (see Table 4). Focused surveys consisted of multiple surveys conducted throughout the breeding season that employed methods intended to find each individual of the species; other species recorded are incidental to the purpose of those surveys. The summer season bird surveys were one-day surveys that employed methods intended to measure the diversity and abundance of all species that use the SBC reach.

TABLE 6
SUMMER BIRD DIVERSITY AND ABUNDANCE AT THE ELEVEN SOFT-BOTTOM CHANNEL REACHES (RANKED HIGH TO LOW FOR BIRD DENSITY)

Reach Number	Reach Name	Area (acres)	Total Bird Species/ Species Diversity (species per acre)	Total Bird Abundance/ Bird Density (birds per acre)
36	Cheseboro Main Channel Inlet	0.08	8/100.0	12/150.0
34	Medea Creek (PD T1005) Main Channel Outlet	0.19	18/94.7	25/131.6
38	Lindero Main Channel Outlet	0.19	10/52.6	12/63.2
37	Medea Creek/Cheseboro Creek Inlet	0.47	7/14.9	10/21.3
26	Tributary to Dominguez Channel Project No. 74	0.35	5/14.3	7/20.0
33	Medea Creek (PD T1378 u.2)	0.69	7/10.1	12/17.4
28	Triunfo Creek (PD T2200)	2.30	16/7.0	36/15.7
35	Medea Creek Main Channel Inlet – under Route 101	0.14	2/14.3	2/14.3
32	Stokes Canyon Channel (PD T043)	1.40	7/5.0	10/7.1
29	Las Virgenes Creek (PD T1684) Main Channel Inlet	1.16	4/3.4	6/5.2
27	Wilmington Drain	7.87	12/1.5	29/3.7

Table 6 above ranks the 11 channel reaches of this Report from high to low based on bird density derived from the one-day summer season bird surveys. The highest density scores are generally associated with the small channel reaches (less than one acre) that abut natural open spaces such as Reaches 34 (Medea Creek), 38 (Lindero Main Channel Outlet), and 37 (Medea Creek/Cheseboro Creek Inlet). Reach 36 (Cheseboro Main Channel Inlet) is situated adjacent to an urban park in a residential area of Agoura Hills. The largest SBC reach, Reach 27 (Wilmington Drain), had the lowest diversity, but this was largely attributable to the Proposition O project implemented by the City of Los Angeles Department of Public Works. For this survey, large areas of Reach 27 were cleared of vegetation and identified as unvegetated wash. In the future, these areas are expected to support native riparian vegetation that would support a diverse assemblage of avian species.

3.4 MIGRATORY BIRD SURVEYS

Migratory bird surveys were performed before and after the LACFCD's annual fall maintenance activities at Reach 26 (Project 74) in the Dominguez Channel Watershed and at Reach 28 (Triunfo Creek) in the Malibu Creek Watershed. "Migratory birds" refer to those species that regularly migrate to and from distant areas where they nest and spend the winter. In North America, about 75 percent of breeding birds migrate, with the rest remaining year-round in the same general area (Sibley 2001). Peak migration periods in North America occur during the spring (April–May) and fall (September–October) seasons, but many bird migrations take place throughout the year, especially in warmer regions such as Southern California. Depending on the species, migrations occur at night (nocturnal) or during the day (diurnal) and are subject to a variety of environmental influences, particularly weather.

The migratory bird surveys were conducted by BonTerra Psomas Senior Biologist/Ornithologist Brian Daniels and BonTerra Psomas Biologist Sarah Thomas. Reach 28 was selected since it is the largest of the nine SBC reaches in the Malibu Creek Watershed. Wilmington Drain (Reach 27) is the largest SBC reach in the Dominguez Channel Watershed, but was not selected due to on-going construction activities for the City of Los Angeles Department of Public Work's Proposition O project. That left only Reach 26 for the migratory bird surveys in the Dominguez Channel Watershed. Reach 27, however, was included as a reference site for the migratory bird surveys conducted for the Los Angeles River Watershed Feasibility Study and those 2010 survey results are included in Table 7 with Reaches 26 and 28.

The survey results for all three SBC reaches show relatively few species that are confidently identified as "transients" (a term used for migratory birds being at a location for a relatively short stay during migration). The western wood-pewee (*Contopus sordidulus*), warbling vireo (*Vireo gilvus*), Wilson's warbler (*Cardellina pusilla*), and western tanager (*Piranga ludoviciana*) are clearly transients because these four species neither winter nor summer at these three SBC reaches. In migration, willows and other trees provide valuable foraging habitat for these four species. As shown by the vegetation maps (see Appendix A), willows dominate all three SBC reaches in the willow riparian vegetation type. Clearing activities at these three SBC reaches are generally limited to areas mapped as the ruderal vegetation type although some understory vegetation in the willow riparian areas such as lower branches of willows on or adjacent to the low flow channel are being removed.

The surveys detected seven migrant species that only winter at these SBC reaches: northern pintail (*Anas acuta*), belted kingfisher (*Ceryle alcyon*), ruby-crowned kinglet (*Regulus calendula*), hermit thrush (*Catharus guttatus*), yellow-rumped warbler (*Setophaga coronata*), Lincoln's sparrow (*Melospiza lincolnii*), and white-crowned sparrow (*Zonotrichia leucophrys*). Two of these seven species, the yellow-rumped warbler and white-crowned sparrow, are among the most abundant winter visitors to the region. One migratory species, the house wren (*Troglodytes aedon*), breeds at Reach 28, but only winters or is a transient at Reaches 26 and 27.

TABLE 7
MIGRATORY BIRD SURVEYS

Species	Reach 28			Reach 26				Reach 27	
	9/25/20013	10/3/2013	10/25/2013	9/9/2014	9/15/2014	10/14/2014	10/22/2014	9/21/2010	12/1/2010
Canada goose (*Branta canadensis*)			1						
gadwall (*Anas strepera*)									8
mallard (*Anas platyrhynchos*)								12	90
northern pintail (*Anas acuta*)									1
California quail (*Callipepla californica*)	6		1						
great blue heron (*Ardea herodias*)	2		1					1	3
great egret (*Ardea alba*)		1							3
snowy egret (*Egretta thula*)						1		1	10
green heron (*Butorides virescens*)		1							4
black-crowned night-heron (*Nycticorax nycticorax*)				1					
Cooper's hawk (*Accipiter cooperii*)					1				
red-shouldered hawk (*Buteo lineatus*)	1	1	1					1	1
red-tailed hawk (*Buteo jamaicensis*)		1							
American coot (*Fulica americana*)								1	
western gull (*Larus occidentalis*)					2				
rock pigeon (*Columba livia*)*								15	11
band-tailed pigeon (*Patagioenas fasciata*)	1		9						
Eurasian collared-dove (*Streptopelia decaocto*)*							1		
mourning dove (*Zenaida macroura*)	3	5	1		1			2	1
Anna's hummingbird (*Calypte anna*)	4	2	3	1	2		2	3	4
Allen's hummingbird (*Selasphorus sasin*)		1							
Allen's/rufous hummingbird (*Selasphorus sasin* or *rufus*)				2				1	1
belted kingfisher (*Ceryle alcyon*)									1
acorn woodpecker (*Melanerpes formicivorus*)	3	6	6						
Nuttall's woodpecker (*Picoides nuttallii*)	1	2	1						
downy woodpecker (*Picoides pubescens*)	2	1	1						
northern flicker (*Colaptes auratus*)		2	2						
American kestrel (*Falco sparverius*)									2
red-crowned parrot (*Amazona viridigenalis*)*									
Nanday parakeet (*Aratinga nenday*) **	12	17							
western wood-pewee (*Contopus sordidulus*)		1							
Pacific-slope flycatcher (*Empidonax difficilis*)	1	1							
black phoebe (*Sayornis nigricans*)	3	2	-	-	1	1	2	3	6

TABLE 7
MIGRATORY BIRD SURVEYS

Species	Reach 28			Reach 26				Reach 27	
	9/25/20013	10/3/2013	10/25/2013	9/9/2014	9/15/2014	10/14/2014	10/22/2014	9/21/2010	12/1/2010
Hutton's vireo (*Vireo huttoni*)	1	-	-	-	-	-	-	-	-
warbling vireo (*Vireo gilvus*)	-	1	-	-	-	-	-	-	-
western scrub-jay (*Aphelocoma californica*)	4	4	1	-	1	-	-	-	-
American crow (*Corvus brachyrhynchos*)	-	-	-	-	1	-	-	4	-
common raven (*Corvus corax*)	2	7	4	-	-	-	-	4	4
oak titmouse (*Baeolophus inornatus*)	1	7	10	-	-	-	-	-	-
bushtit (*Psaltriparus minimus*)	10	9	20	-	3	10	4	-	10
white-breasted nuthatch (*Sitta carolinensis*)	-	-	1	-	-	-	-	-	-
canyon wren (*Catherpes mexicanus*)	-	-	1	-	-	-	-	-	-
house wren (*Troglodytes aedon*)	2	2	-	-	-	-	-	-	2
Bewick's wren (*Thryomanes bewickii*)	2	1	1	-	-	-	-	-	-
ruby-crowned kinglet (*Regulus calendula*)	-	1	2	-	-	-	-	-	3
wrentit (*Chamaea fasciata*)	1	1	1	-	-	-	-	-	-
hermit thrush (*Catharus guttatus*)	-	-	1	-	-	-	-	-	-
California thrasher (*Toxostoma redivivum*)	-	1	-	-	-	-	-	-	-
northern mockingbird (*Mimus polyglottos*)	-	-	1	-	1	-	-	-	-
European starling (*Sturnus vulgaris*)*	3	6	10	-	-	-	-	-	-
orange-crowned warbler (*Oreothlypis celata*)	2	-	-	-	1	-	-	3	2
common yellowthroat (*Geothlypis trichas*)	1	2	2	-	1	1	-	22	11
yellow warbler (*Setophaga petechial*)	-	-	-	-	-	-	-	1	-
yellow-rumped warbler (*Setophaga coronata*)	-	2	20	-	-	3	1	-	25
Townsend's warbler (*Setophaga townsendi*)	-	-	-	-	-	-	1	-	1
Wilson's warbler (*Cardellina pusilla*)	-	-	-	-	-	-	-	1	1
spotted towhee (*Pipilo maculatus*)	4	4	3	-	-	-	-	-	-
California towhee (*Melozone crissalis*)	2	1	-	-	-	-	-	1	2
chipping sparrow (*Spizella passerina*)	-	-	1	-	-	-	-	-	-
song sparrow (*Melospiza melodia*)	4	2	-	-	-	-	-	5	2
Lincoln's sparrow (*Melospiza lincolnii*)	-	-	-	-	-	-	-	-	4
white-crowned sparrow (*Zonotrichia leucophrys*)	-	2	3	-	-	-	-	-	3
dark-eyed junco (*Junco hyemalis*)	1	2	10[1]	-	-	-	-	-	-
western tanager (*Piranga ludoviciana*)	-	-	-	1	-	-	-	2	-
blue grosbeak (*Passerina caerulea*)	-	-	-	-	-	-	-	2	-
hooded oriole (*Icterus cucullatus*)	-	-	-	-	1	-	-	-	-

TABLE 7
MIGRATORY BIRD SURVEYS

Species	Reach 28			Reach 26				Reach 27	
	9/25/20013	**10/3/2013**	**10/25/2013**	**9/9/2014**	**9/15/2014**	**10/14/2014**	**10/22/2014**	**9/21/2010**	**12/1/2010**
house finch (*Haemorhous mexicanus*)	6	7	5	2	4	2	-	13	12
lesser goldfinch (*Spinus psaltria*)	3	2	1	-	-	-	2	5	-
American goldfinch (*Spinus tristis*)	-	-	-	-	-	-	-	-	1
house sparrow (*Passer domesticus*)*	-	-	-	-	-	-	-	2	-
scaly-breasted munia (*Ponchura punctulata*)*	-	-	-	-	-	-	-	35	5
TOTAL SPECIES	**29**	**35**	**31**	**5**	**13**	**6**	**7**	**23**	**31**
TOTAL BIRD ABUNDANCE/BIRD DENSITY (bird per acre)	**88/38.3**	**108/50.0**	**125/54.3**	**7/20.0**	**20/57.1**	**6/17.1**	**13/37.1**	**164/20.8**	**265/33.7**

* Introduced Species – Non-native species that have received recognition by the California Bird Records Committee (CBRC) as having established breeding populations in California
** Exotic species

[1] One gray-headed junco (*Junco hyemalis caniceps*), a rare subspecies in southern California, was observed during the survey among the flock of ten Oregon juncos (*Junco hyemalis thurberi*), which is the common subspecies wintering in the region

3.5 VEGETATION TRANSECTS

BonTerra Psomas Biologists quantitatively assessed the percent cover of the vegetation within each of the SBC reaches. The quantification was accomplished by selecting transect locations that were correlated to the maps that depicted Manning's or hydraulic roughness coefficient values (*n* values) developed by hydrologists for the reaches. Transects were conducted before and after the LACFCD's annual fall season maintenance activities. Each transect was conducted perpendicular to the flow of water (i.e., across the width of each reach). Global Positioning System (GPS) points were taken at both the beginning and ending locations for each transect. The starting point of each transect was generally located at the top of the bank to the right when facing upstream.

The point-intercept method was used to collect data at one-foot intervals along each transect. Except for sites with high diversity of plant species, the results of the line-intercept method do not differ significantly from the point-intercept method. Since the point-intercept method is less time-consuming and since flood-control channels generally support relatively low diversity, the line-intercept method was selected as the most appropriate method for the vegetation transects. Table 8 below lists each reach and the distance of each transect. Data included identification and documentation of each plant species and the ground cover that occurred at one-foot intervals along each transect. Data workbooks are included as Appendix D. Non-native grass species were generally compiled together into one non-native grass category. Tree sizes were identified as mature, medium shrub, or seedling. Data does not include trees and other plants rooted on upper banks outside the drainage (i.e., the tree canopy of a tree rooted outside the channel was not included)[1]. Photographs were also taken from the starting and ending points of each transect or transect segment.

TABLE 8
VEGETATION ANALYSIS TRANSECTS

Reach No.	Transect No.	Transect Length (ft)	Reach No.	Transect No.	Transect Length (ft)
26	1	80	34	1	20
	2	80		2	20
	3	200	35	1	70
	4	90		2	70
28	1	165	36	1	65
	2	168		2	65
29	1	40	37	1	100
	2	40		2	100
32	1	27		3	100
	2	27	38	1	50
	3	27		2	50
	4	27			
33	1	32			
	2	32			
	3	32			
	4	32			

ft: feet
Note: No transect data was collected for Reach 27 due to construction of the Proposition O project.

[1] Note that this differs from the methods used to map vegetation types of some of the SBC reaches in the Los Angeles River Watershed, as tree canopies of trees rooted outside the banks of the channel were used to determine the vegetation type.

3.5.1 PRE- AND POST-CLEARING VEGETATION TRANSECTS

Except for Reach 27, which was under construction for the City of Los Angeles Department of Public Works Proposition O project, transect data was collected at each of the SBC reaches in this Report by BonTerra Psomas Biologists Brian Daniels and Jennifer Pareti and Leatherman BioConsulting Botanist Sandra Leatherman. Transects were completed on August 6, 8, 12, and 22, 2013, prior to the beginning of the LACFCD's annual maintenance activities. Pre-clearing vegetation transects are shown below in Table 9.

Post-vegetation clearing transect data were also collected (using the same method as for the pre-clearing transects) after completion of maintenance activities on October 22, and December 9, and 22, 2013, by Ms. Pareti and Ms. Leatherman. These transects were conducted at the same locations as the pre-clearing vegetation transects. Because vegetation clearing occurred for different SBC reaches on different dates, a variable but generally small amount of vegetative re-growth occurred before post-clearing transect data collection was performed. If vegetation clearing did not occur, no post-clearing transect data was collected. Of the ten SBC reaches at which pre-vegetation clearing transects were performed, vegetation clearing did not occur at five transect locations: all four Reach 33 transects and one of the three Reach 37 transects. The total averages presented below in Table 9 do not include the pre-clearing data collected for these five transects.

Table 9 shows the results of the pre- and post-clearing transects of percent cover of native vegetation, non-native vegetation, and unvegetated areas for 10 of the 11 SBC reaches in this Report. Data in Table 9 also summarize the net changes in percent cover between pre- and post-clearing transects to measure the effect of vegetation clearing on percent cover relative to native vegetation, non-native vegetation, and unvegetated areas. The combined totals of 22 pre- and post-clearing vegetation transects on Table 9 for the SBC reaches show an average net loss of 12.1 percent cover and 32.8 percent cover for native and non-native vegetation, respectively, and an average net gain of 31.5 percent cover for unvegetated areas following the 2013 clearing activities conducted by the LACFCD.

TABLE 9
TOTAL VEGETATED AND UNVEGETATED PERCENT COVER

Reach	Transect	Pre-Vegetation Clearing			Post-Vegetation Clearing			Vegetation Clearing Effect on Percent Cover (Post-Clearing minus Pre-Clearing)		
		% Native	% Non-native	% Unvegetated	% Native	% Non-native	% Unvegetated	% Native	% Non-native	% Unvegetated
26	1	27.5	63.0	32.5	20.0	35.0	63.8	-7.5	-28.0	31.3
	2	32.5	97.5	2.5	30.0	65.0	21.3	-2.5	-32.5	18.8
	3	42.5	83.0	0.0	31.5	64.5	4.0	-11.0	-18.5	4.0
	4	32.2	95.6	0.0	6.7	43.3	52.2	-25.5	-52.3	52.2
28	1	43.0	28.5	30.9	53.3	1.2	45.5	10.3	-27.3	17.0
	2	64.3	31.0	13.1	65.5	0.6	33.9	1.2	-30.4	2.9
29	1	2.5	25.0	72.5	15.0	7.5	77.5	12.5	-17.5	5.0
	2	57.5	10.0	40.0	40.0	0.0	60.0	-17.5	-10.0	20.0
32	1	74.1	33.3	22.2	11.1	0.0	88.9	63.0	-33.3	66.7
	2	14.8	22.2	63.0	0.0	25.9	74.1	-14.8	-3.7	11.1
	3	11.1	92.6	7.4	3.7	3.7	92.6	-7.4	-88.9	85.2
	4	3.7	92.6	7.4	0.0	0.0	100.0	-3.7	-92.6	92.6
33	1	75.0	21.9	15.6	N/A	N/A	N/A	N/A	N/A	N/A
	2	56.3	25.0	40.6	N/A	N/A	N/A	N/A	N/A	N/A
	3	100.0	0.0	0.0	N/A	N/A	N/A	N/A	N/A	N/A
	4	96.9	0.0	3.1	N/A	N/A	N/A	N/A	N/A	N/A
34	1	100.0	40.0	0.0	95.0	0.0	5.0	-5.0	-40.0	5.0
	2	100.0	95.0	0.0	100.0	50.0	0.0	0.0	-45.0	0.0
35	1	47.1	41.4	32.9	1.4	2.9	95.7	-45.7	-40.0	62.8
	2	71.4	50.0	0.0	20.0	22.9	57.1	-51.4	-27.1	57.1
36	1	100.0	43.1	0.0	87.7	12.3	0.0	-12.3	-30.8	12.3
	2	86.2	24.6	3.1	96.9	3.1	0.0	10.7	-21.5	-3.1
37	1	81.0	27.0	16.0	25.0	4.0	75.0	-56.0	-23.0	59.0
	2	82.0	29.0	18.0	46.0	1.0	53.0	-36.0	-28.0	35.0
	3	92.0	57.0	3.0	N/A	N/A	N/A	N/A	N/A	N/A
38	1	70.0	38.0	20.0	12.0	12.0	76.0	-58.0	-26.0	56.0
	2	100.0	44.0	0.0	90.0	38.0	10.0	-10.0	-6.0	1.0
Average		**56.5**	**50.3**	**17.3**	**38.7**	**17.9**	**49.3**	**-12.1**	**-32.8**	**31.5**

N/A: not applicable.
Note: N/A indicates that a post-clearing survey was not completed because vegetation at this transect location had not been cleared. As a result, the pre-vegetation clearing data for those five transects (i.e., all four Reach 33 transects and one of the three Reach 37 transects) are excluded and are not used in the calculation of overall averages.

SECTION 4.0 CALIFORNIA RAPID ASSESSMENT METHOD ANALYSIS

4.1 METHODS/INTRODUCTION

The California Rapid Assessment Method (CRAM) is a wetland monitoring tool that is designed to quickly evaluate the overall condition of a wetland and identify stressors that affect its condition. CRAM scores result from the evaluation of four equally weighted attributes: (1) buffer and landscape context; (2) hydrology; (3) physical structure; and (4) biotic structure (CWMW 2013). A summary of the ten metrics and six sub-metrics that comprise these attributes is provided in Table 10.

TABLE 10
SUMMARY OF CALIFORNIA RAPID ASSESSMENT METHOD ATTRIBUTES AND METRICS

Attribute	Metric		Description
Buffer and Landscape Context	Aquatic Area Abundance		Measures connectivity along the riparian corridor for wildlife movement; non-buffer land types are identified 500 meters upstream and downstream of the Assessment Area
	Buffer Condition		Combination of the three sub-metric scores described below
	Sub-metrics	Percentage of Assessment Area with Buffer	Measures percentage of the Assessment Area perimeter that contains land cover types that provide a buffer
		Average Buffer Width	Measures the average width of identified buffer land types around the Assessment Area
		Buffer Condition	Qualitatively evaluates buffer condition
Hydrology	Water Source		Qualitatively evaluates impacts to the extent, duration, and frequency of saturated or ponded conditions
	Hydroperiod/Channel Stability		Qualitatively evaluates channel equilibrium, degradation, or aggradation
	Hydrologic Connectivity		Measures the entrenchment of the channel to determine the ability for water to inundate adjacent upland areas.
Physical Structure	Structural Patch Richness		Measures the diversity of physical riparian features that may potentially provide habitat for aquatic species (e.g., vegetated islands, pools, and riffles, among others).
	Topographic Complexity		Qualitatively evaluates the variety of elevations (i.e., micro-topographic heterogeneity)
Biotic Structure	Plant Community		Average of the three sub-metric scores described below
	Sub-metrics	Number of Plant Layers	Identifies number of plant strata
		Number of Co-dominant Species	Identifies the number of co-dominant plant species based on visual estimation
		Percent Invasive Species	Measures the percent of invasive plant species among the co-dominant species identified above
	Horizontal Interspersion		Qualitatively evaluates the variety and distribution of plant associations
	Vertical Biotic Structure		Identifies the number and distribution of plant strata

In 2006, the U.S. Environmental Protection Agency recommended a framework for comprehensive wetland monitoring to help States meet the requirements described in the Clean Water Act. This framework consists of the following three-tiered approach (USEPA 2006):

- Level 1 Assessments: map-based inventories of wetland resources;
- Level 2 Assessments: evaluation of general wetland condition using relatively simple field indicators; and
- Level 3 Assessments: collection of quantitative data about selected functions or beneficial uses of wetlands.

CRAM is designed as a Level 2 assessment tool that provides scientifically defensible, standardized data on the trends and conditions of wetlands in addition to stressors that affect wetlands (CWMW 2013). The ten metrics (and six sub-metrics) used in CRAM evaluations are derived from Level 3 studies that are designed to show relationships between the ecological functions of the wetlands and anthropogenic stress. Stein et al. (2009) tested the validity of the CRAM approach by correlating CRAM scores to existing monitoring and assessment data on avian diversity, benthic macroinvertebrate indices, and plant community composition. The results of this analysis indicated that rapid assessment methods, including CRAM, can provide a meaningful and reliable tool for assessing wetland conditions.

Each of the CRAM metrics is given a score of A (12 points), B (9 points), C (6 points), or D (3 points). CRAM scores for each of the 4 attributes range from 25 to 100. The 4 attribute scores are then averaged to determine the final CRAM score for a site. The final score is a relative measurement to indicate how an individual site compares to the best achievable conditions. For context, personnel associated with the Southern California Coastal Water Research Project (SCCWRP 2010) performed CRAM evaluations throughout the San Gabriel River Watershed. The highest score in that report was 91, recorded in areas of the upper San Gabriel River Watershed, while the lowest score was 35, recorded in the channelized main stem of the river.

BonTerra Psomas Regulatory Specialist Ecologist David Hughes visited each of the 11 SBC reaches in this Report to perform the CRAM evaluation on August 16, 20, 23, and 29, 2013. Prior to visiting each channel reach, one or more Assessment Areas (AA) were identified on aerial photographs, consistent with CRAM guidelines. The AA is the CRAM study area for each channel reach; the number of AAs is dependent on the size of the area to be assessed and the variability of conditions. Generally, the minimum length of an AA is 100 meters; however, Reach 36 was less than 100 meters in total length, so the AA was shortened to encompass the entire reach.

Field investigation at each of these channel reaches consisted of performing channel measurements, visually estimating conditions, and identifying features on standardized checklists to determine scores for the following metrics and sub-metrics: buffer condition, hydroperiod/channel stability, hydrologic connectivity, structural patch richness, topographic complexity, number of plant layers, number of do-dominant species, percent invasive species, horizontal interspersion, and vertical biotic structure. The following metrics were initially analyzed in the office via aerial photo analysis with results confirmed or adjusted in the field: landscape connectivity, percent of AA with buffer, average buffer width, and water source.

As noted above, CRAM scores can range from a minimum score of 25 to a maximum score of 100. This range of scores can be split into 5 equal ranges that allow categorization of ecological functioning as summarized below in Table 11. This categorization is not described in the CRAM User's Manual, but it is provided herein for the purpose of broadly categorizing each reach.

TABLE 11
FUNCTIONAL RATING

CRAM Score	Functional Rating
85.0–100.0	Very High
70.0–84.9	High
55.0–69.9	Moderate
40.0–54.9	Low
25.0–39.9	Very Low

4.2 RESULTS

A total of 13 AAs were established in the various channel reaches. Generally, the number of AAs utilized was dependent on the length of the channel reach and the uniformity of the conditions (i.e., channels with heterogeneous conditions had more AAs). Of the 11 reaches surveyed for this Report, 6 scored in the "moderate" range (Reaches 27, 28, 34, 36, 37, and 38) and 5 scored in the "low" range (Reaches 26, 29, 32, 33, and 35). A summary of the results of the CRAM evaluation is provided in Table 12. The CRAM datasheets for each AA are provided in Appendix E. A summary of field conditions that determined the CRAM scores for each attribute is provided below.

TABLE 12
SUMMARY OF CALIFORNIA RAPID ASSESSMENT METHOD
ATTRIBUTE SCORES

Channel Reach No.	Number of Assessment Areas	CRAM Attributes					Functional Rating
		Buffer and Landscape Context	Hydrology	Physical Structure	Biotic Structure	Final Score[a]	
26[b]	2	39.4	75.0	37.5	56.3	52.1	Low
27	1	75.0	66.7	50.0	44.4	59.0	Moderate
28	1	73.3	58.3	75.0	66.7	68.3	Moderate
29	1	66.5	41.7	25.0	33.3	41.6	Low
32[b]	2	73.7	58.3	37.5	40.3	52.5	Low
33	1	50.0	50.0	25.0	44.4	42.4	Low
34	1	47.9	83.3	50.0	55.6	59.2	Moderate
35	1	67.7	33.3	37.5	41.7	45.0	Low
36	1	25.0	83.3	50.0	63.9	55.6	Moderate
37	1	52.8	75.0	62.5	66.7	64.2	Moderate
38	1	55.8	83.3	37.5	63.9	60.1	Moderate

[a] Final score is calculated as the average of the four attribute scores.
[b] More than one Assessment Area was utilized for these channel reaches. The final score reflects the average score of the Assessment Areas.

4.2.1 BUFFER AND LANDSCAPE CONTEXT ATTRIBUTE

The surrounding landscapes in which the various reaches are found differ markedly, which is reflected in the wide variety of CRAM scores for this attribute. Scores for the Aquatic Area Abundance metric (previously Landscape Connectivity) were generally a D or an A (Reach 33 received a B score). Reaches that received a D were affected by the reach entering an underground or concrete channel that restricted the ability of wildlife to migrate through the

area. The Percentage of the AA with a Buffer metric also received highly variable scores. Seven reaches received a score of A or B while the remaining four reaches received a C or D. Buffer widths were generally poor, as eight reaches received a D score. Most reaches were bordered by residential or commercial development on at least one side that resulted in low scores (Reach 32 received an A for the Buffer Width metric in the upstream portion of the reach and a D in the downstream portion). Scores for Buffer Condition metric were less variable with seven SBC reaches receiving a score of B or C. Buffers usually consisted of an intermediate mixture of native and non-native vegetation with limited human visitation. One exception was Reach 34, where the buffer (while very narrow) was dominated by native vegetation. Overall, scores for the Buffer and Landscape Context attribute varied widely, with Reach 36 receiving a minimum score of 25 and Reach 32 receiving a very high score of almost 80.

4.2.2 HYDROLOGY ATTRIBUTE

Scores within the Hydrology attribute ranged much less than the Buffer and Landscape Context attribute described above. Nine reaches received a score of C for the Water Source metric, as the watershed for these reaches is highly or moderately urbanized. The other two reaches (29 and 36) received a B score as their watersheds appeared to be less than 20 percent developed. Many of the reaches were affected by mild to moderate degradation (overall loss of sediment) and received a B score. Reaches 29 and 35 received a D score, as these reaches were artificially hardened. Surprisingly five of the reaches received a score of A for the Hydrologic Connectivity metric. Because the SBCs that the County maintains are part of the flood-control system, these reaches typically receive a low Hydrologic Connectivity score as they are highly entrenched to minimize the opportunity for water to overflow the banks. However, many of the reaches in this Report (e.g., 34, 36, 37, and 38) are in a semi-natural state. These reaches, along with Reach 26, received A scores. The remaining reaches received scores of C or D (except Reach 27, which received a B score). Overall, scores for this attribute range from 33.3 for Reach 35 to 83.3 for Reach 36.

4.2.3 PHYSICAL STRUCTURE ATTRIBUTE

The Structural Patch Richness and Topographic Complexity metrics that comprise this attribute generally received scores of C or D. These channels in their natural state are ephemeral, many of these channels are highly modified, and ones that are in a more natural state have had their natural stream dynamics (e.g., sediment deposition) altered. These factors generally discourage development of structural patches, and few of the structural patches that are described in the CRAM manual were observed. The only reaches that did not receive a minimum score are Reaches 28 and 37 (these reaches received a C score). Similarly, because these are slightly modified channels, these reaches received generally low scores for Topographic Complexity. Secondary benches along the stream banks generally were not present, and when they were, they lacked the micro-topography that encourages habitation by invertebrate wildlife. One exception was Reach 28, which received an A due to the heterogeneity of the banks. Overall, scores for this attribute range from 25.0 for Reaches 29 and 33 up to 75.0 for Reach 28.

4.2.4 BIOTIC STRUCTURE ATTRIBUTE

Similar to many of the attributes described above, scores in the Biotic Structure attribute also varied significantly. Scores for the Number of Plant Layers tended to be rather high with most reaches receiving an A or B. Scores related to the Number of Co-dominant Species and Number of Co-dominant Invasive Species tended to be in the moderate range (B or C). Scores for the Horizontal Interspersion/Plant Zonation metric were generally low (C or D) due to a mostly uniform coverage of vegetation. While scores of the Number of Plant Layers are fairly high, these layers generally have limited overlap. Therefore, scores for the Vertical Biotic

Structure metric are moderately low with six of the reaches receiving scores of C or D and five receiving a score of B. Overall, scores for this attribute range from 41.6 for Reach 29 to 68.3 for Reach 28.

4.2.5 STRESSORS

Several stressors are associated with each of the reaches in this Report. A summary of these stressors is provided below in Table 13. The most common stressors include the presence of development in the general vicinity of the reaches (both residential and industrial), unnatural inflows, point-source discharges (storm water outlets into the channels), and the location of the reaches in and immediately adjacent to engineered channels. Other stressors are associated with the maintenance activities in the reaches such as vegetation management, removal of woody debris, and treatment of non-native plants. Trash was an issue at several reaches as well.

TABLE 13
SUMMARY OF STRESSORS ASSOCIATED WITH EACH REACH

Stressors	Reaches										
	26	**27**	**28**	**29**	**32**	**33**	**34**	**35**	**36**	**37**	**38**
Buffer and Landscape Context Attribute											
Urban Residential	x	x	x	x	x	x	x	x	x	x	x
Industrial/Commercial	x	-	-	-	-	x	-	x	-	x	x
Transportation Corridor	-	-	-	-	-	-	-	x	-	-	-
Ranching	-	-	-	-	x	-	-	-	x	-	-
Sports Fields/Parks	-	-	-	-	-	-	x	-	x	-	-
Hydrology Attribute											
Point-Source discharge	-	-	-	x	x	-	-	-	-	-	-
Unnatural Inflows	x	x	-	-	-	-	-	x	-	-	-
Drop Structures	-	-	-	-	x	-	-	-	-	-	-
Engineered Channel	x	x	x	x	x	x	-	x	-	x	-
Excessive Sediment or Organic Debris	-	-	-	-	-	x	-	-	-	-	-
Physical Structure Attribute											
Vegetation Management	x	x	x	x	x	x	x	x	x	x	x
Trash	x	x	-	x	-	-	-	x	x	-	-
Biotic Structure Attribute											
Removal of Woody Debris	x	-	-	-	-	-	-	-	x	-	-
Treatment of Non-Native plants	x	-	-	-	-	-	-	-	-	-	-

SECTION 5.0 RECOMMENDATIONS

In order to provide the LACFCD with recommendations for allowing additional vegetation in those SBC reaches identified by the hydraulic analysis as having sufficient flood-control capacity to allow such vegetation, BonTerra Psomas developed biological value rankings for all 11 SBC reaches in this Report. The biological value rankings are a synthesis of results from all biological surveys conducted for this Report, including the CRAM analysis. The results are presented below in Tables 14 and 15. Note that Table 16, as it did in the biological technical assessment reports for the Los Angeles and San Gabriel River Watersheds, shows a strong correlation between higher CRAM scores and higher Biological Value scores.

TABLE 14
SUMMARY OF BIOLOGICAL VALUES

Reach Number	Native Vegetation Types[a]	Special Status Plants	Special Status Wildlife[b]	Summer (Breeding) Birds[c]	Transects - Native Vegetation[d]	CRAM Results[e]	Final Score
26	1.0	–	–	–	0.5	–	1.5
27	1.0	–	1.0	0.5	1.0*	0.5	4.0
28	1.0	–	–	0.5	1.0	0.5	3.0
29	1.0	–	–	–	0.5	–	1.5
32	1.0	–	–	0.5	0.5	–	2.0
33	1.0	–	–	–	1.0	–	2.0
34	1.0	–	–	0.5	1.0	0.5	3.0
35	1.0	–	–	–	1.0	–	2.0
36	1.0	–	–	0.5	1.0	0.5	3.0
37	1.0	–	–	0.5	1.0	0.5	3.0
38	1.0	–	–	0.5	1.0	0.5	3.0

[a] A score of 1 was assigned if a native vegetation type was present in the reach; the score was reduced by one-half if the native vegetation type was identified as disturbed (see Table 2).

[b] A score of 1 was assigned if a Threatened or Endangered species was located in the reach during focused surveys (see Table 4); if a reach has potential for a Threatened and Endangered species from another taxonomic group, an additional half-point was assigned to this column score.

[c] A score of 1 was assigned to this column if a California Bird Species of Special Concern was located in the reach during the summer breeding bird surveys (see Table 5); an additional half-point was assigned to this column score if one or more species on the Los Angeles County Bird Watchlist was present during the summer breeding bird surveys (see Table 5).

[d] A score of 1 was assigned if the pre-clearing transects produced greater than 50% native vegetation on average for the reach; a half-point was assigned to this column score if the native vegetation averaged more than 25% but less than 50% for the reach. Note that transects were not conducted at Reach 27 due to on-going construction activities for the City of Los Angeles Department of Public Work's Proposition O project, but a score of 1.0 was assigned to this SBC reach based on expected results after construction.

[e] A score of 1 was assigned to those SBC reaches with high CRAM functional ratings, a score of one-half for SBC reaches with moderate CRAM functional rating, and no score for SBC reaches with a low CRAM functional rating.

TABLE 15
BIOLOGICAL VALUE SCORES RANKED HIGH TO LOW

Reach Number	Native Vegetation Types	Special Status Plants	Special Status Wildlife	Summer (Breeding) Birds	Transects Native Vegetation	CRAM Results	Final Score[a]
27	1.0	–	1.0	0.5	1.0	0.5	4.0
28	1.0	–	–	0.5	1.0	0.5	3.0
37	1.0	–	–	0.5	1.0	0.5	3.0
38	1.0	–	–	0.5	1.0	0.5	3.0
34	1.0	–	–	0.5	1.0	0.5	3.0
36	1.0	–	–	0.5	1.0	0.5	3.0
32	1.0	–	–	0.5	0.5	–	2.0
35	1.0	–	–	–	1.0	–	2.0
33	1.0	–	–	–	1.0	–	2.0
26	1.0	–	–	–	0.5	–	1.5
29	1.0	–	–	–	0.5	–	1.5

[a] Final scores of equal value were sorted from high to low based on their final CRAM score (see Table 14).

As noted in the Hydraulic Analysis Technical Assessment Report prepared for the LACFCD, 6 of the 11 SBC reaches (i.e., Reaches 26, 28, 34, 36, 37, and 38) were found to lack sufficient hydraulic capacity to support additional vegetation. No recommendations for additional vegetation were therefore made for these six SBC reaches. The hydraulic deficiencies of Wilmington Drain (Reach 27) have been addressed through implementation of the Proposition O project by the City of Los Angeles Department of Public Works. The LACFCD requested that BonTerra Psomas develop recommendations for additional vegetation for the remaining four SBC Reaches (29, 32, 33, and 35). The recommendations for these SBC Reaches, following review by LACFCD channel maintenance personnel, are provided below.

REACH 29 (Las Virgenes Creek)

Within the herbaceous vegetation on the left bank, plant two (2) valley oaks (*Quercus lobata*) and five (5) blue elderberry (*Sambucus nigra*) at edge of right-of-way (about 100 to 125 feet away from concrete levee).

REACH 32 (Stokes Canyon)

The structure of the channel precludes permanent vegetation on the invert or banks immediately next to the ageing wire and pipe revetment structure. The right bank (or north bank) is cleared and used for maintenance activities. The left bank (or south bank) has some vegetation (e.g., young oaks) growing in a couple of locations. These areas could support more vegetation. Plant at least 20 young coast live oaks (*Quercus agrifolia*) on the south bank between the bridge and the most upstream end of the Reach.

REACH 33 (Medea Creek)

No additional vegetation is recommended in the upstream portion of this Reach above Thousand Oaks Blvd. It is recommended that the cattails downstream of Thousand Oaks Blvd to be allowed to naturally expand throughout this downstream area. As this natural expansion may cause overgrowth over time, the vegetation at this location may need to be trimmed back every so often.

REACH 35 (Medea Creek – Main Channel Inlet)

Although this very small channel reach has capacity, the vegetation that had been present on banks was removed by an unknown entity some years ago for a bridge repair project. The vegetation consisted of oak and native chaparral shrubs. If feasible, it is recommended that a few blue elderberry and a few mule fat shrubs are planted on the both channel banks to provide additional habitat value in the area.

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APPENDIX A

VEGETATION MAP

DEV
RUD
DEV
RUD
RUD
OW
WS
RUD
WS
WR/ORN
RUD
RUD
OW
WR
FWM
OW
OW
WR/ORN
RUD
RUD
FWM
173rd St
173rd Pl
Merit Ave
Artesia Blvd
Artesia Blvd
91
State Hwy 91
State Hwy 91
91
Vermont Ave
Cassidy St
Ramp
Ramp

Vegetation Types and Other Areas

- WR, Willow Riparian
- WR/ORN, Willow Riparian/Ornamental
- WS, Western Sycamore
- OW, Open Water
- FWM, Fresh Water Marsh
- RUD, Ruderal
- DEV, Developed

Aerial Source: LAR-IAC 2011

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Vegetation Types – Reach 26

Appendix A-1

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

Bonterra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

Aerial Source: LAR-IAC 2011

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Vegetation Types – Reach 27a

Appendix A-2

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

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Vegetation Types – Reach 27b

Appendix A-3

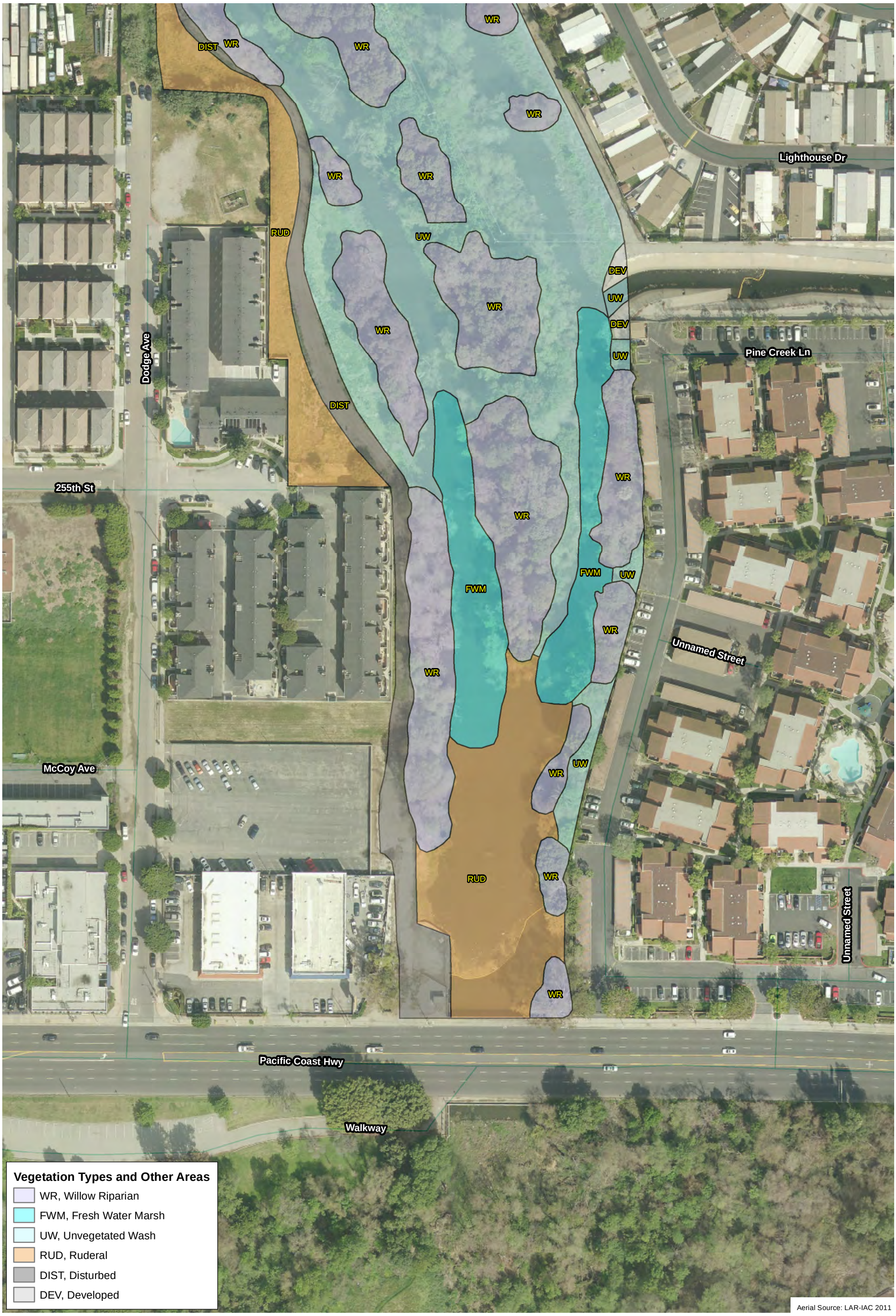
Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf



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Vegetation Types – Reach 27c

Appendix A-4

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

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Vegetation Types – Reach 28

Appendix A-5

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

OW
RUD
CAB
CSS
WR
CSS
CSS
Las Virgenes Rd
Unnamed Street

Vegetation Types and Other Areas

- CAB, California Buckwheat Scrub
- CSS, Coastal Sage Scrub
- WR, Willow Riparian
- OW, Open Water
- RUD, Ruderal

Aerial Source: LAR-IAC 2011

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Vegetation Types – Reach 29

Appendix A-6

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

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Vegetation Types – Reach 32a

Appendix A-7

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

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Vegetation Types – Reach 32b

Appendix A-8

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

Bonterra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

Vegetation Types – Reach 32c

Appendix A-9

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

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Vegetation Types – Reach 33

Appendix A-10

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

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Vegetation Types – Reach 34

Appendix A-11

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

Benterra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

Medea Ln
Canwood St
Ramp
101
101
US Hwy 101
US Hwy 101
Ramp
Roadside Dr
FWM
UW
FWM
DIST
DIST
OW
Cornell Rd

Vegetation Types and Other Areas

- OW, Open Water
- FWM, Fresh Water Marsh
- UW, Unvegetated Wash
- DIST, Disturbed

Aerial Source: LAR-IAC 2011

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Vegetation Types – Reach 35

Appendix A-12

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

Bonterra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

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Vegetation Types - Reach 36

Appendix A-13

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

PSOMAS

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Vegetation Types – Reach 37

Appendix A-14

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

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Vegetation Types – Reach 38

Appendix A-15

Malibu Creek and Dominguez Channel Watersheds Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 5-01-2015 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\AppA_Veg_Map_20150501.pdf

APPENDIX B

FOCUSED PLANT SURVEY REPORT

BonTerra PSOMAS

Balancing the Natural and Built Environment

January 31, 2014

Jemellee Cruz
Flood Maintenance Division
Department of Public Works
County of Los Angeles
900 South Fremont Ave., 2nd Floor Annex
Alhambra, California 91803

VIA U.S. MAIL AND EMAIL
jcruz@dpw.lacounty.gov

Subject: Results of Focused Surveys for Special Status Plant Species in 11 Soft-bottom Channel Reaches in the Dominguez Channel and Malibu Creek Watersheds, Los Angeles County, California

Dear Ms. Cruz:

This Letter Report presents the findings of focused surveys for special status plant species conducted in 11 Soft-bottom Flood Control Channel Reaches of the Dominguez Channel and Malibu Creek Watersheds in Los Angeles County (Exhibits 1, 2a to 2f, and 3a to 3n). All 11 channel reaches are maintained by the Los Angeles County Flood Control District (LACFCD). These focused surveys were performed for the LACFCD's Feasibility Study of the Dominguez Channel and Malibu Creek Watersheds. Table 1 below lists the number, length, and name of each channel reach, and their locations in a Thomas Guide.

TABLE 1
CHANNEL REACH INFORMATION/11 SOFT-BOTTOM CHANNEL REACHES

Reach No.	Reach Name	Reach Length (feet)	Clearing Width (feet)	Area (acres)	Thomas Guide Location
Dominguez Channel Watershed					
26	Tributary to Dominguez Channel Project No. 74	900	17	0.35	734-B7
27	Wilmington Drain, tributary to Harbor Lake	500	147	7.87	794-B4 to B5
		2,450	110		
Malibu Creek Watershed					
28	Triunfo Creek	474	211.57	2.30	587-H3
29	Las Virgenes Creek	371	136.2	1.16	558-H3
32	Stokes Canyon Channel, tributary to Las Virgenes Creek	2,255	27	1.40	588-J4 to H4
33	Medea Creek (PD T1378)	946	32	0.69	558-A4
34	Medea Creek (PD T1005) Main Channel Outlet	405	20	0.19	558-A5
35	Medea Creek under Route 101	85	70	0.14	558-A6
36	Cheseboro Main Channel Inlet, tributary to Medea Creek	56	60	0.08	558-C6
37	Medea Creek, downstream of Agoura Road	170	120	0.47	558-A6
38	Lindero Creek	187	45	0.19	558-A6

225 South Lake Avenue
Suite 1000
Pasadena, CA 91101

Tel 626.351.2000
Fax 626.351.2030
www.Psomas.com

METHODS

Botanical surveys were floristic in nature and consistent with the *Protocols for Surveying and Evaluating Impacts to Special Status Native Plant Populations and Natural Communities* (CDFG 2009). A literature search was conducted to identify special status plants and habitats known to occur in the vicinity of the 11 channel reaches. Sources reviewed include the Inglewood, Torrance, and Long Beach quadrangles for Dominguez Channel Watershed and the Calabasas, Canoga Park, Malibu Beach, Point Dume, and Thousand Oaks quadrangles for Malibu Creek Watershed in the California Native Plant Society's (CNPS) Electronic Inventory of Rare and Endangered Vascular Plants of California (CNPS 2013) and the CDFW's California Natural Diversity Database (CNDDB) (CDFW 2013a). All of the species from these electronic database searches and their status are listed in Table 3.

Reference populations were monitored for annual and difficult-to-detect target species to ensure that the scheduled surveys were comprehensive and conducted during the appropriate blooming period for these species, as shown in Table 2. Reference populations of CNPS List 3 and 4 species, and perennial species that are readily observable were not monitored. Known reference populations of San Fernando Valley spineflower (*Chorizanthe parryi var. fernandina*), Agoura Hills dudleya (*Dudleya cynisa ssp. agourensis*), and southern tarplant (*Centromadia parryi ssp. australis*) were monitored to confirm their flowering status and to verify that project surveys were conducted during the appropriate blooming period for these species. Based on the reference survey results, these focused surveys were conducted during a time frame when the target plant species were observable.

TABLE 2
SPECIAL STATUS PLANT SPECIES REFERENCE POPULATIONS

Date Checked	Species	Status	General Location
April 10, 2013	*Chorizanthe parryi* var. *Fernandina* San Fernando Valley spineflower	Flowering	Las Virgenes Canyon
May 2, 2013	*Centromadia parryi* ssp. *Australis* southern tarplant	Flowering	Seal Beach
May 28, 2013	*Dudleya cymosa ssp. agourensis* Agoura Hills dudleya	Flowering	Agoura

According to the California Department of Water Resources, the Los Angeles Airport Weather Reporting Station received 6.92 inches of precipitation form October 2012 through September 2013, which is about 54 percent of the normal average (California Department of Water Resources 2014). Additionally, Oxnard Weather Reporting Station received 5.18 inches of precipitation (October 2012 to September 2013) which is 36 percent of the normal average (California Department of Water Resources 2014). The 2013 survey season (spring 2013 through summer 2013) was below an average year with regard to rainfall, therefore increasing the importance to reference populations to show survey validity.

TABLE 3

SPECIAL STATUS PLANT SPECIES KNOWN FROM THE VICINITY OF THE 11 CHANNEL REACHES AND THEIR STATUS

Species	Status			Potential to Occur in Surveyed Reach
	USFWS	CDFW	CRPR	
Dominguez Channel Watershed				
Aphanisma blitoides aphanisma	-	-	1B.2	No potential to occur in surveyed reaches.
Astragalus tener var. titi coastal dunes milk-vetch	FE	SE	1B.1	No potential to occur in surveyed reaches.
Atriplex coulteri Coulter's saltbush	-	-	1B.2	No potential to occur in surveyed reaches.
Atriplex pacifica South Coast saltscale	-	-	1B.2	No potential to occur in surveyed reaches.
Atriplex parishii Parish's brittlescale	-	-	1B.1	No potential to occur in surveyed reaches.
Atriplex serenana car. davidsonii Davidson's saltscale	-	-	1B.2	No potential to occur in surveyed reaches.
Camissoniopsis lewisii Lewis' evening primrose	-	-	3	No potential to occur in surveyed reaches.
Centromadia parryi ssp. australis southern tarplant	-	-	1B.1	Known from Reach 27. Potential to occur in Reach 26 and 27. Not observed during focused plant survey.
Cholophyron [Cordylanthus] maritimum ssp. maritimum salt marsh bird's beak	FE	SE	1B.2	No potential to occur in surveyed reaches.
Lasthenia glabrata ssp. coulteri Coulter's goldfields	-	-	1B.1	No potential to occur in surveyed reaches.
Nama stenocarpum Mud nama	-	-	2B.2	No potential to occur in surveyed reaches.
Navarretia fossalis Spreading navarretia	FT	-	1B.1	No potential to occur in surveyed reaches.
Navarretia prostrata Prostrate vernal pool navarretia	-	-	1B.1	No potential to occur in surveyed reaches.
Nemcaulis denudate var. denudata Coast woolly-heads	-	-	1B.2	No potential to occur in surveyed reaches.
Orcuttia californica California Orcutt Grass	FE	SE	1B.1	No potential to occur in surveyed reaches.
Pentachaeta lyonii Lyon's pentachaeta	FE	SE	1B.1	No potential to occur in surveyed reaches.
Phacelia stellaris Brand's star phacelia	FC	-	1B.1	No potential to occur in surveyed reaches.
Suada esteroa estuary seablite	-	-	1B.2	No potential to occur in surveyed reaches.
Symphyotrichum defoliatum San Bernadino aster	-	-	1B.2	Historically known from area. Not observed in surveyed reaches during focused plant survey.

TABLE 3

SPECIAL STATUS PLANT SPECIES KNOWN FROM THE VICINITY OF THE 11 CHANNEL REACHES AND THEIR STATUS

Species	Status			Potential to Occur in Surveyed Reach
	USFWS	CDFW	CRPR	
Malibu Creek Watershed				
Astagalus brauntonii Braunton's milk vetch	FE	-	1B.1	Not observed in surveyed reaches during focused plant survey.
Atriplex coulteri Coulter's saltbush	-	-	1B.2	Not observed in surveyed reaches during focused plant survey.
Atriplex parishii *Parish's brittlescale*	-	-	1B.1	Not observed in surveyed reaches during focused plant survey.
Atriplex serenana car. davidsonii Davidson's saltscale	-	-	1B.2	Not observed in surveyed reaches during focused plant survey.
Baccharis malibuensis Malibu Baccharis	-	-	1B.1	Known from adjacent to Reach 32. Not observed in surveyed reaches during focused plant survey.
California macrophylia Round leaved filaree	-	-	1B.1	Not observed in surveyed reaches during focused plant survey.
Calochortus clavatus var. gracilis Slender mariposa lily	-	-	1B.2	Not observed in surveyed reaches during focused plant survey.
Calochortus plummerae Plummer's mariposa lily	-	-	4.2	Not observed in surveyed reaches during focused plant survey.
Camissoniopsis lewisii Lewis' evening primrose	-	-	3	No potential to occur in surveyed reaches.
Centromadia parryi ssp. australis Southern tarplant	-	-	1B.1	Not observed during focused plant survey.
Cholophyron [Cordylanthus] maritimum ssp. maritimum salt marsh bird's beak	FE	SE	1B.2	No potential to occur in surveyed reaches.
Chorizanthe parryi var. fernandina San Fernando Valley spineflower	FC	SE	1B.1	No potential to occur in surveyed reaches. Not observed in surveyed reaches during focused plant survey.
Chorizanthe parryi var. parryi Parry's spineflower	-	-	1B.1	No potential to occur in surveyed reaches.
Deinandra minthornii Santa Susana tarplant	-	SR	1B.2	No potential to occur in surveyed reaches.
Delphinium parryi ssp. blochmaniae dune larkspur	-	-	1B.2	No potential to occur in surveyed reaches.
Didymodon norrisii Norris beard moss	-	-	2B.2	No potential to occur in surveyed reaches.
Dudleya blochmaniae ssp. blochmaniae Blochman's dudleya	-	-	1B.1	No potential to occur in surveyed reaches.
Dudleya cymosa ssp. agourensis Agoura Hills dudleya	FT	-	1B.2	No potential to occur in surveyed reaches. Not observed during focused plant survey.

TABLE 3

SPECIAL STATUS PLANT SPECIES KNOWN FROM THE VICINITY OF THE 11 CHANNEL REACHES AND THEIR STATUS

Species	Status			Potential to Occur in Surveyed Reach
	USFWS	CDFW	CRPR	
Dudleya cymosa ssp. marcescens Macescent dudleya	FT	SR	1B.2	No potential to occur in surveyed reaches.
Dudleya cymosa ssp. ovatifolia Santa Monica dudleya	FT	-	1B.2	No potential to occur in surveyed reaches.
Dudleya multicaulis Many stemmed dudleya	-	-	1B.2	No potential to occur in surveyed reaches.
Dudleya parva Conejo dudleya	FT	-	1B.2	No potential to occur in surveyed reaches.
Eriogonum crocatum Conejo buckwheat	-	SR	1B.2	No potential to occur in surveyed reaches.
Isocoma menziesii var. decumbens Decumbent goldenbush	-	-	1B.2	Not observed in surveyed reaches during focused plant survey.
Lasthenia glabrata ssp. coulteri Coulter's goldfields	-	-	1B.1	Not observed in surveyed reaches during focused plant survey.
Monardella hypoleuca ssp. hypoleuca White veined monardella	-	-	1B.3	No potential to occur in surveyed reaches.
Nama stenocarpum Mud nama	-	-	2B.2	No potential to occur in surveyed reaches.
Navarretia fossalis Spreading navarretia	FT	-	1B.1	No potential to occur in surveyed reaches.
Navarretia prostrata Prostrate vernal pool navarretia	-	-	1B.1	No potential to occur in surveyed reaches.
Nolina cismontana Chaparral nolina	-	-	1B.2	Not observed in surveyed reaches during focused plant survey.
Orcuttia californica California Orcutt grass	FE	SE	1B.1	No potential to occur in surveyed reaches.
Pentachaeta lyonii Lyons pentachaeta	FE	SE	1B.1	No potential to occur in surveyed reaches.
Phacelia ramosissima var. austrolitoralis south coast branching phacelia	-	-	3.2	No potential to occur in surveyed reaches.
Suada esteroa estuary seablite	-	-	1B.2	No potential to occur in surveyed reaches.
Symphyotrichum defoliatum San Bernardino aster	-	-	1B.2	Not observed in surveyed reaches during focused plant survey.
Thelypteris puberula var. sonorensis Sonoran maiden fern	-	-	2B.2	No potential to occur in surveyed reaches.

TABLE 3

SPECIAL STATUS PLANT SPECIES KNOWN FROM THE VICINITY OF THE 11 CHANNEL REACHES AND THEIR STATUS

Species	Status			Potential to Occur in Surveyed Reach
	USFWS	CDFW	CRPR	
Tortula Californica California Screw moss	-	-	1B.2	Not observed in surveyed reaches during focused plant survey.

LEGEND:

Federal (USFWS)

FE	Endangered
FT	Threatened
FC	Candidate

State (CDFW)

SE	Endangered
ST	Threatened
SR	Rare

California Rare Plant Rank (CRPR)

1A Plants Presumed Extirpated in California and Either Rare or Extinct Elsewhere
1B Plants Rare, Threatened, or Endangered in California and Elsewhere
2A Plants Presumed Extirpated in California, But More Common Elsewhere
2B Plants Rare, Threatened, or Endangered in California But More Common Elsewhere
3 Plants of About Which We Need More Information – A Review List
4 Plants of Limited Distribution – A Watch List

CRPR Threat Code Extensions

None Plants lacking any threat information
.1 Seriously Endangered in California (over 80% of occurrences threatened; high degree and immediacy of threat)
.2 Fairly Endangered in California (20–80% of occurrences threatened; moderate degree and immediacy of threat)
.3 Not very threatened in California (<20% of occurrences threatened; low degree and immediacy of threat or no current threats known)

The focused plant surveys were conducted by BonTerra Consulting Biologists Jennifer Pareti (JP) and Brian Daniels (BD); and Consulting Senior Botanist Sandy Leatherman of Leatherman BioServices (SL). The focused plant survey dates and personnel are listed below in Table 4.

TABLE 4
SURVEY DATES AND PERSONNEL

Reach No.	Survey 1		Survey 2		Survey 3	
	Dates	Personnel	Dates	Personnel	Dates	Personnel
26	April 17, 2013	JP, BD, SL	June 5, 2013	JP, SL	August 22, 2013	JP, SL
27	April 17, 2013	JP, BD, SL	June 5, 2013	JP, SL	N/A	N/A
28	April 10, 2013	JP, SL	May 28, 2013	JP, SL	August 8, 2013	JP, SL
29	April 10, 2013	JP, SL	May 28, 2013	JP, SL	August 6, 2013	JP, SL
32	April 10, 2013	JP, SL	May 22, 2013	JP, SL	August 8, 2013	JP, SL
33	April 8, 2013	JP, SL	May 22, 2013	JP, SL	August 6, 2013	JP, SL
34	April 8, 2013	JP, SL	May 22, 2013	JP, SL	August 6, 2013	JP, SL
35	April 8, 2013	JP, SL	May 22, 2013	JP, SL	August 8, 2013	JP, SL
36	April 8, 2013	JP, SL	May 28, 2013	JP, SL	August 6, 2013	JP, SL
37	April 8, 2013	JP, SL	May 28, 2013	JP, SL	August 12, 2013	JP, SL
38	April 8, 2013	JP, SL	May 28, 2013	JP, SL	August 12, 2013	JP, SL

A systematic survey was conducted in all areas of suitable special status plant habitat within the survey area for each of the 11 channel reaches. The survey area included habitats on the

earthen bottom of each channel reach but also the adjacent channel banks within the designated clearance area (Table 1). Late summer surveys (Survey 3), were conducted concomitantly with pre-clearance vegetation transects. All plant species observed were recorded in field notes. Plant species were identified in the field or collected for later identification. Plants were identified to the taxonomic level necessary to determine whether or not they are a special status species. Plants were identified using taxonomic keys, descriptions, and illustrations in Baldwin et al. (2011), Hickman (1993), and Munz (1974). Taxonomy and nomenclature follows Baldwin et al. (2011), Hickman (1993), and current scientific journals for scientific and common names. All voucher specimens collected were deposited in the herbarium at Rancho Santa Ana Botanic Gardens in Claremont, California by Ms. Leatherman in December 2013. Taxonomy and nomenclature follows Hickman (1993), the CNPS (2010), and current scientific journals for scientific and common names.

SITE DESCRIPTION

Vegetation types and other areas mapped in the 11 channel reaches consist of annual grassland, California buckwheat scrub, coyote brush scrub, coastal sage scrub, willow riparian, willow riparian/ornamental, western sycamore, open water, fresh water marsh, unvegetated wash, ruderal, ornamental, boulders, disturbed, and developed. The vegetation was mapped in the drainages, but not the overhanging canopy. The special status plant species known to occur in the study area vicinity and their potential to occur on the project sites are listed in Table 3 above. The potential for occurrence was determined based upon the suitability of the habitat present in each of the 11 channel reaches. The results of the survey are listed below.

SURVEY RESULTS

An early spring and late spring survey was conducted at each of the 11 channel reaches, with a late summer survey occurring concurrent with the pre-clearance vegetation transects. These surveys focused on the species listed above in Table 3 with potential to occur in the 11 channel reaches. No special status species were observed at any of the 11 channel reaches during the surveys.

Although reference populations and regional rainfall amounts were monitored to ensure the scientific adequacy of these focused surveys, there is always a minimal potential for false negative survey results, as species could possibly be present on a site but may not be detectable at the time of the survey.

Russian knapweed (*Acroptilon repens*) was observed in Reach 26. Russian knapweed is a noxious weed that is not native to California. Care should be taken when clearing the vegetation within Reach 26 to decrease the spread of seeds from this species.

If you have any comments or questions, please call Marc Blain or Brian Daniels at (626) 351-2000.

Sincerely,

BONTERRA PSOMAS

Marc T. Blain
Associate, Biological Resources Manager

Brian Daniels
Senior Project Manager

Enclosures: Exhibit 1 – Regional Location
Exhibits 2A to 2F – Local Vicinity
Exhibits 3A to 3M – Project Location
Attachment A – Plant Compendium

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Regional Location

Exhibit 1

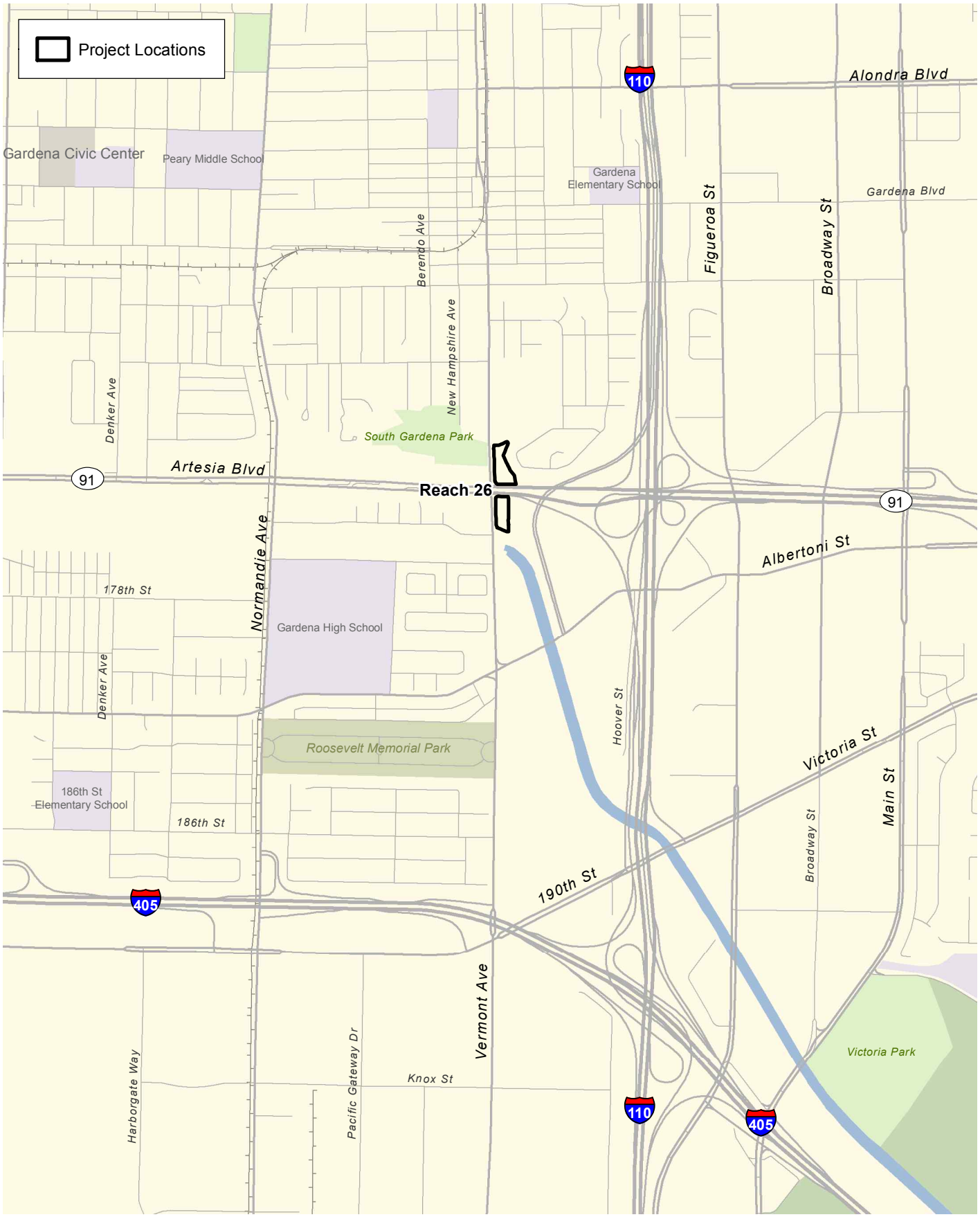
Malibu and Dominguez Channels Feasibility Study

N W E S

10 5 0 10 Miles

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\ex1_RL.pdf



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Local Vicinity

Exhibit 2a

Malibu and Dominguez Channels Feasibility Study

N W E S

1,500 750 0 1,500 Feet

BonTerra PSOMAS

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Local Vicinity

Exhibit 2b

Malibu and Dominguez Channels Feasibility Study

N W E S

1,500 750 0 1,500 Feet

BonTerra PSOMAS

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Local Vicinity

Exhibit 2c

Malibu and Dominguez Channels Feasibility Study

N
W E
S

1,500 750 0 1,500

Feet

BonTerra PSOMAS

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Local Vicinity

Exhibit 2d

Malibu and Dominguez Channels Feasibility Study

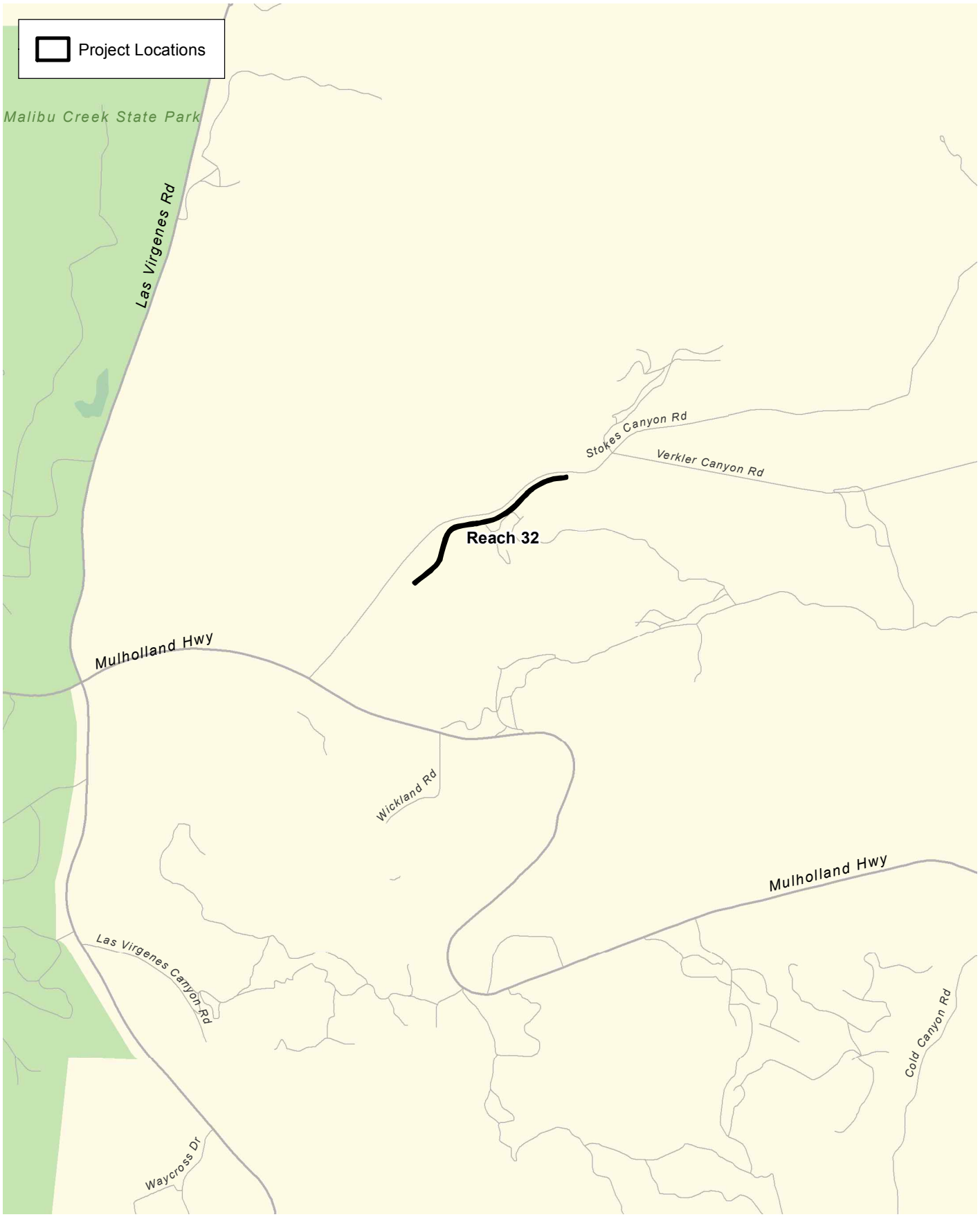
N
W E
S

1,500 750 0 1,500

Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) H:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\ex2_lv.pdf



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Local Vicinity

Exhibit 2e

Malibu and Dominguez Channels Feasibility Study

N
W E
S

1,500 750 0 1,500

Feet

BonTerra PSOMAS

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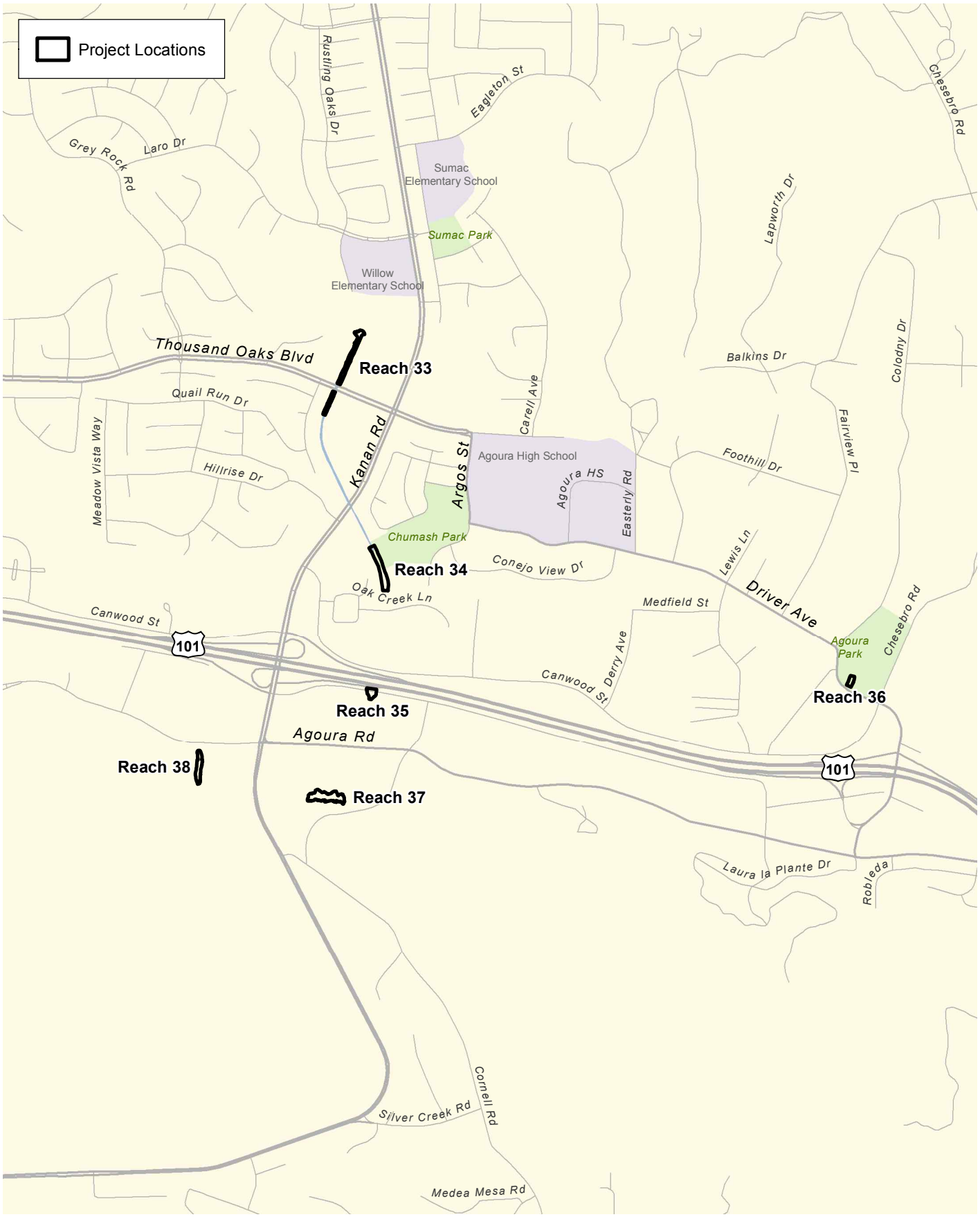

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Local Vicinity

Exhibit 2f

Malibu and Dominguez Channels Feasibility Study

N W E S

1,500 750 0 1,500 Feet

BonTerra PSOMAS

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Project Location – Reach 26

Exhibit 3a

Malibu and Dominguez Channels Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf

S Vermont Ave

110

Lomita Blvd

McCoy Ave

Aerial Source: LAR-IAC 2014

Project Location – Reach 27

Exhibit 3b

Malibu and Dominguez Channels Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf

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Aerial Source: LAR-IAC 2014

Project Location – Reach 27

Exhibit 3c

Malibu and Dominguez Channels Feasibility Study

N
W E
S

100 50 0 100
Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf

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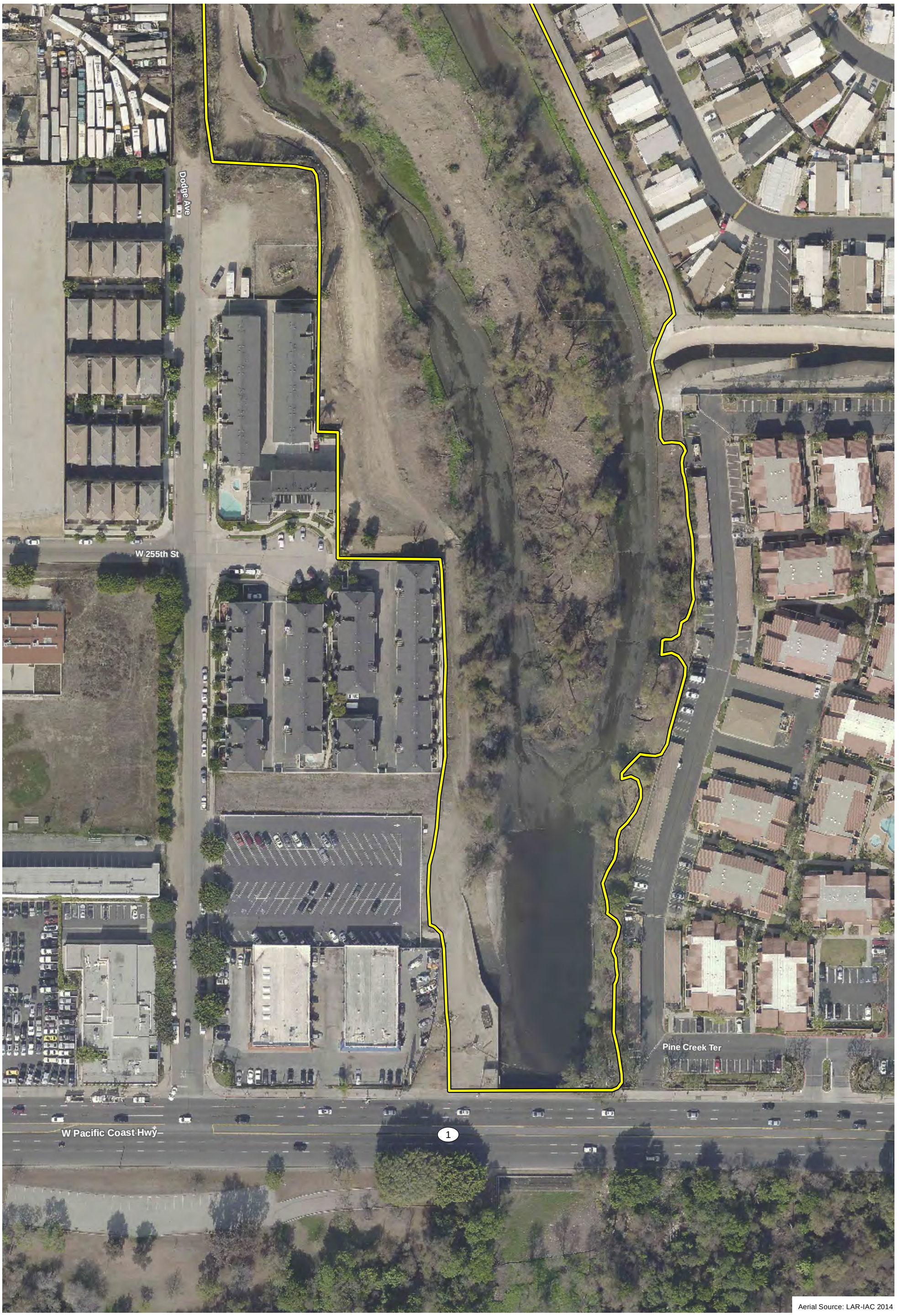

Project Location – Reach 27

Exhibit 3d

Malibu and Dominguez Channels Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

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Aerial Source: LAR-IAC 2014

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Project Location – Reach 28

Exhibit 3e

Malibu and Dominguez Channels Feasibility Study

N
W E
S

100 50 0 100
Feet

BonTerra PSOMAS

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Aerial Source: LAR-IAC 2014

Project Location – Reach 29

Exhibit 3f

Malibu and Dominguez Channels Feasibility Study

N
W E
S

100 50 0 100
Feet

Bonterra PSOMAS

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Aerial Source: LAR-IAC 2014

Project Location – Reach 32

Exhibit 3g

Malibu and Dominguez Channels Feasibility Study

N
W E
S

100 50 0 100
Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf

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Aerial Source: LAR-IAC 2014

Project Location – Reach 32

Exhibit 3h

Malibu and Dominguez Channels Feasibility Study

N
W E
S

100 50 0 100
Feet

Bonterra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf

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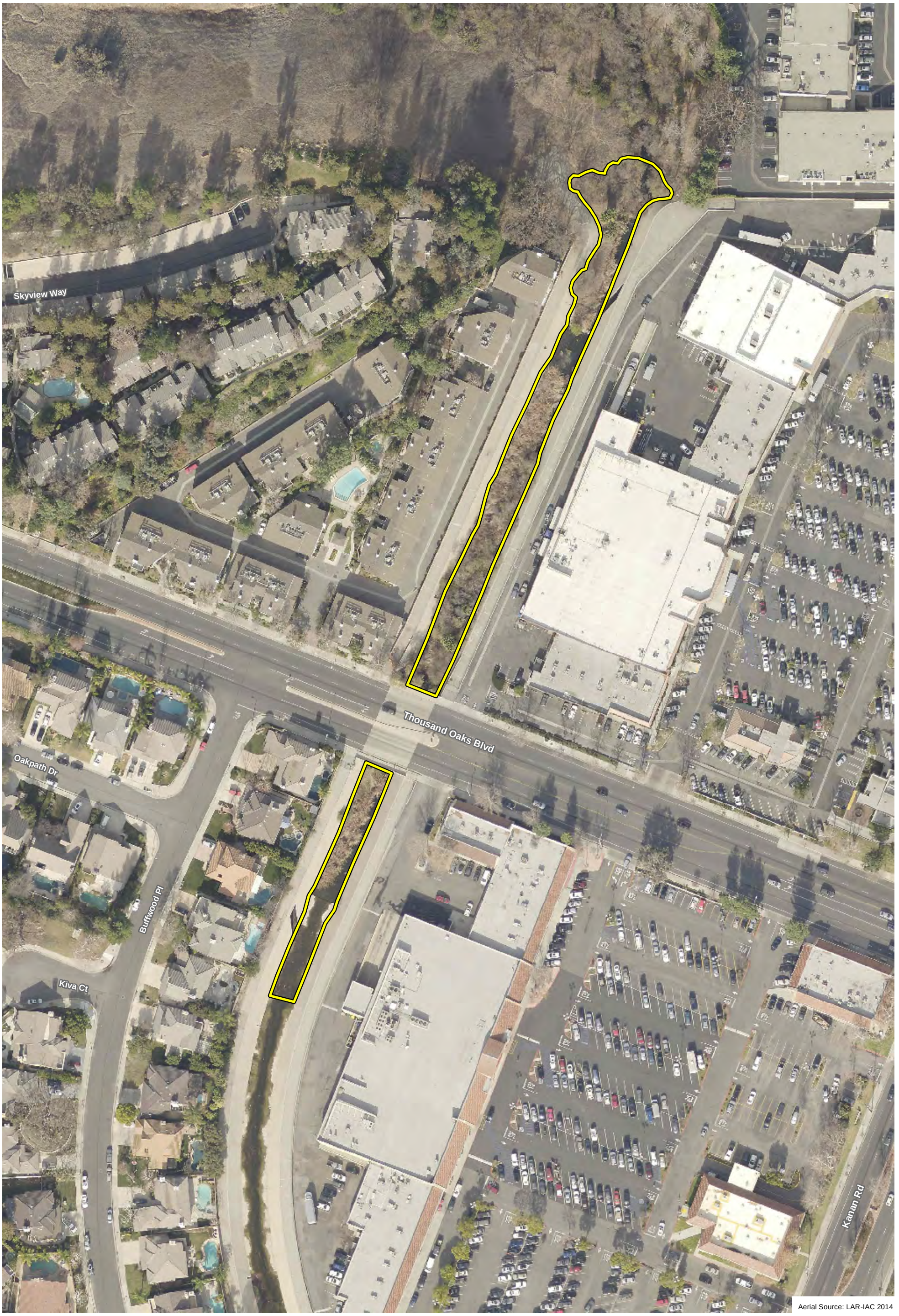

Aerial Source: LAR-IAC 2014

Project Location – Reach 33

Exhibit 3i

Malibu and Dominguez Channels Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf

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Aerial Source: LAR-IAC 2014

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Project Location – Reach 34

Exhibit 3j

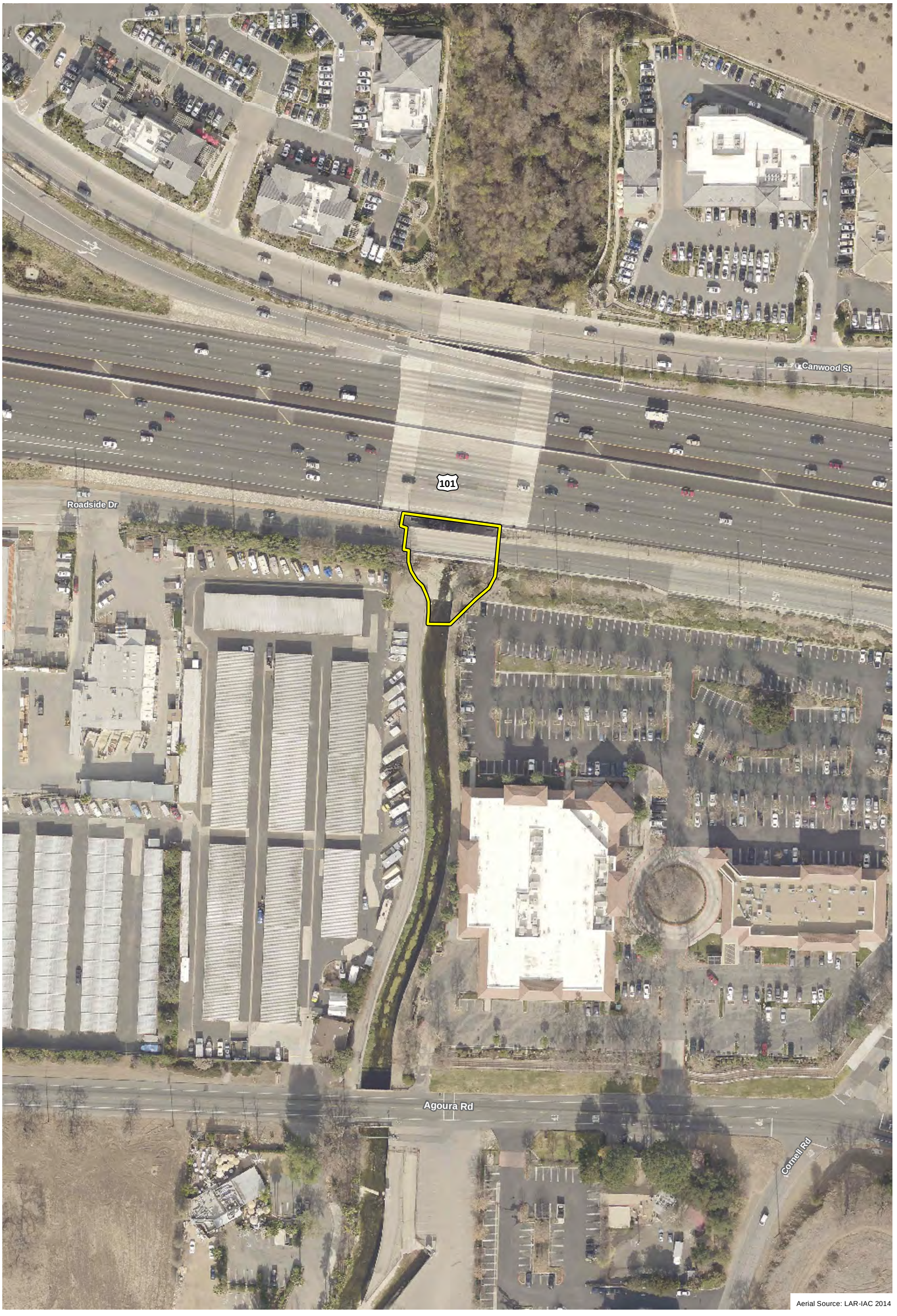
Malibu and Dominguez Channels Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf



Aerial Source: LAR-IAC 2014

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Project Location – Reach 35

Exhibit 3k

Malibu and Dominguez Channels Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf

Aerial Source: LAR-IAC 2014

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Project Location – Reach 36

Exhibit 3l

Malibu and Dominguez Channels Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf

Aerial Source: LAR-IAC 2014

Project Location – Reach 37

Exhibit 3m

Malibu and Dominguez Channels Feasibility Study

N
W E
S

100 50 0 100
Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf

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Aerial Source: LAR-IAC 2014

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Project Location – Reach 38

Exhibit 3n

Malibu and Dominguez Channels Feasibility Study

N W E S

100 50 0 100 Feet

BonTerra PSOMAS

(Rev: 03-28-2016 LEW) R:\Projects\CoLADPW (DPW)\J211\Graphics\PlantReport\Ex3_ProjectLocation.pdf

ATTACHMENT A

PLANT COMPENDIUM

Species		26	27	28	29	32	33	34	35	36	37	38
EUDICOTS		x	x	x	x	x	x	x	x	x	x	x
ADOXACEAE – MUSKROOT FAMILY				x		x						
Sambucus nigra ssp. *caerulea* [*S. mexicana*]	blue elderberry			x		x						
AIZOACEAE – FIG-MARIGOLD FAMILY			x									
*Carpobrotus edulis**	freeway iceplant		x									
AMARANTHACEAE - AMARANTH FAMILY			x									
Amaranthus blitoides	procumbent pigweed		x									
*Atriplex suberecta**	sprawling saltbush		x									
ANACARDIACEAE – SUMAC FAMILY		**x**	**x**	**x**							**x**	
*Schinus molle**	Peruvian pepper tree		x	x								
*Schinus terebinthifolius**	Brazilian pepper tree	x	x									
Toxicodendron diversilobum	western poison oak										x	
APIACEAE – CARROT FAMILY		x	x	x		x					x	x
*Apium graveolens**	common celery					x						x
*Conium maculatum**	poison hemlock		x									x
*Foeniculum vulgare**	sweet fennel	x	x	x							x	x
APOCYNACEAE – DOGBANE FAMILY							x			x	x	x
Asclepias fascicularis	narrow-leaf milkweed										x	x
*Nerium oleander**	common oleander						x					
*Vinca major**	greater periwinkle									x		
ARALIACEAE – GINSENG FAMILY		x										
*Hedera helix**	English ivy	x										
ASTERACEAE – SUNFLOWER FAMILY		x	x	x	x	x	x	x	x	x	x	x
*Acroptilon repens**	Russian knapweed	x										
Ambrosia psilostachya	western ragweed	x		x		x	x			x	x	x
Artemisia douglasiana	mugwort			x		x				x	x	x
Baccharis pilularis ssp. *consanguinea* [*B. pilularis*]	coyote brush		x			x	x	x				x
Baccharis salicifolia ssp. *salicifolia* [*B. salicifolia*]	mule fat		x	x		x		x	x		x	x
Bidens frondosa	sticktight		x									
Carduus pycnocephalus ssp. *pycnocephalus**	Italian thistle			x		x	x	x		x	x	x
Centaurea benedicta [*Cnicus benedictus*]*	blessed thistle					x						
*Centaurea melitensis**	tocalote, Malta star-thistle		x	x		x						
*Centaurea solstitialis**	yellow star-thistle			x								x
*Cirsium vulgare**	bull thistle			x		x		x		x	x	x
Corethrogyne filaginifolia[*Lessingia f.*]	California-aster					x						
*Cotula coronopifolia**	brass-buttons		x									
Erigeron canadensis [*Conyza c.*]	common horseweed	x	x		x				x		x	x
Eriophyllum confertiflorum	golden-yarrow			x		x						
Glebionis coronaria [*Chrysanthemum coronarium*]*	garland daisy	x	x									
Helminthotheca echioides [*Picris e.*]*	bristly ox-tongue	x	x	x			x	x				
Heterotheca grandiflora	telegraph weed		x	x		x						x
*Lactuca serriola**	prickly lettuce	x	x			x			x			
Logfia gallica [*Filago g.*]*	daggerleaf cottonrose					x						
Malacothrix saxatilis var. *saxatilis*	cliff malacothrix					x						
Matricaria discoidea [*Chamomilla suaveolens*]*	pineapple weed										x	x
Pseudognaphalium californicum [*Gnaphalium c.*]	California everlasting			x		x						
Pseudognaphalium luteoalbum [*Gnaphalium l.*]*	weedy cudweed					x					x	
*Senecio vulgaris**	common groundsel				x							
*Silybum marianum**	milk thistle		x	x		x						
Sonchus asper ssp. *asper**	prickly sow thistle											
*Sonchus oleraceus**	common sow thistle	x	x	x	x	x	x	x	x	x	x	
*Taraxacum officinale**	common dandelion	x										
*Tragopogon porrifolius**	purple salsify		x									
Xanthium strumarium	cocklebur				x						x	
BIGNONIACEAE – BIGNONIA FAMILY					x	x	x					
Heliotropium curassavicum var. *oculatum*	salt heliotrope, alkali heliotrope				x	x	x					x
BORAGINACEAE – BORAGE FAMILY				x						x		

Species		26	27	28	29	32	33	34	35	36	37	38
Amsinckia menziesii [*Amsinckia m.* var. *m.*]	common fiddleneck, small-flowered fiddleneck										x	
Phacelia cicutaria	caterpillar phacelia			x						x		
BRASSICACEAE – MUSTARD FAMILY		x	x	x		x	x	x	x	x	x	x
*Brassica nigra**	black mustard					x		x			x	x
*Brassica rapa**	field mustard											
*Capsella bursa-pastoris**	shepherd's purse							x				
*Hirschfeldia incana**	shortpod mustard	x	x	x		x		x	x	x	x	x
*Lepidium latifolium**	broad-leaved peppergrass		x	x			x	x	x	x	x	x
Nasturtium officinale [*Rorippa nasturtium-aquaticum*]*	water cress								x		x	x
*Raphanus sativus**	radish	x	x									
CAPRIFOLIACEAE – HONEYSUCKLE FAMILY											x	
Lonicera subspicata var. *denudata*	southern honeysuckle										x	
CASUARINACEAE – SHE-OAK FAMILY							x					
*Casuarina equisetifolia**	Australian pine						x					
CHENOPODIACEAE – GOOSEFOOT FAMILY		x	x						x			
*Chenopodium album**	lamb's quarters		x									
*Salsola tragus**	Russian thistle	x	x						x			
CONVOLVULACEAE – MORNING-GLORY FAMILY		x	x									
*Convolvulus arvensis**	bindweed	x	x									
CUCURBITACEAE – GOURD FAMILY				x								
Marah macrocarpus	wild cucumber, chilicothe			x								
EUPHORBIACEAE – SPURGE FAMILY		x	x	x				x				x
Chamaesyce albomarginata [*Euphorbia a.*]	rattlesnake weed		x									
Croton setigerus [*Eremocarpus s.*]	doveweed, turkey mullein			x								
*Euphorbia peplus**	petty spurge			x				x				x
*Ricinus communis**	castor bean	x	x									
FABACEAE – LEGUME FAMILY			x	x	x	x	x			x	x	x
Acmispon americanus [*Lotus purshianus*]	American lotus					x						x
Acmispon glaber var. *glaber* [*Lotus scoparius* var. *scoparius*]	coastal deerweed					x						
Lupinus bicolor	miniature lupine					x					x	
Lupinus microcarpus var. *microcarpus*	chick lupine					x						
Lupinus truncatus	truncate lupine, collar lupine					x						
*Medicago polymorpha**	California burclover		x			x						
*Melilotus alba**	white sweetclover						x				x	x
*Melilotus indica**	sourclover		x	x	x	x				x	x	x
*Vicia sp.**	vetch					x					x	
FAGACEAE – OAK/BEECH FAMILY				x			x	x			x	x
Quercus agrifolia	coast live oak			x			x	x			x	
Quercus lobata	valley oak						x				x	x
FRANKENIACEAE – FRANKENIA FAMILY												
Frankenia salina	alkali heath											
GERANIACEAE – GERANIUM FAMILY				x		x		x				x
*Erodium botrys**	long-beaked filaree			x								
*Erodium cicutarium**	red-stemmed filaree			x		x					x	x
Geranium dissectum	cutleaf geranium							x				
JUGLANDACEAE – WALNUT FAMILY										x		
Juglans californica	Southern California black walnut									x		
*Juglans regia**	English walnut									x		
LAMIACEAE – MINT FAMILY				x		x		x			x	x
*Marrubium vulgare**	common horehound			x		x		x			x	x
Stachys albens	white hedge-nettle											x
Stachys rigida ssp. rigida	rigid hedge-nettle										x	

Species		26	27	28	29	32	33	34	35	36	37	38
MALVACEAE – MALLOW FAMILY		x	x			x						
*Malva parviflora**	cheeseweed	**x**	**x**			**x**						
Malvella leprosa	alkali mallow		**x**									
MONTIACEAE – MONTIA FAMILY						x						
Claytonia perfoliata ssp. *perfoliata*	common miner's-lettuce					x						
MORACEAE – FIG FAMILY		**x**					**x**				**x**	
*Ficus carica**	edible fig	**x**					**x**				**x**	
MYRSINACEAE – MYRSINE FAMILY				x						x		
*Anagallis arvensis**	scarlet pimpernel			x						x		
MYRTACEAE – MYRTLE FAMILY			x									
Eucalyptus sp.*	gum		x									
OLEACEAE – OLIVE FAMILY		x	x	x		x	x	x	x			
Fraxinus sp.*	ash tree	x	x	x		x	x	x	x			
*Ligustrum sp.**	privit		x									
*Olea europaea**	olive		x									
ONAGRACEAE – EVENING-PRIMROSE FAMILY		x	x			x	x					x
Camissoniopsis bistorta [*Camissonia b.*]	California sun cup					x						
Clarkia unguiculata	elegant clarkia					x check species w Sandy						
Epilobium ciliatum	willow-herb	x					x					x
*Ludwigia peploides**	yellow waterweed	x	x									
OXALIDACEAE – WOOD-SORREL FAMILY		x										
*Oxalis corniculata**	yellow sorrel	x										
PAPAVERACEAE – POPPY FAMILY				x								
Eschscholzia californica	California poppy			x								
PHRYMACEAE – LOPSEED FAMILY				x								
Mimulus aurantiacus	bush monkeyflower			x								
PLANTAGINACEAE – PLANTAIN FAMILY		x				x	x	x				x
*Plantago lanceolata**	English plantain	x				x						x
*Plantago major**	common plantain					x		x				x
*Veronica anagallis-aquatica**	water speedwell						x	x				x
PLATANACEAE – SYCAMORE FAMILY				x			x	x			x	
Platanus racemosa	western sycamore			x			x	x			x	
POLYGONACEAE – BUCKWHEAT FAMILY			x			x						x
Persicaria lapathifolia [*Polygonum lapathifolium*]	willow weed		x			x						x
Rumex salicifolius	willow dock		x			x						x
Rumex sp.	dock											
RHAMNACEAE – BUCKTHORN FAMILY						x					x	
Frangula californica [*Rhamnus californica*]	California coffee berry					x					x	
ROSACEAE – ROSE FAMILY		x			x			x	x	x		
Heteromeles arbutifolia	toyon, Christmas berry										x	
Prunus persica	peach	x										
Rosa californica	California rose				x				x	x		
Rubus ursinus	California blackberry							x		x		
RUBIACEAE – MADDER FAMILY			x	x		x					x	
Galium aparine	goose grass		x	x							x	
Galium angustifolium	narrowly leaved bedstraw		x			x						
RUTACEAE – ORANGE FAMILY			x									
*Citrus sp.**	Citrus tree		x									
SALICACEAE – WILLOW FAMILY			x	x		x	x	x		x	x	x
Populus fremontii ssp. *fremontii*	Fremont cottonwood					x						
Salix exigua	narrow-leaved willow						x					

Species		26	27	28	29	32	33	34	35	36	37	38
Salix gooddingii	Goodding's black willow	x	x					x				
Salix laevigata	red willow			x			x			x		x
Salix laevigata x Salix lasiolepis	hybrid red-arroyo willow										x	
Salix lasiolepis	arroyo willow		x	x		x	x	x		x	x	x
SAPINDACEAE – SOAP BERRY FAMILY			x									
Cupaniopsis anacardioides	Carrotwood		x									
SIMAROUBACEAE – QUASSIA FAMILY		x	x									
*Ailanthus altissima**	tree of heaven	x	x									
SOLANACEAE – NIGHTSHADE FAMILY		x	x	x			x	x	x	x	x	
*Datura stramonium**	jimson weed			x				x		x	x	
*Nicotiana glauca**	tree tobacco			x					x			
Solanum americanum	small flowered nightshade		x									
Solanum douglasii	Douglas' nightshade		x				x					
Solanum maxima	golden chalice vine	x										
TAMARICACEAE – TAMARISK FAMILY				x				x				
*Tamarix ramosissima**	saltcedar			x				x				
TROPAEOLACEAE – NASTURTIUM FAMILY		x	x									
*Tropaeolum majus**	garden nasturtium	x	x									
URTICACEAE – NETTLE FAMILY			x									
Urtica dioica ssp. *holosericea*	hoary nettle		x									
VERBENACEAE – VERVAIN FAMILY						x						x
Verbena lasiostachys var. *lasiostachys*	western verbena					x						x
VITACEAE – GRAPE FAMILY			x	x			x					
*Parthenocissus quinquefolia**	Virginia creeper			x								
*Parthenocissus tricuspidata**	Boston ivy						x					
Vitis girdiana	desert wild grape		x									
***MONOCOTYLEDONES* – MONOCOTS**			x	x	x		x	x	x	x	x	x
ARECACEAE – PALM FAMILY		x	x			x	x	x			x	x
*Phoenix canariensis**	Canary Island palm		x									
Washingtonia sp.*	fan palm	x	x			x	x	x			x	x
ALISMATACEAE – WATER-PLANTAIN FAMILY			x									
Alisma lanceolatum ?	water plantain		x									
CYPERACEAE – SEDGE FAMILY		x	x	x	x		x				x	
Cyperus sp.	umbrella-sedge	x	x									
Schoenoplectus americanus [*Scirpus a.*]	Olney's bulrush	x	x	x			x				x	
Schoenoplectus sp. [Scirpus sp.]	bulrush				x							
IRIDACEAE – IRIS FAMILY			x									
Iris pseudacorus	water iris		x									
POACEAE – GRASS FAMILY		x	x	x	x	x	x	x	x	x	x	x
Avena sp.*	oat	x	x			x						
*Avena fatua**	wild oat			x								
*Brachypodium distachyon**	purple false brome	x										
Bromus arizonicus	Arizona chess											
*Bromus diandrus**	ripgut grass	x	x	x	x	x	x			x	x	x
*Bromus hordeaceus**	soft chess			x		x						
Bromus madritensis ssp. *rubens**	red brome	x	x	x	x	x		x		x	x	x
*Cynodon dactylon**	bermuda grass	x	x			x	x	x				
*Echinochloa crus-galli**	barnyard grass	x	x								x	x
Elymus condensatus [*Leymus c.*]	giant wild rye	x	x									x
Elymus glaucus	blue wild-rye										x	
Elymus triticoides [*Leymus t.*]	beardless wild rye					x						x
Festuca myuros [*Vulpia m.* var. *myuros*]*	rattail fescue					x						
Festuca perennis [*Lolium perenne, L. multiflorum*]*	perennial ryegrass	x	x			x					x	x
Hordeum murinum var. *leporinum**	hare barley	x	x			x					x	

Species		26	27	28	29	32	33	34	35	36	37	38
Melica imperfecta	little California melic grass					x						
*Polypogon monspeliensis**	annual beard grass					x	x	x			x	x
Stipa sp. [*Nassella sp.*]	needlegrass											x
Stipa miliacea [*Piptatherum miliacea*]*	smilo grass	x	x	x		x	x	x	x	x	x	x
THEMIDACEAE – BRODIAEA FAMILY						x						
Bloomeria crocea	common goldenstar					x						
TYPHACEAE – CATTAIL FAMILY			x	x	x	x	x	x	x		x	x
Typha sp.	cattail		x	x	x	x	x	x	x		x	x

APPENDIX C

SBC FOCUSED SURVEY REPORT

2013 Focused Survey Results

Los Angeles County Flood Control District Soft-Bottom Channels Maintenance Clearing

Prepared for

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September 17, 2013

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EXECUTIVE SUMMARY

Focused surveys for Threatened and Endangered (T/E) species are conducted on a regular basis at selected soft-bottom channel reaches maintained by the Los Angeles County Flood Control District (LACFCD). Annual biological monitoring and periodic habitat assessments of all LACFCD soft-bottom channel reaches are completed to update and revise, when necessary, the particular channel reaches and species for which surveys are recommended. The following summary includes 3 Endangered animal species for which focused surveys were conducted at 22 channel reaches in 2013 and includes a maintenance overview with respect to these species. The 2013 survey results are also summarized below in Table ES-1.

AMPHIBIANS

ARROYO TOAD

Focused surveys for the arroyo toad (*Anaxyrus californicus*) were conducted at the following 11 channel reaches in 2013: Castaic Creek Reaches 86, 87, and 97 and Reach 104 in the Castaic Creek Watershed; San Francisquito Canyon Reach 105; the northern part of the South Fork Santa Clara River Reach 75 (i.e., from Magic Mountain Parkway upstream to the Via Princessa Bridge) and the South Fork Santa Clara River Reach 79; Reach 80 at the confluence of the Santa Clara and South Fork Santa Clara Rivers; and Santa Clara River Reaches 71, 82, and 109. These channel reaches may provide suitable breeding habitat during the spring season for the arroyo toad when water is present. Portions of these channel reaches also provide potentially suitable aestivating and foraging habitat. These surveys followed the U.S. Fish and Wildlife Service (USFWS) protocol for this species. Since the protocol does not require handling of the species, a Section 10(a)(1)(A) permit (Scientific Permit) for "take" under the Endangered Species Act is not necessary for performance of these surveys. Although not detected during the 2013 surveys, previous focused surveys have detected the arroyo toad at Reaches 71 and 82 (BonTerra Consulting 2003) and these two channel reaches are considered to be occupied (USFWS 2004). No arroyo toads were observed during the 2013 focused surveys.

The arroyo toad is not typically active during the time period when the soft-bottom channel maintenance occurs (September to November), with the exception of a limited number of juveniles, which stay near the active channel, and increased activity of some adults after storms (Ramirez 2003). Therefore, even if arroyo toads were present, the maintenance activity would not be expected to impact the arroyo toad's foraging or breeding activities. The arroyo toad would not be expected to aestivate in the maintenance area because the area that is maintained has compacted soil; therefore, the maintenance activities would not be expected to affect aestivation of this species.

BIRDS

LEAST BELL'S VIREO AND SOUTHWESTERN WILLOW FLYCATCHER

Focused surveys for the least Bell's vireo (*Vireo bellii pusillus*) and southwestern willow flycatcher (*Empidonax traillii extimus*) were conducted in 2013 at a total of 21 channel reaches where they have potential to occur: 4 channel reaches in the Los Angeles River/San Pedro Bay/Santa Monica Bay areas (Reaches 12, 14, 27, and 28); 4 channel reaches in the San Gabriel River (Reaches 39, 40b, 43a, and 43b); and 13 channel reaches in the Santa Clara River and Castaic Creek Drainages (Reaches 71, 75, 79, 80, 82, 87, 97, 103, 104, 105, 106, 109, and 110). Surveys followed the USFWS protocol for both species. The southwestern willow flycatcher was not present during the 2013 focused surveys and there were also negative

survey results in 2011, 2009, 2007, 2005, 2003, and 2002. The least Bell's vireo was present during the 2013 surveys with a total of 13 territories at 5 channel reaches. Table ES-1 below presents a summary of the 2013 survey results for southwestern willow flycatcher and least Bell's vireo.

TABLE ES-1
SUMMARY OF 2013 RESULTS OF FOCUSED BIRD SURVEYS FOR THE LACFCD SOFT-BOTTOM CHANNELS

Reach Number	Reach Name	Focused Surveys for Arroyo Toad	Focused Surveys for Least Bell's Vireo	Focused Surveys for Southwestern Willow Flycatcher
Los Angeles River Watershed/San Pedro Bay				
12	Haines Canyon Main Channel Outlet	N/A	Negative	Negative
14	May Channel (Main Channel Outlet into Pacoima Canyon)	N/A	2 territories (1 pair/1 solitary male)	Negative
27	Wilmington Drain	N/A	1 territory (solitary male)	Negative
Malibu Creek Watershed/Santa Monica Bay				
28	Triunfo Creek (PD T2200)	N/A	Negative	Negative
San Gabriel River Watershed				
39	Beatty Channel Outlet at San Gabriel River (25+99.00+50')	N/A	2 territories (1 pair/1 solitary male)	Negative
40b	San Gabriel River – Santa Monica (I-10) Freeway to Thienes Ave	N/A	5 territories (4 pairs)	1 Migrant
43a	San Gabriel River – Upper	N/A	3 territories (2 pairs/1 solitary male)	Negative
43b	San Gabriel River – Lower	N/A	Negative	Negative
Santa Clara River Watershed				
71	Santa Clara River Main Channel (PD 1946)	Negative	Negative	Negative
75	South Fork-Santa Clara River (PDs 725, 916, 1041, 1300)	Negative	Negative	Negative
79	South Fork – Santa Clara River (Valencia Blvd Bridge Stabilizer)	Negative	Negative	Negative
80	South Fork – Santa Clara River (PDs 1947 and 1946)	Negative	Migrant male	Negative
82	Santa Clara River Main Channel (PD 2278)	Negative	Negative	1 Migrant
86	Violin Canyon Main Channel Outlet	Negative	N/A	N/A
87	Castaic – The Old Road Drain (CDR 525.021D) Outlet	Negative	Negative	Negative
97	Castaic Creek – The Old Road (PD 1982)	Negative	Negative	Negative
103	Bouquet Canyon Channel (PD 2225)	N/A	Negative	Negative
104	Castaic Creek (PD 2441 Units 1 and 2)	Negative	Negative	Negative

TABLE ES-1
SUMMARY OF 2013 RESULTS OF FOCUSED BIRD SURVEYS FOR THE LACFCD SOFT-BOTTOM CHANNELS

Reach Number	Reach Name	Focused Surveys for Arroyo Toad	Focused Surveys for Least Bell's Vireo	Focused Surveys for Southwestern Willow Flycatcher
105	San Francisquito Canyon Channel (PD 2456)	Negative	Negative	3 Migrants
106	Castaic Drain Outlet (RMD Channel)	N/A	Negative	Negative
109	Santa Clara River – South Bank West of McBean Pkwy (MTD 1510)	Negative	Negative	1 Migrant
110	Hasley Canyon Channel (PD 2262)	N/A	Negative	Negative
N/A = Not applicable; no potential habitat for the species; therefore no survey conducted.				

The 2013 survey results for least Bell's vireo are shown below in Table ES-2 with the previous survey results for this species under the LACFCD soft-bottom channel maintenance program. Although migrant or transitory least Bell's vireos have been detected at other channel reaches in these focused surveys, only these six channel reaches have supported least Bell's vireo territories.

Both the least Bell's vireo and southwestern willow flycatcher are migratory species that are only present in Southern California from about March through early September. As required by the permits (see U.S. Army Corps of Engineers Nationwide Permit 31 dated September 30, 2010, with Informal USFWS Section 7 Consultation), in order to avoid and/or minimize potential impacts on these species, all channel maintenance clearing work occurs outside this time period (March 15–September 15); additionally, seasonally occupied habitat is identified and protected by flagging and clearing activities are monitored by a qualified biologist.

TABLE ES-2
SUMMARY OF LEAST BELL'S VIREO SURVEY RESULTS SINCE 2002 FOR THE SOFT-BOTTOM CHANNEL MAINTENANCE PROGRAM

Reach Number	Reach Name	2013	2011	2009	2007	2005	2003	2002
Los Angeles River Watershed/San Pedro Bay								
14	May Channel (Main Channel Outlet into Pacoima Canyon)	2 territories (1 pair/ 1 solitary male)	3 territories (3 pairs)	2 territories (2 solitary males)	Negative	1 territory (1 pair)	Negative	Negative
27	Wilmington Drain	1 territory (solitary male)	1 territory (solitary male)	Negative	1 territory (solitary male)	Negative	Negative	Negative
San Gabriel River Watershed								
39	Beatty Channel Outlet at San Gabriel River (25+99.00+50')	2 territories (2 pairs)	3 territories (3 pairs)	4 territories (3 pairs/ 1 solitary male)	2 territories (2 pairs)	1 territory (1 pair)	Negative	No Survey

TABLE ES-2
SUMMARY OF LEAST BELL'S VIREO SURVEY RESULTS SINCE 2002 FOR THE SOFT-BOTTOM CHANNEL MAINTENANCE PROGRAM

Reach Number	Reach Name	2013	2011	2009	2007	2005	2003	2002
40b	San Gabriel River-Santa Monica (I-10) Freeway to Thienes Ave	5 territories (4 pairs/ 1 solitary male)	4 territories (4 pairs)	2 territories (1 pair/ 1 solitary male)	3 territories (3 solitary males)	Negative	Negative	2 territories (1 pair/ 1 solitary male)
43a	San Gabriel River-Upper	3 territories (2 pairs/ 1 solitary male)	4 territories (2 pairs/ 2 solitary males)	4 territories (3 pairs/ 1 solitary male)	1 territory (1 pair)	1 territory (1 pair)	1 territory (solitary male)	1 territory (1 pair)
43b	San Gabriel River-Lower	Negative	Negative	1 territory (solitary male)	Negative	Negative	Negative	1 territory (1 pair)
	Total Territories	**13**	**15**	**13**	**7**	**3**	**1**	**4**

SECTION 1.0 INTRODUCTION

In 2002, focused surveys and habitat assessments were conducted at 54 soft-bottom channel reaches that included 53 of the original channel reaches plus 1 new channel reach identified as Reach 101 (Violin Canyon – PD 2312). All 53 original channel reaches have continued to be maintained by the LACFCD under the required regulatory permits, but Reach 101 and other new channel reaches added since that time have yet to be permitted. The purpose of the 2002 surveys was to provide baseline information on the occurrence or potential occurrence of Threatened or Endangered plant and wildlife species for permitted and non-permitted channel reaches. This information is updated annually during pre- and post-clearing surveys of all permitted and non-permitted soft-bottom channel reaches managed by the LACFCD.

1.1 ENVIRONMENTAL SETTING

1.1.1 REGIONAL SETTING

The topography in Los Angeles County is diverse, containing coastline, flatlands, mountains, and desert within approximately 4,000 square miles. Elevations in the County range from sea level to over 10,000 feet above mean sea level (msl). The climate ranges from mild near the coast to severe in the high mountains and in the desert. This variation in environments has created a unique and diverse collection of biological resources (England and Nelson 1976).

The San Gabriel Mountains are a prominent topographic feature that include a portion of the headwaters of the Santa Clara, Los Angeles, Rio Hondo, and San Gabriel Rivers, and are the source of streams that drain into the Antelope and Fremont Valleys. The San Gabriel Mountains rise 7,000 feet above msl from the Antelope and Santa Clarita Valleys and exert considerable influence on the climate, hydrology, and ecology of the lands around them. The San Andreas and other numerous faults have fractured the mountains so that they erode at a rapid rate. Hence, the stream basins along the northern slope are generally characterized by steep headwaters and sloping alluvial beds on the adjacent flatlands (CRA et al. 2001).

The Santa Monica Mountains are also a prominent topographic feature and include the headwaters of Malibu Creek and Topanga Creek; these are the sources of streams that drain to the Malibu Coast. The Santa Monica Mountains are up to 10 miles wide and reach an elevation of 3,100 feet above msl at Sandstone Peak. The Santa Monica Mountains have a complex structure because they have been uplifted and then eroded several times over the past 200 million years (Dale 1986; England and Nelson 1976).

There are 4 major rivers in Los Angeles County: the Los Angeles River is approximately 51 miles long (main stem) and drains 830 square miles; the Rio Hondo River is approximately 20 miles long (main stem) and drains 125 square miles; the San Gabriel River is approximately 59 miles long (main stem) and drains 350 square miles; and the Santa Clara River is approximately 75 miles long (main stem) and drains 1,616 square miles (LACFCD 2007). Numerous other streams also occur in Los Angeles County. Surface water in streams and rivers is generally only present during the winter and spring, particularly after storm events. Many storms do not generate sufficient runoff to sustain surface flow in all streams. In some areas, flows are supplemented with reclaimed water and agricultural and urban runoff. Particularly intense storms can result in flash floods or debris flows, which can carry large amounts of sediment, rocks, and debris to be deposited in the valley below (CRA et al. 2001).

The Los Angeles River system has been extensively channelized to provide flood protection as it passes through several cities on its way to the Pacific Ocean. The Los Angeles River tributaries include Bell Creek, Calabasas Creek, Burbank Western Channel, Pacoima Wash,

Tujunga Wash, Verdugo Wash, Arroyo Seco, Compton Creek, and the Rio Hondo River (LACFCD 2007). There are now over 400 miles of concrete-lined tributaries that feed into the main channel (LACFCD 2007). Approximately 47.9 miles of the 51.0-mile river is concrete-lined. The two stretches where the river is not lined (i.e., soft or earthen bottom channels) are the Sepulveda Flood Control Basin through the Glendale Narrows and south of Willow Street in Long Beach (LACFCD 2007). Reclaimed water enters the Los Angeles River at the Sepulveda Basin where the Department of Water and Power releases as much as 75 million gallons of reclaimed water daily from the Donald C. Tillman Water Reclamation Plant.

The San Gabriel River begins in the Angeles National Forest and also flows through several cities on its way to the Pacific Ocean. The San Gabriel River tributaries include Walnut Creek, San Jose Creek, Coyote Creek, and numerous storm drains (LACFCD 2007). The headwaters of the San Gabriel River begin just north of Pasadena and northwest of Mount Wilson, where they flow through a steep canyon to Cogswell Reservoir. The west fork of the river then merges with the east fork and flows into the San Gabriel Reservoir. Below the reservoir, the east fork converges with the main stem of the San Gabriel River and flows through San Gabriel Canyon to Morris Reservoir. Below Morris Reservoir, the river flows through cities from Azusa to Seal Beach and empties into the Long Beach Harbor.

The Santa Clara River is unique because it is the only major non-channelized river that drains the San Gabriel Mountains. The Santa Clara River is fed by five major tributaries: Sand Canyon, Mint Canyon, Bouquet Canyon, South Fork, and San Francisquito Canyon (LACFCD 2007). Further west, Castaic, Piru, Sespe, and Santa Paula Creeks join the river (CRA et al. 2001). The headwaters of the Santa Clara River are located near Acton, and the river runs approximately 100 miles to its outlet in the City of Ventura in Ventura County. Most development adjacent to the river is located in or near the City of Santa Clarita (LACFCD 2007).

The Malibu Creek Watershed is a system of independent streams that drains approximately 109 square miles in northwest Los Angeles County from the Santa Monica Mountains to the Pacific Ocean. These include Las Virgenes, Triunfo, and Cold Creeks, as well as other small streams that flow from the Santa Monica Mountains to Santa Monica Bay. These creeks flow through the cities of Agoura Hills, Calabasas, Malibu, Thousand Oaks, Westlake Village, unincorporated Los Angeles County, and Ventura County (LACFCD 2007).

The Ballona Creek Watershed is a ten-mile-long flood-control channel that drains the Los Angeles basin from the Santa Monica Mountains to the north, the Harbor Freeway (Interstate [I] 110) to the east, and the Baldwin Hills to the south. All together, the Ballona Creek Watershed drains approximately 130 square miles of the Los Angeles Basin. Creeks or drainages of this watershed include Centinela Creek, Sepulveda Channel, and Benedict Canyon Channel. These drainages pass through the communities of Beverly Hills, Culver City, Inglewood, Los Angeles, and West Hollywood (LACDPW 2007).

The Dominguez Channel Watershed is situated in south Los Angeles County and drains approximately 133 square miles of the Los Angeles Basin into the Los Angeles Harbor. Parts of the communities of Hawthorne, Torrance, Gardena, Carson, and Wilmington drain into the Dominguez Channel. Over 40 percent of this watershed consists of industrial, commercial, and transportation land uses.

The Antelope Valley Watershed is a system of independent streams that drains approximately 1,200 square miles in north Los Angeles County from the San Gabriel Mountains and Kern County into the valley floor. These include Little Rock, Big Rock, and Mill Creeks, as well as other small streams that flow from the San Gabriel Mountains into the Antelope Valley. Due to the surrounding topography, these streams do not drain into the sea, but into dry lakebeds on the valley floor, with most surface flows infiltrating into groundwater basins or evaporating

(CRA et al. 2001; LACFCD 2007). Because the valley lacks defined natural channels outside the foothills, it is subject to unpredictable sheet flow patterns (LACFCD 2007). The portion of the Antelope Valley Watershed in Los Angeles County includes the cities of Lancaster and Palmdale, with scattered clusters of sparse development outside these cities (LACFCD 2007). None of the channel reaches discussed in this report are located in the Antelope Valley Watershed.

1.1.2 LOCAL SETTING

In 2002, the LACFCD maintained 95 soft-bottom channel reaches located within its district boundaries, consisting of 885.58 acres that require management. Since 2002, ten soft-bottom channel reaches have been lost due to development or ownership change, but several more have been added to the list. As of 2013, the LACFCD manages 108 channel reaches (Nos. 1 through 117[1]) that are located in 7 identified watersheds of Los Angeles County:

- Los Angeles River/San Pedro Bay – 25 channel reaches[2]
- Dominguez Channel – 3 channel reaches
- Malibu Creek – 9 channel reaches
- San Gabriel River – 9 channel reaches (not splitting Reaches 40 and 43 and including Reach 116, Los Cerritos Channel)
- Santa Clara River – 59 channel reaches
- Ballona Creek – 1 channel reach
- Antelope Valley – 1 channel reach

In 1997, the 95 soft-bottom flood-control channel reaches encompassed 885.58 acres and included 205.27 acres of vegetation. Based on vegetation categories developed at the time, the 205.27 acres of vegetation included an estimated 105.32 acres of riparian vegetation, 63.40 acres of mule fat vegetation, and 36.55 acres of scrub vegetation (BonTerra Consulting 1999). The acreages noted above have not been updated since that time and are presented to indicate the large amount of habitat under LACFCD jurisdiction.

Survey Areas

Of the 94 maintained channel reaches within the boundaries of the LACFCD, 22 reaches have been determined to contain potential habitat for Threatened or Endangered amphibian (arroyo toad) and/or bird (southwestern willow flycatcher and least Bell's vireo) species. These channel reaches are the subject of the focused survey effort and are described below.

Los Angeles River Watershed/San Pedro Bay

Reach 12 – Haines Canyon Main Channel Outlet

Reach 12, Haines Canyon Main Channel Outlet, is located within the Tujunga Wash approximately one mile northwest of the intersection of Mount Gleason Avenue and Foothill Boulevard, in the community of Sunland, City of Los Angeles (Exhibit 1). Reach 12 is approximately 437 feet in total length, extending approximately 791 feet downstream of

[1] Numbers for channel reaches that have been developed or had their ownership transferred are no longer in use.

[2] Although it had been previously included in the regulatory permits, it was recently determined during the Los Angeles River Watershed Feasibility Study that the Sheep Corral Channel (Reach 17) flood-control facility was owned and maintained by the City of Glendale and not the LACFCD.

Wentworth Street to approximately 1,228 feet downstream. It is found in Section 11 on the U.S. Geological Survey (USGS) Sunland 7.5-minute quadrangle map at Township 2 North and Range 14 West.

Reach 14 – May Channel (Main Channel Outlet into Pacoima Canyon)

Reach 14, May Channel (Main Channel Outlet into Pacoima Canyon), is located within the Pacoima Wash, approximately 1.25 miles east of the intersection of the Foothill Freeway (I-210) and Hubbard Street in the City of Los Angeles (Exhibit 2). Reach 14 is 690 feet in total length extending from 3,038 feet downstream of Hubbard Street to approximately 3,728 feet downstream of the confluence of Hubbard Street with Pacoima Canyon. It is found in Section 25 on the USGS San Fernando 7.5-minute quadrangle at Township 3 North and 15 Range West.

Reach 27 – Wilmington Drain

Reach 27, Wilmington Drain, is located within the San Pedro Bay Watershed in unincorporated Los Angeles County and within the Wilmington community of the City of Los Angeles (Exhibit 3). The limits of Reach 27 are the Harbor (I-110) Freeway to Pacific Coast Highway. Reach 27 is approximately 3,584 feet in total length. The reach is found in Section 25 of the USGS Torrance 7.5-minute quadrangle map at Township 4 South and Range 14 West.

Malibu Creek Watershed/Santa Monica Bay

Reach 28 –Triunfo Creek (PD T2200)

Reach 28, Triunfo Creek (PD T2200), is located within the Malibu Creek Watershed in unincorporated Los Angeles County, approximately 0.1 mile east of the Mulholland Highway and Troutdale Drive intersection (Exhibit 4). The limits of Reach 28 are approximately 384 feet upstream of Mulholland Highway to the downstream edge of Mulholland Highway. Reach 28 is approximately 474 feet in total length. The reach is found in Section 4 of the USGS Point Dume 7.5-minute quadrangle map at Township 1 South and Range 18 West.

San Gabriel River Watershed

Reach 39 – Beatty Channel Outlet at San Gabriel River

Reach 39, Beatty Channel Outlet at San Gabriel River (25+99.00±50'), is located within the San Gabriel River Watershed, approximately 0.8 mile north of the Foothill Boulevard and Irwindale Avenue intersection in the City of Azusa (Exhibit 5). The limits of Reach 39 are approximately 2,323 feet downstream of Todd Avenue to approximately 2,415 feet downstream of Todd Avenue. Reach 39 is 145 feet in total length. The reach is found in Section 28 of the USGS Azusa 7.5-minute quadrangle map at Township 1 North and Range 10 West.

Reach 40b – San Gabriel River – Santa Monica (I-10) Freeway to Thienes Avenue

Reach 40b, San Gabriel River-Santa Monica (I-10) Freeway to Thienes Avenue, is located within the San Gabriel River Watershed in the San Gabriel Valley area (Exhibit 6). The limits of Reach 40b are the Santa Monica (I-10) Freeway (upstream) and Thienes Avenue (downstream). Reach 40b has a total length of approximately 10,800 feet. The reach is found in Sections 23, 26, and 34 of the USGS Baldwin Park 7.5-minute quadrangle map at Township 1 South and Range 11 West.

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Reach 12 – Haines Canyon Main Channel Outlet

Exhibit 1

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

0.5 0.25 0 0.5

Miles

BonTerra CONSULTING

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Reach 14 – May Channel (Main Channel Outlet into Pacoima Canyon)

Exhibit 2

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

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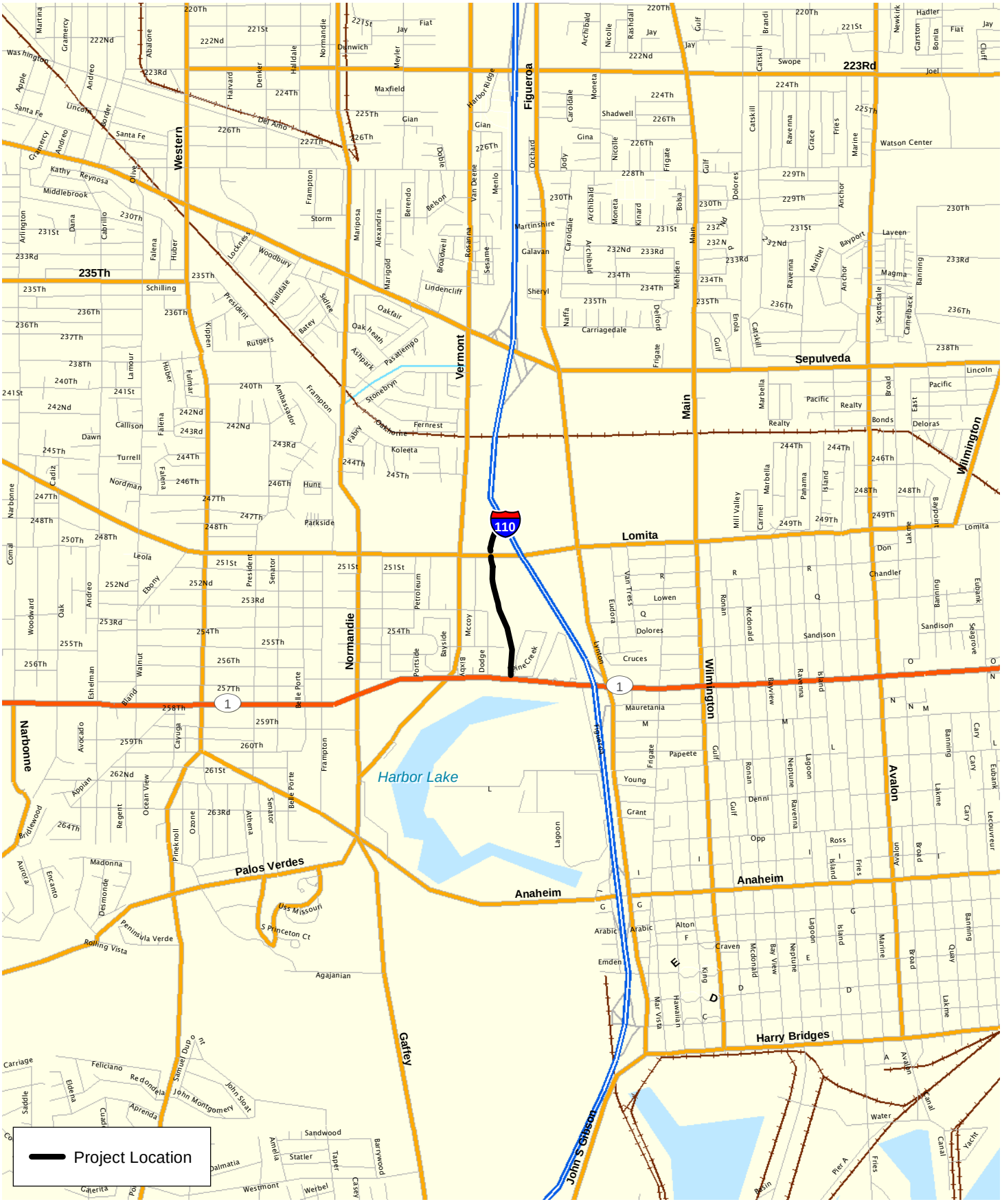

Reach 27 – Wilmington Drain

Exhibit 3

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

0.5 0.25 0 0.5 Miles

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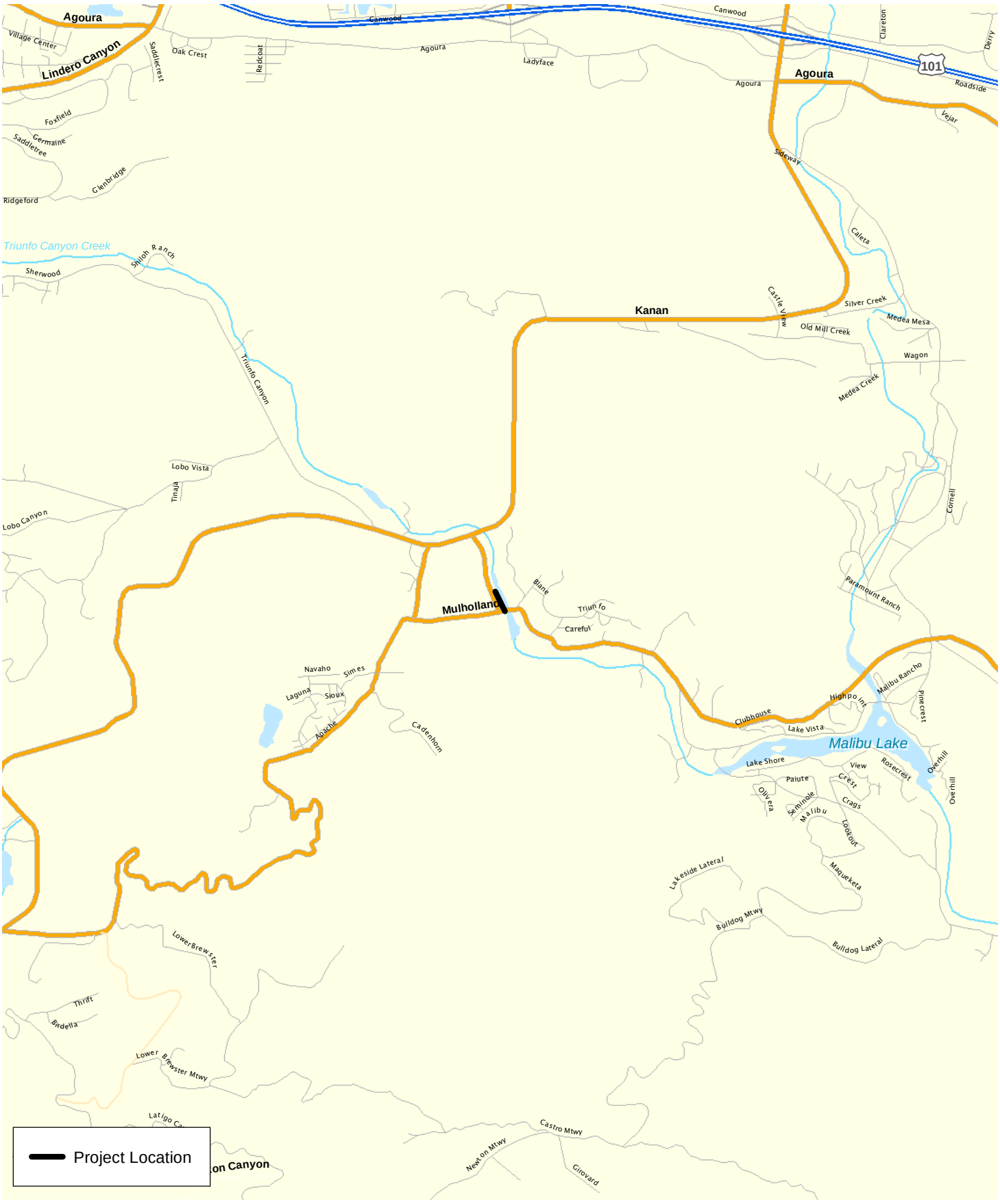

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Reach 28 – Triunfo Creek (PD T2200)

Exhibit 4

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

0.5 0.25 0 0.5 Miles

BonTerra CONSULTING

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Reach 39 – Beatty Channel Outlet at San Gabriel River (25+99.00+50')

Exhibit 5

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

0.5 0.25 0 0.5 Miles

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(Rev: 9-05-2013 MMD) R:\PAS\Projects\CoLADPW\J228\Graphics\2013 Focused Survey Results\Ex5_PL.pdf

Reach 40b – San Gabriel River – Santa Monica (I-10) Freeway to Thienes Avenue

Exhibit 6

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

1 0.5 0 1 Miles

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Reach 43a – San Gabriel River – Upper

Reach 43a, San Gabriel River – Upper, is located within the San Gabriel River Watershed, in the San Gabriel Valley area (Exhibit 7). The limits of Reach 43a are between Whittier Narrows Dam and San Gabriel River Parkway. Reach 43a has a total length of approximately 3,450 feet. The reach is found in Sections 5 and 8 of the USGS Whittier 7.5-minute quadrangle map at Township 2 South and Range 11 West.

Reach 43b – San Gabriel River – Lower

Reach 43b, San Gabriel River – Lower, is located within the San Gabriel River Watershed, in the San Gabriel Valley area (Exhibit 8). The limits of Reach 43b are San Gabriel River Parkway (upstream) and Beverly Boulevard (downstream). Reach 43b has a total length of approximately 3,050 feet. The reach is found in Sections 7 and 8 of the USGS Whittier 7.5-minute quadrangle map at Township 2 South and Range 11 West.

Santa Clara River Watershed

Reach 71 – Santa Clara River Main Channel (PD 1946)

Reach 71, Santa Clara River Main Channel (PD 1946), is located within the Santa Clara River-South Fork Watershed in the City of Santa Clarita (Exhibit 9). The limits of Reach 71 are approximately 276 feet upstream of McBean Parkway (at the confluence with the South Fork of the Santa Clara River) to the downstream edge of McBean Parkway. Reach 71 is 346 feet in total length. The reach is found in Section 16 of the USGS Newhall 7.5-minute quadrangle map at Township 4 North and Range 16 West.

Reach 75 – South Fork – Santa Clara River (PDs 725, 916, 1041, 1300)

Reach 75, South Fork – Santa Clara River (PDs 725, 916, 1041, 1300), is located within the Santa Clara River – South Fork Watershed in the City of Santa Clarita (Exhibit 10). The limits of Reach 75 are approximately 255 feet downstream of Lyons Avenue to the downstream edge of Magic Mountain Parkway. Reach 75 is 13,965 feet in total length. The reach is found in Sections 22, 27, and 34 of the USGS Newhall 7.5-minute quadrangle map at Township 4 North and Range 16 West.

Reach 79 – South Fork – Santa Clara River (Valencia Boulevard Bridge Stabilizer)

Reach 79, South Fork – Santa Clara River (Valencia Boulevard Bridge Stabilizer), is located within the Santa Clara River – South Fork Watershed (Exhibit 11). The limits of Reach 79 are the downstream edge of Valencia Boulevard to approximately 167 feet downstream of Valencia Boulevard. Reach 79 is 167 feet in total length. The reach is found in Sections 5 and 7 of the USGS Newhall 7.5-minute quadrangle map at Township 2 South and Range 11 West.

Reach 80 – South Fork-Santa Clara River (PDs 1947 and 1946)

Reach 80, South Fork – Santa Clara River (PDs 1947 and 1946), is located within the Santa Clara River – South Fork Watershed (Exhibit 12). The limits of Reach 80 are approximately 3,080 feet upstream of McBean Parkway to approximately 276 feet upstream of McBean Parkway and the confluence with Santa Clara River. Reach 80 is 2,804 feet in total length. The reach is found in Sections 15 and 16 of the USGS Newhall 7.5-minute quadrangle map at Township 4 North and Range 16 West.

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Reach 43a – San Gabriel River – Upper

Exhibit 7

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

0.5 0.25 0 0.5 Miles

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Reach 43b – San Gabriel River – Lower

Exhibit 8

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

0.5 0.25 0 0.5 Miles

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Reach 71 – Santa Clara River Main Channel (PD 1946)

Exhibit 9

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

0.5 0.25 0 0.5

Miles

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Reach 75 – South Fork – Santa Clara River (PDs 725, 916, 1041, 1300)

Exhibit 10

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

0.5 0.25 0 0.5 Miles

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Reach 79 – South Fork – Santa Clara River (Valencia Boulevard Bridge Stabilizer)

Exhibit 11

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

0.5 0.25 0 0.5

Miles

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Reach 80 – South Fork – Santa Clara River (PDs 1947 and 1946)

Exhibit 12

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

0.5 0.25 0 0.5 Miles

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(Rev: 9-05-2013 MMD) R:\PAS\Projects\CoLADPW\J228\Graphics\2013 Focused Survey Results\Ex12_PL.pdf

Reach 82 – Santa Clara River Main Channel (PD 2278)

Reach 82, Santa Clara River Main Channel (PD 2278), is located within the Santa Clara River Watershed, approximately 0.75 mile east of the I-5 and Magic Mountain Parkway intersection in the City of Santa Clarita (Exhibit 13). The upstream limits of Reach 82 are approximately 740 feet southeast of the intersection of Hopkins Avenue and Rockefeller Avenue to just south of the intersection of Hopkins Avenue and Rockefeller Avenue. Reach 82 is 865 feet in total length. The reach is found in Section 16 of the USGS Newhall 7.5-minute quadrangle map at Township 4 North and Range 16 West.

Reach 86 – Violin Canyon Main Channel Outlet

Reach 86, Violin Canyon Main Channel Outlet, is located within the Castaic Creek Watershed in the community of Castaic in unincorporated Los Angeles County, approximately 0.5 mile southeast of the I-5 and Lake Hughes Road intersection (Exhibit 14). The limits of Reach 86 are approximately 1,021 feet downstream of Ridge Route Road to the confluence with Castaic Creek. Reach 86 is 946 feet in total length. The reach is found in Sections 23 and 24 of the USGS Newhall 7.5-minute quadrangle map at Township 5 North and Range 17 West.

Reach 87 – Castaic – Old Road Drain (CDR 525.021D) Outlet

Reach 87, Castaic – Old Road Drain (CDR 525.021D) Outlet, is located within the Castaic Creek Watershed, approximately one mile northwest of the I-5 and Henry Mayo Drive (State Route 126) in the Castaic Junction Community of unincorporated Los Angeles County (Exhibit 15). The limits of Reach 87 are approximately 610 feet downstream of the intersection of Hasley Canyon Road and Old Road to the confluence with Castaic Creek. Reach 87 is 240 feet in total length. The reach is found in Section 12 of the USGS Newhall 7.5-minute quadrangle map at Township 4 North and Range 17 West.

Reach 97 – Castaic Creek – The Old Road (PD 1982)

Reach 97, Castaic Creek – The Old Road (PD 1982), is located within the Castaic Creek Watershed in the Castaic Junction Community of unincorporated Los Angeles County (Exhibit 16). The limits of Reach 97 are approximately 300 feet downstream to 2,300 feet downstream of The Old Road. Reach 97 is 2,000 feet in total length. The reach is found in Section 12 of the USGS Newhall 7.5-minute quadrangle map at Township 4 North and Range 17 West.

Reach 103 – Bouquet Canyon Channel (PD 2225)

Reach 103, Bouquet Canyon Channel (PD 2225), is located within the Santa Clara River Watershed (Exhibit 17). The limits of Reach 103 are approximately 173 feet downstream of the centerline of Newhall Ranch Road (beginning of Grouted Stone Toe) to the Metropolitan Water District Fee Right-of-Way on the right bank and the embankment turn at the Santa Clara River on the left bank. Reach 103 is 1,824 feet in total length. The reach is found in Section 16 of the USGS Newhall 7.5-minute quadrangle map at Township 4 North and Range 16 West.

Reach 104 – Castaic Creek (PD 2441 – Units 1 and 2)

Reach 104 – Castaic Creek (PD 2441 – Units 1 and 2), is located within the Castaic Creek Watershed. The limits of Reach 104 are approximately 669 feet upstream of the Muirfield Lane Centerline to 478 feet downstream of the Turnberry Lane Centerline (Exhibit 18). Reach 104 is 2,186 feet in total length. The reach is found in Section 12 of the USGS Newhall 7.5-minute quadrangle map at Township 4 North and Range 17 West.

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Reach 82 – Santa Clara River Main Channel (PD 2278)

Exhibit 13

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

0.5 0.25 0 0.5 Miles

BonTerra CONSULTING

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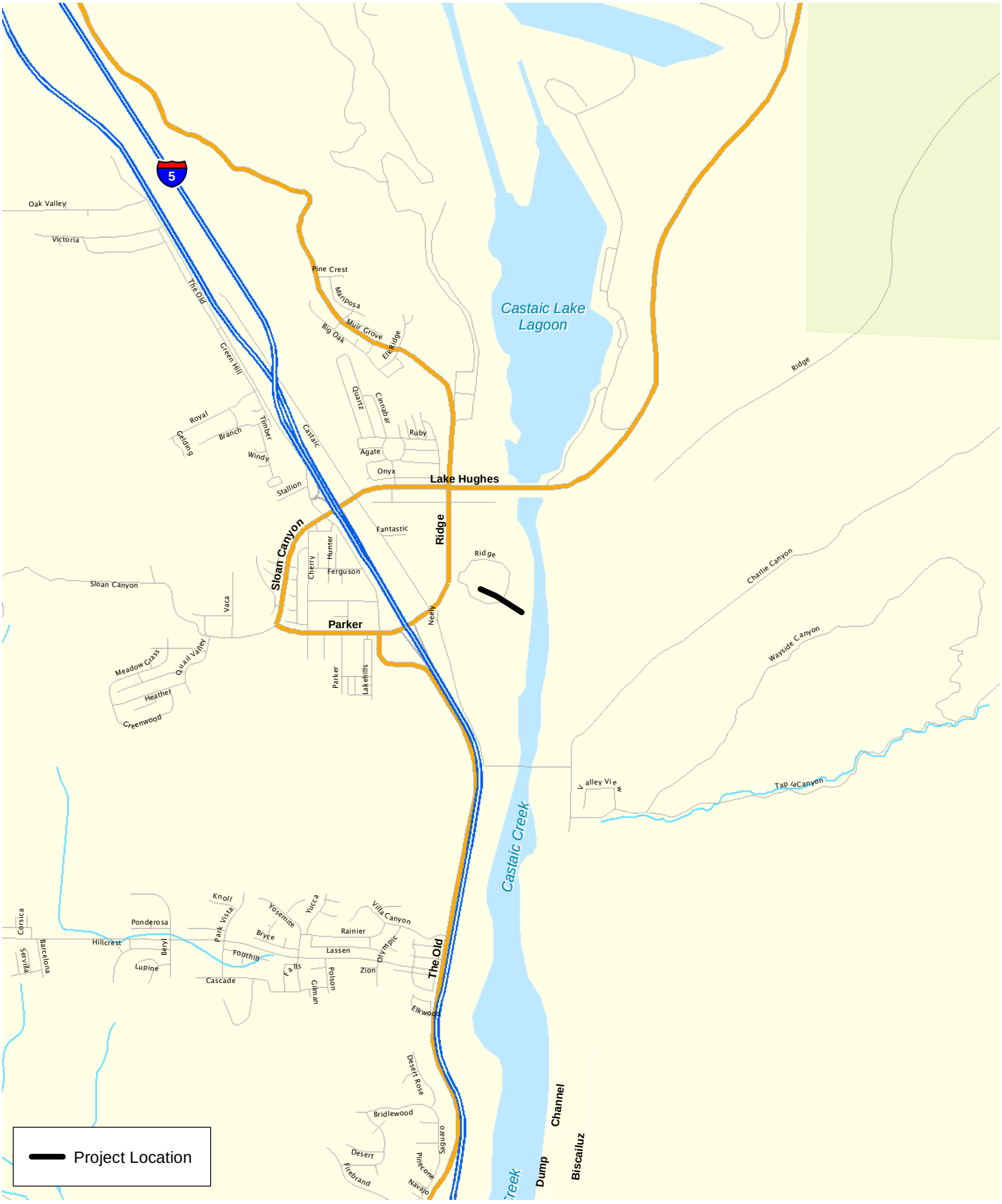

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Reach 86 – Violin Canyon Main Channel Outlet

Exhibit 14

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

0.5 0.25 0 0.5 Miles

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Reach 87 – Castaic Creek – The Old Road Drain (CDR 525.021D) Outlet

Exhibit 15

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

0.5 0.25 0 0.5

Miles

BonTerra CONSULTING

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Reach 97 – Castaic Creek – The Old Road (PD 1982)

Exhibit 16

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

0.5 0.25 0 0.5

Miles

BonTerra CONSULTING

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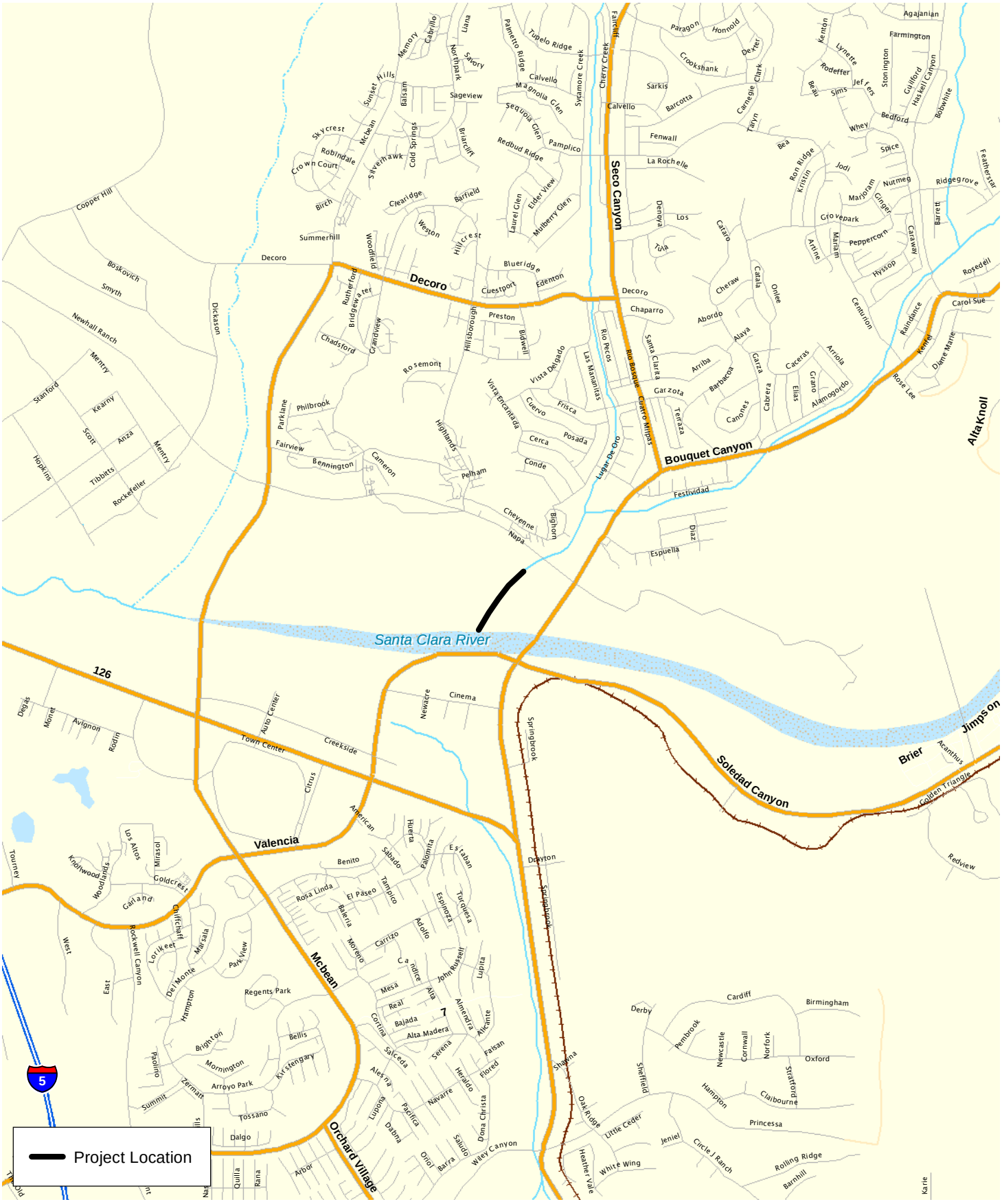

Reach 103 – Bouquet Canyon Channel (PD 2225)

Exhibit 17

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

0.5 0.25 0 0.5

Miles

BonTerra CONSULTING

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Reach 104 – Castaic Creek (PD 2441 Units 1 and 2)

Exhibit 18

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

0.5 0.25 0 0.5

Miles

BonTerra CONSULTING

(Rev: 9-05-2013 MMD) R:\PAS\Projects\CoLADPW\J228\Graphics\2013 Focused Survey Results\Ex18_PL.pdf

Reach 105 – San Francisquito Canyon Channel (PD 2456)

Reach 105, San Francisquito Canyon Channel (PD 2456), is located within the Santa Clara River Watershed in unincorporated Los Angeles County (Exhibit 19). The limits of Reach 105 are approximately 417 feet upstream of the Decoro Drive Centerline to 416 feet downstream of the Decoro Drive Centerline. Reach 105 is 833 feet in total length. The reach is found in Section 9 of the USGS Newhall 7.5-minute quadrangle map at Township 4 North and Range 16 West.

Reach 106 – Castaic Drain Outlet (RMD[3] Channel)

Reach 106, Castaic Drain Outlet (RMD Channel), is located within the Santa Clara River Watershed. The limits of Reach 106 are approximately the toe of grouted riprap apron to approximately 147 feet downstream of grouted riprap apron (Exhibit 20). Reach 106 is 147 feet in total length. The reach is found in Section 25 of the USGS Newhall 7.5-minute quadrangle map at Township 5 North and Range 17 West.

Reach 109 – Santa Clara River – South Bank West of McBean Parkway (MTD 1510)

Reach 109, Santa Clara River – South Bank West of McBean Parkway (MTD 1510), is an outlet located on the south bank (concrete levee) just west or downstream of McBean Parkway (Exhibit 21). The limits of Reach 109 are from the outlet, approximately 300 feet downstream of the McBean Parkway centerline to approximately 371 feet downstream of the McBean Parkway centerline (Exhibit 21). The reach is found in Section 16 of the USGS Newhall 7.5-minute quadrangle map at Township 4 North and Range 16 West.

Reach 110 – Hasley Canyon Channel (PD 2262)

Reach 110, Hasley Canyon Channel (PD 2262), is located within the Santa Clara River Watershed (Exhibit 22). It is a narrow channel of about ½ mile long with a relatively steep gradient. The reach is found in Sections 2 and 11 of the USGS Val Verde 7.5-minute quadrangle map at Township 4 North and Range 17 West.

1.2 PROPOSED PROJECT

1.2.1 BACKGROUND

To effectively control flood waters from the mountainous watersheds surrounding the Los Angeles Basin, the U.S. Army Corps of Engineers (USACE) and the LACFCD constructed concrete-bottom and earth-bottom channels leading from dams and debris basins located along the frontal slopes of the San Gabriel, Santa Monica, Verdugo, and Santa Susanna Mountains. Construction began in the 1930s. These channels, as a system, provide flood protection for Los Angeles County.

Channel maintenance activities have been performed regularly in LACFCD channels for over 50 years. Originally constructed by the USACE, upon completion, most of the channel facilities were transferred to the LACFCD for cyclic maintenance. The USACE's maintenance guidelines require that "debris, objectionable growth, shoals, and waste materials must not encroach on the invert. Excess materials that will not move readily with low flows must be removed. Measures must be taken to control objectionable growth by approved chemical or mechanical means" (USACE 1996).

[3] The Los Angeles County Department of Public Works' Road Maintenance Division (RMD) is responsible for maintenance at this soft-bottom channel reach.

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Reach 105 – San Francisquito Canyon Channel (PD 2456)

Exhibit 19

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

0.5 0.25 0 0.5 Miles

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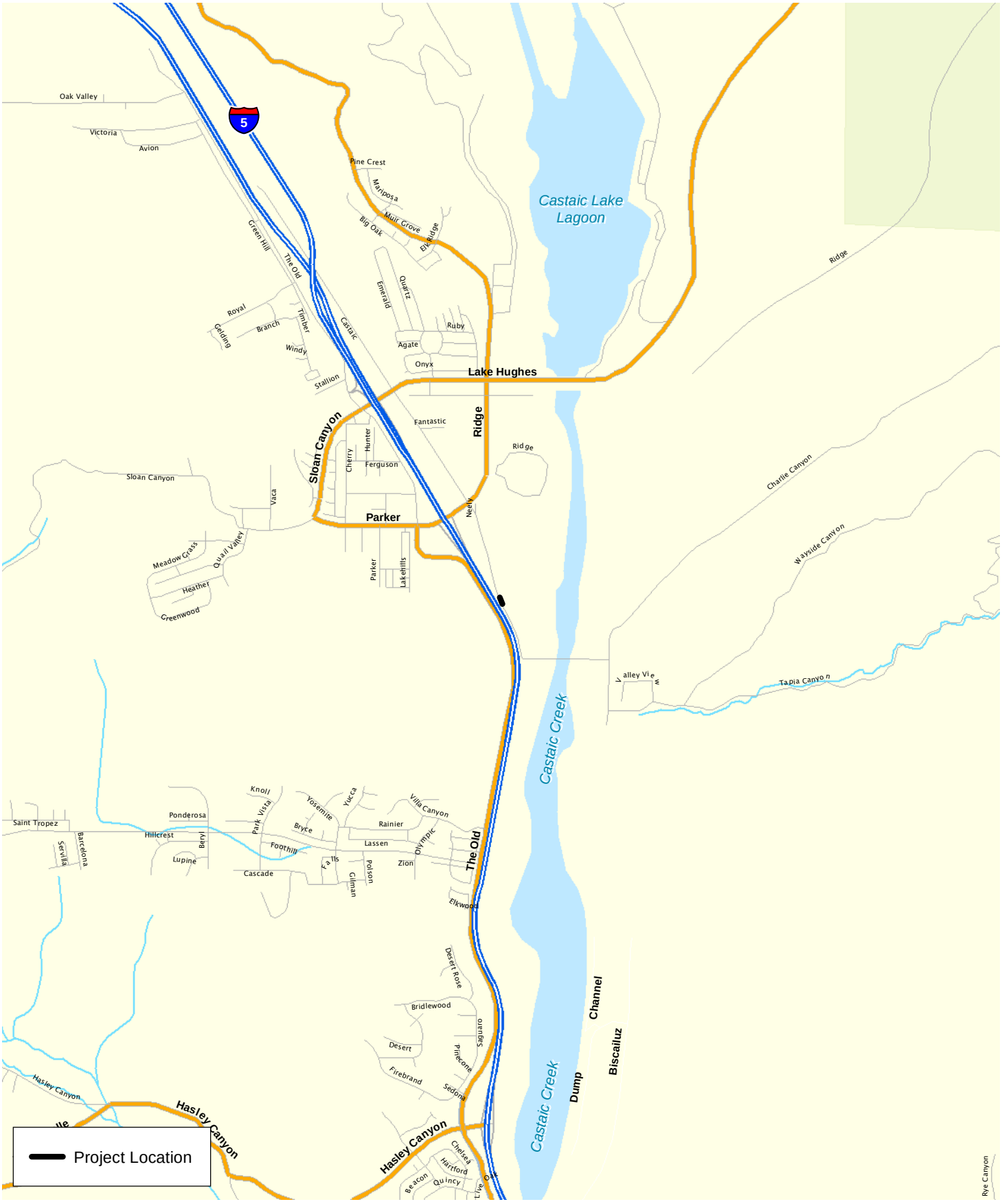

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Reach 106 – Castaic Drain Outlet (RMD Channel)

Exhibit 20

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

0.5 0.25 0 0.5 Miles

BonTerra CONSULTING

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Reach 109 – Santa Clara River – South Bank West of McBean Pkwy (MTD 1510)

Exhibit 21

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

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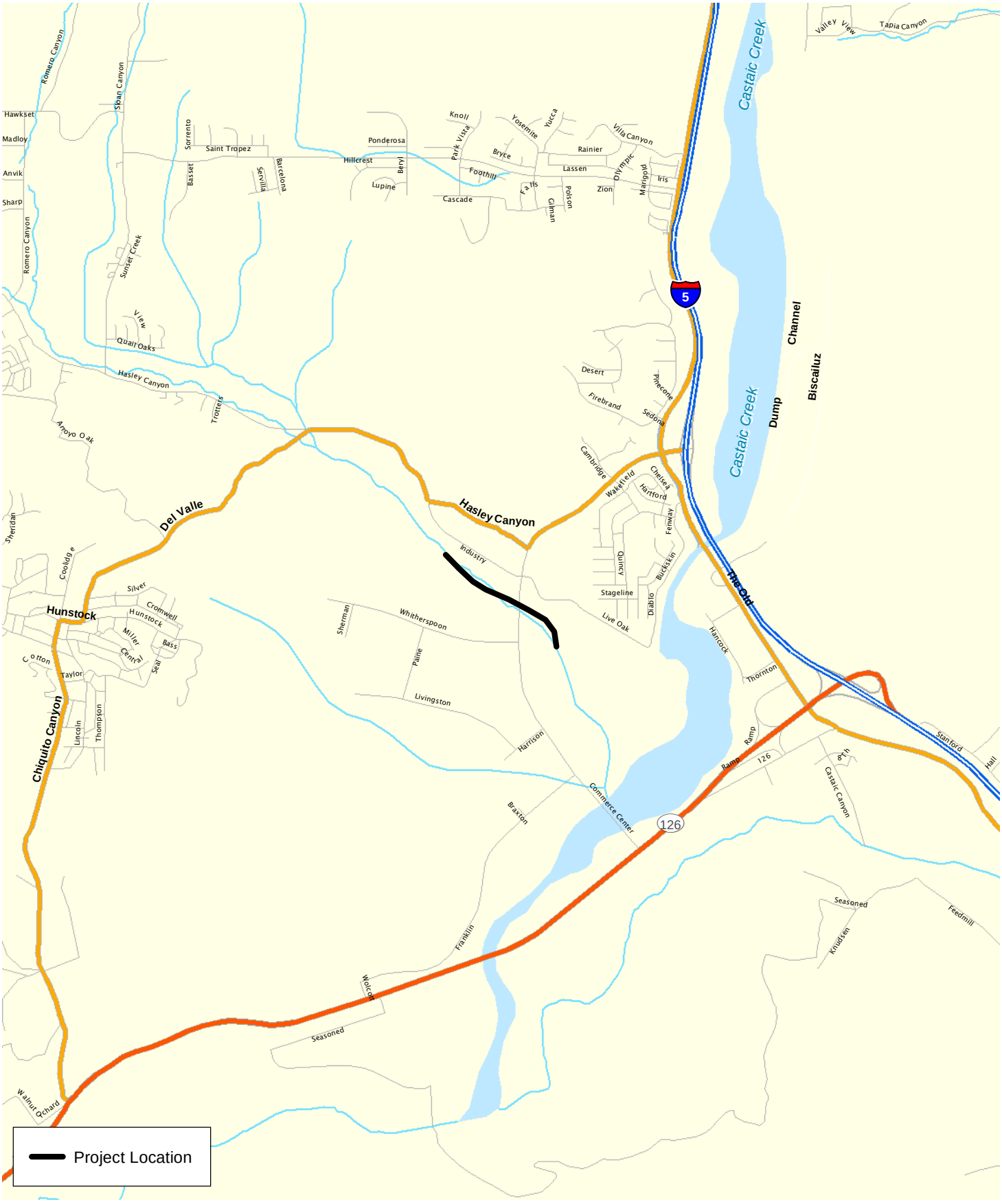

Reach 110 – Hasley Canyon Channel (PD 2262)

Exhibit 22

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

0.5 0.25 0 0.5 Miles

BonTerra CONSULTING

(Rev: 9-05-2013 MMD) R:\PAS\Projects\CoLADPW\J228\Graphics\2013 Focused Survey Results\Ex22_PL.pdf

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The County formerly maintained channels clear of any vegetation, as required under the *Code of Federal Regulations* (33 CFR 208.10), until the California Department of Fish and Wildlife (CDFW) began requiring the County to clear vegetation on alternating sides of the channels each year. The USACE allowed limited clearing to occur between 1993 and 1995. Anticipated heavy rains during the 1997/1998 storm season caused by El Niño conditions resulted in a statewide need to remove vegetation and sediment from soft-bottom channels to restore their flood-carrying capacity. The LACFCD obtained all necessary permits to conduct this work in the 1997/1998 storm season and has continued the ongoing maintenance as approved by the permits.

1.2.2 PROJECT DESCRIPTION

Vegetative growth in a channel system reduces channel capacity. All soft-bottom channels were designed and constructed as relatively clean, unvegetated channels. As vegetation grows more densely, the roughness of the channel increases and the velocity of flows decrease, which corresponds to a loss in the channel's carrying capacity. The vegetation also traps some of the sediments being transported by flood flows which, when deposited, further reduce channel capacity. Studies have shown that increased vegetation and sediments in the channels result in reduced flow area with a concomitant decrease in flow velocity (LACFCD 1996). A loss of carrying capacity in the channels could cause flood flows to escape the channel systems and impact adjacent properties (LACFCD 1996).

Vegetation can also affect the structural integrity of bridges during a major storm event. Vegetation slows flood flows, which creates a backwater effect and increases water surface elevations upstream. Bridges are not normally designed to withstand the forces that result from significantly increased flood water elevations. Additionally, increased flood depths upstream can result in flooding of adjacent properties and erosion of channel banks.

The LACFCD performs annual vegetation clearing in channels and minor grading to retrain channel flows consistent with the clearing limits established by the permitted maintenance plan (BonTerra Consulting 1999). This ongoing program is necessary to maintain the design capacities of the channels and to ensure the proper functioning of these facilities located within the LACFCD boundaries.

Within each reach, the LACFCD proposes to clear the same areas (and acreage) that have been cleared annually since 1997. Biological impacts to these channel reaches associated with the initial clearing of vegetation for maintenance activities were previously mitigated through maintaining and enhancing 62.7 acres of riparian habitats at the Big Tujunga Wash Mitigation Bank site (BonTerra Consulting 1999).

Channel clearing activities are performed primarily by mechanical means, using heavy equipment (e.g., trucks, bulldozers, dump trucks, and loaders), as well as other equipment (e.g., mowers) that are designed specifically for this type of work. Hand clearing or mowing is conducted in areas where mechanical equipment cannot be used or where important biological resources exist nearby. Herbicides approved by regulatory agencies are applied, as necessary, to eradicate invasive and/or non-native vegetation including, but not limited to, giant reed (*Arundo donax*) and castor bean (*Ricinus communis*).

The channel clearing activities are performed under an existing Maintenance Plan approved by the Los Angeles Regional Water Quality Control Board (RWQCB) and USACE and modified by the CDFW under the existing Streambed Alteration Agreement between CDFW and the LACFCD. BonTerra Consulting has reviewed the Maintenance Plan and has extensive knowledge of channel clearing activities in all channel reaches, having worked with the LACFCD since 1997 to provide biological monitoring of flood-control channel maintenance work.

Pre-clearing and post-clearing photos have been taken every year to document the biological resources in these channel reaches in compliance with the mitigation requirements of existing permits from the USACE, the USFWS, the Los Angeles RWQCB, and the CDFW.

1.3 SPECIAL STATUS SPECIES BACKGROUND

In order to comply fully with the regulatory permits issued to the LACDPW, surveys are performed for a variety of special status species at soft-bottom channel reaches where suitable or potentially suitable habitat has been identified. For example, the permits require annual pre-clearing surveys for the federally and State-listed Endangered unarmored threespine stickleback (*Gasterosteus aculeatus williamsoni*) and the federally listed Threatened Santa Ana sucker (*Catostomus santaanae*). Results of these fish surveys were included with previous survey efforts in 2002 and 2003 (BonTerra Consulting 2002, 2003), but have since been reported separately to the LACDPW. This report provides the results of surveys for the arroyo toad (*Anaxyrus californicus*), least Bell's vireo (*Vireo bellii pusillus*), and southwestern willow flycatcher (*Empidonax traillii extimus*).

1.3.1 ARROYO TOAD

The arroyo toad was listed as a federally Endangered species by the USFWS on January 17, 1995 (CDFW 2013) and is a California Species of Special Concern (CDFW 2011). At the time of listing, the arroyo toad was one of two subspecies of the southwestern toad (*Bufo microscaphus*), but subsequent genetic studies (Gergus 1998) resulted in the separation of arroyo toad (*B. californicus*) from the Arizona toad (*B. microscaphus*). Recent research (Frost et al. 2006) placed both species in the genus *Anaxyrus*.

This is a rather uniformly warty and stocky toad with a light-colored stripe across the head that includes the eyelids. The parotid glands are oval-shaped, widely separated, and pale toward the front. The underside of the arroyo toad is usually buff-colored and unspotted, and the cranial crests are absent or weak. The typical size (snout to vent length) range of reproductive adult toads is 2 to 2.6 inches for males and 2.6 to 3.1 inches for females (Sweet 1992, 1993). Tadpoles reach an average maximum length of 1.3 inches (maximum of 1.6 inches) and are black at hatching. Soon after hatching, the tadpoles develop a tan-colored dorsum with crossbars on the tail and an opaque, white abdomen (venter) before metamorphosing (Sweet 1992).

Early descriptions of the habitat requirements for the arroyo toad are based on detailed life history studies conducted over a period of years by Sweet (1992, 1993). Much of that work was conducted in the Los Padres National Forest in Santa Barbara County. Subsequent to this work, additional studies of populations in other portions of the range have resulted in a somewhat broader habitat description (e.g., Griffin et al. 1999; Ramirez 1999, 2000, 2001, 2002a, 2002b, 2002c). It can generally be said that the arroyo toad frequents third order washes, streams, and arroyos in semiarid parts of the southwest. Stream substrates range from sands to small cobble, with sandy banks supporting mule fat (*Baccharis salicifolia*), willows (*Salix* spp.), cottonwoods (*Populus* spp.), and/or sycamores (*Platanus racemosa*). The arroyo toad breeds both within streams and in small backwater pools that form along the stream margins, usually in relatively shallow water (about four inches) with sand or gravel substrate.

Arroyo toads are primarily nocturnal, except during the breeding season when they are sometimes active during daylight hours. These toads will move extensively in upland habitats, at least seasonally. Adult males will sometimes travel 1.2 to 1.9 miles along a stream course, often becoming more sedentary once reaching a large size (Sweet 1992). Females are more sedentary, typically maintaining an area of movement less than 330 feet in diameter (Sweet 1992). Adults mostly feed on ants, particularly nocturnal ants such as trail-forming tree

ants (*Liometopum occidentale*), but will also consume other invertebrates (Sweet 1992). Tadpoles are substrate gleaners, feeding on detritus and microbial mats from just beneath the surface layer of fine sediments or within the interstices of gravel deposits (Sweet 1992).

On February 7, 2001, the USFWS published a final rule designating 182,360 acres of land in California including parts of Monterey, Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, Orange, and San Diego Counties as critical habitat for the arroyo toad (USFWS 2005a). Following the designation of critical habitat, several lawsuits were filed challenging various aspects of the designation. In response to these lawsuits, the critical habitat designation was vacated and the USFWS was instructed by the court to re-evaluate its previous position.

On April 28, 2004, the USFWS published a final rule designating 11,695 acres of critical habitat for the arroyo toad in portions of Santa Barbara, Ventura, Los Angeles, San Bernardino, and Riverside Counties (USFWS 2005a). Further lawsuits were filed that successfully challenged this final rule and resulted in another proposed rule for revised critical habitat that was published in the *Federal Register* on October 13, 2009 (USFWS 2009). The revised critical habitat final rule was released on February 9, 2011 (USFWS 2011).

Four Castaic Creek channel reaches (Reaches 86, 87, 97, and 104) are located in Unit 6, Subunit B, of this final critical habitat revision (USFWS 2011). Another surveyed channel reach (Reach 110) is located just upstream of Unit 6, Subunit B of this final critical habitat (USFWS 2011). One surveyed channel reach (Reach 82) previously located within proposed critical habitat (USFWS 2005a), is now located about 1,000 feet upstream of Unit 6, Subunit B of this final critical habitat (USFWS 2011). No other channel reaches managed by the LACFCD are located in this final critical habitat.

1.3.2 LEAST BELL'S VIREO

The least Bell's vireo was formerly a common, even locally abundant summer resident of Southern California's lowland riparian woodlands (Grinnell and Miller 1986). The substantial population decline of this avian species over the latter half of the twentieth century is attributable to the loss and degradation of riparian habitats and, perhaps more importantly, brood parasitism by the brown-headed cowbird (*Molothrus ater*). The least Bell's vireo was listed by the California Department of Fish and Game (CDFG)[4] as State Endangered on October 2, 1980, and by the USFWS as federally Endangered on May 2, 1986 (USFWS 1986).

The Bell's vireo is a neotropical migrant that breeds in central and southwestern North America from northern Mexico to Southern California, Nevada, and Utah, east to Louisiana, and north to North Dakota, Wisconsin, and Indiana in the central U.S. (AOU 1998). The winter range of this vireo, although not well known, is believed to be the west coast of Central America from southern Sonora south to northwest Nicaragua, including the cape region of Baja California, Mexico (Brown 1993). Of the four Bell's vireo subspecies, only two breed in California: the least Bell's vireo and the Arizona Bell's vireo (*V. b. arizonae*), which occurs in the Colorado River Valley (Garrett and Dunn 1981; Rosenberg et al. 1991). Though the least Bell's vireo was formerly considered a common breeder in riparian habitats throughout the Central Valley and other low elevation river systems in California and Baja California, Mexico (Franzreb 1989), it had been eliminated from much of its historical range by the time of its listing in 1986 (Franzreb 1989; Brown 1993). Recovery efforts since its listing have included habitat protection; removal of exotic species (particularly giant reed); and trapping programs for the brown-headed cowbird (USFWS 2006). The least Bell's vireo population has increased tenfold from

[4] Although the California Department of Fish and Game (CDFG) changed its name to the California Department of Fish and Wildlife (CDFW) effective January 1, 2013, "CDFG" is still used throughout this document for all documents published or database searches completed before January 1, 2013.

291 territories in the early 1980s to an estimated 2,968 territories 20 years later (USFWS 2006). After a decade or more of absence in Los Angeles County, the least Bell's vireo returned by the mid-1980s with a pair reported from Whittier Narrows in 1985 and 1986 (Long 1993). Least Bell's vireo numbers have continued to increase since that time, and it is now known to occur at several other locations in Los Angeles County such as the San Fernando (Van Norman) Dam; the San Gabriel River at Fish Canyon and Van Tassel Canyon; the Sepulveda Basin Wildlife Area; and the Castaic Lagoon Recreation Area (CDFG 2009). The two largest populations in the county are at Hansen Dam in the northeastern corner of the San Fernando Valley where 44 least Bell's vireo territories were present in 2009 (Griffith Wildlife Biology 2009) and on the Santa Clara River from the I-5 Freeway downstream to the Las Brisas Bridge where 56 least Bell's vireo territories were present in 2007 (Bloom Biological, Inc. 2007).

Least Bell's vireos breed primarily in riparian habitats dominated by willows with dense understory vegetation. Shrubs such as mule fat and California rose (*Rosa californica*) are often a component of the understory (Goldwasser 1981). The least Bell's vireo is often found in areas that include trees such as willow, sycamore, or cottonwood, particularly where the canopy is within or immediately adjacent to an understory layer of vegetation (Salata 1983). The least Bell's vireo generally nests in early successional stages of riparian habitats, with vireo nest sites frequently located in willows that are between four and ten years of age (RECON 1988; Franzreb 1989). The most critical factor in habitat structure is the presence of a dense understory shrub layer from approximately two feet to ten feet above ground level (Goldwasser 1981; Salata 1983; Franzreb 1989).

On February 2, 1994, the USFWS published a final critical habitat for the least Bell's vireo designating approximately 37,560 acres of land in Santa Barbara, Ventura, Los Angeles, San Bernardino, Riverside, and San Diego Counties, California (USFWS 1994b). Designated critical habitat in Los Angeles County is located only in the Santa Clara River from the Golden State (I-5) Freeway west to the Ventura County line. The surveyed soft-bottom channel reaches are all located outside the critical habitat for this species.

1.3.3 SOUTHWESTERN WILLOW FLYCATCHER

The southwestern willow flycatcher was formerly a common summer resident of southern California's lowland riparian woodlands and up into mountain canyons (Garrett and Dunn 1981). By the 1970s, the southwestern willow flycatcher was considered to be absent as a breeder in Southern California (McCaskie 1975). The virtual extirpation of this species as a breeder in Southern California has been attributed to the loss and degradation of riparian habitats and brood parasitism by the brown-headed cowbird. All willow flycatchers breeding in California—which include the subspecies *E. t. brewsteri* and *E. t. adastus* in addition to the southwestern willow flycatcher—were listed by the CDFG as State Endangered on January 2, 1991. The USFWS listed the southwestern willow flycatcher as federally Endangered on February 7, 1995 (USFWS 1993).

The willow flycatcher is a neotropical migrant that breeds in the west from northern Baja California, Mexico to central British Columbia, Canada and generally east through the northern half of the United States to the Atlantic coast (AOU 1998). The willow flycatcher winters in Central America from Nayarit, Mexico (Pacific coast) and Honduras (Gulf of Mexico coast) to Panama and also to northern Colombia and northwest Venezuela (Sedgwick 2000). Depending on the authority, there are four or five recognized subspecies of willow flycatcher (Sedgwick 2000). The breeding range of the southwestern willow flycatcher includes Southern California, Arizona, New Mexico, western Texas, and extreme southern parts of Nevada and Utah (USFWS 1993).

The California population of southwestern willow flycatchers breeds along the coast north of Baja California to the Santa Ynez River, Santa Barbara County, and north in the interior to about Independence, Inyo County (Unitt 1987). Besides the Colorado River, there are five drainages in California that support major breeding populations of southwestern willow flycatcher: the South Fork of the Kern River in Kern County; the Santa Margarita River on Camp Pendleton and the San Luis Rey River in San Diego County; the Santa Ana River in Riverside and San Bernardino Counties; and the Owen's River in Inyo and Mono Counties (Durst et al. 2007). In the 1970s, the southwestern willow flycatcher was believed to have been extirpated from coastal Southern California (Remsen 1978), but small numbers were found during the late 1970s and early 1980s in San Diego County (Unitt 1984). An early population estimate for the southwestern willow flycatcher in California was 70 pairs (USFWS 1993). More recent population estimates are higher—such as 200 territories in 2004 and 190 territories in 2006 (Durst et al. 2005; Durst et al. 2007)—and are more likely the result of increased survey effort rather than a population increase (Durst et al. 2007).

The southwestern willow flycatcher breeds in willow-dominated riparian habitats that are similar to least Bell's vireo nesting habitats. The southwestern willow flycatcher differs from least Bell's vireo in that it shows a stronger dependency on willow thickets for all its requirements (Grinnell and Miller 1986). In addition, the southwestern willow flycatcher appears to have a preference for sites with surface water in the vicinity, such as along streams, on the margins of a pond or lake, and at wet mountain meadows (Grinnell and Miller 1986; Flett and Sanders 1987; Harris et al. 1987); in Arizona, the southwestern willow flycatcher invariably nests near surface water (Phillips et al. 1964). Recently, the southwestern willow flycatcher has adapted to introduced vegetation present in riparian vegetation types, such as tamarisk (*Tamarix* sp.) and Russian olive (*Elaeagnus angustifolia*) (USFWS 1993).

The willow flycatcher is a common migrant in the interior of California and is a rare to uncommon migrant along the coastal slope, with most birds moving through Southern California between May 15 and June 20 during the spring season (Garrett and Dunn 1981; Unitt 1987). The spring southwestern willow flycatcher migration is earlier than that of the northern subspecies (Unitt 1987; USFWS 1993). As a result, surveys for nesting southwestern willow flycatcher are complicated by the presence of more abundant subspecies migrating through its range during its breeding season.

On October 19, 2005, the USFWS published a Final Rule designating critical habitat for the southwestern willow flycatcher (USFWS 2005). This final rule designated 120,824 acres in Arizona, California, Nevada, New Mexico, and Utah as critical habitat. Of that, 17,212 acres were designated as Critical habitat in Kern, Santa Barbara, San Bernardino, and San Diego Counties, California. Following lawsuits, the USFWS recently issued a revised Final Rule on January 3, 2013. This Final Rule designates critical habitat that covers 2,090 stream miles in California, Nevada, Utah, Colorado, Arizona, and New Mexico (USFWS 2013). This Final Rule uses a slightly different methodology to designate critical habitat. For example, it includes areas that are considered essential for the recovery of the species even if they were not occupied at the time of the species' listing. These new stream segments include Castaic Creek (3.0 miles), Little Tujunga (1.4 miles), Big Tujunga (3.0 miles), and the San Gabriel River (8.8 miles) (USFWS 2013). Three Castaic Creek channel reaches (Reaches 87, 97, and 104), four Santa Clara River channel reaches (Reaches 71, 80, 82, and 109), and one San Gabriel River channel reach (Reach 39) are located within this proposed revised critical habitat.

SECTION 2.0 SURVEY METHODOLOGIES

For each species surveyed, the surveys were conducted according to USFWS protocols. The biologists conducted the surveys at the most appropriate time of day to ensure maximum opportunity to observe the species.

2.1 SPECIAL STATUS AMPHIBIAN SPECIES

2.1.1 ARROYO TOAD

The initial studies conducted in 2002 included a background literature review and habitat assessment for each of the soft-bottom channel reaches that represented suitable arroyo toad breeding and/or upland habitat. The literature review included the documentation of relevant literature regarding the presence of the arroyo toad within and/or adjacent to each reach, including areas both upstream and downstream. This included review of *Federal Register* listings, protocols, and species data provided by the USFWS, the CDFW's California Natural Diversity Database (CNDDB); consultation with qualified experts familiar with the distribution and natural history of the arroyo toad; and review of unpublished biological resource letter reports and assessments conducted within the region.

Focused surveys for the arroyo toad were conducted at 11 channel reaches in 2013: Castaic Creek Reaches 86, 87, and 97, and Reach 104 in the Castaic Creek Watershed; San Francisquito Canyon Channel Reach 105; the northern part of the South Fork Santa Clara River Reach 75 (i.e., from Magic Mountain Parkway upstream to the Via Princessa Bridge) and the South Fork Santa Clara River Reach 79; Reach 80 at the confluence of the Santa Clara and South Fork Santa Clara Rivers; and Santa Clara River Reaches 71, 82, and 109.

The surveys followed the guidelines presented in the USFWS' *Survey Protocol for the Arroyo Toad* (1999b). Each channel reach was surveyed on foot to characterize aquatic (breeding) and upland habitat (refugia) types and to document any characteristic sign (clutches, larvae, juveniles, adults). Also, in accordance with the USFWS protocol, areas within 0.6 mile of documented arroyo toad sites (previously documented by the presence of eggs, larvae, juveniles, or adults) that have suitable habitat were presumed to have arroyo toads (USFWS 1999b). In addition to following the guidelines outlined above, all field surveys adhered to recommended equipment decontamination procedures outlined in Appendix B of the California red-legged frog survey guidelines (USFWS 2005b).

Six surveys following USFWS recommended protocol were conducted at each of the channel reaches. These surveys included both a diurnal and nocturnal component. The initial (diurnal) surveys included walking each reach in an effort to assess and document the suitability of breeding and upland habitat for the arroyo toad. These initial surveys also focused on locating any areas of inundation that may have represented suitable breeding pools (egg clutches and/or tadpoles). These surveys identified portions within each reach with the highest probability to support the arroyo toad. Following the initial surveys, areas identified during the daytime surveys were visited again at night in order to detect active toads. The same routes were covered repeatedly throughout the evening to ensure that no individuals went undetected. Survey data is presented in Table 1. A list of all wildlife species encountered during these surveys is included in Appendix C.

TABLE 1
ARROYO TOAD SURVEY DATA

Survey Number	Survey Date	Reaches Surveyed	Surveying Biologists	Survey Conditions			
				Temperature (°F)	Relative Humidity (%)	Wind (mph)	Moon Phase
1a	3/26/2013	86, 87, 97, 104	Sam Stewart Jonas Winbolt	50–77	30–80	0–10	Waxing gibbous
1b	3/27/2013	75, 79, 80, 105	Sam Stewart Jonas Winbolt	50–74	45–82	0–7	Full
1c	3/28/2013	71, 82, 109	Sam Stewart Jason Mintzer	50–72	54–84	0–5	Waning gibbous
2a	4/2/2013	86, 87, 97, 104	Sam Stewart Jason Mintzer	51–66	30–90	0–5	Waning crescent
2b	4/3/2013	75, 79, 80, 105	Sam Stewart Sarah Thomas	55–74	39–71	0–7	Waning crescent
2c	4/4/2013	71, 82, 109	Sam Stewart Jason Mintzer	60–80	30–72	0–6	Waning crescent
3a	4/15/2013	86, 87, 97, 104	Sam Stewart Jason Mintzer	58–81	30–71	0–7	Waxing crescent
3b	4/17/2013	71, 82, 109	Sam Stewart Jason Mintzer	50–69	10–20	0–9	Waxing crescent
3c	4/18/2013	75, 79, 80, 105	Sam Stewart Jason Mintzer	50–76	10–40	0–4	Waxing crescent
4a	5/1/2013	86, 87, 97, 104	Sam Stewart Jason Mintzer	60–88	10–15	0–11	3rd quarter
4b	5/2/2013	75, 79, 80, 105	Sam Stewart Jason Mintzer	57–86	10–14	0–15	Waning crescent
4c	5/3/2013	71, 82, 109	Sam Stewart Jason Mintzer	57–97	10–40	0–8	Waning crescent
5a	5/16/2013	71, 82, 109	Sam Stewart Jason Mintzer	57–75	60–80	0–7	Waxing crescent
5b	5/23/2013	86, 87, 97, 104	Sam Stewart Jason Mintzer	54–73	45–60	0–13	Waxing gibbous
5c	5/28/2013	75, 79, 80, 105	Sam Stewart Jonas Winbolt	68–80	35–45	0–15	Waning gibbous
6a	6/18/2013	86, 87, 97, 104	Sam Stewart Jason Mintzer	64–88	35–65	0–5	Waxing gibbous
6b	6/19/2013	75, 79, 80, 105	Sam Stewart Jason Mintzer	66–88	12–25	0–10	Waxing gibbous
6c	6/20/2013	71, 82, 109	Sam Stewart Jason Mintzer	75–88	20–38	0–8	Waxing gibbous

°F: degrees Fahrenheit; mph: miles per hour.

2.2 SPECIAL STATUS BIRD SPECIES

The initial literature review in 2002 included all relevant and available documentation on the presence of the least Bell's vireo and southwestern willow flycatcher in Los Angeles County. This included review of *Federal Register* listings, protocols, and species data provided by the USFWS; review of the CDFW's CNDDB; consultation with qualified experts familiar with the distribution and natural history of the least Bell's vireo and southwestern willow flycatcher; and review of unpublished biological resource letter reports and assessments.

Based on the results of prior BonTerra Consulting surveys (2011 focused surveys and annual monitoring surveys) of the channel reaches, the 2013 focused surveys for the least Bell's vireo and southwestern willow flycatcher were conducted at a total of 21 channel reaches where they have potential to occur: 3 channel reaches in the Los Angeles River/San Pedro Bay Area (Reaches 12, 14, and 27); 1 channel reach in the Malibu Creek Watershed (Reach 28); 4 channel reaches in the San Gabriel River (Reaches 39, 40b, 43a, and 43b); and 13 channel reaches in the Santa Clara River and Castaic Creek drainages (Reaches 71, 75, 79, 80, 82, 87, 97, 103, 104, 105, 106, 109, and 110). The channel reaches were surveyed by BonTerra Consulting Biologists Brian Daniels (USFWS Recovery Permit No. 821401-4), Lindsay Messett, Amber Oneal Heredia (USFWS Recovery Permit No. 148554-2), and Steve Morris as well as Consulting Biologist James Pike (USFWS Recovery Permit No. 832946-4). Surveys followed the USFWS protocol for both species; surveys for southwestern willow flycatcher were conducted by permitted individuals.

The USFWS survey protocol for southwestern willow flycatcher was updated in June 2010 (Sogge et al. 2010). The changes affected the timing of surveys, but not the number of surveys or the method of conducting each survey. A minimum of five surveys must be performed for the southwestern willow flycatcher to determine absence of that species from a project site. The five surveys must be performed within three specified time periods at least five days apart. The first survey must be conducted between May 15 and May 31; two surveys are required in the second survey window from June 1 to June 24; and two surveys need to be conducted between June 25 and July 17. The survey protocol for least Bell's vireo remains the same with a minimum of eight surveys being conducted at least ten days apart between April 10 and July 31. Surveys for the least Bell's vireo and southwestern willow flycatcher can be performed simultaneously because of their similar habitat requirements.

The survey area consisted of all riparian habitats in each reach. The riparian habitat was systematically surveyed by walking slowly and methodically along two transects (downstream then upstream or the reverse) with some variance depending on streambed width. Recorded vocalizations of southwestern willow flycatcher were used to elicit a response from any potentially territorial southwestern willow flycatcher; recorded vocalizations of least Bell's vireo were not used according to the protocol for this species. If no southwestern willow flycatchers were detected after the initial playing of the vocalization, the recording was usually replayed at least once. Any observations of willow flycatcher (all subspecies) and least Bell's vireo, including any pertinent behavior, were recorded and their locations mapped in the field. It should be noted that all subspecies of the willow flycatcher breeding in California are listed as State Endangered species; however, only breeding locations are protected.

The surveys were conducted under optimal weather conditions and during the early morning hours when bird activity is at its peak. Numbers were recorded for all bird species detected during the surveys, including notable observations of any special status species or other birds such as the brown-headed cowbird. Survey data is presented in Table 2. Daily tallies of all bird species recorded during these surveys are included in Appendix B.

TABLE 2
SPECIAL STATUS BIRD SURVEY DATA

Reaches Surveyed	Survey Dates	Surveying Biologist
12, 14, 39	4/10/2013	Steve Morris
	4/20/2013	
	4/30/2013	
	5/10/13	
	5/23/2013	Brian Daniels
	6/10/2013	
	6/17/2013	
	6/25/2013	
	7/5/2013	
27, 28	4/15/2013	Steve Morris
	4/25/2013	
	5/5/2013	
	5/15/2013	
	5/29/2013	Brian Daniels
	6/12/2013	
	6/21/2013	
	6/28/2013	
	7/11/2013	
40b, 43a	4/10/2013	James Pike
	4/20/2013	
	5/1/2013	
	5/11/2013	
	5/22/2013	
	6/1/2013	
	6/14/2013	
	6/28/2013	
	7/12/2013	
71, 75, 79, 80	4/11/2013	James Pike
	4/21/2013	
	5/3/2013	
	5/12/2013	
	5/23/2013	
	6/2/2013	
	6/16/2013	
	6/30/2013	
	7/13/2013	
82, 105, 109	4/10/2013	Lindsay Messett
	4/23/2013	
	5/3/2013	
	5/13/2013	
	5/24/2013	Brian Daniels
	6/11/2013	
	6/18/2013	
	6/26/2013	
	7/9/2013	

TABLE 2
SPECIAL STATUS BIRD SURVEY DATA

Reaches Surveyed	Survey Dates	Surveying Biologist
103, 110	4/11/2013	Lindsay Messett
	4/24/2013	
	5/7/2013	
	5/17/2013	
	5/30/2013	Brian Daniels
	6/13/2013	
	6/20/2013	
	6/27/2013	
	7/10/2013	
87, 97 104, 106	4/16/2013	Lindsay Messett
	4/29/2013	
	5/9/2013	
	5/22/2013	Amber Oneal Heredia
	6/7/2013	
	6/18/2013	
	7/2/2013	
	7/12/2013	

SECTION 3.0 SURVEY RESULTS

The following section presents the results of the 2013 focused surveys conducted within the survey areas described above in Section 1.1.2. No arroyo toads were observed during these surveys. Least Bell's vireo territories were established in Reaches 14, 27, 39, 40b, and 43a these surveys (see Table ES-1). A migrant male least Bell's vireo was observed on only one survey date (April 11, 2013) in Reach 80. Migrant willow flycatchers were observed in four channel reaches (Reaches 40b, 82, 105, and 109), but no southwestern willow flycatcher territories were established during these 2013 surveys. The details of these observations are provided below and grouped by watershed, including Los Angeles River Watershed/San Pedro Bay and the Santa Clara River Watershed. Table ES-1 in the Executive Summary at the beginning of the report summarizes the 2013 survey results. Los Angeles River Watershed/San Pedro Bay

3.1.1 REACH 14 – MAY CHANNEL (MAIN CHANNEL OUTLET INTO PACOIMA CANYON)

Least Bell's Vireo

Two least Bell's vireo territories were established in Reach 14 during these surveys (Exhibits 23 and 24). The solitary (unpaired) male (shown as LBV1 on Exhibits 23 and 24) occupied both the main channel outlet on the west side of Pacoima Wash as well as the northernmost drainage on the east side of Pacoima Wash from April 10 to May 23, but not thereafter. This solitary male interacted with a silent LBV, presumed to be a female, on May 23, but appeared to remain unpaired on that date. It is unknown what happened to this male since he was no longer present in the survey area after May 23. The pair (shown as LBV2 on Exhibit 23) constructed a nest in the willows of the southernmost drainage on east side of Pacoima Wash and was observed brooding and feeding fledglings on June 25 (Exhibit A-1). At least two fledglings were present in this territory on July 5.

3.1.2 REACH 27 – WILMINGTON DRAIN

Least Bell's Vireo

One least Bell's vireo territory was established in Reach 27 during these surveys. This territory consisted of a singing male that was first detected on April 25. On April 25, this male wandered upstream and downstream of Lomita Boulevard, but thereafter remained upstream of Lomita Boulevard. This solitary male least Bell's vireo stayed unpaired and remained on territory through at least July 11 (see Exhibits 25 and 26).

3.2 SAN GABRIEL RIVER AREA

3.2.1 REACH 39 – BEATTY CHANNEL OUTLET AT SAN GABRIEL RIVER (25+99.00+50')

Least Bell's Vireo

Two least Bell's vireo territories were established in Reach 39 during these surveys (Exhibits 27 and 28). The territory in the southern part of the survey area next to the pedestrian bridge was paired with a female from April 10 to at least April 30 (shown as LBV1 on Exhibits 27 and 28). This pair occupied the willow clump at the west end of the pedestrian bridge that has supported nesting least Bell's vireo since 2007. The least Bell's vireo territory in the northeastern part of survey area (shown as LBV2 on Exhibits 27 and 28) was solitary (unpaired) from April 10 to May 10, but was found to be paired during the May 23 survey. The pair was observed nest building on May 23; the female was color banded with a combination that showed it was banded

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Reach 14 Least Bell's Vireo Locations (Aerial)

Exhibit 23

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

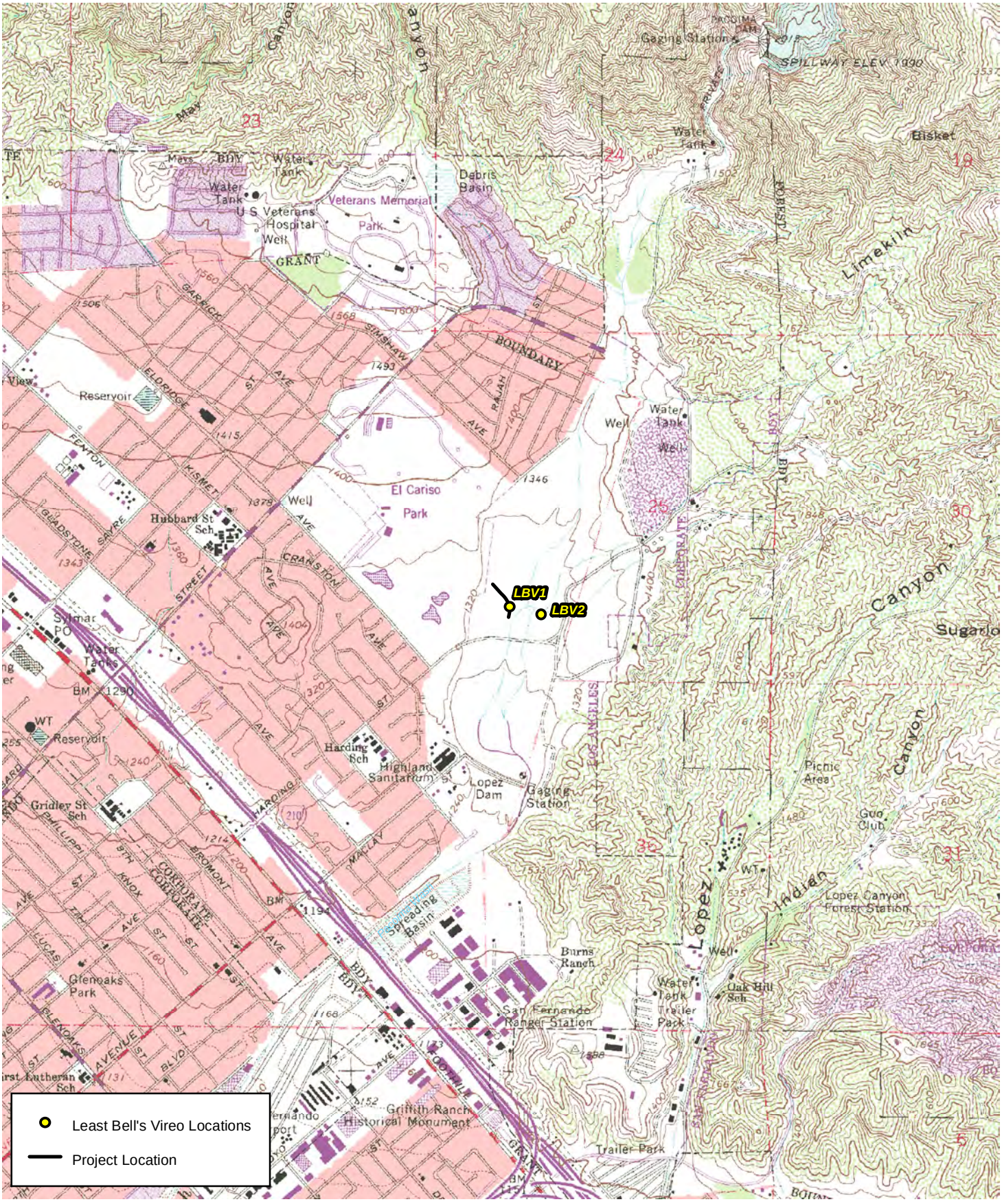
N
W E
S

300 150 0 300

Feet

BonTerra CONSULTING

(Rev: 9-05-2013 JAZ) R:\PAS\Projects\CoLADPW\J228\Graphics\2013 Focused Survey Results\Ex23_LBV_Aerial.pdf



Reach 14 Least Bell's Vireo Locations (USGS Quad)

Exhibit 24

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

2,000 1,000 0 2,000

Feet

BonTerra CONSULTING

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Reach 27 Least Bell's Vireo Location (Aerial)

Exhibit 25

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

400 200 0 400
Feet

BonTerra CONSULTING

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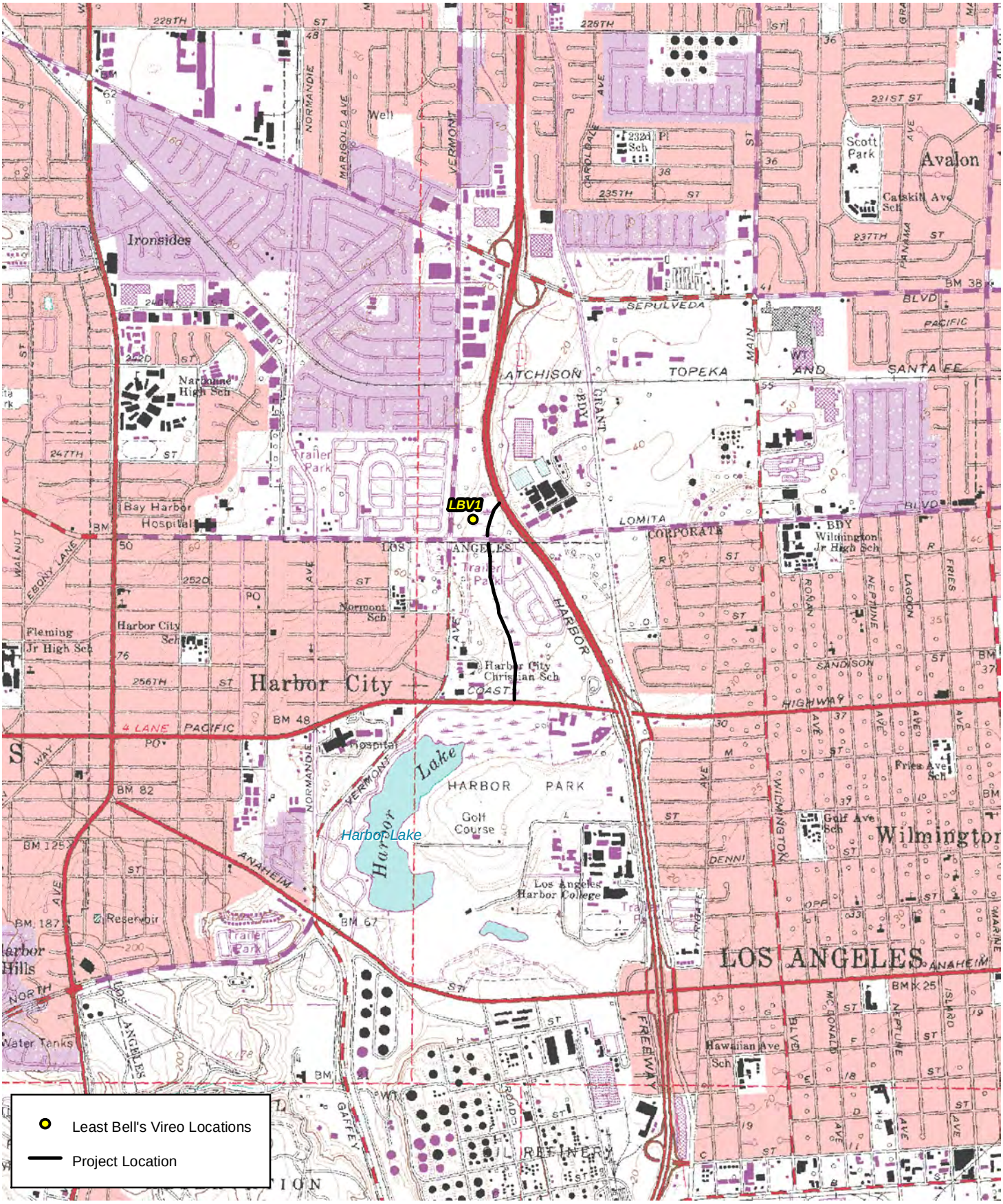

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Reach 27 Least Bell's Vireo Location (USGS Quad)

Exhibit 26

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

BonTerra CONSULTING

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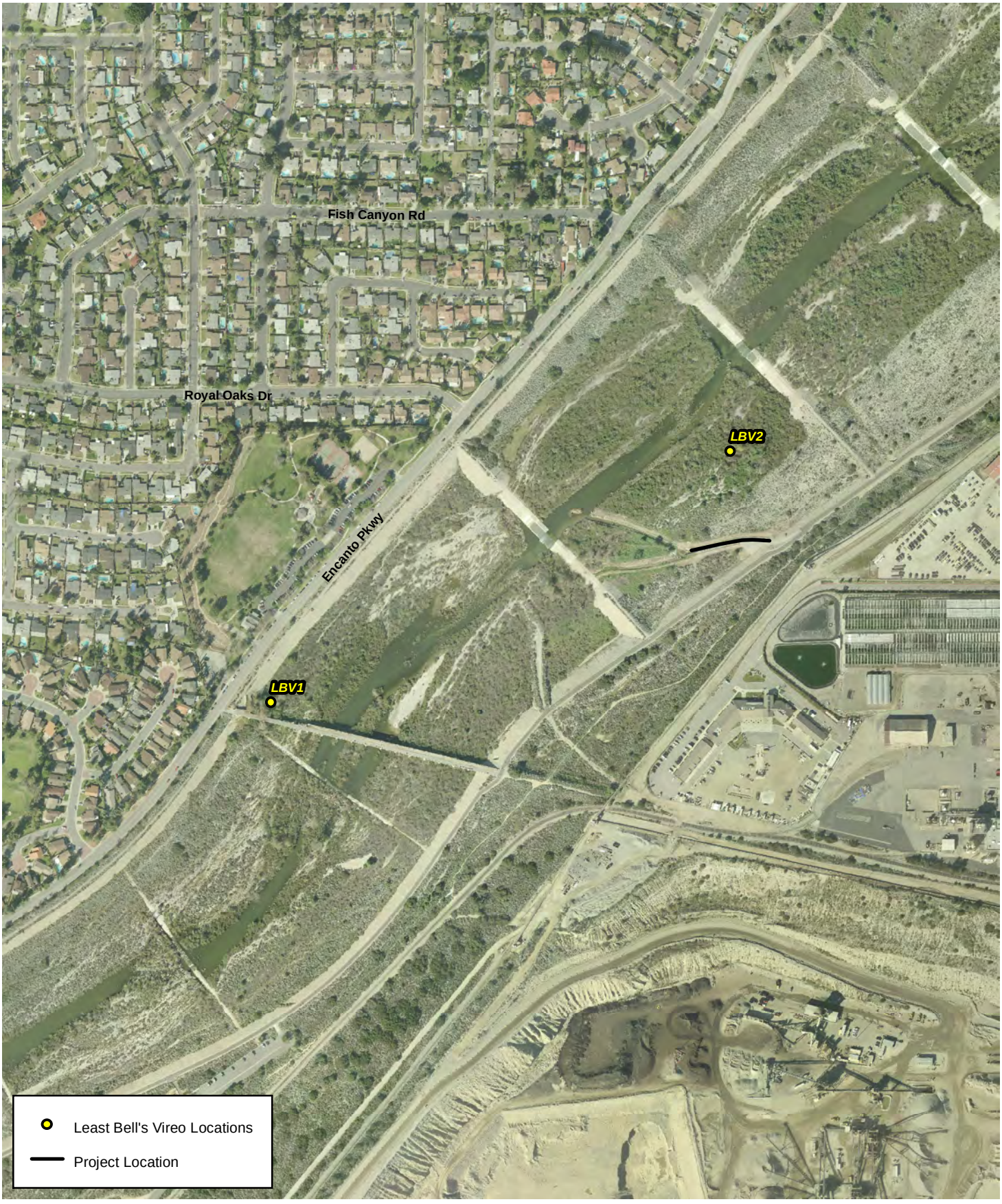

Reach 39 Least Bell's Vireo Locations (Aerial)

Exhibit 27

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

500 250 0 500

Feet

BonTerra CONSULTING

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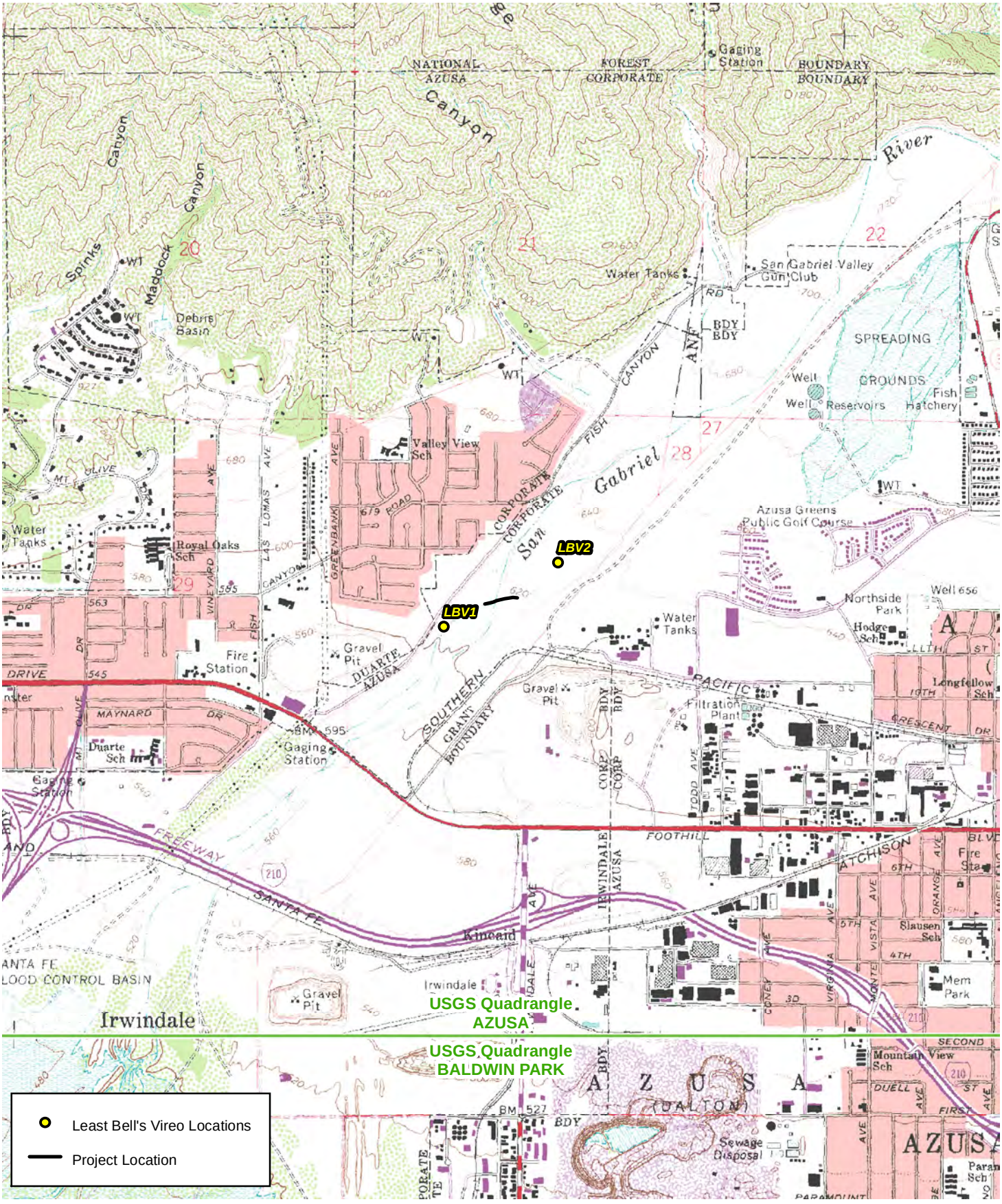

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Reach 39 Least Bell's Vireo Locations (USGS Quad)

Exhibit 28

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

(Rev: 9-05-2013 CJS) R:\PAS\Projects\CoLADPW\J228\Graphics\2013 Focused Survey Results\Ex28_LBV_USGS.pdf

on its wintering grounds in October 2012 near San Jose del Cabo at the southern tip of the Baja California peninsula (Exhibit A-1). The pair at the pedestrian bridge was not detected on May 10 or thereafter. On May 23, a singing male presumed to be the male from the pedestrian bridge pair was at the Beatty channel outlet and engaged in counter-singing with the male least Bell's vireo with color banded female. Only the male with the color-banded female was detected on the June 10 survey, but presumably the same male least Bell's vireo was present at the Beatty channel outlet and again engaged in counter-singing with the paired male during the June 17 survey. Only the male least Bell's vireo (LBV2) was detected during the June 25 and July 5 surveys; the outcome of nesting for this pair was not determined.

3.2.2 REACH 40B – SAN GABRIEL RIVER – SANTA MONICA (I-10) FREEWAY TO THIENES AVENUE

Least Bell's Vireo

Five least Bell's vireo territories were established in Reach 40b during these surveys (Exhibits 29 and 30). The first least Bell's vireo territory (LBV1) consisted of a pair first detected on April 10. This pair had a nest in a narrow-leaved willow that produced four fledglings on June 14. The second least Bell's vireo territory (LBV2) was a pair that was first detected on April 10 and which fledged three young from a nest in narrow-leaved willow in early May. This pair built a second nest in narrow-leaved willow that contained three eggs on July 12. The third territory (LBV3) consisted of a pair that was first detected on April 10 and which built a nest in narrow-leaved willow that produced four fledglings in early May. They built a second nest in mule fat that produced four more fledglings in late June. The least Bell's vireo territory (LBV4) just upstream of the first drop structure on Exhibits 29 and 30 was a solitary male that was first detected on April 10 and stayed unpaired through the season. The fifth least Bell's vireo territory (LBV5) consisted of a pair with the male first detected on April 20 and the female on May 1. The nesting outcome of this pair was not determined. Two transient male least Bell's vireos were also detected during these surveys. One transient or wandering male was detected singing on April 20 opposite the end of Thienes Avenue at the confluence of San Jose Creek and the San Gabriel River (11S 0405196 3766823). Presumably this same male was detected in the same general area on May 1, but not again. The second transient male was detected on June 28 upstream of the least Bell's vireo pair (LBV5) closest to the second drop structure upstream from confluence with San Jose Creek.

Southwestern Willow Flycatcher

A migrant willow flycatcher was observed in a dry narrow-leaved willow "island" (11S 0406416, 3767690) on June 1. This willow flycatcher was unresponsive to playback of pre-recorded vocalizations.

3.2.3 REACH 43A – SAN GABRIEL RIVER – UPPER

Least Bell's Vireo

Three least Bell's vireo territories were established in Reach 43a during these surveys (Exhibits 31 and 32). The first least Bell's vireo territory (LBV1) consisted of a male first detected on April 10 and a female first detected on May 1. This pair produced two nests, both in mule fat, that each had three eggs. Both nests, however, were depredated. The second least Bell's vireo territory (LBV2) consisted of a male first detected on April 10 followed by the female on April 20; one fledgling was present on May 22 with this pair. The third least Bell's vireo territory (LBV3) consisted of a solitary male that was first detected on April 10 and which stayed unpaired through the season. One transient or wandering male was detected singing on May 22 (11S 0402050, 3764336), but not thereafter.

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Reach 40b Least Bell's Vireo Locations (Aerial)

Exhibit 29

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

600 300 0 600

Feet

BonTerra CONSULTING

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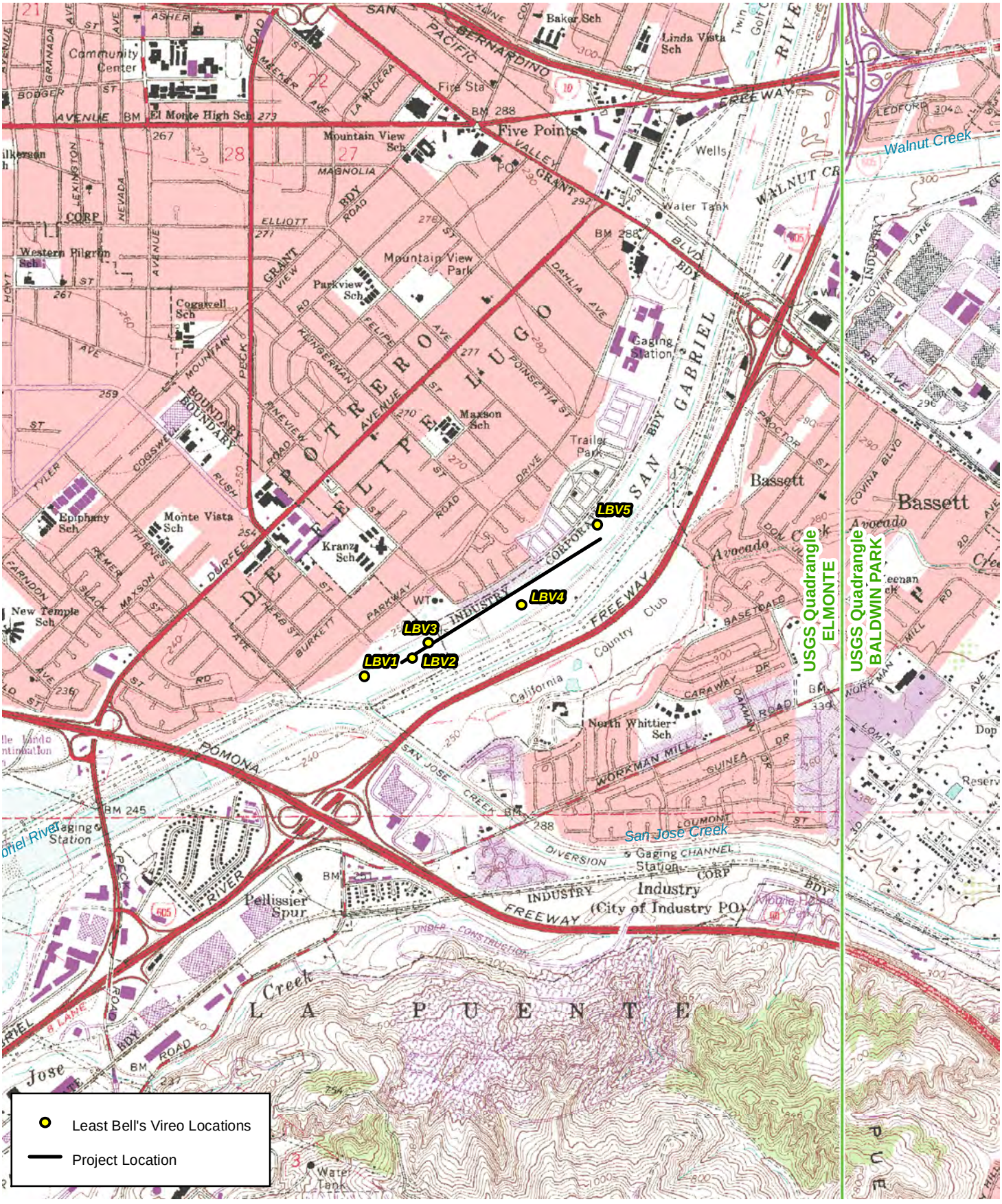

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Reach 40b Least Bell's Vireo Locations (USGS Quad)

Exhibit 30

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

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Reach 43a Least Bell's Vireo Locations (Aerial)

Exhibit 31

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

400 200 0 400

Feet

BonTerra CONSULTING

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Reach 43a Least Bell's Vireo Locations (USGS Quad)

Exhibit 32

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

2,000 1,000 0 2,000 Feet

BonTerra CONSULTING

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3.3 SANTA CLARA RIVER AREA

3.3.1 REACH 80 – SOUTH FORK – SANTA CLARA RIVER (PDS 1947 AND 1946)

Least Bell's Vireo

One singing male least Bell's vireo was present on April 11 (Exhibits 33 and 34). This migrant stayed for just a few minutes before leaving the survey area. It was on the north bench of the channel in habitat that consisted of patchy tree tobacco (*Nicotiana glauca*), scalebroom (*Lepidospartum squamatum*), and Great Basin sagebrush (*Artemisia tridentata*).

3.3.2 REACH 82 – SANTA CLARA RIVER MAIN CHANNEL (PD 2278)

Southwestern Willow Flycatcher

A migrant willow flycatcher was observed west of the Reach 82 (11S 355509, 3810832) on June 18. It was foraging low in young willows growing in standing water associated with a side outlet. This bird sang and called occasionally, but was unresponsive to playback of pre-recorded vocalizations.

3.3.3 REACH 105 – SAN FRANCISQUITO CHANNEL (PD 2456)

Southwestern Willow Flycatcher

Two migrant willow flycatchers were together and singing upstream of the Decoro Drive bridge and west of the Reach 105 flood-control structures on the left bank (east bank) of the channel (11S 356731, 3812706) on June 18. A very late migrant was present at the left bank side outlet upstream of the Decoro Drive Bridge (11S 356898, 3812686) on June 26. This bird was silent and unresponsive to playback of pre-recorded vocalizations. It left the riparian habitat and foraged in the ornamental trees of the adjacent residential homes. After approximately one hour, it returned to the willow riparian habitat next to the water at the same side outlet where it was initially observed. Mr. Daniels returned early the next morning, June 27, but was not able to find this willow flycatcher. No willow flycatcher was found on July 9. Photos of this bird (see Exhibit A-2) were shared with other observers with expertise on the species, but could not be identified to subspecies. Therefore, this bird is best considered to be a very late migrant of unknown subspecies.

3.3.4 REACH 109 – SANTA CLARA RIVER – SOUTH BANK WEST OF MCBEAN PARKWAY (MTD 1510)

Southwestern Willow Flycatcher

One migrant willow flycatcher was observed west of Reach 109 (11S 356079, 3810302) on June 18. It was calling and foraging in mule fat next to the bike trail on the south bank of the Santa Clara River. It moved north into the river and out of view. Playback of pre-recorded vocalizations brought the bird back into view. It was silent and within a minute or two continued south across the bike trail and open field into an ornamental sycamore in the adjacent apartment complex.

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Reach 80 Least Bell's Vireo Location (Aerial)

Exhibit 33

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N W E S

350 175 0 350

Feet

BonTerra CONSULTING

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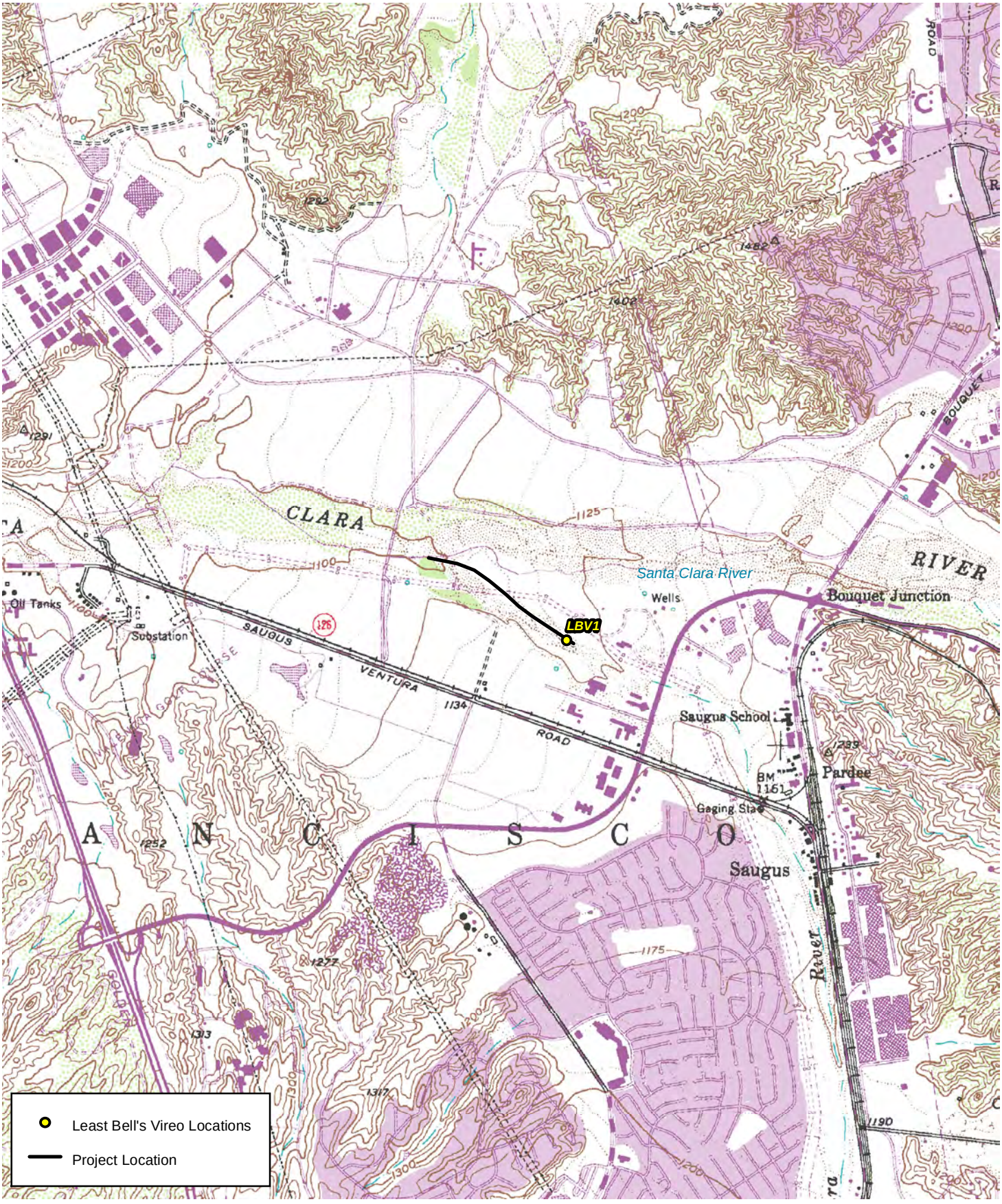

Reach 80 Least Bell's Vireo Location (USGS Quad)

Exhibit 34

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

N
W E
S

2,000 1,000 0 2,000

Feet

BonTerra CONSULTING

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[5] Although the California Department of Fish and Game (CDFG) changed its name to the California Department of Fish and Wildlife (CDFW) effective January 1, 2013, "CDFG" is still used throughout this document for all documents published or database searches completed before January 1, 2013.

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APPENDIX A

PHOTO-DOCUMENTATION EXHIBITS

June 25, 2013. View of female least Bell's vireo on nest at Reach 14.

May 23, 2013. View of color-banded least Bell's vireo at Reach 39.

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Site Photographs

Exhibit A-1

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

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June 26, 2013. View of very late migrant willow flycatcher at Reach 105.

June 26, 2013. View of very late migrant willow flycatcher at Reach 105.

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Site Photographs

Exhibit A-2

2013 Focused Survey Results for the Los Angeles County Soft-Bottom Channels

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APPENDIX B

BIRD COMPENDIA

APPENDIX B

BIRD COMPENDIA TABLE OF CONTENTS

Reach **Page**

REACH 12
HAINES CANYON MAIN CHANNEL OUTLET

Species	Survey Dates – 2013								
	10-Apr	20-Apr	30-Apr	10-May	23-May	10-Jun	17-Jun	25-Jun	5-Jul
Mallard (*Anas platyrhynchos)*	1	2	3		2	2			3
California Quail (*Callipepla californica*)	1	4	2	6	1	1	1		10
Great Blue Heron (*Ardea herodias*)	1				1		1		1
Great Egret (*Ardea alba*)	1								
Green Heron (*Butorides virescens*)		1		2					
Black-crowned Night-Heron (*Nycticorax nycticorax*)					1				
Cooper's Hawk (*Accipiter cooperii*)							1		
Red-tailed Hawk (*Buteo jamaicensis*)					1				
Rock Pigeon (*Columba livia*)*			2						
Eurasian Collared-Dove (*Streptopelia decaocto*)*	2								
Mourning Dove (*Zenaida macroura*)		8	4	2		3	3	4	5
Black-chinned Hummingbird (*Archilochus alexandri*)		1				1		1	2
Anna's Hummingbird (*Calypte anna*)	2	3	4	4	1	1		3	3
Costa's Hummingbird (*Calypte costae*)		1		2					
Allen's Hummingbird (*Selasphorus sasin*)	1	1	4	2		1		1	
Allen's/Rufous Hummingbird (*Selasphorus* sp.)		1	1	2	2	7	4	8	10
Belted Kingfisher (*Ceryle alcyon*)		1							
Nuttall's Woodpecker (*Picoides nuttallii*)				1			1	1	1
Downy Woodpecker (*Picoides pubescens*)							1		1
Black Phoebe (*Sayornis nigricans*)	1	1		1	1	1	1	1	1
Say's Phoebe (*Sayornis saya*)	1								
Ash-throated Flycatcher (*Myiarchus cinerascens*)					1	2	1		1
Cassin's Kingbird (*Tyrannus vociferans*)	2		1				2	2	2
Western Kingbird (*Tyrannus verticalis*)									1
Warbling Vireo (*Vireo gilvus*)				2	3				

REACH 12
HAINES CANYON MAIN CHANNEL OUTLET

Species	Survey Dates – 2013								
	10-Apr	20-Apr	30-Apr	10-May	23-May	10-Jun	17-Jun	25-Jun	5-Jul
Western Scrub-Jay (*Aphelocoma insularis*)		1	1	1	1	1	1		1
American Crow (*Corvus brachyrhynchos*)	2	3	5	3	2		2	6	5
Common Raven (*Corvus corax*)		1	2	1	3				2
Violet-green Swallow (*Tachycineta thalassina*)				4					
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	1		4	1	5	4	13	12	1
Cliff Swallow (*Petrochelidon pyrrhonota*)								2	
Barn Swallow (*Hirundo rustica*)				1					
Bushtit (*Psaltriparus minimus*)		5	3						
Red-breasted Nuthatch (*Sitta canadensis*)			1						
Bewick's Wren (*Thryomanes bewickii*)	3	2	2	2		4		2	1
Blue-gray gnatcatcher (*Polioptila caerulea*)		1							
Ruby-crowned Kinglet (*Regulus calendula*)	1	2							
Western Bluebird (*Sialia mexicana*)	3	3	1						
Swainson's Thrush (*Catharus ustulatus*)					2				
American Robin (*Turdus migratorius*)			1						
Northern Mockingbird (*Mimus polyglottos*)	1	1	2	1	1			3	5
European Starling (*Sturnus vulgaris*)*	1	1	1				2	1	
Cedar Waxwing (*Bombycilla cedrorum*)			5	10					
Phainopepla (*Phainopepla nitens*)						1	1	1	
Orange-crowned Warbler (*Oreothlypis celata*)	1								
Common Yellowthroat (*Geothlypis trichas*)	3	3	1	1	6	3	4	3	4
Yellow Warbler (*Setophaga petechia*)		1	2	8	5	4	4	4	5
Yellow-rumped Warbler (*Setophaga coronata*)	12	12							
Wilson's Warbler (*Wilsonia pusilla*)		1	2	6	2				
Spotted Towhee (*Pipilo maculates*)	1					2			

REACH 12
HAINES CANYON MAIN CHANNEL OUTLET

Species	Survey Dates – 2013								
	10-Apr	**20-Apr**	**30-Apr**	**10-May**	**23-May**	**10-Jun**	**17-Jun**	**25-Jun**	**5-Jul**
California Towhee (*Melozone crissalis*)			2	2	1	2	1	2	
Song Sparrow (*Melospiza lincolnii*)	5	1	2	3	8	6	4	7	3
Lincoln's sparrow (*Melospiza lincolnii*)		1							
White-crowned Sparrow (*Zonotrichia leucophrys*)	11								
Western Tanager (*Piranga ludoviciana*)			12	1	3				
Black-headed Grosbeak (*Pheucticus melanocephalus*)			1	2	1				
Blue Grosbeak (*Passerina caerulea*)								1	1
Lazuli Bunting (*Passerina amoena*)			1	1					
Red-winged Blackbird (*Ageaius phoeniceus*)	3	3	2	1					
Brewer's Blackbird (*Euphagus cyanocephalus*)				1					
Great-tailed Grackle (*Quiscalus mexicanus*)			2						
Hooded Oriole (*Icterus cucullatus*)	1	1	1	3	1	1	2	3	3
Bullock's Oriole (*Icterus bullockii*)		1	1	3	1	4	3	2	
House Finch (*Haemorhous mexicanus*)	6	6	11	9	8	4	10	8	8
Lesser Goldfinch (*Spinus psaltria*)	4	7	3	12	8	5	4	3	1
American Goldfinch (*Spinus tristis*)		1		2					1
House Sparrow (*Passer domesticus*)*		1				5		2	1

* Introduced non-native species with established breeding population in California

REACH 14
MAY CHANNEL
(MAIN CHANNEL OUTLET INTO PACOIMA CANYON)

Species	Survey Dates – 2013								
	10-Apr	20-Apr	30-Apr	10-May	23-May	10-Jun	17-Jun	25-Jun	5-Jul
Canada Goose (*Branta canadensis*)	2								
Mallard (*Anas platyrhynchos)*			1	3	1				
California Quail (*Callipepla californica*)				2		5		10	10
Cooper's Hawk (*Accipiter cooperii*)	1			1					
Red-shouldered Hawk (*Buteo lineatus*)	1	1					1	1	
Killdeer (*Charadrius vociferous*)					2				
Rock Pigeon (*Columba livia*)*		3							
Eurasian Collared-Dove (*Streptopelia decaocto*)*			2						
Mourning Dove (*Zenaida macroura*)	6	6	2	6		1	1		4
Lesser Nighthawk (*Chordeiles acutipennis*)			1	1					
White-throated Swift (*Aeronautes saxatalis*)		1							
Black-chinned Hummingbird (*Archilochus alexandri*)	1	1			3	1		1	
Anna's Hummingbird (*Calypte anna*)	5	3	3	4	1		2	1	2
Costa's Hummingbird (*Calypte costae*)	1			1					
Allen's/Rufous Hummingbird (*Selasphorus* sp.)	1	2	1	1		1	2	1	1
Nuttall's Woodpecker (*Picoides nuttallii*)	1		1			1	2		
Peregrine Falcon (*Falco peregrines*)								1	
Hammond's flycatcher (*Empidonax hammondii*)	1								
Black Phoebe (*Sayornis nigricans*)					1				1
Say's Phoebe (*Sayornis saya*)	1	1	1	2		1			
Ash-throated Flycatcher (*Myiarchus cinerascens*)	1	1		2	1				
Cassin's Kingbird (*Tyrannus vociferans*)		2	2			1	1	2	
Western Kingbird (*Tyrannus verticalis*)	1	2	2	2		1			
Bell's Vireo (*Vireo bellii*)	2	3	3	3	4	1		1	1

REACH 14
MAY CHANNEL
(MAIN CHANNEL OUTLET INTO PACOIMA CANYON)

Species	Survey Dates – 2013								
	10-Apr	20-Apr	30-Apr	10-May	23-May	10-Jun	17-Jun	25-Jun	5-Jul
Warbling Vireo (*Vireo gilvus*)				3					
American Crow (*Corvus brachyrhynchos*)	3	3	2	6	4	6	5	2	2
Common Raven (*Corvus corax*)	4	1	6	2	3	6	1	5	4
Violet-green Swallow (*Tachycineta thalassina*)	1								
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	5	1			2	2	4	6	
Cliff Swallow (*Petrochelidon pyrrhonota*)	15	2	5	12	6	3	8		4
Barn Swallow (*Hirundo rustica*)						1			
Bushtit (*Psaltriparus minimus*)	2	7	9	14		2			
White-breasted Nuthatch (*Sitta carolinensis*)								1	
Bewick's Wren (*Thryomanes bewickii*)	3	2	3	3	3	4	2	2	2
Wrentit (*Chamaea fasciata*)	2	2	1		1		1		1
Swainson's Thrush (*Catharus ustulatus*)				1	2				
American Robin (*Turdus migratorius*)						1	1	1	
California Thrasher (*Toxostoma redivivum*)		1			2		1	1	1
Northern Mockingbird (*Mimus polyglottos*)		1				1			
European Starling (*Sturnus vulgaris*)*	4								
Cedar Waxwing (*Bombycilla cedrorum*)			6	5					
Nashville Warbler (*Oreothlypis ruficapilla*)			1						
Common Yellowthroat (*Geothlypis trichas*)	3			3					
Yellow Warbler (*Setophaga petechia*)		1	2	3					
Yellow-rumped Warbler (*Setophaga coronata*)	16	2							
Wilson's Warbler (*Wilsonia pusilla*)		1		4	1				
Spotted Towhee (*Pipilo maculates*)	2	3	3	4	2	5	3		2
California Towhee (*Melozone crissalis*)	8	9	8	10	3	5	3		4

REACH 14
MAY CHANNEL
(MAIN CHANNEL OUTLET INTO PACOIMA CANYON)

Species	Survey Dates – 2013								
	10-Apr	20-Apr	30-Apr	10-May	23-May	10-Jun	17-Jun	25-Jun	5-Jul
Savannah sparrow (*Passerculus sandwichensis*)	1								
Song Sparrow (*Melospiza lincolnii*)	3	7	5	7	6	10	2	1	
White-crowned Sparrow (*Zonotrichia leucophrys*)	15	2							
Western Tanager (*Piranga ludoviciana*)			2						
Black-headed Grosbeak (*Pheucticus melanocephalus*)	1	1	1	1	1	1	1		
Blue Grosbeak (*Passerina caerulea*)			1	1		1			1
Lazuli Bunting (*Passerina amoena*)	2		2						
Western Meadowlark (*Sturnella neglecta*)	4								
Brewer's Blackbird (*Euphagus cyanocephalus*)			2						
Brown-headed Cowbird (*Molothrus ater*)	1	1		2					
Hooded Oriole (*Icterus cucullatus*)								1	
Bullock's Oriole (*Icterus bullockii*)	2			1					
House Finch (*Haemorhous mexicanus*)	18	11	18	21	25	12	20		
Lesser Goldfinch (*Spinus psaltria*)	16	9	7	17	8	4	5	4	3
American Goldfinch (*Spinus tristis*)	5	12	6	12	1	6		1	2
House Sparrow (*Passer domesticus*)*								16	2

* Introduced non-native species with established breeding population in California

REACH 27
WILMINGTON DRAIN

Species	Survey Dates – 2013								
	15-Apr	25-Apr	5-May	15-May	29-May	12-Jun	21-Jun	28-Jun	11-Jul
Mallard (*Anas platyrhynchos)*		2	3		2				
Great Blue Heron (*Ardea herodias*)		1	1						
Great Egret (*Ardea alba*)	2		1			1			
Snowy Egret (*Egretta thula*)		1	1	1		6		1	
Green Heron (*Butorides virescens*)						1			
Red-shouldered Hawk (*Buteo lineatus*)		2		1	1				
Western Gull (*Larus occidentalis*)	3					1		1	
Rock Pigeon (*Columba livia*)*			20	3	2	2			30
Eurasian Collared-Dove (*Streptopelia decaocto*)*		1	3	1		1	3	3	
Mourning Dove (*Zenaida macroura*)	5	7			1	2	4	3	1
Vaux's Swift (*Chaetura vauxi*)		8							
Anna's Hummingbird (*Calypte anna*)		2	2	4			1		
Allen's Hummingbird (*Selasphorus sasin*)	3	3	1	2				1	
Allen's/Rufous Hummingbird (*Selasphorus* sp.)		2	2	1	3	1	1	1	
Belted Kingfisher (*Ceryle alcyon*)									
Downy Woodpecker (*Picoides pubescens)*	1	1		2	1	2	1		
Western Wood-Pewee (*Contopus sordidulus*)									
Pacific-slope flycatcher (*Empidonax difficilis*)		1			1				
Black Phoebe (*Sayornis nigricans*)	3	4	2	3	4	2	2	3	1
Ash-throated Flycatcher (*Myiarchus cinerascens*)		2							
Western Kingbird (*Tyrannus verticalis*)		1							
Bell's Vireo (*Vireo bellii*)		1	1	1	1	1	1	1	1
Warbling Vireo (*Vireo gilvus*)		3		4					
Western Scrub-Jay (*Aphelocoma insularis*)		1							
American Crow (*Corvus brachyrhynchos*)	1	7	4	6		10	1	2	

REACH 27
WILMINGTON DRAIN

Species	Survey Dates – 2013								
	15-Apr	25-Apr	5-May	15-May	29-May	12-Jun	21-Jun	28-Jun	11-Jul
Common Raven (*Corvus corax*)		1	2	2	1			1	
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)		4	4	2	4	2	2	1	
Cliff Swallow (*Petrochelidon pyrrhonota*)		6							
Barn Swallow (*Hirundo rustica*)		3			7	10	2	6	6
Bushtit (*Psaltriparus minimus*)	2	1	15	18	15	15	10	10	
Northern Mockingbird (*Mimus polyglottos*)		4	2	2	1	2	1	3	2
European Starling (*Sturnus vulgaris*)*	1	2		5	3	5	2	2	
Cedar Waxwing (*Bombycilla cedrorum*)	12	25	4						
Orange-crowned Warbler (*Oreothlypis celata*)	1	2	1	5	1				
Common Yellowthroat (*Geothlypis trichas*)	1		5	3	9	4	2		
Palm Warbler (*Dendroica palmarum*)		1							
Yellow Warbler (*Setophaga petechia*)	2	4	9	6	6	6	6	3	4
Yellow-rumped Warbler (*Setophaga coronata*)	8	9							
Black-throated Gray Warbler (*Setophaga nigrescens*)		1							
Townsend's Warbler (*Setophaga townsendi*)		1	2						
Wilson's Warbler (*Wilsonia pusilla*)	4	3	5	4					
California Towhee (*Melozone crissalis*)		6	6	4	5	4	3		6
Song Sparrow (*Melospiza lincolnii*)	2	6	9	7	3	4		5	
White-crowned Sparrow (*Zonotrichia leucophrys*)	2								
Western Tanager (*Piranga ludoviciana*)		9	8	3					
Black-headed Grosbeak (*Pheucticus melanocephalus*)	1	2	1						
Lazuli Bunting (*Passerina amoena*)		4	1						
Red-winged Blackbird (*Ageaius phoeniceus*)	1	2	2						
Brown-headed Cowbird (*Molothrus ater*)	1	5	6	4					
Hooded Oriole (*Icterus cucullatus*)	4	6	6	2	3	5	4	4	3

REACH 27
WILMINGTON DRAIN

Species	Survey Dates – 2013								
	15-Apr	**25-Apr**	**5-May**	**15-May**	**29-May**	**12-Jun**	**21-Jun**	**28-Jun**	**11-Jul**
Bullock's Oriole (*Icterus bullockii*)	2	3	3	1	1	1	2		1
House Finch (*Haemorhous mexicanus*)	2	25	18	22	25	12	50	20	10
Lesser Goldfinch (*Spinus psaltria*)	2	9	8	10	2		6		2
American Goldfinch (*Spinus tristis*)				2	3	1			
House Sparrow (*Passer domesticus*)*		1	2	1	2	3			2
Nutmeg Mannikin (*Lonchura punctulata*)**					2	6	2	6	5

* Introduced non-native species with established breeding population in California
** Exotic or escaped non-native species that may or many not be breeding in California

REACH 28
TRIUNFO CREEK (PD T2200)

Species	Survey Dates – 2013								
	15-Apr	25-Apr	5-May	15-May	29-May	12-Jun	21-Jun	28-Jun	11-Jul
Mallard (*Anas platyrhynchos)*	2	4	1	1					
California Quail (*Callipepla californica*)	1							10	5
Common Peafowl (*Pavo cristatus*)**	2	9	6	2	5	4	1	3	2
Great Blue Heron (*Ardea herodias*)	1	1			1				1
Snowy Egret (*Egretta thula*)		1							
Green Heron (*Butorides virescens*)	1								
Black-crowned Night-Heron (*Nycticorax nycticorax*)								1	
Red-shouldered Hawk (*Buteo lineatus*)		1			1	2	2	3	2
Band-tailed Pigeon (*Patagioenas fasciata*)		1			5		1	1	
Mourning Dove (*Zenaida macroura*)			1					1	3
Western screech owl (*Megascops kennicottii*)					1				
Black-chinned Hummingbird (*Archilochus alexandri*)					1				
Anna's Hummingbird (*Calypte anna*)	2	2	1	1				3	
Allen's/Rufous Hummingbird (*Selasphorus* sp.)	1								
Acorn Woodpecker (*Melanerpes formicivorus*)		3	4	3	7	3	5	6	4
Nuttall's Woodpecker (*Picoides nuttallii*)	1	2	1	2	2	2	1	2	1
Downy Woodpecker (*Picoides pubescens)*				1					
Northern Flicker (*Colaptes auratus*)	1			1	2	1	1	4	1
Red-crowned Parrot (*Amazona viridigenalis*)*	5								
Black-hooded Parkeet (*Nandayus nenday*)**			4	22	2	1	2	17	5
Pacific-slope Flycatcher (*Empidonax difficilis*)	1	1	2	3	2	4	2	1	1
Black Phoebe (*Sayornis nigricans*)	1	1			2	1	4	2	
Ash-throated Flycatcher (*Myiarchus cinerascens*)			2	2	3	2	1	2	1
Cassin's Kingbird (*Tyrannus vociferans*)		2					1		
Warbling Vireo (*Vireo gilvus*)					1				

REACH 28
TRIUNFO CREEK (PD T2200)

Species	Survey Dates – 2013								
	15-Apr	25-Apr	5-May	15-May	29-May	12-Jun	21-Jun	28-Jun	11-Jul
Western Scrub-Jay (*Aphelocoma insularis*)		1	2	1	4		2	5	
American Crow (*Corvus brachyrhynchos*)	2	12	7	11	12	17	10	7	19
Common Raven (*Corvus corax*)	1	1							
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	1	1		2	1				
Oak Titmouse (*Baeolophus inornatus*)	2	2			3	2	4	3	2
Bushtit (*Psaltriparus minimus*)			5				2		
White-breasted Nuthatch (*Sitta carolinensis*)	1	2			2	3	3	2	2
House Wren (*Troglodytes aedon*)	6	8	9	9	6	7	2		
Blue-gray gnatcatcher (*Polioptila caerulea*)		1		1					
Wrentit (*Chamaea fasciata*)	2		1		1	1	1	2	
Western Bluebird (*Sialia mexicana*)				1	1	1			
Swainson's Thrush (*Catharus ustulatus*)						1			
European Starling (*Sturnus vulgaris*)*		5	6	2	8		2	3	2
Orange-crowned Warbler (*Oreothlypis celata*)	1		1	3	2	1	1		
Yellow Warbler (*Setophaga petechia*)	1	1	1		1		2		
Yellow-rumped Warbler (*Setophaga coronata*)	1								
Spotted Towhee (*Pipilo maculates*)	3		3	3	6	5	4	5	1
Rufous-crowned Sparrow (*Aimophila ruficeps*)							1		
California Towhee (*Melozone crissalis*)	2	1	1	4	1		2	1	1
Song Sparrow (*Melospiza lincolnii*)	2	2		2	6	1	6	6	4
Dark-eyed Junco (*Junco hyemalis*)							2		
Western Tanager (*Piranga ludoviciana*)		1	1		2	1			
Black-headed Grosbeak (*Pheucticus melanocephalus*)		3			1	3	2	1	3
Red-winged Blackbird (*Ageaius phoeniceus*)		1	1						1
Brown-headed Cowbird (*Molothrus ater*)	1	2		1	2	3	1		1

REACH 28
TRIUNFO CREEK (PD T2200)

Species	Survey Dates – 2013								
	15-Apr	**25-Apr**	**5-May**	**15-May**	**29-May**	**12-Jun**	**21-Jun**	**28-Jun**	**11-Jul**
Hooded Oriole (*Icterus cucullatus*)	1		3		1	3	2	1	
Bullock's Oriole (*Icterus bullockii*)	1	2		1	2	6	5	1	
House Finch (*Haemorhous mexicanus*)	4	5	5	14	20	17	12	15	18
Lesser Goldfinch (*Spinus psaltria*)	1	8	12	9	6	7	2	5	4

* Introduced non-native species with established breeding population in California
** Exotic or escaped non-native species that may or many not be breeding in California

REACH 39
BEATTY CHANNEL OUTLET AT SAN GABRIEL RIVER
25+99.00+50'

Species	Survey Dates – 2013								
	10-Apr	20-Apr	30-Apr	10-May	23-May	10-Jun	17-Jun	25-Jun	5-Jul
Mallard (*Anas platyrhynchos)*	1								
California Quail (*Callipepla californica*)	5	3	4	2			4		10
Great Egret (*Ardea alba*)						1			
Turkey Vulture (*Cathartes aura*)	4		1	2		2	2		1
Cooper's Hawk (*Accipiter cooperii*)					1	1	1		
Red-tailed Hawk (*Buteo jamaicensis*)	2						2		
Red-shouldered Hawk (*Buteo lineatus*)				1					1
Killdeer (*Charadrius vociferous*)	2	1		1					
Greater Yellowlegs (*Tringa melanoleuca*)	1								
Rock Pigeon (*Columba livia*)*	3			20	2		20		
Band-tailed Pigeon (*Patagioenas fasciata*)									
Mourning Dove (*Zenaida macroura*)	3	3	2	8	5	3	4	3	18
Yellow-chevroned Parakeet (*Brotogeris chiriri*)**						7			
Red-crowned Parrot (*Amazona viridigenalis*)*							2	2	2
Lesser Nighthawk (*Chordeiles acutipennis*)				1					
Vaux's Swift (*Chaetura vauxi*)				3					
White-throated Swift (*Aeronautes saxatalis*)	1	1		2		2	2		
Black-chinned Hummingbird (*Archilochus alexandri*)				1	1	1	1		
Anna's Hummingbird (*Calypte anna*)	6	9	4	3	3	1	2		1
Costa's Hummingbird (*Calypte costae*)			2				1		
Allen's Hummingbird (*Selasphorus sasin*)	1	1			1		1		
Allen's/Rufous Hummingbird (*Selasphorus* sp.)		1		2	1		2		
Acorn Woodpecker (*Melanerpes formicivorus*)				1	1	1	1		
Nuttall's Woodpecker (*Picoides nuttallii*)		1	1	2	1			1	1

REACH 39
BEATTY CHANNEL OUTLET AT SAN GABRIEL RIVER
25+99.00+50'

Species	Survey Dates – 2013								
	10-Apr	20-Apr	30-Apr	10-May	23-May	10-Jun	17-Jun	25-Jun	5-Jul
Downy Woodpecker (*Picoides pubescens)*		1							
Parakeet Sp. (*Psittacidae sp.*)**		2							
Parrot Sp. (*Psittacidae sp*)**		2							
Black Phoebe (*Sayornis nigricans*)		4	3	2	2	1	4		
Ash-throated Flycatcher (*Myiarchus cinerascens*)		1						1	
Cassin's Kingbird (*Tyrannus vociferans*)								2	
Western Kingbird (*Tyrannus verticalis*)			1	1					
Bell's Vireo (*Vireo bellii*)	3	2	3	1	3	1	2	1	
Hutton's Vireo (*Vireo huttoni*)					1				
Warbling Vireo (*Vireo gilvus*)					2				
Western Scrub-Jay (*Aphelocoma insularis*)	1	2	3		1		2	3	1
American Crow (*Corvus brachyrhynchos*)		4		6		3		1	4
Common Raven (*Corvus corax*)	2	1	1	2	3	3	3		1
Red-whiskered Bulbul (*Pycnonotus jocosus*)**							1		
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	4	1	2	5	4	2	6		6
Cliff Swallow (*Petrochelidon pyrrhonota*)	1	8	4	21	2	25	5	10	5
Barn Swallow (*Hirundo rustica*)		1							
Bushtit (*Psaltriparus minimus*)	6		23	6		10	2		
Red-breasted Nuthatch (*Sitta canadensis*)		1							
House Wren (*Troglodytes aedon*)		1		1	1				
Bewick's Wren (*Thryomanes bewickii*)	3	3	4	2	5	6	3	1	1
Blue-gray gnatcatcher (*Polioptila caerulea*)		2							
Wrentit (*Chamaea fasciata*)	4	4	2	2	5	4	10	4	5
Swainson's Thrush (*Catharus ustulatus*)					1				

REACH 39
BEATTY CHANNEL OUTLET AT SAN GABRIEL RIVER
25+99.00+50'

Species	Survey Dates – 2013								
	10-Apr	20-Apr	30-Apr	10-May	23-May	10-Jun	17-Jun	25-Jun	5-Jul
Northern Mockingbird (*Mimus polyglottos*)	5	5	5	6	3	11	8	6	5
California Thrasher (*Toxostoma redivivum*)	1	3	2	2	2	1	1	1	1
European Starling (*Sturnus vulgaris*)*				2					
Cedar Waxwing (*Bombycilla cedrorum*)			7	5					
Phainopepla (*Phainopepla nitens*)		1		3	8	5	4	2	2
Common Yellowthroat (*Geothlypis trichas*)	7	11	3	7	6	5	4	2	3
Yellow Warbler (*Setophaga petechia*)	1	2	2	2		2	1		1
Yellow-rumped Warbler (*Setophaga coronata*)	1								
Wilson's Warbler (*Wilsonia pusilla*)				3	1				
Yellow-breasted Chat (*Icteria virens*)		1	2		3	2	3		1
Spotted Towhee (*Pipilo maculates*)	6	4	4	6	8	5	8	5	
California Towhee (*Melozone crissalis*)	9	10	10	12	7	6	4	3	5
Song Sparrow (*Melospiza lincolnii*)	8	16	15	15	20	1	2		5
Lincoln's sparrow (*Melospiza lincolnii*)		1							
Western Tanager (*Piranga ludoviciana*)		1		1					
Black-headed Grosbeak (*Pheucticus melanocephalus*)		4	4	5	1	2	2	2	1
Blue Grosbeak (*Passerina caerulea*)					1				
Lazuli Bunting (*Passerina amoena*)			1						
Red-winged Blackbird (*Ageaius phoeniceus*)	1				1				
Brown-headed Cowbird (*Molothrus ater*)		6	4	4	3	1	4		1
Hooded Oriole (*Icterus cucullatus*)		1		1				1	
Bullock's Oriole (*Icterus bullockii*)		1					1		
Purple Finch (*Haemorhous purpureus*)	1		2	2	1		2		
House Finch (*Haemorhous mexicanus*)	16	5	22	20	5	20	30	26	16

REACH 39
BEATTY CHANNEL OUTLET AT SAN GABRIEL RIVER
25+99.00+50'

Species	Survey Dates – 2013								
	10-Apr	20-Apr	30-Apr	10-May	23-May	10-Jun	17-Jun	25-Jun	5-Jul
Lesser Goldfinch (*Spinus psaltria*)	11	6	14	11	5	3	4	2	
Lawrence's Goldfinch (*Spinus lawrencei*)	2								
American Goldfinch (*Spinus tristis*)	2		2	2	4	5	5		
Nutmeg Mannikin (*Lonchura punctulata*)**						1	3		8
Orange Bishop (*Euplectes franciscanus*)**		2			1		2		

* Introduced non-native species with established breeding population in California
** Exotic or escaped non-native species that may or many not be breeding in California

REACH 40B
SAN GABRIEL RIVER – I-10 FREEWAY TO THIENES AVENUE

Species	Survey Dates – 2013								
	10-Apr	20-Apr	1-May	11-May	22-May	1-Jun	14-Jun	28-Jun	12-Jul
Canada Goose (*Branta canadensis*)	1								
Mallard (*Anas platyrhynchos*)	2		3	8	10	4	6		1
Pied-billed Grebe (*Podilymbus podiceps*)	3	3		3	4	2	5	3	1
Double-crested Cormorant (*Phalacrocorax auritus*)	4			4	1	1	3	1	1
Great Blue Heron (*Ardea herodias*)	1	2		1		2		1	1
Great Egret (*Ardea alba*)		1		1				1	
Snowy Egret (*Egretta thula*)					1		3	3	
Green Heron (*Butorides virescens*)					2		1	1	1
Black-crowned Night-Heron (*Nycticorax nycticorax*)							1	1	1
Turkey Vulture (*Cathartes aura*)	1	1		1		1			1
Cooper's Hawk (*Accipiter cooperii*)		1							
Red-tailed Hawk (*Buteo jamaicensis*)	1	1				1			
Common Gallinule (*Gallinula galeata*)	2		1	1			10	4	4
American Coot (*Fulica americana*)	5	5	3	2	4	5	5	2	2
Killdeer (*Charadrius vociferous*)		4	4	1	2	3	2	4	1
Black-necked Stilt (*Himantopus mexicanus*)		2		2	10	3			
American Avocet (*Recurvirostra americana*)					2				
Spotted Sandpiper (*Actitis macularius*)								1	2
Greater Yellowlegs (*Tringa melanoleuca*)					1				
California Gull (*Larus californicus*)	25								
Caspian Tern (*Hydroprogne caspia*)					2		1	1	
Rock Pigeon (*Columba livia*)*		3					3		
Eurasian Collared-Dove (*Streptopelia decaocto*)*	2	1	1	1	6	2	5	3	4
Mourning Dove (*Zenaida macroura*)	2	3	3		5	3	6	7	9
White-throated Swift (*Aeronautes saxatalis*)								3	

REACH 40B
SAN GABRIEL RIVER – I-10 FREEWAY TO THIENES AVENUE

Species	Survey Dates – 2013								
	10-Apr	20-Apr	1-May	11-May	22-May	1-Jun	14-Jun	28-Jun	12-Jul
Anna's Hummingbird (*Calypte anna*)	3	3	3	3	1	1	2	2	3
Allen's Hummingbird (*Selasphorus sasin*)		1							
Allen's/Rufous Hummingbird (*Selasphorus* sp.)	3	1	4	1	2	2	1	3	1
Nuttall's Woodpecker (*Picoides nuttallii*)					1				
Downy Woodpecker (*Picoides pubescens)*							1	1	
American Kestrel (*Falco sparverius*)	1			1	1	2	1		1
Yellow-chevroned Parakeet (*Brotogeris chiriri*)**					6		6		
Red-crowned Parrot (*Amazona viridigenalis*)*							6		
Willow Flycatcher (*Empidonax traillii*)						1			
Black Phoebe (*Sayornis nigricans*)	5	6	4	6	4	3	5	8	5
Say's Phoebe (*Sayornis saya*)							1		
Ash-throated Flycatcher (*Myiarchus cinerascens*)				1		1			
Cassin's Kingbird (*Tyrannus vociferans*)	2			2		1	3	3	1
Western Kingbird (*Tyrannus verticalis*)	4	1							
Bell's Vireo (*Vireo bellii*)	7	6	6	8	5	5	5	6	4
Warbling Vireo (*Vireo gilvus*)				14					
Western Scrub-Jay (*Aphelocoma insularis*)				1		1	1	3	1
American Crow (*Corvus brachyrhynchos*)		1	1				4		8
Common Raven (*Corvus corax*)	1		1	4		4	1	1	1
Tree Swallow (*Tachycineta bicolor*)								2	
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	3	6	4	4	4	18	10	28	5
Cliff Swallow (*Petrochelidon pyrrhonota*)	5	3	3	8	20	25	30	10	5
Barn Swallow (*Hirundo rustica*)	6	5	4	5	2	3	5	10	4
Bushtit (*Psaltriparus minimus*)	20	12	26	24	18	12	20	20	25
Bewick's Wren (*Thryomanes bewickii*)									1

REACH 40B
SAN GABRIEL RIVER – I-10 FREEWAY TO THIENES AVENUE

Species	Survey Dates – 2013								
	10-Apr	20-Apr	1-May	11-May	22-May	1-Jun	14-Jun	28-Jun	12-Jul
Blue-gray gnatcatcher (*Polioptila caerulea*)	1								
Swainson's Thrush (*Catharus ustulatus*)			2						
American Robin (*Turdus migratorius*)	1			1					
Northern Mockingbird (*Mimus polyglottos*)	9	7	6	7	4	6	6	8	9
European Starling (*Sturnus vulgaris*)*	5	12	5	3	5	13	10	14	15
American Pipit (*Anthus rubescens*)	8								
Cedar Waxwing (*Bombycilla cedrorum*)		12							
Orange-crowned Warbler (*Oreothlypis celata*)	2	1	1						
Common Yellowthroat (*Geothlypis trichas*)	18	15	11	16	12	13	14	10	4
MacGillivray's Warbler (*Geothlypis tolmiei*)				1					
Yellow Warbler (*Setophaga petechia*)	5	11	17	12	12	12	13	14	9
Yellow-rumped Warbler (*Setophaga coronata*)	14	3							
Wilson's Warbler (*Wilsonia pusilla*)	1		6	4					
Yellow-breasted Chat (*Icteria virens*)			1	2	1	2	2	1	1
California Towhee (*Melozone crissalis*)	5	9	9	7	7	6	5	3	3
Song Sparrow (*Melospiza lincolnii*)	20	18	23	26	20	18	13	7	3
White-crowned Sparrow (*Zonotrichia leucophrys*)	2								
Western Tanager (*Piranga ludoviciana*)			1	3					
Black-headed Grosbeak (*Pheucticus melanocephalus*)	2	3	3	1	1		1		
Blue Grosbeak (*Passerina caerulea*)					1		2	1	2
Red-winged Blackbird (*Ageaius phoeniceus*)	6		12	2	5	1	8		
Great-tailed Grackle (*Quiscalus mexicanus*)	12	10	15	13	15	15	15	13	10
Brown-headed Cowbird (*Molothrus ater*)		6	2	1	1	2			
Hooded Oriole (*Icterus cucullatus*)	1		2	2	1		3	1	4
Bullock's Oriole (*Icterus bullockii*)	3	4	5	4	4	2	6	3	3

REACH 40B
SAN GABRIEL RIVER – I-10 FREEWAY TO THIENES AVENUE

Species	Survey Dates – 2013								
	10-Apr	**20-Apr**	**1-May**	**11-May**	**22-May**	**1-Jun**	**14-Jun**	**28-Jun**	**12-Jul**
House Finch (*Haemorhous mexicanus*)	14	14	22	24	12	16	30	18	55
Lesser Goldfinch (*Spinus psaltria*)	12	12	8	10	6	5	3	10	5
American Goldfinch (*Spinus tristis*)	10		6		2	2	4	1	5
House Sparrow (*Passer domesticus*)*	20	15	12	18	18	25	30	25	65
Nutmeg Mannikin (*Lonchura punctulata*)**							1		
Orange Bishop (*Euplectes franciscanus*)**									2

* Introduced non-native species with established breeding population in California
** Exotic or escaped non-native species that may or many not be breeding in California

REACH 43A
SAN GABRIEL RIVER – UPPER

Species	Survey Dates – 2013								
	10-Apr	22-Apr	1-May	11-May	22-May	1-Jun	14-Jun	28-Jun	12-Jul
Canada Goose (*Branta canadensis*)			2						
Mallard (*Anas platyrhynchos)*		5	2			1	3		
Cinnamon Teal (*Anas cyanoptera*)		1							
Pied-billed Grebe (*Podilymbus podiceps*)				1					
Double-crested Cormorant (*Phalacrocorax auritus*)		1							
Great Blue Heron (*Ardea herodias*)	1	1	1		1		2		2
Great Egret (*Ardea alba*)		1					1		
Snowy Egret (*Egretta thula*)		1						1	
Green Heron (*Butorides virescens*)									
Black-crowned Night-Heron (*Nycticorax nycticorax*)						1			1
Sharp-shinned Hawk (*Accipiter striatus*)	2								
Cooper's Hawk (*Accipiter cooperii*)	1	1						2	
Red-shouldered Hawk (*Buteo lineatus*)		1			1			1	
Red-tailed Hawk (*Buteo jamaicensis*)	1		1						
Common Gallinule (*Gallinula galeata*)			1		1				
American Coot (*Fulica americana*)		1							
California Gull (*Larus californicus*)			1						
Caspian Tern (*Hydroprogne caspia*)									2
Forster's Tern (*Sterna forsteri*)									
Rock Pigeon (*Columba livia*)*			5		4			1	1
Eurasian Collared-Dove (*Streptopelia decaocta*)				1					
Mourning Dove (*Zenaida macroura*)	1	2	2	2	5	5	5		
White-throated Swift (*Aeronautes saxatalis*)	3	3			1				
Black-chinned Hummingbird (*Archilochus alexandri*)		2		1				1	
Anna's Hummingbird (*Calypte anna*)	2	4	3	3	1	1	2	1	2
Allen's Hummingbird (*Selasphorus sasin*)		1	1						

REACH 43A
SAN GABRIEL RIVER – UPPER

Species	Survey Dates – 2013								
	10-Apr	22-Apr	1-May	11-May	22-May	1-Jun	14-Jun	28-Jun	12-Jul
Allen's/Rufous Hummingbird (*Selasphorus* sp.)	3		3	1		3	3	3	
Nuttall's Woodpecker (*Picoides nuttallii*)		2		1	1			2	1
Downy Woodpecker (*Picoides pubescens)*	1		2	1		2	2	1	
Yellow-chevroned Parakeet (*Brotogeris chiriri*)**				5					
Black Phoebe (*Sayornis nigricans*)	4		2	4	4	1	1	3	4
Say's Phoebe (*Sayornis saya*)		1							
Ash-throated Flycatcher (*Myiarchus cinerascens*)			1		1	1			
Cassin's Kingbird (*Tyrannus vociferans*)									1
Western Kingbird (*Tyrannus verticalis*)		1							
Bell's Vireo (*Vireo bellii*)	3	3	3	3	4	3	3	2	1
Hutton's Vireo (*Vireo huttoni*)								1	
Warbling Vireo (*Vireo gilvus*)	1	3		2	1				
American Crow (*Corvus brachyrhynchos*)		2					2	1	2
Common Raven (*Corvus corax*)	1			2	1				
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	1	1	2			5	3	1	
Cliff Swallow (*Petrochelidon pyrrhonota*)	30	3	5	12	4	10	20	3	5
Barn Swallow (*Hirundo rustica*)	1	5		4		3	5		3
Bushtit (*Psaltriparus minimus*)	14	10	20	22	20	18	20	25	25
House Wren (*Troglodytes aedon*)	2	1		2			2		
Bewick's Wren (*Thryomanes bewickii*)		2	2	1			1	1	
Swainson's Thrush (*Catharus ustulatus*)			1	3	3	3	1	1	1
American Robin (*Turdus migratorius*)	1	2	1			1		1	
Northern Mockingbird (*Mimus polyglottos*)	2	2	1	1	2	1	2	2	2
European Starling (*Sturnus vulgaris*)*					2	45	1		
Cedar Waxwing (*Bombycilla cedrorum*)			15	6					
Orange-crowned Warbler (*Oreothlypis celata*)	2	2	2	1	3	2			

REACH 43A
SAN GABRIEL RIVER – UPPER

Species	Survey Dates – 2013								
	10-Apr	22-Apr	1-May	11-May	22-May	1-Jun	14-Jun	28-Jun	12-Jul
Common Yellowthroat (*Geothlypis trichas*)	22	15	19	10	10	12	4	3	3
Yellow Warbler (*Setophaga petechia*)	15	16	21	17	16	21	16	18	17
Yellow-rumped Warbler (*Setophaga coronata*)	15	3							
Black-throated Gray Warbler (*Setophaga nigrescens*)	2								
Townsend's Warbler (*Setophaga townsendi*)				1					
Yellow-breasted Chat (*Icteria virens*)	1	2	2	1	2	2	3	3	1
Spotted Towhee (*Pipilo maculates*)	6	6	8	11	8	6	6	4	3
California Towhee (*Melozone crissalis*)	2	7	5	4	5	2	5		3
Song Sparrow (*Melospiza lincolnii*)	18	18	30	21	16	14	4	3	
Northern Cardinal (*Cardinalis cardinalis*)*					1			1	
Black-headed Grosbeak (*Pheucticus melanocephalus*)	2	3	4	3	3	2	2	2	2
Blue Grosbeak (*Passerina caerulea*)			2	2	1		1		1
Lazuli Bunting (*Passerina amoena*)			2						
Red-winged Blackbird (*Ageaius phoeniceus*)						6		1	1
Brown-headed Cowbird (*Molothrus ater*)	4	2	3	2	3	3	3	3	6
Hooded Oriole (*Icterus cucullatus*)				1	4	1	1	2	2
Bullock's Oriole (*Icterus bullockii*)	1	2	1	1	2	3	1	2	
House Finch (*Haemorhous mexicanus*)	12	14	16	22	14	25	60	25	40
Lesser Goldfinch (*Spinus psaltria*)	14	16	12	16	20	25	25	18	6
American Goldfinch (*Spinus tristis*)	6	5	5	1	5	10	1	2	15
Nutmeg Mannikin (*Lonchura punctulata*)**							3		1

* Introduced non-native species with established breeding population in California
** Exotic or escaped non-native species that may or many not be breeding in California

REACH 43B
SAN GABRIEL RIVER – LOWER

Species	Survey Dates – 2013								
	10-Apr	20-Apr	1-May	11-May	22-May	1-Jun	14-Jun	28-Jun	12-Jul
Mallard (*Anas platyrhynchos)*	1	4	25	4	2	1	3	2	3
Double-crested Cormorant (*Phalacrocorax auritus*)	1						1		
Great Blue Heron (*Ardea herodias*)	2	2		1					1
Great Egret (*Ardea alba*)			1	1					2
Snowy Egret (*Egretta thula*)			1		1			2	2
Black-crowned Night-Heron (*Nycticorax nycticorax*)				3				1	
Cooper's Hawk (*Accipiter cooperii*)		1	1						
Red-tailed Hawk (*Buteo jamaicensis*)	1		2		1				
Common Gallinule (*Gallinula galeata*)			50						
Killdeer (*Charadrius vociferous*)	3	1		1		3			
Spotted Sandpiper (*Actitis macularius*)	1								
Western Gull (*Larus occidentalis*)	1				6		2	5	2
Rock Pigeon (*Columba livia*)*	5	5	2	3		3	6		2
Eurasian Collared-Dove (*Streptopelia decaocto*)	5	4	1	5	4	1	3	3	6
Mourning Dove (*Zenaida macroura*)	4	3	3	1	3	3	5	2	12
White-throated Swift (*Aeronautes saxatalis*)	4	2		5					
Anna's Hummingbird (*Calypte anna*)	3	3	1	1	2	1	1	2	2
Allen's Hummingbird (*Selasphorus sasin*)	2						1		
Allen's/Rufous Hummingbird (*Selasphorus* sp.)		4	1		1	5	7	5	10
Nuttall's Woodpecker (*Picoides nuttallii*)	1		1	2					
Downy Woodpecker (*Picoides pubescens)*			1			1			
American Kestrel (*Falco sparverius*)				1					
Black Phoebe (*Sayornis nigricans*)	6	2	6	4	5	3	3	4	4
Ash-throated Flycatcher (*Myiarchus cinerascens*)	1	1			1				
Cassin's Kingbird (*Tyrannus vociferans*)	3	3	3	3	2	3	3	3	3

REACH 43B
SAN GABRIEL RIVER – LOWER

Species	Survey Dates – 2013								
	10-Apr	20-Apr	1-May	11-May	22-May	1-Jun	14-Jun	28-Jun	12-Jul
Western Kingbird (*Tyrannus verticalis*)	1						1		
Cassin's Vireo (*Vireo cassinii*)		1		1					
Warbling Vireo (*Vireo gilvus*)		1			1				
Western Scrub-Jay (*Aphelocoma insularis*)			1						
American Crow (*Corvus brachyrhynchos*)			2				1	2	5
Common Raven (*Corvus corax*)	2				1		1	2	
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	2	3	1		2	4	5		1
Cliff Swallow (*Petrochelidon pyrrhonota*)	30	8	30	15	15	40	35	20	25
Barn Swallow (*Hirundo rustica*)	1	4	4	3	1	8	10	1	3
Bushtit (*Psaltriparus minimus*)	12	10	12	20	16	12	10	12	15
Northern Mockingbird (*Mimus polyglottos*)	8	6	6	8	7	82	6	6	7
European Starling (*Sturnus vulgaris*)*	16	22	5	6	3	8		5	1
Cedar Waxwing (*Bombycilla cedrorum*)	3	2							
Orange-crowned Warbler (*Oreothlypis celata*)	1		1						
Nashville Warbler (*Vermivora ruficapilla*)	1	2							
Common Yellowthroat (*Geothlypis trichas*)	14	5	7	6	2	4	4	1	1
Yellow Warbler (*Setophaga petechia*)	3	8	10	11	8	8	9	9	4
Yellow-rumped Warbler (*Setophaga coronata*)	13	3							
Black-throated Gray Warbler (*Setophaga nigrescens*)	1	3							
Wilson's Warbler (*Wilsonia pusilla*)		1	1						
Spotted Towhee (*Pipilo maculates*)			1			1			
California Towhee (*Melozone crissalis*)	6	4	8	3	7	3	3	4	2
Song Sparrow (*Melospiza lincolnii*)	12	9	10	13	16	8	5	4	1
Lincoln's Sparrow (*Melospiza lincolnii*)	1								
White-crowned Sparrow (*Zonotrichia leucophrys*)	5								

REACH 43B
SAN GABRIEL RIVER – LOWER

Species	Survey Dates – 2013								
	10-Apr	20-Apr	1-May	11-May	22-May	1-Jun	14-Jun	28-Jun	12-Jul
Blue Grosbeak (*Passerina caerulea*)		2	2	1		1	2	4	2
Red-winged Blackbird (*Ageaius phoeniceus*)	5	5			3		8	20	14
Brewer's Blackbird (*Euphagus cyanocephalus*)		3							
Great-tailed Grackle (*Quiscalus mexicanus*)	4								
Brown-headed Cowbird (*Molothrus ater*)	6	12	3	2	3	6	2	1	2
Hooded Oriole (*Icterus cucullatus*)	6	2	4	3	1	1	1	2	4
Bullock's Oriole (*Icterus bullockii*)	1	1					2	2	
House Finch (*Haemorhous mexicanus*)	14	12	12	16	13	10	12	4	8
Lesser Goldfinch (*Spinus psaltria*)	4	5	6	2	4	8	3	6	4
American Goldfinch (*Spinus tristis*)	5				1				
House Sparrow (*Passer domesticus*)*	5	4	10	8	12	4	5	10	5
Nutmeg Mannikin (*Lonchura punctulata*)**			1				1	1	1

* Introduced non-native species with established breeding population in California
** Exotic or escaped non-native species that may or many not be breeding in California

REACH 71, 79, AND 80
SANTA CLARA RIVER MAIN CHANNEL (PD 1946)
SOUTH FORK – SANTA CLARA RIVER (VALENCIA BLVD. BRIDGE STABILIZER)
SOUTH FORK – SANTA CLARA RIVER (PD's 1947 & 1946)

Species	Survey Dates – 2013								
	11-Apr	21-Apr	3-May	12-May	23-May	2-Jun	16-Jun	30-Jun	13-Jul
Canada Goose (*Branta canadensis*)		1	4						
Mallard (*Anas platyrhynchos)*			1						
California Quail (*Callipepla californica*)	8	12	6	3	5		6	5	2
Red-tailed Hawk (*Buteo jamaicensis*)				1	1	1			
Killdeer (*Charadrius vociferous*)		2	1	2		1			
Western Gull (*Larus occidentalis*)		1							
Mourning Dove (*Zenaida macroura*)	4	15	10	2	6	6	19	6	15
Anna's Hummingbird (*Calypte anna*)	2	2	2	2	4	6	4	4	4
Costa's Hummingbird (*Calypte costae*)						1			1
Allen's/Rufous Hummingbird (*Selasphorus* sp.)	1	1							2
Nuttall's Woodpecker (*Picoides nuttallii*)	4	2	3	3	2	1	1	3	1
Downy Woodpecker (*Picoides pubescens)*				1			1		1
Black Phoebe (*Sayornis nigricans*)					1		2	1	3
Say's Phoebe (*Sayornis saya*)	2		2	2	3		1	1	1
Ash-throated Flycatcher (*Myiarchus cinerascens*)	1	4	2	3	3	2		2	3
Cassin's Kingbird (*Tyrannus vociferans*)	2	2	3	4	5	6	6	4	3
Western Kingbird (*Tyrannus verticalis*)	2	1	1	2		2	1	1	
Loggerhead Shrike (*Lanius ludovicianus*)		1							
Bell's Vireo (*Vireo bellii*)	1								
Warbling Vireo (*Vireo gilvus*)					1				
Western Scrub-Jay (*Aphelocoma insularis*)	5	3	4	6	5	8	9	5	4
American Crow (*Corvus brachyrhynchos*)			2	1		2	35	10	4
Common Raven (*Corvus corax*)	10	12	16	8	6	3	4	10	3
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	2	3	2	3	2	4	2		2

REACH 71, 79, AND 80
SANTA CLARA RIVER MAIN CHANNEL (PD 1946)
SOUTH FORK – SANTA CLARA RIVER (VALENCIA BLVD. BRIDGE STABILIZER)
SOUTH FORK – SANTA CLARA RIVER (PD's 1947 & 1946)

Species	Survey Dates – 2013								
	11-Apr	21-Apr	3-May	12-May	23-May	2-Jun	16-Jun	30-Jun	13-Jul
Cliff Swallow (*Petrochelidon pyrrhonota*)				3	25	12	10	10	
Barn Swallow (*Hirundo rustica*)	1	1			1				
Oak Titmouse (*Baeolophus inornatus*)		1	2				2		3
Bushtit (*Psaltriparus minimus*)	8	8	8	25	18		10	18	12
Bewick's Wren (*Thryomanes bewickii*)	8	13	9	11	13	7	6	6	3
Wrentit (*Chamaea fasciata*)	1								
Western Bluebird (*Sialia mexicana*)				2				2	
American Robin (*Turdus migratorius*)	1							1	
Northern Mockingbird (*Mimus polyglottos*)		3		4	1	3	1	4	2
California Thrasher (*Toxostoma redivivum*)	4	6		1	2	2	2		2
European Starling (*Sturnus vulgaris*)*	2	5	10	7	8		3		
American Pipit (*Anthus rubescens*)		1							
Cedar Waxwing (*Bombycilla cedrorum*)			5	3	2				
Phainopepla (*Phainopepla nitens*)				1			1		
Orange-crowned Warbler (*Oreothlypis celata*)	4	1							
MacGillivray's Warbler (*Geothlypis tolmiei*)		1							
Common Yellowthroat (*Geothlypis trichas*)		1							
Yellow Warbler (*Setophaga petechia*)	2	1	2	2	3	2	1	2	
Yellow-rumped Warbler (*Setophaga coronata*)	14	6	2						
Black-throated Gray Warbler (*Setophaga nigrescens*)	1								
Wilson's Warbler (*Wilsonia pusilla*)	1	2	4		1				
Spotted Towhee (*Pipilo maculates*)	1	3	3	2	1	2	2	2	
California Towhee (*Melozone crissalis*)	6	8	7	7	9	6	4	4	1
Song Sparrow (*Melospiza lincolnii*)	4		1	2	3	1		1	

REACH 71, 79, AND 80
SANTA CLARA RIVER MAIN CHANNEL (PD 1946)
SOUTH FORK – SANTA CLARA RIVER (VALENCIA BLVD. BRIDGE STABILIZER)
SOUTH FORK – SANTA CLARA RIVER (PD's 1947 & 1946)

Species	Survey Dates – 2013								
	11-Apr	21-Apr	3-May	12-May	23-May	2-Jun	16-Jun	30-Jun	13-Jul
Lincoln's sparrow (*Melospiza lincolnii*)	2								
White-crowned Sparrow (*Zonotrichia leucophrys*)	12	5							
Western Tanager (*Piranga ludoviciana*)			2		4	1			
Black-headed Grosbeak (*Pheucticus melanocephalus*)	1	4	2	2	2	1			
Blue Grosbeak (*Passerina caerulea*)								1	
Brewer's Blackbird (*Euphagus cyanocephalus*)	1	1		3	5	3		10	
Great-tailed Grackle (*Quiscalus mexicanus*)								2	
Brown-headed Cowbird (*Molothrus ater*)		1							
Hooded Oriole (*Icterus cucullatus*)					1		1		
Bullock's Oriole (*Icterus bullockii*)	3		1	1		2	1		
House Finch (*Haemorhous mexicanus*)	23	18	16	24	26	16	28	18	12
Lesser Goldfinch (*Spinus psaltria*)	5	3	2	4	3	2	3	5	2
Lawrence's Goldfinch (*Spinus lawrencei*)			1				1		
House Sparrow (*Passer domesticus*)*							2		

* Introduced non-native species with established breeding population in California

REACH 75
SOUTH FORK – SCR (PD's725, 916, 1041 ,& 1300)

Species	Survey Dates – 2013								
	11-Apr	21-Apr	3-May	12-May	23-May	2-Jun	16-Jun	30-Jun	13-Jul
Mallard (*Anas platyrhynchos)*	2								
California Quail (*Callipepla californica*)	3	2	6	5	10	6	3		
Double-crested cormorant (*Phalacrocorax auritus*)	1								
Cooper's Hawk (*Accipiter cooperii*)	1		1				1		
Red-shouldered Hawk (*Buteo lineatus*)			1				1		1
Rock Pigeon (*Columba livia*)*	40			2				1	
Mourning Dove (*Zenaida macroura*)	3	3	4	4	3	6	12		8
Greater Roadrunner (*Geococcyx californianus*)	1								
White-throated Swift (*Aeronautes saxatalis*)	4	10	10	4	5	8	4	5	
Black-chinned Hummingbird (*Archilochus alexandri*)	1	1				3	1	1	1
Anna's Hummingbird (*Calypte anna*)	3	3	2	3	4	6	5	5	7
Allen's/Rufous Hummingbird (*Selasphorus* sp.)	1	1	1	1	1	1	2	3	2
Nuttall's Woodpecker (*Picoides nuttallii*)	1	2	2	1	2	3	1		1
Downy Woodpecker (*Picoides pubescens)*	2						1		
American Kestrel (*Falco sparverius*)	1	1					1		
Western Wood-Pewee (*Contopus sordidulus*)					1				
Black Phoebe (*Sayornis nigricans*)	6	2	3	3	4	8	4	4	7
Say's Phoebe (*Sayornis saya*)	1			2					
Ash-throated Flycatcher (*Myiarchus cinerascens*)						1			
Cassin's Kingbird (*Tyrannus vociferans*)	6	5	6	3	5	5	7	4	3
Western Kingbird (*Tyrannus verticalis*)	2	1			1	1			
Warbling Vireo (*Vireo gilvus*)		2	4			1			
Western Scrub-Jay (*Aphelocoma insularis*)	6	3	4	2	4	6	5	8	6
American Crow (*Corvus brachyrhynchos*)	2	1			1	4	2	1	

REACH 75
SOUTH FORK – SCR (PD's725, 916, 1041 ,& 1300)

Species	Survey Dates – 2013								
	11-Apr	21-Apr	3-May	12-May	23-May	2-Jun	16-Jun	30-Jun	13-Jul
Common Raven (*Corvus corax*)	12	4	3	4	4	10	3	3	5
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	10	2	8	3	2	3	4	2	1
Barn Swallow (*Hirundo rustica*)		2							
Oak Titmouse (*Baeolophus inornatus*)			3		1	4	6	2	
Bushtit (*Psaltriparus minimus*)	12	12	10	20	14	22	12	24	15
Bewick's Wren (*Thryomanes bewickii*)	7	11	9	11	8	11	6	5	2
Wrentit (*Chamaea fasciata*)	2	1	1		1	1	1	1	
Western Bluebird (*Sialia mexicana*)	1		3	1	1	2	1	3	
California Thrasher (*Toxostoma redivivum*)	6	6	4	2	4	2	2	6	1
Northern Mockingbird (*Mimus polyglottos*)	3	4	3	5	5	7	5	6	4
American Pipit (*Anthus rubescens*)	1								
Orange-crowned Warbler (*Oreothlypis celata*)		3							
Cedar Waxwing (*Bombycilla cedrorum*)			3						
Nashville Warbler (*Oreothlypis ruficapilla*)		2							
Common Yellowthroat (*Geothlypis trichas*)						1			
Yellow Warbler (*Setophaga petechia*)			1		2		1		
Yellow-rumped Warbler (*Setophaga coronata*)	13	13	1						
Wilson's Warbler (*Wilsonia pusilla*)		2	2		1				
Black-throated Gray Warbler (*Setophaga nigrescens*)	1	2							
Spotted Towhee (*Pipilo maculates*)			3	2			2	2	
California Towhee (*Melozone crissalis*)	8	8	7	6	7	6	5	6	3
Lark Sparrow (*Chondestes grammacus*)								1	
Song Sparrow (*Melospiza lincolnii*)	2	3	5	3	3	5	2	3	4
White-crowned Sparrow (*Zonotrichia leucophrys*)	8	1							

REACH 75
SOUTH FORK – SCR (PD's725, 916, 1041 ,& 1300)

Species	Survey Dates – 2013								
	11-Apr	21-Apr	3-May	12-May	23-May	2-Jun	16-Jun	30-Jun	13-Jul
Western Tanager (*Piranga ludoviciana*)		1	9	6	6				
Black-headed Grosbeak (*Pheucticus melanocephalus*)		4	1	1	1	4	2	1	
Blue Grosbeak (*Passerina caerulea*)						1	1	1	1
Lazuli Bunting (*Passerina amoena*)			1						
Brown-headed Cowbird (*Molothrus ater*)	1				1				
Hooded Oriole (*Icterus cucullatus*)	2	2	2	2		1		1	3
Bullock's Oriole (*Icterus bullockii*)	3	6	5	2	4	6	6	2	2
House Finch (*Haemorhous mexicanus*)	14	18	18	25	28	22	60	16	20
Pine Siskin (*Carduelis pinus*)		3							
Lesser Goldfinch (*Spinus psaltria*)	5		5	4	3	6	8	1	2
American Goldfinch (*Spinus tristis*)	50	20	2						
House Sparrow (*Passer domesticus*)*	5	4	8	6	6	6	5	3	5

* Introduced non-native species with established breeding population in California

REACHES 82 AND 109
SANTA CLARA RIVER MAIN CHANNEL (PD 2278)
AND
SANTA CLARA RIVER – SOUTH BANK WEST OF MCBRAN PKWY (MTD 1510)

Species	Survey Dates - 2013								
	10-Apr	23-Apr	3-May	13-May	24-May	11-Jun	18-Jun	26-Jun	9-Jul
Mallard (*Anas platyrhynchos)*					2		1		
California Quail (*Callipepla californica*)	13			14	5	2	20	5	
Great Blue Heron (*Ardea herodias*)						1			
Cooper's Hawk (*Accipiter cooperii*)			1			1	1		
Red-shouldered Hawk (*Buteo lineatus*)	2		1		2	2	1	2	2
Rock Pigeon (*Columba livia*)*									
Mourning Dove (*Zenaida macroura*)	2		4	6		3	7	1	
Greater Roadrunner (*Geococcyx californianus*)									1
Black-chinned Hummingbird (*Archilochus alexandri*)						1			
Anna's Hummingbird (*Calypte anna*)	3	2	6	8	1	1	3	3	3
Allen's/Rufous Hummingbird (*Selasphorus* sp.)							1		2
Nuttall's Woodpecker (*Picoides nuttallii*)	6		4	4	6	5	5	8	5
Downy Woodpecker (*Picoides pubescens)*					1		1	2	3
Hairy Woodpecker (*Picoides villosus*)					1		2	1	
Northern Flicker (*Colaptes auratus*)		1							
Western Wood-Pewee (*Contopus sordidulus*)			4		1				
Willow Flycatcher (*Empidonax traillii*)							2		
Black Phoebe (*Sayornis nigricans*)	2	2	2	3	4	4	3	5	2
Say's Phoebe (*Sayornis saya*)					1		1	1	
Ash-throated Flycatcher (*Myiarchus cinerascens*)	1	2	3	5	5	6	8	7	7
Cassin's Vireo (*Vireo cassinii*)	1								
Warbling Vireo (*Vireo gilvus*)				1	2				
Western Scrub-Jay (*Aphelocoma insularis*)	4		2	6	9	9	6	4	2

REACHES 82 AND 109
SANTA CLARA RIVER MAIN CHANNEL (PD 2278)
AND
SANTA CLARA RIVER – SOUTH BANK WEST OF MCBRAN PKWY (MTD 1510)

Species	Survey Dates - 2013								
	10-Apr	23-Apr	3-May	13-May	24-May	11-Jun	18-Jun	26-Jun	9-Jul
American Crow (*Corvus brachyrhynchos*)					4	7	3	8	5
Common Raven (*Corvus corax*)	4	2	5	5	11	8	8	8	5
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)				2	2	8	4	2	
Cliff Swallow (*Petrochelidon pyrrhonota*)					2	4	5	6	
Barn Swallow (*Hirundo rustica*)			4						
Oak Titmouse (*Baeolophus inornatus*)				2	3	3	3	7	1
Bushtit (*Psaltriparus minimus*)	10	6	15	26	15		8		10
White-breasted Nuthatch (*Sitta carolinensis*)									1
House Wren (*Troglodytes aedon*)	3				3			2	1
Bewick's Wren (*Thryomanes bewickii*)	3		10	6	8	7	10	15	9
Wrentit (*Chamaea fasciata*)							4	2	
Swainson's Thrush (*Catharus ustulatus*)					1				
American Robin (*Turdus migratorius*)			1		1	1	3		1
California Thrasher (*Toxostoma redivivum*)					4	2	10	4	7
Northern Mockingbird (*Mimus polyglottos*)		1	2	2	5	1	3	1	
European Starling (*Sturnus vulgaris*)*							2	1	
Phainopepla (*Phainopepla nitens*)				2	1		1		1
Orange-crowned Warbler (*Oreothlypis celata*)			1						
Common Yellowthroat (*Geothlypis trichas*)			2		7	6	10		4
Yellow Warbler (*Setophaga petechia*)	1		1	2	16	6	6	6	1
Yellow-rumped Warbler (*Setophaga coronata*)	15								
Wilson's Warbler (*Wilsonia pusilla*)			2	2	1				
Spotted Towhee (*Pipilo maculates*)	3	2	6	4	13	10	19	13	8
California Towhee (*Melozone crissalis*)	4	2	4	5	4	6	1	1	1

REACHES 82 AND 109
SANTA CLARA RIVER MAIN CHANNEL (PD 2278)
AND
SANTA CLARA RIVER – SOUTH BANK WEST OF MCBRAN PKWY (MTD 1510)

Species	Survey Dates - 2013								
	10-Apr	23-Apr	3-May	13-May	24-May	11-Jun	18-Jun	26-Jun	9-Jul
Song Sparrow (*Melospiza lincolnii*)		1	10	8	25	6	6	4	7
White-crowned Sparrow (*Zonotrichia leucophrys*)	5								
Western Tanager (*Piranga ludoviciana*)				1	1				
Black-headed Grosbeak (*Pheucticus melanocephalus*)	1		2	2	10	13	6	8	6
Blue Grosbeak (*Passerina caerulea*)							1		
Hooded Oriole (*Icterus cucullatus*)						1			
Bullock's Oriole (*Icterus bullockii*)	2		4				2		
House Finch (*Haemorhous mexicanus*)	6		8	15	12	22	32	30	65
Lesser Goldfinch (*Spinus psaltria*)	4	6	10	14	6	7	3	5	8
American Goldfinch (*Spinus tristis*)							1		
Nutmeg Mannikin (*Lonchura punctulata*)**								1	

* Introduced non-native species with established breeding population in California
** Exotic or escaped non-native species that may or many not be breeding in California

REACHES 87 AND 97
CASTAIC – OLD ROAD DRAIN (CDR 525.012D) OUTLET
AND
CASTAIC CREEK – THE OLD ROAD 2

Species	Survey Dates – 2013							
	16-Apr	29-Apr	9-May	22-May	7-Jun	18-Jun	2-Jul	12-Jul
Canada Goose (*Branta canadensis*)		2						
California Quail (*Callipepla californica*)	6	6	5			1	2	
Cooper's Hawk (*Accipiter cooperii*)					1			
Red-shouldered Hawk (*Buteo lineatus*)	1	1	1					
Killdeer (*Charadrius vociferous*)			2					
Mourning Dove (*Zenaida macroura*)		2	4		2	2	3	3
Anna's Hummingbird (*Calypte anna*)	2	4	4	2	4	3	2	3
Allen's/Rufous Hummingbird (*Selasphorus* sp.)				1			2	
Acorn Woodpecker (*Melanerpes formicivorus*)			1					
Nuttall's Woodpecker (*Picoides nuttallii*)			2	1	3	2		3
Western Wood-Pewee (*Contopus sordidulus*)			2					
Black Phoebe (*Sayornis nigricans*)				1	1		2	
Ash-throated Flycatcher (*Myiarchus cinerascens*)		1	3	1	1	4		
Warbling Vireo (*Vireo gilvus*)				1				
Western Scrub-Jay (*Aphelocoma insularis*)		2	2	4	4	7	7	2
American Crow (*Corvus brachyrhynchos*)				3	8	8	2	
Common Raven (*Corvus corax*)	2	2	4	4		2	1	1
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	2	5	2	4	10	1		
Cliff Swallow (*Petrochelidon pyrrhonota*)	5			7				
Barn Swallow (*Hirundo rustica*)		2						
Oak Titmouse (*Baeolophus inornatus*)		1	1					
Bushtit (*Psaltriparus minimus*)	8	10	10					
Bewick's Wren (*Thryomanes bewickii*)		2	4	4		2	1	3
California Thrasher (*Toxostoma redivivum*)				2				

REACHES 87 AND 97
CASTAIC – OLD ROAD DRAIN (CDR 525.012D) OUTLET
AND
CASTAIC CREEK – THE OLD ROAD 2

Species	Survey Dates – 2013							
	16-Apr	29-Apr	9-May	22-May	7-Jun	18-Jun	2-Jul	12-Jul
Northern Mockingbird (*Mimus polyglottos*)			1					
Common Yellowthroat (*Geothlypis trichas*)	1				1	3	3	1
Yellow Warbler (*Dendroica petechia*)				2				
Yellow-rumped Warbler (*Setophaga coronata*)	3		1					
Spotted Towhee (*Pipilo maculates*)	2		2		3	1		2
California Towhee (*Melozone crissalis*)		2	6		4	2	1	
Song Sparrow (*Melospiza lincolnii*)	3	1		2	1	2	1	
White-crowned Sparrow (*Zonotrichia leucophrys*)	2							
Western Tanager (*Piranga ludoviciana*)			2					
Black-headed Grosbeak (*Pheucticus melanocephalus*)		1	1	2	1	1		
Red-winged Blackbird (*Ageaius phoeniceus*)		2						
House Finch (*Haemorhous mexicanus*)		4	10	2	12		7	13
Lesser Goldfinch (*Spinus psaltria*)			5	6	1		2	2
American Goldfinch (*Spinus tristis*)			5					
House Sparrow (*Passer domesticus*)*				1				

* Introduced non-native species with established breeding population in California

REACH 103
BOUQUET CANYON CHANNEL (PD 2225)

Species	Survey Dates – 2013							
	11-Apr	24-Apr	7-May	30-May	13-Jun	20-Jun	27-Jun	10-Jul
Mallard (*Anas platyrhynchos)*		2			2	2	2	
California Quail (*Callipepla californica*)		8	10					
Red-tailed Hawk (*Buteo jamaicensis*)		2						
Red-shouldered Hawk (*Buteo lineatus*)	1							
Cooper's Hawk (*Accipiter cooperii*)					1		1	
Rock Pigeon (*Columba livia*)*					1			
Mourning Dove (*Zenaida macroura*)			2	2	3		2	1
White-throated Swift (*Aeronautes saxatalis*)		3						
Anna's Hummingbird (*Calypte anna*)	4	4	2	1	3	2	3	2
Costa's Hummingbird (*Calypte costae*)						2		
Allen's Hummingbird (*Selasphorus sasin*)	2	2	2	1				
Allen's/Rufous Hummingbird (*Selasphorus* sp.)				3	1	1	2	1
Nuttall's Woodpecker (*Picoides nuttallii*)		2	1	1	1	1		1
Black Phoebe (*Sayornis nigricans*)		1	2	1	1	1	3	
Say's Phoebe (*Sayornis saya*)					1			
Ash-throated Flycatcher (*Myiarchus cinerascens*)	1	1	2		1			
Cassin's Kingbird (*Tyrannus vociferans*)							1	
Warbling Vireo (*Vireo gilvus*)			1					
Killdeer (*Charadrius vociferous*)					1			
American Robin (*Turdus migratorius*)			1					
Western Scrub-Jay (*Aphelocoma insularis*)		1			1			2
American Crow (*Corvus brachyrhynchos*)				2		4	3	3
Common Raven (*Corvus corax*)	5	2	2	8	4	2	8	6
Violet-green Swallow (*Tachycineta thalassina*)								1
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	2	2	4	2	2		2	5

REACH 103
BOUQUET CANYON CHANNEL (PD 2225)

Species	Survey Dates – 2013							
	11-Apr	**24-Apr**	**7-May**	**30-May**	**13-Jun**	**20-Jun**	**27-Jun**	**10-Jul**
Cliff Swallow (*Petrochelidon pyrrhonota*)	4				2	3	2	
Barn Swallow (*Hirundo rustica*)								1
Oak Titmouse (*Baeolophus inornatus*)								2
Bushtit (*Psaltriparus minimus*)		15	10	15	2			
Bewick's Wren (*Thryomanes bewickii*)		6	6	1	2	1	1	5
Common Yellowthroat (*Geothlypis trichas*)	2			2	4	3	3	3
Yellow Warbler (*Dendroica petechia*)				1	2		1	
Yellow-rumped Warbler (*Setophaga coronata*)	5							
Wilson's Warbler (*Wilsonia pusilla*)			3					
Spotted Towhee (*Pipilo maculates*)	3	2	6	3	1	1		2
California Towhee (*Melozone crissalis*)		2	6	1	1	1	2	1
Song Sparrow (*Melospiza lincolnii*)	10	10	6	8	10	8	9	5
White-crowned Sparrow (*Zonotrichia leucophrys*)	3							
Black-headed Grosbeak (*Pheucticus melanocephalus*)	1		3	3	2	1	1	
Blue Grosbeak (*Passerina caerulea*)						1		1
Brewer's Blackbird (*Euphagus cyanocephalus*)					1			
Bullock's Oriole (*Icterus bullockii*)	2							
House Finch (*Haemorhous mexicanus*)	10	10	5	6	11	8	15	13
Lesser Goldfinch (*Spinus psaltria*)	12	10	6	1	2		3	1
Lawrence's Goldfinch (*Spinus lawrencei*)		2						
House Sparrow (*Passer domesticus*)*	2		2			1		

* Introduced non-native species with established breeding population in California

REACH 104
CASTAIC CREEK (PD 2441 UNITS 1 AND 2)

Species	Survey Dates – 2013							
	16-Apr	29-Apr	9-May	22-May	7-Jun	18-Jun	2-Jun	12-Jul
California Quail (*Callipepla californica*)			3	3			8	
Cooper's Hawk (*Accipiter cooperii*)			1					
Greater Roadrunner (*Geococcyx californianus*)					1			
Mourning Dove (*Zenaida macroura*)				1		3		3
Anna's Hummingbird (*Calypte anna*)			2	7	4	2	2	3
Allen's Hummingbird (*Selasphorus sasin*)			1					
Nuttall's Woodpecker (*Picoides nuttallii*)			1	3	2	2	2	6
Black Phoebe (*Sayornis nigricans*)		1						2
Ash-throated Flycatcher (*Myiarchus cinerascens*)		1	1	3	2	3	4	6
Western Kingbird (*Tyrannus verticalis*)				2	2			
Western Scrub-Jay (*Aphelocoma insularis*)				6	3	1	7	4
American Crow (*Corvus brachyrhynchos*)				1	1		3	
Common Raven (*Corvus corax*)	2	1	2	3				2
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)				3	1	4		
Cliff Swallow (*Petrochelidon pyrrhonota*)						1		
Oak Titmouse (*Baeolophus inornatus*)				1	1	2		2
Bushtit (*Psaltriparus minimus*)	5			8	1		9	
House Wren (*Troglodytes aedon*)			2	1	1			
Bewick's Wren (*Thryomanes bewickii*)		2		7	6	3	6	4
Western Bluebird (*Sialia mexicana*)								
American Robin (*Turdus migratorius*)		1						
Wrentit (*Chamaea fasciata*)								1
California Thrasher (*Toxostoma redivivum*)			1	2	1			
European Starling (*Sturnus vulgaris*)*			5					
Common Yellowthroat (*Geothlypis trichas*)					3			

REACH 104
CASTAIC CREEK (PD 2441 UNITS 1 AND 2)

Species	Survey Dates – 2013							
	16-Apr	29-Apr	9-May	22-May	7-Jun	18-Jun	2-Jun	12-Jul
Wilson's Warbler (*Wilsonia pusilla*)			2					
Spotted Towhee (*Pipilo maculates*)	1		4	8	6	3	3	2
California Towhee (*Melozone crissalis*)	1			2	1	1		
Song Sparrow (*Melospiza lincolnii*)			2	1				
Black-headed Grosbeak (*Pheucticus melanocephalus*)		1		1	1		1	2
Blue Grosbeak (*Passerina caerulea*)				1				
Brown-headed Cowbird (*Molothrus ater*)					1			
Bullock's Oriole (*Icterus bullockii*)					1			
House Finch (*Haemorhous mexicanus*)		2	8	1	7	2	3	9
Lesser Goldfinch (*Spinus psaltria*)	4	2	6	3			2	

* Introduced non-native species with established breeding population in California

REACH 105
SAN FRANCISQUITO CANYON CHANNEL (PD 2456)

Species	Survey Dates – 2013							
	10-Apr	**23-Apr**	**3-May**	**24-May**	**11-Jun**	**18-Jun**	**26-Jun**	**9-Jul**
California Quail (*Callipepla californica*)	5	2	6		2	2	3	3
Turkey Vulture (*Cathartes aura*)			2					
Red-tailed Hawk (*Buteo jamaicensis*)				1				
Red-shouldered Hawk (*Buteo lineatus*)					1		1	
Cooper's Hawk (*Accipiter cooperii*)	1							
Killdeer (*Charadrius vociferous*)				1				
Mourning Dove (*Zenaida macroura*)	2		4	3	4	5	2	
Greater Roadrunner (*Geococcyx californianus*)					1			
Black-chinned Hummingbird (*Archilochus alexandri*)							1	
Anna's Hummingbird (*Calypte anna*)	2	2	2	1		2	3	4
Costa's Hummingbird (*Calypte costae*)							1	
Allen's/Rufous Hummingbird (*Selasphorus* sp.)				2		1	1	3
Nuttall's Woodpecker (*Picoides nuttallii*)	1				1	1	1	1
Downy Woodpecker (*Picoides pubescens)*							1	
American Kestrel (*Falco sparverius*)				1				
Willow Flycatcher (*Empidonax traillii*)						2	1	
Black Phoebe (*Sayornis nigricans*)	1	2	2	1		1	1	1
Say's Phoebe (*Sayornis saya*)		1						
Ash-throated Flycatcher (*Myiarchus cinerascens*)				1				2
Cassin's Kingbird (*Tyrannus vociferans*)							1	
Western Scrub-Jay (*Aphelocoma insularis*)	1	1	2	2		2	1	3
American Crow (*Corvus brachyrhynchos*)	2			2		2	1	1
Common Raven (*Corvus corax*)	1	1	2	1	2	1		2
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)	2			2	6	4		
Cliff Swallow (*Petrochelidon pyrrhonota*)	4	3	3	2		5	2	2

REACH 105
SAN FRANCISQUITO CANYON CHANNEL (PD 2456)

Species	Survey Dates – 2013							
	10-Apr	23-Apr	3-May	24-May	11-Jun	18-Jun	26-Jun	9-Jul
Oak Titmouse (*Baeolophus inornatus*)						1		
Bushtit (*Psaltriparus minimus*)	6	2	5				10	
Bewick's Wren (*Thryomanes bewickii*)				3	2		2	3
Wrentit (*Chamaea fasciata*)	1		1					
Western Bluebird (*Sialia mexicana*)	2							
California Thrasher (*Toxostoma redivivum*)			2	1		1	2	5
Northern Mockingbird (*Mimus polyglottos*)				1				
Phainopepla (*Phainopepla nitens*)				1				
European Starling (*Sturnus vulgaris*)*						2		
Common Yellowthroat (*Geothlypis trichas*)					3	1	1	2
Yellow Warbler (*Setophaga petechia*)					1			
Yellow-rumped Warbler (*Setophaga coronata*)	10							
Wilson's Warbler (*Wilsonia pusilla*)			1					
Spotted Towhee (*Pipilo maculates*)					2			1
California Towhee (*Melozone crissalis*)	2		2	2	2		2	2
Song Sparrow (*Melospiza lincolnii*)		1					2	1
White-crowned Sparrow (*Zonotrichia leucophrys*)	3							
Black-headed Grosbeak (*Pheucticus melanocephalus*)							1	
Blue Grosbeak (*Passerina caerulea*)							1	2
Red-winged Blackbird (*Ageaius phoeniceus*)						1		
House Finch (*Haemorhous mexicanus*)	5	5		11	7	10	1	13
Lesser Goldfinch (*Spinus psaltria*)	4	4	8	1	2	3	4	2

REACH 106
CASTAIC DRAIN OUTLET (RMD CHANNELS)

Species	Survey Dates – 2013							
	16-Apr	29-Apr	9-May	22-May	7-Jun	18-Jun	2-Jul	12-Jul
Mallard (*Anas platyrhynchos)*	2	2						
California Quail (*Callipepla californica*)							1	
Killdeer (*Charadrius vociferous*)		2		1				
Rock Pigeon (*Columba livia*)*				15			1	
Eurasian Collared-Dove (*Streptopelia decaocto*)*		2		1				
Mourning Dove (*Zenaida macroura*)	1	1						
Anna's Hummingbird (*Calypte anna*)		2	1	2	3		1	
Western Wood-Pewee (*Contopus sordidulus*)				2				
Black Phoebe (*Sayornis nigricans*)		3	3	5	2	1	1	
Western Kingbird (*Tyrannus verticalis*)					2	6	4	4
Warbling Vireo (*Vireo gilvus*)				1				
Western Scrub-Jay (*Aphelocoma insularis*)		4			1	2		
American Crow (*Corvus brachyrhynchos*)			1		2			
Common Raven (*Corvus corax*)	2	2				1	1	
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)			1				1	2
Cliff Swallow (*Petrochelidon pyrrhonota*)		4						
Barn Swallow (*Hirundo rustica*)			3	1	2	1		
House Wren (*Troglodytes aedon*)			1					
American Robin (*Turdus migratorius*)								1
California Thrasher (*Toxostoma redivivum*)			1					
Northern Mockingbird (*Mimus polyglottos*)								1
European Starling (*Sturnus vulgaris*)*				4				
Common Yellowthroat (*Geothlypis trichas*)			1		1	1	1	
Yellow Warbler (*Setophaga petechia*)		1		1				
Wilson's Warbler (*Wilsonia pusilla*)		1						

REACH 106
CASTAIC DRAIN OUTLET (RMD CHANNELS)

Species	Survey Dates – 2013							
	16-Apr	29-Apr	9-May	22-May	7-Jun	18-Jun	2-Jul	12-Jul
California Towhee (*Melozone crissalis*)				4				
Song Sparrow (*Melospiza lincolnii*)	2	2	4	4	3	1		
Black-headed Grosbeak (*Pheucticus melanocephalus*)			1			1		
Blue Grosbeak (*Passerina caerulea*)								1
Red-winged Blackbird (*Ageaius phoeniceus*)	4	10		10			1	
Brewer's Blackbird (*Euphagus cyanocephalus*)							1	
Great-tailed Grackle (*Quiscalus mexicanus*)				4				
Bullock's Oriole (*Icterus bullockii*)				2				
House Finch (*Haemorhous mexicanus*)	4	7	4	10	2	3	3	6
Lesser Goldfinch (*Spinus psaltria*)	5		2		1			

* Introduced non-native species with established breeding population in California

REACH 110
HASLEY CANYON CHANNEL (PD 2262)

Species	Survey Dates – 2013								
	11-Apr	24-Apr	7-May	17-May	30-May	13-Jun	20-Jun	27-Jun	10-Jul
California Quail (*Callipepla californica*)		14	2	2			2	1	5
Great Egret (*Ardea alba*)									1
Red-tailed Hawk (*Buteo jamaicensis*)		1							
Killdeer (*Charadrius vociferous*)		2				1		4	
Western Gull (*Larus occidentalis*)									1
Rock Pigeon (*Columba livia*)*									25
Mourning Dove (*Zenaida macroura*)			1	5		1	3		
Barn Owl (*Tyto alba*)						1			
Anna's Hummingbird (*Calypte anna*)	1	3	1		2			4	2
Costa's Hummingbird (*Calypte costae*)						1	1		
Allen's Hummingbird (*Selasphorus sasin*)				3				2	
Allen's/Rufous Hummingbird (*Selasphorus* sp.)					1	1	1		
Nuttall's Woodpecker (*Picoides nuttallii*)								1	
Western Wood-Pewee (*Contopus sordidulus*)					2				
Black Phoebe (*Sayornis nigricans*)					1	1			1
Say's Phoebe (*Sayornis saya*)		1				1		1	1
Ash-throated Flycatcher (*Myiarchus cinerascens*)							1		
Cassin's Kingbird (*Tyrannus vociferans*)								2	2
Western Scrub-Jay (*Aphelocoma insularis*)		2			3		1		1
American Crow (*Corvus brachyrhynchos*)			1	2	2		1	2	4
Common Raven (*Corvus corax*)	1	4	1	4	4	6	4	2	3
Northern Rough-winged Swallow (*Stelgidopteryx serripennis*)			4	4			2	2	
Cliff Swallow (*Petrochelidon pyrrhonota*)					2		10	1	
Bushtit (*Psaltriparus minimus*)	1	15			12		15		6
White-breasted Nuthatch (*Sitta carolinensis*)					1				

REACH 110
HASLEY CANYON CHANNEL (PD 2262)

Species	Survey Dates – 2013								
	11-Apr	24-Apr	7-May	17-May	30-May	13-Jun	20-Jun	27-Jun	10-Jul
Bewick's Wren (*Thryomanes bewickii*)		6	1	4	5	3	4	1	2
Western Bluebird (*Sialia mexicana*)								1	
American Robin (*Turdus migratorius*)								2	
Wrentit (*Chamaea fasciata*)					1	2	1	3	1
California Thrasher (*Toxostoma redivivum*)					1	1	1	3	1
Northern Mockingbird (*Mimus polyglottos*)					1		1	3	2
Common Yellowthroat (*Geothlypis trichas*)						1			
Yellow Warbler (*Setophaga petechia*)					2				
Yellow-rumped Warbler (*Setophaga coronata*)	1	5							
Wilson's Warbler (*Wilsonia pusilla*)				1					
Townsend's Warbler (*Setophaga townsendi*)			1						
Spotted Towhee (*Pipilo maculates*)		6	1	3	8	3	2	1	3
Rufous-crowned Sparrow (*Aimophila ruficeps*)						1			
California Towhee (*Melozone crissalis*)		6	1	6	6	4	4	5	4
Lark Sparrow (*Chondestes grammacus*)								1	3
Song Sparrow (*Melospiza lincolnii*)	1	4	1	3	4	2	1		
Western Tanager (*Piranga ludoviciana*)					6				
Black-headed Grosbeak (*Pheucticus melanocephalus*)		2				3	4	2	1
Blue Grosbeak (*Passerina caerulea*)					1	1	1	4	2
Hooded Oriole (*Icterus cucullatus*)									1
Bullock's Oriole (*Icterus bullockii*)	1							1	
House Finch (*Haemorhous mexicanus*)	1	15	1		10	14	13	15	15
Lesser Goldfinch (*Spinus psaltria*)			1	6	1	2		3	4

* Introduced non-native species with established breeding population in California

APPENDIX C

WILDLIFE COMPENDIA
(ARROYO TOAD SURVEYS)

TABLE 2
WILDLIFE COMPENDIA (ARROYO TOAD SURVEYS)

Scientific Name	Common Name	Status		Channel Reach
		USFWS	CDFG	
Fish				
CYPRINIDAE – MINNOWS				
Gila orcutti	arroyo chub	-	SSC	Reaches 79, 109
Rhinichthys osailolus	Santa Ana speckled dace	-	SSC	Reaches 79, 109
Catostomus santaanae[2]	Santa Ana sucker	-	-	Reaches 79, 109
GASTEROSTERIDAE - STICKLEBACKS				
Gasterosteus aculeatus	unarmored threespine stickleback	E	E, FP	Reach 109
Amphibians				
BUFONIDAE – TRUE TOADS				
Anaxyrus boreas	western toad	-	-	All Reaches
HYLIDAE – TREEFROGS				
Pseudacris hypochondriaca	Baja California treefrog	-	-	Reaches 71, 79, 80, 82, 87, 105, 109
RANIDAE – TRUE FROGS				
*Lithobates catesbeiana**	American bullfrog	-	-	Reach 109
PIPIDAE – TONGUELESS FROGS				
*Xenopus laevis**	African clawed frog	-	-	Reaches 79, 82, 87, 105, 109

Federal Designations
FE Listed by the federal government as an Endangered species
S Listed by the U.S. Forest Service as "Sensitive"

State Designations
SE Listed by the state government as an Endangered species
SSC Species of Special Concern
FP Fully Protected

* Introduced species.

APPENDIX D

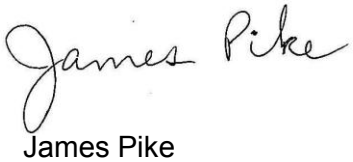
SURVEYOR CERTIFICATE STATEMENT

APPENDIX D
SURVEYOR CERTIFICATION STATEMENT

We certify that the information in this survey report and enclosed exhibits fully and accurately present our work.

Brian Daniels
Senior Biologist
(TE-821401-4)

Amber Oneal Heredia
Senior Biologist
(TE-148554-2)



James Pike
Consulting Biologist
(TE-832946-4)

APPENDIX E

CALIFORNIA NATURAL DIVERSITY DATABASE (CNDDB) FIELD SURVEY FORMS

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/22/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Vireo bellii pusillus*

Common Name: least Bell's vireo

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 7 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jim Pike
Address: 18744 Beach Bld, #E
Huntington Beach, CA, 92648
E-mail Address: jpike44@earthlink.net
Phone: (714) 968-7977

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

6	1			
# adults	# juveniles	# larvae	# egg masses	# unknown

☐ wintering ☑ breeding ☑ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Multi-strata riparian vegetation bordering the streambed

County: Los Angeles Landowner / Mgr.: Department of Public Works
Quad Name: _____ Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60 CSx
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 3 meters meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 11S 0402103 3764482

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Territorial singing by three male vireos throughout the survey season. A fourth male was only present on one survey. One pair eventually observed with at least one fledgling. Two nests of another pair were found in mulefat, but both were depredated.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Bordered by industrial and a golf course.

Visible disturbances:

Threats: Invasive vegetation and paintball games

Comments: Relatively good quality habitat for riparian species, but xeric conditions an issue this season.

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Bird expert and professional vireo biologist

Photographs: *(check one or more)* Slide Print Digital
Plant / animal ☐ ☐ ☐
Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes☐ no☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/14/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Vireo bellii pusillus*

Common Name: least Bell's vireo

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 26 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ ☐ no ☑ unk.
Yes, Occ. #

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jim Pike
Address: 18744 Beach Blvd, #E
Huntington Beach, CA, 92648
E-mail Address: jpike44@earthlink.net
Phone: (714) 968-7977

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

11	15				
# adults	# juveniles	# larvae	# egg masses	# unknown	

☐ wintering ☑ breeding ☑ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Tall black willows and islands of narrow-leaved willow bordering the San Gabriel River

County: Los Angeles Landowner / Mgr.: Department of Public Works
Quad Name: _____ Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSx
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 3 meters meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 11S 0405626 3767122

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Five territorial males throughout the season. Two additional males present only on one or two surveys. Three nests found in narrow-leaved willow (with a fourth nesting effort almost certainly in the same plant species), and another nest in mulefat. Three of the four nests that were discovered were successful, producing a minimum of 15 young. An additional very late nest had three white eggs on the last of the proscribed surveys on July 12, and its outcome is unknown at this time.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Urban and horse stables

Visible disturbances: Homeless encampments

Threats: Brown-headed cowbirds and fluctuating water levels

Comments: Narrow-leaved willow islands provide high-quality vireo habitat, but the threat posed by a burgeoning homeless population is enormous.

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Bird expert and professional vireo biologist

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

DFG/BDB/1747 Rev. 6/16/09

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/23/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Vireo bellii pusillus*

Common Name: least Bell's vireo

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 3 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian E. Daniels
Address: 225 South Lake Avenue, Suite 1000
Pasadena, CA. 91101
E-mail Address: bdaniels@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

3 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County/ Army Corps of Engineers
Quad Name: Asuza Elevation: 609 ft.
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GoogleEarth
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 11S 413549, 3778307 and 414080, 3778597

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Two territorial males and at least 1 female present during the survey season. The color-banded female was nest building with the male on this date, but the outcome of the nesting was not determined. Note that this color-banded female was banded on October 27, 2012, at San Jose del Cabo, Baja California.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Mix of open space, residential to west, and quarry operations to east and north.

Visible disturbances: Homeless encampments at willow clumps, one of which burned during the survey season - complete loss of several willows.

Threats: Nothing imminent (other than the homeless).

Comments: The side drainage on east side (Beatty Channel - Reach 39) is maintained by the County of LA Department of Pubic Works. Annual clearing of vegetation occurs in compliance with regulatory permits. Homeless activity has been an issue for years.

Determination: *(check one or more, and fill in blanks)*
- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes☐ no☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/21/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Vireo bellii pusillus*

Common Name: least Bell's vireo

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 1 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian E. Daniels
Address: 225 South Lake Avenue, Suite 1000
Pasadena, CA. 91101
E-mail Address: bdaniels@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

1 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County
Quad Name: Torrance Elevation: 15 ft.
T____ R____ Sec ____, ____ ¼ of ____¼, Meridian: H☐ M☐ S☐
T____ R____ Sec ____, ____ ¼ of ____¼, Meridian: H☐ M☐ S☐
Source of Coordinates (GPS, topo. map & type): GoogleEarth
GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 11S 380620 3740573

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

One territorial male was present in the willow riparian habitats of Wilmington Drain upstream of Lomita Blvd. This bird was found during focused least Bell's vireo surveys on the late date of May 29 and remained on territory as a bachelor to at least July 11.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☑ Excellent ☐ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: mix of residential and commercial; downstream across PCH is Ken Malloy Regional Park

Visible disturbances: The drainage has long history of use by homeless, but these encampments were cleared prior to surveys in March 2011.

Threats: Nothing imminent

Comments: Wilmington Drain (Reach 27) from the I-110 Fwy to PCH is maintained by the County of LA Department of Pubic Works. Annual clearing of vegetation occurs in compliance with regulatory permits.

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

DFG/BDB/1747 Rev. 6/16/09

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/17/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Vireo bellii pusillus*

Common Name: least Bell's vireo

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 5 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian E. Daniels
Address: 225 South Lake Avenue, Suite 1000
Pasadena, CA. 91101
E-mail Address: bdaniels@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

3 # adults | 2 # juveniles | _____ # larvae | _____ # egg masses | _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County
Quad Name: San Fernando Elevation: 1,300 ft.
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐
Source of Coordinates (GPS, topo. map & type): GoogleEarth
GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐
Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 11S 370290, 3797539 and 370436, 3797504

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Two territorial males with just one paired during survey season. This pair fledged at least two young.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: mix of open space, residential, and golf course

Visible disturbances: Relatively high use levels of wash by humans for various activities; more limited in basin

Threats: Nothing imminent

Comments: High levels of disturbance especially upstream of Maclay Street including illegal dumping, off-road motorcycles, etc. The side drainage on west side of Pacoima Wash is May Channel Outlet (Channel Reach 13) that is maintained by the County of LA Department of Pubic Works. Annual clearing of vegetation occurs in compliance with regulatory permits.

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 05/23/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Icteria virens*

Common Name: Yellow-breasted Chat

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 2 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian E. Daniels
Address: 225 South Lake Avenue, Suite 1000
Pasadena, CA. 91101
E-mail Address: bdaniels@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

2 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County/ Army Corps of Engineers
Quad Name: Asuza Elevation: 609 ft.
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GoogleEarth
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 11S 414066 3778621

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Two territorial males during these surveys. Survey area extends from pedestrian bridge (opposite Encanto Park) upstream to second drop structure. Habitat is southern willow scrub with mule fat being dominant in most areas.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Mix of open space, residential to west, and quarry operations to east and north.

Visible disturbances: Homeless encampments at willow clumps, one of which burned during the survey season - complete loss of several willows.

Threats: Nothing imminent (other than the homeless).

Comments: The side drainage on east side (Beatty Channel - Reach 39) is maintained by the County of LA Department of Pubic Works. Annual clearing of vegetation occurs in compliance with regulatory permits. Homeless activity has been an issue here for years.

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

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1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/14/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Icteria virens*

Common Name: Yellow-breasted Chat

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 3 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jim Pike
Address: 18744 Beach Blvd, #E
Huntington Beach, CA, 92648
E-mail Address: jpike44@earthlink.net
Phone: (714) 968-7977

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

3 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☑ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Multi-strata riparian vegetation bordering the streambed

County: Los Angeles Landowner / Mgr.: Department of Public Works
Quad Name: _____ Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSx
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 3 meters meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 11S 0402134 3764453

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Territorial singing throughout the series of surveys that were conducted

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Bordered by industrial and a golf course

Visible disturbances:

Threats: Invasive vegetation and paintball games

Comments: Relatively good quality habitat for riparian species

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Bird expert and professional vireo biologist

Photographs: *(check one or more)* Slide Print Digital

Plant / animal ☐ ☐ ☐
Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes☐ no☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/01/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Icteria virens*

Common Name: Yellow-breasted Chat

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 2 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jim Pike
Address: 18744 Beach Blvd, #E
Huntington Beach, CA, 92648
E-mail Address: jpike44@earthlink.net
Phone: (714) 968-7977

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

3 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☑ nesting ☐ rookery ☐ burrow site ☐ other

***Location Description* (please attach map AND/OR fill out your choice of coordinates, below)**

Islands of narrow-leaved willow bordering the streambed

County: Los Angeles Landowner / Mgr.: Department of Public Works

Quad Name: _____ Elevation: _____

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS

T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSx

DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 3 meters meters/feet

Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐

Coordinates: 11S 0405681 3767137

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Territorial singing throughout the series of surveys that were conducted

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Bordered by urban and stables

Visible disturbances: Homeless encampments

Threats: Lack of water flow in the river

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Bird expert and professional vireo biologist

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/10/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Setophaga petechia*

Common Name: Yellow Warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 2 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian E. Daniels
Address: 225 South Lake Avenue, Suite 1000
Pasadena, CA. 91101
E-mail Address: bdaniels@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

2 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles
Landowner / Mgr.: Los Angeles County/ Army Corps of Engineers
Quad Name: Asuza
Elevation: 609 ft.
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐
Source of Coordinates (GPS, topo. map & type): GoogleEarth
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐
GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐
Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 11S 413536, 3778304

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

One breeding pair during focused surveys for least Bell's vireo. Survey area extends from pedestrian bridge (opposite Encanto Park) upstream to second drop structure. Habitat is southern willow scrub with mule fat being dominant in most areas. The yellow warbler territory was at willow clump over a pond at side outlet at western base of the pedestrian bridge.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Mix of open space, residential to west, and quarry operations to east and north.

Visible disturbances: Homeless encampments at willow clumps, one of which burned during the survey season - complete loss of several willows.

Threats: Nothing imminent (other than the homeless).

Comments: The side drainage on east side (Beatty Channel - Reach 39) is maintained by the County of LA Department of Pubic Works. Annual clearing of vegetation occurs in compliance with regulatory permits. Homeless activity has been an issue for years.

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes☐ no☐

Mail to:
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Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/11/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Setophaga petechia*

Common Name: Yellow Warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 6 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian E. Daniels
Address: 225 South Lake Avenue, Suite 1000
Pasadena, CA. 91101
E-mail Address: bdaniels@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

6 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County
Quad Name: Newhall Elevation: 1,091 ft.
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GoogleEarth
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ *OR* Geographic (Latitude & Longitude) ☐
Coordinates: 11S 378348 3792716

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

At least 6 territorial males in Santa Clara River west (downstream) of McBean Pkwy bridge present during focused surveys for least Bell's vireo. Survey area is the confluence of San Francisquito Wash and Santa Clara River. Habitats include young southern willow scrub to old growth riparian forest dominated by stands of cottonwoods. Surface water present throughout surveys.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Mix of commercial, residential, and light industrial.

Visible disturbances: none

Threats: none

Comments: These surveys are for flood control facilities managed by the County of LA Department of Pubic Works. Maintenance activities are limited to toe of concrete levee at confluence with San Francisquito Wash and are governed by regulatory permits including biological opinion for unarmored threespine stickleback and arroyo toad.

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/14/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Setophaga petechia*

Common Name: Yellow Warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 9 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jim Pike
Address: 18744 Beach Blvd, #E
Huntington Beach, CA, 92648
E-mail Address: jpike44@earthlink.net
Phone: (714) 968-7977

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown
9				

☐ wintering ☑ breeding ☑ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Tall black willows bordering the streambed

County: Los Angeles Landowner / Mgr.: Department of Public Works
Quad Name: _____ Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSx
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 3 meters meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 11S 0402314 3764521

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Territorial singing throughout the series of surveys that were conducted

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Bordered by industrial and urban

Visible disturbances:

Threats: Lack of water flow in the river

Comments:

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Bird expert and professional vireo biologist

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes☐ no☐

Mail to:
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Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/28/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Setophaga petechia*

Common Name: Yellow Warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 17 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jim Pike
Address: 18744 Beach Blvd, #E
Huntington Beach, CA, 92648
E-mail Address: jpike44@earthlink.net
Phone: (714) 968-7977

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown
17				

☐ wintering ☑ breeding ☑ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Multi-strata riparian vegetation bordering the streambed

County: Los Angeles Landowner / Mgr.: Department of Public Works
Quad Name: _____ Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSx
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy 3 meters meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 11S 0402230 3764524

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Territorial singing throughout the series of surveys that were conducted

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Bordered by industrial and a golf course

Visible disturbances:

Threats: Invasive vegetation and paintball games

Comments: Relatively good quality habitat for riparian species

Determination: *(check one or more, and fill in blanks)*

☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☑ Other: Bird expert and professional vireo biologist

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
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Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/14/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Setophaga petechia*

Common Name: Yellow Warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 12 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Jim Pike
Address: 18744 Beach Blvd, #E
Huntington Beach, CA, 92648
E-mail Address: jpike44@earthlink.net
Phone: (714) 968-7977

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

# adults	# juveniles	# larvae	# egg masses	# unknown
12				

☐ wintering ☑ breeding ☑ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

Tall black willows and islands of narrow-leaved willow bordering the San Gabriel River

County: Los Angeles Landowner / Mgr.: Department of Public Works
Quad Name: _____ Elevation: _____
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GPS
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model Garmin 60CSx
DATUM: NAD27 ☐ NAD83 ☑ WGS84 ☐ Horizontal Accuracy 3 meters meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 11S 0405470 3767041

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Territorial singing throughout the survey season

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☐ Good ☑ Fair ☐ Poor

Immediate AND surrounding land use: Urban and horse stables

Visible disturbances: Homeless encampments

Threats: Brown-headed cowbirds and lack of water flow in the river

Comments:

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☑ Other: Bird expert and professional vireo biologist

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/21/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Setophaga petechia*

Common Name: Yellow Warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 7 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian E. Daniels
Address: 225 South Lake Avenue, Suite 1000
Pasadena, CA. 91101
E-mail Address: bdaniels@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

6	1				
# adults	# juveniles	# larvae	# egg masses	# unknown	

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County
Quad Name: Torrance Elevation: 22 ft.
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GoogleEarth
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 11S 380700 3740618

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Three breeding pairs present during least Bell's vireo surveys of willow riparian habitats of Wilmington Drain from Pacific Coast Highway upstream to I-110 Freeway. One begging fledgling observed in one territory upstream of Lomita Blvd.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Mix of residential and commercial (small amount of industrial - oil property); Regional Park south of PCH.

Visible disturbances: Proposition O activities began during the course of these surveys that involved removal of exotic plant species.

Threats: Removal of exotic plants followed by plantings of native should benefit this species.

Comments: Wilmington Drain (Reach 27) from the I-110 Fwy to PCH is maintained by the County of LA Department of Public Works. Annual clearing of vegetation occurs in compliance with regulatory permits.

Determination: *(check one or more, and fill in blanks)*
☐ Keyed (cite reference): _____
☐ Compared with specimen housed at: _____
☐ Compared with photo / drawing in: _____
☐ By another person (name): _____
☐ Other: _____

Photographs: *(check one or more)* Slide Print Digital
Plant / animal ☐ ☐ ☐
Habitat ☐ ☐ ☐
Diagnostic feature ☐ ☐ ☐

May we obtain duplicates at our expense? yes☐ no☐

Mail to:
California Natural Diversity Database
Department of Fish and Game
1807 13th Street, Suite 202
Sacramento, CA 95811
Fax: (916) 324-0475 email: CNDDB@dfg.ca.gov

Date of Field Work (mm/dd/yyyy): 06/17/2013

For Office Use Only
Source Code _____ Quad Code _____
Elm Code _____ Occ. No. _____
EO Index No. _____ Map Index No. _____

Reset

California Native Species Field Survey Form

Send Form

Scientific Name: *Setophaga petechia*

Common Name: Yellow Warbler

Species Found? ☑ Yes ☐ No _____ If not, why?

Total No. Individuals 4 Subsequent Visit? ☑ yes ☐ no

Is this an existing NDDB occurrence? _____ Yes, Occ. # ☐ no ☑ unk.

Collection? If yes: _____ Number _____ Museum / Herbarium

Reporter: Brian E. Daniels
Address: 225 South Lake Avenue, Suite 1000
Pasadena, CA. 91101
E-mail Address: bdaniels@bonterraconsulting.com
Phone: (626) 351-2000

Plant Information

Phenology: _____% vegetative _____% flowering _____% fruiting

Animal Information

4 # adults _____ # juveniles _____ # larvae _____ # egg masses _____ # unknown

☐ wintering ☑ breeding ☐ nesting ☐ rookery ☐ burrow site ☐ other

Location Description ***(please attach map AND/OR fill out your choice of coordinates, below)***

County: Los Angeles Landowner / Mgr.: Los Angeles County
Quad Name: Sunland Elevation: 2,1254 ft.
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ Source of Coordinates (GPS, topo. map & type): GoogleEarth
T____ R____ Sec ____, ____ ¼ of _____¼, Meridian: H☐ M☐ S☐ GPS Make & Model _____
DATUM: NAD27 ☐ NAD83 ☐ WGS84 ☐ Horizontal Accuracy _____ meters/feet
Coordinate System: UTM Zone 10 ☐ UTM Zone 11 ☑ ***OR*** Geographic (Latitude & Longitude) ☐
Coordinates: 11S 378348 3792716

Habitat Description (plants & animals) *plant communities, dominants, associates, substrates/soils, aspects/slope:*
Animal Behavior *(Describe observed behavior, such as territoriality, foraging, singing, calling, copulating, perching, roosting, etc., especially for avifauna):*

Two breeding pairs present during least Bell's vireo surveys of riparian habitat at mouth of Haines Channel Outlet in Tujunga Wash. Both pairs nested successfully as one fledgling was observed. The survey area is about 200 feet from outlet of concrete channel and is dominated by tall trees including willows, cottonwoods, eucalyptus and several other ornamental trees.

Please fill out separate form for other rare taxa seen at this site.

Site Information Overall site/occurrence quality/viability (site + population): ☐ Excellent ☑ Good ☐ Fair ☐ Poor

Immediate AND surrounding land use: Residential, alluvial sage scrub habitats of Tujunga Wash, and golf course at downstream end of survey area.

Visible disturbances: human traffic

Threats: nothing imminent

Comments: this is Channel Reach 12 that is maintained by the County of LA Department of Public Works. Annual clearing of vegetation occurs in compliance with regulatory permits.

Determination: *(check one or more, and fill in blanks)*

- ☐ Keyed (cite reference): _____
- ☐ Compared with specimen housed at: _____
- ☐ Compared with photo / drawing in: _____
- ☐ By another person (name): _____
- ☐ Other: _____

Photographs: *(check one or more)*

	Slide	Print	Digital
Plant / animal	☐	☐	☐
Habitat	☐	☐	☐
Diagnostic feature	☐	☐	☐

May we obtain duplicates at our expense? yes ☐ no ☐

APPENDIX F

WILLOW FLYCATCHER SURVEY AND DETECTION FORMS

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft-Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Sunland Elevation: 353 (meters)

Creek, River, or Lake Name: Haines Canyon Main Channel Outlet (Reach 12)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* X *No* ____

Survey Coordinates: Start: E 378432 N 3792715 UTM Datum: WGS84 (See instructions)

Stop: E 378233 N 3792737 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date: 05/23/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0545						0			
	Stop: 0645									
	Total hrs: 1.0									
Survey # 2	Date: 06/10/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0600						0			
	Stop: 0650									
	Total hrs: 0.8									
Survey # 3	Date: 06/17/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0545						0			
	Stop: 0635									
	Total hrs: 0.8									
Survey # 4	Date: 06/25/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0550						0			
	Stop: 0640									
	Total hrs: 0.8									
Survey # 5	Date: 07/5/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0600						0			
	Stop: 0645									
	Total hrs: 4.2									

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No ____
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.	0	0	0	0	If yes, report color combination(s) in the comments section on back of form and report to USFWS.
Total survey hrs: 4.2					

Reporting Individual: Brian E. Daniels Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE821401-4 State Wildlife Agency Permit #: SC-4535

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Brian E. Daniels — Phone #: 626-351-2000

Affiliation: BonTerra Consulting — E-mail: bdaniels@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft-Bottom Channels — Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ____ Not Applicable ____

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes X No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area: Federal ____ Municipal/County X State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Flood Maintenance Division)

Length of area surveyed: 0.2 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X Native broadleaf plants (entirely or almost entirely, > 90% native)

____ Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix sp., Populus fremontii

Average height of canopy (Do not include a range): 6 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

The survey area for this channel reach consists of a dense strip of willow woodland upstream of the Mulholland Highway and more scrubby willows with mule fat scrub downstream of the bridge.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft-Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Sunland Elevation: 400 (meters)

Creek, River, or Lake Name: May Channel Outlet into Pacoima Canyon (Reach 14)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ***Yes*** X ***No*** ____

Survey Coordinates: Start: E 370215 N 3797657 UTM Datum: WGS84 (See instructions)

Stop: E 370286 N 3797496 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date: 05/23/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0700						0			
	Stop: 0820									
	Total hrs: 1.3									
Survey # 2	Date: 06/10/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0705						0			
	Stop: 0845									
	Total hrs: 0.7									
Survey # 3	Date: 06/17/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0650						0			
	Stop: 0800									
	Total hrs: 1.2									
Survey # 4	Date: 06/25/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0655						0			
	Stop: 0820									
	Total hrs: 1.4									
Survey # 5	Date: 07/5/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0700						0			
	Stop: 0830									
	Total hrs: 1.5									

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.				
Total survey hrs: 6.1	0	0	0	0

Were any WIFLs color-banded? Yes ____ No ____

If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: Brian E. Daniels Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE821401-4 State Wildlife Agency Permit #: SC-4535

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Brian E. Daniels | Phone #: 626-351-2000

Affiliation: BonTerra Consulting | E-mail: bdaniels@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft-Bottom Channels | Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ____ Not Applicable ____

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes X No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area: Federal ____ Municipal/County X State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Flood Maintenance Division)

Length of area surveyed: 0.2 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

____ Native broadleaf plants (entirely or almost entirely, > 90% native)

X Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix sp., Baccharis salicifolia

Average height of canopy (Do not include a range): 5 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

The survey area for this channel reach includes a strip of disturbed willow scrub on the west bank of Pacoima Wash. In the vicinity of this side drainage, Pacoima Wash supports only alluvial sage scrub habitats. Two unnamed side outlets opposite this channel reach support willow riparian and are also included in the survey area for this channel reach.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft-Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Torrance Elevation: 8 (meters)

Creek, River, or Lake Name: Wilmington Drain (Reach 27)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? ***Yes*** X ***No*** ____

Survey Coordinates: Start: E 380800 N 3739755 UTM Datum: WGS84 (See instructions)

Stop: E 380667 N 3740748 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date: 05/29/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0915						0			
	Stop: 1100									
	Total hrs: 1.75									
Survey # 2	Date: 06/12/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0820						0			
	Stop: 1000									
	Total hrs: 1.7									
Survey # 3	Date: 06/21/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0810						0			
	Stop: 0930									
	Total hrs: 1.3									
Survey # 4	Date: 06/28/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0830						0			
	Stop: 1000									
	Total hrs: 1.5									
Survey # 5	Date: 07/11/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0530						0			
	Stop: 0645									
	Total hrs: 1.25									

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No ____
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.	0	0	0	0	If yes, report color combination(s) in the comments section on back of form and report to USFWS.
Total survey hrs: 7.5					

Reporting Individual: Brian E. Daniels Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE821401-4 State Wildlife Agency Permit #: SC-4535

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Brian E. Daniels | Phone #: 626-351-2000

Affiliation: BonTerra Consulting | E-mail: bdaniels@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft-Bottom Channels | Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ____ Not Applicable ____

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes X No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area: Federal ____ Municipal/County X State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest) LA County Department of Public Works (Flood Maintenance Division)

Length of area surveyed: 1.0 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X Native broadleaf plants (entirely or almost entirely, > 90% native)

____ Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix sp., Baccharis salicifolia

Average height of canopy (Do not include a range): 10 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Non-native vegetation was being removed from Wilmington Drain during these surveys. This activity was funded and permitted through the City of LA's Proposition "O" Clean Water Project.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft-Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Point Dume Elevation: 353 (meters)

Creek, River, or Lake Name: Triunfo Creek Channel (Reach 28)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* X *No* ____

Survey Coordinates: Start: E 335965 N 3776074 UTM Datum: WGS84 (See instructions)

Stop: E 335802 N 3776450 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1 Observer(s): B. Daniels	Date: 05/29/13 Start: 0610 Stop: 0715 Total hrs: 1.1	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			
Survey # 2 Observer(s): B. Daniels	Date: 06/12/13 Start: 0545 Stop: 0630 Total hrs: 0.75	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			
Survey # 3 Observer(s): B. Daniels	Date: 06/21/13 Start: 0600 Stop: 0700 Total hrs: 1.0	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			
Survey # 4 Observer(s): B. Daniels	Date: 06/28/13 Start: 0600 Stop: 0700 Total hrs: 1.0	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			
Survey # 5 Observer(s): B. Daniels	Date: 07/11/13 Start: 0830 Stop: 0930 Total hrs: 1.0	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.	0	0	0	0
Total survey hrs: 4.85				

Were any WIFLs color-banded? Yes ____ No ____

If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: Brian E. Daniels Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE821401-4 State Wildlife Agency Permit #: SC-4535

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Brian E. Daniels — Phone #: 626-351-2000

Affiliation: BonTerra Consulting — E-mail: bdaniels@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft-Bottom Channels — Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ____ Not Applicable ____

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes X No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area: Federal ____ Municipal/County X State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Flood Maintenance Division)

Length of area surveyed: 0.4 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X Native broadleaf plants (entirely or almost entirely, > 90% native)

____ Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix sp., Baccharis salicifolia

Average height of canopy (Do not include a range): 6 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

The survey area for this channel reach consists of a dense strip of willow woodland upstream of the Mulholland Highway and more scrubby willows with mule fat scrub downstream of the bridge.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft-Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Azusa Elevation: 195 (meters)

Creek, River, or Lake Name: Beatty Channel Outlet into San Gabriel River (Reach 39)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* X *No* ____

Survey Coordinates: Start: E 413530 N 3778309 UTM Datum: WGS84 (See instructions)

Stop: E 414168 N 3778620 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
							# Birds	Sex	UTM E	UTM N
Survey # 1	Date: 05/23/13	0	0	0	N		0			
Observer(s): B. Daniels	Start: 0910									
	Stop: 1230									
	Total hrs: 3.3									
Survey # 2	Date: 06/10/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0920						0			
	Stop: 1130									
	Total hrs: 2.2									
Survey # 3	Date: 06/17/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0840						0			
	Stop: 1100									
	Total hrs: 2.3									
Survey # 4	Date: 06/25/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0900						0			
	Stop: 1045									
	Total hrs: 1.75									
Survey # 5	Date: 07/5/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0915						0			
	Stop: 1100									
	Total hrs: 1.75									

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.				
Total survey hrs: 11.3	0	0	0	0

Were any WIFLs color-banded? Yes ____ No ____

If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: Brian E. Daniels Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE821401-4 State Wildlife Agency Permit #: SC-4535

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Brian E. Daniels — Phone #: 626-351-2000

Affiliation: BonTerra Consulting — E-mail: bdaniels@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft-Bottom Channels — Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ___ Unknown ___

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ___ Not Applicable ___

If name is different, what name(s) was used in the past? ___

If site was surveyed last year, did you survey the same general area this year? Yes X No ___ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ___ If no, summarize below.

Management Authority for Survey Area: Federal ___ Municipal/County X State ___ Tribal ___ Private ___

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Flood Maintenance Division)

Length of area surveyed: 0.7 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X — Native broadleaf plants (entirely or almost entirely, > 90% native)

___ Mixed native and exotic plants (mostly native, 50 - 90% native)

___ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

___ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix sp., Baccharis salicifolia

Average height of canopy (Do not include a range): 2 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

The survey area for this side channel outlet into the San Gabriel River consists primarily of mule fat scrub. There is also some alluvial sage scrub and basically three small patches of willow scrub in the survey area.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Appendix 1. Willow Flycatcher Survey and Detection Form

Always check the U.S. Fish and Wildlife Service Arizona Ecological Services Field Office web site (http://www.fws.gov/southwest/es/arizona/) for the most up-to-date version.

Willow Flycatcher (WIFL) Survey and Detection Form (revised April 2010)

Site Name Reaches 406/43a/43b State CA County Los Angeles
USGS Quad Name Baldwin Park; Whittier Elevation _____ (meters)
Creek, River, Wetland, or Lake Name San Gabriel River

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes*___ *No*___

Survey Coordinates: Start: E 0401220 N 3762839 UTM Datum NAD83 (See instructions)
Stop: E 0406552 N 3767887 UTM Zone 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*** Fill in additional site information on back of this page ****

Survey # / Observer(s) (Full Name)	Date (m/d/y) Survey time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N. If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding; potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
							# Birds	Sex	UTM E	UTM N
Survey # 1 Observer(s) Jim Pike	Date 5/22 Start 6:20 Stop 10:45 Total hrs 4.5	0	0	0	N					
Survey # 2 Observer(s) Jim Pike	Date 6/1 Start 6:15 Stop 10:40 Total hrs 4.5	0	0	0	N					
Survey # 3 Observer(s) Jim Pike	Date 6/14 Start 5:50 Stop 10:20 Total hrs 4.5	0	0	0	N					
Survey # 4 Observer(s) Jim Pike	Date 6/28 Start 5:45 Stop 10:15 Total hrs 4.5	0	0	0	N					
Survey # 5 Observer(s) Jim Pike	Date 7/12 Start 6:10 Stop 10:10 Total hrs 4	0	0	0	N					

Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total Survey Hrs	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any Willow Flycatchers color-banded? Yes___ No X If yes, report color combination(s) in the comments section on back of form and report to USFWS.
	0	0	0	0	

Reporting Individual Jim Pike Date Report Completed 7/29/13
US Fish and Wildlife Service Permit # TE 832946-4 State Wildlife Agency Permit # SC-9788

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual Jim Pike Phone # 714-968-7977
Affiliation subcontracting biologist for Bonterra E-mail jpike44@earthlink.net
Site Name Reaches 406 43a, 43b Date Report Completed 7/29/13
Was this site surveyed in a previous year? Yes X No ___ Unknown ___
Did you verify that this site name is consistent with that used in previous years? Yes X No ___ Not Applicable ___
If site name is different, what name(s) was used in the past? ___
If site was surveyed last year, did you survey the same general area this year? Yes ___ No ___ If no, summarize below.
Did you survey the same general area during each visit to this site this year? Yes X No ___ If no, summarize below.

Management Authority for Survey Area: Federal___ Municipal/County X State___ Tribal___ Private___
Name of Management Entity or Owner (e.g., Tonto National Forest) Los Angeles Dept of Public Works

Length of area surveyed: 4.34 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

___ Native broadleaf plants (entirely or almost entirely, > 90% native)

X Mixed native and exotic plants (mostly native, 50 - 90% native)

___ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

___ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific names.
Salix gooddingii, Salix exigua, Baccharis salicifolia

Average height of canopy (Do not include a range): 13 (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections; 2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests; 3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Appendix 1. Willow Flycatcher Survey and Detection Form

Always check the U.S. Fish and Wildlife Service Arizona Ecological Services Field Office web site (http://www.fws.gov/southwest/es/arizona/) for the most up-to-date version.

Willow Flycatcher (WIFL) Survey and Detection Form (revised April 2010)

Site Name Reaches 71/75/79/80 State CA County Los Angeles
USGS Quad Name Newhall Elevation _____ (meters)
Creek, River, Wetland, or Lake Name Santa Clara River
Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes*___ *No*___

Survey Coordinates: Start: E 0356081 N 3810291 UTM Datum NAD 83 (See instructions)
Stop: E 0358349 N 3807296 UTM Zone 11
If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.
*** Fill in additional site information on back of this page ****

Survey # / Observer(s) (Full Name)	Date (m/d/y) Survey time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding; potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
							# Birds	Sex	UTM E	UTM N
Survey # 1 Observer(s) Jim Pike	Date 5/23 Start 6:05 Stop 9:35 Total hrs 3.5	0	0	0	N					
Survey # 2 Observer(s) Jim Pike	Date 6/2 Start 6:10 Stop 9:45 Total hrs 3.5	0	0	0	N					
Survey # 3 Observer(s) Jim Pike	Date 6/16 Start 6:05 Stop 9:40 Total hrs 3.5	0	0	0	N					
Survey # 4 Observer(s) Jim Pike	Date 6/30 Start 5:50 Stop 9:00 Total hrs 3.2	0	0	0	N					
Survey # 5 Observer(s) Jim Pike	Date 7/13 Start 6:20 Stop 9:35 Total hrs 3.25	0	0	0	N					

Overall Site Summary Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total Survey Hrs	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any Willow Flycatchers color-banded? Yes___ No X If yes, report color combination(s) in the comments section on back of form and report to USFWS.
	0	0	0	0	

Reporting Individual Jim Pike Date Report Completed 7/29/13
US Fish and Wildlife Service Permit # TE 832946-4 State Wildlife Agency Permit # SC-9788

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual Jim Pike Phone # 714-968-7977
Affiliation subcontracting biologist for Bonterra E-mail jpike44@earthlink.net
Site Name Reaches 71/75/79/80 Date Report Completed 7/29/13
Was this site surveyed in a previous year? Yes X No ___ Unknown ___
Did you verify that this site name is consistent with that used in previous years? Yes X No ___ Not Applicable ___
If site name is different, what name(s) was used in the past? ___
If site was surveyed last year, did you survey the same general area this year? Yes ___ No ___ If no, summarize below.
Did you survey the same general area during each visit to this site this year? Yes X No ___ If no, summarize below.

Management Authority for Survey Area: Federal ___ Municipal/County X State ___ Tribal ___ Private ___
Name of Management Entity or Owner (e.g., Tonto National Forest) Los Angeles Dept of Public Works

Length of area surveyed: 3.46 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X Native broadleaf plants (entirely or almost entirely, > 90% native)

___ Mixed native and exotic plants (mostly native, 50 - 90% native)

___ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

___ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific names.
Populus fremontii; Salix laevigata

Average height of canopy (Do not include a range): 14 (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections; 2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests; 3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft-Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Newhall Elevation: 336 (meters)

Creek, River, or Lake Name: Santa Clara River Main Channel (Reach 82) and Santa Clara River - South Bank West of McBean Pkwy (Reach 109)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* X *No* ____

Survey Coordinates: Start: E 356404 N 3810290 UTM Datum: WGS84 (See instructions)

Stop: E 355493 N 3810815 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1 Observer(s): B. Daniels	Date: 05/24/13 Start: 0600 Stop: 0925 Total hrs: 3.4	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			
Survey # 2 Observer(s): B. Daniels	Date: 06/11/13 Start: 0600 Stop: 0845 Total hrs: 2.75	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			
Survey # 3 Observer(s): B. Daniels	Date: 06/18/13 Start: 0530 Stop: 0915 Total hrs: 3.75	2	0	0	N		# Birds	Sex	UTM E	UTM N
							1	unk	356079	3810302
							1	male	355509	3810832
Survey # 4 Observer(s): B. Daniels	Date: 06/26/13 Start: 0600 Stop: 0900 Total hrs: 3.0	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			
Survey # 5 Observer(s): B. Daniels	Date: 07/9/13 Start: 0710 Stop: 0945 Total hrs: 2.6	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No X
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.					
Total survey hrs: 15.5	0	0	0	0	If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: Brian E. Daniels Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE821401-4 State Wildlife Agency Permit #: SC-4535

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Brian E. Daniels — Phone #: 626-351-2000

Affiliation: BonTerra Consulting — E-mail: bdaniels@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft-Bottom Channels — Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ____ Not Applicable ____

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes X No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area: Federal ____ Municipal/County X State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Flood Maintenance Division)

Length of area surveyed: 1.1 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X Native broadleaf plants (entirely or almost entirely, > 90% native)

____ Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix sp., Baccharis salicifolia, Populus fremontii

Average height of canopy (Do not include a range): 8 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Main channel of the Santa Clara River downstream (west) of McBean Parkway in Santa Clarita. This is at the confluence with San Francisquito Creek. Some relatively old riparian forest is present along north side of channel that is dominated by cottonwoods. The rest of the channel contains relatively young riparian habitats dominated by willows.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Newhall Elevation: 323 (meters)

Creek, River, or Lake Name: Castaic Creek (Reach # 87/97)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* X *No* ____

Survey Coordinates: Start: E 351348 N 3812994 UTM Datum: NAD83 (See instructions)

Stop: E 351684 N 3812307 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
							# Birds	Sex	UTM E	UTM N
Survey # 1 Observer(s): A. Heredia	Date: 05/22/13 Start: 0820 Stop: 0920 Total hrs: 1.0	0	0	0	N		0			
Survey # 2 Observer(s): A. Heredia	Date: 06/07/13 Start: 0820 Stop: 0950 Total hrs: 1.5	0	0	0	N		0			
Survey # 3 Observer(s): A. Heredia	Date: 06/18/13 Start: 0630 Stop: 0800 Total hrs: 1.5	0	0	0	N		0			
Survey # 4 Observer(s): A. Heredia	Date: 07/02/13 Start: 0630 Stop: 0800 Total hrs: 1.5	0	0	0	N		0			
Survey # 5 Observer(s): A. Heredia	Date: 07/12/13 Start: 0745 Stop: 0950 Total hrs: 2.1	0	0	0	N		0			

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total survey hrs: 7.6	0	0	0	0	Were any WIFLs color-banded? Yes ____ No ____ If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: Amber Oneal Heredia Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE148554-2 State Wildlife Agency Permit #: SC-6761

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Amber Oneal Heredia — Phone #: 714-444-9199

Affiliation: BonTerra Consulting — E-mail: aheredia@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft Bottom Channels — Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ____ Not Applicable ____

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes X No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area: Federal ____ Municipal/County X State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Hired by Flood Maintenance Division)

Length of area surveyed: Reach 87/97 (0.80 km) (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

____ Native broadleaf plants (entirely or almost entirely, > 90% native)

X Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix lasiolepis, Populus fremontii, Tamarix sp.

Average height of canopy (Do not include a range): 15m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

There is good cottonwood-willow riparian forest at this location; however, the amount of Tamarisk in this reach has increased substantially since the last surveys in 2011.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft-Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Newhall Elevation: 353 (meters)

Creek, River, or Lake Name: Bouquet Canyon Channel (Reach 103)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* X *No* ____

Survey Coordinates: Start: E 358459 N 3810685 UTM Datum: WGS84 (See instructions)

Stop: E 358161 N 3810426 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
							# Birds	Sex	UTM E	UTM N
Survey # 1 Observer(s): B. Daniels	Date: 05/30/13 Start: 0800 Stop: 0900 Total hrs: 1.0	0	0	0	N		0			
Survey # 2 Observer(s): B. Daniels	Date: 06/13/13 Start: 0745 Stop: 0900 Total hrs: 1.3	0	0	0	N		0			
Survey # 3 Observer(s): B. Daniels	Date: 06/20/13 Start: 0730 Stop: 0830 Total hrs: 1.0	0	0	0	N		0			
Survey # 4 Observer(s): B. Daniels	Date: 06/27/13 Start: 0810 Stop: 0915 Total hrs: 1.1	0	0	0	N		0			
Survey # 5 Observer(s): B. Daniels	Date: 07/10/13 Start: 0700 Stop: 0800 Total hrs: 1.0	0	0	0	N		0			

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No ____
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total survey hrs: 5.4	0	0	0	0	If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: Brian E. Daniels Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE821401-4 State Wildlife Agency Permit #: SC-4535

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Brian E. Daniels | Phone #: 626-351-2000

Affiliation: BonTerra Consulting | E-mail: bdaniels@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft-Bottom Channels | Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ____ Not Applicable ____

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes X No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area: Federal ____ Municipal/County X State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Flood Maintenance Division)

Length of area surveyed: 0.4 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

____ Native broadleaf plants (entirely or almost entirely, > 90% native)

X Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix sp., Baccharis salicifolia, Populus fremontii

Average height of canopy (Do not include a range): 10 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

A dense grove of willows and cottonwoods follows the active channel that is at the foot of the levee on the right (west) bank. Otherwise the channel contains scattered mule fat and invasives such as arundo donax.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Newhall Elevation: 315 (meters)

Creek, River, or Lake Name: Castaic Creek (Reach # 104)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* X *No* ____

Survey Coordinates: Start: E 351547 N 3812915 UTM Datum: NAD83 (See instructions)

Stop: E 351791 N 3812352 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date: 05/22/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): A. Heredia	Start: 0650						0			
	Stop: 0820									
	Total hrs: 1.5									
Survey # 2	Date: 06/07/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): A. Heredia	Start: 0720						0			
	Stop: 0820									
	Total hrs: 1.0									
Survey # 3	Date: 06/18/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): A. Heredia	Start: 0900						0			
	Stop: 0945									
	Total hrs: 0.8									
Survey # 4	Date: 07/02/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): A. Heredia	Start: 0800						0			
	Stop: 0840									
	Total hrs: 0.7									
Survey # 5	Date: 07/12/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): A. Heredia	Start: 0645						0			
	Stop: 0745									
	Total hrs: 1.0									

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No ____
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.	0	0	0	0	If yes, report color combination(s) in the comments section on back of form and report to USFWS.
Total survey hrs: 5					

Reporting Individual: Amber Oneal Heredia Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE148554-2 State Wildlife Agency Permit #: SC-6761

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Amber Oneal Heredia — Phone #: 714-444-9199

Affiliation: BonTerra Consulting — E-mail: aheredia@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft Bottom Channels — Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ____ Not Applicable ____

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes X No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area: Federal ____ Municipal/County X State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Hired by Flood Maintenance Division)

Length of area surveyed: Reach 104 (0.52 km) (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

____ Native broadleaf plants (entirely or almost entirely, > 90% native)

X Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix lasiolepis, Tamarix sp., Populus fremontii

Average height of canopy (Do not include a range): 15 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Habitat at this location is primarily alluvial sage scrub with scattered mule fat and a few patches of large willows and cottonwoods near the outflow of a drain.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft-Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Newhall Elevation: 352 (meters)

Creek, River, or Lake Name: San Francisquito Channel (Reach 105)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* X *No* ____

Survey Coordinates: Start: E 356915 N 3812709 UTM Datum: WGS84 (See instructions)

Stop: E 356841 N 3812286 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1	Date: 05/24/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0930						0			
	Stop: 1010									
	Total hrs: 0.7									
Survey # 2	Date: 06/11/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0855						0			
	Stop: 0945									
	Total hrs: 0.8									
Survey # 3	Date: 06/18/13	2	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0920						2	males	356731	3812706
	Stop: 1015									
	Total hrs: 0.9									
Survey # 4	Date: 06/26/13	1	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0905						1	unk	356898	3812686
	Stop: 1115									
	Total hrs: 2.2									
Survey # 5	Date: 07/9/13	0	0	0	N		# Birds	Sex	UTM E	UTM N
Observer(s): B. Daniels	Start: 0600						0			
	Stop: 0700									
	Total hrs: 1.0									

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.	0	0	0	0
Total survey hrs: 5.6				

Were any WIFLs color-banded? Yes ____ No ____

If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: Brian E. Daniels Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE821401-4 State Wildlife Agency Permit #: SC-4535

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Brian E. Daniels | Phone #: 626-351-2000

Affiliation: BonTerra Consulting | E-mail: bdaniels@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft-Bottom Channels | Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ___ Unknown ___

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ___ Not Applicable ___

If name is different, what name(s) was used in the past? ___

If site was surveyed last year, did you survey the same general area this year? Yes X No ___ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ___ If no, summarize below.

Management Authority for Survey Area: Federal ___ Municipal/County X State ___ Tribal ___ Private ___

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Flood Maintenance Division)

Length of area surveyed: 0.4 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X Native broadleaf plants (entirely or almost entirely, > 90% native)

___ Mixed native and exotic plants (mostly native, 50 - 90% native)

___ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

___ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Baccharis salicifolia, Salix sp., Populus fremontii

Average height of canopy (Do not include a range): 2 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Except for two side outlets with water, this channel is dry and dominated by mule fat. Willows dominate the outlets; couple dry patches of willows and cottonwoods on west side of channel.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Newhall Elevation: 351 (meters)

Creek, River, or Lake Name: Castaic Creek (Reach # 106)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* X *No* ____

Survey Coordinates: Start: E 351666 N 3817198 UTM Datum: NAD83 (See instructions)

Stop: E 351781 N 3816785 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1 Observer(s): A. Heredia	Date: 05/22/13 Start: 0920 Stop: 1015 Total hrs: 0.9	1	0	0	N	Visually observed individual foraging. Individual was silent, no vocalizations. Not observed on any follow-up surveys, presumed to be a migrant.	# Birds	Sex	UTM E	UTM N
							1		351721	3817090
Survey # 2 Observer(s): A. Heredia	Date: 06/07/13 Start: 0620 Stop: 0720 Total hrs: 1.0	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			
Survey # 3 Observer(s): A. Heredia	Date: 06/18/13 Start: 0800 Stop: 0900 Total hrs: 1.0	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			
Survey # 4 Observer(s): A. Heredia	Date: 07/02/13 Start: 0840 Stop: 0910 Total hrs: 0.5	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			
Survey # 5 Observer(s): A. Heredia	Date: 07/12/13 Start: 0950 Stop: 1020 Total hrs: 0.5	0	0	0	N		# Birds	Sex	UTM E	UTM N
							0			

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals.					Were any WIFLs color-banded? Yes ____ No ____
Total survey hrs: 3.9	0	0	0	0	If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: Amber Oneal Heredia Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE148554-2 State Wildlife Agency Permit #: SC-6761

***Submit** form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.*

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Amber Oneal Heredia | Phone #: 714-444-9199

Affiliation: BonTerra Consulting | E-mail: aheredia@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft Bottom Channels | Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ____ Not Applicable ____

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes X No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area: Federal ____ Municipal/County X State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Hired by Flood Maintenance Division)

Length of area surveyed: Reach 106 (0.43 km) (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

____ Native broadleaf plants (entirely or almost entirely, > 90% native)

X Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix lasiolepis, Tamarix sp., Baccharis salicifolia

Average height of canopy (Do not include a range): 12 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

Habitat at this location is somewhat degraded. Although there is a willow canopy, the understory is lacking, there is trash along the reach, and it is heavily invaded by Tamarisk. The drainage is limited to a channel between the Interstate-5 and the Castaic Sports Complex.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

Willow Flycatcher (WIFL) Survey and Detection Form (revised April, 2010)

Site Name: LA County Department of Public Works Soft-Bottom Channels State: CA County: Los Angeles

USGS Quad Name: Newhall and Val Verde Elevation: 361 (meters)

Creek, River, or Lake Name: Hasley Canyon Channel (Reach 110)

Is copy of USGS map marked with survey area and WIFL sightings attached (as required)? *Yes* X *No* ____

Survey Coordinates: Start: E 349511 N 3813766 UTM Datum: WGS84 (See instructions)

Stop: E 350785 N 3812746 UTM Zone: 11

If survey coordinates changed between visits, enter coordinates for each survey in comments section on back of this page.

*****Fill in additional site information on back of this page*****

Survey # Observer(s) (Full Name)	Date (m/d/y) Survey Time	Number of Adult WIFLs	Estimated Number of Pairs	Estimated Number of Territories	Nest(s) Found? Y or N If Yes, number of nests	Comments (e.g., bird behavior; evidence of pairs or breeding;-potential threats [livestock, cowbirds, *Diorhabda* spp.]). If *Diorhabda* found, contact USFWS and State WIFL coordinator.	GPS Coordinates for WIFL Detections (this is an optional column for documenting individuals, pairs, or groups of birds found on each survey). Include additional sheets if necessary.			
Survey # 1 Observer(s): B. Daniels	Date: 05/30/13 Start: 0610 Stop: 0745 Total hrs: 1.6	0	0	0	N		# Birds: 0	Sex	UTM E	UTM N
Survey # 2 Observer(s): B. Daniels	Date: 06/13/13 Start: 0550 Stop: 0730 Total hrs: 1.7	0	0	0	N		# Birds: 0	Sex	UTM E	UTM N
Survey # 3 Observer(s): B. Daniels	Date: 06/20/13 Start: 0545 Stop: 0715 Total hrs: 1.5	0	0	0	N		# Birds: 0	Sex	UTM E	UTM N
Survey # 4 Observer(s): B. Daniels	Date: 06/27/13 Start: 0545 Stop: 0700 Total hrs: 1.25	0	0	0	N		# Birds: 0	Sex	UTM E	UTM N
Survey # 5 Observer(s): B. Daniels	Date: 07/10/13 Start: 0545 Stop: 0645 Total hrs: 1.0	0	0	0	N		# Birds: 0	Sex	UTM E	UTM N

Overall Site Summary	Total Adult Residents	Total Pairs	Total Territories	Total Nests	Were any WIFLs color-banded? Yes ____ No ____
Totals do not equal the sum of each column. Include only resident adults. Do not include migrants, nestlings, and fledglings. Be careful not to double count individuals. Total survey hrs: 7.1	0	0	0	0	If yes, report color combination(s) in the comments section on back of form and report to USFWS.

Reporting Individual: Brian E. Daniels Date Report Completed: 2013

US Fish & Wildlife Service Permit #: TE821401-4 State Wildlife Agency Permit #: SC-4535

Submit form to USFWS and State Wildlife Agency by September 1st. Retain a copy for your records.

Fill in the following information completely. Submit form by September 1st. Retain a copy for your records.

Reporting Individual: Brian E. Daniels — Phone #: 626-351-2000

Affiliation: BonTerra Consulting — E-mail: bdaniels@bonterraconsulting.com

Site Name: LA County Department of Public Works Soft-Bottom Channels — Date report Completed: 2013

Was this site surveyed in a previous year? Yes x No ____ Unknown ____

Did you verify that this site name is consistent with that used in previous yrs? Yes X No ____ Not Applicable ____

If name is different, what name(s) was used in the past? ____

If site was surveyed last year, did you survey the same general area this year? Yes X No ____ If no, summarize below.

Did you survey the same general area during each visit to this site this year? Yes X No ____ If no, summarize below.

Management Authority for Survey Area: Federal ____ Municipal/County X State ____ Tribal ____ Private ____

Name of Management Entity or Owner (e.g., Tonto National Forest): LA County Department of Public Works (Flood Maintenance Division)

Length of area surveyed: 1.75 (km)

Vegetation Characteristics: Check (only one) category that best describes the predominant tree/shrub foliar layer at this site:

X — Native broadleaf plants (entirely or almost entirely, > 90% native)

____ Mixed native and exotic plants (mostly native, 50 - 90% native)

____ Mixed native and exotic plants (mostly exotic, 50 - 90% exotic)

____ Exotic/introduced plants (entirely or almost entirely, > 90% exotic)

Identify the 2-3 predominant tree/shrub species in order of dominance. Use scientific name.
Salix sp., Baccharis salicifolia, Populus fremontii

Average height of canopy (Do not include a range): 5 m (meters)

Attach the following: 1) copy of USGS quad/topographical map (REQUIRED) of survey area, outlining survey site and location of WIFL detections;
2) sketch or aerial photo showing site location, patch shape, survey route, location of any detected WIFLs or their nests;
3) photos of the interior of the patch, exterior of the patch, and overall site. Describe any unique habitat features in Comments.

Comments (such as start and end coordinates of survey area if changed among surveys, supplemental visits to sites, unique habitat features. Attach additional sheets if necessary.

A fairly narrow and dry channel that transitions from dense woodland downstream to sparse shrubs at its upstream terminus.

Territory Summary Table. Provide the following information for each verified territory at your site.

Territory Number	All Dates Detected	UTM E	UTM N	Pair Confirmed? Y or N	Nest Found? Y or N	Description of How You Confirmed Territory and Breeding Status (e.g., vocalization type, pair interactions, nesting attempts, behavior)

Attach additional sheets if necessary

APPENDIX G

LEAST BELL'S VIREO SURVEY DATA SUMMARY SHEETS

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information	
Project Title:	Soft-bottom Channel Reach 12
Landowner:	Los Angeles County Department of Public Works

Survey Information			
Surveyors:	Steve Morris, Brian Daniels	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3792715	Northing:	3792737	WGS84
Easting:	378432	Easting:	378233	WGS84

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
0.2	9	7.8

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information	
Project Title:	Soft-bottom Channel Reach 14
Landowner:	Los Angeles County Department of Public Works

Survey Information			
Surveyors:	Steve Morris, Brian Daniels	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3797657	Northing:	3797496	WGS84
Easting:	370286	Easting:	370286	WGS84

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
0.2	9	13

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	1	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	1	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	2	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)
1	3797539	370290	unpaired
2	3797504	370436	paired/2+ fledglings

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information	
Project Title:	Soft-bottom Channel Reach 27
Landowner:	Los Angeles County Department of Public Works

Survey Information			
Surveyors:	Steve Morris, Brian Daniels	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3739755	Northing:	3740748	WGS84
Easting:	380800	Easting:	380667	WGS84

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
1.0	9	15

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	1	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	1	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)
1	3740573	380620	unpaired

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information	
Project Title:	Soft-bottom Channel Reach 28
Landowner:	Los Angeles County Department of Public Works

Survey Information			
Surveyors:	Steve Morris, Brian Daniels	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3776074	Northing:	3776450	WGS84
Easting:	335965	Easting:	335802	WGS84

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
0.4	9	9.3

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information	
Project Title:	Soft-bottom Channel Reach 39
Landowner:	Los Angeles County Department of Public Works

Survey Information			
Surveyors:	Steve Morris, Brian Daniels	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3778309	Northing:	3778620	WGS84
Easting:	413530	Easting:	414168	WGS84

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
0.7	9	17

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	2	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	2	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)
1	3778307	413549	paired/failed
2	3778597	414080	paired/unknown outcome

LEAST BELL'S VIREO SURVEY DATA SUMMARY

(Reaches 40b, 43a, 43b)

Site Information

Project Title:	Los Angeles County Soft Bottom Channel Surveys
Landowner:	Los Angeles Dept of Public Works

Survey Information

Surveyors:	Jim Pike	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3762839	Northing:	3767887	NAD 83
Easting:	0401220	Easting:	0406552	" "

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
4.34	9	40.5

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	6	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	2	The total number of resident males not confirmed as paired.
"Non-territorial" Transient:	3	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	11	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)
LBV 1	3764482	0402103	Two nests depradated
LBV 2	3764665	0402273	Female and 1 fledgling
LBV 3	3764811	0402384	Unpaired
LBV 4	3767041	0405403	Fledged 4
LBV 5	3767122	0405626	3 fledglings, second nest with eg
LBV 6	3767194	0405700	8 fledglings from 2 nests
LBV 7	3767363	0406132	Unpaired
LBV 8	3767732	0406487	Paired

Reach 43a

Reach 40b

LEAST BELL'S VIREO SURVEY DATA SUMMARY

(Reaches 71, 75, 79, 80)

Site Information

Project Title:	Los Angeles County Soft Bottom Channel Surveys
Landowner:	Los Angeles Dept of Public Works

Survey Information

Surveyors:	Jim Pike	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3810291	Northing:	3807296	NAD 83
Easting:	0356081	Easting:	0358349	" "

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
3.46	9	31.5

Least Bell's Vireo Detection Information

Number of males that were:

Paired:		Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:		The total number of resident males not confirmed as paired.
"Non-territorial" Transient:	1	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:		The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information	
Project Title:	Soft-bottom Channel Reaches 82 and 109
Landowner:	Los Angeles County Department of Public Works

Survey Information			
Surveyors:	Steve Morris, Brian Daniels	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3810290	Northing:	3810815	WGS84
Easting:	356404	Easting:	355493	WGS84

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
1.1	9	15.5

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)
			unpaired

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information			
Project Title:	LA County Department of Public Works Soft Bottom Channels, Reach 87/97		
Landowner:	LA County Department of Public Works		
Survey Information			
Surveyors:	Lindsay Messett, Amber Oneal Heredia	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3812994	Northing:	3812307	NAD83
Easting:	351348	Easting:	351684	NAD83

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
0.80 km	8	13.6

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information	
Project Title:	Soft-bottom Channel Reach 103
Landowner:	Los Angeles County Department of Public Works

Survey Information			
Surveyors:	Steve Morris, Brian Daniels	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3810685	Northing:	3810426	WGS84
Easting:	358459	Easting:	358161	WGS84

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
0.4	9	5.4

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)
			unpaired

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information			
Project Title:	LA County Department of Public Works Soft Bottom Channels, Reach 104		
Landowner:	LA County Department of Public Works		
Survey Information			
Surveyors:	Lindsay Messett, Amber Oneal Heredia	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3812915	Northing:	3812352	NAD83
Easting:	351547	Easting:	351791	NAD83

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
0.52 km	8	8.0

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information	
Project Title:	Soft-bottom Channel Reach 105
Landowner:	Los Angeles County Department of Public Works

Survey Information			
Surveyors:	Steve Morris, Brian Daniels	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3812709	Northing:	3812286	WGS84
Easting:	356915	Easting:	356841	WGS84

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
0.4	9	5.6

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)
			unpaired

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information			
Project Title:	LA County Department of Public Works Soft Bottom Channels, Reach 106		
Landowner:	LA County Department of Public Works		
Survey Information			
Surveyors:	Lindsay Messett, Amber Oneal Heredia	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3817198	Northing:	3816785	NAD83
Easting:	351666	Easting:	351781	NAD83

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
0.43 km	8	8.4

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)

LEAST BELL'S VIREO SURVEY DATA SUMMARY

Site Information	
Project Title:	Soft-bottom Channel Reach 110
Landowner:	Los Angeles County Department of Public Works

Survey Information			
Surveyors:	Steve Morris, Brian Daniels	Year:	2013

Survey Begin Coordinates		Survey End Coordinates		Datum
Northing:	3813766	Northing:	3812746	WGS84
Easting:	349511	Easting:	350785	WGS84

Survey Length (Km)	Total Number of Surveys	Total Number of Survey Hours
1.75	9	7.1

Least Bell's Vireo Detection Information

Number of males that were:

Paired:	0	Based on observation of female, nest, young, or nesting behavior (nest-building, food carrying).
Undetermined Status:	0	The total number of resident males not confirmed as paired.
Transient:	0	Only detected once despite repeated surveys, or were not detected at the same location for more than 2 weeks.
Total number of males:	0	The sum of the three categories above.

Coordinates for LBVI Territories (continue on second sheet if necessary)

Territory ID	Northing	Easting	Status/Comments (e.g. paired)
			unpaired

APPENDIX D

DATA WORKBOOKS

PLANT SPECIES	Pre-clearing		Post-clearing		Pre-clearing		Post-clearing		Pre-clearing		Post-clearing		Pre-clearing		Post-clearing	
	Transect 26-1 (80 feet)		Transect 26-1 (80 feet)		Transect 26-2 (80 feet)		Transect 26-2 (80 feet)		Transect 26-3 (200 feet)		Transect 26-3 (200 feet)		Transect 26-4 (90 feet)		Transect 26-4 (90 feet)	
	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage
Native																
Bidens frondosa		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%	2	4.0%		0.0%
Conyza canadensis	2	4.0%		0.0%	1	2.0%		0.0%		0.0%		0.0%	3	6.0%		0.0%
Leymus triticoides		0.0%		0.0%		0.0%		0.0%	3	6.0%		0.0%		0.0%		0.0%
Ludwigia peploides	7	14.0%		0.0%	23	46.0%	3	6.0%		0.0%		0.0%		0.0%		0.0%
Salix goodingii		0.0%		0.0%	26	52.0%	22	44.0%	84	168.0%	65	130.0%	29	58.0%	6	12.0%
Scirpus (tall)	22	44.0%	16	32.0%		0.0%	6	12.0%		0.0%		0.0%		0.0%		0.0%
Solanum (sm one)		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%	2	4.0%		0.0%
Non-native																
Ailanthus altissima		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%	2	4.0%		0.0%
Avena sp.	2	4.0%		0.0%	4	8.0%		0.0%	18	36.0%		0.0%	23	46.0%		0.0%
Bromus diandrus		0.0%		0.0%		0.0%		0.0%	13	26.0%		0.0%	6	12.0%		0.0%
Bromus madritensis ssp. *rubens*	1	2.0%		0.0%	10	20.0%		0.0%		0.0%		0.0%	1	2.0%		0.0%
Centaurea repens	7	14.0%		0.0%	18	36.0%	5	10.0%		0.0%		0.0%		0.0%		0.0%
Chrysanthemum coronarium	24	48.0%		0.0%	10	20.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Cynodon dactylon		0.0%	5	10.0%		0.0%		0.0%	29	58.0%		0.0%		0.0%		0.0%
Cyperus involucratus (umbrella)	3	6.0%		0.0%		0.0%	1	2.0%	2	4.0%		0.0%	1	2.0%		0.0%
Ehrharta erecta		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%	20	40.0%		0.0%
Foeniculum vulgare	1	2.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Fraxinus sp. (NN)		0.0%		0.0%	28	56.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Fraxinus sp.		0.0%		0.0%		0.0%	30	60.0%	122	244.0%	148	296.0%	57	114.0%	9	18.0%
Hedera helix		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%	3	6.0%		0.0%
Lolium perenne	15	30.0%		0.0%	10	20.0%		0.0%	28	56.0%		0.0%	5	10.0%		0.0%
Ludwigia s (NN)		0.0%	18	36.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Melilotus albus	4	8.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
NNG		0.0%		0.0%		0.0%	15	30.0%		0.0%	82	164.0%		0.0%	30	60.0%
Picris echioides		0.0%		0.0%	2	4.0%		0.0%		0.0%		0.0%	9	18.0%		0.0%
Plantago lanceolata	4	8.0%	1	2.0%	1	2.0%		0.0%		0.0%		0.0%	4	8.0%		0.0%
Raphanus sativus	4	8.0%	5	10.0%	1	2.0%	4	8.0%		0.0%		0.0%	1	2.0%		0.0%
Ricinus communis	6	12.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Smilo	12	24.0%		0.0%	8	16.0%		0.0%	33	66.0%		0.0%	7	14.0%		0.0%
Sonchus oleraceus	1	2.0%		0.0%		0.0%		0.0%	2	4.0%		0.0%	1	2.0%		0.0%
Washingtonia sp.		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%	1	2.0%		0.0%
Passion vine		0.0%		0.0%		0.0%		0.0%	2	4.0%		0.0%		0.0%		0.0%
Privet		0.0%		0.0%		0.0%		0.0%	11	22.0%		0.0%		0.0%		0.0%
ABSOLUTE COVERAGE																
Total Abs. Native Species Coverage		62.0%		32.0%		100.0%		62.0%		174.0%		130.0%		72.0%		12.0%
Total Abs. Non-Native Species Coverage		148.0%		58.0%		120.0%		100.0%		458.0%		460.0%		218.0%		78.0%
Total Absolute Coverage (All)		230.0%		90.0%		284.0%		172.0%		694.0%		590.0%		354.0%		90.0%
CLASS COVERAGE																
Native	3	6.0%	1	2.0%		0.0%	11	22.0%	34	68.0%	37	74.0%	4	8.0%	4	8.0%
Non-Native	32	64.0%	13	26.0%	52	104.0%	39	78.0%	115	230.0%	129	258.0%	61	122.0%	37	74.0%
Both	19	38.0%	15	30.0%	26	52.0%	13	26.0%	51	102.0%	26	52.0%	25	50.0%	2	4.0%
No Plant	26	52.0%	51	102.0%	2	4.0%	17	34.0%		0.0%	8	16.0%		0.0%	47	94.0%
CHECK		160.0%		160.0%		160.0%		160.0%		400.0%		400.0%		180.0%		180.0%
SUMMARY																
Total Native Class Coverage		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Total Non-Native Class Coverage		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Total Unvegetated		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
GROUND COVER																
Bare Soil	22	44.0%	59	118.0%	12	24.0%	34	68.0%	2	4.0%	38	76.0%	4	8.0%	48	96.0%
Rock/Cobble	3	6.0%	2	4.0%		0.0%		0.0%		0.0%	1	2.0%		0.0%		0.0%
Leaf Litter	52	104.0%	28	56.0%	57	114.0%	34	68.0%	154	308.0%	146	292.0%	79	158.0%	27	54.0%
Coarse Woody Debris		0.0%		0.0%		0.0%		0.0%	3	6.0%		0.0%		0.0%		0.0%
Open Water	3	6.0%		0.0%	11	22.0%	12	24.0%	11	22.0%	14	28.0%	7	14.0%	14	28.0%
Other litter		0.0%		0.0%		0.0%		0.0%	30	60.0%		0.0%		0.0%		0.0%
Trash		0.0%		0.0%		0.0%		0.0%		0.0%	1	2.0%		0.0%		0.0%
CHECK	80	160.0%	89	178.0%	80	160.0%	80	160.0%	200	400.0%	200	400.0%	90	180.0%	89	178.0%

PLANT SPECIES	Pre-clearing Transect 28-1 (165 feet)		Post-clearing Transect 28-1 (165 feet)		Pre-clearing Transect 28-2 (168 feet)		Post-clearing Transect 28-2 (168 feet)	
	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage
Native								
Ambrosia psilostachya		0.0%	1	2.0%		0.0%		0.0%
Artemesia douglasiana	13	26.0%	6	12.0%		0.0%	3	6.0%
Baccharis salicifolia	49	98.0%	50	100.0%		0.0%		0.0%
Platanus racemosa	11	22.0%	31	62.0%		0.0%		0.0%
Salix (red)	38	76.0%		0.0%		0.0%		0.0%
Salix lasiolepis		0.0%		0.0%	107	214.0%	110	220.0%
Scirpus (tall)	31	62.0%	32	64.0%		0.0%		0.0%
Non-native								
Avena sp.		0.0%		0.0%	5	10.0%		0.0%
Bromus diandrus	2	4.0%	2	4.0%	2	4.0%		0.0%
Bromus madritensis ssp. *rubens*	6	12.0%		0.0%	9	18.0%		0.0%
Carduus pycnocephalus	3	6.0%		0.0%	4	8.0%		0.0%
Centaurea melitensis	1	2.0%		0.0%		0.0%		0.0%
Centaurea solstitialis	10	20.0%		0.0%	3	6.0%		0.0%
Erodium botrys	4	8.0%		0.0%		0.0%		0.0%
Euphorbia peploides		0.0%		0.0%	1	2.0%		0.0%
Foeniculum vulgare	1	2.0%		0.0%		0.0%		0.0%
Hirschfeldia incana	5	10.0%		0.0%	10	20.0%		0.0%
Lepidium latifolium		0.0%		0.0%	20	40.0%		0.0%
Non-native grasses		0.0%		0.0%		0.0%	1	2.0%
Opuntia ficus-indica		0.0%		0.0%	2	4.0%		0.0%
Plantago major		0.0%		0.0%	1	2.0%		0.0%
Polypogon monspeliensis		0.0%		0.0%	3	6.0%		0.0%
Smilo grass		0.0%		0.0%	1	2.0%		0.0%
Vulpia myuros	1	2.0%		0.0%		0.0%		0.0%
ABSOLUTE COVERAGE								
Total Abs. Native Species Coverage		284.0%		238.0%		214.0%		226.0%
Total Abs. Non-Native Species Coverage		22.0%		0.0%		76.0%		2.0%
Total Absolute Coverage (All)		350.0%		242.0%		336.0%		228.0%
CLASS COVERAGE								
Native	67	134.0%	88	176.0%	93	186.0%	110	220.0%
Non-Native	43	86.0%	2	4.0%	38	76.0%	1	2.0%
Both	4	8.0%		0.0%	14	28.0%		0.0%
No Plant	51	102.0%	75	150.0%	22	44.0%	57	114.0%
CHECK		330.0%		330.0%		334.0%		336.0%
SUMMARY								
Total Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Non-Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Unvegetated		0.0%		0.0%		0.0%		0.0%
GROUND COVER								
Bare Soil	5	10.0%	5	10.0%	5	10.0%	6	12.0%
Rock/Cobble	10	20.0%	3	6.0%	6	12.0%	1	2.0%
Leaf Litter	142	284.0%	146	292.0%	92	184.0%	123	246.0%
Coarse Woody Debris		0.0%		0.0%	21	42.0%	3	6.0%
Open Water		0.0%		0.0%	16	32.0%	4	8.0%
Seedlings		0.0%		0.0%		0.0%		0.0%
Seedlings/Bare Soil		0.0%		0.0%		0.0%		0.0%
Riprap un-grouted		0.0%		0.0%		0.0%	25	50.0%
Riprap grouted	8	16.0%	11	22.0%	22	44.0%	6	12.0%
Other litter		0.0%		0.0%		0.0%		0.0%
CHECK	165	330.0%	165	330.0%	162	324.0%	168	336.0%

PLANT SPECIES	Pre-clearing		Post-clearing		Pre-clearing		Post-clearing	
	Transect 29-1 (40 feet)		Transect 29-1 (40 feet)		Transect 29-2 (40 feet)		Transect 29-2 (40 feet)	
	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage
Native								
Cyperus eragrostis		0.0%		0.0%	7	14.0%		0.0%
Lemma sp.		0.0%	6	12.0%		0.0%		0.0%
Rosa californica		0.0%		0.0%	9	18.0%	10	20.0%
Salix laevigata		0.0%		0.0%	16	32.0%	16	32.0%
Typha	1	2.0%		0.0%		0.0%		0.0%
Non-native								
Hirschfeldia incana	7	14.0%		0.0%	3	6.0%		0.0%
Polypogon monspeliensis	5	10.0%	3	6.0%	1	2.0%		0.0%
ABSOLUTE COVERAGE								
Total Abs. Native Species Coverage		2.0%		12.0%		64.0%		52.0%
Total Abs. Non-Native Species Coverage		24.0%		6.0%		8.0%		0.0%
Total Absolute Coverage (All)		26.0%		18.0%		72.0%		52.0%
CLASS COVERAGE								
Native	1	2.0%	6	12.0%	20	40.0%	16	32.0%
Non-Native	10	20.0%	3	6.0%	1	2.0%		0.0%
Both		0.0%		0.0%	3	6.0%		0.0%
No Plant	29	58.0%	31	62.0%	16	32.0%	24	48.0%
CHECK		80.0%		80.0%		80.0%		80.0%
SUMMARY								
Total Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Non-Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Unvegetated		0.0%		0.0%		0.0%		0.0%
GROUND COVER								
Bare Soil	38	76.0%	27	54.0%	21	42.0%	22	44.0%
Rock/Cobble		0.0%		0.0%	1	2.0%		0.0%
Leaf Litter		0.0%	4	8.0%	18	36.0%	16	32.0%
Coarse Woody Debris		0.0%		0.0%		0.0%		0.0%
Concrete		0.0%		0.0%		0.0%	2	4.0%
Open Water	2	4.0%	9	18.0%		0.0%		0.0%
Seedlings		0.0%		0.0%		0.0%		0.0%
Seedlings/Bare Soil		0.0%		0.0%		0.0%		0.0%
Riprap grouted		0.0%		0.0%		0.0%		0.0%
Other litter		0.0%		0.0%		0.0%		0.0%
CHECK	40	80.0%	40	80.0%	40	80.0%	40	80.0%

PLANT SPECIES	Pre-clearing		Post-clearing		Pre-clearing		Post-clearing		Pre-clearing		Post-clearing		Pre-clearing		Post-clearing	
	Transect 32-1 (27 feet)		Transect 32-1 (27 feet)		Transect 32-2 (27 feet)		Transect 32-2 (27 feet)		Transect 32-3 (27 feet)		Transect 32-3 (27 feet)		Transect 32-4 (27 feet)		Transect 32-4 (27 feet)	
	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage
Native																
Epilobium ciliatum	1	2.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Heliotropium curassavicum	1	2.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Populus fremontii		0.0%		0.0%	1	2.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Typha sp. (mowed)		0.0%	3	6.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Typha sp. (slender?)	20	40.0%		0.0%	3	6.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Non-native																
Ambrosia psilostachya		0.0%		0.0%		0.0%		0.0%	3	6.0%		0.0%	1	2.0%		0.0%
Apium graveolens	9	18.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Avena sp.		0.0%		0.0%		0.0%		0.0%	1	2.0%		0.0%		0.0%		0.0%
Bromus diandrus		0.0%		0.0%		0.0%	2	4.0%		0.0%		0.0%	13	26.0%		0.0%
Bromus hordeaceus		0.0%		0.0%		0.0%		0.0%	11	22.0%		0.0%		0.0%		0.0%
Bromus madritensis ssp. *rubens*		0.0%		0.0%	2	4.0%	1	2.0%	14	28.0%		0.0%	16	32.0%		0.0%
Cynodon dactylon		0.0%		0.0%		0.0%	1	2.0%		0.0%		0.0%		0.0%		0.0%
Eragrostis sp.		0.0%		0.0%		0.0%	1	2.0%		0.0%		0.0%		0.0%		0.0%
Melilotus albus		0.0%		0.0%	1	2.0%		0.0%	8	16.0%		0.0%		0.0%		0.0%
Melilotus sp.		0.0%		0.0%		0.0%	2	4.0%		0.0%		0.0%		0.0%		0.0%
Mimulus aurantiacus		0.0%		0.0%		0.0%		0.0%		0.0%	1	2.0%		0.0%		0.0%
NNG (?) slid		0.0%		0.0%	1	2.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Polypogon monspeliensis		0.0%		0.0%	2	4.0%		0.0%	1	2.0%		0.0%		0.0%		0.0%
Vulpia myuros		0.0%		0.0%	1	2.0%	1	2.0%		0.0%	1	2.0%		0.0%		0.0%
ABSOLUTE COVERAGE																
Total Abs. Native Species Coverage		44.0%		6.0%		8.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Total Abs. Non-Native Species Coverage		0.0%		0.0%		8.0%		6.0%		2.0%		4.0%		0.0%		0.0%
Total Absolute Coverage (All)		62.0%		6.0%		22.0%		16.0%		76.0%		4.0%		60.0%		0.0%
CLASS COVERAGE																
Native	12	24.0%	3	6.0%	4	8.0%		0.0%		0.0%	1	2.0%		0.0%		0.0%
Non-Native	1	2.0%		0.0%	6	12.0%	7	14.0%	22	44.0%	1	2.0%	24	48.0%		0.0%
Both	8	16.0%		0.0%		0.0%		0.0%	3	6.0%		0.0%	1	2.0%		0.0%
No Plant	6	12.0%	24	48.0%	17	34.0%	20	40.0%	2	4.0%	25	50.0%	2	4.0%	27	54.0%
CHECK		54.0%		54.0%		54.0%		54.0%		54.0%		54.0%		54.0%		54.0%
SUMMARY																
Total Native Class Coverage		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Total Non-Native Class Coverage		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Total Unvegetated		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
GROUND COVER																
Bare Soil	6	12.0%	10	20.0%		0.0%	1	2.0%	4	8.0%	11	22.0%		0.0%	5	10.0%
Bare Soil/sand		0.0%		0.0%	1	2.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Rock/Cobble		0.0%		0.0%		0.0%	16	32.0%		0.0%		0.0%	5	10.0%	3	6.0%
Leaf Litter	21	42.0%	17	34.0%	7	14.0%	8	16.0%	23	46.0%	16	32.0%	22	44.0%	19	38.0%
Coarse Woody Debris		0.0%		0.0%	1	2.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Open Water		0.0%		0.0%	2	4.0%	2	4.0%		0.0%		0.0%		0.0%		0.0%
Boulder		0.0%		0.0%	16	32.0%		0.0%		0.0%		0.0%		0.0%		0.0%
CHECK	27	54.0%	27	54.0%	27	54.0%	27	54.0%	27	54.0%	27	54.0%	27	54.0%	27	54.0%

PLANT SPECIES	Pre-clearing		Post-clearing		Pre-clearing		Post-clearing		Pre-clearing		Post-clearing		Pre-clearing		Post-clearing	
	Transect 33-1 (32 feet)		Transect 33-1 (32 feet)		Transect 33-2 (32 feet)		Transect 33-2 (32 feet)		Transect 33-3 (32 feet)		Transect 33-3 (32 feet)		Transect 33-4 (32 feet)		Transect 33-4 (32 feet)	
	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage
Native																
Baccharis pilularis		0.0%		0.0%	11	22.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Salix laevigata	15	30.0%		0.0%		0.0%		0.0%	27	54.0%		0.0%		0.0%		0.0%
Salix lasiolepis	9	18.0%		0.0%		0.0%		0.0%	12	24.0%		0.0%		0.0%		0.0%
Scirpus		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%	24	48.0%		0.0%
Typha		0.0%		0.0%	7	14.0%		0.0%	4	8.0%		0.0%	9	18.0%		0.0%
Non-native																
Avena sp.	4	8.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Bromus diandrus	2	4.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Lepidium		0.0%		0.0%	8	16.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Smilo	3	6.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
ABSOLUTE COVERAGE																
Total Abs. Native Species Coverage		48.0%		0.0%		36.0%		0.0%		86.0%		0.0%		66.0%		0.0%
Total Abs. Non-Native Species Coverage		6.0%		0.0%		16.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Total Absolute Coverage (All)		66.0%		0.0%		52.0%		0.0%		86.0%		0.0%		66.0%		0.0%
CLASS COVERAGE																
Native	20	40.0%		0.0%	11	22.0%		0.0%	32	64.0%		0.0%	31	62.0%		0.0%
Non-Native	3	6.0%		0.0%	1	2.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Both	4	8.0%		0.0%	7	14.0%		0.0%		0.0%		0.0%		0.0%		0.0%
No Plant	5	10.0%		0.0%	13	26.0%		0.0%		0.0%		0.0%	1	2.0%		0.0%
CHECK		64.0%		0.0%		64.0%		0.0%		64.0%		0.0%		64.0%		0.0%
SUMMARY																
Total Native Class Coverage		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Total Non-Native Class Coverage		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Total Unvegetated		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
GROUND COVER																
Bare Soil	1	2.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Leaf Litter	12	24.0%		0.0%	15	30.0%		0.0%	12	24.0%		0.0%	2	4.0%		0.0%
Open Water	19	38.0%		0.0%	17	34.0%		0.0%	20	40.0%		0.0%	30	60.0%		0.0%
CHECK	32	64.0%	0	0.0%	32	64.0%	0	0.0%	32	64.0%	0	0.0%	32	64.0%	0	0.0%

TRANSECT 33 NOT CLEARED AT TIME OF DATA ENTRY- NO POST CLEARANCE DATA

PLANT SPECIES	Pre-clearing		Post-clearing		Pre-clearing		Post-clearing	
	Transect 34-1 (20 feet)		Transect 34-1 (20 feet)		Transect 34-2 (20 feet)		Transect 34-2 (20 feet)	
	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage
Native								
Rorippa nasturtium-aquaticum		0.0%		0.0%	1	2.0%		0.0%
Salix laevigata	8	16.0%	8	16.0%		0.0%		0.0%
Salix lasiolepis	17	34.0%	17	34.0%	20	40.0%	20	40.0%
Typha sp.		0.0%		0.0%	4	8.0%	3	6.0%
Non-native								
Cynodon dactylon		0.0%		0.0%	2	4.0%		0.0%
Cyperus sp.	1	2.0%		0.0%		0.0%		0.0%
Lepidium latifolium	8	16.0%		0.0%	17	34.0%	7	14.0%
Lepidium sp.		0.0%	1	2.0%		0.0%		0.0%
Picris echioides		0.0%		0.0%	1	2.0%		0.0%
Smilo grass		0.0%		0.0%	3	6.0%	3	6.0%
ABSOLUTE COVERAGE								
Total Abs. Native Species Coverage		50.0%		50.0%		50.0%		46.0%
Total Abs. Non-Native Species Coverage		18.0%		2.0%		46.0%		20.0%
Total Absolute Coverage (All)		68.0%		52.0%		96.0%		66.0%
CLASS COVERAGE								
Native	12	24.0%	19	38.0%	1	2.0%	10	20.0%
Non-Native		0.0%		0.0%		0.0%		0.0%
Both	8	16.0%	1	2.0%	19	38.0%	10	20.0%
No Plant		0.0%		0.0%		0.0%		0.0%
CHECK		40.0%		40.0%		40.0%		40.0%
SUMMARY								
Total Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Non-Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Unvegetated		0.0%		0.0%		0.0%		0.0%
GROUND COVER								
Bare Soil	1	2.0%	3	6.0%	1	2.0%		0.0%
Leaf Litter	8	16.0%	4	8.0%	15	30.0%	13	26.0%
Open Water	11	22.0%	13	26.0%	4	8.0%	7	14.0%
CHECK	20	40.0%	20	40.0%	20	40.0%	20	40.0%

PLANT SPECIES	Pre-clearing Transect 35-1 (70 feet)		Post-clearing Transect 35-1 (70 feet)		Pre-clearing Transect 35-2 (70 feet)		Post-clearing Transect 35-2 (70 feet)	
	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage
Native								
Baccharis pilularis		0.0%		0.0%	5	10.0%	5	10.0%
Rorippa nasturtium-aquaticum	1	2.0%		0.0%	1	2.0%		0.0%
Rosa californica		0.0%		0.0%	8	16.0%	4	8.0%
Salix laevigata	12	24.0%		0.0%		0.0%		0.0%
Salix lasiolepis	5	10.0%		0.0%	14	28.0%		0.0%
Typha	26	52.0%	1	2.0%	23	46.0%	4	8.0%
Non-native								
Ailanthus altissima		0.0%		0.0%		0.0%		0.0%
Avena sp.		0.0%		0.0%	2	4.0%		0.0%
Bromus diandrus		0.0%		0.0%		0.0%		0.0%
Bromus madritensis ssp. *rubens*		0.0%		0.0%	2	4.0%		0.0%
Camascysis sp.	2	4.0%		0.0%		0.0%		0.0%
Centaurea melitensis		0.0%		0.0%	10	20.0%	9	18.0%
Lepidium latifolium	28	56.0%	2	4.0%	16	32.0%	4	8.0%
Melilotus albus		0.0%		0.0%	19	38.0%		0.0%
Nicotiana glauca		0.0%		0.0%	2	4.0%		0.0%
NNG		0.0%		0.0%		0.0%	4	8.0%
Picris		0.0%		0.0%	7	14.0%		0.0%
Polypogon monspeliensis		0.0%		0.0%	4	8.0%		0.0%
Smilo grass	28	56.0%		0.0%	2	4.0%		0.0%
Sonchus oleraceus		0.0%		0.0%	6	12.0%		0.0%
Veronica		0.0%		0.0%	2	4.0%		0.0%
Willow herb	1	2.0%		0.0%		0.0%		0.0%
ABSOLUTE COVERAGE								
Total Abs. Native Species Coverage		88.0%		2.0%		102.0%		26.0%
Total Abs. Non-Native Species Coverage		114.0%		4.0%		116.0%		16.0%
Total Absolute Coverage (All)		206.0%		6.0%		246.0%		60.0%
CLASS COVERAGE								
Native	18	36.0%	1	2.0%	35	70.0%	14	28.0%
Non-Native	14	28.0%	2	4.0%	20	40.0%	16	32.0%
Both	15	30.0%		0.0%	15	30.0%		0.0%
No Plant	23	46.0%	67	134.0%		0.0%	40	80.0%
CHECK		140.0%		140.0%		140.0%		140.0%
SUMMARY								
Total Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Non-Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Unvegetated		0.0%		0.0%		0.0%		0.0%
GROUND COVER								
Bare Soil		0.0%	6	12.0%	2	4.0%	5	10.0%
Rock/Cobble	5	10.0%	6	12.0%		0.0%		0.0%
Leaf Litter	15	30.0%	2	4.0%	39	78.0%	32	64.0%
Coarse Woody Debris		0.0%		0.0%	6	12.0%	7	14.0%
Open Water	17	34.0%	18	36.0%	15	30.0%	11	22.0%
Riprap grouted	33	66.0%	38	76.0%	8	16.0%	15	30.0%
CHECK	70	140.0%	70	140.0%	70	140.0%	70	140.0%

PLANT SPECIES	Pre-clearing		Post-clearing		Pre-clearing		Post-clearing	
	Transect 36-1 (65 feet)		Transect 36-1 (65 feet)		Transect 36-2 (65 feet)		Transect 36-2 (65 feet)	
	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage
Native								
Artemisia douglasiana	1	2.0%		0.0%		0.0%		0.0%
Salix laevigata		0.0%		0.0%	20	40.0%	20	40.0%
Salix lasiolepis	65	130.0%	65	130.0%	36	72.0%	45	90.0%
Non-native								
Bromus diandrus		0.0%		0.0%	6	12.0%		0.0%
Bromus madritensis ssp. *rubens*		0.0%		0.0%	1	2.0%		0.0%
Juglans (nn species- european)	13	26.0%	8	16.0%		0.0%	1	2.0%
Smilo grass	3	6.0%		0.0%	10	20.0%		0.0%
Turfgrass fescue		0.0%		0.0%		0.0%	1	2.0%
Vinca (nn)	13	26.0%		0.0%		0.0%		0.0%
ABSOLUTE COVERAGE								
Total Abs. Native Species Coverage		132.0%		130.0%		112.0%		130.0%
Total Abs. Non-Native Species Coverage		58.0%		16.0%		20.0%		4.0%
Total Absolute Coverage (All)		190.0%		146.0%		146.0%		134.0%
CLASS COVERAGE								
Native	36	72.0%	57	114.0%	47	94.0%	63	126.0%
Non-Native		0.0%		0.0%	7	14.0%		0.0%
Both	29	58.0%	8	16.0%	9	18.0%	2	4.0%
No Plant		0.0%		0.0%	2	4.0%		0.0%
CHECK		130.0%		130.0%		130.0%		130.0%
SUMMARY								
Total Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Non-Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Unvegetated		0.0%		0.0%		0.0%		0.0%
GROUND COVER								
Bare Soil		0.0%	3	6.0%	11	22.0%	3	6.0%
Leaf Litter	62	124.0%	54	108.0%	52	104.0%	62	124.0%
Coarse Woody Debris (root)	3	6.0%		0.0%		0.0%		0.0%
Coarse Woody Debris		0.0%		0.0%	1	2.0%		0.0%
Asphalt		0.0%		0.0%	1	2.0%		0.0%
CHECK	65	130.0%	57	114.0%	65	130.0%	65	130.0%

PLANT SPECIES	Pre-clearing		Post-clearing		Pre-clearing		Post-clearing		Pre-clearing		Post-clearing	
	Transect 37-1 (100 feet)		Transect 37-1 (100 feet)		Transect 37-2 (100 feet)		Transect 37-2 (100 feet)		Transect 37-3 (100 feet)		Transect 37-3 (100 feet)	
	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage
Native												
Cyperus (native)	10	20.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Leymus triticoides	23	46.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Lonicera subspicata		0.0%		0.0%		0.0%		0.0%	2	4.0%		0.0%
Platanus racemosa		0.0%		0.0%		0.0%		0.0%	10	20.0%		0.0%
Quercus agrifolia		0.0%		0.0%		0.0%	8	16.0%		0.0%		0.0%
Quercus lobata		0.0%		0.0%		0.0%		0.0%	43	86.0%		0.0%
Rorippa nasturtium-aquaticum	5	10.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Salix laevigata	35	70.0%		0.0%	51	102.0%	38	76.0%	50	100.0%		0.0%
Salix lasiolepis	22	44.0%	25	50.0%	8	16.0%		0.0%	14	28.0%		0.0%
Salix lasiolepis x w/ed		0.0%		0.0%	19	38.0%		0.0%		0.0%		0.0%
Typha sp.		0.0%		0.0%	7	14.0%		0.0%		0.0%		0.0%
Non-native												
Ambrosia psilostachya		0.0%		0.0%		0.0%		0.0%	5	10.0%		0.0%
Avena sp.	4	8.0%		0.0%	1	2.0%		0.0%	1	2.0%		0.0%
Bromus diandrus	16	32.0%		0.0%	15	30.0%		0.0%	35	70.0%		0.0%
Bromus madritensis ssp. *rubens*	1	2.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Carduus pycnocephalus	1	2.0%		0.0%		0.0%		0.0%	3	6.0%		0.0%
Fig- edible		0.0%		0.0%		0.0%		0.0%	15	30.0%		0.0%
Lema	9	18.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Lepidium latifolium	1	2.0%		0.0%	13	26.0%		0.0%		0.0%		0.0%
NNG		0.0%	4	8.0%		0.0%		0.0%		0.0%		0.0%
Smilo grass	1	2.0%		0.0%	1	2.0%	1	2.0%	24	48.0%		0.0%
ABSOLUTE COVERAGE												
Total Abs. Native Species Coverage		190.0%		50.0%		170.0%		92.0%		238.0%		0.0%
Total Abs. Non-Native Species Coverage		22.0%		8.0%		28.0%		2.0%		78.0%		0.0%
Total Absolute Coverage (All)		256.0%		58.0%		230.0%		94.0%		404.0%		0.0%
CLASS COVERAGE												
Native	57	114.0%	21	42.0%	53	106.0%	46	92.0%	40	80.0%		0.0%
Non-Native	3	6.0%		0.0%		0.0%	1	2.0%	5	10.0%		0.0%
Both	24	48.0%	4	8.0%	29	58.0%		0.0%	52	104.0%		0.0%
No Plant	16	32.0%	75	150.0%	18	36.0%	53	106.0%	3	6.0%		0.0%
CHECK		200.0%		200.0%		200.0%		200.0%		200.0%		0.0%
SUMMARY												
Total Native Class Coverage		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Total Non-Native Class Coverage		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
Total Unvegetated		0.0%		0.0%		0.0%		0.0%		0.0%		0.0%
GROUND COVER												
Bare Soil	6	12.0%	23	46.0%	2	4.0%	22	44.0%	1	2.0%		0.0%
Rock/Cobble		0.0%		0.0%	1	2.0%		0.0%	2	4.0%		0.0%
Leaf Litter	60	120.0%	25	50.0%	45	90.0%	42	84.0%	76	152.0%		0.0%
Coarse Woody Debris	3	6.0%		0.0%	11	22.0%	3	6.0%	4	8.0%		0.0%
Open Water	24	48.0%	47	94.0%	4	8.0%	12	24.0%	16	32.0%		0.0%
Riprap grouted	7	14.0%	5	10.0%	37	74.0%	21	42.0%		0.0%		0.0%
Wattle		0.0%		0.0%		0.0%		0.0%	1	2.0%		0.0%
CHECK	100	200.0%	100	200.0%	100	200.0%	100	200.0%	100	200.0%	0	0.0%

37-3 Not cleared at time of data entry

PLANT SPECIES	Pre-clearing Transect 38-1 (50 feet)		Post-clearing Transect 38-1 (50 feet)		Pre-clearing Transect 38-2 (50 feet)		Post-clearing Transect 38-2 (50 feet)	
	Hits	Coverage	Hits	Coverage	Hits	Coverage	Hits	Coverage
Native								
Distichlis spicata	3	6.0%		0.0%		0.0%		0.0%
Heliotropium curassavicum	4	8.0%		0.0%		0.0%		0.0%
NG		0.0%		0.0%	0	0.0%	7	14.0%
Rumex salicifolius		0.0%		0.0%	1	2.0%		0.0%
Salix laevigata		0.0%		0.0%	36	72.0%	12	24.0%
Salix lasiolepis		0.0%		0.0%	13	26.0%	31	62.0%
Stachys albens	4	8.0%		0.0%		0.0%		0.0%
Typha latifolia(?)	26	52.0%		0.0%		0.0%		0.0%
Typha sp.	26	52.0%	6	12.0%	3	6.0%		0.0%
Non-native								
Ambrosia psilostachya	5	10.0%		0.0%		0.0%		0.0%
Artemisia douglasiana		0.0%		0.0%	3	6.0%	2	4.0%
Avena sp.		0.0%		0.0%	2	4.0%		0.0%
Cheno triang (?)	7	14.0%		0.0%	1	2.0%		0.0%
Echinochloa		0.0%		0.0%	1	2.0%		0.0%
Foeniculum vulgare	2	4.0%		0.0%		0.0%		0.0%
Lepidium latifolium	5	10.0%	4	8.0%	9	18.0%	4	8.0%
Lolium perenne	3	6.0%		0.0%		0.0%		0.0%
NNG		0.0%	2	4.0%		0.0%	4	8.0%
Polypogon monspeliensis	2	4.0%		0.0%		0.0%		0.0%
Smilo grass		0.0%		0.0%	9	18.0%	4	8.0%
Spurge	1	2.0%		0.0%		0.0%		0.0%
ABSOLUTE COVERAGE								
Total Abs. Native Species Coverage		126.0%		12.0%		106.0%		100.0%
Total Abs. Non-Native Species Coverage		22.0%		12.0%		36.0%		24.0%
Total Absolute Coverage (All)		176.0%		24.0%		156.0%		128.0%
CLASS COVERAGE								
Native	21	42.0%	6	12.0%	28	56.0%	26	52.0%
Non-Native	5	10.0%	6	12.0%		0.0%		0.0%
Both	14	28.0%		0.0%	22	44.0%	19	38.0%
No Plant	10	20.0%	38	76.0%		0.0%	5	10.0%
CHECK		100.0%		100.0%		100.0%		100.0%
SUMMARY								
Total Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Non-Native Class Coverage		0.0%		0.0%		0.0%		0.0%
Total Unvegetated		0.0%		0.0%		0.0%		0.0%
GROUND COVER								
Bare Soil		0.0%	1	2.0%		0.0%		0.0%
Leaf Litter	15	30.0%	15	30.0%	32	64.0%	32	64.0%
Open Water	22	44.0%	21	42.0%	18	36.0%	18	36.0%
Riprap - grouted		0.0%	13	26.0%		0.0%		0.0%
Riprap	13	26.0%		0.0%		0.0%		0.0%
CHECK	50	100.0%	50	100.0%	50	100.0%	50	100.0%

APPENDIX E

CRAM DATASHEETS

TABLE E-1
SUMMARY OF CRAM SCORES

	Reach No.	26	26	26 avg	27	28	29	32	32	32 avg	33	34	35	36	37	38
	Wetland Class	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**	**riverine**
	Wetland Subclass	**confined**	**confined**	**confined**	**confined**	**confined**	**confined**	**confined**	**confined**	**confined**	**confined**	**confined**	**confined**	**confined**	**non-confined**	**non-confined**
Attribute	**Metric**															
Buffer and Landscape Context	Aquatic Area Abundance	D (3)	D (3)		A (12)	A (12)	A (12)	A (12)	A (12)		B (9)	D (3)	A (12)	D (3)	D (3)	D (3)
	Buffer Condition (sub-metrics below)															
	Percentage of Assessment Area Perimeter with Buffer	A (12)	B (9)		A (12)	B (9)	B (9)	C (6)	D (3)		D (3)	A (12)	D (3)	D (3)	A (12)	A (12)
	Average Buffer Width	D (3)	D (3)		D (3)	D (3)	D (3)	A (12)	D (3)		D (3)	D (3)	D (3)	D (3)	B (9)	A (12)
	Buffer Condition	B (9)	C (6)		C (6)	C (6)	D (3)	C (6)	C (6)		D (3)	A (12)	C (6)	D (3)	B (9)	B (9)
	Attribute Score	**43.1**	**35.8**	**39.4**	**75.0**	**73.3**	**66.5**	**79.7**	**67.7**	**73.7**	**50.0**	**47.9**	**67.7**	**25.0**	**52.8**	**55.8**
Hydrology	Water Source	C (6)	C (6)		C (6)	C (6)	B (9)	C (6)	C (6)		C (6)	C (6)	C (6)	B (9)	C (6)	C (6)
	Hydroperiod/Channel Stability	B (9)	B (9)		B (9)	B (9)	D (3)	B (9)	B (9)		C (6)	A (12)	D (3)	B (9)	B (9)	A (12)
	Hydrologic Connectivity	A (12)	A (12)		B (9)	C (6)	D (3)	C (6)	C (6)		C (6)	A (12)	D (3)	A (12)	A (12)	A (12)
	Attribute Score	**75.0**	**75.0**	**75.0**	**66.7**	**58.3**	**41.7**	**58.3**	**58.3**	**58.3**	**50.0**	**83.3**	**33.3**	**83.3**	**75.0**	**83.3**
Physical Structure	Structural Patch Richness	D (3)	D (3)		D (3)	C (6)	D (3)	D (3)	D (3)		D (3)	D (3)	D (3)	D (3)	C (6)	D (3)
	Topographic Complexity	C (6)	C (6)		B (9)	A (12)	D (3)	C (6)	C (6)		D (3)	B (9)	C (6)	B (9)	B (9)	C (6)
	Attribute Score	**37.5**	**37.5**	**37.5**	**50.0**	**75.0**	**25.0**	**37.5**	**37.5**	**37.5**	**25.0**	**50.0**	**37.5**	**50.0**	**62.5**	**37.5**
Biotic Structure	Plant Community (sub-metrics below)															
	Number of Plant Layers	A (12)	A (12)		B (9)	B (9)	C (6)	A (12)	B (9)		A (12)	A (12)	A (12)	A (12)	A (12)	A (12)
	Number of Co-dominant Species	B (9)	A (12)		A (12)	C (6)	D (3)	A (12)	C (6)		C (6)	C (6)	C (6)	C (6)	B (9)	C (6)
	Percent of Co-dominant Species Known to be Invasive	D (3)	D (3)		B (9)	A (12)	B (9)	C (6)	C (6)		A (12)	C (6)	B (9)	C (6)	C (6)	C (6)
	Horizontal Interspersion/Plant Zonation	C (6)	C (6)		D (3)	C (6)	D (3)	D (3)	D (3)		D (3)	D (3)	D (3)	C (6)	C (6)	C (6)
	Vertical Biotic Structure	C (6)	C (6)		D (3)	B (9)	D (3)	D (3)	D (3)		D (3)	B (9)	D (3)	B (9)	B (9)	B (9)
	Attribute Score	**54.2**	**58.3**	**56.3**	**44.4**	**66.7**	**33.3**	**44.4**	**36.1**	**40.3**	**44.4**	**55.6**	**41.7**	**63.9**	**66.7**	**63.9**
	Overall AA Score	**52.4**	**51.6**	**52.1**	**59.0**	**68.3**	**41.6**	**55.0**	**49.9**	**52.5**	**42.4**	**59.2**	**45.0**	**55.6**	**64.2**	**60.1**

APPENDIX B

HYDRAULIC ANALYSIS
TECHNICAL ASSESSMENT REPORT

Engineered Earthen-Bottom Flood Control Channels, Malibu Creek and Dominguez Channel Watersheds Hydraulic Analysis and Technical Assessment Report

March 2016

Prepared for:

Los Angeles County
Flood Control District

Prepared by:

WEST Consultants, Inc.

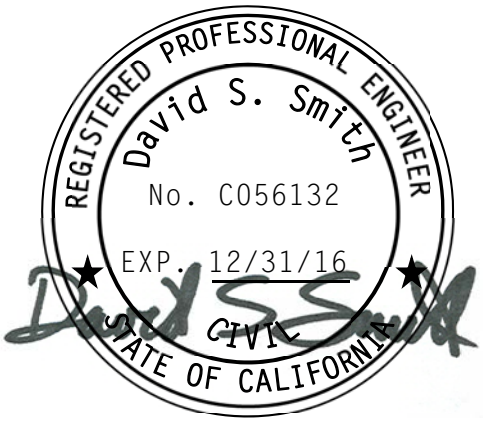
Engineered Earthen-Bottom Flood Control Channels, Malibu Creek and Dominguez Channel Watersheds Hydraulic Analysis and Technical Assessment Report

March 2016

Prepared for:

Los Angeles County Flood Control District
Department of Public Works
900 South Fremont Ave.
Alhambra, CA 91803

Prepared by:



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1 INTRODUCTION

The Los Angeles County Flood Control District (LACFCD) operates and maintains numerous engineered soft-bottom flood control channels within the County of Los Angeles (County). These channels convey storm flows from the canyons and surrounding areas. The LACFCD conducts annual maintenance on these facilities to protect life and property from potential flooding, fire hazards, control vector nuisance issues, and for the facilities to efficiently and effectively function.

On February 4, 2010, the Los Angeles Regional Water Quality Control Board (Regional Board) adopted Waste Discharge Requirements (WDR) for the maintenance of soft-bottomed flood control channels (SBC), Order No. R4-2010-0021. The adopted WDR required a Feasibility Study (FS) to be conducted within six years for all the earth-bottomed channels, authorized in the WDR, in each watershed within Los Angeles County. The FS included a hydraulic analysis for the engineered earthen-bottom flood control channels located within the Malibu Creek and Dominguez Channel Watersheds. The hydraulic analysis will determine the existing flood control capacity of the SBC reaches and whether the potential may exist for native vegetation to remain within the soft-bottom portion of the channel or if additional hydraulic capacity is needed. The WDR was extended on February 12, 2015 (Order No. R4-2015-0032).

This report presents the results of a technical assessment of the hydraulic conditions for 10 earth-bottom channel reaches included in the WDR for the Malibu Creek and Dominguez Channel Watersheds. This report was prepared in conformance with Section 4.1 of the Study Work Plan for Engineered Earthen-Bottom Flood Control Channels Located within the Malibu Creek and Dominguez Channel Watersheds, April 2014.

Detailed reach characteristics and hydraulic modeling assumptions are presented in the respective sections for the reaches examined in this report. The report addresses capacity requirements for flood control and analyzes, from a hydraulic perspective, reaches with the potential for restoration or addition of native vegetation or where existing vegetation must be removed. Reaches were identified where vegetation can remain in the channel (or native vegetation can be reintroduced).

1.1 STUDY REACHES

The Malibu Creek Watershed covers an area of approximately 109 square miles and extends from the Santa Monica Mountains and Simi Hills to Santa Monica Bay in the Pacific Ocean. Several creeks and lakes located in the upper portions of the watershed drain to Malibu Creek and ultimately into Malibu Lagoon, a 13-acre tidal lagoon in Santa Monica Bay.

The Dominguez Channel Watershed covers an area of approximately 133 square miles and includes the Los Angeles and Long Beach Harbors. The watershed includes Wilmington Drain, which empties into Machado Lake, and other drainages that empty directly into Los Angeles and Long Beach Harbors. The Dominquez Channel itself is 15.7 miles long, drains to Los Angeles Harbor and, after passing beneath Vermont Avenue, is tidally influenced.

Within the Malibu Creek and Dominguez Channel Watersheds, there are 11 defined soft-bottom reaches in the Regional Board's WDR. There are 10 channel reaches (Wilmington Drain was excluded) varying in length from 56 feet to 2,255 feet. Locations of the 10 soft-bottom reaches are presented in Figure 1-1. Reach length and surface area are summarized in Table 1-1.

A technical assessment of the hydraulic conditions for Reach No. 27 - Wilmington Drain was not performed since there is currently a stream restoration project in progress with the City of Los Angeles. A hydraulic analysis of Wilmington Drain will be completed for the final project condition after mitigation and plantings have occurred. Maintenance responsibilities will also need to be determined between the LACFCD and the City of Los Angeles.

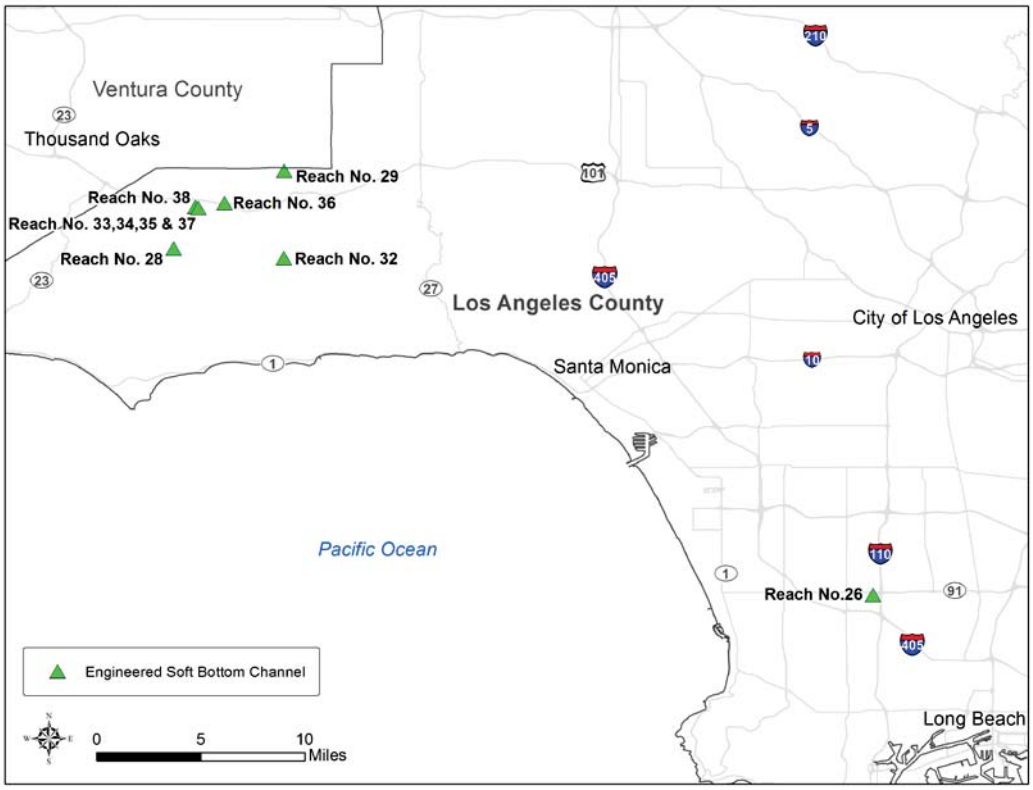


Figure 1-1. Project Location Map

Table 1-1. Malibu Creek and Dominguez Channel Watersheds SBC List

Reach No.	Reach Name	Reach Length (ft)	Surface Area (acres)	Watershed
26	Project 74	900	0.35	Dominguez
28	Triunfo Creek	474	2.30	Malibu Creek
29	Las Virgenes Creek	371	1.16	Malibu Creek
32	Stokes Canyon Channel, tributary to Las Virgenes Creek	2,255	1.40	Malibu Creek

Reach No.	Reach Name	Reach Length (ft)	Surface Area (acres)	Watershed
33	Medea Creek (PD T1378)	946	0.69	Malibu Creek
34	Medea Creek (PD T1005) Main Channel Outlet	405	0.19	Malibu Creek
35	Medea Creek, under Route 101	85	0.14	Malibu Creek
36	Cheseboro Main Channel Inlet, tributary to Medea Creek	56	0.08	Malibu Creek
37	Medea Creek, downstream of Agoura Road	170	0.47	Malibu Creek
38	Lindero Creek	187	0.19	Malibu Creek

1.2 REPORT ORGANIZATION

This report is organized into individual sections identifying and describing each SBC analyzed for the Malibu Creek and Dominguez Channel Watersheds. The sections present the reaches in the same order as listed in Table 1-1. In general, each section describes one soft-bottom reach; however, reaches 33, 34, 35 and 37 are summarized in one section, since they are modeled hydraulically as a single reach.

Supplementary information is provided in the Appendices. Appendices A – G include annotated photographs of each reach showing vegetation levels observed in the field. Appendix H includes the results of the Manning's roughness values calculations for the reaches. Appendix I includes digital copies of the HEC-RAS input files.

1.3 HYDROLOGIC DATA

Design flow rates were used for the hydraulic analysis of the soft-bottom channel reaches. The flow data used in this study were obtained from channel design plans. A discussion of the source of the flow data is provided in each reach's section.

1.4 HYDRAULIC MODELS

Hydraulic models were developed for the 10 SBC reaches using the United States Army Corps of Engineers (USACE) Hydrologic Engineering Center's River Analysis System (HEC-RAS) computer program, Version 4.1. Several iterations of the models were conducted for each channel reach.

Initially, a model of the existing conditions was developed. The model of the existing conditions includes design flow rates and existing vegetation levels in the channel reach.

For the reaches with insufficient capacity for existing vegetation levels, a second model was developed to determine whether the reach might have excess capacity for a "design conditions" (or estimated design conditions) scenario. The design conditions scenario is based on design flow rates and design roughness conditions. If no design data were

available, the estimated design condition was assumed to have little or no vegetation within the channel. If there was no excess capacity in the design conditions model reach of interest, no further modeling was performed. However, if the model showed excess capacity under the design conditions scenario, a model was developed with added native vegetation in a quantity that does not exceed the design channel capacity. The type and species of the additional vegetation was determined in consultation with BonTerra Psomas, the LACFCD biological consultant.

For reaches that were found to have sufficient channel capacity under existing vegetation levels, a model was developed to determine the amount and type of additional vegetation that might be allowed to remain in the channel reach without affecting the design channel capacity. Selection of the vegetation was accomplished with recommendations from BonTerra Psomas.

The hydraulic models follow standard orientation conventions used by the USACE. Cross sections defining channel geometry are described by station and elevation data from left to right, looking in the downstream direction. River stationing begins downstream and increases upstream. Input and output files for the hydraulic models discussed in this report are provided in Appendix I.

Field Investigations

Field investigations were conducted for all 10 SBC reaches to verify channel geometry, obstructions, structures, and vegetation. The field investigations were completed by WEST on February 16 – 27, 2015 and included cross section surveys. Survey notes and photographs of all reaches were collected.

Geometric Data and Cross-Sections

The hydraulic models were developed by obtaining topographic survey data for each reach, extending both upstream and downstream of the reach of interest to avoid influence of the user defined boundary conditions on the results. The survey data were then processed using GIS tools and imported into HEC-RAS to develop the hydraulic models. Four of the reaches of interest are within Medea Creek and, as such, they were all included in the same model. The vertical datum of the models is NAVD 88.

As-built plans and field measurements were also used to reproduce channel features such as bridges, culverts, and drop structures. Cross-section cut lines were drawn using HEC-GeoRAS at all survey cross sections (approximately 120 to 150 foot spacing). All cross sections were surveyed normal to the main channel flow path.

Manning's Roughness

Manning's roughness was determined from field observations, published values of Manning's roughness and engineering judgement. The references used in estimating the Manning's hydraulic roughness coefficients were *"Open-Channel Hydraulics"* by Ven T. Chow and *"Guide for Selecting Manning's Roughness Coefficients for Natural Channels and Flood Plains"*, United States Geological Survey Water-supply Paper 2339. The earth-

bottom channel roughness values were estimated using the following formula, developed by Cowan (1956):

$$n = (n_b + n_1 + n_2 + n_3 + n_4)m$$

where:

n_b = a base value of n for a straight, uniform, smooth channel in natural materials,

n_1 = a correction factor for the effect of surface irregularities,

n_2 = a value for variation in the shape and size of the channel cross section,

n_3 = a value for obstructions,

n_4 = a value for vegetation and flow conditions, and

m = a correction factor for meandering of the channel.

The Manning's roughness values were estimated on a reach by reach basis. Depending on the native bed material, Figure 1-2 was used to determine the base roughness value, n_b.

Bed material	Median size of bed material (in millimeters)	Base *n* value	
		Straight uniform channel[1]	Smooth channel[2]
Sand channels			
Sand[3]	0.2	0.012	—
	.3	.017	—
	.4	.020	—
	.5	.022	—
	.6	.023	—
	.8	.025	—
	1.0	.026	—
Stable channels and flood plains			
Concrete	—	0.012–0.018	0.011
Rock cut	—	—	.025
Firm soil	—	0.025–0.032	.020
Coarse sand	1–2	0.026–0.035	—
Fine gravel	—	—	.024
Gravel	2–64	0.028–0.035	—
Coarse gravel	—	—	.026
Cobble	64–256	0.030–0.050	—
Boulder	>256	0.040–0.070	—

[1] Benson and Dalrymple (1967).
[2] For indicated material; Chow (1959).
[3] Only for upper regime flow where grain roughness is predominant.

Figure 1-2. Base Roughness Value (USGS Water-Supply Paper 2339)

The estimated Manning's roughness values are summarized for each reach in Appendix H.

Expansion and Contraction Coefficients

The recommended contraction and expansion coefficients of 0.1 and 0.3 were used to compute energy losses between cross sections. Since changes in the shape of river cross sections are more abrupt upstream and downstream of bridges, contraction and expansion coefficients were adjusted to 0.3 and 0.5 for the two cross sections upstream of the bridge and one cross section downstream of the bridge.

Boundary Conditions and Flow Regime

The models were run assuming steady state conditions and a mixed flow regime. The mixed flow regime option was chosen to allow subcritical and supercritical flow regimes. Normal depth boundary conditions were applied at the upstream and downstream ends of each model except for Project 74, which has a known design water surface elevation at the confluence with Dominguez Channel. The upstream and downstream limits of each study reach were extended several hundred feet beyond the maintenance limits such that any user-defined boundary condition would not affect the results within the study reach.

Sensitivity Analysis

The existing conditions model was also evaluated for sensitivity to the choice of Manning's *n* value. The evaluation consisted of developing a model identical to existing conditions but with Manning's *n* values increased by 20% in all locations except concrete or asphalt pavement cover. The higher Manning's n models were run and results compared with the existing conditions model. A similar process was again conducted with a decrease of 20% in the Manning's *n* value. With one exception, soft-bottom reach capacity results do not change within the evaluated range of Manning's *n* value. The exception is Stokes Canyon Channel which is described in Section 5 below.

1.5 CHANGES IN STREAM FLOW

Condition 21 of the 2015 WDR requires that the hydraulic analysis discuss expected changes in stream flow in response to requirements of the Los Angeles County Municipal Separate Storm Sewer System (MS4) NPDES Permit, Standard Urban Stormwater Mitigation Plans (SUSMPs), Total Maximum Daily Loads (TMDLs) and other pertinent local plans including, but not limited to the Integrated Regional Water Management Plan (IRWMP) (including implementation of, and plans for, increased stormwater infiltration), the City of Los Angeles' Integrated Resources Plan, the relevant watershed master plan, and the LACFCD's Drought Management Plan.

While such infiltration requirements are expected to be effective in reducing stream flows during smaller storm events, which may potentially occur multiple times during a single year, the purpose of such requirements is to improve water quality and conserve water—not to significantly reduce the risk of flooding during major storm events. Flood control channels are typically designed to handle much higher stream flows which occur during large storm events. Such storm events (Flood Control Storms) will produce large volumes of runoff, quickly overwhelming water quality infiltration facilities and rendering them

unable to effectively reduce flow rates during the most intense part of a storm. The Los Angeles County Flood Control District (LACFCD) created Figure 1-3 (LACFCD 2013), comparing a typical Flood Control Storm (7 inches per 24-hour period) and a storm for which low impact development (LID) structures are designed (.75 inches per 24-hour period) (LID Storm).

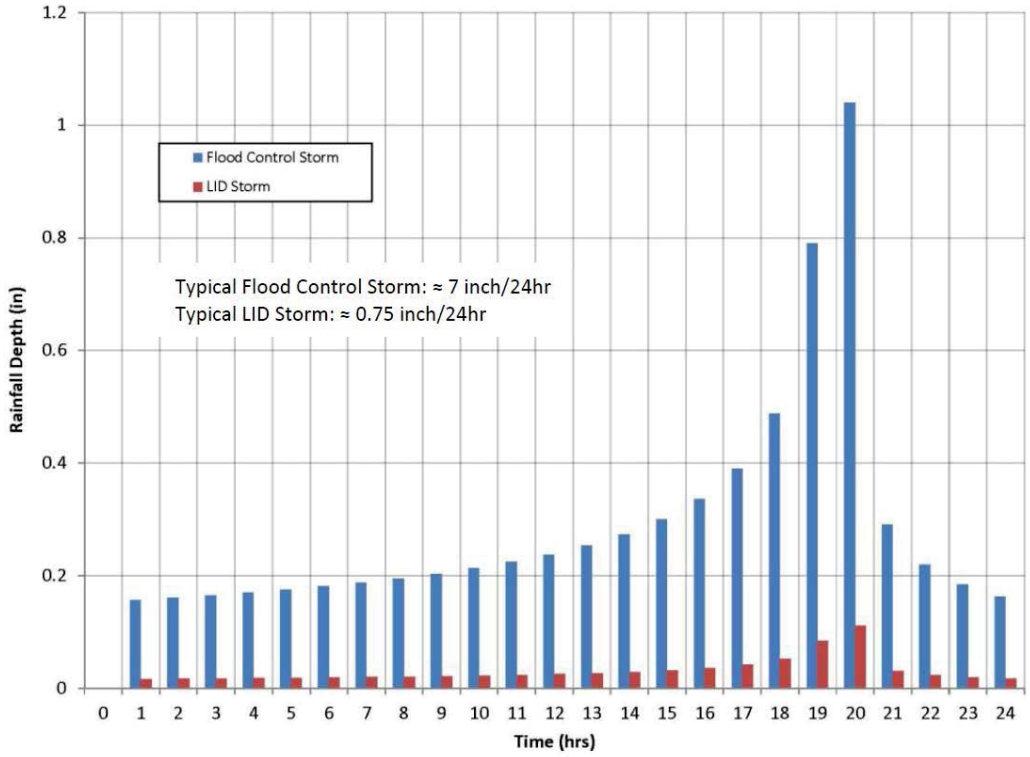


Figure 1-3. Typical Flood Control Storm vs. LID Storm (after LACFCD 2013)

To assess the impact of the infiltration requirements set forth in Condition 21, an example watershed was modeled by LACFCD assuming that the entire surface of the watershed was designed to capture flows generated during the 85th percentile storm, which is the standard LID requirement (and which is contained in the current Los Angeles County MS4 permit). This assumption actually overestimates the impact of the infiltration requirements required to be assessed in the Feasibility Study, since those requirements do not apply to entire watersheds and are being implemented over multiple year time horizons. The example watershed further assumed that the infiltration infrastructure was not filled from previous storm events, which would reduce its effectiveness in handling new storm flows.

When these assumptions were applied in the example watershed, the results showed that the volume of only the first 4.5 hours of a Flood Control Storm hydrograph would be captured in the LID/infiltration infrastructure (the duration of a Flood Control Storm is 24 hours) (LACFCD 2013). After that point, any remaining volume would not infiltrate and would have to be contained in the flood control channels, as presented in Figure 1-4. Thus, while LID/infiltration facilities will reduce storm flows during typical (up to the 85th percentile) storm events, flows from the major storms for which the flood control

channels were designed, including the soft-bottom reaches, will not be affected. Therefore, the presence of LID/infiltration infrastructure would not affect expected stream flow during major storms (LACFCD 2013).

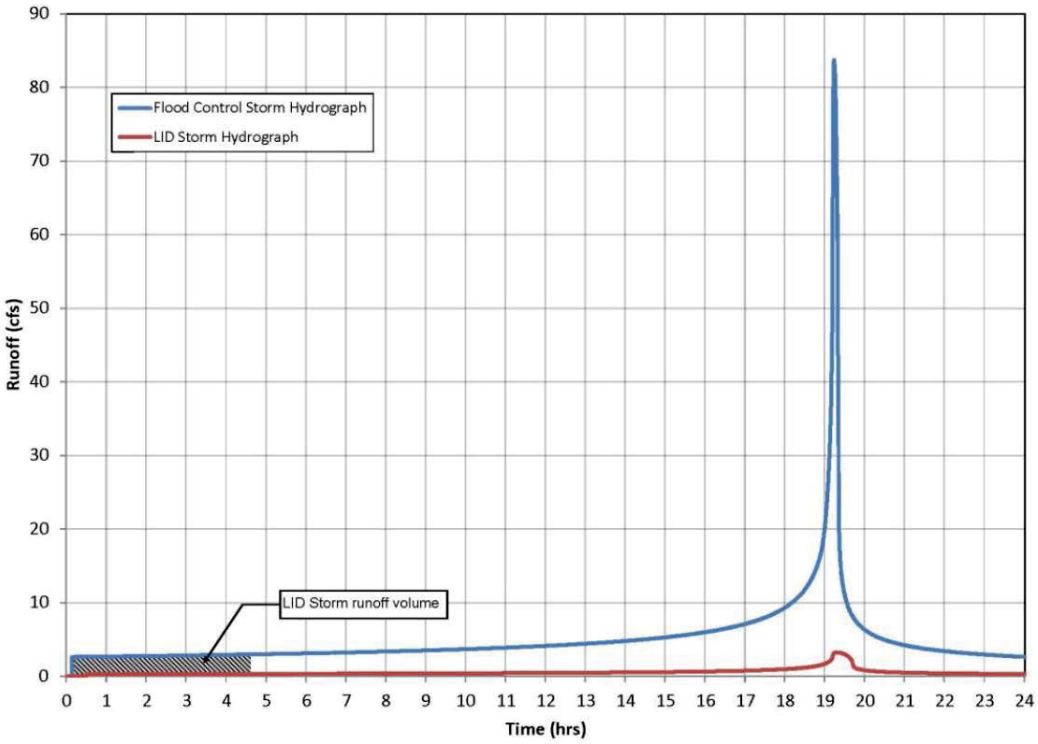


Figure 1-4. Example Watershed Runoff Peaks and Volume (after LACFCD 2013)

1.6 SUMMARY OF RESULTS

The 10 soft-bottom reaches were analyzed assuming existing vegetation conditions. Reach freeboard requirements were obtained from the LACFCD Hydraulic Design Manual dated March 1982.

The soft-bottom reaches evaluated in this study were not sensitive to the selection of Manning's *n* values, with one exception in Stokes Canyon Channel. When evaluated using a 20 percent lower Manning's *n* value, the decrease in water surface elevation results in additional capacity in Reach No. 32. However, a lower Manning's *n* value is unlikely due to expected re-growth of recently cut channel reeds.

The channel capacity analysis indicates that soft-bottom Reach Nos. 26, 28, 33, 34, 36, 37, and 38 have insufficient capacity due to a combination of vegetation and hydraulic controls. The study reaches were then modeled assuming the "design" channel condition, to determine whether any excess capacity might exist if the existing vegetation was cleared. The model results showed that none of these reaches have excess capacity in the clear condition. Therefore, no additional vegetation can be allowed in these reaches.

Under the existing vegetation condition, soft-bottom Reach Nos. 29, 32, and 35 were found to have sufficient capacity. These reaches were then modeled to represent the vegetation recommendations proposed by BonTerra Psomas. Table 1-2 summarizes the hydraulic modeling results for all the soft-bottom reaches for the different scenarios described above.

Table 1-2. Malibu Creek and Dominguez Channel Watersheds SBC Modeling Results

Reach No.	Reach Name	Excess Capacity Determination			
		Existing Condition	Existing Condition Sensitivity Results Affect Outcome?	Design Condition	Recommended Additional Vegetation
26	Project 74	No	No	No	No
28	Triunfo Creek	No	No	No	No
29	Las Virgenes Creek	Yes	No	Yes	Yes
32	Stokes Canyon Channel,	Yes	Yes(1)	Yes	Yes
33	Medea Creek (PD T1378)	Yes(2)	No	Yes(2)	No
34(3)	Medea Creek (PD T1005) Main Channel Outlet	No	No	No	No
35	Medea Creek, under Route 101	Yes	No	Yes	No(4)
36	Cheseboro Main Channel Inlet	No	No	No	No
37	Medea Creek, d/s of Agoura Road	No	No	No	No
38	Lindero Creek	No	No	No	No

Notes: (1) Reach No. 32 lower Manning's *n* indicates additional potential existing capacity towards the downstream end. Higher Manning's *n* indicates less capacity near the private bridge. These results demonstrate the likelihood of hydraulic control in addition to vegetation in the reach.
(2) Reach No. 33 excess capacity available downstream of Thousand Oaks Blvd. Bridge only;
(3) Reach No. 34 will no longer be maintained by LACFCD;
(4) Reach No. 35 had vegetation previously removed for bridge repair; no vegetation has established itself under the bridge, and with homeless camping under the bridge, it may not be very suitable for re-planting.

2 REACH NO. 26 – PROJECT 74 (DOMINGUEZ CHANNEL)

2.1 GENERAL DESCRIPTION

The Dominguez Channel is 15.7 miles long, draining approximately 43,400 acres of the Dominguez Channel Watershed into the Los Angeles Harbor in the east basin. Project 74 drains into Dominguez Channel and contains soft-bottom Reach No. 26. The upper limit of the soft-bottom reach of interest is about 500 feet upstream of Artesia Boulevard. The lower limit is about 400 feet downstream of Artesia Blvd, with a total reach length of 900 feet. The study reach is illustrated by the red line in Figure 2-1 (the blue line depicts the rest of the modeled reach).

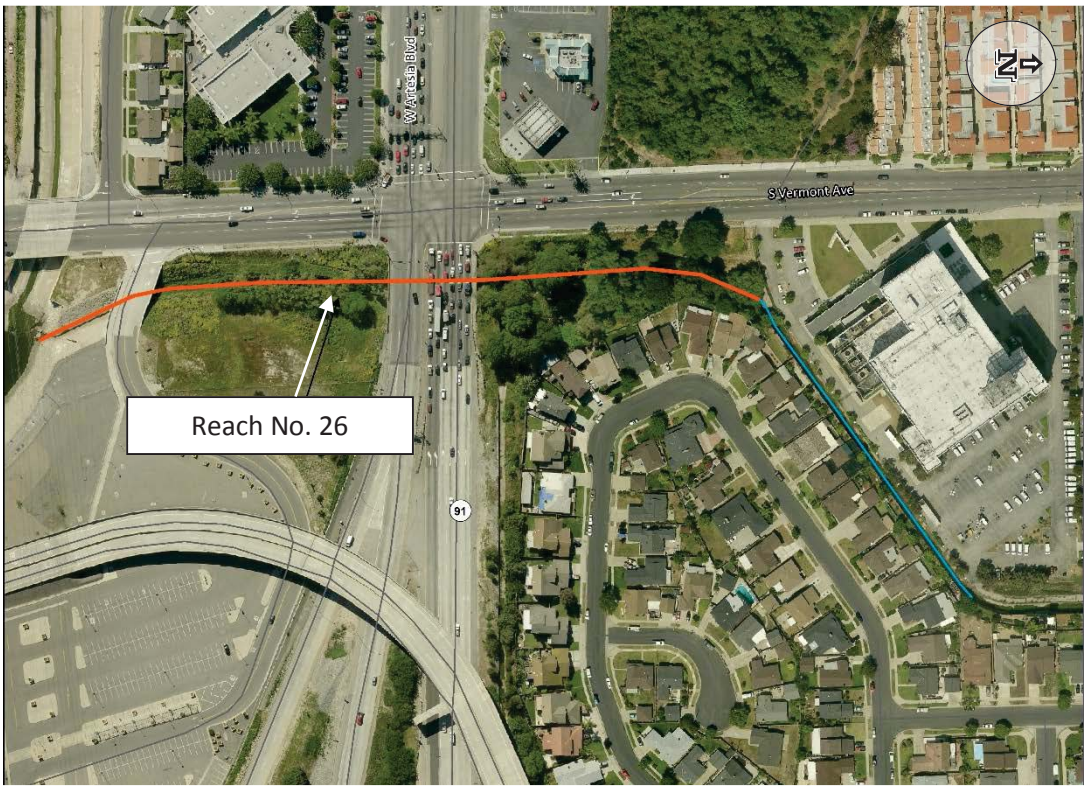


Figure 2-1. Project 74 Soft-bottom Limits

2.2 STRUCTURES

Reach No. 26 - Project 74 drains to Dominguez Channel and is a rectangular concrete channel that transitions into an earthen bottom channel. There are two bridges spanning the soft-bottom Project 74 reach (see Table 2-1).

Table 2-1. Structures along Project 74

Structure No.	Bounding River Stations	Road Name	Type	Description
1	718 – 572	Artesia Blvd/ Highway 91	Bridge	Vehicular traffic bridge

2	221 – 101	Park ‘n Ride access	Bridge	Vehicular traffic bridge

The most upstream bridge is located at river station 645 and carries vehicle traffic on W. Artesia Boulevard (CA Highway 91) over the channel. The road is 10 lanes wide on the bridge with a middle median and a sidewalk/shoulder on each side. The downstream face of the Artesia Boulevard Bridge is presented in Figure 2-2.

Right Abutment	Channel	Left Abutment

Figure 2-2. Artesia Blvd Bridge

The most downstream bridge is located at river station 161 and is the downstream limit of the soft-bottom reach. The bridge provides vehicle access to a Park ‘n Ride on the east side of the channel and the upstream face is presented in Figure 2-3.

Figure 2-3. Park ‘n Ride Access Bridge

2.3 MANNING'S ROUGHNESS COEFFICIENTS

Photographs documenting creek conditions are provided in Appendix A. The existing conditions Manning's roughness coefficients are summarized in Table 2-2 with backup detail provided in Appendix H.

Table 2-2. Manning's Roughness Coefficient, Existing Conditions – Reach No. 26

River Station Limits	Left Bank	Main Channel	Right Bank
1697 – 1206	0.015	0.015	0.015
1157 – 1097*	0.065	0.030	0.040
945 – 530*	0.040	0.030	0.040
370*	0.040	0.055	0.040
221*	0.040	0.065	0.040
101 – 68	0.015	0.015	0.015

* - Reach No. 26

2.4 HYDROLOGY

Design flow rates were obtained from LACFCD "Hydraulic Calculation Sheet" Line A Hydraulic Sheet dated July 1967. The peak discharge rate associated with the subject reach is 1436.5 cfs at River Station 1697, 1460 cfs at River Station 1206, and 2150 cfs at River Station 68.

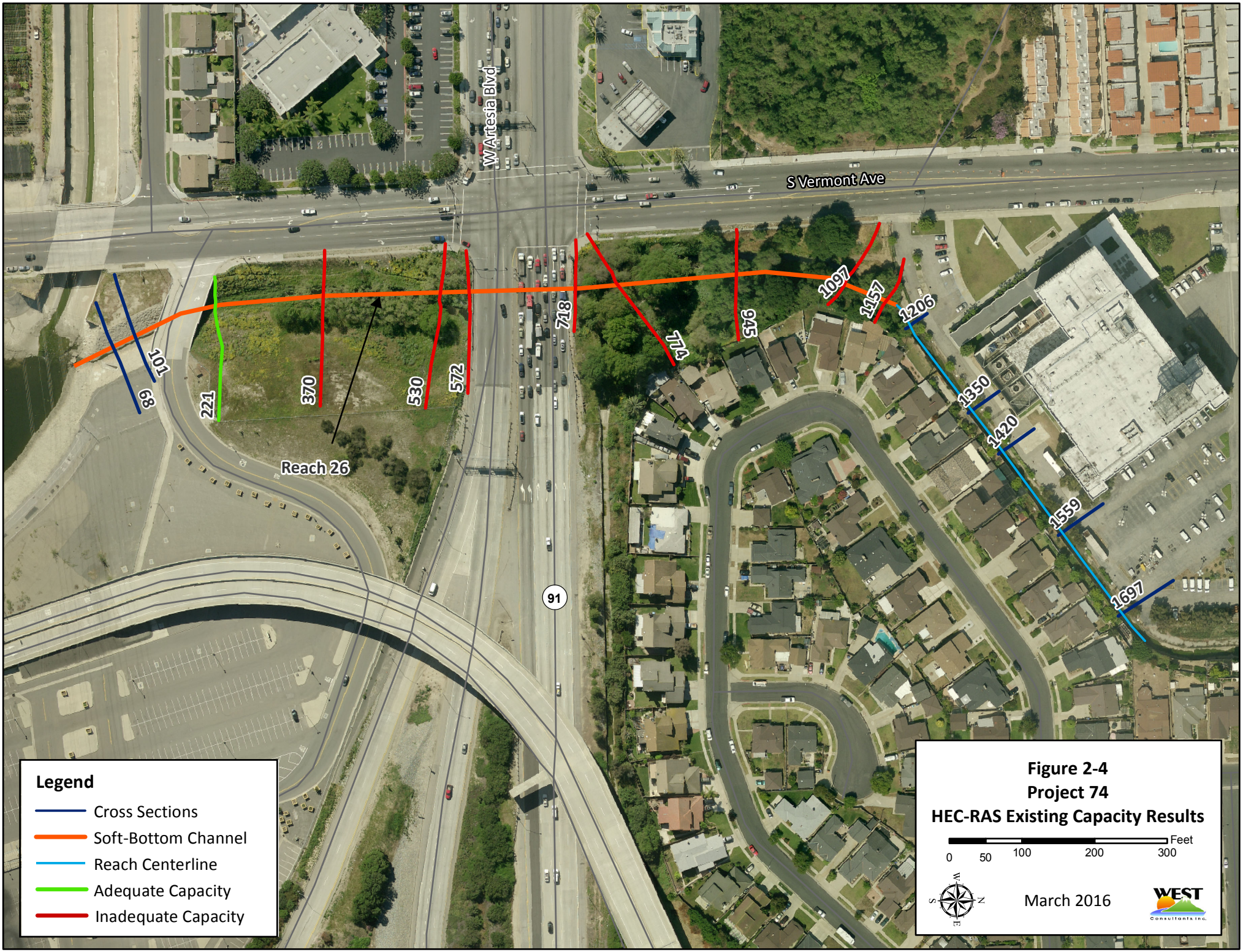
2.5 HYDRAULIC MODEL

The study reach was modeled using 21 field surveyed cross sections with an average distance between cross sections of 109 feet. Cross section locations and soft-bottom reach extents are presented in Figure 2-4.

The upstream end of soft-bottom Reach No. 26 is located at river station 1157. The maximum distance between cross sections in relatively uniform portions of the channel was 171 feet. Cross section reach lengths were chosen to ensure a gradually varied flow profile and to adequately represent the channel's geometry and structures along the study reach. The hydraulic model was run under "mixed flow" conditions so potential areas of supercritical flow were adequately modeled. HEC-RAS input and output files are provided in Appendix I.

2.6 BOUNDARY CONDITIONS

Hydraulic model boundary conditions were normal depth for the upstream boundary and design water surface elevation for Dominguez Channel downstream. The upstream boundary slope was $S_0 = 0.00088$ and the downstream water surface elevation was 20.85


W Artesia Blvd
S Vermont Ave
Reach 26
91
101
68
221
370
530
572
718
774
945
1097
1157
1206
1350
1420
1559
1697
Legend
Cross Sections
Soft-Bottom Channel
Reach Centerline
Adequate Capacity
Inadequate Capacity
Figure 2-4
Project 74
HEC-RAS Existing Capacity Results
Feet
0
50
100
200
300
March 2016
WEST
Consultants Inc.

feet (NAVD88). The hydraulic model was extended approximately 490 feet upstream and 160 feet downstream of the soft-bottom reach to minimize boundary condition effects in the soft-bottom reach of interest.

2.7 RESULTS

The water surface elevation for each model cross section in the soft-bottom reach was compared to the required freeboard to determine whether there is excess capacity at the cross-section. Cross section, required freeboard (or bridge clearance), and capacity determination data are presented in Table 2-3.

Table 2-3. Reach No. 26 - Project 74 Excess Capacity Determination

River Station	Required Freeboard / Bridge Clearance (ft)	Existing Freeboard (ft)	Excess Freeboard (ft)	Excess Capacity Determination (yes/no)
1157	2.5	2.1	0.0	no
1097	2.5	1.8	0.0	no
945	2.5	1.1	0.0	no
774	2.5	1.3	0.0	no
718	2.5	0.6	0.0	no
645 (bridge, u/s)	1.0	-0.5	0.0	no
645 (bridge, d/s)	1.0	-0.7	0.0	no
572	2.5	2.0	0.0	no
530	2.5	2.1	0.0	no
370	2.5	2.3	0.0	no
221	2.5	2.9	0.3	yes

2.8 ADDITIONAL ANALYSIS

Due to a lack of capacity for existing conditions, a model run was developed with estimated design conditions vegetation to evaluate whether reducing the vegetation to this level would result in excess capacity. Reach No. 26 – Project 74 does not have any excess capacity for existing conditions or estimated design conditions. Manning's *n* values for both model runs (existing conditions and estimated design conditions) are summarized in Appendix H. HEC-RAS hydraulic models for Reach No. 26 – Project 74 are presented in Appendix I.

3 REACH NO. 28 - TRIUNFO CREEK

3.1 GENERAL DESCRIPTION

Triunfo Creek is a tributary to Malibu Creek, and the upper limit of the soft-bottom reach of interest (Reach No. 28) is about 384 feet upstream of Mulholland Highway. The lower limit is the downstream edge of Mulholland Highway, with a total reach length of 474 feet. The study reach is illustrated with a red line in Figure 3-1.

Figure 3-1. Triunfo Creek Soft-bottom Limits

3.2 STRUCTURES

The Triunfo Creek study reach is an earthen bottom natural stream. One bridge spans Triunfo Creek immediately downstream of Reach No. 28 at HEC-RAS river station 1125. The structure is summarized in Table 3-1 with details following.

Table 3-1. Structures along Triunfo Creek

Structure No.	Bounding River Stations	Road Name	Type	Description
1	1208 – 1041	Mulholland Highway	Bridge	Vehicular traffic bridge

The bridge is a steel girder bridge with asphalt pavement placed over a wooden deck. The bridge is part of Mulholland Highway and the upstream face is presented in Figure 3-2.

Figure 3-2. Mulholland Highway Bridge

3.3 MANNING'S ROUGHNESS COEFFICIENTS

Photographs documenting creek conditions are provided in Appendix B. The existing conditions Manning's roughness coefficients are summarized in Table 3-2 with backup detail provided in Appendix H.

Table 3-2. Existing Conditions Manning's Roughness Coefficient – Reach No. 28

River Station Limits	Left Bank	Main Channel	Right Bank
2545 – 2239	0.030	0.060	0.060
2103	0.030	0.060	0.080
1945 - 1765	0.030	0.060	0.030
1627	0.030	0.060	0.030
1539 – 1369*	0.035	0.045	0.030
1208*	0.030	0.045	0.030
1041	0.035	0.040	0.030
921 – 766	0.040	0.040	0.035
595	0.040	0.040	0.040

River Station Limits	Left Bank	Main Channel	Right Bank
528	0.030	0.040	0.015
451 – 363	0.015	0.040	0.045
163 – 4	0.030	0.040	0.045

* - Reach No. 28

3.4 HYDROLOGY

The LACFCD Storm Drain Plan in TRACT No. 44475, PD T2200, dated October 14, 1988 was obtained from LACFCD website: http://dpw.lacounty.gov/. The plans provide 50-year frequency discharge values for Triunfo Creek. The peak discharge rate associated with the subject reach is 23,700 cfs.

3.5 HYDRAULIC MODEL

The study reach was modeled with 21 field surveyed cross sections to ensure a gradually varied flow profile and to adequately represent the channel's geometry and structures along the study reach. HEC-RAS input and output files are provided in Appendix I. The average distance between cross sections was 121 feet. Cross section locations and soft-bottom reach extents are presented in Figure 3-3.

The upstream end of soft-bottom Reach No. 28 is located at HEC-RAS river station 1627. The maximum distance between cross sections in relatively uniform portions of the channel was 200 feet. Cross section reach lengths were chosen to ensure a gradually varied flow profile and to adequately represent the channel's geometry and structures along the study reach. The hydraulic model was run under "mixed flow" conditions so potential areas of supercritical flow were adequately modeled. HEC-RAS input and output files are provided in Appendix I.

3.6 BOUNDARY CONDITIONS

Hydraulic model boundary conditions were normal depth for both upstream and downstream boundaries. The upstream boundary slope was S_0 = 0.008 and the downstream boundary slope was S_0 = 0.006. The hydraulic model was extended approximately 1000 feet upstream and 1100 feet downstream of the soft-bottom reach to minimize boundary condition effects on the soft-bottom reach of interest.

3.7 RESULTS

The water surface elevation for each model cross section in the soft-bottom reach was compared to the required freeboard to determine whether there is excess capacity at the cross section. Cross section, required free board (or bridge clearance) and capacity determination data are presented in Table 3-3.


Reach 28
Troutdale Dr
Westhaven Dr
Triunfo Dr
Mulholland Hwy
4
163
363
451
528
595
921
1041
1208
1369
1627
1765
1945
2103
2239
2412
Legend
Cross Sections
Soft-Bottom Channel
Reach Centerline
Inadequate Capacity
Figure 3-3
Triunfo Creek
HEC-RAS Existing Capacity Results
Feet
0 50 100 200 300 400 500
March 2016
WEST
Consultants Inc.

Table 3-3. Reach No. 28 - Triunfo Creek Excess Capacity Determination

River Station	Required Freeboard / Bridge Clearance (ft)	Existing Freeboard (ft)	Excess Freeboard (ft)	Excess Capacity Determination (yes/no)
1627	2.5	-5.4	0.0	no
1539	2.5	-4.7	0.0	no
1369	2.5	-4.3	0.0	no
1208	2.5	-2.3	0.0	no
1125 (bridge, u/s)	1.0	1.6	0.6	yes

3.8 ADDITIONAL ANALYSIS

Due to a lack of capacity for existing conditions, a model run was developed with estimated design conditions vegetation to evaluate whether reducing the vegetation to this level would result in excess capacity. Reach No. 28 – Triunfo Creek does not have any excess capacity for existing conditions or estimated design conditions. Manning's *n* values for both model runs (existing conditions and estimated design conditions) are summarized in Appendix H. HEC-RAS hydraulic models for Reach No. 28 – Triunfo Creek are presented in Appendix I.

4 REACH NO. 29 - LAS VIRGENES CREEK

4.1 GENERAL DESCRIPTION

Las Virgenes Creek is a tributary of Malibu Creek, with its headwaters in the Upper Las Virgenes Canyon Open Space Preserve in Ventura County. The soft-bottom reach (PD T1684) is designated Reach No. 29. The reach length is 371 feet, with its upstream limits at the boundary of Los Angeles and Ventura Counties. The downstream limit is 3,006 feet north of Thousand Oaks Blvd. Las Virgenes Creek is illustrated with a red line in Figure 4-1.

Figure 4-1. Las Virgenes Creek Soft-bottom limits

4.2 STRUCTURES

There are no structures in the soft-bottom reach of Las Virgenes Creek. However, immediately downstream, at the transition from soft-bottom to concrete, there are multiple 4 inch diameter, concrete filled steel pipes. These were installed to function as a debris collector during high flows.

4.3 MANNING'S ROUGHNESS COEFFICIENTS

Photographs documenting creek conditions are provided in Appendix C. The existing conditions Manning's roughness coefficients are summarized in Table 4-1 with backup detail provided in Appendix H.

Table 4-1. Existing Conditions Manning's Roughness Coefficient – Reach No. 29

River Station Limits	Left Bank	Main Channel	Right Bank
1463 – 1284	0.149	0.061	0.149
1170*	0.149	0.034	0.060
1079 – 985*	0.039	0.027	0.015
896*	0.044	0.027	0.015
821 – 2	0.015	0.015	0.015

* - Reach No.29

4.4 HYDROLOGY

Design flow rates were obtained from channel design documents PD 1684 available from the LACFCD website: http://dpw.lacounty.gov/. The design discharge is 9,860 cfs in the natural channel.

4.5 HYDRAULIC MODEL

The study reach was modeled with 17 field surveyed cross sections with an average distance between cross sections of 91 feet. Cross section locations and soft-bottom reach extents are presented in Figure 4-2.

The upstream end of soft-bottom Reach No. 29 is located at river station 1170 at the Los Angeles/Ventura County boundary. The maximum distance between cross sections in relatively uniform portions of the channel was 127 feet. Cross section reach lengths were chosen to ensure a gradually varied flow profile and to adequately represent the channel's geometry and structures along the study reach. The hydraulic model was run under "mixed flow" conditions so potential areas of supercritical flow were adequately modeled. HEC-RAS input and output files are provided in Appendix I.

4.6 BOUNDARY CONDITIONS

Hydraulic model boundary conditions were normal depth for both upstream and downstream boundaries. The upstream boundary slope was S_0 = 0.01 and the downstream boundary slope was S_0 = 0.006. The hydraulic model was extended approximately 275 feet upstream and 800 feet downstream of the soft-bottom reach to minimize boundary condition effects on the soft-bottom reach of interest.

4.7 RESULTS

The water surface elevation for each model cross section in the soft-bottom reach was compared to the required freeboard to determine whether there is excess capacity at the cross section. Cross section, required free board (or bridge clearance) and capacity determination data are presented in Table 4-2.


Las Virgenes Rd
1463
1370
1284
1170
1079
985
896
821
682
559
432
338
216
103
2
Reach 29
Legend
Cross Sections
Soft-Bottom Channel
Reach Centerline
Adequate Capacity
Inadequate Capacity
Figure 4-2
Las Virgenes Creek
HEC-RAS Existing Capacity Results
Feet
0
100
200
400
March 2016
WEST
Consultants Inc.

Table 4-2. Reach No. 29 - Las Virgenes Creek Excess Capacity Determination

River Station	Required Freeboard / Bridge Clearance (ft)	Existing Freeboard (ft)	Excess Freeboard (ft)	Excess Capacity Determination (yes/no)
1170	2.5	7.3	4.8	yes
1079	2.5	8.1	5.6	yes
985	2.5	4.3	1.8	yes
896	2.5	3.9	1.4	yes

4.8 ADDITIONAL ANALYSIS

Due to the excess capacity for existing conditions, a model run was developed with BonTerra Psomas recommendations for additional vegetation to evaluate whether increasing the vegetation to this level would impact the required capacity. The BonTerra Psomas recommendation for additional vegetation was as follows:

> *Within the herbaceous vegetation on the left bank, plant two (2) valley oaks (Quercus lobata) and five (5) blue elderberry (Sambucus nigra) at edge of right-of-way (about 100 to 125 feet away from concrete levee).*

The "Bonterra Psomas Recommended" model geometry was created by modifying the "Existing Conditions" hydraulic model to reflect higher Manning's *n* values in locations where vegetation would be added assuming plantings would be relatively evenly distributed in the area. The Manning's roughness coefficient was increased in the left bank area at HEC-RAS river station 1170 and 985. Backup data for the Manning's *n* values are provided in Appendix H. The revised hydraulic models indicate that there is sufficient capacity along the reach with the additional vegetation. HEC-RAS hydraulic models for Reach No. 29 – Las Virgenes Creek are presented in Appendix I.

5 REACH NO. 32 - STOKES CANYON CHANNEL

5.1 GENERAL DESCRIPTION

Stokes Canyon Channel, Reach No. 32, is part of the ephemeral Stokes Creek located near residences and equestrian facilities. Stokes Canyon Creek is a tributary of Las Virgenes Creek which subsequently drains to Malibu Creek. The soft-bottom reach of interest is Reach No. 32 and measures 2,255 feet in length. The reach downstream limit is located approximately 1,600 feet upstream of the Mulholland Highway and Stokes Canyon Road intersection. The study reach is illustrated with a red line in Figure 5-1.

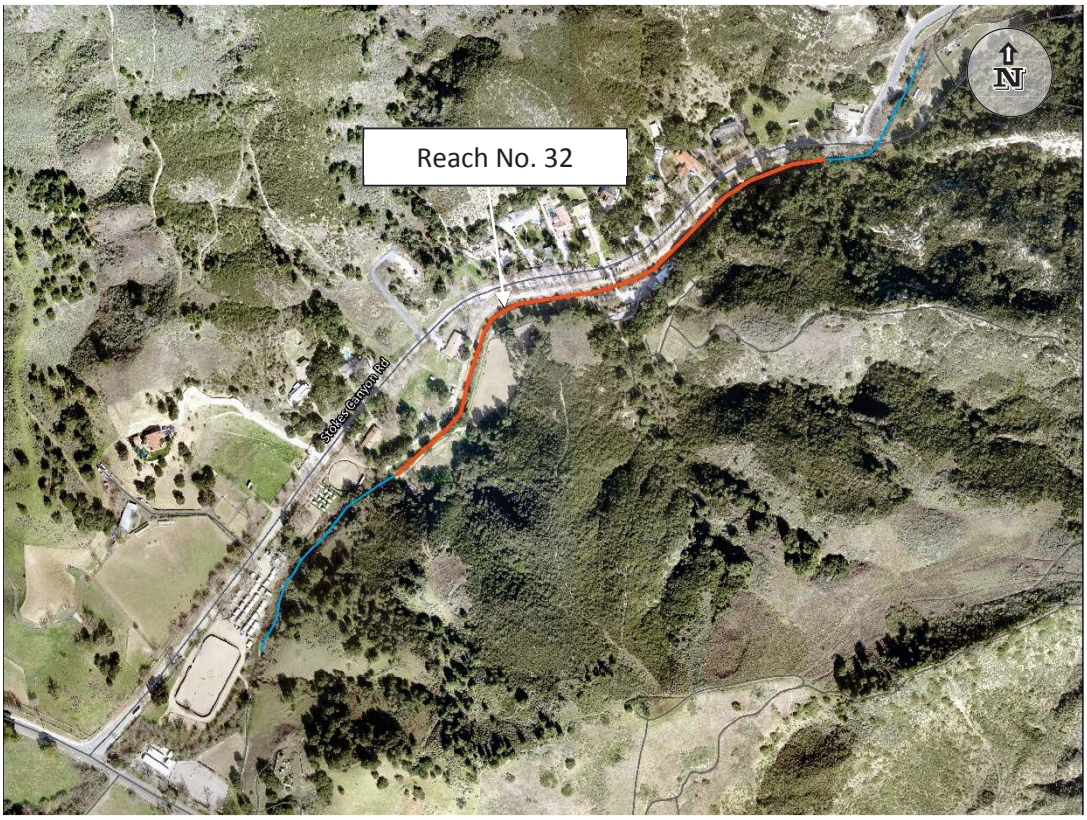


Figure 5-1. Stokes Canyon Channel Soft-Bottom Limits

5.2 STRUCTURES

Soft-bottom Reach No. 32, Stokes Canyon Channel, is an earthen bottom channel with intermittent locations of exposed rock. There are five structures along Stokes Canyon Channel summarized in Table 5-1.

Table 5-1. Structures along Stokes Canyon Channel

Structure No.	Bounding River Stations	Road Name	Type	Description
1	2108 - 2154	Residential access	Bridge	Residential access bridge
2	1940 - 1954	N/A	Channel Protection	Concrete lining
3	1754 - 1906	N/A	Concrete Structure	Lateral concrete structure
4	1508 - 1535	N/A	Channel Protection	Concrete lining
5	900 - 1050	N/A	Channel Protection	Concrete lining

There is one bridge spanning Stokes Canyon Channel located at HEC-RAS river station 2139.5. The bridge appears to provide the sole means of automobile access to a residential property located on the left bank at that location. The upstream face of the bridge is presented in Figure 5-2.

Figure 5-2. Stokes Canyon Channel Residential Access Bridge

There are three locations where concrete has been placed in the channel bottom and on the bank walls. The concrete areas extend approximately 15 to 20 feet in the direction of flow and were likely placed as an erosion control measure. The concrete areas are located at approximately river station 920, 1535 and 1940. As an example, a photo of the downstream face of the concrete placement at river station 1940 is presented in Figure 5-3.

Figure 5-3. Stokes Canyon Channel Concrete Section (1 of 3 Structures)

In addition, there is a diagonally placed concrete structure in the channel bottom at approximately river station 1,754 ft. The purpose of this structure is not clear, though it could be a protective encasement for infrastructure such as a natural gas or potable water line. The downstream end of the structure is shown in Figure 5-4.

Figure 5-4. Stokes Canyon Channel Concrete Structure

5.3 MANNING'S ROUGHNESS COEFFICIENTS

Photographs documenting creek conditions are provided in Appendix D. The existing conditions Manning's roughness coefficients are summarized in Table 5-2 with backup detail provided in Appendix H.

Table 5-2. Existing Conditions Manning's Roughness Coefficient – Reach No. 32

River Station Limits	Left Bank	Main Channel	Right Bank
3699 - 3367	0.030	0.085	0.015
3347	0.015	0.015	0.015
3335	0.030	0.045	0.015
3264	0.025	0.105	0.015
3092 – 2696*	0.040	0.030	0.030
2670 - 2637*	0.040	0.025	0.030
2605 - 2108*	0.040	0.030	0.030
1954*	0.030	0.015	0.030
1940*	0.015	0.015	0.015
1906 – 1557*	0.040	0.030	0.030
1535	0.030	0.015	0.030
1508*	0.015	0.015	0.030
1395*	0.030	0.030	0.030
1233*	0.040	0.030	0.030
1221*	0.040	0.015	0.030
1178*	0.040	0.030	0.030
1050 – 900*	0.030	0.030	0.040
700	0.055	0.015	0.055
691	0.105	0.045	0.105
645	0.105	0.045	0.040
569	0.105	0.065	0.040
379 - 217	0.125	0.075	0.040
16	0.125	0.075	0.025

* - Reach No. 32

5.4 HYDROLOGY

Design flow rates were obtained from channel design documents PD 0043 available from the LACFCD website: http://dpw.lacounty.gov/. The design discharge is 2,020 cfs at river station 1954 and 2,340 cfs at river station 3755.

5.5 HYDRAULIC MODEL

The study reach was modeled with 38 field surveyed cross sections with an average distance between cross sections of 100 feet. Cross section locations and soft-bottom reach extents are presented in Figure 5-5.

The upstream end of soft-bottom Reach No. 32 is located at river station 3092. The maximum distance between cross sections in relatively uniform portions of the channel was 207 feet. Cross section reach lengths were chosen to ensure a gradually varied flow profile and to adequately represent the channel's geometry and structures along the study reach. The hydraulic model was run under "mixed flow" conditions so potential areas of supercritical flow were adequately modeled. HEC-RAS input and output files are provided in Appendix I.

5.6 BOUNDARY CONDITIONS

Hydraulic model boundary conditions were normal depth for both upstream and downstream boundaries. The upstream boundary slope was S_0 = 0.01 and the downstream boundary slope was S_0 = 0.012. The hydraulic model was extended approximately 600 feet upstream and 900 feet downstream of the soft-bottom reach to minimize boundary condition effects on the soft-bottom reach of interest.

5.7 RESULTS

The water surface elevation for each model cross section in the soft-bottom reach was compared to the required freeboard to determine whether there is excess capacity at the cross section. Cross section, required free board (or bridge clearance) and capacity determination data are presented in Table 5-3.

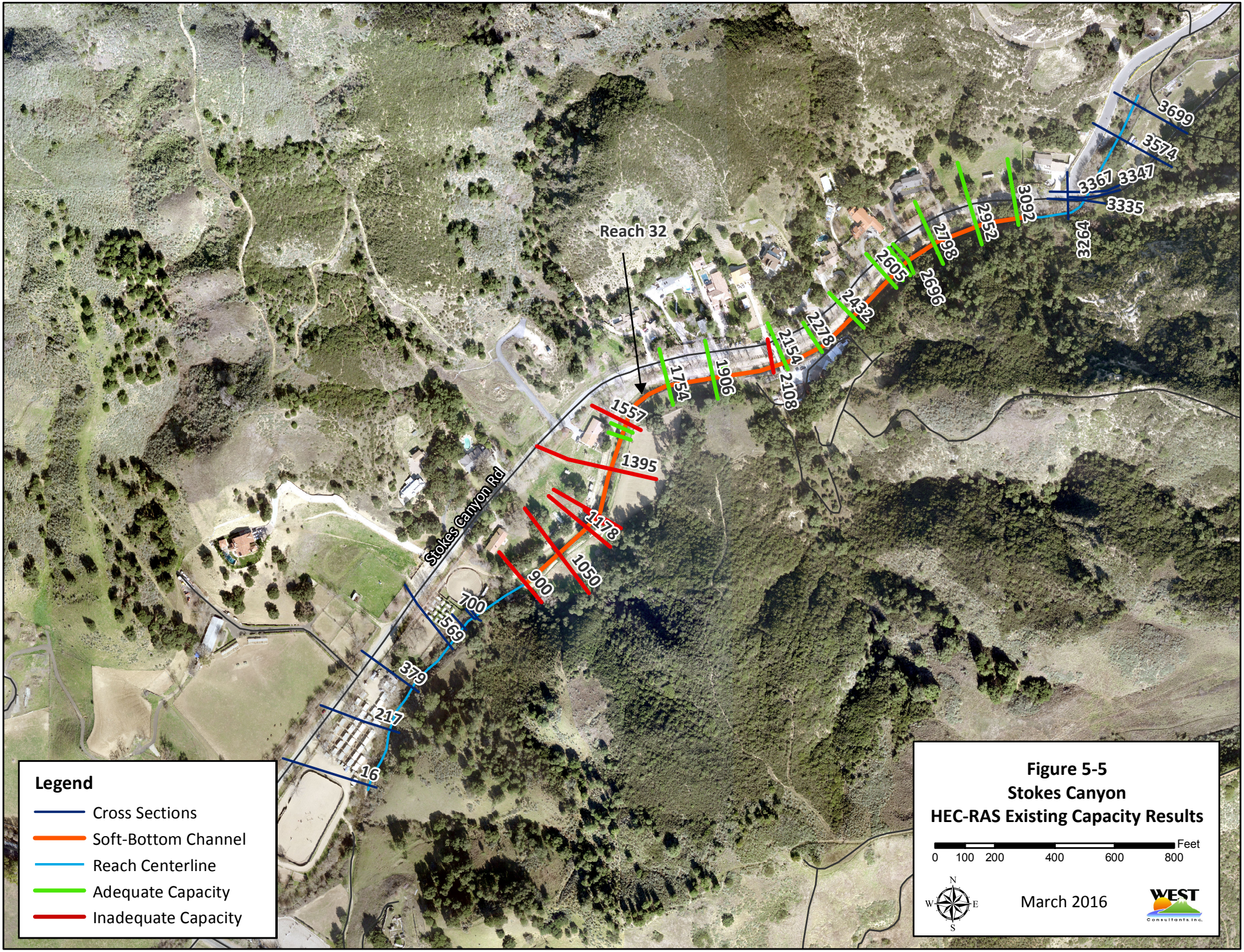

Reach 32
Stokes Canyon Rd
3699
3574
3367
3347
3335
3324
3092
2952
2793
2696
2605
2432
2278
2154
2108
1906
1754
1557
1395
1178
1050
900
700
569
379
217
16
Legend
Cross Sections
Soft-Bottom Channel
Reach Centerline
Adequate Capacity
Inadequate Capacity
Figure 5-5
Stokes Canyon
HEC-RAS Existing Capacity Results
0 100 200 400 600 800
Feet
N
W
E
S
March 2016
WEST
Consultants, Inc.

Table 5-3. Reach No. 32 - Stokes Canyon Channel Excess Capacity Determination

River Station	Required Freeboard / Bridge Clearance (ft)	Existing Freeboard (ft)	Excess Freeboard (ft)	Excess Capacity Determination (yes/no)
3092	2.5	5.9	3.4	Yes
2952	2.5	3.3	0.8	Yes
2798	2.5	4.4	1.9	Yes
2696	2.5	4.7	2.2	Yes
2670	2.5	3.6	1.1	Yes
2637	2.5	6.3	3.8	Yes
2605	2.5	7.4	4.9	Yes
2432	2.5	5.9	3.4	Yes
2278	2.5	3.5	1.0	Yes
2154	2.5	2.6	0.1	Yes
2139.5 (bridge, u/s)	1.0	0.7	0.0	No
2139.5 (bridge, d/s)	1.0	0.7	0.0	No
2108	2.5	2.2	0.0	No
1954	2.5	3.2	0.7	Yes
1940	2.5	4.3	1.8	Yes
1906	2.5	7.5	5.0	Yes
1754	2.5	3.0	0.5	Yes
1557	2.5	1.5	0.0	No
1535	2.5	3.5	1.0	Yes
1508	2.5	5.5	3.0	Yes
1395	2.5	1.8	0.0	No
1233	2.5	2.0	0.0	No
1221	2.5	0.9	0.0	No
1178	2.5	1.0	0.0	No
1050	2.5	-0.7	0.0	No
900	2.5	-3.2	0.0	No

As a result of potential existing capacity in the upstream areas of Stokes Canyon Channel and no existing capacity in the downstream area, input regarding potential new vegetation plantings was requested from the biological consultant, BonTerra Psomas.

5.8 ADDITIONAL ANALYSIS

Due to a lack of capacity for existing conditions in the downstream reach, a model run was developed with design conditions vegetation to evaluate whether reducing the vegetation to this level would result in excess capacity. The design Manning's *n* value of 0.0225 for Reach No. 32 was obtained from channel design documents PF 513511 available from the LACFCD website: http://dpw.lacounty.gov/.

The design Manning's *n* values were assigned to the HEC-RAS model river stations 900 to 3092 which represent Reach No. 32. The result was an additional two areas with potential excess capacity—near the private bridge and in the downstream section of the reach. In the downstream section, the lower Manning's *n* value decreases the upstream extent of backwater effects. Near the bridge, a lower Manning's *n* increases the capacity at the bridge, which is a hydraulic control.

Manning's *n* values for both model runs (existing conditions and design conditions) are summarized in Appendix H. HEC-RAS hydraulic models for Reach No. 32 – Stokes Canyon Channel are presented in Appendix I. As a result of downstream vegetation and other hydraulic controls, Reach No. 32 exhibited only minor changes in capacity determination using "Design Assumption Conditions".

Due to the excess capacity for existing conditions in the upstream reach, BonTerra Psomas recommendations were considered to determine whether adding additional vegetation would impact the required channel capacity. The BonTerra Psomas recommendation for additional vegetation was as follows:

> *The structure of the channel appears to preclude permanent vegetation on the invert or banks immediately next to the ageing wire and pipe revetment structure. The right bank (or north bank) is cleared and presumably used for maintenance activities. The left bank (or south bank) has some vegetation (e.g., young oaks) growing in a couple locations. These areas could support more vegetation. If this is County property, then plant at least 20 young coast live oaks (Quercus agrifolia) on the south bank at the upper end of the channel reach (upstream of private bridge that marks the approximate half-way point of channel reach).*

Since the recommendation called for possible plantings, a "Bonterra Psomas Recommended" model geometry was created by modifying the "Existing Conditions" hydraulic model to reflect higher Manning's *n* values in locations where vegetation would be added. The Manning's roughness coefficient was increased in the south (left) overbank area from HEC-RAS river station 3092 to 2432 assuming tree plantings would be relatively evenly spaced along the reach. Backup data for the Manning's *n* values are provided in Appendix H. The revised hydraulic model results reflect sufficient capacity along the reach with the additional vegetation. HEC-RAS hydraulic models for Reach No. 32 – Stokes Canyon Channel are presented in Appendix I.

6 REACH NO. 33, 34, 35 AND 37 - MEDEA CREEK

6.1 GENERAL DESCRIPTION

Medea Creek is located in the Malibu Creek watershed and drains directly to Malibu Lake. The headwaters of Medea Creek are located in Ventura County north of Oak Park. It enters Los Angeles County in Agoura Hills flowing south through primarily residential neighborhoods. The creek flows through Agoura Hills and continues south to Saratoga Hills and eventually enters Malibu Lake. The study reach is 1.4 miles long, beginning approximately 1,400 feet upstream of East Thousand Oaks Boulevard and ending approximately 1,625 feet downstream of Agoura Road. There are four soft-bottom reaches of interest along Medea Creek in Agoura Hills measuring 946, 405, 85 and 170 feet in length. From upstream to downstream, the soft-bottom reaches upstream limits are identified in Table 6-1. The study reaches are illustrated with red lines in Figure 6-1.

Table 6-1. Medea Creek – Soft-bottom Reach Locations Description

Reach No.	Name	Upstream Limit	Reach Length (ft)
33	Medea Creek – PD T1378 Unit 2	731 feet u/s of Thousand Oaks Blvd	946
34	Medea Creek Main Channel Outlet – PD T1005	535 feet d/s of Kanan Rd	405
35	Medea Creek M.C.I. – under Route 101	98 feet u/s of u/s side of Roadside Dr	85
37	Medea Creek/Cheseboro Creek Outlet	614 feet d/s of Agoura Rd	170

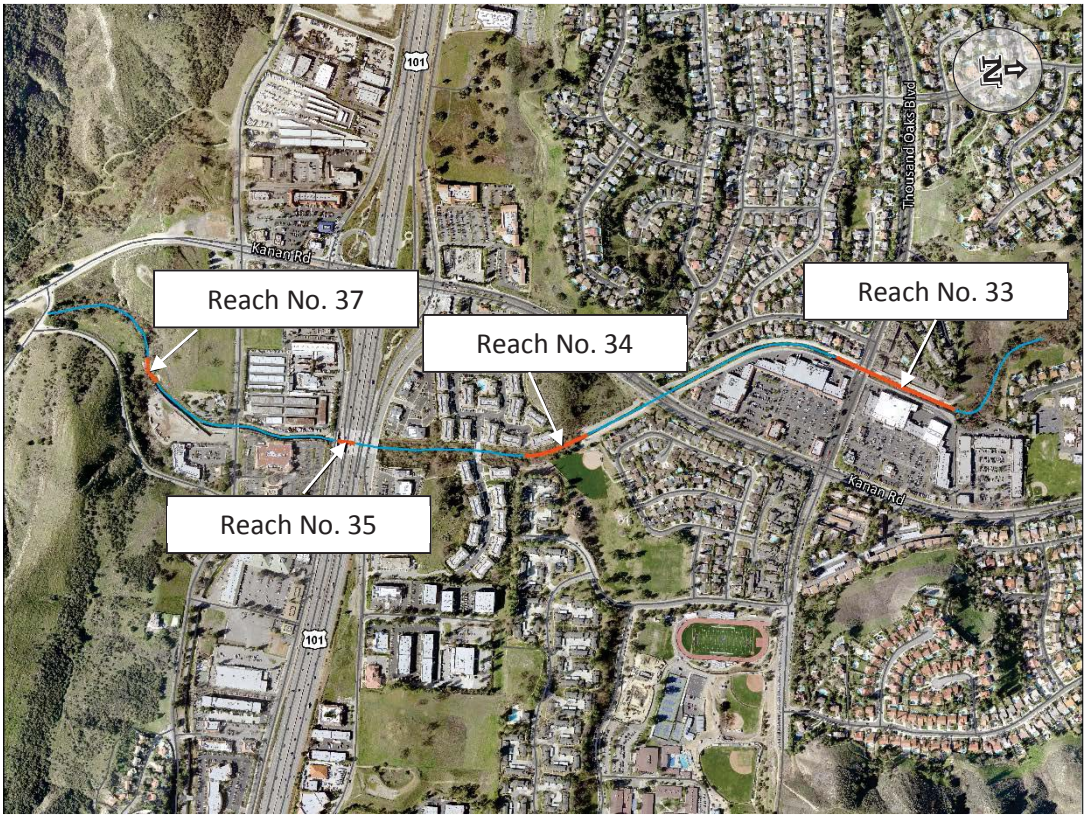


Figure 6-1. Medea Creek Soft-bottom Limits

6.2 STRUCTURES

The Medea Creek study reach contains four soft-bottom reaches separated along the channel by engineered, hard surface segments. There are seven bridges crossing Medea Creek along the 1.4 miles summarized in Table 6-2. Structure details follow.

Table 6-2. Structures along Medea Creek

Structure No.	Bounding River Stations	Road Name	Type	Description
1	5985 – 5885	E. Thousand Oaks Blvd	Bridge	Vehicular street traffic bridge
2	4585 – 4399	Kanan Rd	Triple Box Culvert	Vehicular street traffic culvert
3	3261 – 3213	Oak Creek Lane	Bridge	Vehicular street traffic bridge
4	2589 – 2535	Canwood Street	Bridge	Vehicular street traffic bridge
5	2535 – 2328	U.S. Highway 101	Bridge	Highway bridge
6	2328 – 2292	Roadside Dr	Bridge	Vehicular street traffic bridge
7	1671 – 1626	Agoura Rd	Bridge	Vehicular street traffic bridge

Beginning from the upstream extent and moving in the downstream direction, the first structure is the East Thousand Oaks Boulevard Bridge located at river station 5985. Beneath the bridge, riprap has been placed in the channel and a low, lateral concrete weir has been placed. Both upstream and downstream of the bridge is Medea Creek soft-bottom Reach No. 33. Photos of the downstream face and beneath the bridge are presented in Figure 6-2 and Figure 6-3.

Figure 6-2. E. Thousand Oaks Blvd. Bridge

Figure 6-3. Beneath E. Thousand Oaks Blvd. Bridge

The second structure is located at HEC-RAS river station 4492 and is formed by the triple box culvert conveying Medea Creek beneath Kanan Road. The box culvert drops 10.5 feet in elevation from the upstream to the downstream side. Both upstream and downstream of the box culvert, Medea Creek is a concrete, trapezoidal channel. A photo of the upstream face of the culvert is presented in Figure 6-4. The upstream end of Reach No. 34, a soft-bottom reach, is located at river station 3918, approximately 574 feet downstream of the box culvert.

Figure 6-4. Box Culvert at Kanan Road

The third structure is Oak Creek Lane Bridge located within the Avalon apartment complex which is not located within a soft-bottom reach. The bridge is located at river station 3237 and the upstream face is presented in Figure 6-5. The bridge is constructed on pier supports. The left bank under the bridge is relatively flat soil with a concrete abutment. The right bank beneath the bridge is sloped and covered with turf reinforcement matting. Immediately downstream of Oak Creek Lane Bridge located in the right bank is a concrete riser for stormwater access. The stormwater access is presented in Figure 6-6.

Figure 6-5. Oak Creek Lane Bridge

Figure 6-6. Stormwater Access at Oak Creek Lane Bridge

The fourth structure is Canwood Street Bridge located immediately upstream of U.S. Highway 101. The bridge is located at river station 2562 and is the first in a sequence of three closely spaced bridges. Extremely dense vegetation prevents good, encompassing photo documentation from upstream due to visibilty. The close proximity of downstream bridges prevents good documentation from downstream. Looking upstream from under the bridge, the left bank under Canwood Street Bridge is presented in Figure 6-7 and the right bank is presented in Figure 6-8. Both embankments beneath the bridge are concrete.

Figure 6-7. Beneath Canwood Street Bridge, Left Bank

Figure 6-8. Beneath Canwood Street Bridge, Right Bank

The fifth structure is U.S. Highway 101 Bridge, located immediately downstream of Canwood Street Bridge. The bridge is located at river station 2432 and is the second in a sequence of three closely spaced bridges. Again, close proximity of upstream and downstream bridges prevents good, encompassing photo documentation of the bridge. The left bank beneath U.S. Highway 101 from the upstream perspective is presented in Figure 6-9 and the right bank is presented in Figure 6-10 from the upstream perspective. Reach No. 35, a soft-bottom reach 85 feet long, is located beneath the southbound lanes of U.S. Highway 101 Bridge.

Figure 6-9. Beneath U.S. Highway 101 Bridge, Left Bank

Figure 6-10. Beneath U.S. Highway 101 Bridge, Right Bank

The sixth structure is Roadside Drive Bridge, located immediately downstream of U.S. Highway 101 Bridge. The bridge is located at river station 2310 and is the third in a sequence of three closely spaced bridges. The downstream face of Roadside Drive Bridge is presented in Figure 6-11. The downstream end of soft-bottom Reach No. 35 terminates 13 feet upstream of this bridge.

Figure 6-11. Roadside Drive Bridge

The seventh and final structure along the Medea Creek reach is Agoura Road Bridge. The bridge is located at river station 1649. The upstream face of Agoura Road Bridge is presented in Figure 6-12. Both upstream and downstream of Agoura Road Bridge, Medea Creek is channelized in a rectangular, concrete channel. Reach No. 37, the most downstream soft-bottom reach, begins approximately 625 feet downstream of Agoura Road Bridge.

Figure 6-12. Agoura Road Bridge

6.3 MANNING'S ROUGHNESS COEFFICIENTS

Photographs documenting creek conditions are provided in Appendix E. The existing conditions Manning's roughness coefficients are summarized in Table 6-3 with backup detail provided in Appendix H.

Table 6-3. Existing Conditions Manning's Roughness Coefficient – Reach No. 33, 34, 35 and 37

River Station Limits	Left Bank	Main Channel	Right Bank
7394 - 6803	0.026	0.14	0.026
6679	0.14	0.026	0.026
6578[(1)]	0.015	0.112	0.015
6438[(1)]	0.015	0.11	0.015
6421[(1)]	0.015	0.025	0.015
6370 – 5985[(1)]	0.015	0.105	0.015
5885 - 5776[(1)]	0.015	0.027	0.015
5719 - 3969	0.015	0.015	0.015
3918[(2)]	0.035	0.025	0.035
3862[(2)]	0.025	0.135	0.025
3725[(2)]	0.025	0.135	0.135
3633 – 3552[(2)]	0.030	0.135	0.135
3409 - 3296	0.015	0.135	0.135

River Station Limits	Left Bank	Main Channel	Right Bank
3261 - 3212	0.015	0.135	0.015
3189	0.015	0.135	0.135
3048 - 2958	0.030	0.135	0.135
2889 – 2641	0.135	0.135	0.135
2589	0.095	0.095	0.095
2535	0.030	0.030	0.030
2432 – 2328(3)	0.030	0.030	0.030
2310	0.030	0.030	0.030
2292 - 2267	0.025	0.025	0.025
2242 - 1626	0.015	0.015	0.015
1596 - 1340	0.015	0.015	0.025
1239.66	0.020	0.015	0.027
1139.33	0.025	0.015	0.028
1039	0.030	0.015	0.030
1026(4)	0.030	0.030	0.030
910(4)	0.030	0.030	0.062
876(4)	0.030	0.107	0.025
668 - 478	0.030	0.107	0.025
343	0.030	0.107	0.107
179	0.030	0.122	0.122
78	0.122	0.107	0.107

Notes: (1) Reach No. 33;
(2) Reach No. 34;
(3) Reach No. 35;
(4) Reach No. 37.

6.4 HYDROLOGY

Design flow rates were obtained from multiple as-built channel design documents available from the LACFCD website: http://dpw.lacounty.gov. The design documents and discharges are summarized in Table 6-4.

Table 6-4 Medea Creek – Design Discharges

Design Document No.	Year	Discharge (cfs)	Model River Station	Design Event
PF515487	1980	4,757	7394	50-yr
PF515487	1980	5,946	6438	50-yr
PD1231	1979	5,960	5985	50-yr
PD1231	1979	6,720	5566	50-yr
PD017746	1971	7,060	2242	n/a
PD017746	1971	13,800	1425	n/a

6.5 HYDRAULIC MODEL

The study reach was modeled with 75 field surveyed cross sections with an average distance between cross sections of 100 feet. Cross section locations and soft-bottom reach extents are presented in Figure 5-5.

The maximum distance between cross sections was 207 feet. Cross section reach lengths were chosen to ensure a gradually varied flow profile and to adequately represent the channel's geometry and structures along the study reach. The hydraulic model was run under "mixed flow" conditions so potential areas of supercritical flow were adequately modeled. HEC-RAS input and output files are provided in Appendix I.

6.6 BOUNDARY CONDITIONS

Hydraulic model boundary conditions were normal depth for both upstream and downstream boundaries. The upstream boundary slope was S_0 = 0.0072 and the downstream boundary slope was S_0 = 0.005. The hydraulic model was extended approximately 800 feet upstream and 800 feet downstream of the soft-bottom reach to minimize boundary condition effects on the soft-bottom reach of interest.

6.7 RESULTS

The water surface elevation for each model cross section in the soft-bottom reach was compared to the required freeboard to determine whether there is excess capacity at the cross section. Cross section, required free board (or bridge clearance) and capacity determination data are presented in Table 6-5 through Table 6-8.

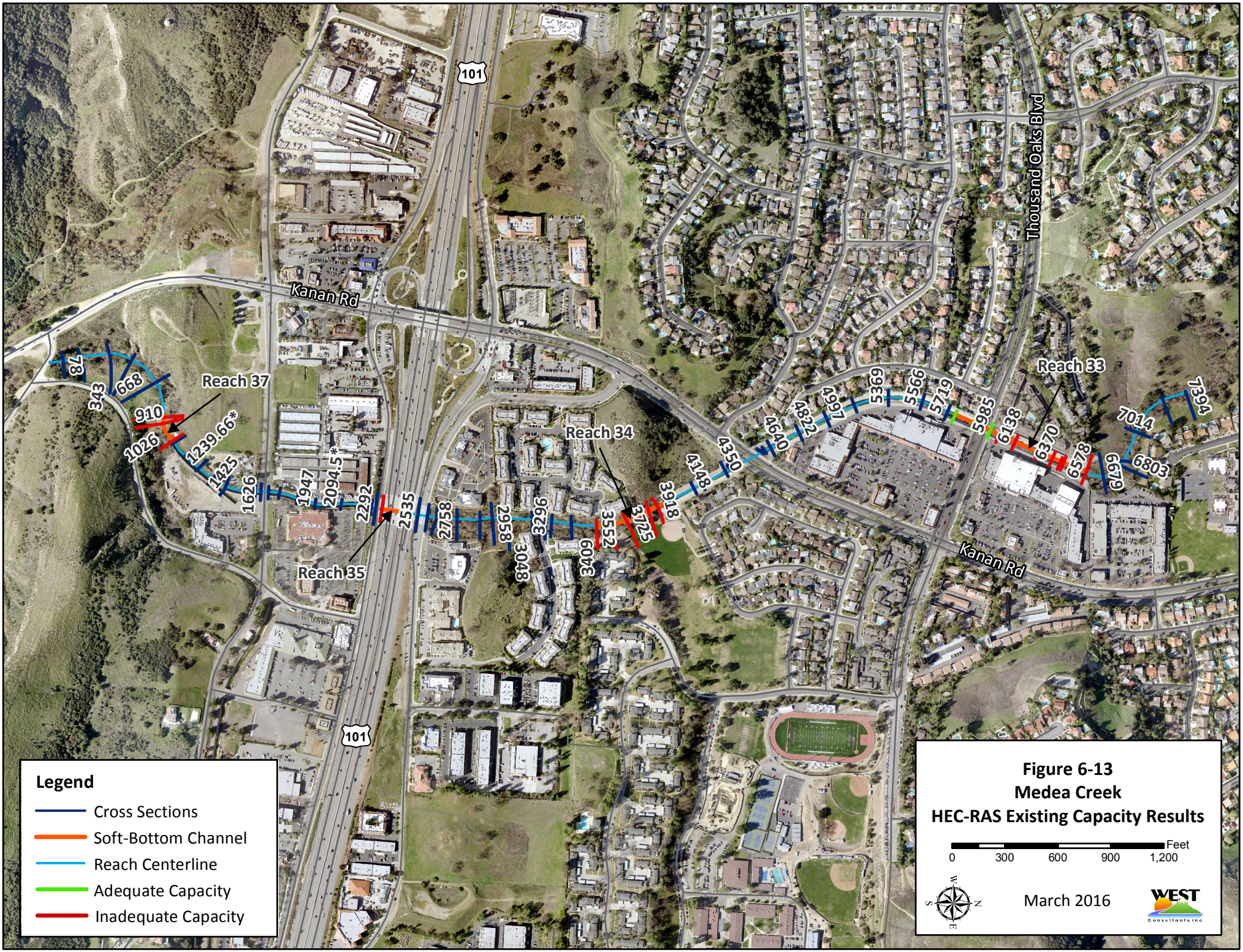

Kanan Rd
101
Thousand Oaks Blvd
Reach 37
Reach 34
Reach 35
Reach 33
87
343
668
910
1026
1239.66*
1425
1626
1947
2094.5*
2292
2535
2758
2958
3048
3293
3403
3552
3725
3918
4148
4350
4640
4822
4997
5369
5566
5719
5985
6138
6370
6578
6679
6803
7014
7394
Legend
Cross Sections
Soft-Bottom Channel
Reach Centerline
Adequate Capacity
Inadequate Capacity
Figure 6-13
Medea Creek
HEC-RAS Existing Capacity Results
Feet
0
300
600
900
1,200
March 2016
WEST
Consultants, Inc.

Table 6-5. Medea Creek Reach No. 33 Excess Capacity Determination

River Station	Required Freeboard / Bridge Clearance (ft)	Existing Freeboard (ft)	Excess Freeboard (ft)	Excess Capacity Determination (yes/no)
6578	2.5	-4.1	0.0	No
6438	2.5	0.9	0.0	No
6421	2.5	-0.1	0.0	No
6370	2.5	-0.1	0.0	No
6283	2.5	-0.1	0.0	No
6138	2.5	-0.2	0.0	No
6042	2.5	-0.5	0.0	No
5985	2.5	4.0	1.5	Yes
5935 (bridge, u/s)	1.0	1.7	0.7	Yes
5935 (bridge, d/s)	1.0	2.4	1.4	Yes
5885	1.0	6.4	3.9	Yes
5881	2.5	4.0	1.5	Yes
5766	2.5	3.2	0.7	Yes

Table 6-6. Medea Creek Reach No. 34 Excess Capacity Determination

River Station	Required Freeboard / Bridge Clearance (ft)	Existing Freeboard (ft)	Excess Freeboard (ft)	Excess Capacity Determination (yes/no)
3918	2.5	-5.4	0.0	No
3862	2.5	-7.6	0.0	No
3725	2.5	-5.5	0.0	No
3633	2.5	-5.0	0.0	No
3552	2.5	-5.2	0.0	No

Table 6-7. Medea Creek Reach No. 35 Excess Capacity Determination

River Station	Required Freeboard / Bridge Clearance (ft)	Existing Freeboard (ft)	Excess Freeboard (ft)	Excess Capacity Determination (yes/no)
2432 (bridge, u/s)	1.0	1.6	0.6	Yes
2432 (bridge, d/s)	1.0	2.0	1.0	Yes
2328	2.5	2.4	0.0	No

Table 6-8. Medea Creek Reach No. 37 Excess Capacity Determination

River Station	Required Freeboard / Bridge Clearance (ft)	Existing Freeboard (ft)	Excess Freeboard (ft)	Excess Capacity Determination (yes/no)
1026	2.5	-1.3	0.0	No
910	2.5	-7.8	0.0	No
876	2.5	-6.1	0.0	No

6.8 ADDITIONAL ANALYSIS

The BonTerra Psomas recommendations for additional vegetation in Medea Creek soft-bottom reaches are as follows:

> *Reach No. 33: No recommendation at this time.*
>
> *Reach No. 35: Although this very small channel reach has capacity, the vegetation that had been present on banks was removed by unknown entity some years ago for a bridge repair project. The vegetation consisted of an oak and native chaparral shrubs. This vegetation could be replanted; however, there are homeless living under the bridge and it just may not be a suitable location for habitat restoration.*

Due to a lack of capacity for existing conditions in Reach Nos. 33 (partial), 34, 35 (partial), and 37, a model run was developed with known or estimated design conditions vegetation to evaluate whether reducing the vegetation to this level would result in excess capacity. These reaches were found to have no additional capacity for estimated design conditions with one exception—near HEC-RAS River Station 6438 where the estimated design conditions result in 0.4 feet of excess freeboard. However, this location is near a large stormwater channel confluence making it susceptible to complex flow dynamics that cannot be modeled accurately with a one-dimensional model such as HEC-RAS. Therefore, adding vegetation in this short reach is not recommended.

Because Reach No. 33 has no excess capacity for existing conditions or the known design roughness value, an additional model run was completed assuming removal of all vegetation. Under this condition, Reach No. 33 has excess freeboard except in two locations--the upstream end of the reach where the engineered channel begins and near HEC-RAS River Station 6421 at a large stormwater channel confluence. Modeled freeboard values for Reach No. 33 are presented in Table 6-9.

Table 6-9. Medea Creek Reach No. 33 Additional Model Runs Excess Capacity Determination

River Station	Required Freeboard (ft)	Excess Freeboard (ft)		
		Existing Condition	Design Roughness Condition	Cleared Vegetation
6578	2.5	0.0	0.0	0.0
6438	2.5	0.0	0.4	0.8
6421	2.5	0.0	0.0	0.0
6370	2.5	0.0	0.0	0.7
6283	2.5	0.0	0.0	0.8
6138	2.5	0.0	0.0	2.5
6042	2.5	0.0	0.0	0.0
5985	2.5	1.5	1.9	1.5
5935 (bridge, u/s)	1.0	0.7	0.4	0.7
5935 (bridge, d/s)	1.0	1.4	0.6	1.4
5885	1.0	3.9	3.1	3.9
5881	2.5	1.5	0.2	1.5
5766	2.5	0.7	0.6	0.7

The City of Agoura Hills is currently naturalizing a portion of Medea Creek, just upstream of Reach No. 34. The naturalization consists of removing approximately 425 linear feet of concrete channel downstream of Kanan Road and construction of a natural channel stabilized with native vegetation and other stream features. As a result, Reach No. 34 will no longer be maintained by LACFCD. For this reason, additional analysis was not completed for Reach No. 34.

Reach No. 35 is directly beneath U.S. Highway 101 and vegetation was not present on the banks or in the channel. Based on this observation and the BonTerra Psomas recommendation that it may not be a suitable location for habitat restoration, additional analysis was not conducted for Reach No. 35.

Manning's *n* values for all model runs are summarized in Appendix H. HEC-RAS hydraulic models for Reach Nos. 33, 34, 35, and 37 are presented in Appendix I.

7 REACH NO. 36 - CHESEBORO MAIN CHANNEL INLET (M.C.I.)

7.1 GENERAL DESCRIPTION

The Cheseboro Main Channel Inlet, Reach No. 36, is located in Agoura Hills, Los Angeles, on the southwest side of Old Agoura Park. The inlet is located in a residential area and conveys the ephemeral Cheseboro Creek into an engineered, rectangular cross section concrete channel. The soft-bottom reach of interest is 56 feet in length. The reach downstream limit is located 44 feet upstream of Driver Avenue. The study reach is illustrated with a red line in Figure 7-1.

Figure 7-1. Cheseboro Main Channel Inlet Soft-Bottom Limits

7.2 STRUCTURES

There are no structures in the soft-bottom reach at the Cheseboro Main Channel Inlet. However, there is a box culvert immediately downstream at Driver Avenue that exerts hydraulic control during high flows. The downstream face of the culvert is presented in Figure 7-2.

Figure 7-2. Driver Ave Culvert Downstream of Cheseboro Main Channel Inlet

7.3 MANNING'S ROUGHNESS COEFFICIENTS

Photographs documenting creek conditions are provided in Appendix F. The existing conditions Manning's roughness coefficients are summarized in Table 7-1 with backup detail provided in Appendix H.

Table 7-1. Existing Conditions Manning's Roughness Coefficient – Reach No. 36.

River Station Limits	Left Bank	Main Channel	Right Bank
1684 - 1582	0.035	0.090	0.025
1413	0.035	0.090	0.015
1288	0.040	0.090	0.025
1190	0.055	0.075	0.035
1085 – 1056*	0.025	0.045	0.035
1026*	0.030	0.015	0.025
1004 - 16	0.020	0.015	0.020

* - Reach No. 36

7.4 HYDROLOGY

Design flow rates were obtained from channel design document PD018044 available from the LACFCD website: http://dpw.lacounty.gov/. The design discharge is 8,310 cfs at HEC-RAS river station 1684.

7.5 HYDRAULIC MODEL

The study reach was modeled with 21 field surveyed cross sections with an average distance between cross sections of 79 feet. Cross section locations and soft-bottom reach extents are presented in Figure 7-3.

The maximum distance between cross sections was 169 feet. Cross section reach lengths were chosen to ensure a gradually varied flow profile and to adequately represent the channel's geometry and structures along the study reach. The hydraulic model was run under "mixed flow" conditions so potential areas of supercritical flow were adequately modeled. HEC-RAS input and output files are provided in Appendix I.

7.6 BOUNDARY CONDITIONS

Hydraulic model boundary conditions were normal depth for both upstream and downstream boundaries. The upstream boundary slope was S_0 = 0.012 and the downstream boundary slope was S_0 = 0.0074. The hydraulic model was extended approximately 600 feet upstream and 1,010 feet downstream of the soft-bottom reach to minimize boundary condition effects on the soft-bottom reach of interest.

7.7 RESULTS

The water surface elevation for each model cross section in the soft-bottom reach was compared to the required freeboard to determine whether there is excess capacity at the cross section. Cross section, required free board (or bridge clearance) and capacity determination data are presented in Table 7-2.

Table 7-2. Cheseboro Main Channel Inlet Excess Capacity Determination

River Station	Required Freeboard / Bridge Clearance (ft)	Existing Freeboard (ft)	Excess Freeboard (ft)	Excess Capacity Determination (yes/no)
1085	2.5	-5.5	0.0	No
1056	2.5	-7.1	0.0	No
1026	2.5	-7.9	0.0	No

7.8 ADDITIONAL ANALYSIS

Due to a lack of capacity for existing conditions, a model run was developed with estimated design conditions vegetation to evaluate whether reducing the vegetation to this level would result in excess capacity. Reach No. 36 – Cheseboro M.C.I. does not have any excess capacity for existing conditions or estimated design conditions. Manning's n values for both model runs (existing conditions and estimated design conditions) are summarized in Appendix H. HEC-RAS hydraulic models for Reach No. 36 – Cheseboro M.C.I. are presented in Appendix I.


W. Driver Ave
Colodny Dr
Colodny Dr
Reach 36
Chesebro Rd
101
16
159*
306
340
442.25*
544.5*
646.75*
758.49
909
962
1004
1026
1059
1085
1190
1413
1582
1684
Legend
Cross Sections
Soft-Bottom Channel
Reach Centerline
Inadequate Capacity
Figure 7-3
Cheseboro Main Channel Inlet
HEC-RAS Existing Capacity Results
Feet
0 50 100 200 300
March 2016
WEST
Consultants Inc.

8 REACH NO. 38 - LINDERO MAIN CHANNEL OUTLET (M.C.O.)

8.1 GENERAL DESCRIPTION

Lindero Main Channel Outlet, Reach No. 38, is located downstream of the Lake Lindero outfall beneath Agoura Road. It is located in an undeveloped area on the south side of Agoura Hills. The soft-bottom reach of interest is 187 feet in length. The soft-bottom reach upstream limit is located approximately 83 feet downstream of Agoura Road. The study reach is illustrated with a red line in Figure 8-1

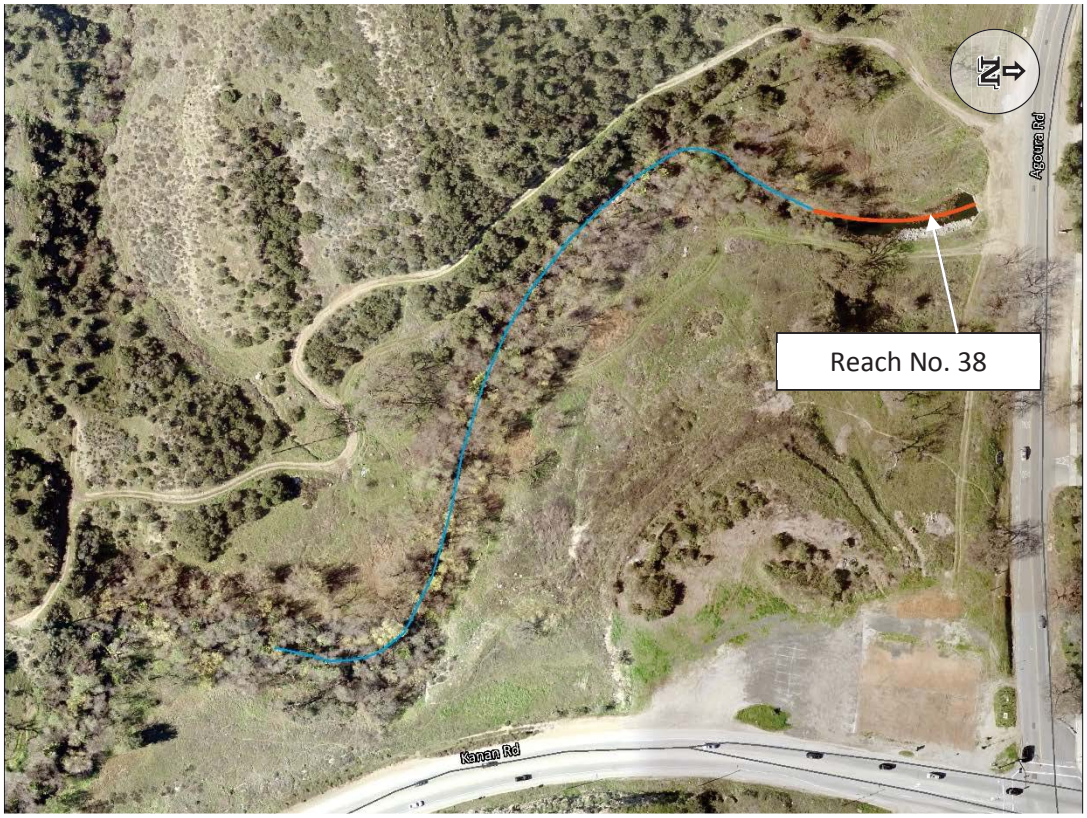


Figure 8-1. Lindero M.C.O. Soft-Bottom Limits

8.2 STRUCTURES

There are no structures in the Lindero M.C.O. reach.

8.3 MANNING'S ROUGHNESS COEFFICIENTS

Photographs documenting creek conditions are provided in Appendix G. The existing conditions Manning's roughness coefficients are summarized in Table 8-1 with backup detail provided in Appendix H.

Table 8-1. Existing Conditions Manning's Roughness Coefficient – Lindero M.C.O.

River Station Limits	Left Bank	Main Channel	Right Bank
1200*	0.030	0.035	0.025
1115*	0.030	0.035	0.030
1035*	0.045	0.105	0.070
936	0.035	0.105	0.060
738	0.045	0.105	0.105
577	0.035	0.105	0.105
390 - 22	0.035	0.105	0.035

* - Reach No. 38

8.4 HYDROLOGY

Design flow rates were obtained from channel design document PD018009 available from the LACFCD website: http://dpw.lacounty.gov/. The design discharge is 4,810 cfs at HEC-RAS river station 1200.

8.5 HYDRAULIC MODEL

The study reach was modeled with 9 field surveyed cross sections with an average distance between cross sections of 147 feet. Cross section locations and soft-bottom reach extents are presented in Figure 7-3.

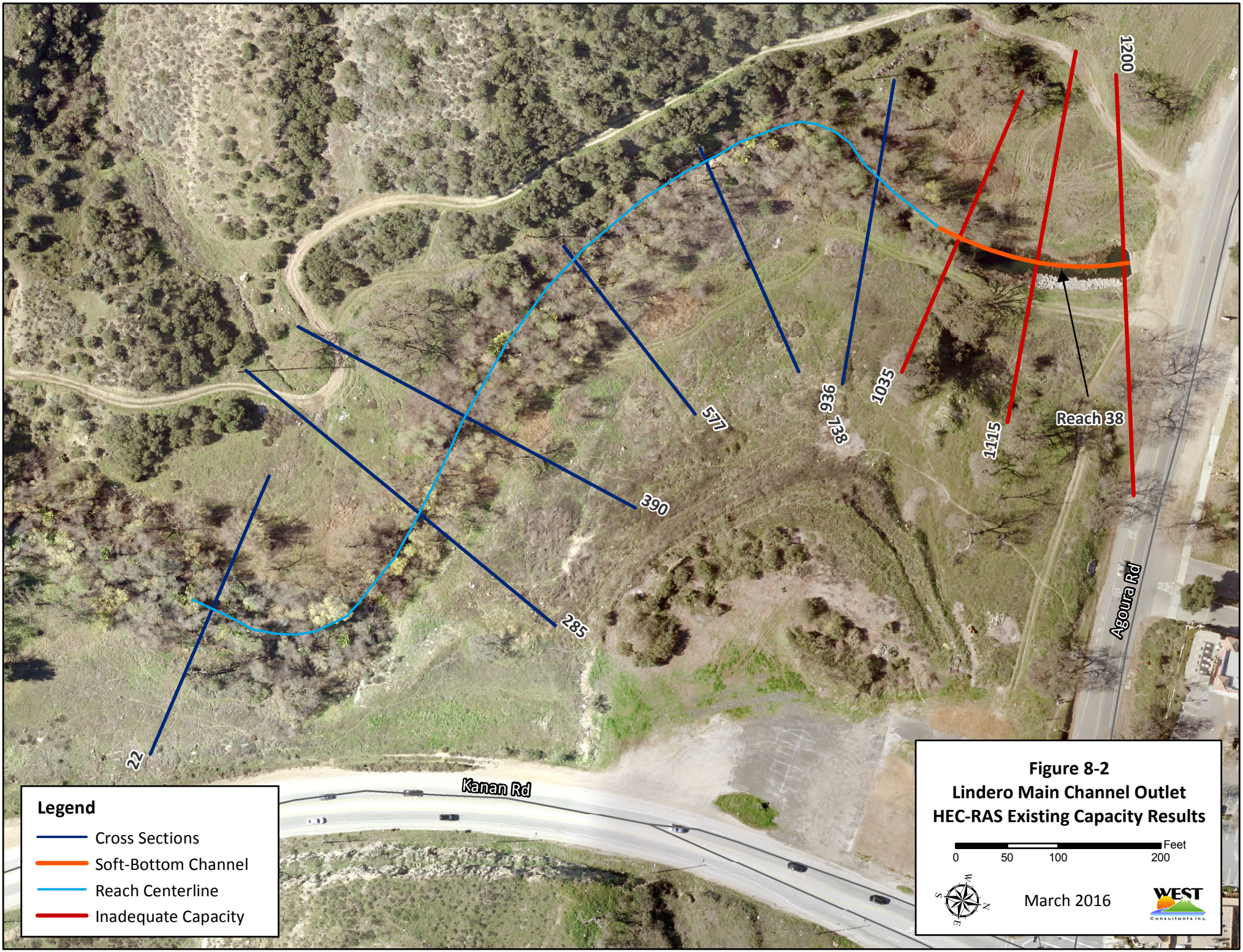
The maximum distance between cross sections was 263 feet. Cross section reach lengths were chosen to ensure a gradually varied flow profile and to adequately represent the channel's geometry and structures along the study reach. The hydraulic model was run under "mixed flow" conditions so potential areas of supercritical flow were adequately modeled. HEC-RAS input and output files are provided in Appendix I.

8.6 BOUNDARY CONDITIONS

Hydraulic model boundary conditions were normal depth for both upstream and downstream boundaries. The upstream boundary slope was S_0 = 0.00885 and the downstream boundary slope was S_0 = 0.0058. The hydraulic model was extended approximately 83 feet upstream (to Lake Lindero conduit outlet) and 900 feet downstream of the soft-bottom reach to minimize boundary condition effects on the soft-bottom reach of interest.

8.7 RESULTS

The water surface elevation for each model cross section in the soft-bottom reach was compared to the required freeboard to determine whether there is excess capacity at the


1200
1035
936
738
577
1115
Reach 38
390
285
22
Agoura Rd
Kanan Rd
Legend
Cross Sections
Soft-Bottom Channel
Reach Centerline
Inadequate Capacity
Figure 8-2
Lindero Main Channel Outlet
HEC-RAS Existing Capacity Results
0
50
100
200
Feet
March 2016
WEST
Consultants Inc.

cross section. Cross section, required free board (or bridge clearance) and capacity determination data are presented in Table 8-2.

Table 8-2. Lindero M.C.O. Excess Capacity Determination

River Station	Required Freeboard/Bridge Clearance (ft)	Existing Freeboard (ft)	Excess Freeboard (ft)	Excess Capacity Determination (yes/no)
1200	2.5	-2.3	0.0	No
1115	2.5	0.7	0.0	No
1035	2.5	-5.5	0.0	No

8.8 ADDITIONAL ANALYSIS

Due to a lack of capacity for existing conditions, a model run was developed with estimated design conditions vegetation to evaluate whether reducing the vegetation to this level would result in excess capacity. Reach No. 38 – Lindero M.C.O. does not have any excess capacity for existing conditions or estimated design conditions. Manning's n values for both model runs (existing conditions and estimated design conditions) are summarized in Appendix H. HEC-RAS hydraulic models for Reach No. 38 – Lindero M.C.O. are presented in Appendix I.

9 REFERENCES

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APPENDIX A

ANNOTATED REACH PHOTOGRAPHS

REACH NO. 26

PROJECT 74 (DOMINGUEZ CHANNEL)

REACH DOWNSTREAM EXTENT, HEC-RAS RIVER STATION 2+21, DOWNSTREAM DIRECTION

REACH DOWNSTREAM EXTENT, HEC-RAS RIVER STATION 2+21, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 3+70, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 3+70, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 5+30, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 5+30, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 5+30, LEFT OVERBANK

HEC-RAS RIVER STATION 5+30, RIGHT OVERBANK

HEC-RAS RIVER STATION 7+18, LEFT OVERBANK, UPSTREAM

HEC-RAS RIVER STATION 7+18, LEFT OVERBANK

HEC-RAS RIVER STATION 7+74, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 7+74, LEFT OVERBANK, UPSTREAM

HEC-RAS RIVER STATION 7+74, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 9+45, LEFT OVERBANK

HEC-RAS RIVER STATION 9+45, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 9+45, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 11+57, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 11+57, DOWNSTREAM DIRECTION

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 12+06, DOWNSTREAM DIRECTION

BEGIN PHOTOS UPSTREAM OF
REACH NO. 26 - PROJECT 74 (DOMINGUEZ CHANNEL)

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 12+06, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 13+50, UPSTREAM DIRECTION

UPSTREAM OF

REACH NO. 26 - PROJECT 74 (DOMINGUEZ CHANNEL)

FEBRUARY 25, 2015

HEC-RAS RIVER STATION 13+50, DOWNSTREAM DIRECTION

BEGIN PHOTOS DOWNSTREAM OF

REACH NO. 26 - PROJECT 74 (DOMINGUEZ CHANNEL)

HEC-RAS RIVER STATION 01+01, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 01+01, DOWNSTREAM DIRECTION

APPENDIX B

ANNOTATED REACH PHOTOGRAPHS

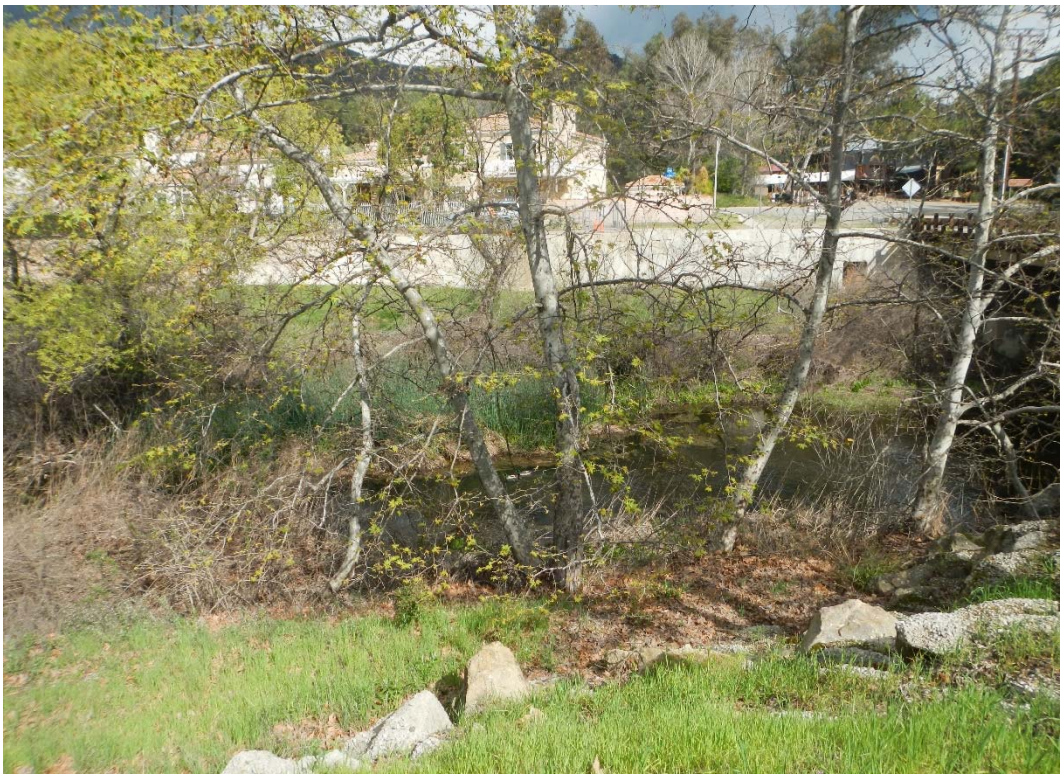
REACH NO. 28

TRIUNFO CREEK

REACH DOWNSTREAM EXTENT, 83 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 12+08, MULHOLLAND HIGHWAY BRIDGE

HEC-RAS RIVER STATION 12+08, DOWNSTREAM DIRECTION (MULHOLLAND HWY BRIDGE)

HEC-RAS RIVER STATION 12+08, UPSTREAM DIRECTION



HEC-RAS RIVER STATION 12+08, RIGHT BANK, CHANNEL & LEFT BANK

HEC-RAS RIVER STATION 13+69, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 13+69, LEFT OVERBANK

HEC-RAS RIVER STATION 13+69, RIGHT BANK

HEC-RAS RIVER STATION 15+39, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 15+39, UPSTREAM DIRECTION

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 16+27, UPSTREAM DIRECTION

REACH NO. 28 - TRIUNFO CREEK

FEBRUARY 24, 2015

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 16+27, CHANNEL AND STREAMSIDE, LEFT

BEGIN PHOTOS UPSTREAM OF
REACH NO. 28 - TRIUNFO CREEK

UPSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 17+65, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 17+65, UPSTREAM DIRECTION

UPSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 19+45, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 19+45, UPSTREAM DIRECTION

UPSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 21+03, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 21+03, STREAMSIDE, LEFT

UPSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 21+03, STREAMSIDE, RIGHT

HEC-RAS RIVER STATION 22+39, DOWNSTREAM DIRECTION

UPSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 22+39, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 24+12, DOWNSTREAM DIRECTION

UPSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 24+12, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 25+45, DOWNSTREAM DIRECTION

UPSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 25+45, UPSTREAM DIRECTION

BEGIN PHOTOS DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 10+41, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 10+41, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 10+41, LEFT OVERBANK

HEC-RAS RIVER STATION 10+41, RIGHT OVERBANK

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 9+21, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 9+21, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 9+21, LEFT OVERBANK

HEC-RAS RIVER STATION 9+21, CHANNEL & RIGHT OVERBANK

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

121 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 9+21, DOWNSTREAM DIRECTION

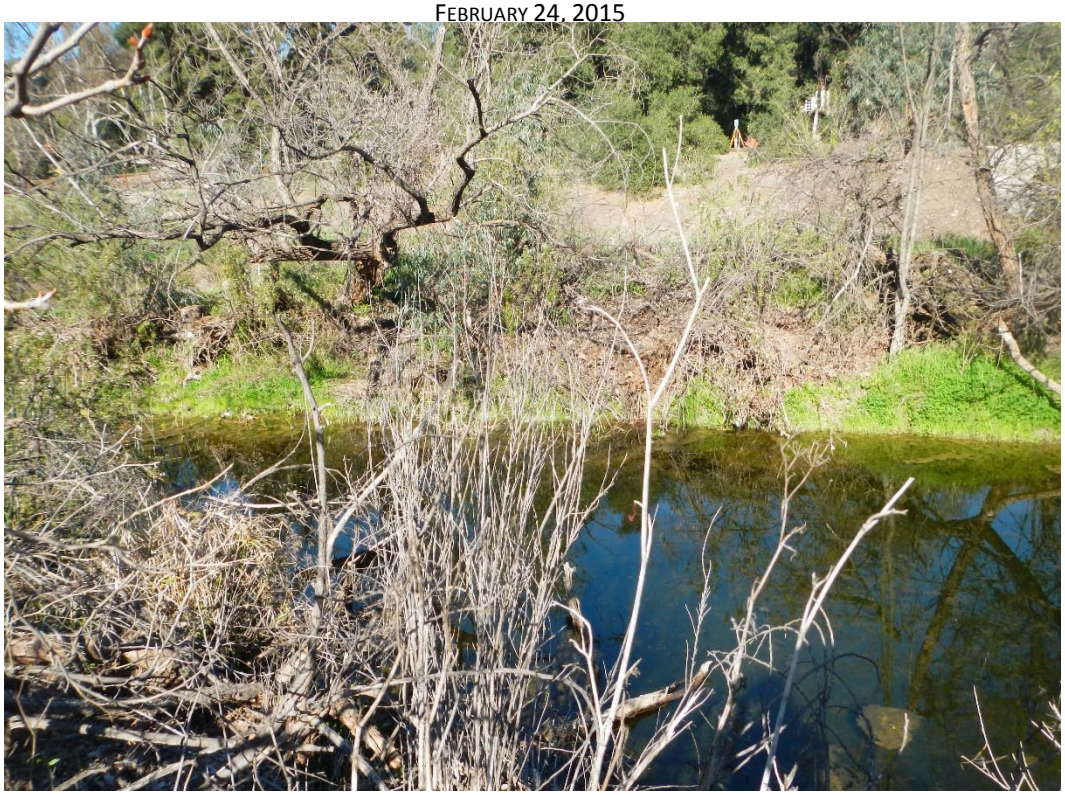
33 FT. UPSTREAM OF HEC-RAS RIVER STATION 7+67, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 7+67, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 7+67, STREAMSIDE LEFT, CHANNEL & STREAMSIDE RIGHT

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015



HEC-RAS RIVER STATION 5+95, STREAMSIDE, LEFT

HEC-RAS RIVER STATION 5+95, STREAMSIDE, RIGHT

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 5+95, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 5+28, LEFT OVERBANK

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

28 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 5+28, DOWNSTREAM DIRECTION

49 FT. UPSTREAM OF HEC-RAS RIVER STATION 4+51, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

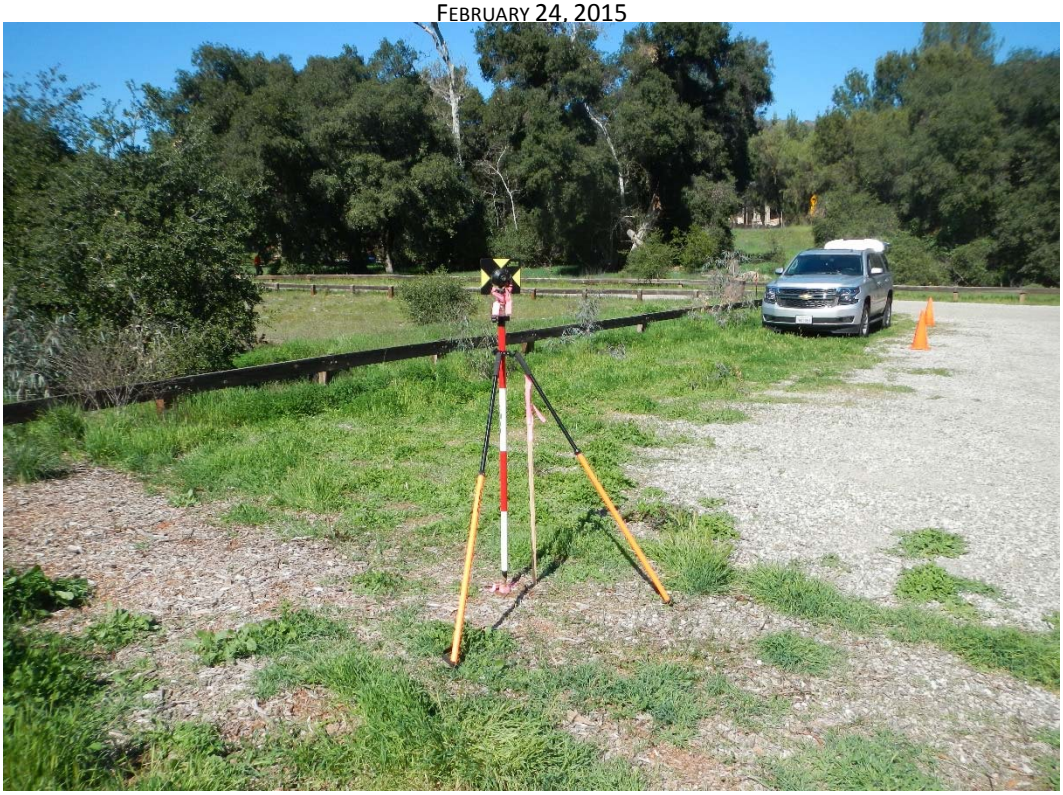
49 FT. UPSTREAM OF HEC-RAS RIVER STATION 4+51, STREAMSIDE, LEFT

49 FT. UPSTREAM OF HEC-RAS RIVER STATION 4+51, STREAMSIDE, RIGHT

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 4+51, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 4+51, UPSTREAM DIRECTION



HEC-RAS RIVER STATION 4+51, STREAMSIDE, LEFT

HEC-RAS RIVER STATION 4+51, STREAMSIDE, RIGHT

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 3+63, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 3+63, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 3+63, STREAMSIDE, LEFT

HEC-RAS RIVER STATION 3+63, STREAMSIDE, RIGHT

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 1+63, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 1+63, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 1+63, STREAMSIDE, LEFT

HEC-RAS RIVER STATION 1+63, STREAMSIDE, RIGHT

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 00+04, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 00+04, STREAMSIDE, LEFT

DOWNSTREAM OF
REACH NO. 28 - TRIUNFO CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 00+04, STREAMSIDE, RIGHT

APPENDIX C

ANNOTATED REACH PHOTOGRAPHS

REACH NO. 29

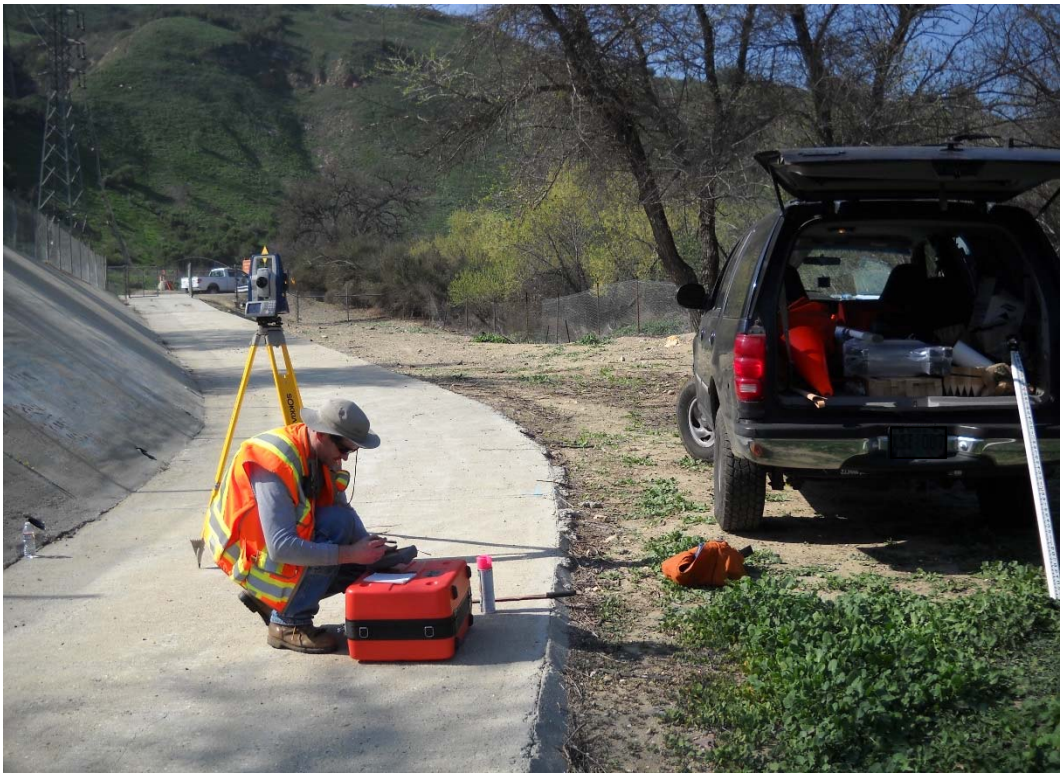
LAS VIRGENES CREEK

REACH DOWNSTREAM EXTENT, HEC-RAS RIVER STATION 7+88, UPSTREAM DIRECTION

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 10+79, DOWNSTREAM DIRECTION

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 10+79, UPSTREAM DIRECTION
(LOS ANGELES/VENTURA COUNTY LINE)

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 10+79, LEFT OVERBANK



REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 11+70, RIGHT OVERBANK

BEGIN PHOTOS UPSTREAM OF
REACH NO. 29 - LAS VIRGENES CREEK

HEC-RAS RIVER STATION 12+84, LEFT OVERBANK

HEC-RAS RIVER STATION 12+84, RIGHT OVERBANK

HEC-RAS RIVER STATION 13+70, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 13+70, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 13+70, LEFT OVERBANK

HEC-RAS RIVER STATION 13+70, RIGHT OVERBANK

DOWNSTREAM OF
REACH NO. 29 - LAS VIRGENES CREEK
FEBRUARY 17, 2015

BEGIN PHOTOS DOWNSTREAM OF
REACH NO. 29 - LAS VIRGENES CREEK

REACH DOWNSTREAM EXTENT, HEC-RAS RIVER STATION 7+88, DOWNSTREAM DIRECTION

APPENDIX D

ANNOTATED REACH PHOTOGRAPHS

REACH NO. 32

STOKES CANYON CHANNEL

REACH DOWNSTREAM EXTENT, HEC-RAS RIVER STATION 9+00, DOWNSTREAM DIRECTION

REACH DOWNSTREAM EXTENT, HEC-RAS RIVER STATION 9+00, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 10+50, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 10+50, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 11+78, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 12+21, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 12+33, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 12+33, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 13+95, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 13+95, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 17+54, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 17+54, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 17+54, CHANNEL AND LEFT OVERBANK

HEC-RAS RIVER STATION 17+54, RIGHT OVERBANK

HEC-RAS RIVER STATION 19+06, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 19+06, CHANNEL AND LEFT OVERBANK

HEC-RAS RIVER STATION 19+06, CHANNEL AND RIGHT OVERBANK

11FT. DOWNSTREAM OF HEC-RAS RIVER STATION 19+54, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 21+08, UPSTREAM DIRECTION (PRIVATE DRIVEWAY BRIDGE)

HEC-RAS RIVER STATION 21+54, DOWNSTREAM DIRECTION (PRIVATE DRIVEWAY BRIDGE)

HEC-RAS RIVER STATION 21+54, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 21+54, CHANNEL & RIGHT BANK

88 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 22+78, DOWNSTREAM DIRECTION
(PRIVATE DRIVEWAY BRIDGE)

82 FT. UPSTREAM OF HEC-RAS RIVER STATION 21+08, UPSTREAM DIRECTION

92 FT. UPSTREAM OF HEC-RAS RIVER STATION 22+78, UPSTREAM DIRECTION

92 FT. UPSTREAM OF HEC-RAS RIVER STATION 22+78, LEFT BANK

HEC-RAS RIVER STATION 24+32, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 24+32, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 24+32, CHANNEL AND LEFT OVERBANK

HEC-RAS RIVER STATION 26+05, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 26+05, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 26+70, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 26+96, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 26+96, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 29+52, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 29+52, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 29+52, RIGHT OVERBANK

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 30+92, DOWNSTREAM DIRECTION

REACH NO. 32 - STOKES CANYON CHANNEL

FEBRUARY 19, 2015

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 30+92, UPSTREAM DIRECTION

BEGIN PHOTOS UPSTREAM OF
REACH NO. 32 - STOKES CANYON CHANNEL

UPSTREAM OF
REACH NO. 32 - STOKES CANYON CHANNEL
FEBRUARY 19, 2015

HEC-RAS RIVER STATION 32+64, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 32+64, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 32+64, LEFT BANK

HEC-RAS RIVER STATION 32+64, RIGHT OVERBANK

HEC-RAS RIVER STATION 33+47, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 33+47, UPSTREAM DIRECTION

UPSTREAM OF
REACH NO. 32 - STOKES CANYON CHANNEL
FEBRUARY 19, 2015

HEC-RAS RIVER STATION 33+47, LEFT OVERBANK, CHANNEL & RIGHT OVERBANK

HEC-RAS RIVER STATION 35+74, DOWNSTREAM DIRECTION

UPSTREAM OF
REACH NO. 32 - STOKES CANYON CHANNEL
FEBRUARY 19, 2015

HEC-RAS RIVER STATION 35+74, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 35+74, LEFT OVERBANK

HEC-RAS RIVER STATION 35+74, RIGHT OVERBANK

HEC-RAS RIVER STATION 36+99, DOWNSTREAM DIRECTION

UPSTREAM OF
REACH NO. 32 - STOKES CANYON CHANNEL
FEBRUARY 19, 2015

HEC-RAS RIVER STATION 36+99, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 36+99, LEFT OVERBANK

BEGIN PHOTOS DOWNSTREAM OF
REACH NO. 32 - STOKES CANYON CHANNEL

HEC-RAS RIVER STATION 7+00, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 7+00, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 6+91, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 6+45, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 5+69, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 5+69, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 5+69, LEFT OVERBANK

HEC-RAS RIVER STATION 5+69, RIGHT OVERBANK

HEC-RAS RIVER STATION 3+79, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 3+79, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 2+17, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 2+17, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 2+17, RIGHT OVERBANK

HEC-RAS RIVER STATION 00+16, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 00+16, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 00+16, LEFT OVERBANK

HEC-RAS RIVER STATION 00+16, RIGHT OVERBANK

APPENDIX E

ANNOTATED REACH PHOTOGRAPHS

REACH NO. 33, 34, 35 & 37

MEDEA CREEK

UPSTREAM AND DOWNSTREAM REACH EXTENT, HEC-RAS RIVER STATION 11+39, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 11+39, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 14+25, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 14+25, UPSTREAM DIRECTION (AGOURA RD. BRIDGE)

HEC-RAS RIVER STATION 17+34, DOWNSTREAM DIRECTION (AGOURA RD. BRIDGE)

HEC-RAS RIVER STATION 17+34, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 22+42, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 22+42, UPSTREAM DIRECTION
(ROADSIDE DR. & HWY 101 BRIDGES)

28 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 23+28, DOWNSTREAM DIRECTION
(DOWNSTREAM OF REACH NO. 35)

DOWNSTREAM & UPSTREAM EXTENT OF REACH NO. 35, BENEATH U.S. HWY 101 BRIDGE
8 FT. UPSTREAM OF HEC-RAS RIVER STATION 22+92, UPSTREAM DIRECTION

UPSTREAM & DOWNSTREAM EXTENT OF REACH NO. 35, BENEATH U.S. HWY 101 BRIDGE
HEC-RAS RIVER STATION 25+35, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 25+35, RIGHT BANK OF REACH NO. 35

HEC-RAS RIVER STATION 25+35, LEFT BANK AND CHANNEL OF REACH NO. 35

HEC-RAS RIVER STATION 25+35, UPSTREAM DIRECTION (UPSTREAM OF REACH NO. 35)
(BENEATH CANWOOD ST. BRIDGE)

40 FT. UPSTREAM OF HEC-RAS RIVER STATION 25+35, RIGHT BANK
(BENEATH CANWOOD ST. BRIDGE)

40 FT. UPSTREAM OF HEC-RAS RIVER STATION 25+35, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 26+41, DOWNSTREAM DIRECTION (AT STREAMSIDE LEFT)
(LOOKING AT CANWOOD ST. BRIDGE)

HEC-RAS RIVER STATION 26+41, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 26+41, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 27+58, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 27+58, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 28+89, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 28+89, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 28+89, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 29+58, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 30+48, LEFT BANK, CHANNEL AND RIGHT BANK

HEC-RAS RIVER STATION 30+48, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 31+89, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 31+89, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 31+89, UPSTREAM DIRECTION
(OAK CREEK LN. BRIDGE)

HEC-RAS RIVER STATION 32+12, RIGHT BANK
(DOWNSTREAM OF OAK CREEK LN. BRIDGE)

11 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 32+61, LEFT BANK
(BENEATH OAK CREEK LN. BRIDGE)

11 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 32+61, RIGHT BANK
(BENEATH OAK CREEK LN. BRIDGE)

HEC-RAS RIVER STATION 32+96, DOWNSTREAM DIRECTION
(OAK CREEK LN. BRIDGE)

HEC-RAS RIVER STATION 32+96, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 34+09, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 34+09, UPSTREAM DIRECTION

DOWNSTREAM EXTENT OF REACH NO. 34, HEC-RAS RIVER STATION 35+52,
DOWNSTREAM DIRECTION (DOWNSTREAM OF REACH NO. 34)

HEC-RAS RIVER STATION 35+52, CHANNEL, RIGHT BANK AND UPSTREAM DIRECTION

HEC-RAS RIVER STATION 35+52, LEFT BANK, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 36+33, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 36+33, UPSTREAM DIRECTION

UPSTREAM EXTENT OF REACH NO. 34, HEC-RAS RIVER STATION 39+69, DOWNSTREAM DIRECTION

56 FT. UPSTREAM OF HEC-RAS RIVER STATION 39+69, UPSTREAM DIRECTION
KANAN RD. CULVERT (UPSTREAM OF REACH NO. 34)

22 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 48+22, DOWNSTREAM DIRECTION
(KANAN RD. CULVERT)

160 FT. UPSTREAM OF HEC-RAS RIVER STATION 46+40, UPSTREAM DIRECTION

79 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 57+19, DOWNSTREAM DIRECTION
(DOWNSTREAM OF REACH NO. 33)

DOWNSTREAM EXTENT OF REACH NO. 33, HEC-RAS RIVER STATION 57+19, UPSTREAM DIRECTION
(THOUSAND OAKS BLVD. BRIDGE)

HEC-RAS RIVER STATION 57+19, UPSTREAM DIRECTION

50 FT. UPSTREAM OF HEC-RAS RIVER STATION 58+85, UPSTREAM DIRECTION
(BENEATH THOUSAND OAKS BLVD. BRIDGE)

HEC-RAS RIVER STATION 60+42, DOWNSTREAM DIRECTION (THOUSAND OAKS BLVD. BRIDGE)

HEC-RAS RIVER STATION 60+42, CHANNEL AND LEFT BANK

HEC-RAS RIVER STATION 60+42, CHANNEL AND LEFT BANK

HEC-RAS RIVER STATION 60+42, UPSTREAM DIRECTION

30 FT. UPSTREAM OF HEC-RAS RIVER STATION 63+70, UPSTREAM DIRECTION

62 FT. UPSTREAM OF HEC-RAS RIVER STATION 64+38, CHANNEL AND LEFT BANK

UPSTREAM OF
REACH NO. 33 - MEDEA CREEK
FEBRUARY 20, 2015

BEGIN PHOTOS UPSTREAM OF
REACH NO. 33 - MEDEA CREEK

HEC-RAS RIVER STATION 68+03, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 68+03, UPSTREAM DIRECTION

139 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 70+14, CHANNEL AND LEFT BANK

UPSTREAM OF
REACH NO. 33 - MEDEA CREEK
FEBRUARY 20, 2015

HEC-RAS RIVER STATION 70+14, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 70+14, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 70+14, RIGHT BANK, CHANNEL AND LEFT BANK

HEC-RAS RIVER STATION 72+57, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 72+57, CHANNEL AND RIGHT BANK

HEC-RAS RIVER STATION 73+94, UPSTREAM DIRECTION

UPSTREAM OF
REACH NO. 33 - MEDEA CREEK
FEBRUARY 20, 2015

HEC-RAS RIVER STATION 73+94, LEFT OVERBANK, DOWNSTREAM DIRECTION

BEGIN PHOTOS DOWNSTREAM OF
REACH NO. 37 - MEDEA CREEK

DOWNSTREAM OF
REACH NO. 37 - MEDEA CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 6+68, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 6+68, DOWNSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 37 - MEDEA CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 4+78, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 4+78, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 37 - MEDEA CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 4+78, LEFT OVERBANK

HEC-RAS RIVER STATION 3+43, RIGHT OVERBANK

DOWNSTREAM OF
REACH NO. 37 - MEDEA CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 3+43, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 1+79, DOWNSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 37 - MEDEA CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 1+79, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 0+78, DOWNSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 37 - MEDEA CREEK
FEBRUARY 24, 2015

HEC-RAS RIVER STATION 0+78, UPSTREAM DIRECTION

APPENDIX F

ANNOTATED REACH PHOTOGRAPHS

REACH NO. 36

CHESEBORO CREEK

UPSTREAM AND DOWNSTREAM REACH EXTENTS, HEC-RAS RIVER STATION 10+04, UPSTREAM DIRECTION

DOWNSTREAM REACH EXTENT, HEC-RAS RIVER STATION 10+04, RIGHT OVERBANK

DOWNSTREAM REACH EXTENT, HEC-RAS RIVER STATION 10+04, LEFT OVERBANK

BEGIN PHOTOS UPSTREAM OF
REACH NO. 36 - CHESEBORO CREEK

UPSTREAM OF
REACH NO. 36 - CHESEBORO CREEK
FEBRUARY 26, 2015

HEC-RAS RIVER STATION 11+90, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 11+90, UPSTREAM DIRECTION

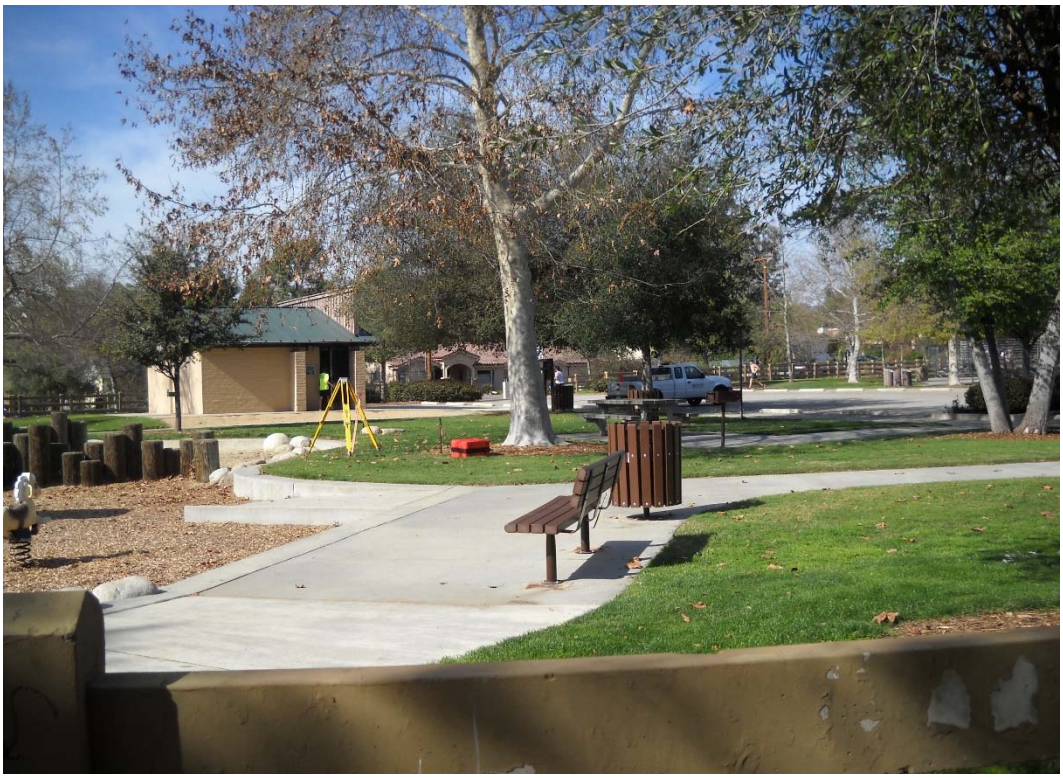
HEC-RAS RIVER STATION 11+90, LEFT OVERBANK

HEC-RAS RIVER STATION 11+90, RIGHT OVERBANK

HEC-RAS RIVER STATION 12+88, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 12+88, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 12+88, LEFT BANK



HEC-RAS RIVER STATION 12+88, RIGHT OVERBANK (OLD AGOURA PARK)

HEC-RAS RIVER STATION 14+13, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 14+13, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 14+13, LEFT OVERBANK

HEC-RAS RIVER STATION 14+13, RIGHT OVERBANK (OLD AGOURA PARK)

UPSTREAM OF
REACH NO. 36 - CHESEBORO CREEK
FEBRUARY 26, 2015

HEC-RAS RIVER STATION 15+82, DOWNSTREAM DIRECTION

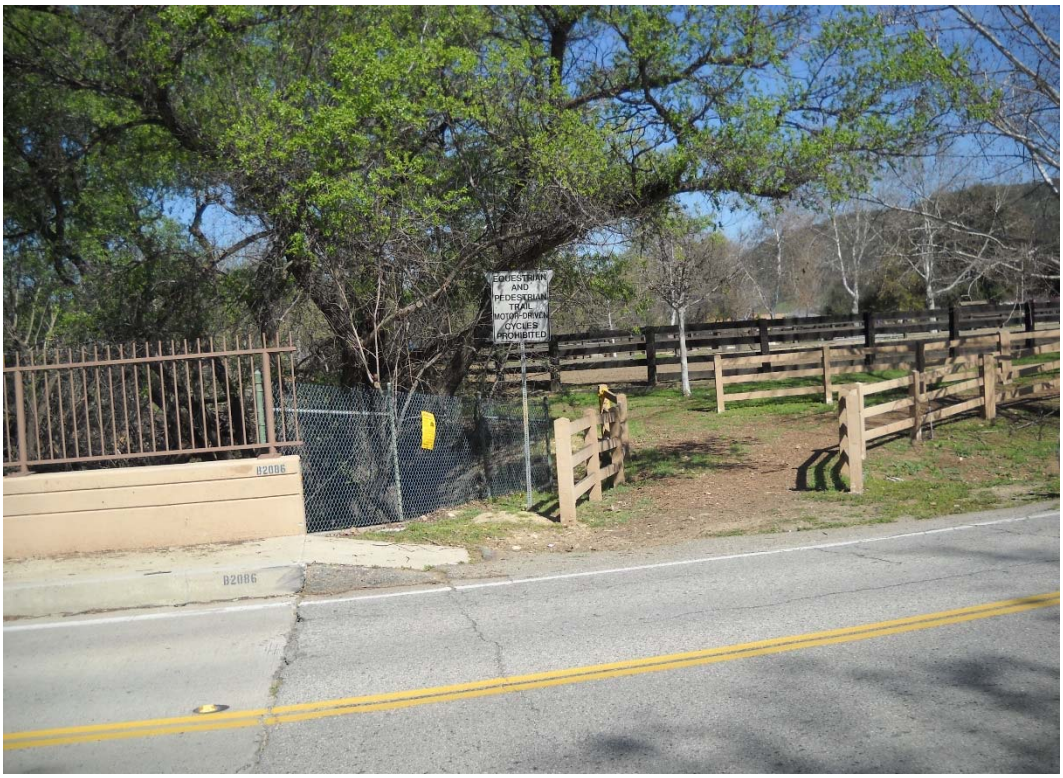
HEC-RAS RIVER STATION 15+82, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 16+84, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 16+84, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 36 - CHESEBORO CREEK
FEBRUARY 26, 2015

BEGIN PHOTOS DOWNSTREAM OF
REACH NO. 36 - CHESEBORO CREEK



HEC-RAS RIVER STATION 9+62, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 36 - CHESEBORO CREEK
FEBRUARY 26, 2015

HEC-RAS RIVER STATION 9+62, LEFT OVERBANK

HEC-RAS RIVER STATION 7+00, UPSTREAM DIRECTION (DRIVER AVE. BRIDGE)

DOWNSTREAM OF
REACH NO. 36 - CHESEBORO CREEK
FEBRUARY 26, 2015

HEC-RAS RIVER STATION 7+00, DOWNSTREAM DIRECTION

77 FT. UPSTREAM OF HEC-RAS RIVER STATION 3+40, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 36 - CHESEBORO CREEK
FEBRUARY 26, 2015

5 FT. DOWNSTREAM OF HEC-RAS RIVER STATION 4+42, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 00+16, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 36 - CHESEBORO CREEK
FEBRUARY 26, 2015

HEC-RAS RIVER STATION 00+16, DOWNSTREAM DIRECTION
(CANWOOD ST. BRIDGE AND U.S. HWY 101 BRIDGE)

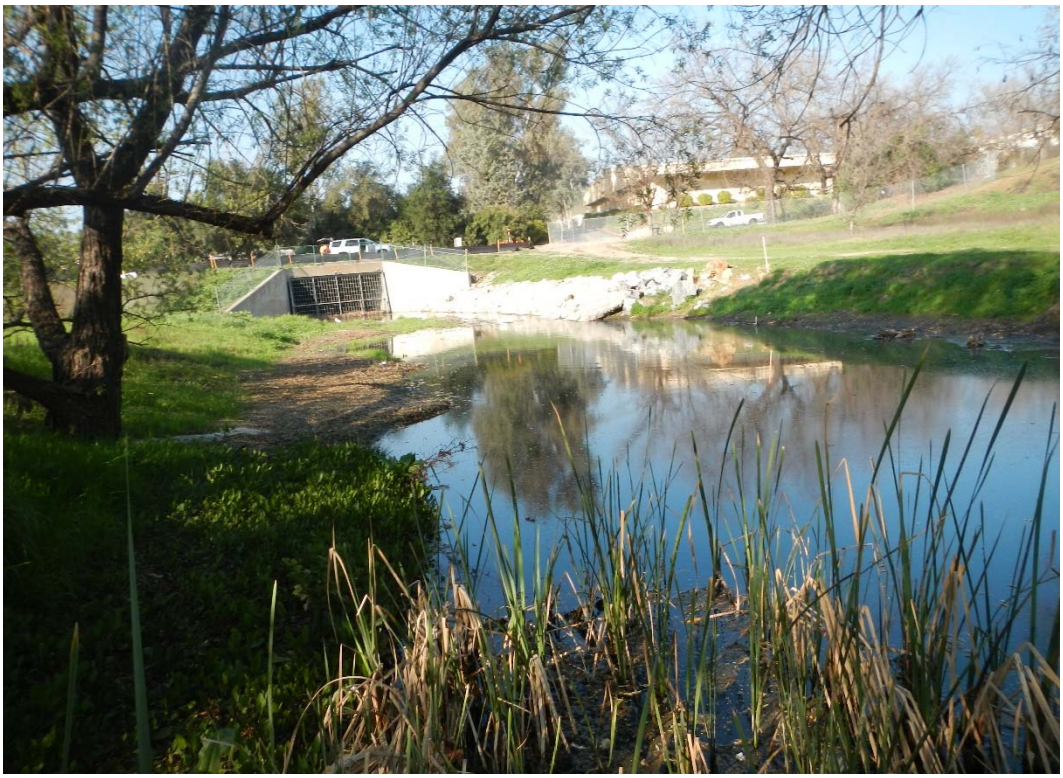
APPENDIX G

ANNOTATED REACH PHOTOGRAPHS

REACH NO. 38

LINDERO CREEK

REACH DOWNSTREAM EXTENT, HEC-RAS RIVER STATION 10+35, DOWNSTREAM DIRECTION



REACH DOWNSTREAM EXTENT, HEC-RAS RIVER STATION 10+35, UPSTREAM DIRECTION

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 11+15, DOWNSTREAM DIRECTION

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 11+15, UPSTREAM DIRECTION

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 11+15, LEFT OVERBANK, CHANNEL & RIGHT OVERBANK

REACH UPSTREAM EXTENT, HEC-RAS RIVER STATION 11+15, CHANNEL

UPSTREAM OF
REACH NO. 38 - LINDERO CREEK
FEBRUARY 26, 2015

BEGIN PHOTOS UPSTREAM OF
REACH NO. 38 - LINDERO CREEK

HEC-RAS RIVER STATION 12+00, DOWNSTREAM DIRECTION

UPSTREAM OF
REACH NO. 38 - LINDERO CREEK
FEBRUARY 26, 2015

HEC-RAS RIVER STATION 12+00, UPSTREAM DIRECTION

BEGIN PHOTOS DOWNSTREAM OF
REACH NO. 38 - LINDERO CREEK

DOWNSTREAM OF
REACH NO. 38 - LINDERO CREEK
FEBRUARY 26, 2015

HEC-RAS RIVER STATION 9+36, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 9+36, UPSTREAM DIRECTION

DOWNSTREAM OF
REACH NO. 38 - LINDERO CREEK
FEBRUARY 26. 2015

HEC-RAS RIVER STATION 7+38, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 7+38, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 5+77, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 5+77, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 5+77, LEFT OVERBANK

HEC-RAS RIVER STATION 3+90, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 3+90, RIGHT OVERBANK

HEC-RAS RIVER STATION 2+85, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 2+85, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 2+85, LEFT BANK, CHANNEL & RIGHT BANK

HEC-RAS RIVER STATION 00+22, DOWNSTREAM DIRECTION

HEC-RAS RIVER STATION 00+22, UPSTREAM DIRECTION

HEC-RAS RIVER STATION 00+22, LEFT OVERBANK

HEC-RAS RIVER STATION 00+22, RIGHT OVERBANK

APPENDIX H

MANNING'S ROUGHNESS DETERMINATION

(RED DENOTES SOFT-BOTTOM REACH)

Reach No. 26 – Project 74: Existing Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1697	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1559	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1420	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1350	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1206	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1157	Left Bank		0.025																	0.04		1			0.065
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025																0.015			1			0.040
1097	Left Bank		0.025																	0.04		1			0.065
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025																0.015			1			0.040
945	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025																0.015			1			0.040
774	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025																0.015			1			0.040
718	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025																0.015			1			0.040
572	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025																0.015			1			0.040

Reach No. 26 – Project 74: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
530	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025																0.015			1			0.040
370	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025																	0.03		1			0.055
	Right Bank		0.025																0.015			1			0.040
221	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025																	0.04		1			0.065
	Right Bank		0.025																0.015			1			0.040
101	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
68	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 26 – Project 74: Assumed Design Conditions

Reach, Station, or X-Section		n_o					n_1				n_2			n_3				n_4				m			Total "n"
		Base "n"					Surface Irregularity				Variation in Channel Cross Section			Obstructions				Vegetation				Meandering			
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1697	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1559	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1420	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1350	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1206	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1157	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025															0.005				1			0.030
1097	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025															0.005				1			0.030
945	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025															0.005				1			0.030
774	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025															0.005				1			0.030
718	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025															0.005				1			0.030
572	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025															0.005				1			0.030

Reach No. 26 – Project 74: Assumed Design Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
530	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025															0.005				1			0.030
370	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
221	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
101	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
68	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 28 – Triunfo Creek: Existing Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
2545	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03		0.005							0.01				0.015			1			0.060
2412	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03		0.005							0.01				0.015			1			0.060
2239	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03		0.005							0.01				0.015			1			0.060
2103	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03		0.005							0.01					0.035		1			0.080
1945	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03																1			0.030
1765	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03																1			0.030
1627	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03																1			0.030
1539	Left Bank					0.035																1			0.035
	Main Channel					0.03													0.015			1			0.045
	Right Bank					0.03																1			0.030
1369	Left Bank					0.035																1			0.035
	Main Channel					0.03													0.015			1			0.045
	Right Bank					0.03																1			0.030
1208	Left Bank					0.03																1			0.030
	Main Channel					0.03													0.015			1			0.045
	Right Bank					0.03																1			0.030
1041	Left Bank		0.025															0.01				1			0.035
	Main Channel					0.03													0.01			1			0.040
	Right Bank		0.025															0.005				1			0.030

Reach No. 28 – Triunfo Creek: Existing Conditions (continued)

Reach, Station, or X-Section		n_o					n_1				n_2			n_3				n_4				m			Total "n"
		Base "n"					Surface Irregularity				Variation in Channel Cross Section			Obstructions				Vegetation				Meandering			
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
921	Left Bank		0.03															0.01				1			0.040
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03															0.005				1			0.035
767	Left Bank		0.03															0.01				1			0.040
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03															0.005				1			0.035
595	Left Bank		0.03															0.01				1			0.040
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03															0.01				1			0.040
528	Left Bank		0.03																			1			0.030
	Main Channel		0.03																0.01			1			0.040
	Right Bank				0.015																	1			0.015
451	Left Bank				0.015																	1			0.015
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03																0.015			1			0.045
363	Left Bank				0.015																	1			0.015
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03																0.015			1			0.045
163	Left Bank		0.03																			1			0.030
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03																0.015			1			0.045
4	Left Bank		0.03																			1			0.030
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03																0.015			1			0.045

Reach No. 28 – Triunfo Creek: Assumed Design Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
2545	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03		0.005							0.01				0.015			1			0.060
2412	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03		0.005							0.01				0.015			1			0.060
2239	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03		0.005							0.01				0.015			1			0.060
2103	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03		0.005							0.01					0.035		1			0.080
1945	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03																1			0.030
1765	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03									0.015				0.015			1			0.060
	Right Bank					0.03																1			0.030
1627	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03																1			0.030
	Right Bank					0.03																1			0.030
1539	Left Bank					0.035																1			0.035
	Main Channel					0.03																1			0.030
	Right Bank					0.03																1			0.030
1369	Left Bank					0.035																1			0.035
	Main Channel					0.03																1			0.030
	Right Bank					0.03																1			0.030
1208	Left Bank					0.03																1			0.030
	Main Channel					0.03																1			0.030
	Right Bank					0.03																1			0.030
1041	Left Bank		0.025															0.01				1			0.035
	Main Channel					0.03													0.01			1			0.040
	Right Bank		0.025															0.005				1			0.030

Reach No. 28 – Triunfo Creek: Assumed Design Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
921	Left Bank		0.03															0.01				1			0.040
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03															0.005				1			0.035
767	Left Bank		0.03															0.01				1			0.040
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03															0.005				1			0.035
595	Left Bank		0.03															0.01				1			0.040
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03															0.01				1			0.040
528	Left Bank		0.03																			1			0.030
	Main Channel		0.03																0.01			1			0.040
	Right Bank				0.015																	1			0.015
451	Left Bank				0.015																	1			0.015
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03																0.015			1			0.045
363	Left Bank				0.015																	1			0.015
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03																0.015			1			0.045
163	Left Bank		0.03																			1			0.030
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03																0.015			1			0.045
4	Left Bank		0.03																			1			0.030
	Main Channel		0.03																0.01			1			0.040
	Right Bank		0.03																0.015			1			0.045

Reach No. 29 – Las Virgenes Creek: Existing Conditions

Reach, Station, or X-Section		n_o					n_1				n_2			n_3				n_4				m			Total "n"
		Base "n"					Surface Irregularity				Variation in Channel Cross Section			Obstructions				Vegetation				Meandering			
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1463	Left Bank		0.025					0.004									0.04				0.08	1			0.149
	Main Channel		0.025					0.003								0.03		0.003				1			0.061
	Right Bank		0.025					0.004									0.04				0.08	1			0.149
1370	Left Bank		0.025					0.004									0.04				0.08	1			0.149
	Main Channel		0.025					0.003								0.03		0.003				1			0.061
	Right Bank		0.025					0.004									0.04				0.08	1			0.149
1284	Left Bank		0.025					0.004									0.04				0.08	1			0.149
	Main Channel		0.025					0.003								0.03		0.003				1			0.061
	Right Bank		0.025					0.004									0.04				0.08	1			0.149
1170	Left Bank		0.025					0.004									0.04				0.08	1			0.149
	Main Channel		0.025					0.003						0.001				0.005				1			0.034
	Right Bank		0.03							0.015					0.015							1			0.060
1079	Left Bank		0.025																0.014			1			0.039
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
985	Left Bank		0.025					0.002											0.012			1			0.039
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
896	Left Bank		0.025					0.002											0.017			1			0.044
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
821	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
788	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
682	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
559	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 29 – Las Virgenes Creek: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
432	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
338	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
216	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
103	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
2	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 29 – Las Virgenes Creek: BonTerra Psomas Recommended Vegetation Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1463	Left Bank		0.025					0.004									0.04				0.08	1			0.149
	Main Channel		0.025					0.003								0.03		0.003				1			0.061
	Right Bank		0.025					0.004									0.04				0.08	1			0.149
1370	Left Bank		0.025					0.004									0.04				0.08	1			0.149
	Main Channel		0.025					0.003								0.03		0.003				1			0.061
	Right Bank		0.025					0.004									0.04				0.08	1			0.149
1284	Left Bank		0.025					0.004									0.04				0.08	1			0.149
	Main Channel		0.025					0.003								0.03		0.003				1			0.061
	Right Bank		0.025					0.004									0.04				0.08	1			0.149
1170[(1)]	Left Bank		0.025					0.004									0.04				0.08	1			0.149
	Main Channel		0.025					0.003						0.001				0.005				1			0.034
	Right Bank		0.03							0.015					0.015							1			0.060
1079[(1)]	Left Bank		0.025																0.019			1			0.044
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
985[(1)]	Left Bank		0.025					0.002											0.017			1			0.044
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
896[(1)]	Left Bank		0.025					0.002											0.017			1			0.044
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.004									0.04				0.08	1			0.015
821	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
788	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
682	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
559	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

(1) It was assumed any plantings will be randomly placed with at least 20 ft of spacing between plantings

Reach No. 29 – Las Virgenes Creek: BonTerra Psomas Recommended Vegetation Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
432	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
338	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
216	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
103	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
2	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 32 – Stokes Canyon Channel: Existing Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
3699	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025												0.01						0.05	1			0.085
	Right Bank				0.015																	1			0.015
3574	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025												0.01						0.05	1			0.085
	Right Bank				0.015																	1			0.015
3367	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025												0.01						0.05	1			0.085
	Right Bank				0.015																	1			0.015
3347	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
3335	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.045																1			0.045
	Right Bank				0.015																	1			0.015
3264	Left Bank			0.025																		1			0.025
	Main Channel					0.045															0.06	1			0.105
	Right Bank		0.015																			1			0.015
3092	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
2952	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
2798	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
2696	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
2670	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025																			1			0.025
	Right Bank		0.025															0.005				1			0.030

Reach No. 32 – Stokes Canyon Channel: Existing Conditions (continued)

Reach, Station, or X-Section		n_o					n_1				n_2			n_3				n_4				m			Total "n"
		Base "n"					Surface Irregularity				Variation in Channel Cross Section			Obstructions				Vegetation				Meandering			
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
2637	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025																			1			0.025
	Right Bank		0.025															0.005				1			0.030
2605	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
2432	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank				0.015														0.015			1			0.030
2278	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank				0.015														0.015			1			0.030
2154	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank				0.015														0.015			1			0.030
2108	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1954	Left Bank		0.025															0.005				1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1940	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1906	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1754	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1557	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030

Reach No. 32 – Stokes Canyon Channel: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1535	Left Bank		0.025															0.005				1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1508	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1395	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1233	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1221	Left Bank		0.025																0.015			1			0.040
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1178	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1050	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025																0.015			1			0.040
900	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025																0.015			1			0.040
700	Left Bank		0.025																	0.03		1			0.055
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																	0.03		1			0.055
691	Left Bank		0.025					0.005													0.075	1			0.105
	Main Channel		0.025					0.005											0.015			1			0.045
	Right Bank		0.025					0.005													0.075	1			0.105
645	Left Bank		0.025					0.005													0.075	1			0.105
	Main Channel		0.025					0.005											0.015			1			0.045
	Right Bank		0.025																0.015			1			0.040

Reach No. 32 – Stokes Canyon Channel: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
569	Left Bank		0.025					0.005													0.075	1			0.105
	Main Channel		0.025					0.005												0.035		1			0.065
	Right Bank		0.025																0.015			1			0.040
379	Left Bank		0.025					0.005													0.095	1			0.125
	Main Channel		0.025					0.005												0.045		1			0.075
	Right Bank		0.025																0.015			1			0.040
217	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025					0.005												0.045		1			0.075
	Right Bank		0.025														0.1[(2)]					1			0.125
16	Left Bank		0.025					0.005													0.095	1			0.125
	Main Channel		0.025					0.005												0.045		1			0.075
	Right Bank		0.025																			1			0.025

(2) The large value for obstructions represents the horse facilities that will significantly impede flow.

Reach No. 32 – Stokes Canyon Channel: Design Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
3699	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025												0.01						0.05	1			0.085
	Right Bank				0.015																	1			0.015
3574	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025												0.01						0.05	1			0.085
	Right Bank				0.015																	1			0.015
3367	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025												0.01						0.05	1			0.085
	Right Bank				0.015																	1			0.015
3347	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
3335	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.045																1			0.045
	Right Bank				0.015																	1			0.015
3264	Left Bank			0.025																		1			0.025
	Main Channel					0.045															0.06	1			0.105
	Right Bank		0.015																			1			0.015
3092	Left Bank		0.025																0.015			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
2952	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
2798	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
2696	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
2670	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030

Reach No. 32 – Stokes Canyon Channel: Design Conditions (continued)

Reach, Station, or X-Section		n_o					n_1				n_2			n_3				n_4				m			Total "n"
		Base "n"					Surface Irregularity				Variation in Channel Cross Section			Obstructions				Vegetation				Meandering			
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
2637	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
2605	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
2432	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank				0.015														0.015			1			0.030
2278	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank				0.015														0.015			1			0.030
2154	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank				0.015														0.015			1			0.030
2108	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
1954	Left Bank		0.025															0.005				1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1940	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1906	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
1754	Left Bank		0.025																0.015			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
1557	Left Bank		0.025																0.015			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030

Reach No. 32 – Stokes Canyon Channel: Design Conditions (continued)

Reach, Station, or X-Section		n_o					n_1				n_2			n_3				n_4				m			Total "n"
		Base "n"					Surface Irregularity				Variation in Channel Cross Section			Obstructions				Vegetation				Meandering			
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1535	Left Bank		0.025															0.005				1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1508	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1395	Left Bank		0.025															0.005				1			0.030
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
1233	Left Bank		0.025																0.015			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
1221	Left Bank		0.025																0.015			1			0.040
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1178	Left Bank		0.025																0.015			1			0.040
	Main Channel																					1			0.0225
	Right Bank		0.025															0.005				1			0.030
1050	Left Bank		0.025															0.005				1			0.030
	Main Channel																					1			0.0225
	Right Bank		0.025																0.015			1			0.040
900	Left Bank		0.025															0.005				1			0.030
	Main Channel																					1			0.0225
	Right Bank		0.025																0.015			1			0.040
700	Left Bank		0.025																	0.03		1			0.055
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																	0.03		1			0.055
691	Left Bank		0.025					0.005													0.075	1			0.105
	Main Channel		0.025					0.005											0.015			1			0.045
	Right Bank		0.025					0.005													0.075	1			0.105
645	Left Bank		0.025					0.005													0.075	1			0.105
	Main Channel		0.025					0.005											0.015			1			0.045
	Right Bank		0.025																0.015			1			0.040

Reach No. 32 – Stokes Canyon Channel: Design Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
569	Left Bank		0.025					0.005													0.075	1			0.105
	Main Channel		0.025					0.005												0.035		1			0.065
	Right Bank		0.025																0.015			1			0.040
379	Left Bank		0.025					0.005													0.095	1			0.125
	Main Channel		0.025					0.005												0.045		1			0.075
	Right Bank		0.025																0.015			1			0.040
217	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025					0.005												0.045		1			0.075
	Right Bank		0.025														0.1[(2)]					1			0.125
16	Left Bank		0.025					0.005													0.095	1			0.125
	Main Channel		0.025					0.005												0.045		1			0.075
	Right Bank		0.025																			1			0.025

(2) The large value for obstructions represents the horse facilities that will significantly impede flow.

Reach No. 32 – Stokes Canyon Channel: BonTerra Psomas Recommended Vegetation Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
3699	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025												0.01						0.05	1			0.085
	Right Bank				0.015																	1			0.015
3574	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025												0.01						0.05	1			0.085
	Right Bank				0.015																	1			0.015
3367	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025												0.01						0.05	1			0.085
	Right Bank				0.015																	1			0.015
3347	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
3335	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.045																1			0.045
	Right Bank				0.015																	1			0.015
3264	Left Bank			0.025																		1			0.025
	Main Channel					0.045															0.06	1			0.105
	Right Bank		0.015																			1			0.015
3092	Left Bank		0.025																0.02			1			0.045
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
2952	Left Bank		0.025					0.005											0.015			1			0.045
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
2798	Left Bank		0.025					0.005											0.015			1			0.045
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
2696	Left Bank		0.025					0.005											0.015			1			0.045
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
2670	Left Bank		0.025					0.005											0.015			1			0.045
	Main Channel		0.025																			1			0.025
	Right Bank		0.025															0.005				1			0.030

Reach No. 32 – Stokes Canyon Channel: BonTerra Psomas Recommended Vegetation Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
2637	Left Bank		0.025					0.005											0.015			1			0.045
	Main Channel		0.025																			1			0.025
	Right Bank		0.025															0.005				1			0.030
2605	Left Bank		0.025					0.005											0.015			1			0.045
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
2432	Left Bank		0.025					0.005											0.015			1			0.045
	Main Channel		0.025															0.005				1			0.030
	Right Bank				0.015														0.015			1			0.030
2278	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank				0.015														0.015			1			0.030
2154	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank				0.015														0.015			1			0.030
2108	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1954	Left Bank		0.025															0.005				1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1940	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1906	Left Bank		0.025					0.005											0.01			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1754	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1557	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030

Reach No. 32 – Stokes Canyon Channel: BonTerra Psomas Recommended Vegetation Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1535	Left Bank		0.025															0.005				1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1508	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1395	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1233	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1221	Left Bank		0.025																0.015			1			0.040
	Main Channel				0.015																	1			0.015
	Right Bank		0.025															0.005				1			0.030
1178	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025															0.005				1			0.030
1050	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025																0.015			1			0.040
900	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025															0.005				1			0.030
	Right Bank		0.025																0.015			1			0.040
700	Left Bank		0.025																	0.03		1			0.055
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																	0.03		1			0.055
691	Left Bank		0.025					0.005													0.075	1			0.105
	Main Channel		0.025					0.005											0.015			1			0.045
	Right Bank		0.025					0.005													0.075	1			0.105
645	Left Bank		0.025					0.005													0.075	1			0.105
	Main Channel		0.025					0.005											0.015			1			0.045
	Right Bank		0.025																0.015			1			0.040

Reach No. 32 – Stokes Canyon Channel: BonTerra Psomas Recommended Vegetation Conditions (continued)

		n_o					n_1				n_2			n_3				n_4				m			
		Base "n"					Surface Irregularity				Variation in Channel Cross Section			Obstructions				Vegetation				Meandering			
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
Reach, Station, or X-Section		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	**Total "n"**
569	Left Bank		0.025					0.005													0.075	1			0.105
	Main Channel		0.025					0.005												0.035		1			0.065
	Right Bank		0.025																0.015			1			0.040
379	Left Bank		0.025					0.005													0.095	1			0.125
	Main Channel		0.025					0.005												0.045		1			0.075
	Right Bank		0.025																0.015			1			0.040
217	Left Bank		0.025																0.015			1			0.040
	Main Channel		0.025					0.005												0.045		1			0.075
	Right Bank		0.025														0.1[(2)]					1			0.125
16	Left Bank		0.025					0.005													0.095	1			0.125
	Main Channel		0.025					0.005												0.045		1			0.075
	Right Bank		0.025																			1			0.025

(2) The large value for obstructions represents the horse facilities that will significantly impede flow.

Reach No. 33, 34, 35 and 37 – Medea Creek: Existing Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
7394	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
7257	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
7014	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6833	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6803	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6679	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6578	Left Bank				0.015																	1			0.015
	Main Channel		0.03					0.002													0.08	1			0.112
	Right Bank				0.015																	1			0.015
6438	Left Bank				0.015																	1			0.015
	Main Channel					0.03															0.08	1			0.110
	Right Bank				0.015																	1			0.015
6421	Left Bank				0.015																	1			0.015
	Main Channel		0.025																			1			0.025
	Right Bank				0.015																	1			0.015
6370	Left Bank				0.015																	1			0.015
	Main Channel		0.025																		0.08	1			0.105
	Right Bank				0.015																	1			0.015
6283	Left Bank				0.015																	1			0.015
	Main Channel		0.025																		0.08	1			0.105
	Right Bank				0.015																	1			0.015

Reach No. 33, 34, 35 and 37 – Medea Creek: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
6138	Left Bank				0.015																	1			0.015
	Main Channel		0.025																		0.08	1			0.105
	Right Bank				0.015																	1			0.015
6042	Left Bank				0.015																	1			0.015
	Main Channel		0.025																		0.08	1			0.105
	Right Bank				0.015																	1			0.015
5985	Left Bank				0.015																	1			0.015
	Main Channel		0.025																		0.08	1			0.105
	Right Bank				0.015																	1			0.015
5885	Left Bank				0.015																	1			0.015
	Main Channel		0.027																			1			0.027
	Right Bank				0.015																	1			0.015
5881	Left Bank				0.015																	1			0.015
	Main Channel		0.027																			1			0.027
	Right Bank				0.015																	1			0.015
5766	Left Bank				0.015																	1			0.015
	Main Channel				0.027																	1			0.027
	Right Bank				0.015																	1			0.015
5719	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
5566	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
5369	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
5172	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4997	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 33, 34, 35 and 37 – Medea Creek: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
4822	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4640	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4603	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4585	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4399	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4384	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4350	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4200	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4148	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
3969	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
3918	Left Bank					0.035																1			0.035
	Main Channel		0.025																			1			0.025
	Right Bank					0.035																1			0.035

Reach No. 33, 34, 35 and 37 – Medea Creek: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
3862	Left Bank		0.025																			1			0.025
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025																			1			0.025
3725	Left Bank		0.025																			1			0.025
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3633	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3552	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3409	Left Bank		0.015																			1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3296	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3261	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank				0.015																	1			0.015
3212	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank				0.015																	1			0.015
3189	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3048	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2958	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135

Reach No. 33, 34, 35 and 37 – Medea Creek: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
2889	Left Bank		0.025						0.01							0.02					0.08	1			0.135
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2758	Left Bank		0.025						0.01							0.02					0.08	1			0.135
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2641	Left Bank		0.025						0.01							0.02					0.08	1			0.135
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2589	Left Bank		0.025						0.01							0.02				0.04		1			0.095
	Main Channel		0.025						0.01							0.02				0.04		1			0.095
	Right Bank		0.025						0.01							0.02				0.04		1			0.095
2535	Left Bank					0.03																1			0.030
	Main Channel					0.03																1			0.030
	Right Bank					0.03																1			0.030
2328	Left Bank					0.03																1			0.030
	Main Channel					0.03																1			0.030
	Right Bank					0.03																1			0.030
2292	Left Bank		0.025																			1			0.025
	Main Channel		0.025																			1			0.025
	Right Bank		0.025																			1			0.025
2267	Left Bank		0.025																			1			0.025
	Main Channel		0.025																			1			0.025
	Right Bank		0.025																			1			0.025
2242	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
2094.5	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1947	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 33, 34, 35 and 37 – Medea Creek: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1840.5	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1734	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1671	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1626	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1596	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1576	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1425	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1340	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1239.66	Left Bank		0.02																			1			0.020
	Main Channel		0.015																			1			0.015
	Right Bank		0.027																			1			0.027
1139.33	Left Bank		0.025																			1			0.025
	Main Channel		0.015																			1			0.015
	Right Bank		0.028																			1			0.028
1039	Left Bank					0.03																1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank					0.03																1			0.030

Reach No. 33, 34, 35 and 37 – Medea Creek: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1026	Left Bank		0.025															0.005				1			0.030
	Main Channel					0.03																1			0.030
	Right Bank		0.025															0.005				1			0.030
910	Left Bank		0.025												0.005							1			0.030
	Main Channel		0.025							0.012					0.005				0.02			1			0.062
	Right Bank		0.025												0.005							1			0.030
876	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025																			1			0.025
668	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025																			1			0.025
478	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025																			1			0.025
343	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025							0.012					0.005						0.065	1			0.107
179	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.08	1			0.122
	Right Bank		0.025							0.012					0.005						0.08	1			0.122
78	Left Bank		0.025							0.012					0.005						0.08	1			0.122
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025							0.012					0.005						0.065	1			0.107

Reach No. 33, 34, 35 and 37 – Medea Creek: Assumed Design/Design Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
7394	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
7257	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
7014	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6833	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6803	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6679	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6578[3]	Left Bank				0.015																	1			0.015
	Main Channel																					1			0.070
	Right Bank				0.015																	1			0.015
6438[3]	Left Bank				0.015																	1			0.015
	Main Channel																					1			0.070
	Right Bank				0.015																	1			0.015
6421	Left Bank				0.015																	1			0.015
	Main Channel		0.025																			1			0.025
	Right Bank				0.015																	1			0.015
6370[3]	Left Bank				0.015																	1			0.015
	Main Channel																					1			0.070
	Right Bank				0.015																	1			0.015
6283[3]	Left Bank				0.015																	1			0.015
	Main Channel																					1			0.070
	Right Bank				0.015																	1			0.015

Reach No. 33, 34, 35 and 37 – Medea Creek: Assumed Design/Design Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
6138[3]	Left Bank				0.015																	1			0.015
	Main Channel																					1			0.070
	Right Bank				0.015																	1			0.015
6042[3]	Left Bank				0.015																	1			0.015
	Main Channel																					1			0.070
	Right Bank				0.015																	1			0.015
5985[3]	Left Bank				0.015																	1			0.015
	Main Channel																					1			0.070
	Right Bank				0.015																	1			0.015
5885[3]	Left Bank				0.015																	1			0.015
	Main Channel																					1			0.070
	Right Bank				0.015																	1			0.015
5881[3]	Left Bank				0.015																	1			0.015
	Main Channel																					1			0.070
	Right Bank				0.015																	1			0.015
5766[3]	Left Bank				0.015																	1			0.015
	Main Channel																					1			0.070
	Right Bank				0.015																	1			0.015
5719	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
5566	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
5369	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
5172	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4997	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 33, 34, 35 and 37 – Medea Creek: Assumed Design/Design Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
4822	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4640	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4603	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4585	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4399	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4384	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4350	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4200	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4148	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
3969	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
3918[4]	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027

Reach No. 33, 34, 35 and 37 – Medea Creek: Assumed Design/Design Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
3862[4]	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027
3725[4]	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027
3633[4]	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027
3552[4]	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027
3409	Left Bank		0.015																			1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3296	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3261	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank				0.015																	1			0.015
3212	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank				0.015																	1			0.015
3189	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3048	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2958	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135

Reach No. 33, 34, 35 and 37 – Medea Creek: Assumed Design/Design Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
2889	Left Bank		0.025						0.01							0.02					0.08	1			0.135
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2758	Left Bank		0.025						0.01							0.02					0.08	1			0.135
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2641	Left Bank		0.025						0.01							0.02					0.08	1			0.135
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2589	Left Bank		0.025						0.01							0.02				0.04		1			0.095
	Main Channel		0.025						0.01							0.02				0.04		1			0.095
	Right Bank		0.025						0.01							0.02				0.04		1			0.095
2535[4]	Left Bank					0.03																1			0.030
	Main Channel					0.03																1			0.030
	Right Bank					0.03																1			0.030
2328[4]	Left Bank					0.03																1			0.030
	Main Channel					0.03																1			0.030
	Right Bank					0.03																1			0.030
2292	Left Bank		0.025																			1			0.025
	Main Channel		0.025																			1			0.025
	Right Bank		0.025																			1			0.025
2267	Left Bank		0.025																			1			0.025
	Main Channel		0.025																			1			0.025
	Right Bank		0.025																			1			0.025
2242	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
2094.5	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1947	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 33, 34, 35 and 37 – Medea Creek: Assumed Design/Design Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1840.5	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1734	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1671	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1626	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1596	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1576	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1425	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1340	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1239.66	Left Bank		0.02																			1			0.020
	Main Channel		0.015																			1			0.015
	Right Bank		0.027																			1			0.027
1139.33	Left Bank		0.025																			1			0.025
	Main Channel		0.015																			1			0.015
	Right Bank		0.028																			1			0.028
1039	Left Bank					0.03																1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank					0.03																1			0.030

Reach No. 33, 34, 35 and 37 – Medea Creek: Assumed Design/Design Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1026[4]	Left Bank		0.025				0.005															1			0.030
	Main Channel					0.03																1			0.030
	Right Bank		0.025				0.005															1			0.030
910[4]	Left Bank		0.025				0.005															1			0.030
	Main Channel		0.025				0.005															1			0.030
	Right Bank		0.025				0.005															1			0.030
876[4]	Left Bank		0.025				0.005															1			0.030
	Main Channel		0.025				0.005															1			0.030
	Right Bank		0.025																			1			0.025
668	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025																			1			0.025
478	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025																			1			0.025
343	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025							0.012					0.005						0.065	1			0.107
179	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.08	1			0.122
	Right Bank		0.025							0.012					0.005						0.08	1			0.122
78	Left Bank		0.025							0.012					0.005						0.08	1			0.122
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025							0.012					0.005						0.065	1			0.107

(3) From design documents
(4) Cleared vegetation

Reach No. 33, 34, 35 and 37 – Medea Creek: Cleared Vegetation Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
7394	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
7257	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
7014	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6833	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6803	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6679	Left Bank		0.025															0.001				1			0.026
	Main Channel		0.025						0.01			0.005				0.02					0.08	1			0.140
	Right Bank		0.025															0.001				1			0.026
6578	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.001														1			0.0026
	Right Bank				0.015																	1			0.015
6438	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
6421	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.002														1			0.025
	Right Bank				0.015																	1			0.015
6370	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
6283	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015

Reach No. 33, 34, 35 and 37 – Medea Creek: Cleared Vegetation Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
6138	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
6042	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
5985	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
5885	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
5881	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
5766	Left Bank				0.015																	1			0.015
	Main Channel		0.025					0.002														1			0.027
	Right Bank				0.015																	1			0.015
5719	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
5566	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
5369	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
5172	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4997	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 33, 34, 35 and 37 – Medea Creek: Cleared Vegetation Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
4822	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4640	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4603	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4585	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4399	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4384	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4350	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4200	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
4148	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
3969	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
3918	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027

Reach No. 33, 34, 35 and 37 – Medea Creek: Cleared Vegetation Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
3862	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027
3725	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027
3633	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027
3552	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027
3409	Left Bank		0.015																			1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3296	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3261	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank				0.015																	1			0.015
3212	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank				0.015																	1			0.015
3189	Left Bank				0.015																	1			0.015
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
3048	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2958	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135

Reach No. 33, 34, 35 and 37 – Medea Creek: Cleared Vegetation Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
2889	Left Bank		0.025						0.01							0.02					0.08	1			0.135
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2758	Left Bank		0.025						0.01							0.02					0.08	1			0.135
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2641	Left Bank		0.025						0.01							0.02					0.08	1			0.135
	Main Channel		0.025						0.01							0.02					0.08	1			0.135
	Right Bank		0.025						0.01							0.02					0.08	1			0.135
2589	Left Bank		0.025						0.01							0.02				0.04		1			0.095
	Main Channel		0.025						0.01							0.02				0.04		1			0.095
	Right Bank		0.025						0.01							0.02				0.04		1			0.095
2535	Left Bank					0.03																1			0.030
	Main Channel					0.03																1			0.030
	Right Bank					0.03																1			0.030
2328	Left Bank					0.03																1			0.030
	Main Channel					0.03																1			0.030
	Right Bank					0.03																1			0.030
2292	Left Bank		0.025																			1			0.025
	Main Channel		0.025																			1			0.025
	Right Bank		0.025																			1			0.025
2267	Left Bank		0.025																			1			0.025
	Main Channel		0.025																			1			0.025
	Right Bank		0.025																			1			0.025
2242	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
2094.5	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1947	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015

Reach No. 33, 34, 35 and 37 – Medea Creek: Cleared Vegetation Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1840.5	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1734	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1671	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1626	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank				0.015																	1			0.015
1596	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1576	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1425	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1340	Left Bank				0.015																	1			0.015
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1239.66	Left Bank		0.02																			1			0.020
	Main Channel		0.015																			1			0.015
	Right Bank		0.027																			1			0.027
1139.33	Left Bank		0.025																			1			0.025
	Main Channel		0.015																			1			0.015
	Right Bank		0.028																			1			0.028
1039	Left Bank					0.03																1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank					0.03																1			0.030

Reach No. 33, 34, 35 and 37 – Medea Creek: Cleared Vegetation Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1026	Left Bank		0.025				0.005															1			0.030
	Main Channel					0.03																1			0.030
	Right Bank		0.025				0.005															1			0.030
910	Left Bank		0.025				0.005															1			0.030
	Main Channel		0.025				0.005															1			0.030
	Right Bank		0.025				0.005															1			0.030
876	Left Bank		0.025				0.005															1			0.030
	Main Channel		0.025				0.005															1			0.030
	Right Bank		0.025																			1			0.025
668	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025																			1			0.025
478	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025																			1			0.025
343	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025							0.012					0.005						0.065	1			0.107
179	Left Bank		0.025															0.005				1			0.030
	Main Channel		0.025							0.012					0.005						0.08	1			0.122
	Right Bank		0.025							0.012					0.005						0.08	1			0.122
78	Left Bank		0.025							0.012					0.005						0.08	1			0.122
	Main Channel		0.025							0.012					0.005						0.065	1			0.107
	Right Bank		0.025							0.012					0.005						0.065	1			0.107

Reach No. 36 – Cheseboro Creek M.C.I.: Existing Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1684	Left Bank		0.025																0.01			1			0.035
	Main Channel		0.025													0.03				0.035		1			0.090
	Right Bank		0.025																			1			0.025
1582	Left Bank		0.025																0.01			1			0.035
	Main Channel		0.025													0.03				0.035		1			0.090
	Right Bank		0.025																			1			0.025
1413	Left Bank		0.025												0.01							1			0.035
	Main Channel		0.025													0.03				0.035		1			0.090
	Right Bank				0.015																	1			0.015
1288	Left Bank		0.025												0.015							1			0.040
	Main Channel		0.025													0.03				0.035		1			0.090
	Right Bank		0.025																			1			0.025
1190	Left Bank		0.025													0.03						1			0.055
	Main Channel		0.025													0.03			0.02			1			0.075
	Right Bank		0.025												0.01							1			0.035
1085	Left Bank		0.025												0.01							1			0.035
	Main Channel		0.025																0.02			1			0.045
	Right Bank		0.025												0.01							1			0.035
1056	Left Bank		0.025												0.01							1			0.035
	Main Channel		0.025													0.02						1			0.045
	Right Bank		0.025												0.01							1			0.035
1026	Left Bank		0.025												0.005							1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1004	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
962	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
909	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020

Reach No. 36 – Cheseboro Creek M.C.I.: Existing Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
883	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
758	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
749	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
646.75	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
544.5	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
442.25	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
340	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
306	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
159	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
16	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020

Reach No. 36 – Cheseboro Creek M.C.I.: Assumed Design Conditions

Reach, Station, or X-Section		n_o					n_1				n_2			n_3				n_4				m			Total "n"
		Base "n"					Surface Irregularity				Variation in Channel Cross Section			Obstructions				Vegetation				Meandering			
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1684	Left Bank		0.025																0.01			1			0.035
	Main Channel		0.025													0.03				0.035		1			0.090
	Right Bank		0.025																			1			0.025
1582	Left Bank		0.025																0.01			1			0.035
	Main Channel		0.025													0.03				0.035		1			0.090
	Right Bank		0.025																			1			0.025
1413	Left Bank		0.025												0.01							1			0.035
	Main Channel		0.025													0.03				0.035		1			0.090
	Right Bank				0.015																	1			0.015
1288	Left Bank		0.025												0.015							1			0.040
	Main Channel		0.025													0.03				0.035		1			0.090
	Right Bank		0.025																			1			0.025
1190	Left Bank		0.025													0.03						1			0.055
	Main Channel		0.025													0.03			0.02			1			0.075
	Right Bank		0.025												0.01							1			0.035
1085	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025												0.01							1			0.035
1056	Left Bank		0.025																			1			0.025
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025												0.01							1			0.035
1026	Left Bank		0.025												0.005							1			0.030
	Main Channel				0.015																	1			0.015
	Right Bank		0.025																			1			0.025
1004	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
962	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
909	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020

Reach No. 36 – Cheseboro Creek M.C.I.: Assumed Design Conditions (continued)

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
883	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
758	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
749	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
646.75	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
544.5	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
442.25	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
340	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
306	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
159	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020
16	Left Bank				0.02																	1			0.020
	Main Channel				0.015																	1			0.015
	Right Bank				0.02																	1			0.020

Reach No. 38 – Lindero Creek M.C.O.: Existing Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1200	Left Bank		0.025					0.005														1			0.030
	Main Channel		0.025					0.005														1			0.030
	Right Bank		0.025																			1			0.025
1115	Left Bank		0.025					0.005														1			0.030
	Main Channel		0.025																			1			0.025
	Right Bank		0.025					0.005														1			0.030
1035	Left Bank		0.025					0.005											0.015			1			0.045
	Main Channel		0.025					0.002								0.018[5]					0.06	1			0.105
	Right Bank		0.025					0.005							0.015				0.025			1			0.070
936	Left Bank		0.025															0.01				1			0.035
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025					0.005							0.015				0.015			1			0.060
738	Left Bank		0.025												0.01			0.01				1			0.045
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025					0.005							0.015						0.06	1			0.105
577	Left Bank		0.025															0.01				1			0.035
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025					0.005							0.015						0.06	1			0.105
390	Left Bank		0.025															0.01				1			0.035
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025															0.01				1			0.035
285	Left Bank		0.025															0.01				1			0.035
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025															0.01				1			0.035
22	Left Bank		0.025															0.01				1			0.035
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025															0.01				1			0.035

(5) The value is appropriate but lies between “Minor” and “Appreciable” so could be placed in either category.

Reach No. 38 – Lindero Creek M.C.O.: Assumed Design Conditions

Reach, Station, or X-Section		n_o Base "n"					n_1 Surface Irregularity				n_2 Variation in Channel Cross Section			n_3 Obstructions				n_4 Vegetation				m Meandering			Total "n"
		0.026 - 0.035	0.025 - 0.032	0.024 - 0.035	0.012 - 0.018	0.03 - 0.07	0.0	0.001 - 0.005	0.006 - 0.010	0.011 - 0.020	0.0	0.001 - 0.005	0.010 - 0.015	0.000 - 0.004	0.005 - 0.015	0.020 - 0.030	0.040 - 0.050	0.002 - 0.010	0.010 - 0.025	0.025 - 0.050	0.050 - 0.100	1.0	1.15	1.3	
		Sand	Firm Soil	Gravel	Concrete	Cobble/ Boulder	Smooth	Minor	Moderate	Severe	Gradual	Alternating Occasionally	Alternating Frequently	Negligible	Minor	Appreciable	Severe	Small	Medium	Large	Very Large	Minor	Appreciable	Severe	
1200	Left Bank		0.025					0.005														1			0.030
	Main Channel		0.025						0.01													1			0.035
	Right Bank		0.025																			1			0.025
1115	Left Bank		0.025					0.005														1			0.030
	Main Channel		0.025																			1			0.025
	Right Bank		0.025						0.005													1			0.030
1035	Left Bank		0.025					0.002														1			0.027
	Main Channel		0.025					0.002														1			0.027
	Right Bank		0.025					0.002														1			0.027
936	Left Bank		0.025															0.01				1			0.035
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025					0.005							0.015				0.015			1			0.060
738	Left Bank		0.025												0.01			0.01				1			0.045
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025					0.005							0.015						0.06	1			0.105
577	Left Bank		0.025															0.01				1			0.035
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025					0.005							0.015						0.06	1			0.105
390	Left Bank		0.025															0.01				1			0.035
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025															0.01				1			0.035
285	Left Bank		0.025															0.01				1			0.035
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025															0.01				1			0.035
22	Left Bank		0.025															0.01				1			0.035
	Main Channel		0.025													0.02					0.06	1			0.105
	Right Bank		0.025															0.01				1			0.035

APPENDIX I

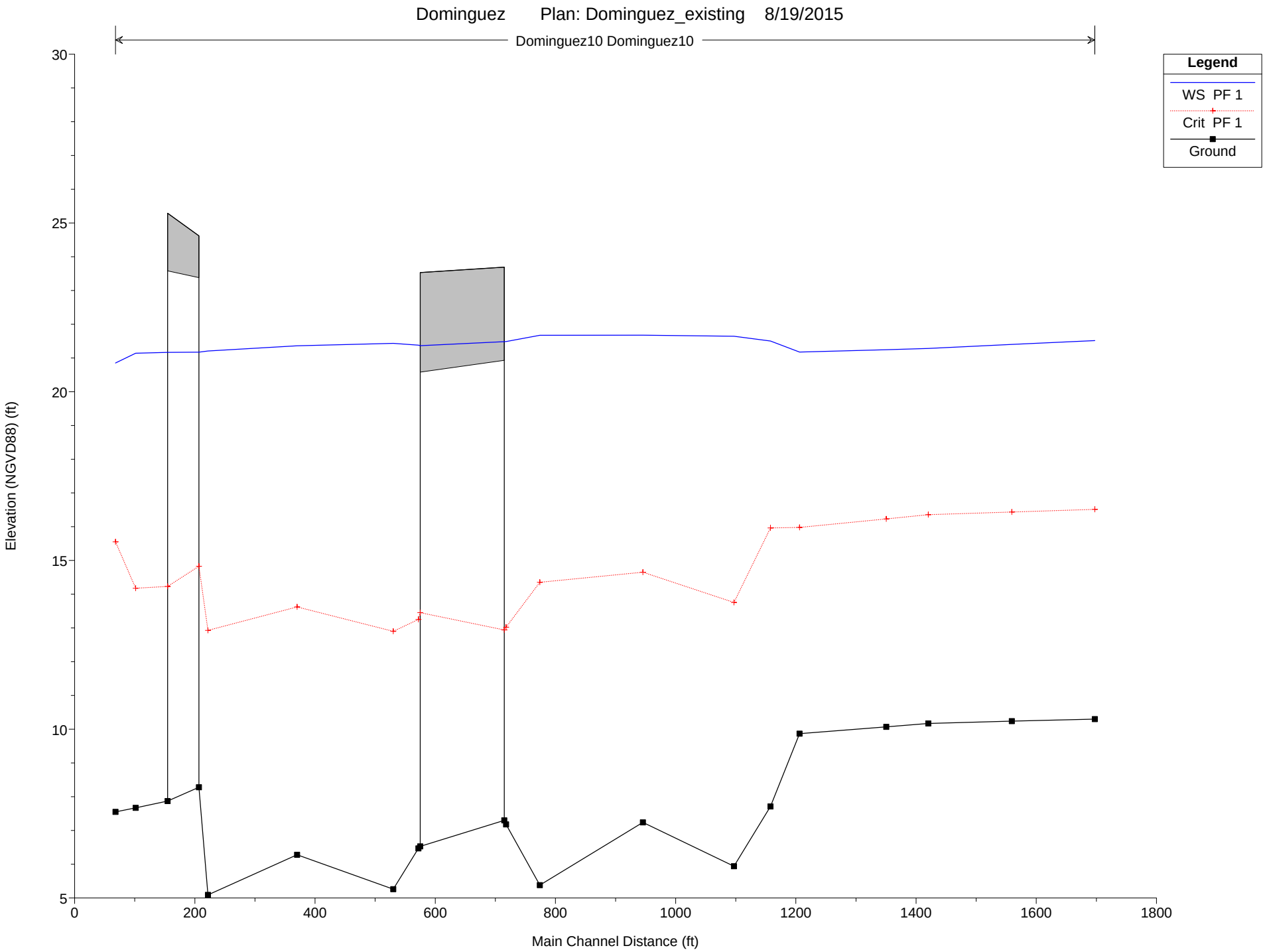
HEC-RAS

OUTPUT FILES

PROJECT 74

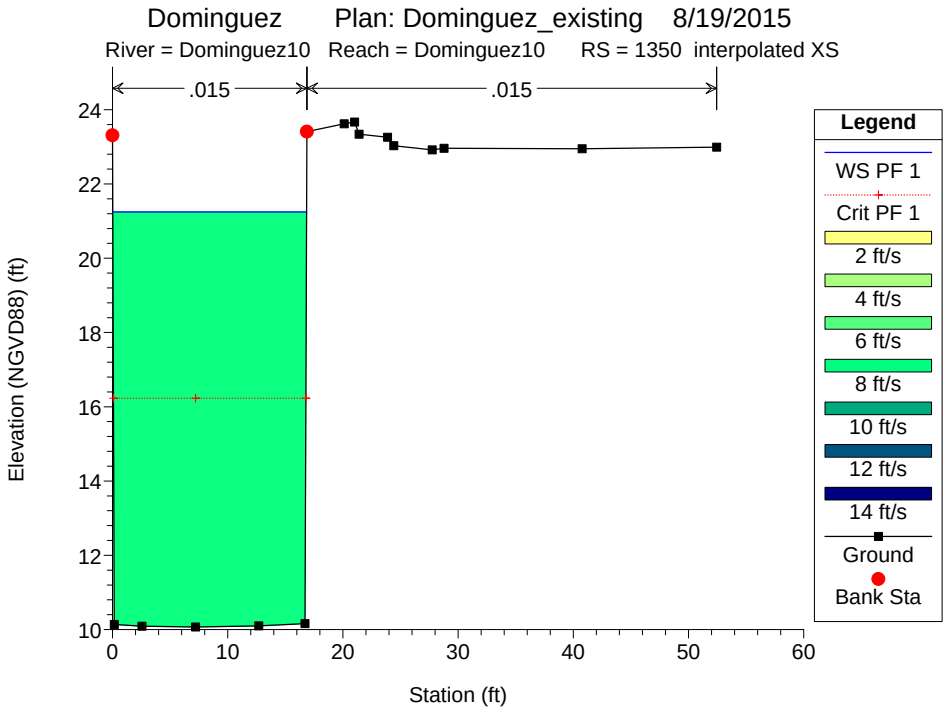
(DOMINGUEZ CHANNEL)

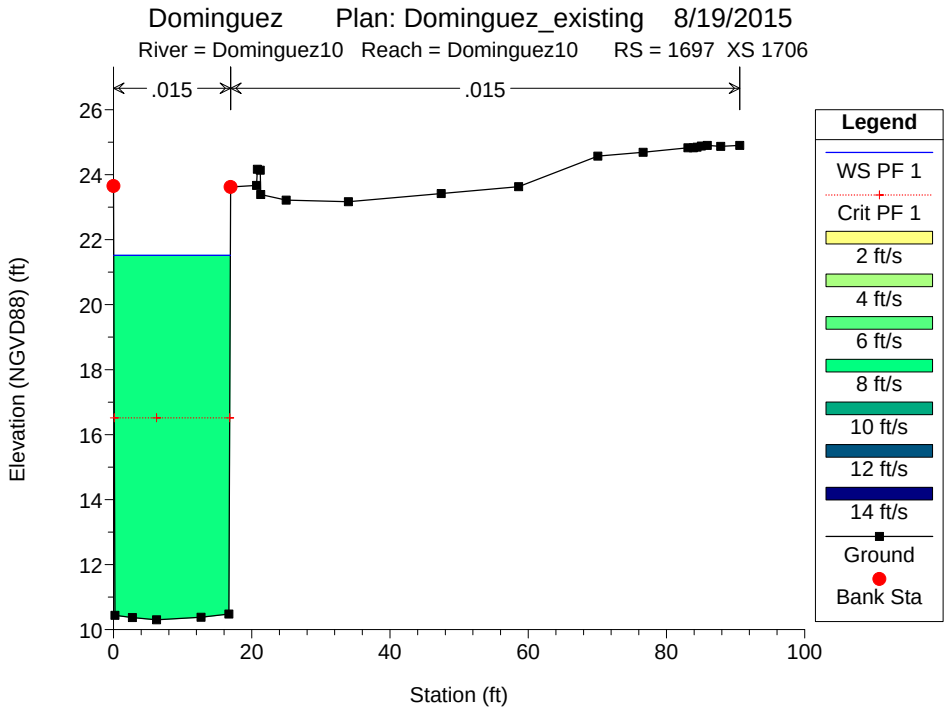

1697
1559
1420
1350
1206
1157
1097
945
774
718
572
530
370
221
101
Dominguez10

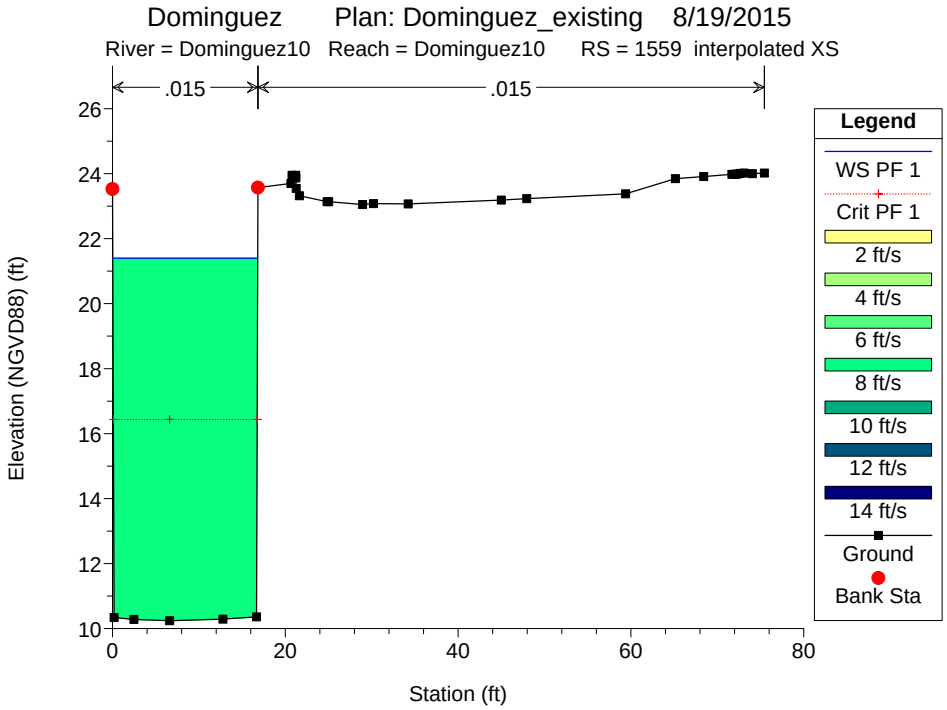

Dominguez Plan: Dominguez_existing 8/19/2015
Dominguez10 Dominguez10
Legend
WS PF 1
Crit PF 1
Ground
Elevation (NGVD88) (ft)
Main Channel Distance (ft)
30
25
20
15
10
5
0
200
400
600
800
1000
1200
1400
1600
1800

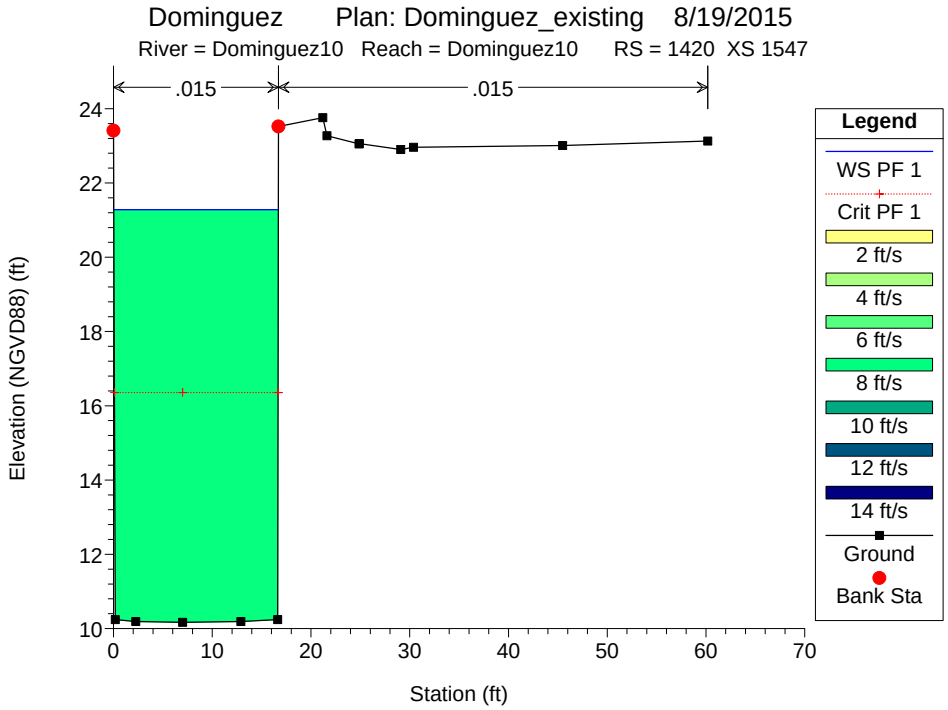
HEC-RAS Plan: Dominguez_exist River: Dominguez10 Reach: Dominguez10 Profile: PF 1

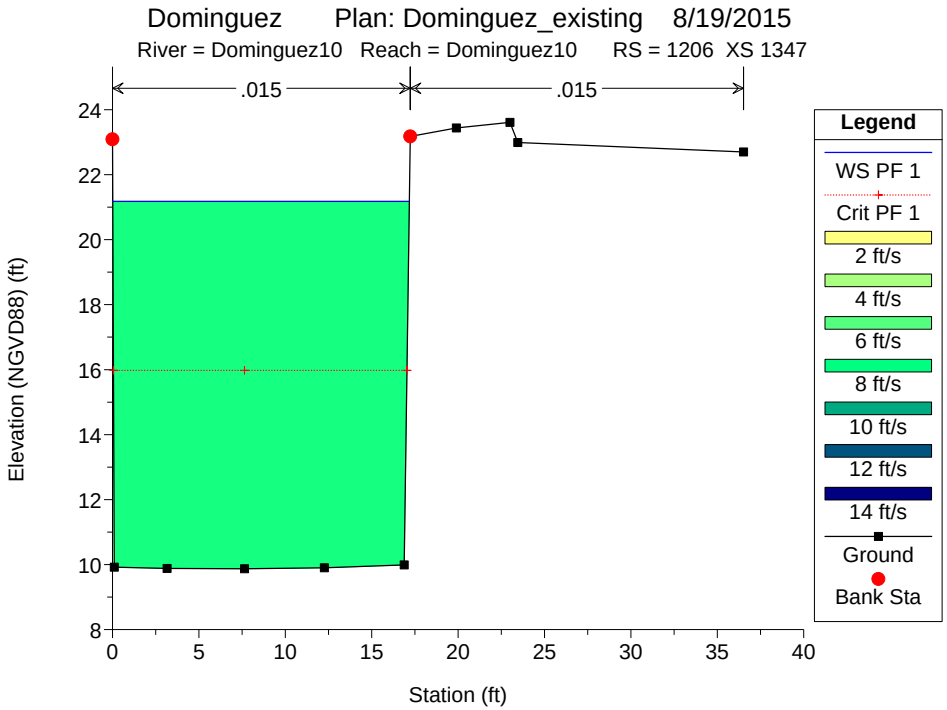
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Dominguez10	1697	PF 1	1436.50	10.30	21.52	16.51	22.44	0.000748	7.72	185.98	16.88	0.41
Dominguez10	1559	PF 1	1436.50	10.24	21.40	16.44	22.34	0.000762	7.77	184.82	16.77	0.41
Dominguez10	1420	PF 1	1436.50	10.17	21.28	16.36	22.23	0.000778	7.82	183.61	16.67	0.42
Dominguez10	1350	PF 1	1436.50	10.07	21.24	16.23	22.17	0.000750	7.72	186.07	16.83	0.41
Dominguez10	1206	PF 1	1436.50	9.87	21.18	15.98	22.05	0.000695	7.51	191.33	17.16	0.40
Dominguez10	1157	PF 1	1436.50	7.71	21.50	15.96	21.86	0.000782	5.55	402.18	59.41	0.28
Dominguez10	1097	PF 1	1436.50	5.94	21.64	13.76	21.76	0.000276	3.07	642.38	99.71	0.16
Dominguez10	945	PF 1	1460.00	7.24	21.67	14.65	21.71	0.000110	2.00	1029.62	130.73	0.10
Dominguez10	774	PF 1	1460.00	5.38	21.67	14.35	21.70	0.000073	1.64	1182.82	184.59	0.08
Dominguez10	718	PF 1	1460.00	7.18	21.49	13.02	21.65	0.000243	3.30	465.07	85.86	0.16
Dominguez10	645		Bridge									
Dominguez10	572	PF 1	1460.00	6.47	21.38	13.25	21.54	0.000241	3.22	453.15	99.60	0.17
Dominguez10	530	PF 1	1460.00	5.26	21.43	12.90	21.48	0.000089	1.79	913.36	184.39	0.10
Dominguez10	370	PF 1	1460.00	6.28	21.36	13.62	21.44	0.000585	2.38	649.60	93.72	0.13
Dominguez10	221	PF 1	1460.00	5.09	21.21	12.93	21.32	0.000974	2.84	544.50	72.28	0.14
Dominguez10	161		Bridge									
Dominguez10	101	PF 1	1460.00	7.67	21.14	14.18	21.30	0.000078	3.16	461.55	60.84	0.20
Dominguez10	68	PF 1	2150.00	7.55	20.85	15.55	21.23	0.000201	4.92	436.75	60.63	0.32

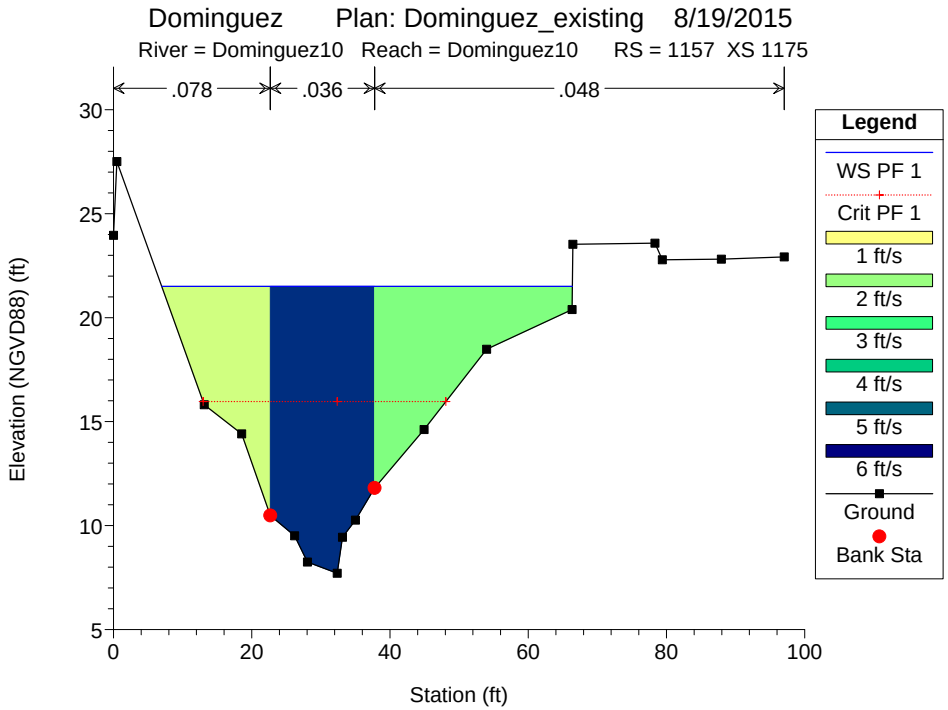

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1350 interpolated XS
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

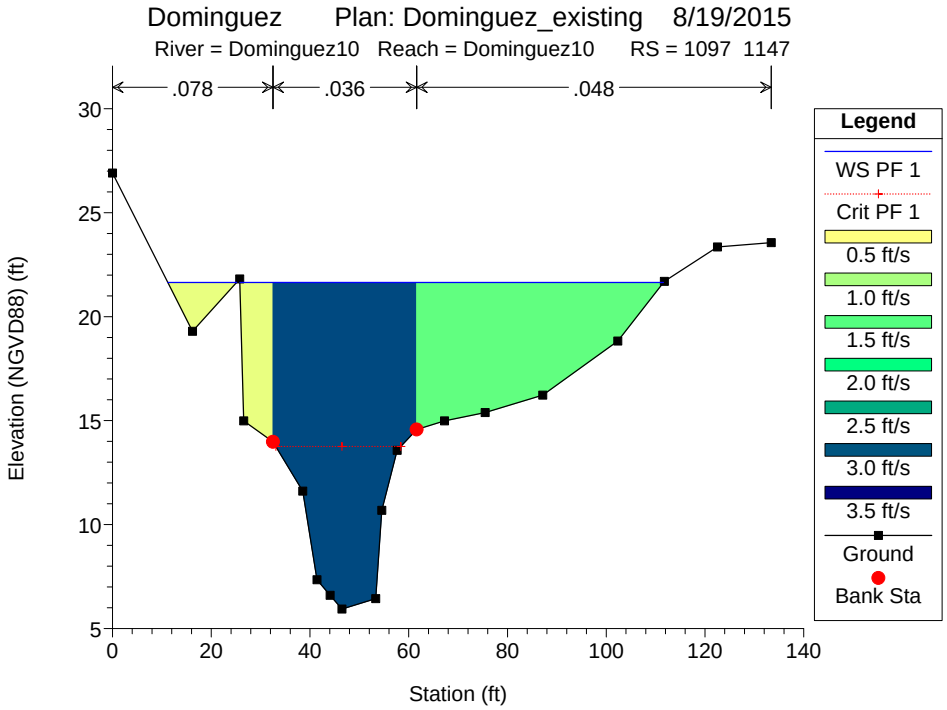

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1697 XS 1706
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

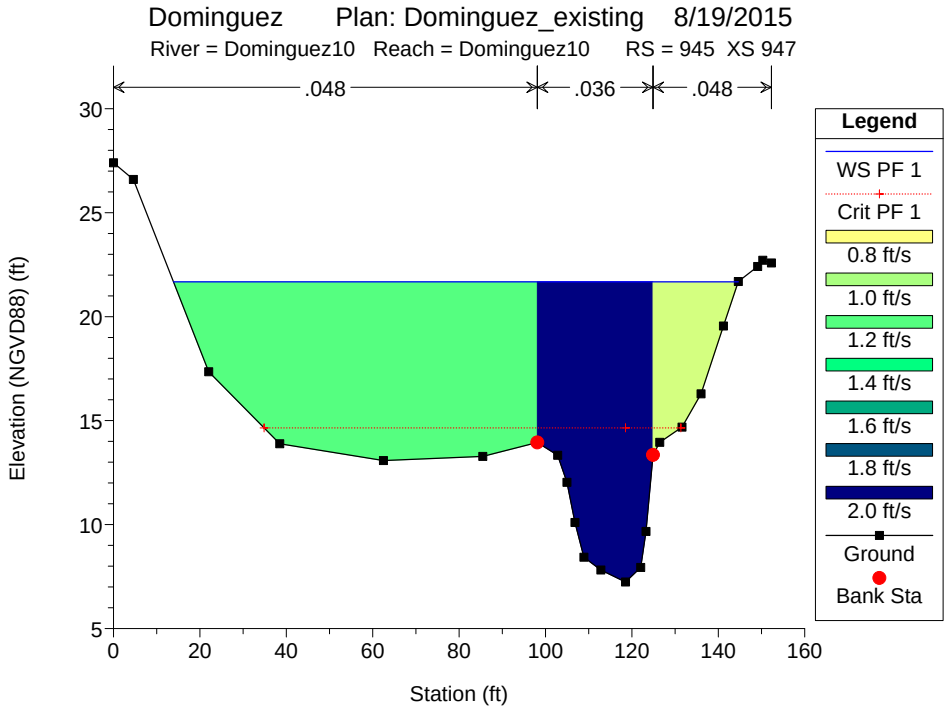

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1559 interpolated XS
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

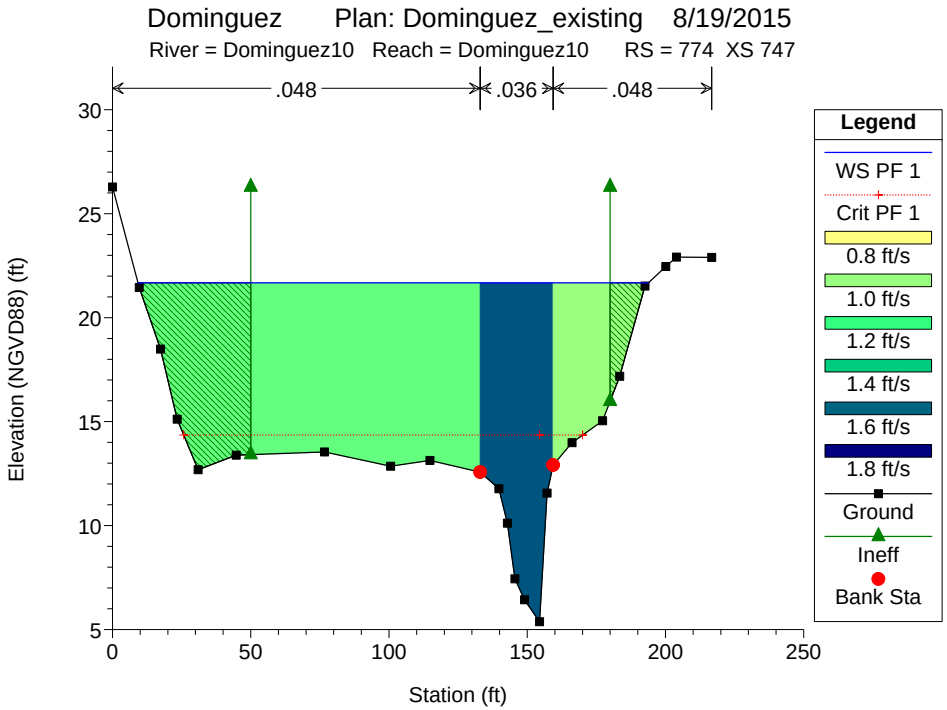

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1420 XS 1547
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

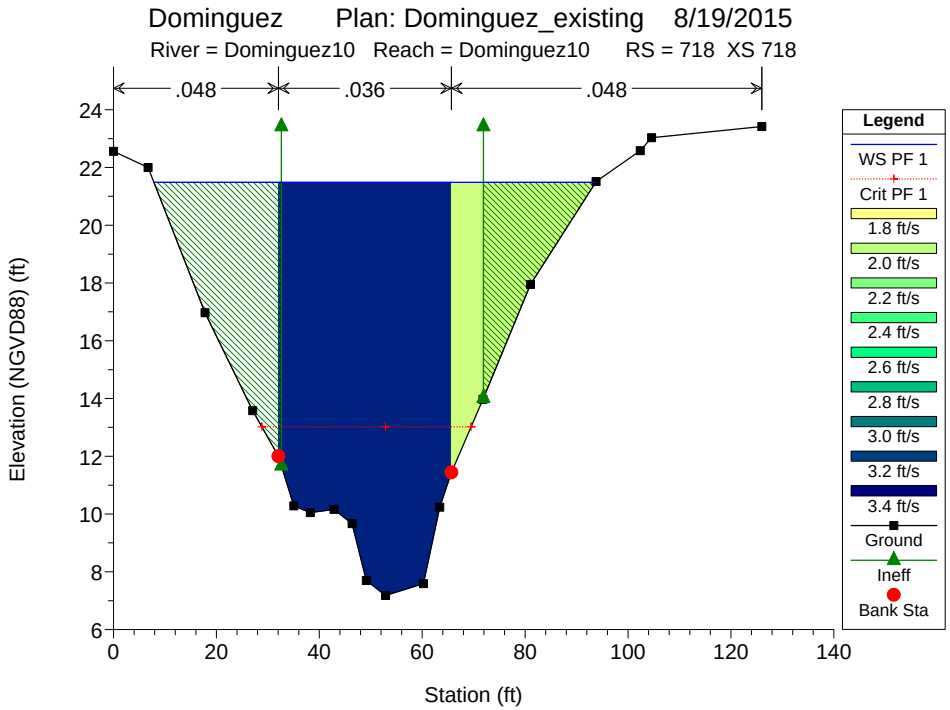

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1206 XS 1347
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

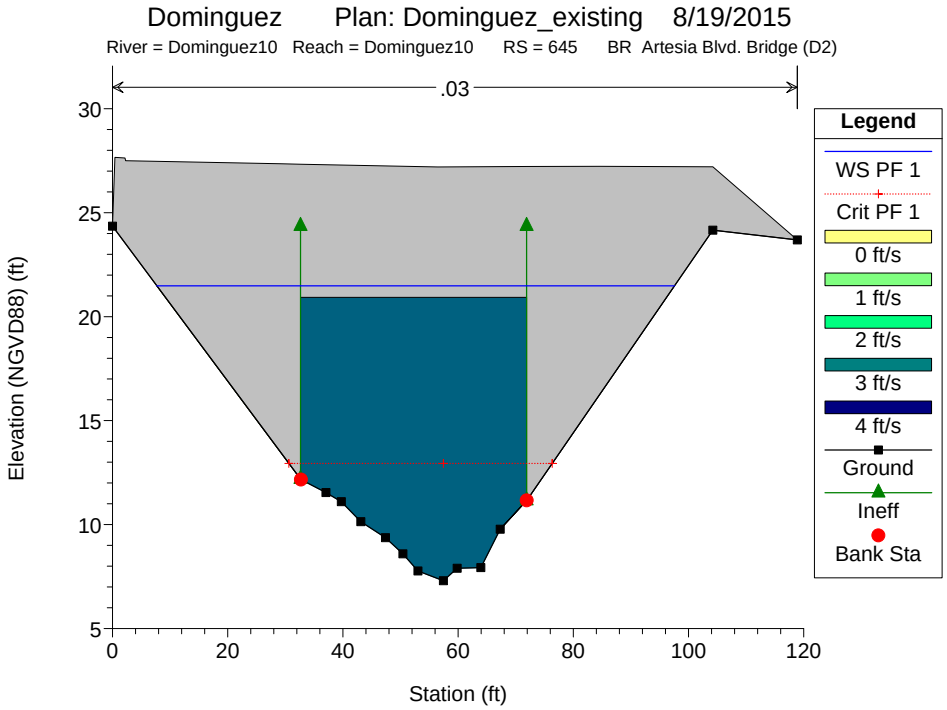

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1157 XS 1175
.078
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
Ground
Bank Sta

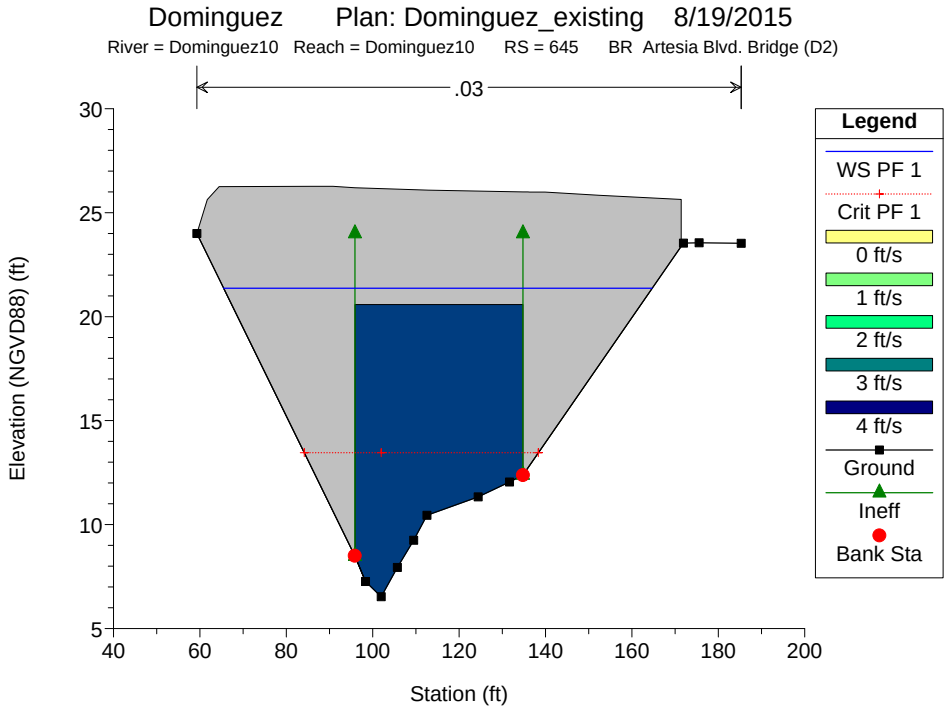

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1097 1147
.078
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
Ground
Bank Sta

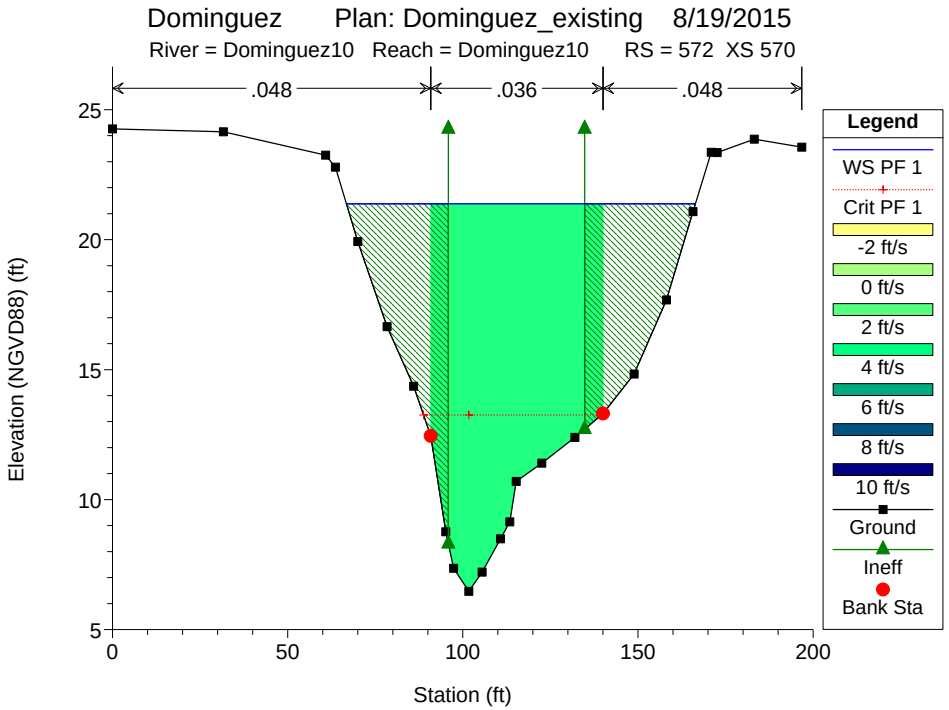

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 945 XS 947
.048
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0.8 ft/s
1.0 ft/s
1.2 ft/s
1.4 ft/s
1.6 ft/s
1.8 ft/s
2.0 ft/s
Ground
Bank Sta

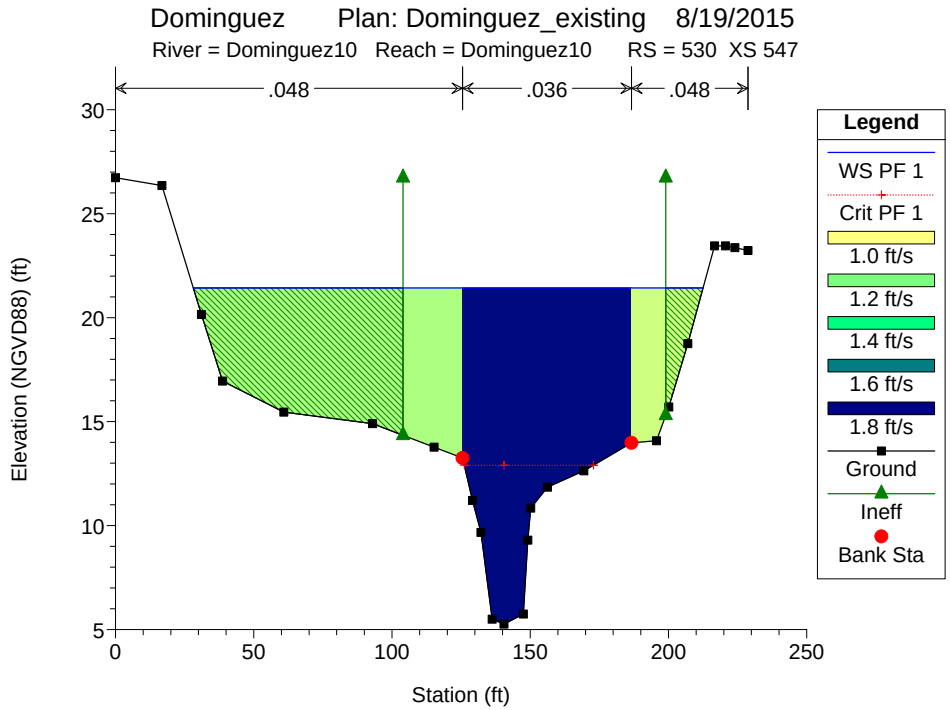

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 774 XS 747
.048
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0.8 ft/s
1.0 ft/s
1.2 ft/s
1.4 ft/s
1.6 ft/s
1.8 ft/s
Ground
Ineff
Bank Sta

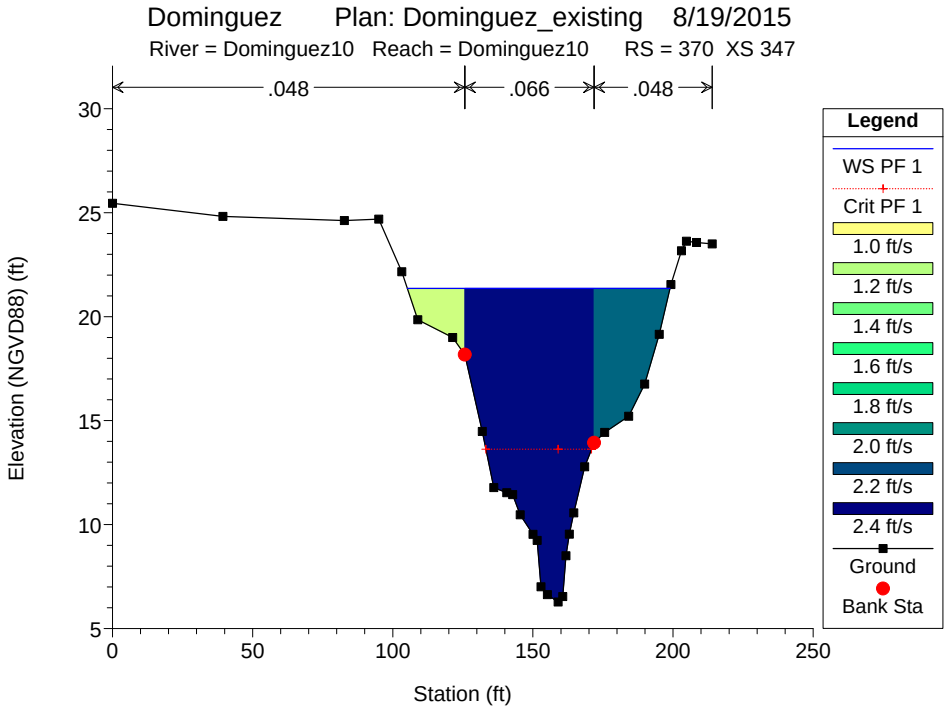

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 718 XS 718
.048
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.8 ft/s
2.0 ft/s
2.2 ft/s
2.4 ft/s
2.6 ft/s
2.8 ft/s
3.0 ft/s
3.2 ft/s
3.4 ft/s
Ground
Ineff
Bank Sta

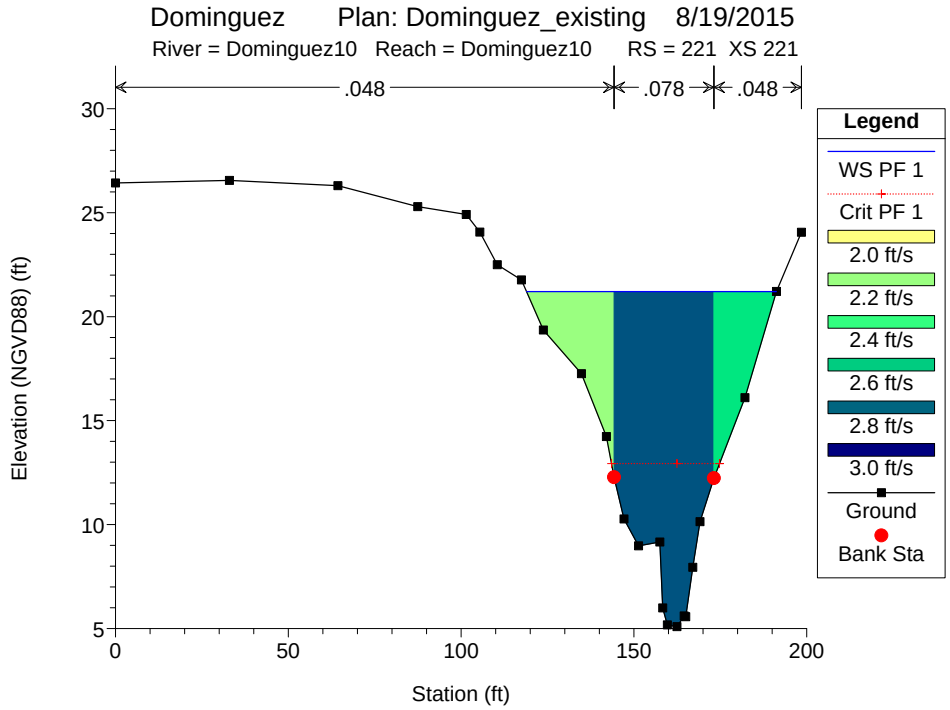

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 645 BR Artesia Blvd. Bridge (D2)
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
Ground
Ineff
Bank Sta

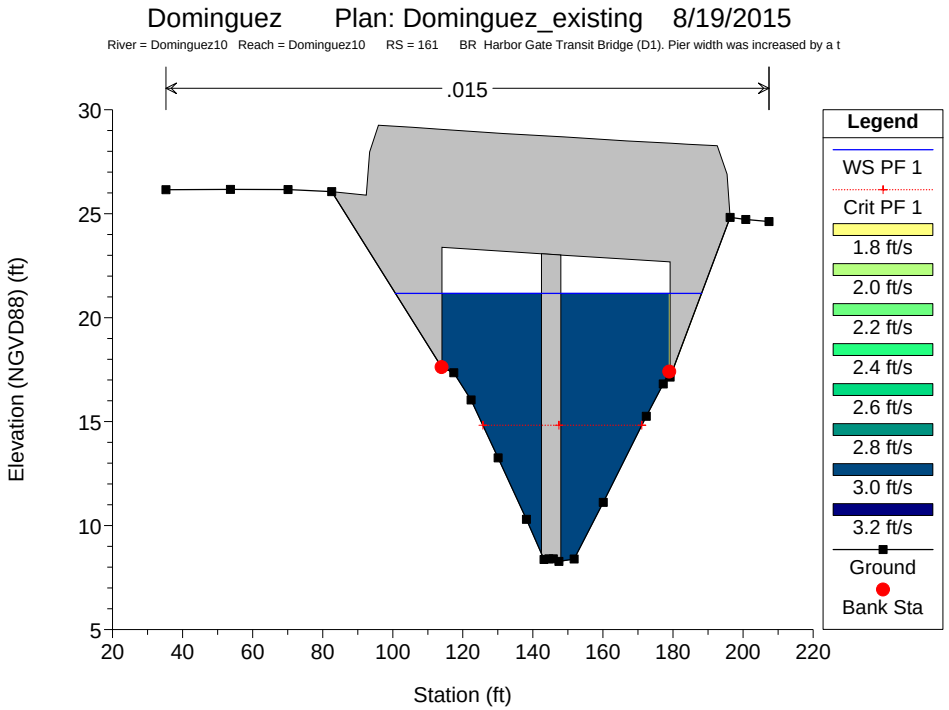

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 645 BR Artesia Blvd. Bridge (D2)
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
Ground
Ineff
Bank Sta

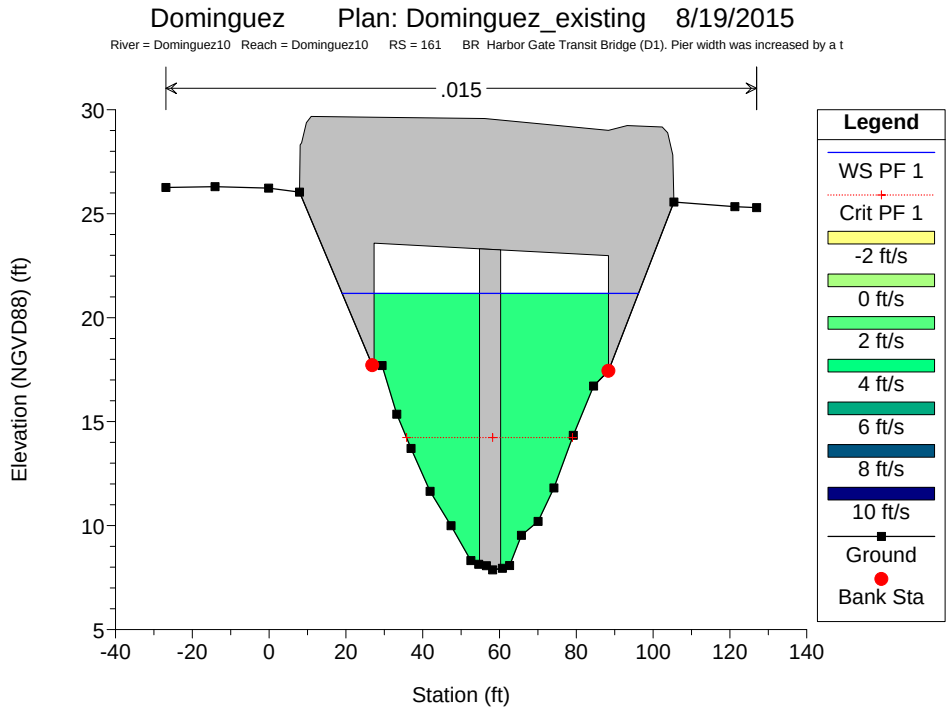

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 572 XS 570
.048
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

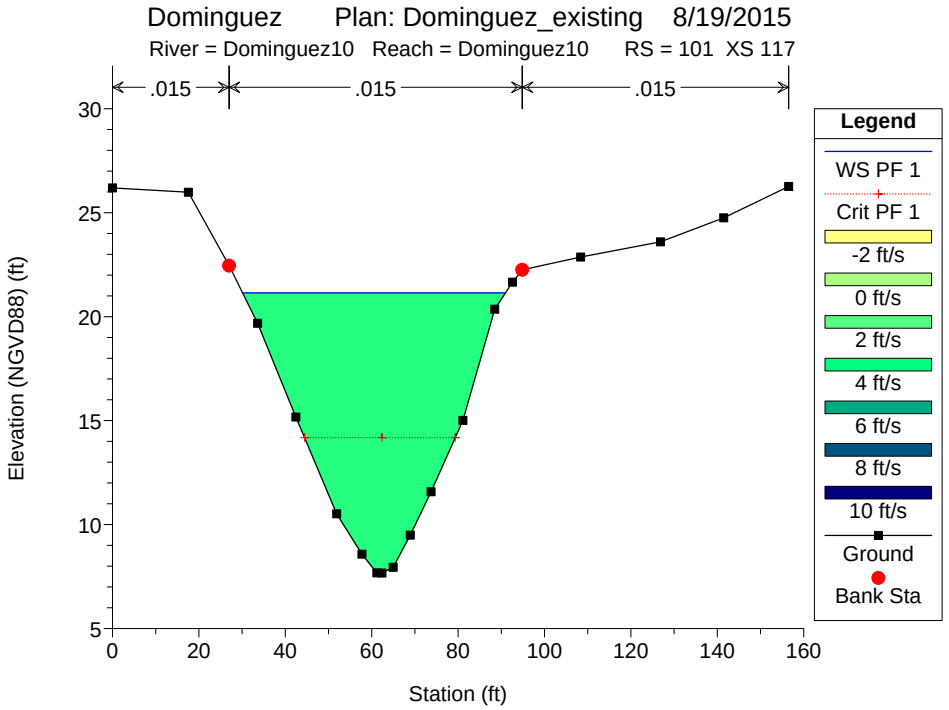

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 530 XS 547
.048
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.0 ft/s
1.2 ft/s
1.4 ft/s
1.6 ft/s
1.8 ft/s
Ground
Ineff
Bank Sta

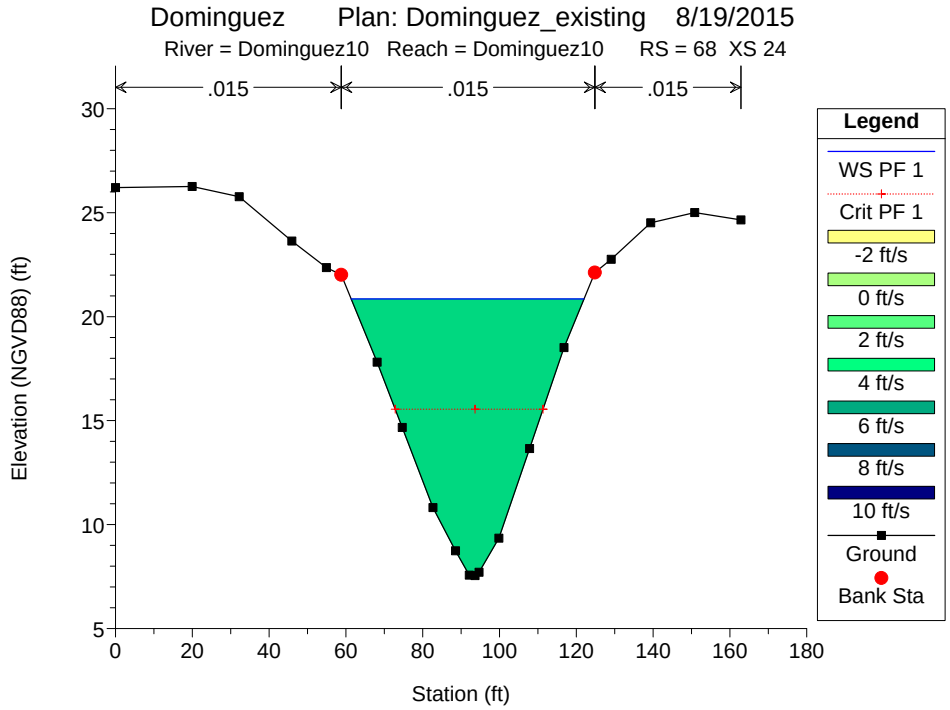

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 370 XS 347
.048
.066
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.0 ft/s
1.2 ft/s
1.4 ft/s
1.6 ft/s
1.8 ft/s
2.0 ft/s
2.2 ft/s
2.4 ft/s
Ground
Bank Sta


Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 221 XS 221
.048
.078
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2.0 ft/s
2.2 ft/s
2.4 ft/s
2.6 ft/s
2.8 ft/s
3.0 ft/s
Ground
Bank Sta

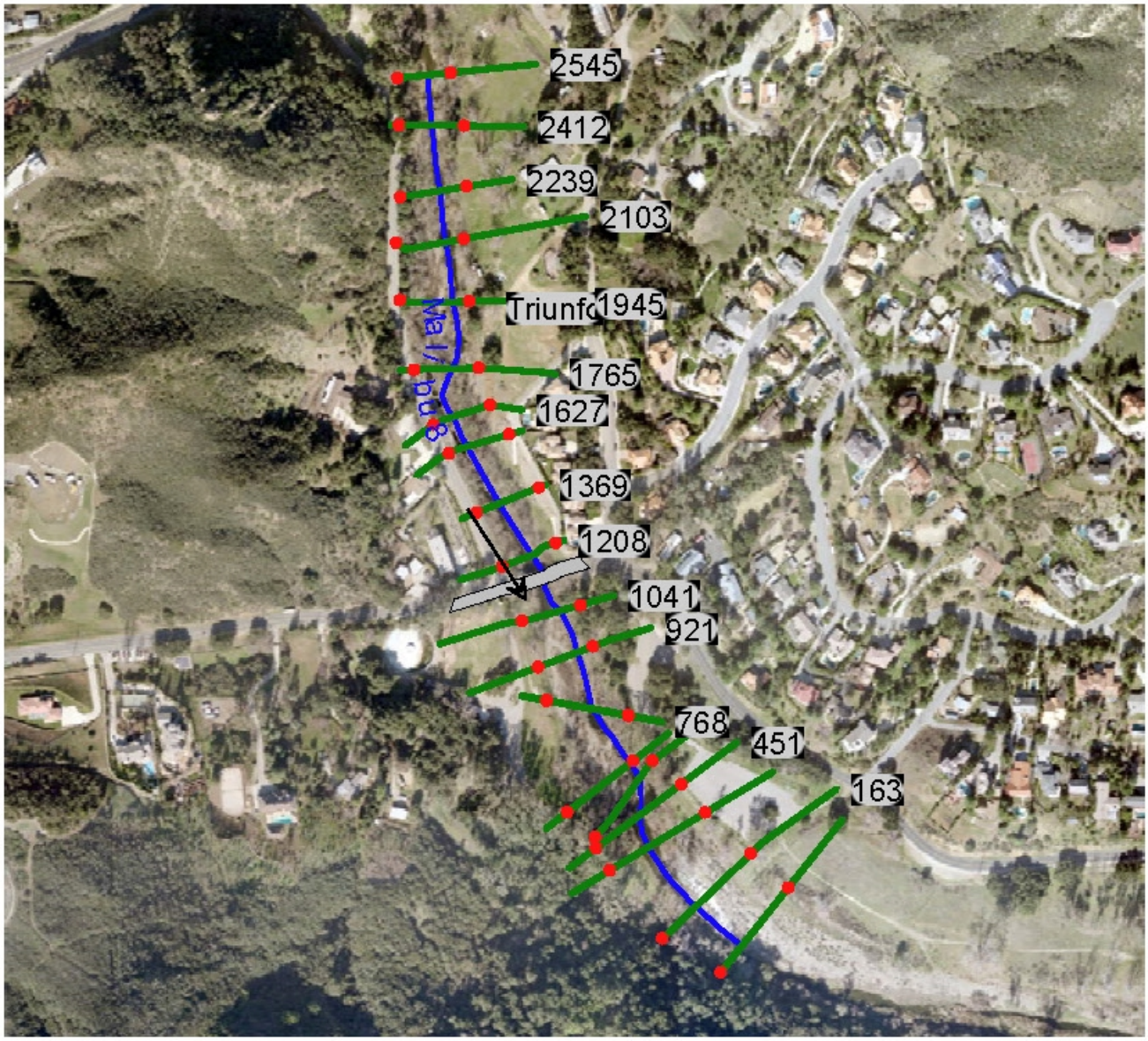

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 161 BR Harbor Gate Transit Bridge (D1). Pier width was increased by a t
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.8 ft/s
2.0 ft/s
2.2 ft/s
2.4 ft/s
2.6 ft/s
2.8 ft/s
3.0 ft/s
3.2 ft/s
Ground
Bank Sta

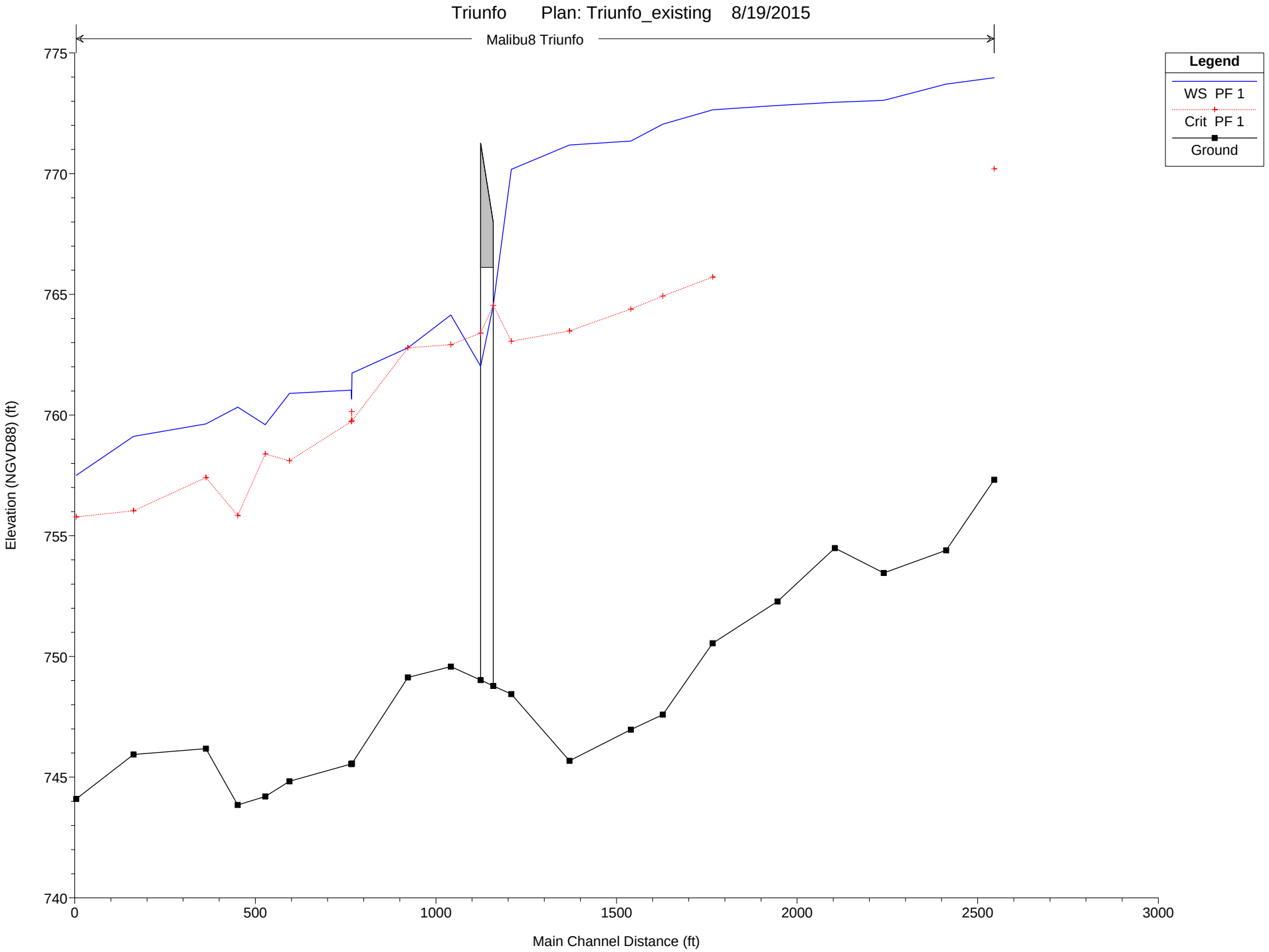

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 161 BR Harbor Gate Transit Bridge (D1). Pier width was increased by a t
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta


Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 101 XS 117
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta


Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 68 XS 24
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta

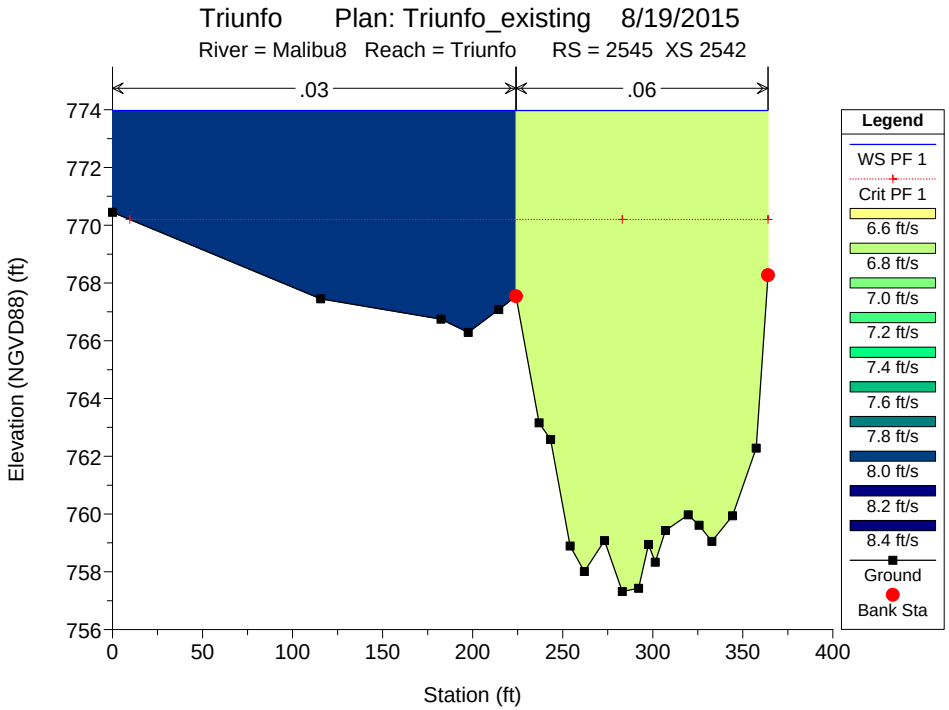
TRIUNFO CREEK

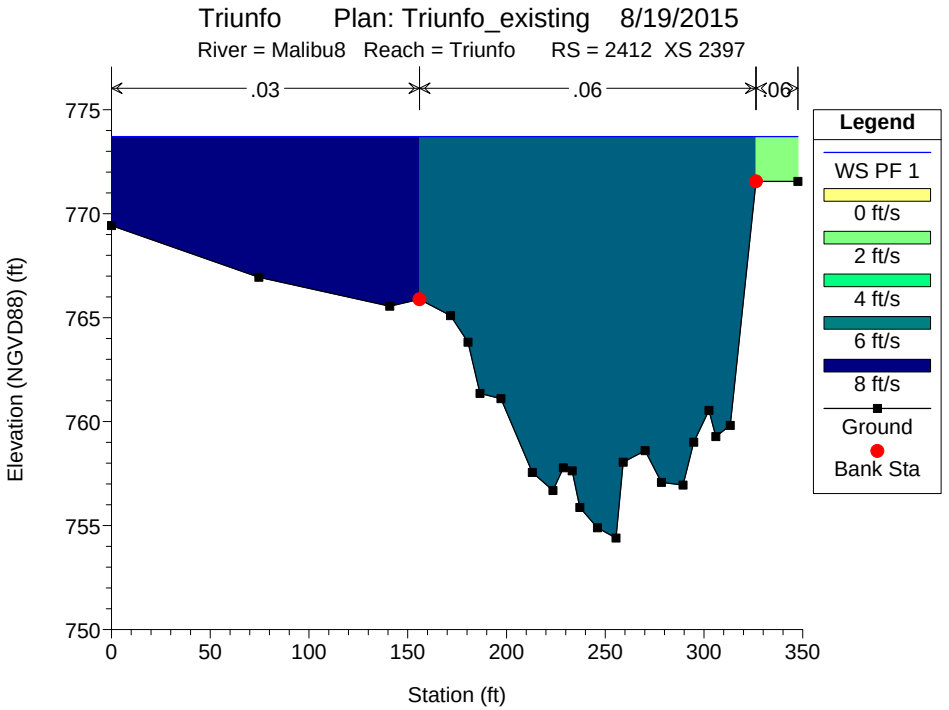

2545
2412
2239
2103
Triunfo
1945
1765
1627
1369
1208
1041
921
768
451
163
Malibu

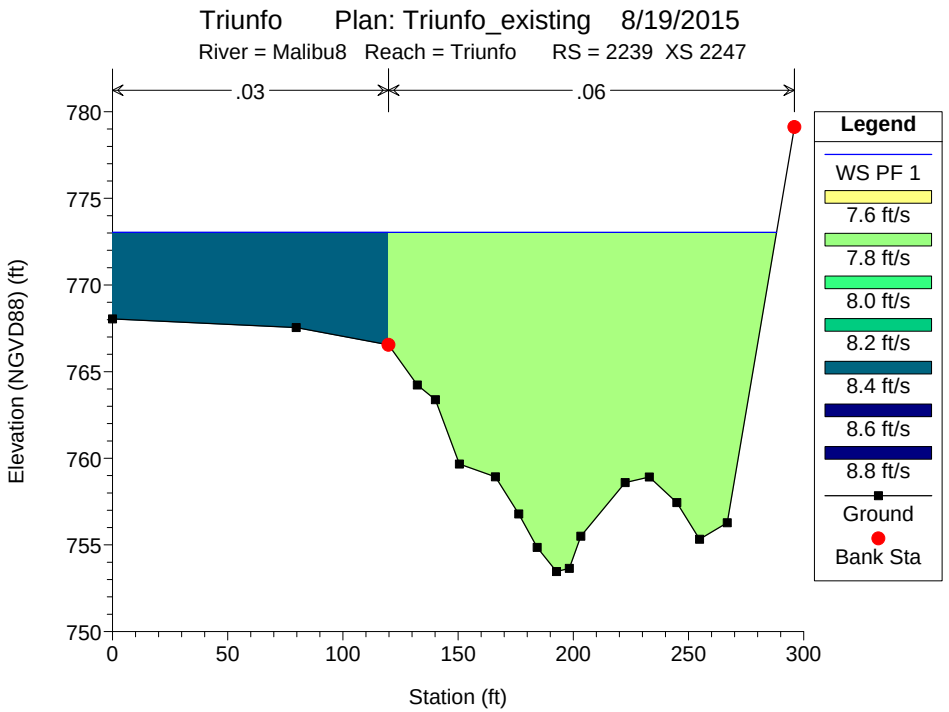

Triunfo Plan: Triunfo_existing 8/19/2015
Malibu8 Triunfo
Legend
WS PF 1
Crit PF 1
Ground
Elevation (NGVD88) (ft)
775
770
765
760
755
750
745
740
0
500
1000
1500
2000
2500
3000
Main Channel Distance (ft)

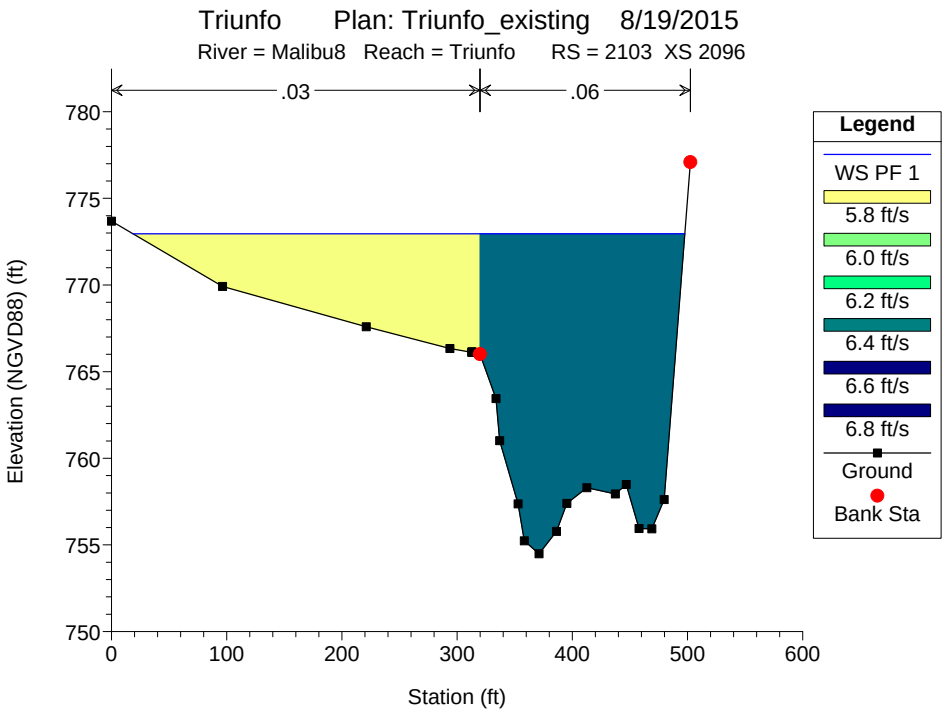
HEC-RAS Plan: Triunfo_exist River: Malibu8 Reach: Triunfo Profile: PF 1

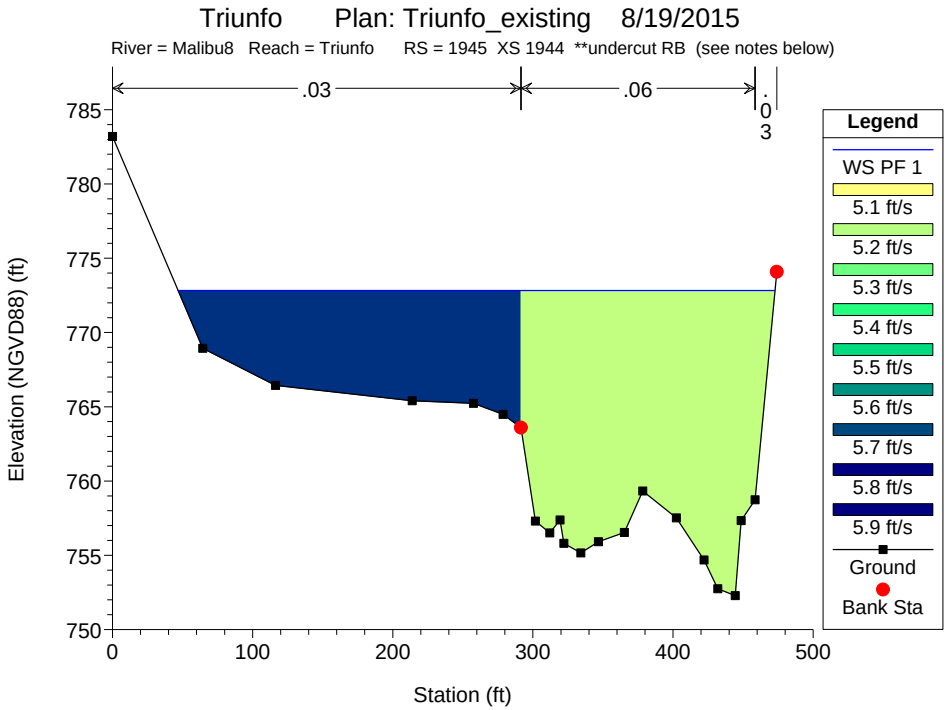
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Triunfo	2545	PF 1	23700.00	757.32	773.97	770.20	774.81	0.002480	6.74	3258.59	364.03	0.32
Triunfo	2412	PF 1	23700.00	754.40	773.71		774.48	0.002181	6.49	3449.60	347.54	0.31
Triunfo	2239	PF 1	23700.00	753.46	773.04		774.01	0.003141	7.77	2996.63	288.20	0.37
Triunfo	2103	PF 1	23700.00	754.49	772.96		773.56	0.002059	6.44	3803.47	479.02	0.30
Triunfo	1945	PF 1	23700.00	752.28	772.83		773.28	0.001115	5.18	4404.20	425.96	0.23
Triunfo	1765	PF 1	23700.00	750.55	772.64	765.72	773.10	0.000895	4.95	4431.91	406.16	0.22
Triunfo	1627	PF 1	23700.00	747.59	772.05	764.93	772.90	0.001914	7.14	3230.39	334.31	0.31
Triunfo	1539	PF 1	23700.00	746.97	771.35	764.39	772.69	0.001710	9.30	2553.28	266.97	0.42
Triunfo	1369	PF 1	23700.00	745.68	771.19	763.49	772.32	0.001872	8.55	2775.93	235.93	0.39
Triunfo	1208	PF 1	23700.00	748.44	770.18	763.06	771.85	0.002010	10.37	2286.00	285.43	0.44
Triunfo	1125		Bridge									
Triunfo	1041	PF 1	23700.00	749.58	764.14	762.92	767.63	0.007720	15.00	1585.77	303.47	0.82
Triunfo	921	PF 1	23700.00	749.13	762.78	762.78	766.55	0.009063	15.67	1577.36	262.08	0.89
Triunfo	768	PF 1	23700.00	745.57	761.74	759.76	764.01	0.005728	12.14	2017.07	308.74	0.70
Triunfo	767	PF 1	23700.00	745.55	760.66	760.14	763.90	0.011379	14.45	1648.50	237.69	0.90
Triunfo	766	PF 1	23700.00	745.55	761.03	759.74	763.73	0.007472	13.19	1819.11	264.61	0.79
Triunfo	595	PF 1	23700.00	744.83	760.90	758.11	762.48	0.004000	10.11	2378.08	349.72	0.59
Triunfo	528	PF 1	23700.00	744.20	759.60	758.39	762.09	0.004769	12.67	1870.64	236.47	0.79
Triunfo	451	PF 1	23700.00	743.85	760.33	755.84	761.43	0.002379	8.41	2822.17	367.51	0.47
Triunfo	363	PF 1	23700.00	746.18	759.63	757.41	761.11	0.004344	9.84	2484.39	397.32	0.61
Triunfo	163	PF 1	23700.00	745.94	759.12	756.04	760.28	0.003160	8.64	2748.20	398.31	0.52
Triunfo	4	PF 1	23700.00	744.10	757.50	755.78	759.52	0.006003	11.39	2080.30	408.39	0.71

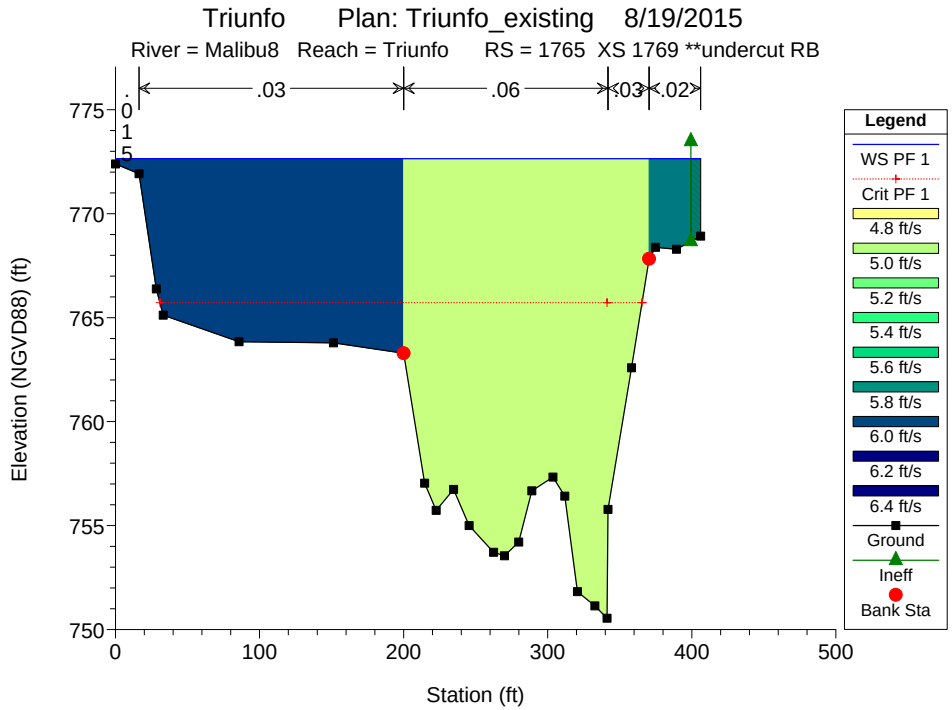

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 2545 XS 2542
.03
.06
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6.6 ft/s
6.8 ft/s
7.0 ft/s
7.2 ft/s
7.4 ft/s
7.6 ft/s
7.8 ft/s
8.0 ft/s
8.2 ft/s
8.4 ft/s
Ground
Bank Sta

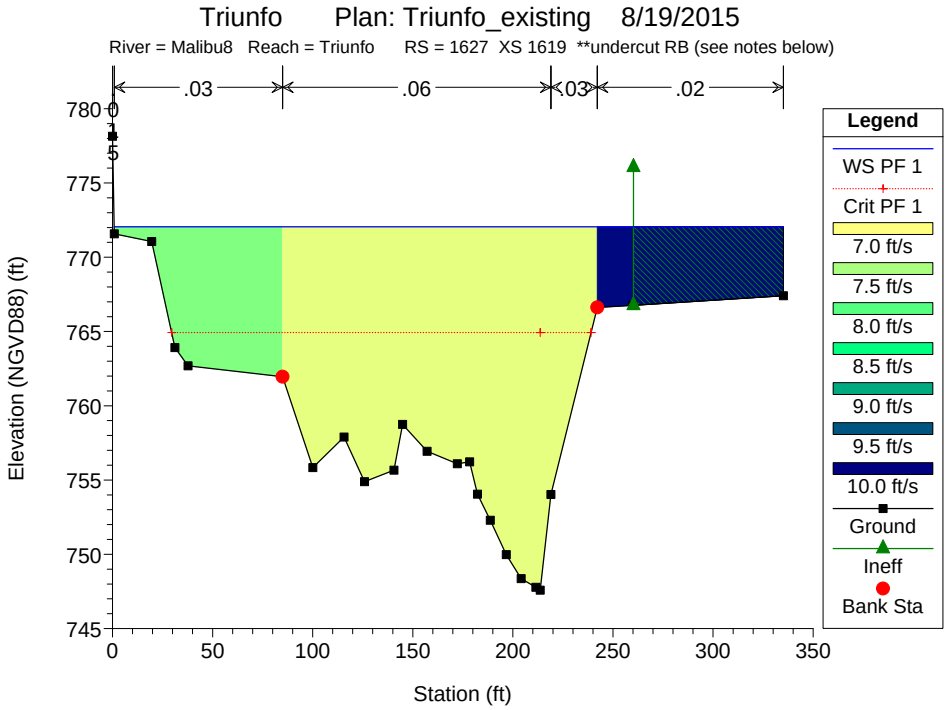

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 2412 XS 2397
.03
.06
.06
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

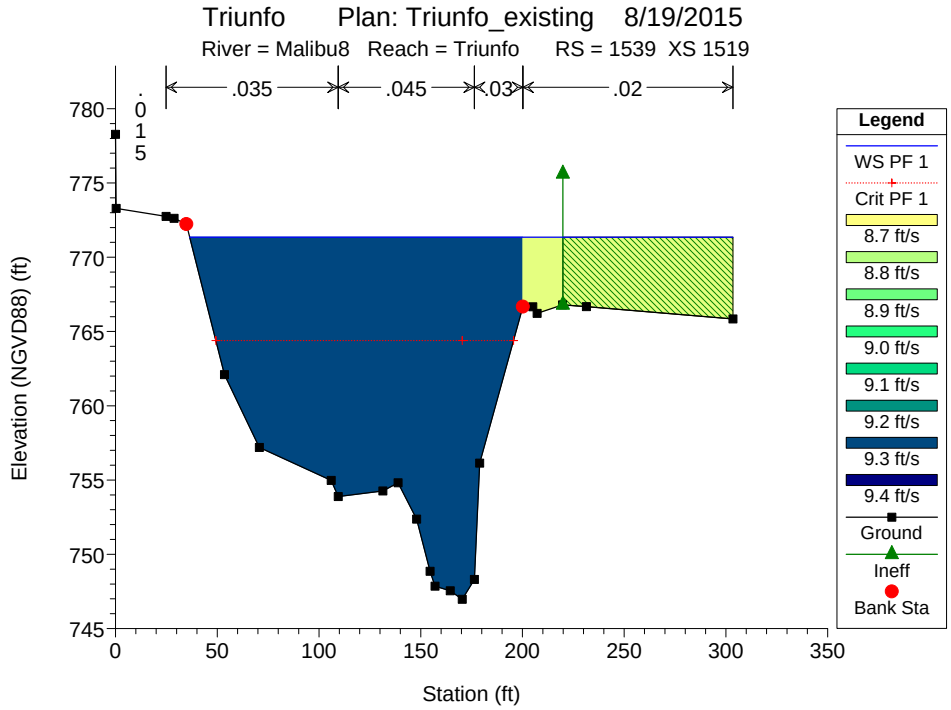

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 2239 XS 2247
.03
.06
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
7.6 ft/s
7.8 ft/s
8.0 ft/s
8.2 ft/s
8.4 ft/s
8.6 ft/s
8.8 ft/s
Ground
Bank Sta

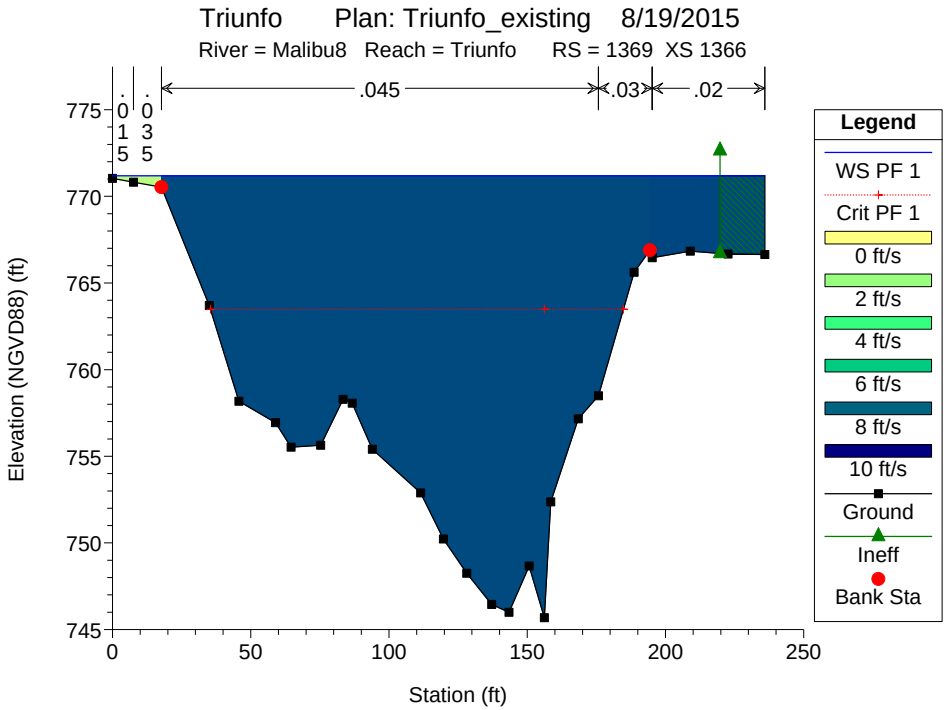

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 2103 XS 2096
.03
.06
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
5.8 ft/s
6.0 ft/s
6.2 ft/s
6.4 ft/s
6.6 ft/s
6.8 ft/s
Ground
Bank Sta

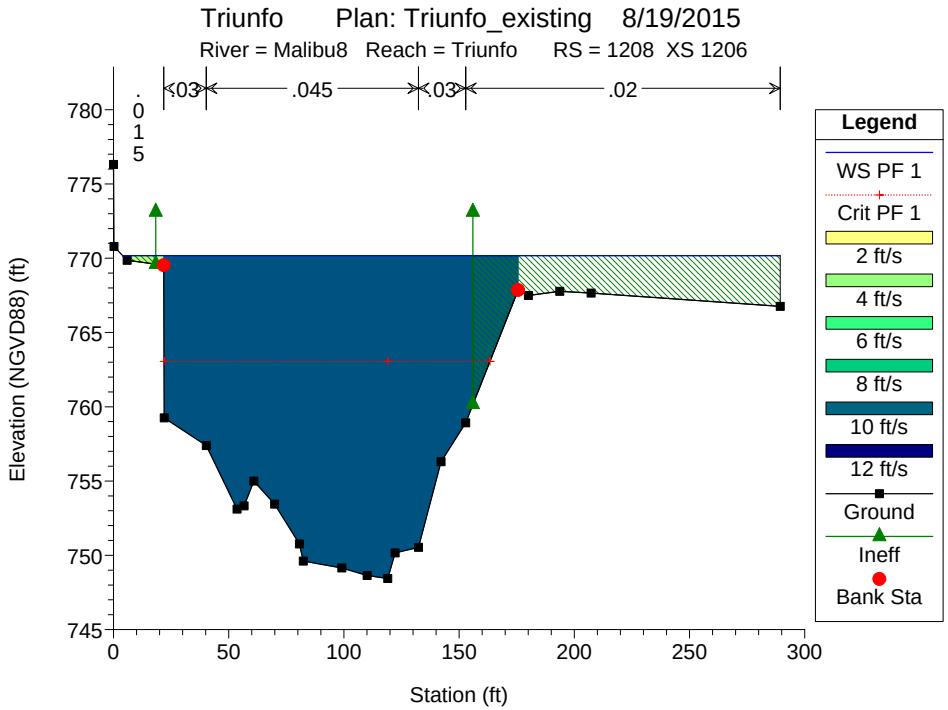

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1945 XS 1944 **undercut RB (see notes below)
.03
.06
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
5.1 ft/s
5.2 ft/s
5.3 ft/s
5.4 ft/s
5.5 ft/s
5.6 ft/s
5.7 ft/s
5.8 ft/s
5.9 ft/s
Ground
Bank Sta

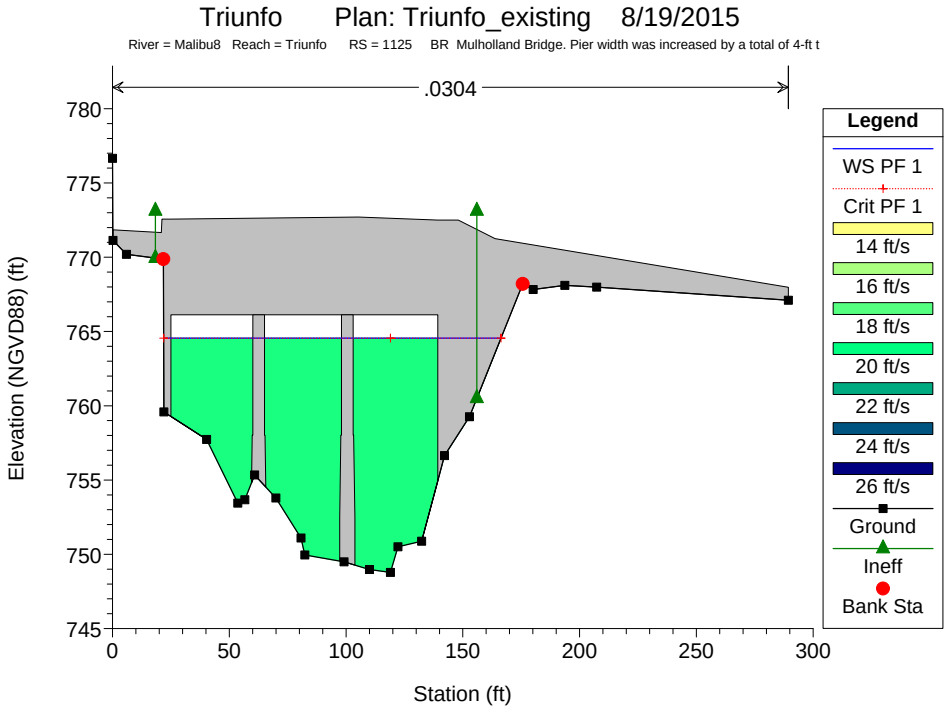

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1765 XS 1769 **undercut RB
.03
.06
.03
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4.8 ft/s
5.0 ft/s
5.2 ft/s
5.4 ft/s
5.6 ft/s
5.8 ft/s
6.0 ft/s
6.2 ft/s
6.4 ft/s
Ground
Ineff
Bank Sta

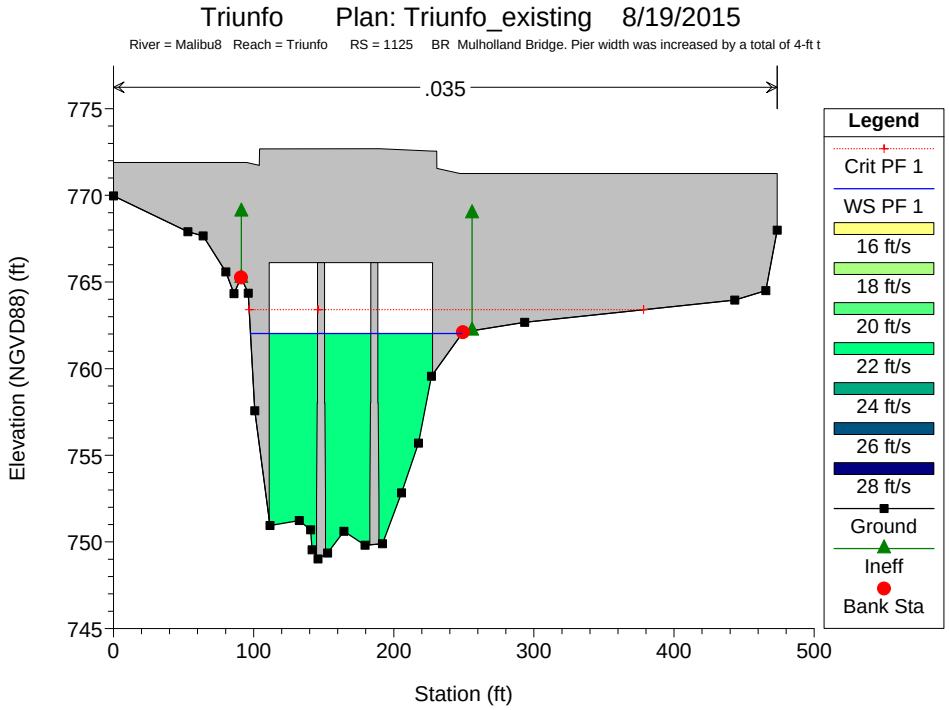

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1627 XS 1619 **undercut RB (see notes below)
.03
.06
.03
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
7.0 ft/s
7.5 ft/s
8.0 ft/s
8.5 ft/s
9.0 ft/s
9.5 ft/s
10.0 ft/s
Ground
Ineff
Bank Sta

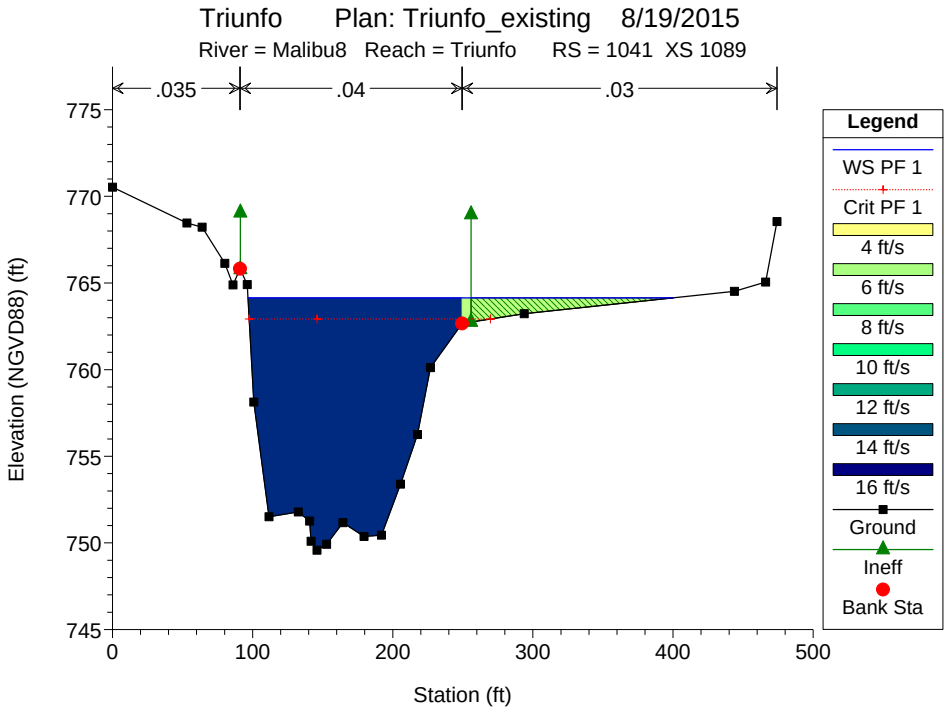

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1539 XS 1519
.035
.045
.03
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
8.7 ft/s
8.8 ft/s
8.9 ft/s
9.0 ft/s
9.1 ft/s
9.2 ft/s
9.3 ft/s
9.4 ft/s
Ground
Ineff
Bank Sta

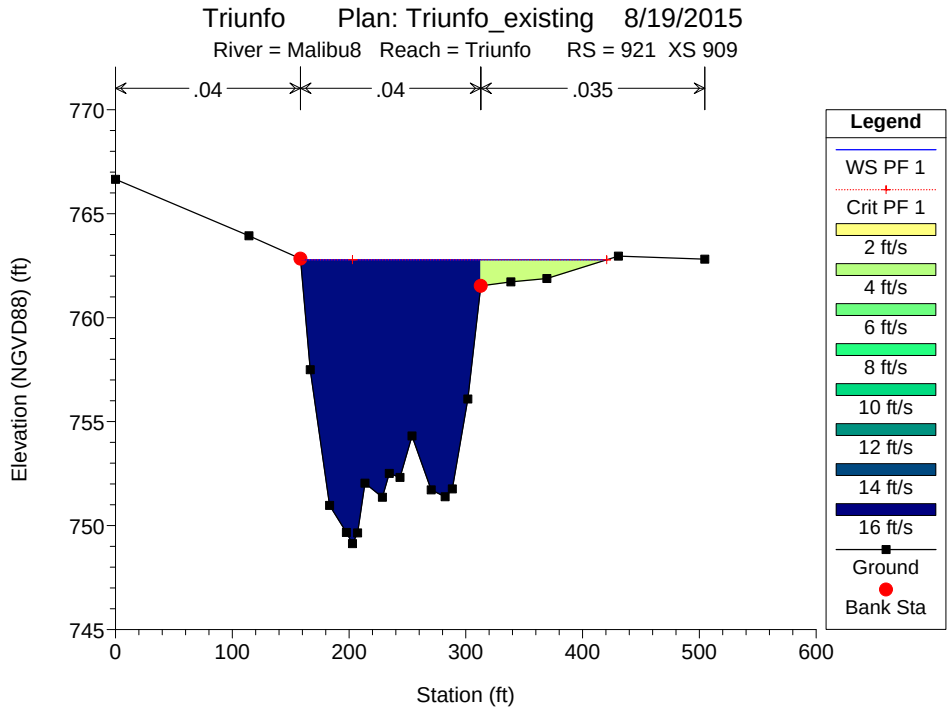

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1369 XS 1366
.045
.03
.02
.015
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

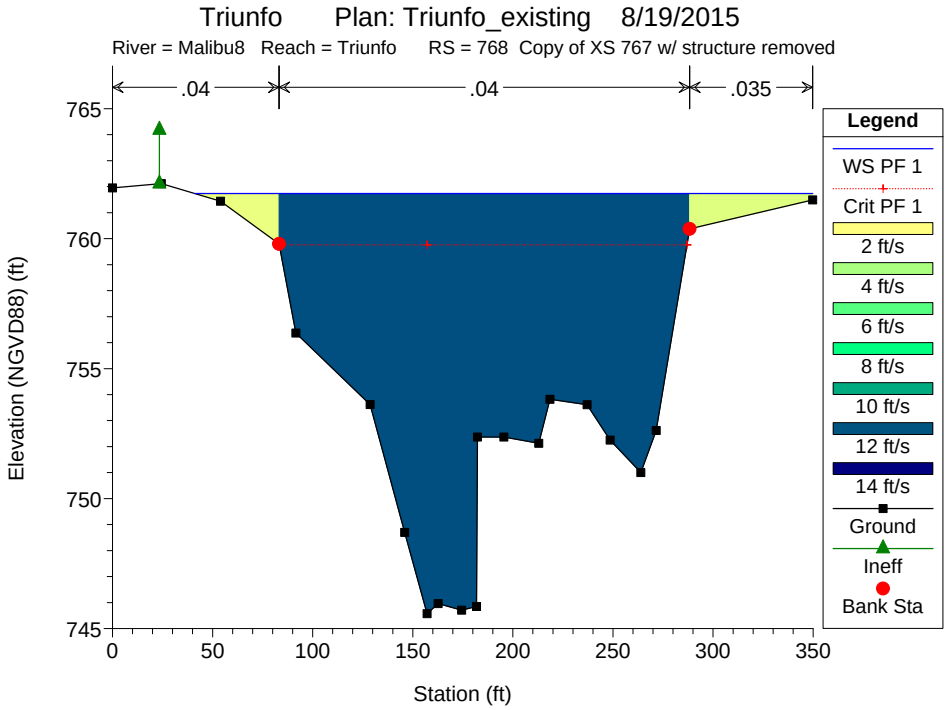

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1208 XS 1206
.03
.045
.03
.02
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

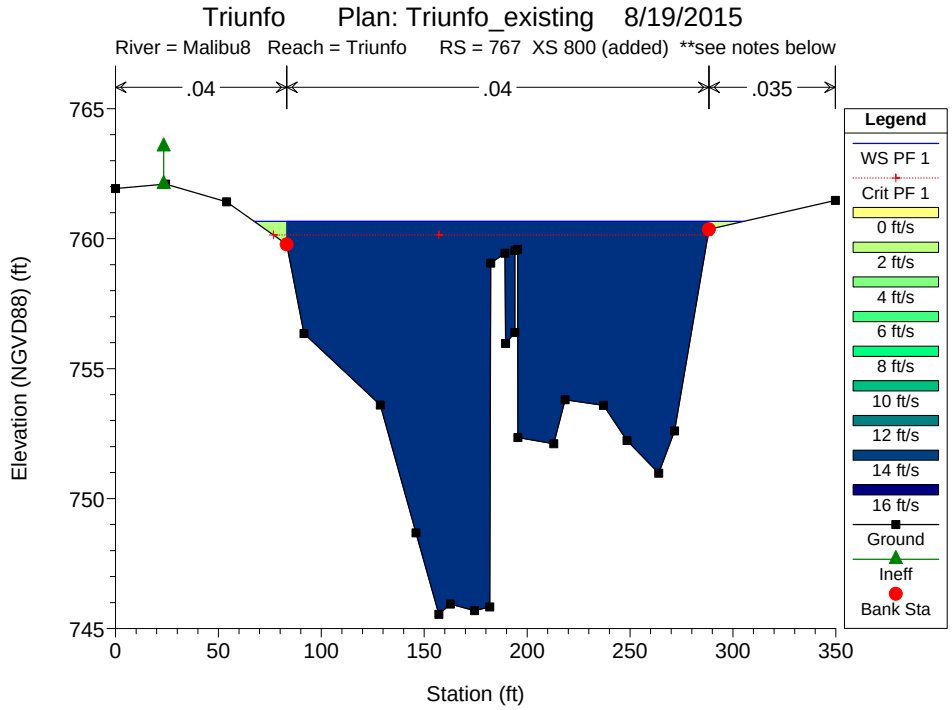

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1125 BR Mulholland Bridge. Pier width was increased by a total of 4-ft t
.0304
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
Ground
Ineff
Bank Sta

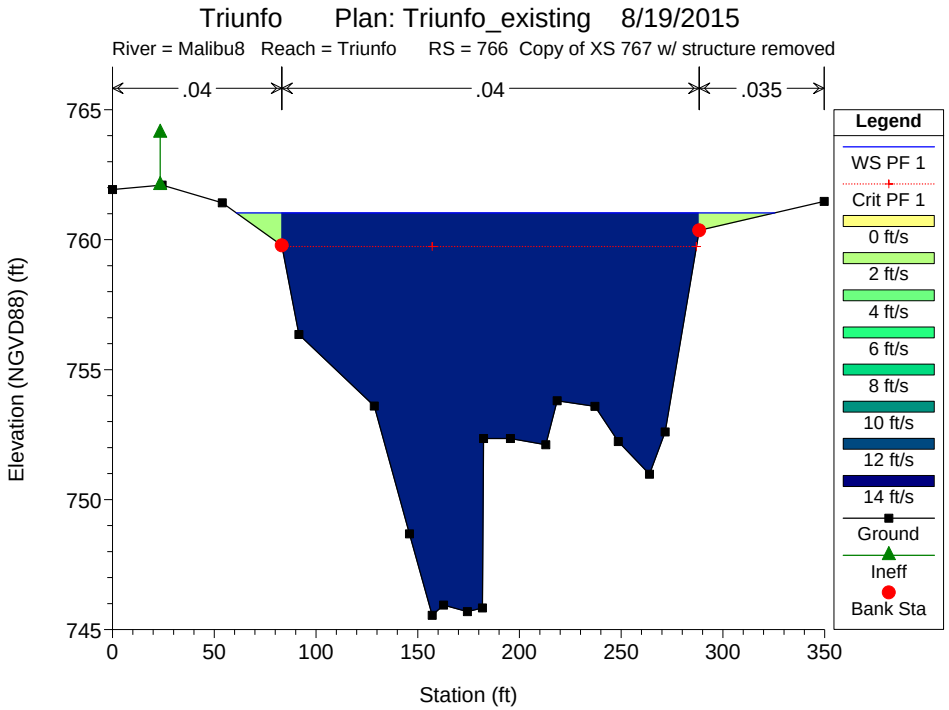

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1125 BR Mulholland Bridge. Pier width was increased by a total of 4-ft t
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
Ground
Ineff
Bank Sta

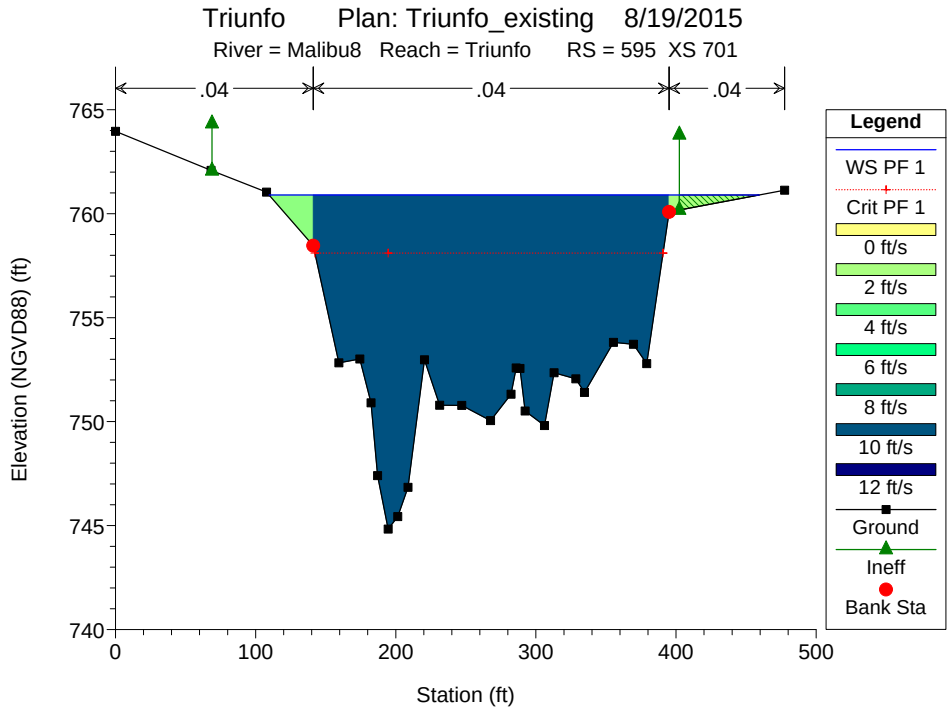

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1041 XS 1089
.035
.04
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Ineff
Bank Sta

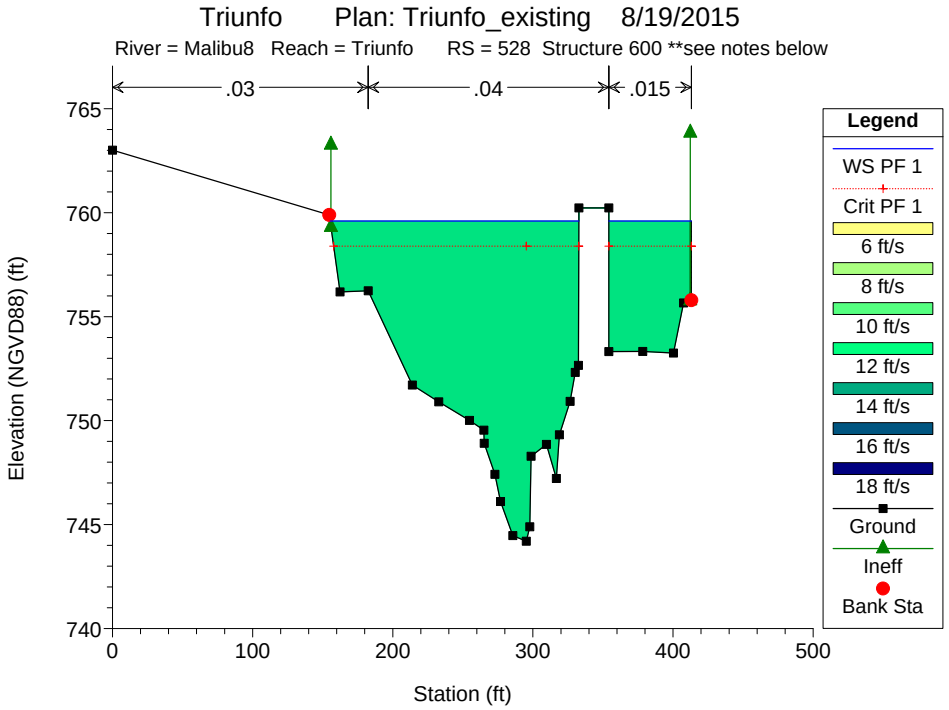

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 921 XS 909
.04
.04
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

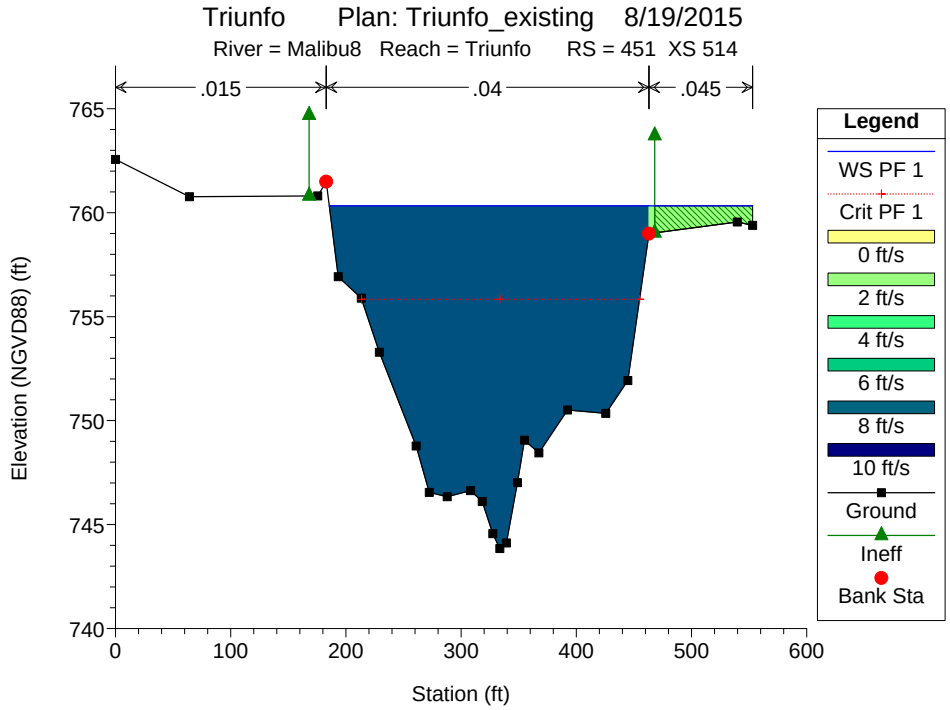

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 768 Copy of XS 767 w/ structure removed
.04
.04
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Ineff
Bank Sta

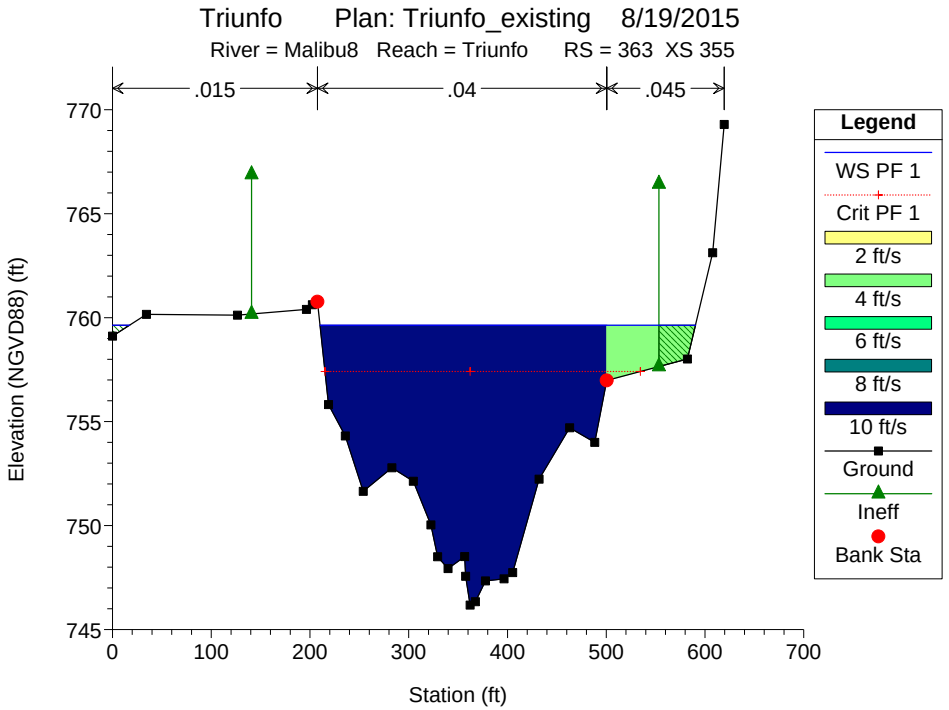

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 767 XS 800 (added) **see notes below
.04
.04
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Ineff
Bank Sta

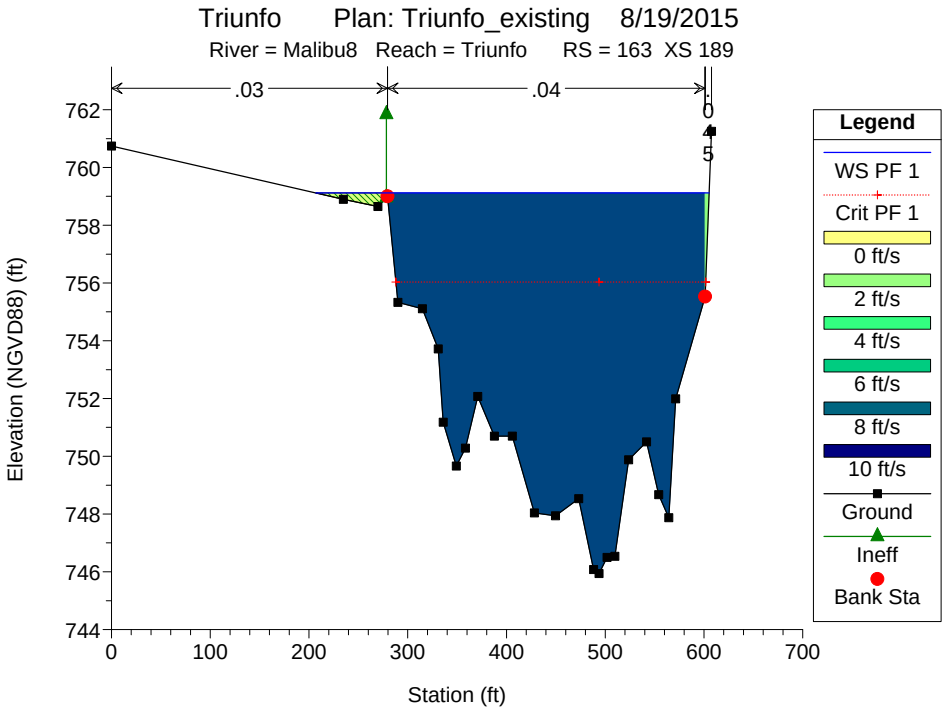

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 766 Copy of XS 767 w/ structure removed
.04
.04
.035
Elevation (NGVD88) (ft)
765
760
755
750
745
0
50
100
150
200
250
300
350
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Ineff
Bank Sta

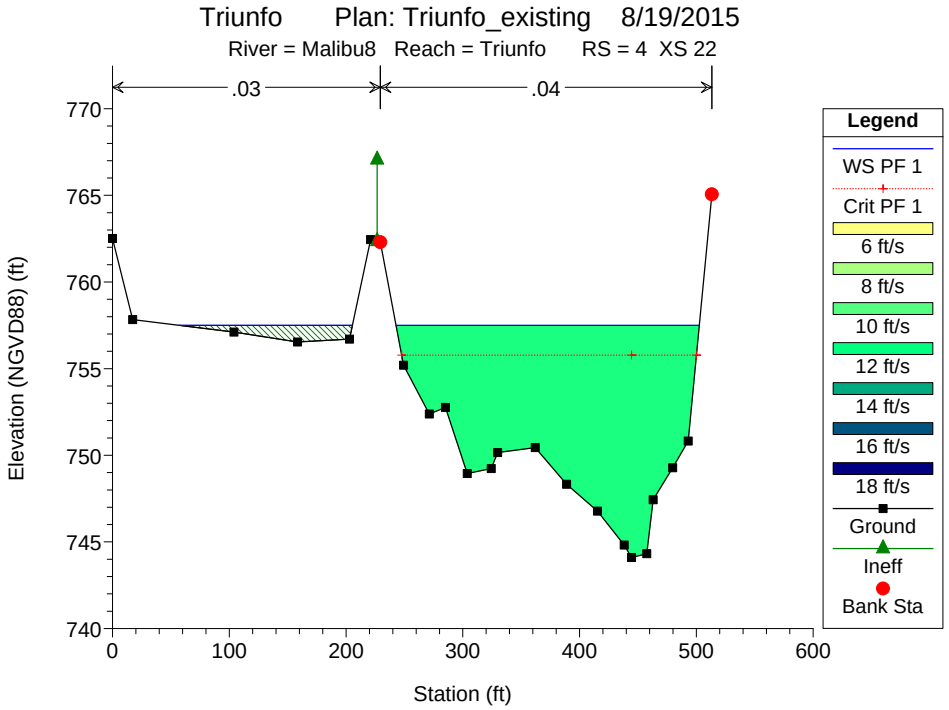

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 595 XS 701
.04
.04
.04
Elevation (NGVD88) (ft)
765
760
755
750
745
740
0
100
200
300
400
500
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta


Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 528 Structure 600 **see notes below
.03
.04
.015
Elevation (NGVD88) (ft)
765
760
755
750
745
740
0
100
200
300
400
500
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Ineff
Bank Sta


Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 451 XS 514
.015
.04
.045
Elevation (NGVD88) (ft)
765
760
755
750
745
740
0
100
200
300
400
500
600
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

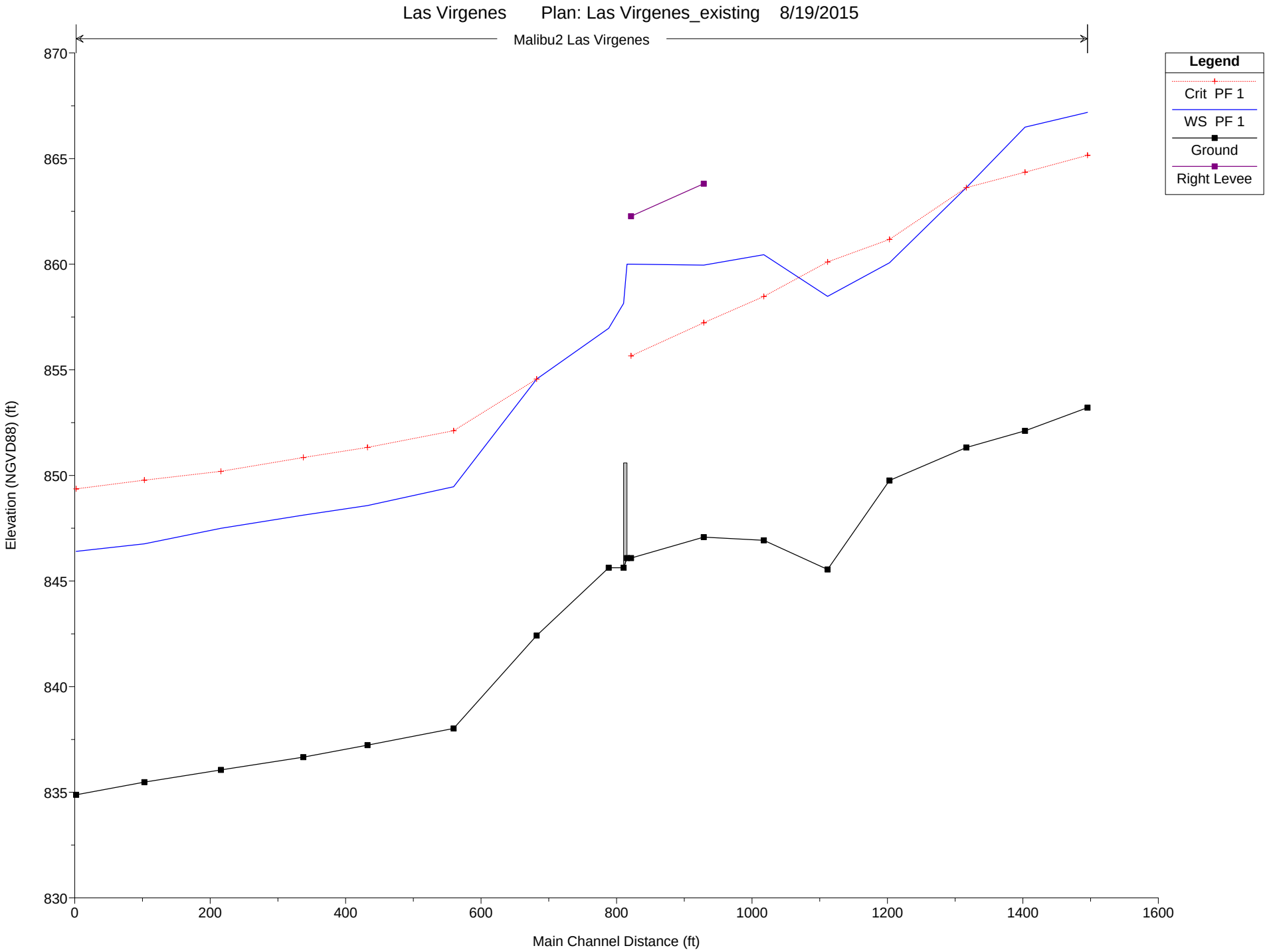

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 363 XS 355
.015
.04
.045
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta


Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 163 XS 189
.03
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta


Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 4 XS 22
.03
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Ineff
Bank Sta

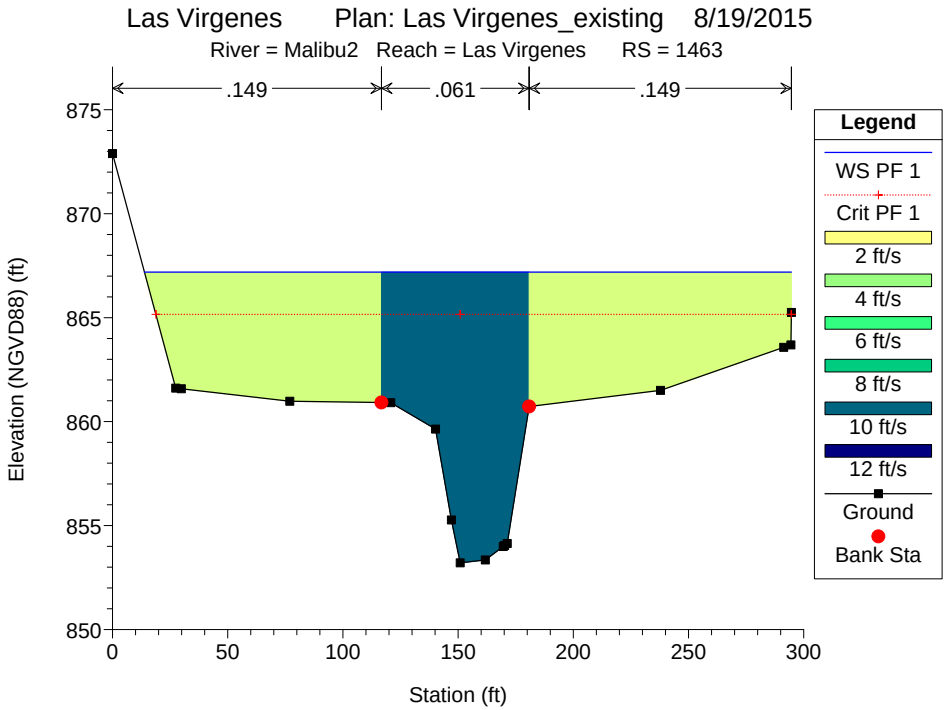
LAS VIRGENES CREEK

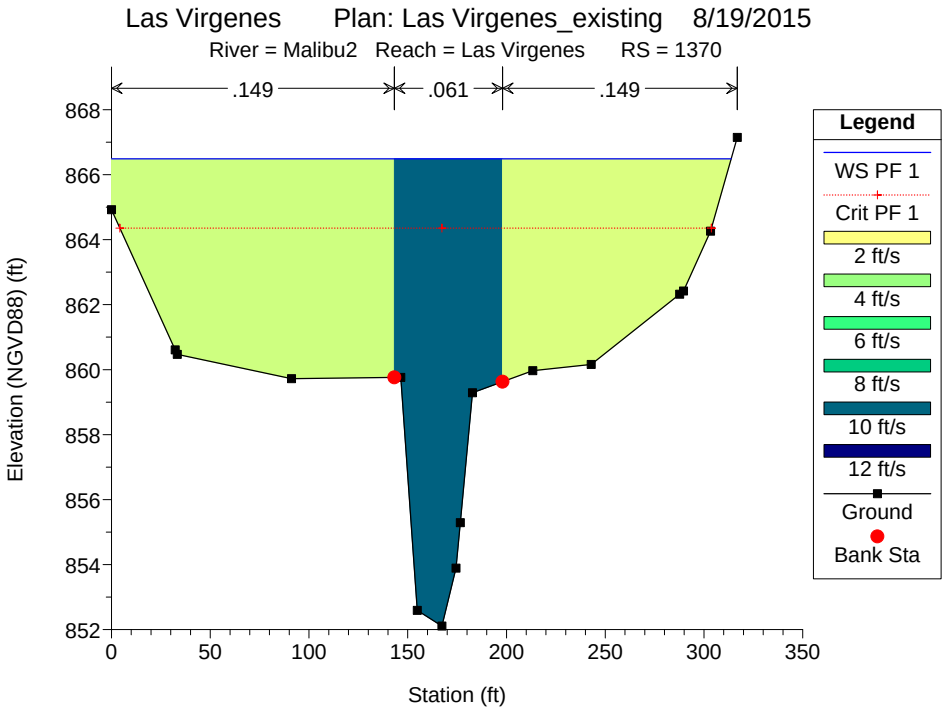

1463
1370
1284
1170
1079
985
Las Virgenes
Malibu
896
821
682
559
432
338
216
103
2

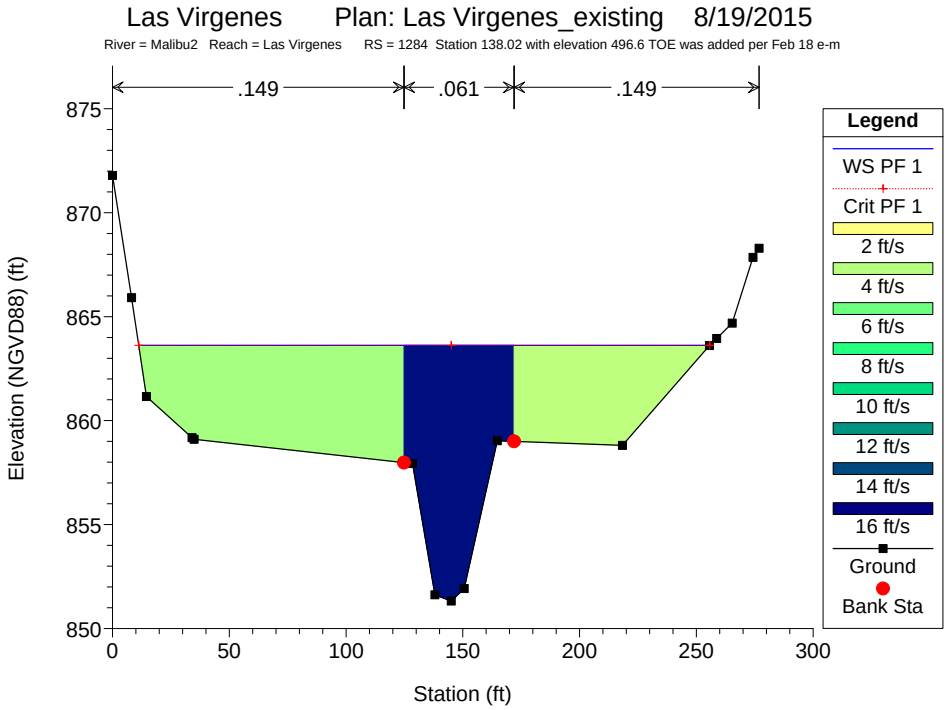

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
Malibu2 Las Virgenes
Legend
Crit PF 1
WS PF 1
Ground
Right Levee
Elevation (NGVD88) (ft)
Main Channel Distance (ft)
870
865
860
855
850
845
840
835
830
0
200
400
600
800
1000
1200
1400
1600

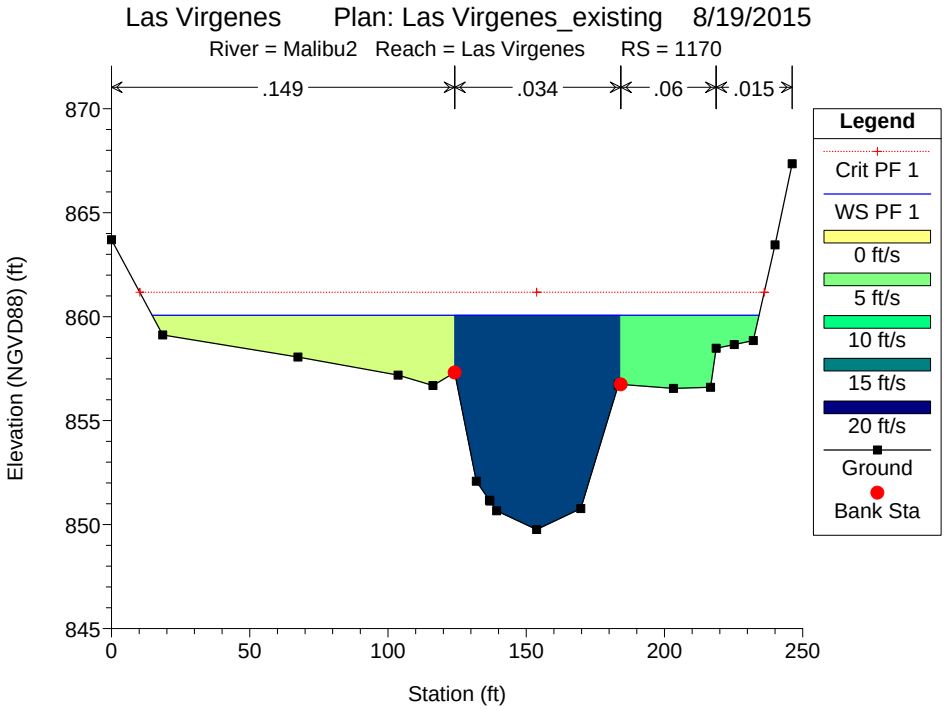
HEC-RAS Plan: L. Virgenes_exst River: Malibu2 Reach: Las Virgenes Profile: PF 1

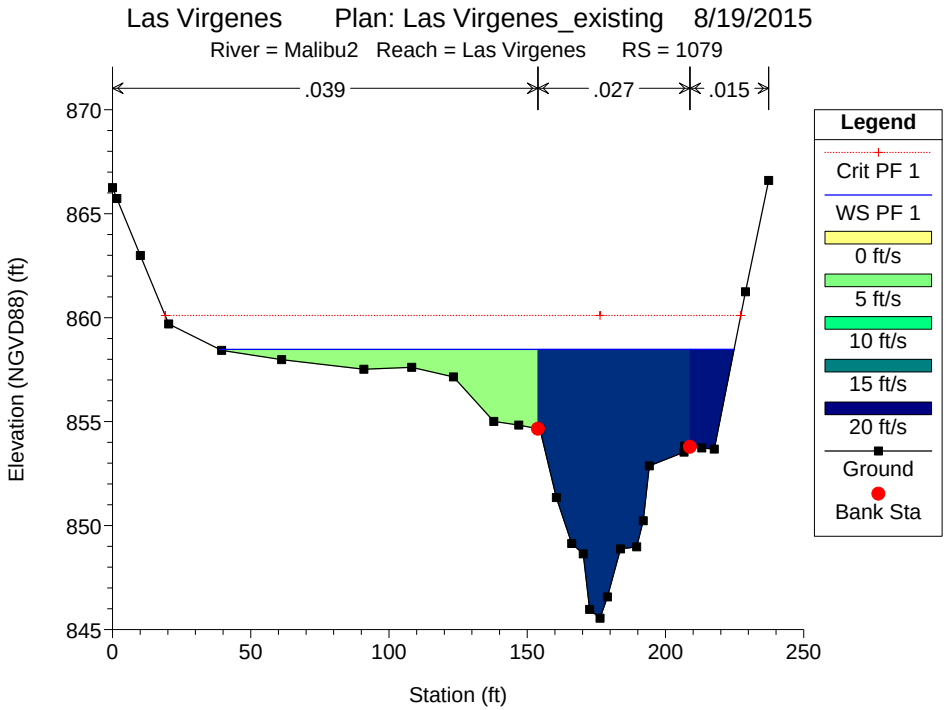
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Las Virgenes	1463	PF 1	9860.00	853.21	867.19	865.16	868.27	0.008459	10.07	1833.06	280.77	0.56
Las Virgenes	1370	PF 1	9860.00	852.11	866.49	864.36	867.47	0.008391	10.09	2008.02	313.76	0.55
Las Virgenes	1284	PF 1	9860.00	851.32	863.62	863.62	866.14	0.025590	15.58	1246.85	244.53	0.94
Las Virgenes	1170	PF 1	9860.00	849.76	860.07	861.17	864.24	0.010213	17.41	857.50	219.49	1.07
Las Virgenes	1079	PF 1	9860.00	845.55	858.48	860.11	863.37	0.007475	18.16	658.75	186.02	1.12
Las Virgenes	985	PF 1	9860.00	846.93	860.45	858.47	861.57	0.001383	9.62	1440.65	216.96	0.52
Las Virgenes	896	PF 1	9860.00	847.08	859.95	857.23	861.41	0.001456	10.57	1267.68	177.59	0.55
Las Virgenes	821	PF 1	9860.00	846.09	860.00	855.66	861.29	0.000331	9.35	1128.17	113.91	0.47
Las Virgenes	815		Inl Struct									
Las Virgenes	788	PF 1	9860.00	845.63	856.97		859.21	0.000778	12.21	845.71	104.81	0.70
Las Virgenes	682	PF 1	9860.00	842.42	854.56	854.56	858.88	0.001814	16.68	591.05	68.28	1.00
Las Virgenes	559	PF 1	9860.00	838.02	849.47	852.12	858.12	0.004386	23.61	417.63	54.50	1.50
Las Virgenes	432	PF 1	9860.00	837.23	848.57	851.33	857.52	0.004552	24.01	410.71	53.67	1.53
Las Virgenes	338	PF 1	9860.00	836.66	848.12	850.85	857.09	0.004583	24.03	410.30	53.63	1.53
Las Virgenes	216	PF 1	9860.00	836.06	847.50	850.19	856.52	0.004610	24.11	408.96	53.43	1.54
Las Virgenes	103	PF 1	9860.00	835.48	846.76	849.78	855.97	0.004773	24.36	404.74	53.43	1.56
Las Virgenes	2	PF 1	9860.00	834.88	846.40	849.37	855.45	0.004665	24.13	408.55	53.68	1.54

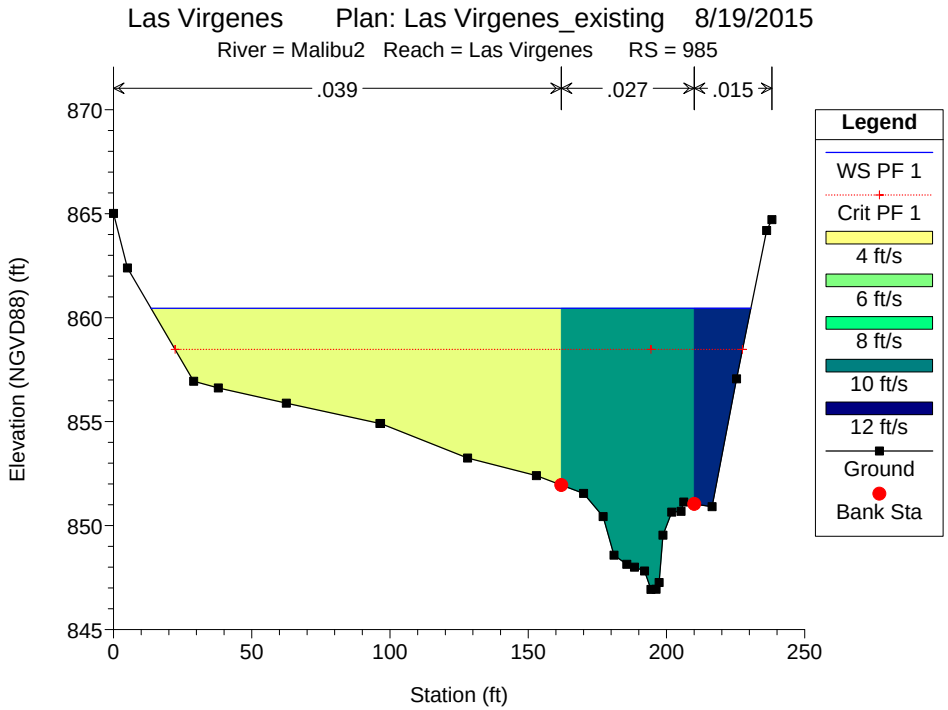

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 1463
.149
.061
.149
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

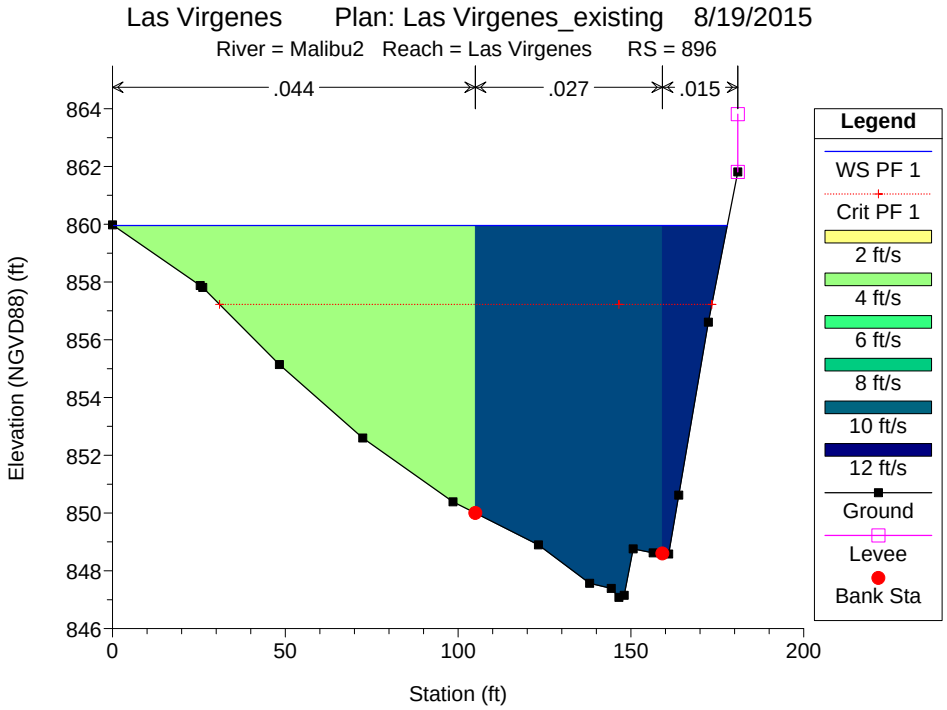

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 1370
.149
.061
.149
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

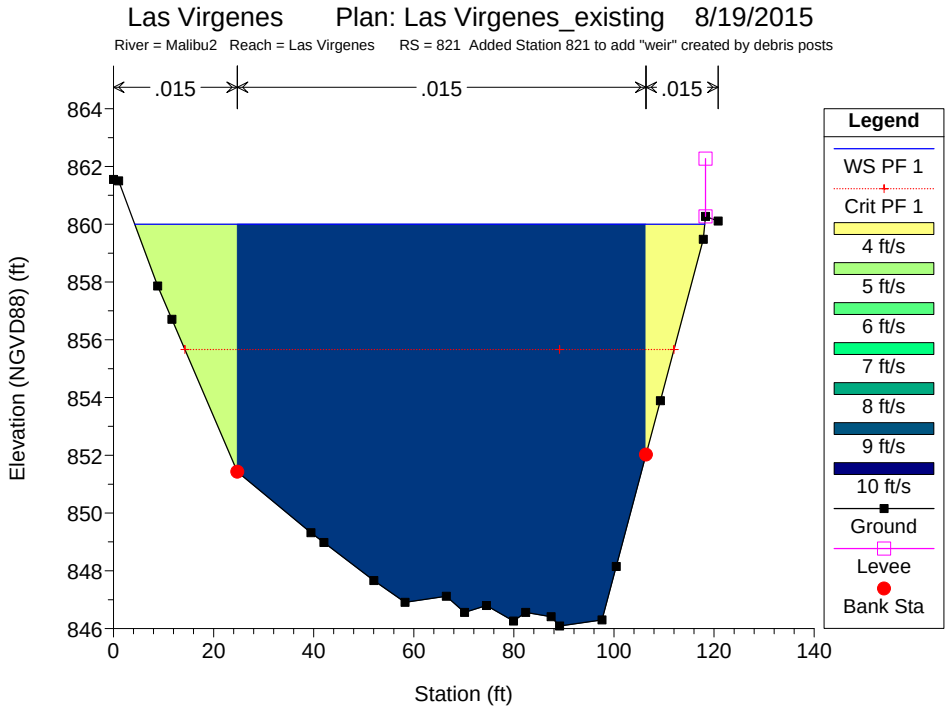

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 1284 Station 138.02 with elevation 496.6 TOE was added per Feb 18 e-m
.149
.061
.149
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

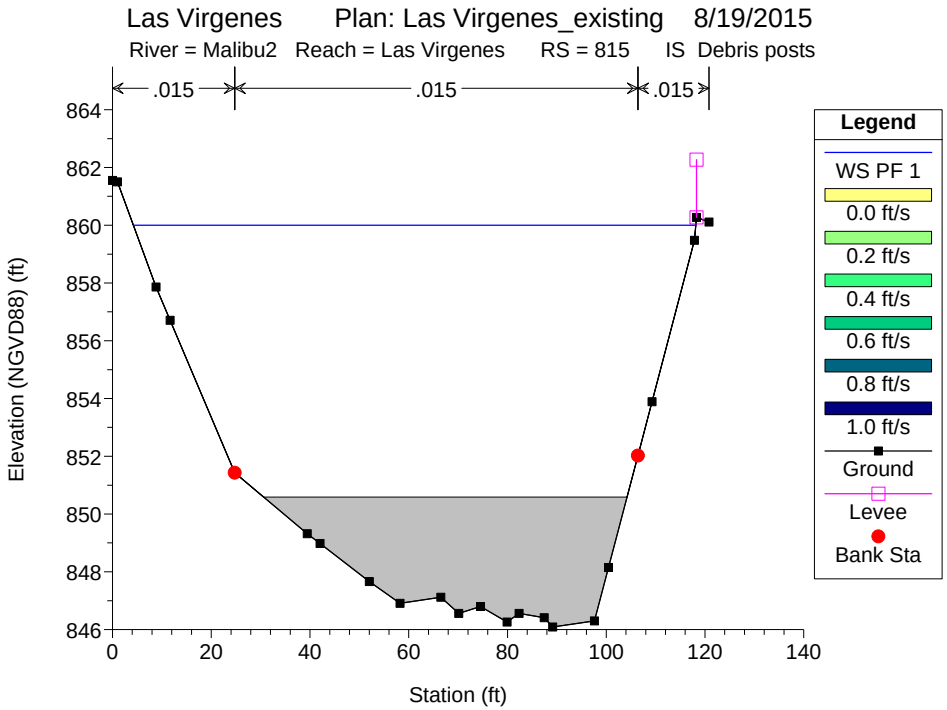

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 1170
.149
.034
.06
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

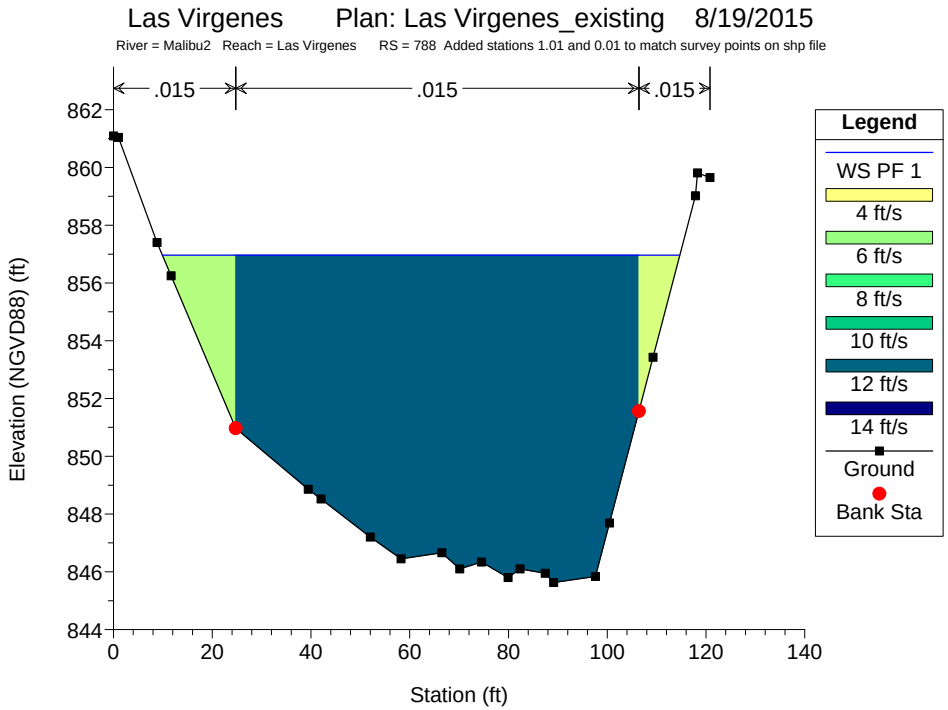

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 1079
.039
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

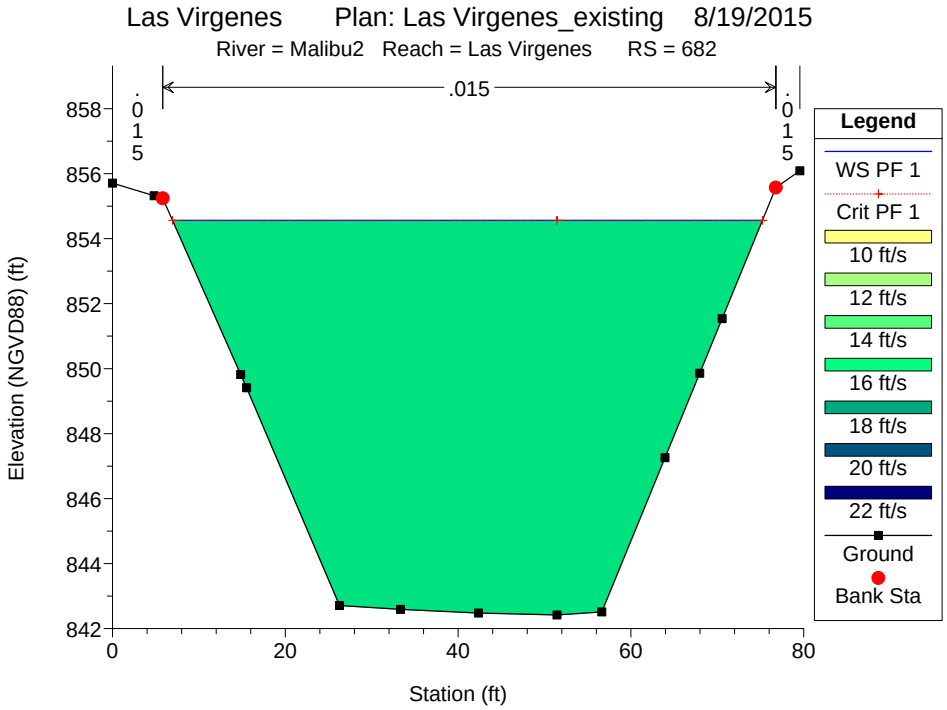

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 985
.039
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

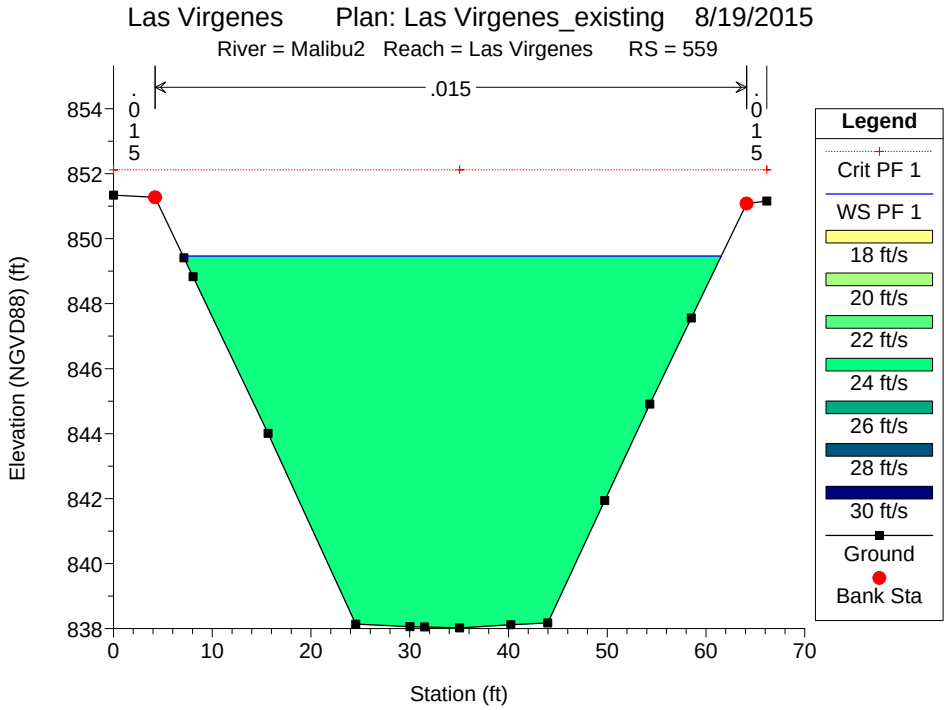

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 896
.044
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Levee
Bank Sta

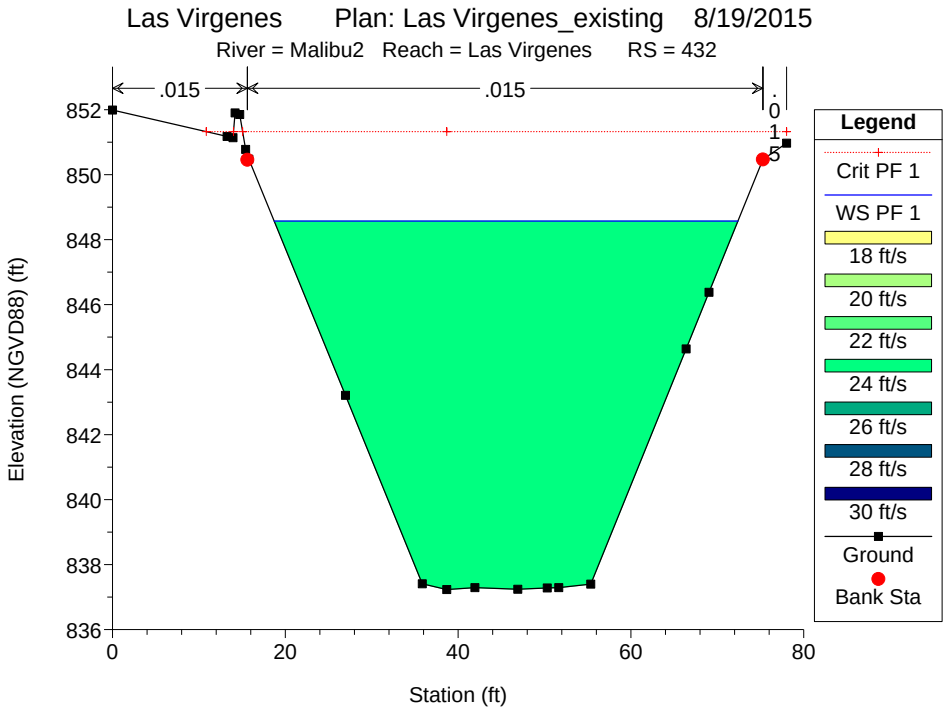

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 821 Added Station 821 to add "weir" created by debris posts
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Levee
Bank Sta

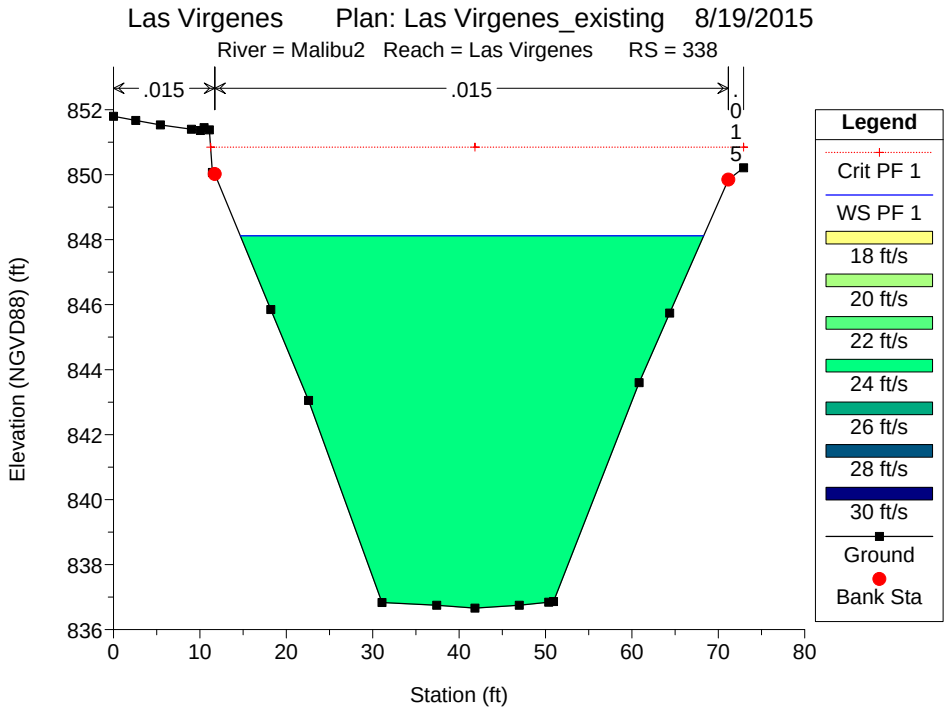

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 815 IS Debris posts
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Levee
Bank Sta

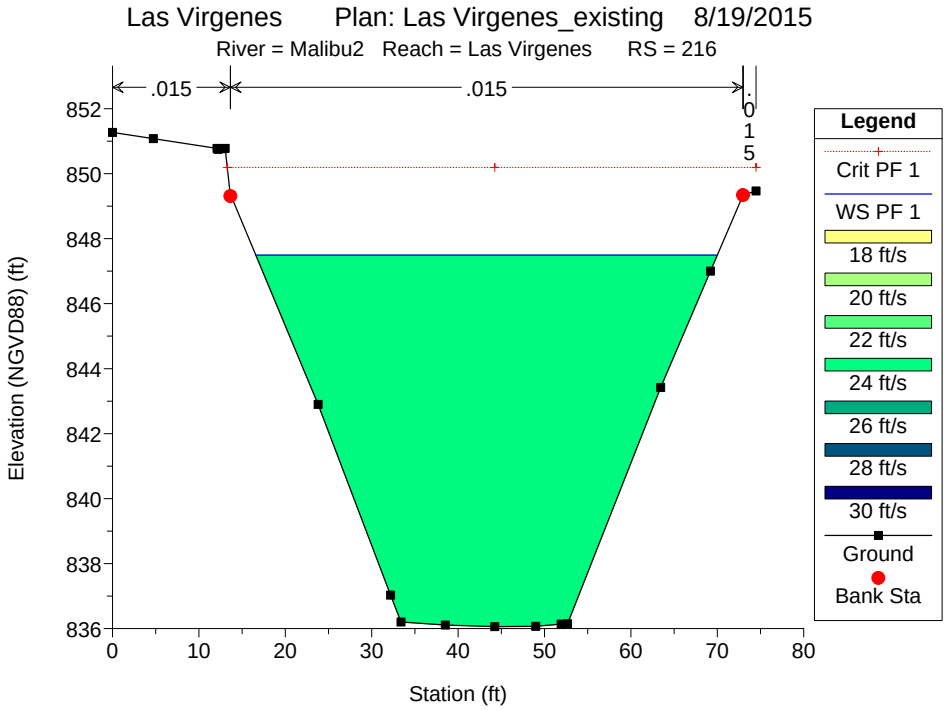

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 788 Added stations 1.01 and 0.01 to match survey points on shp file
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

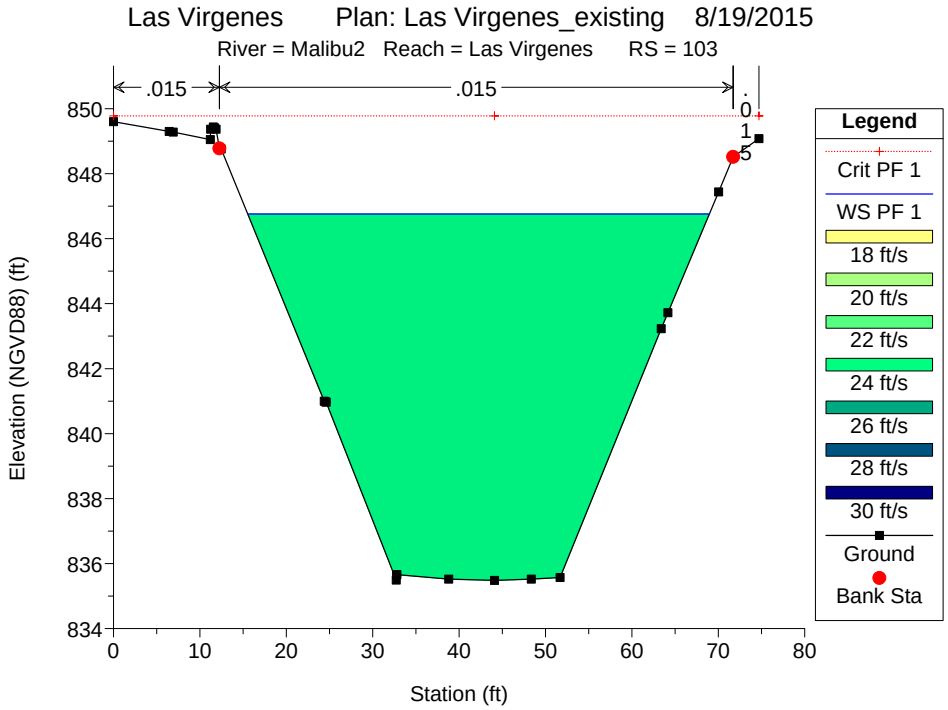

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 682
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Bank Sta

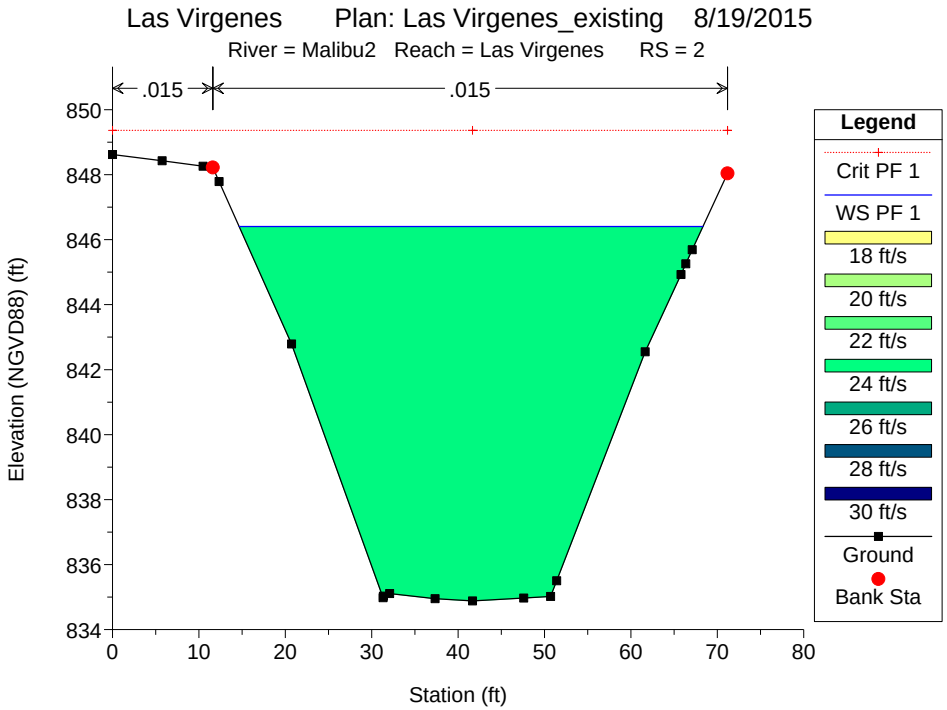

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 559
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta


Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 432
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta

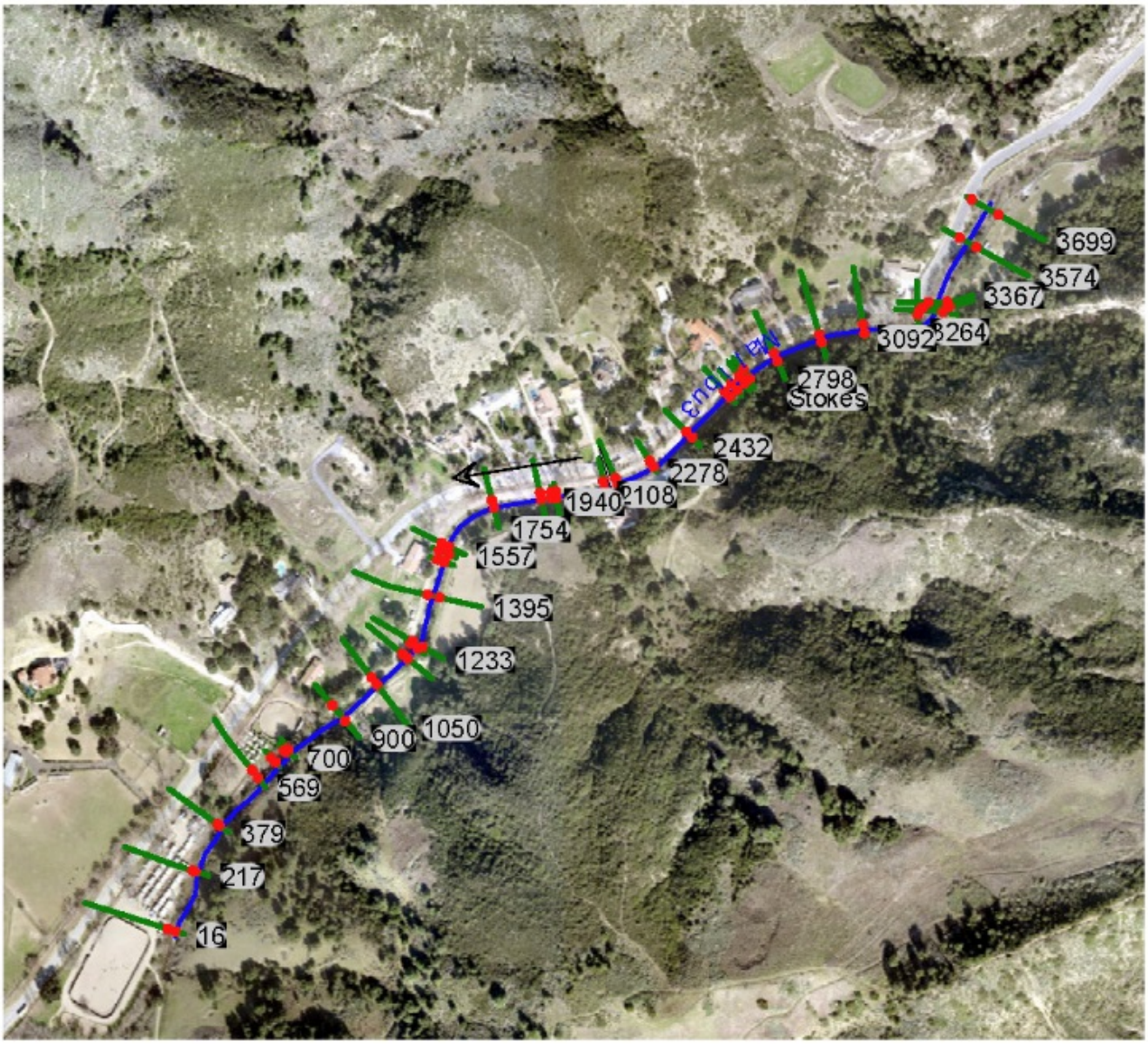

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 338
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta

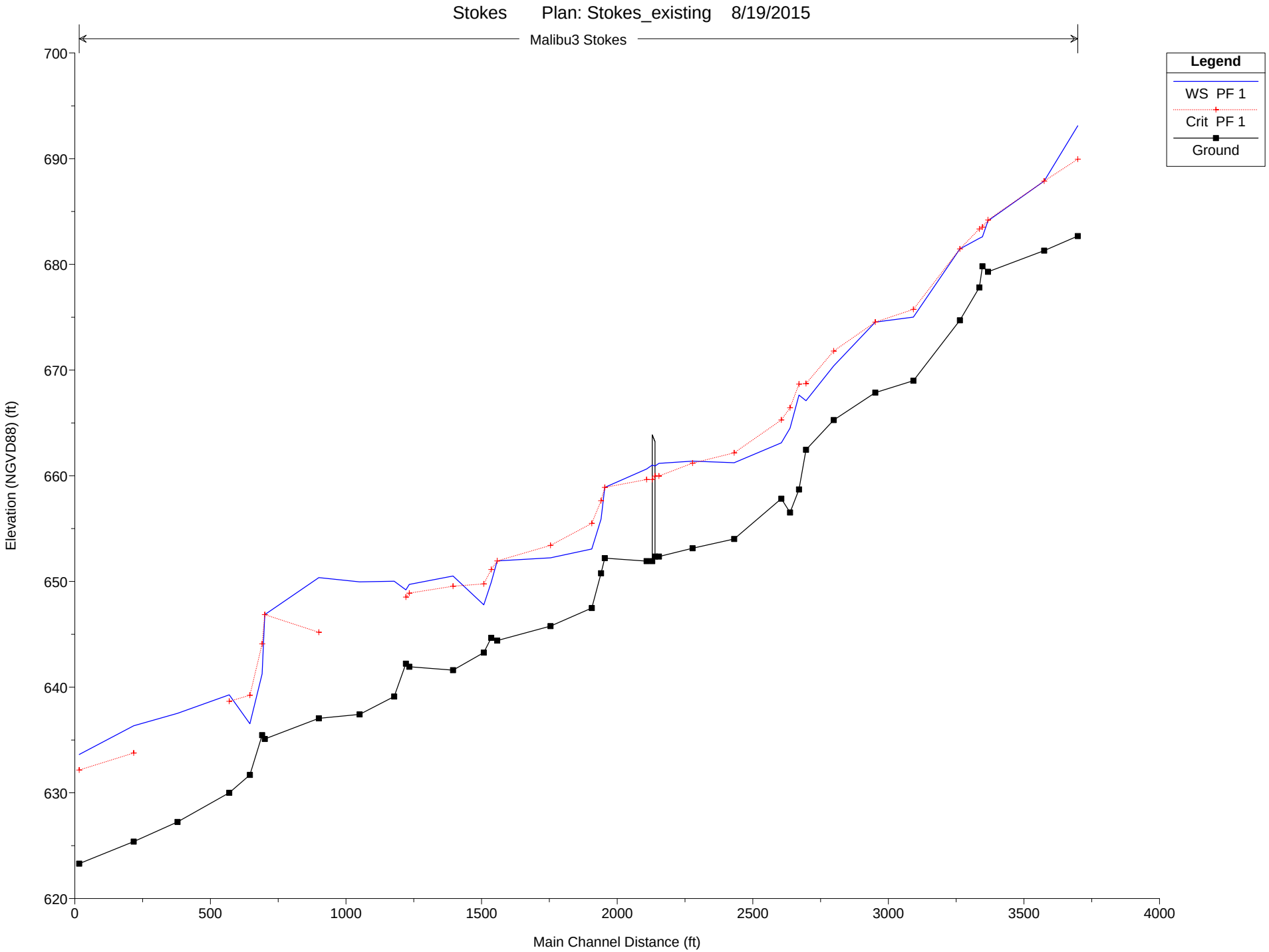

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 216
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta


Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 103
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta


Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 2
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
850
848
846
844
842
840
838
836
834
0
10
20
30
40
50
60
70
80
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta

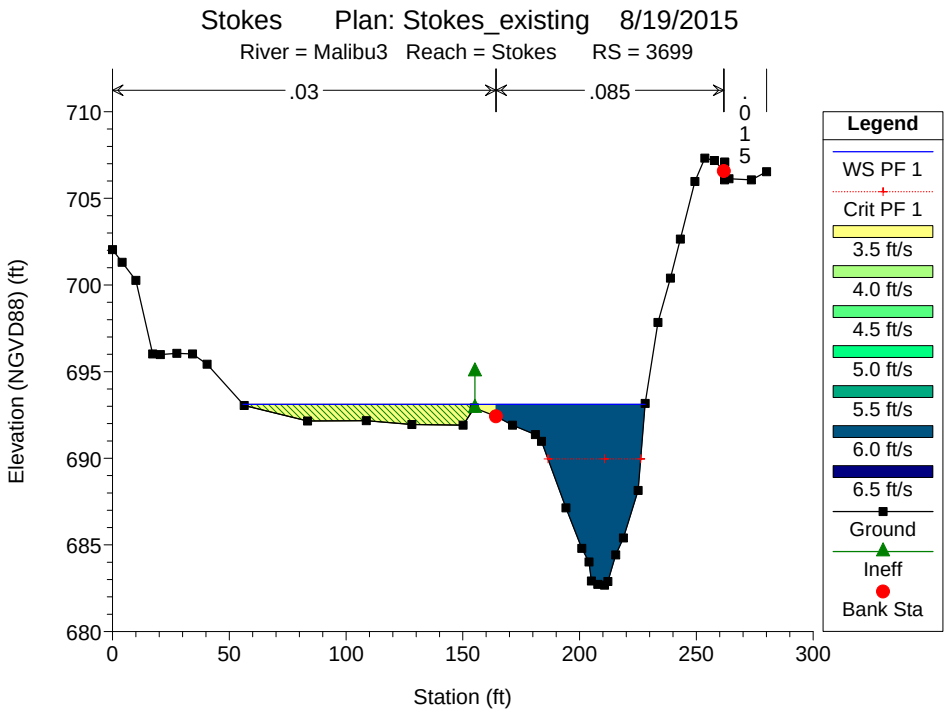
STOKES CANYON CHANNEL

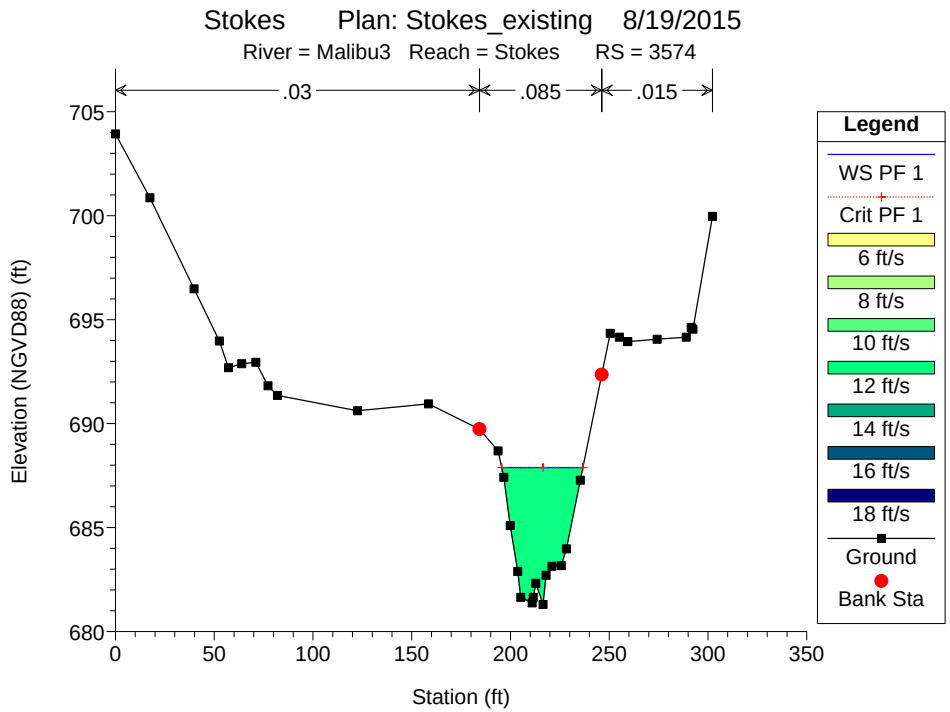

3699
3574
3367
3264
3092
2798
Stokes
2432
2278
2108
1940
1754
1557
1395
1233
1050
900
700
569
379
217
16

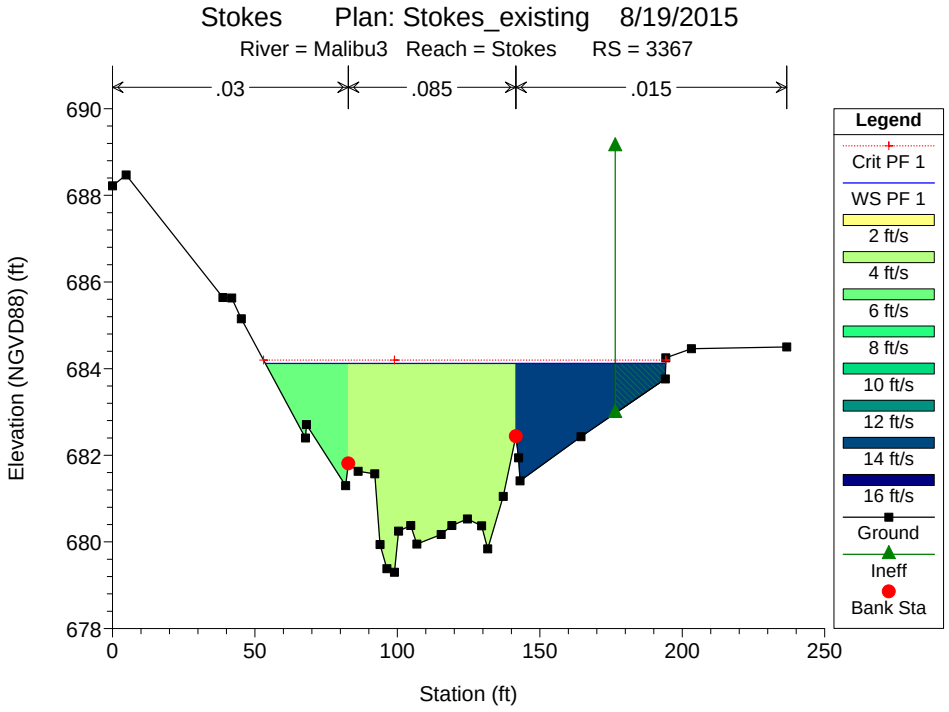

Stokes Plan: Stokes_existing 8/19/2015
Malibu3 Stokes
Legend
WS PF 1
Crit PF 1
Ground
Elevation (NGVD88) (ft)
Main Channel Distance (ft)
700
690
680
670
660
650
640
630
620
0
500
1000
1500
2000
2500
3000
3500
4000

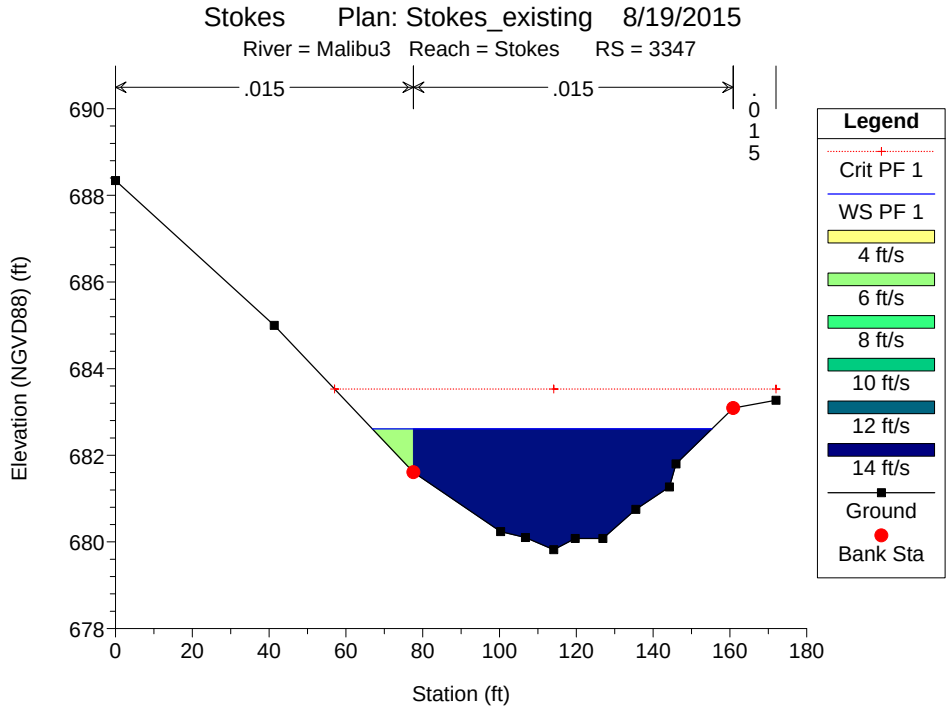
HEC-RAS Plan: Stokes_existing River: Malibu3 Reach: Stokes Profile: PF 1

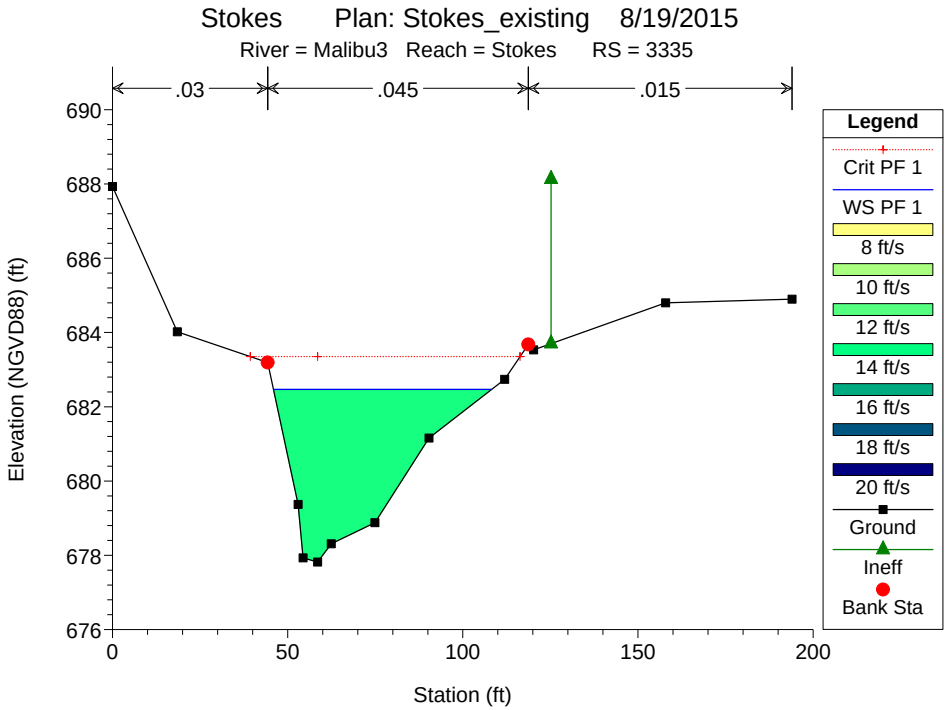
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Stokes	3699	PF 1	2020.00	682.68	693.11	689.96	693.67	0.014675	6.03	336.96	172.08	0.46
Stokes	3574	PF 1	2020.00	681.30	687.89	687.89	690.02	0.074568	11.71	172.47	41.06	1.01
Stokes	3367	PF 1	2020.00	679.30	684.12	684.20	685.79	0.008781	3.77	321.63	140.53	0.35
Stokes	3347	PF 1	2020.00	679.82	682.61	683.53	685.49	0.008353	13.70	150.54	88.46	1.77
Stokes	3335	PF 1	2020.00	677.82	682.47	683.35	685.28	0.052950	13.45	150.19	62.25	1.53
Stokes	3264	PF 1	2020.00	674.71	681.46	681.46	683.56	0.110462	11.63	173.68	41.49	1.00
Stokes	3092	PF 1	2020.00	668.99	675.01	675.74	678.45	0.013114	14.94	137.51	31.73	1.21
Stokes	2952	PF 1	2020.00	667.87	674.54	674.54	677.25	0.008871	13.25	155.63	31.31	0.96
Stokes	2798	PF 1	2020.00	665.27	670.39	671.80	675.09	0.019901	17.44	117.65	29.93	1.47
Stokes	2696	PF 1	2020.00	662.46	667.10	668.72	672.46	0.032611	18.61	109.41	36.01	1.85
Stokes	2670	PF 1	2020.00	658.71	667.64	668.67	671.53	0.012518	15.92	130.17	34.09	1.34
Stokes	2637	PF 1	2020.00	656.52	664.51	666.44	670.73	0.024899	20.04	101.84	27.38	1.75
Stokes	2605	PF 1	2020.00	657.83	663.12	665.27	669.80	0.030531	20.87	98.99	25.36	1.76
Stokes	2432	PF 1	2020.00	654.02	661.24	662.17	665.17	0.016454	15.91	127.13	27.53	1.28
Stokes	2278	PF 1	2020.00	653.14	661.38	661.20	664.01	0.007582	13.31	163.83	31.41	0.93
Stokes	2154	PF 1	2020.00	652.36	661.18	659.98	662.91	0.003857	10.81	204.70	37.26	0.70
Stokes	2139.5		Bridge									
Stokes	2108	PF 1	2020.00	651.92	660.64	659.64	662.49	0.004920	11.02	191.87	34.93	0.76
Stokes	1954	PF 1	2340.00	652.21	658.90	658.90	661.78	0.001674	14.35	209.19	40.96	0.98
Stokes	1940	PF 1	2340.00	650.78	655.90	657.64	661.47	0.004679	20.12	132.20	32.63	1.57
Stokes	1906	PF 1	2340.00	647.49	653.07	655.49	660.91	0.031176	22.82	109.23	29.58	1.91
Stokes	1754	PF 1	2340.00	645.77	652.23	653.41	656.83	0.014391	17.55	143.72	30.56	1.33
Stokes	1557	PF 1	2340.00	644.41	651.95	651.95	654.78	0.006633	13.74	184.90	35.79	0.96
Stokes	1535	PF 1	2340.00	644.67	649.93	651.13	654.48	0.005160	17.12	136.69	29.82	1.41
Stokes	1508	PF 1	2340.00	643.27	647.79	649.77	654.13	0.006573	20.98	120.65	33.95	1.80
Stokes	1395	PF 1	2340.00	641.61	650.51	649.54	652.39	0.005363	10.99	214.44	37.80	0.79
Stokes	1233	PF 1	2340.00	641.93	649.72	648.90	651.53	0.004996	10.95	222.32	41.80	0.78
Stokes	1221	PF 1	2340.00	642.22	649.21	648.53	651.46	0.001213	12.46	230.59	41.75	0.84
Stokes	1178	PF 1	2340.00	639.11	650.02		651.03	0.001405	8.60	328.30	44.20	0.48
Stokes	1050	PF 1	2340.00	637.42	649.97		650.81	0.001247	7.63	367.54	89.17	0.42
Stokes	900	PF 1	2340.00	637.05	650.37	645.19	650.53	0.000278	3.40	791.75	167.04	0.20
Stokes	700	PF 1	2340.00	635.10	646.86	646.86	650.11	0.001494	19.80	411.41	62.20	1.02
Stokes	691	PF 1	2340.00	635.46	641.25	644.09	649.55	0.069873	27.97	156.18	37.91	2.06
Stokes	645	PF 1	2340.00	631.69	636.53	639.23	645.77	0.093635	25.54	110.75	32.93	2.23
Stokes	569	PF 1	2340.00	630.00	639.28	638.66	641.37	0.027029	11.95	217.60	40.23	0.83
Stokes	379	PF 1	2340.00	627.25	637.52		638.29	0.008476	7.21	358.57	95.20	0.41
Stokes	217	PF 1	2340.00	625.38	636.34	633.77	636.80	0.008541	7.96	530.27	250.22	0.44
Stokes	16	PF 1	2340.00	623.30	633.63	632.16	634.71	0.012002	8.16	326.05	318.21	0.50

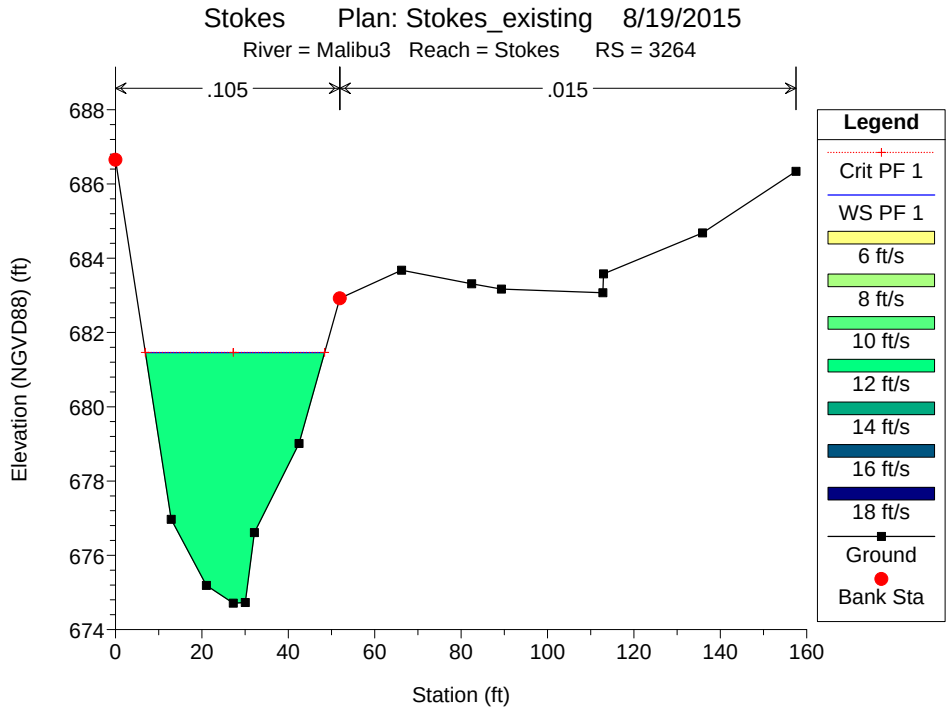

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3699
.03
.085
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
Ground
Ineff
Bank Sta

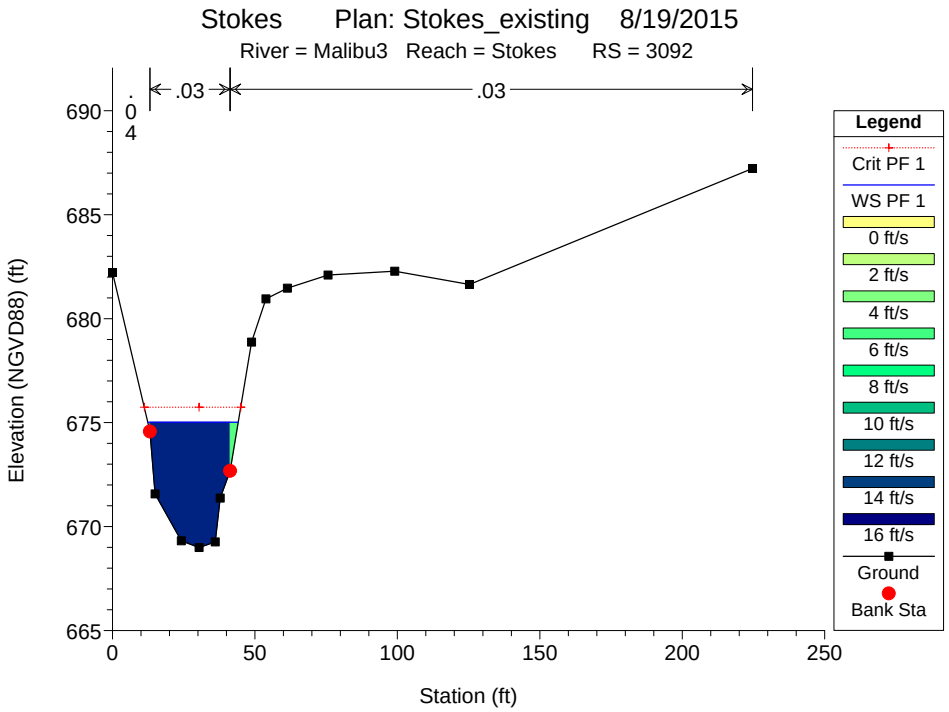

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3574
.03
.085
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

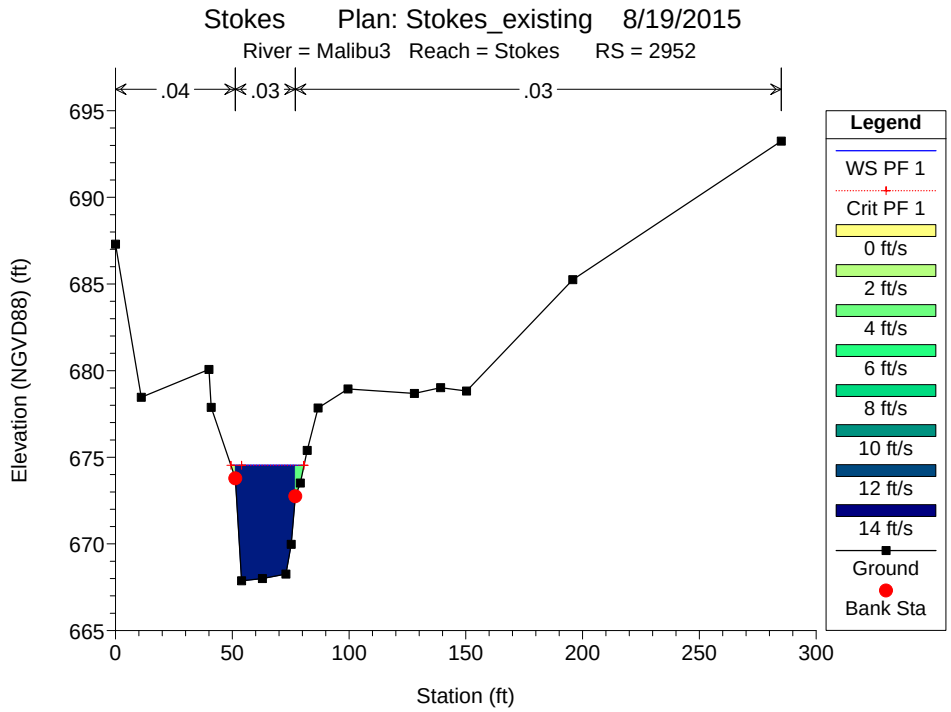

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3367
.03
.085
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Ineff
Bank Sta

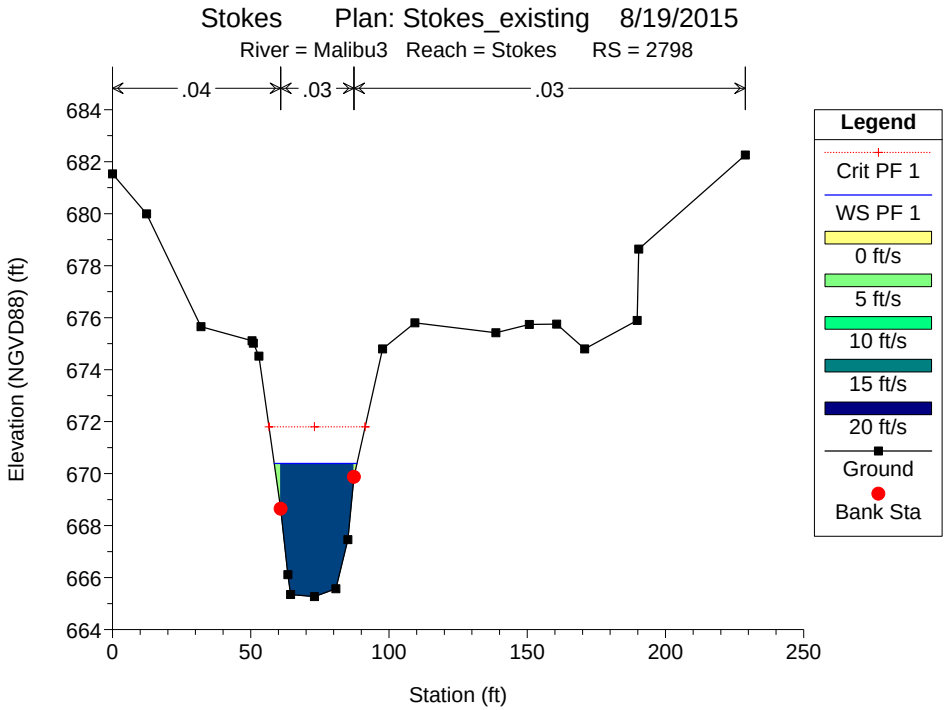

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3347
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

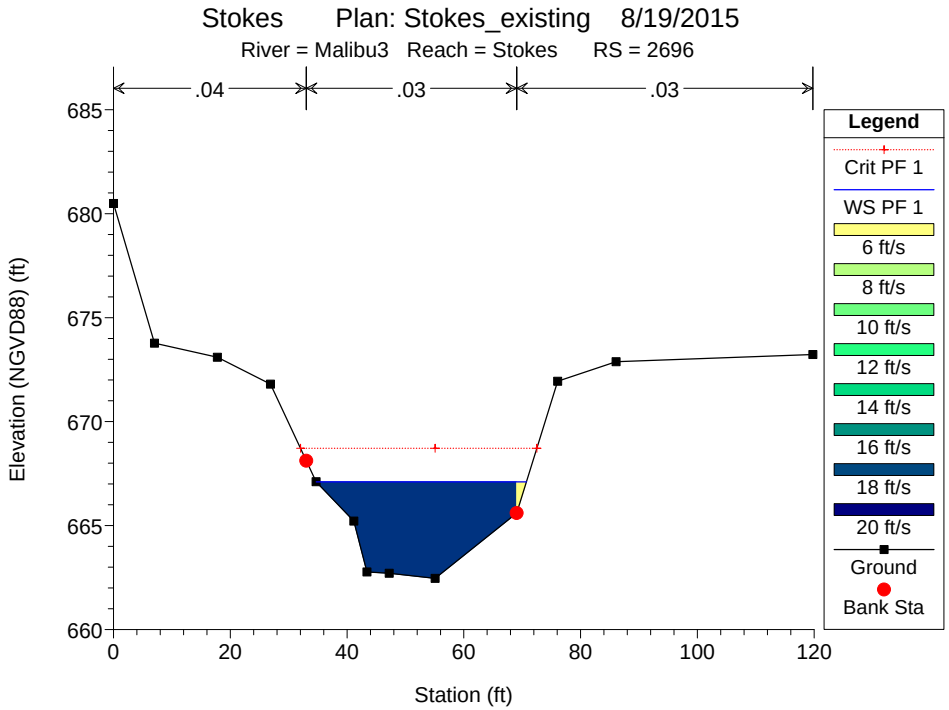

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3335
.03
.045
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

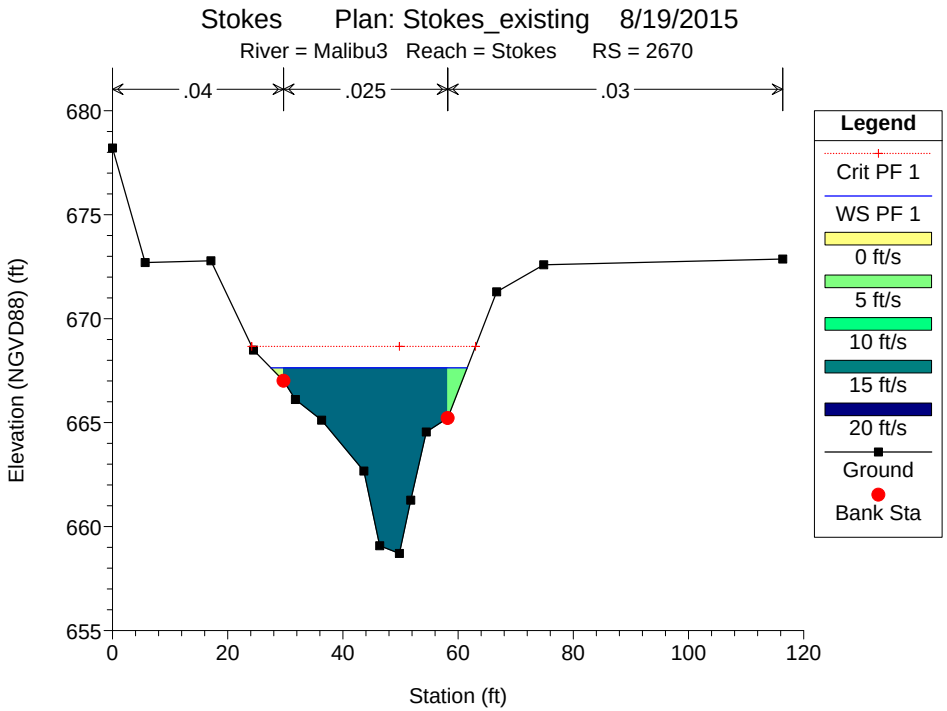

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3264
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

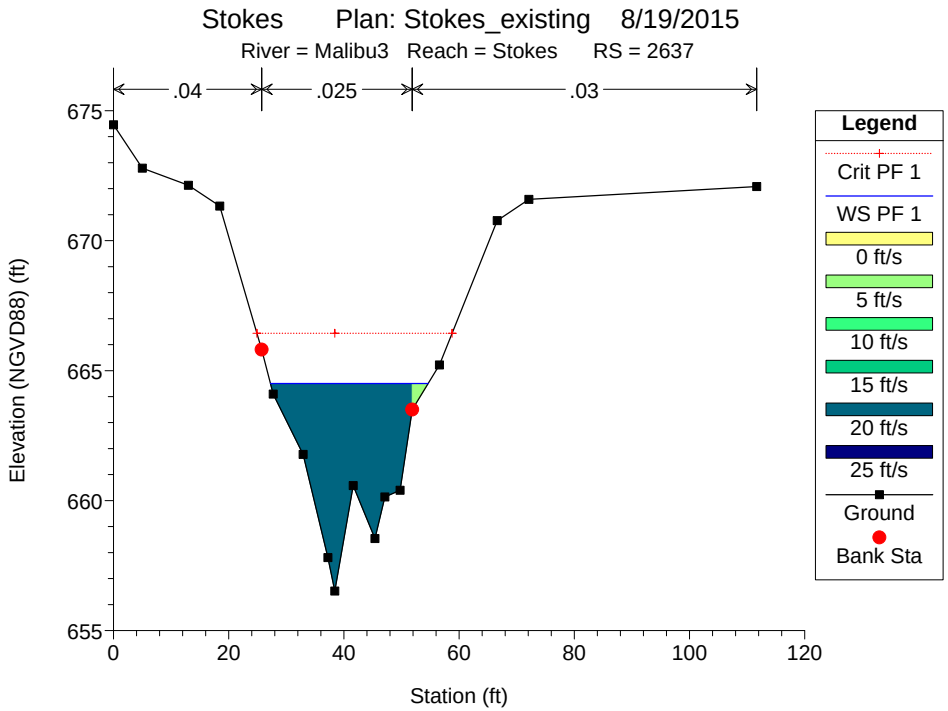

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3092
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

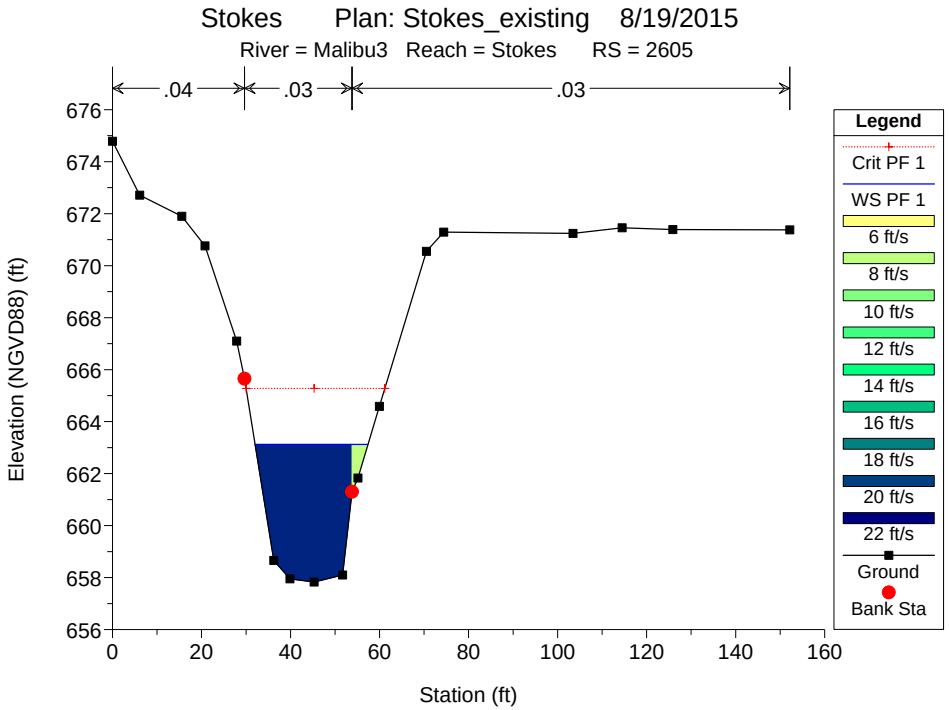

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2952
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

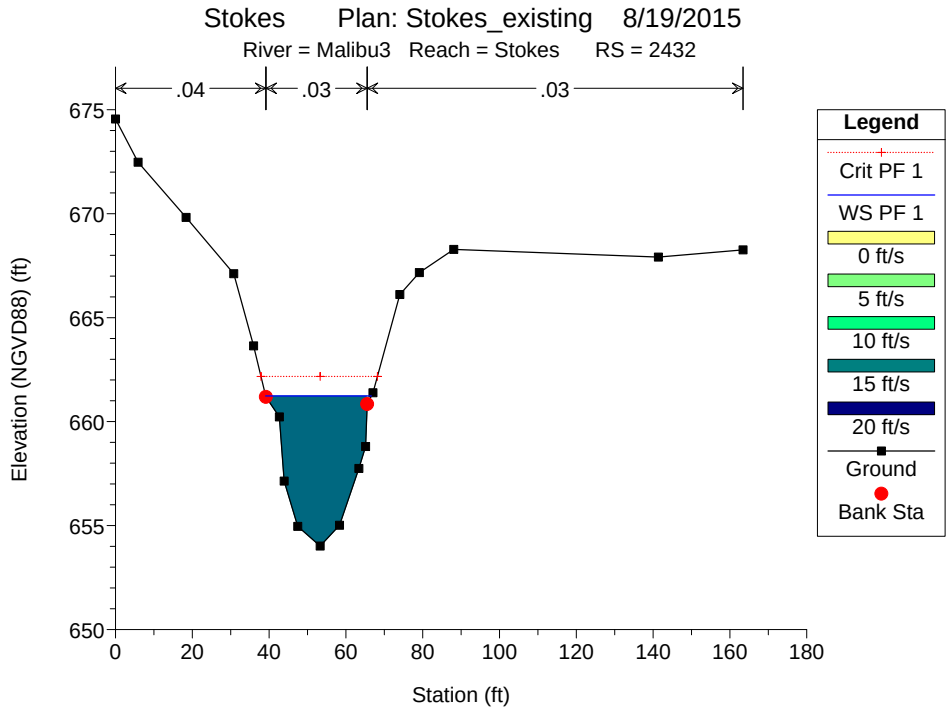

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2798
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

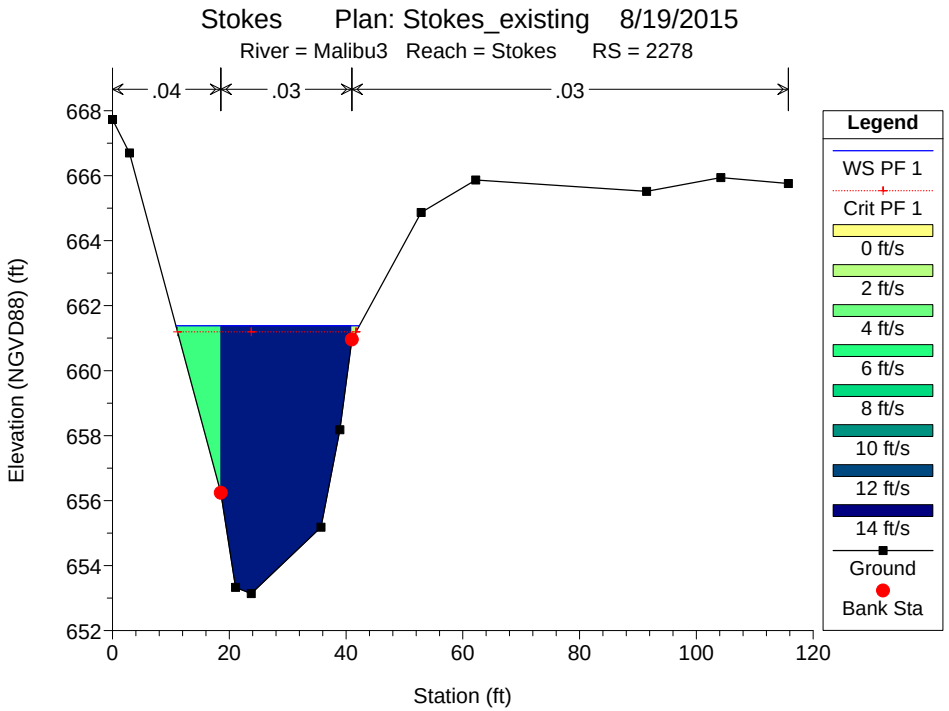

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2696
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Bank Sta

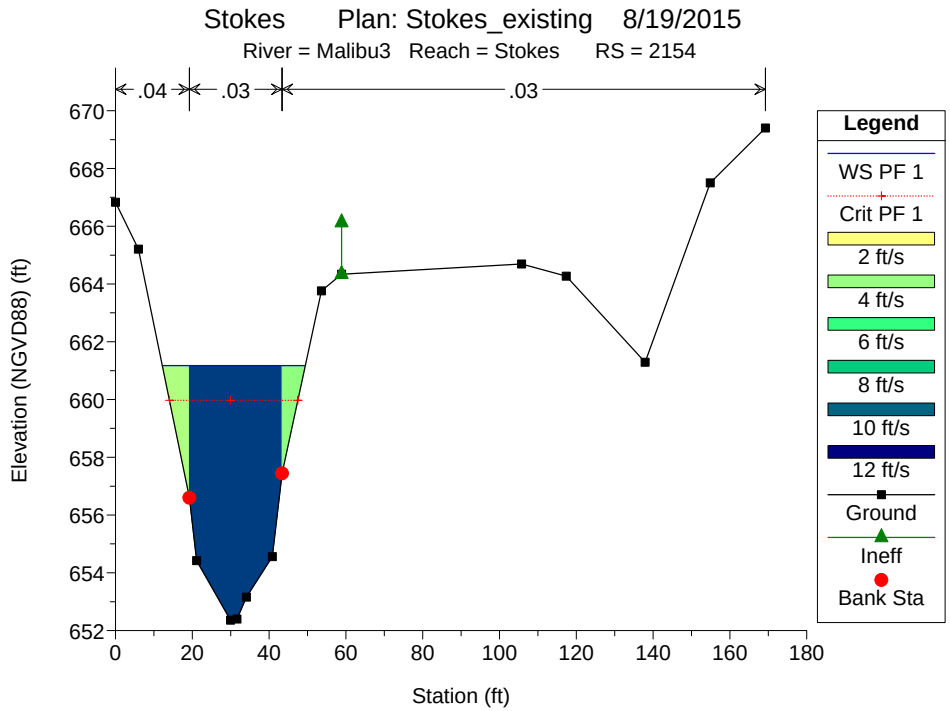

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2670
.04
.025
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

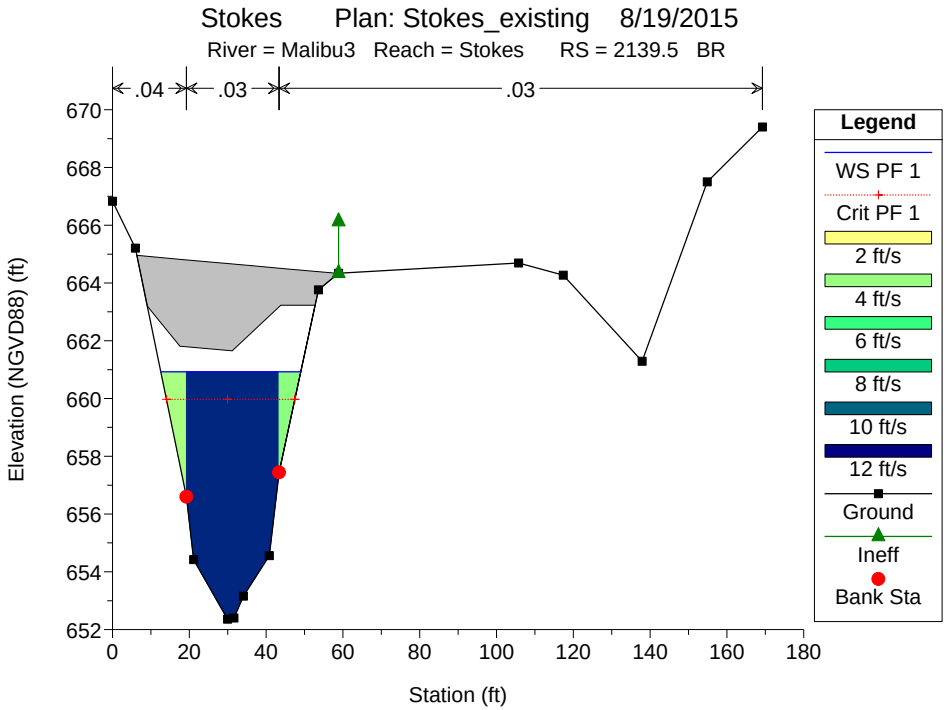

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2637
.04
.025
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
Ground
Bank Sta

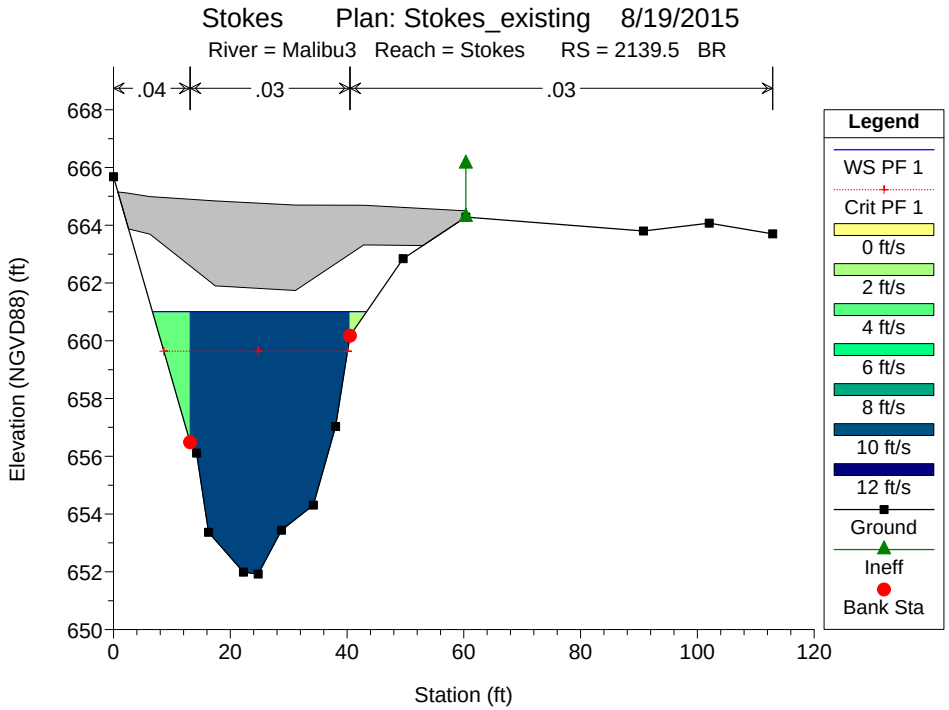

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2605
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Bank Sta

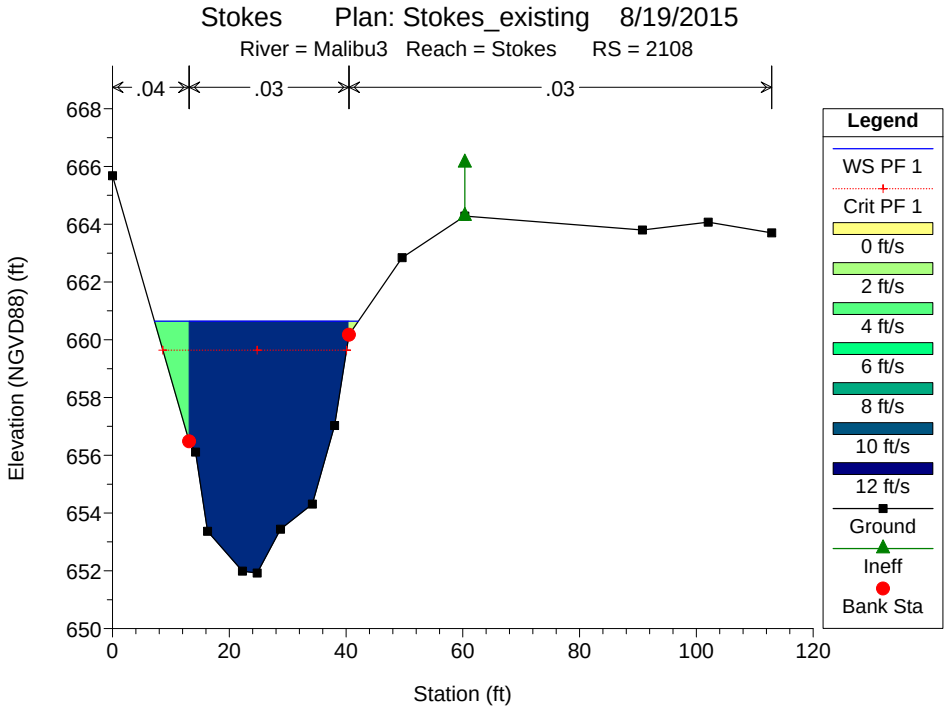

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2432
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

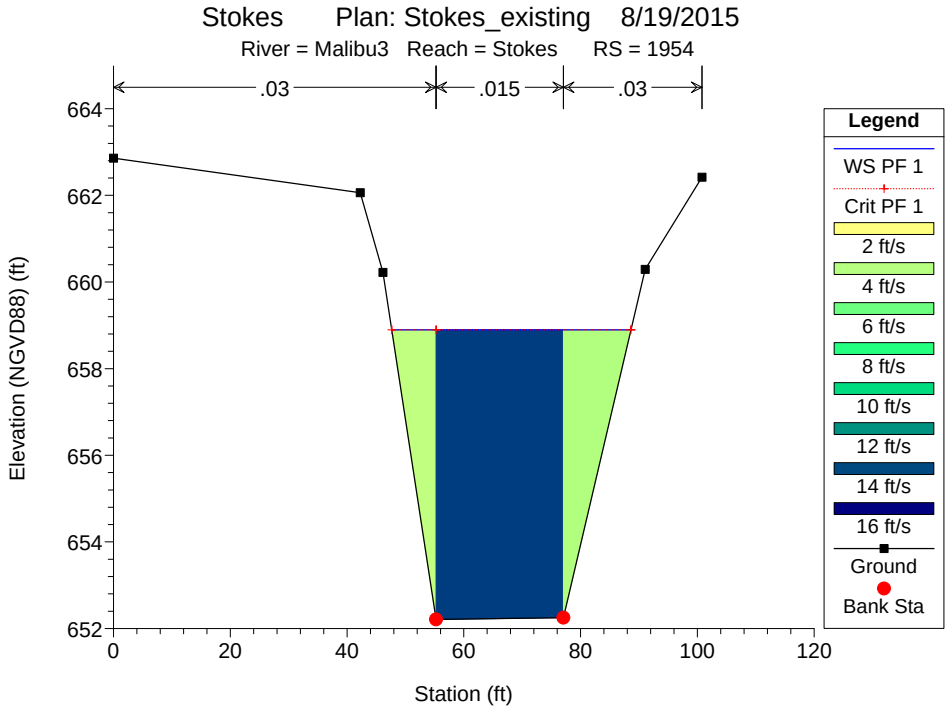

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2278
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

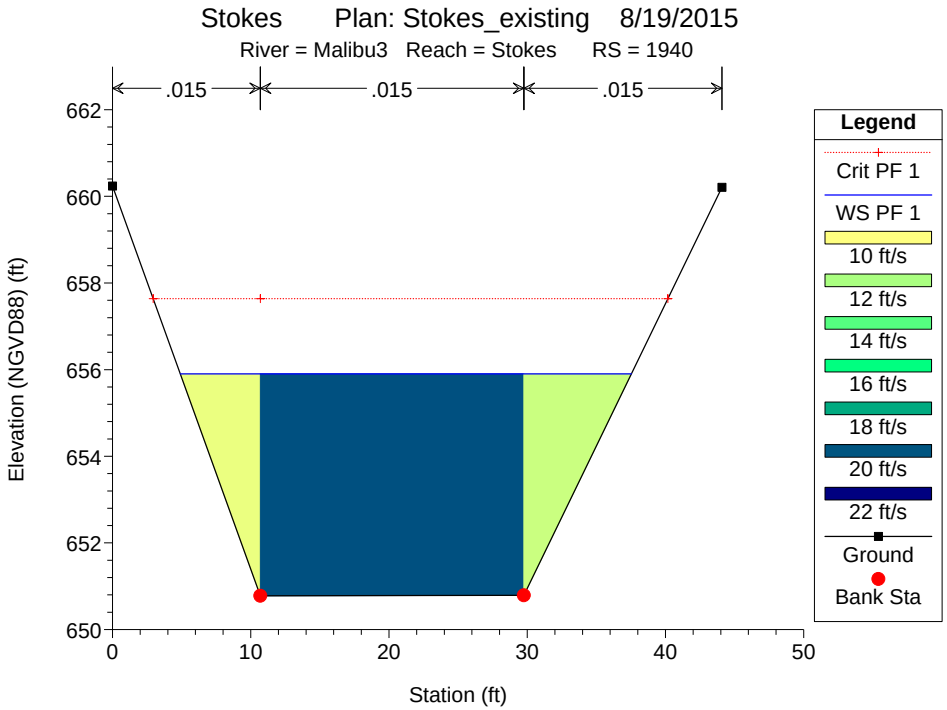

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2154
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

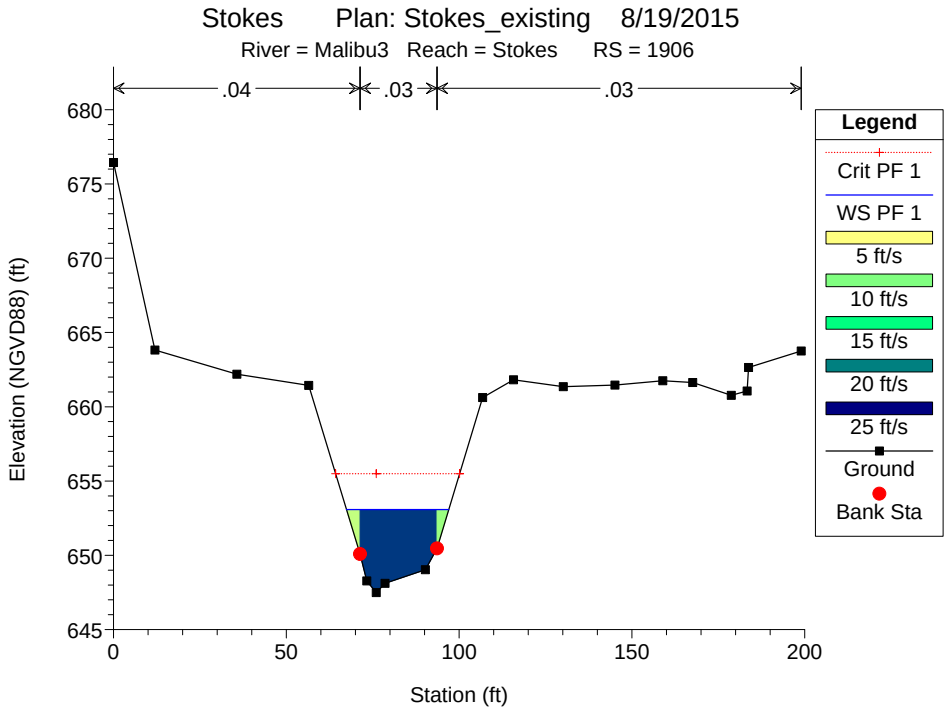

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2139.5 BR
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

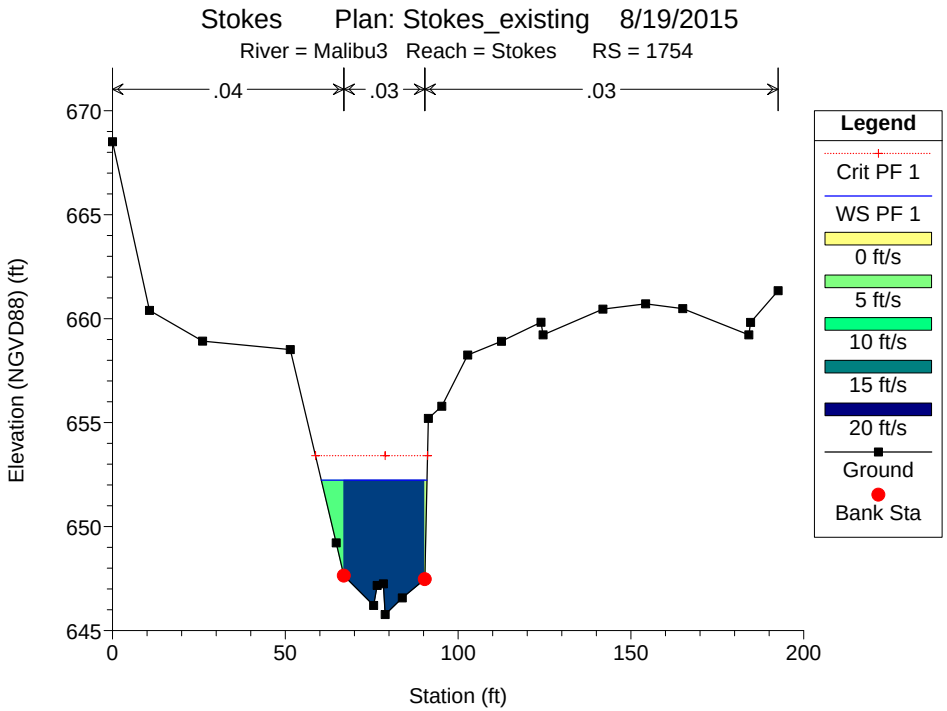

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2139.5 BR
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

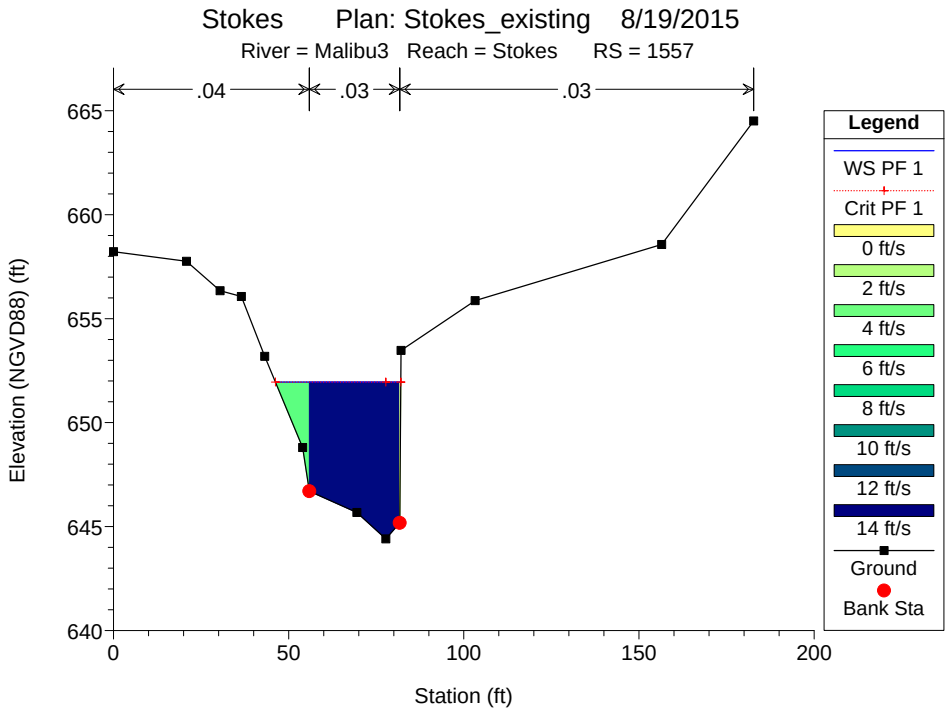

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2108
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

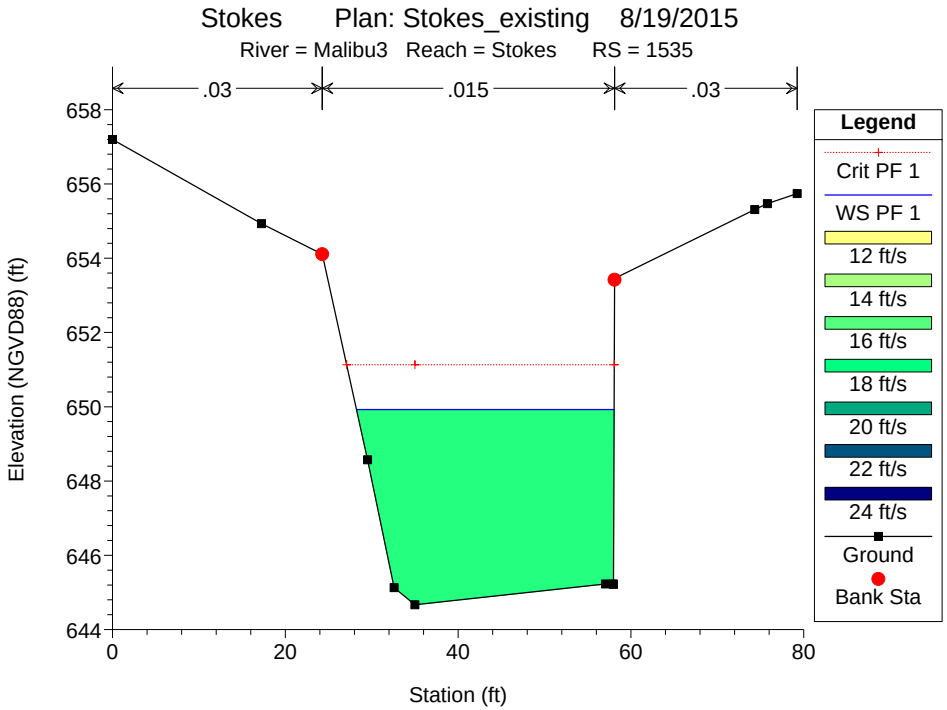

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1954
.03
.015
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

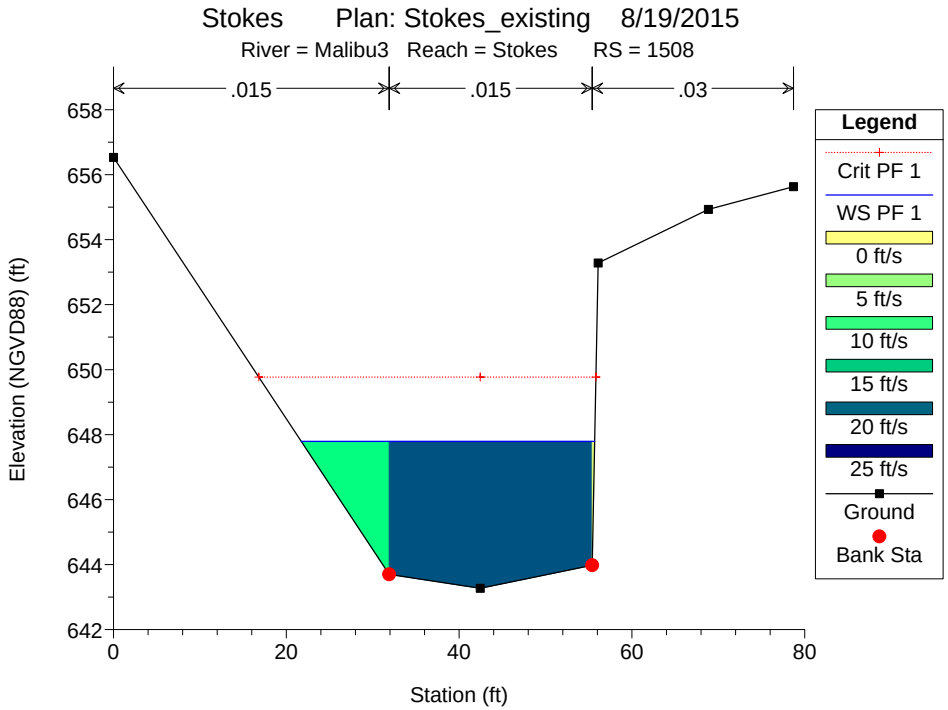

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1940
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Bank Sta

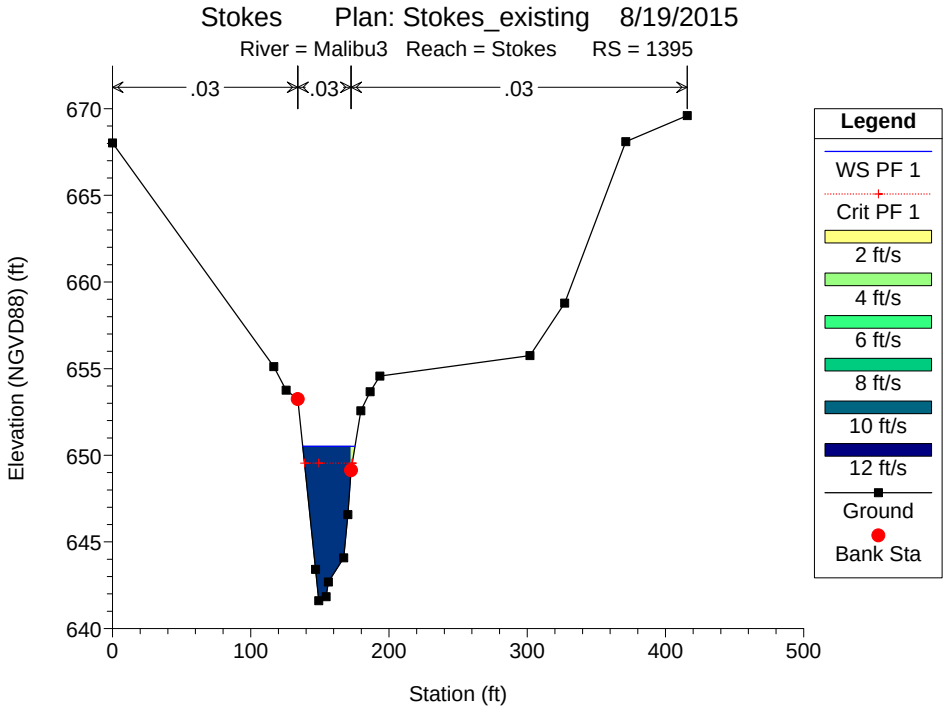

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1906
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
Ground
Bank Sta

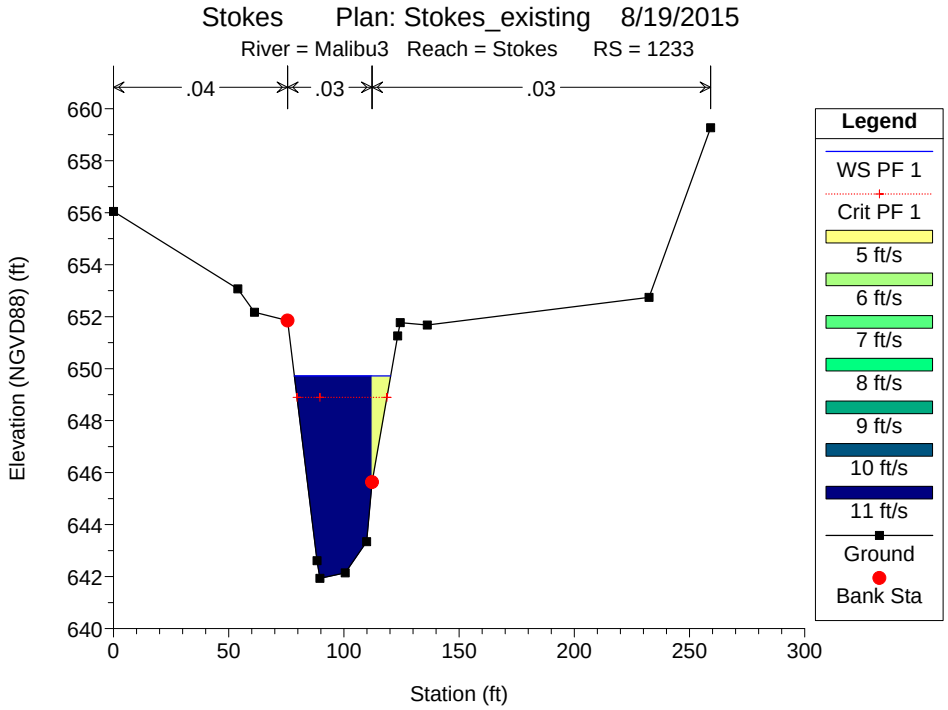

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1754
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

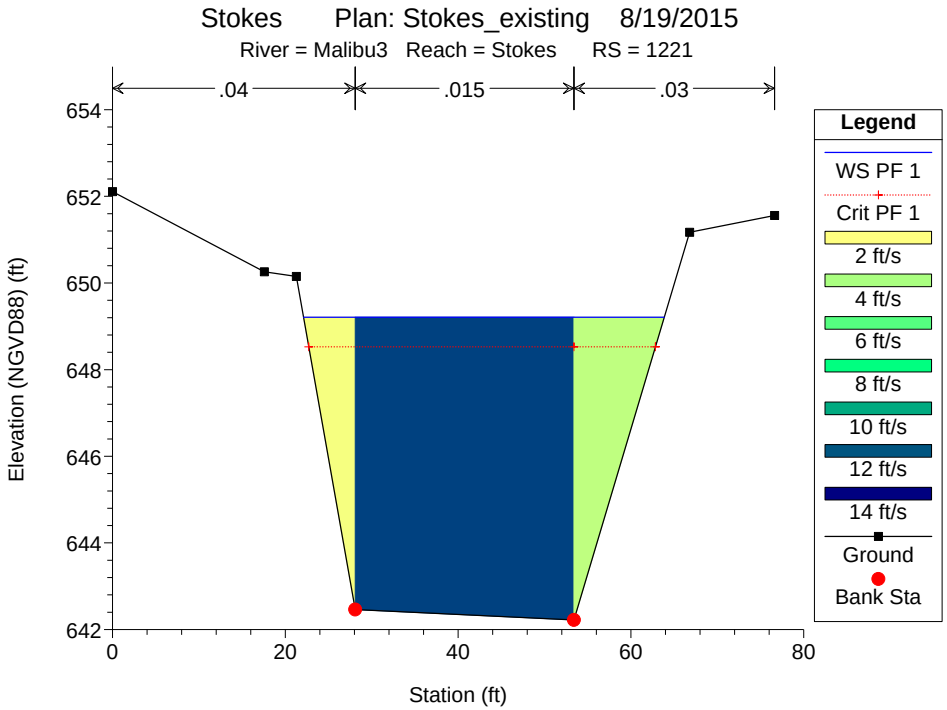

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1557
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

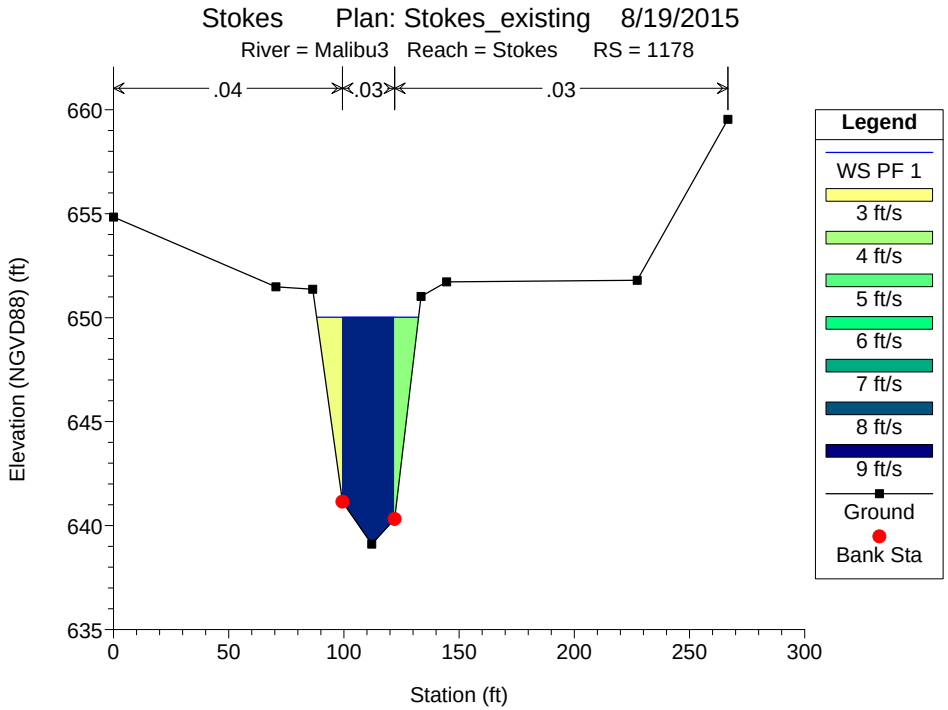

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1535
.03
.015
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
Ground
Bank Sta

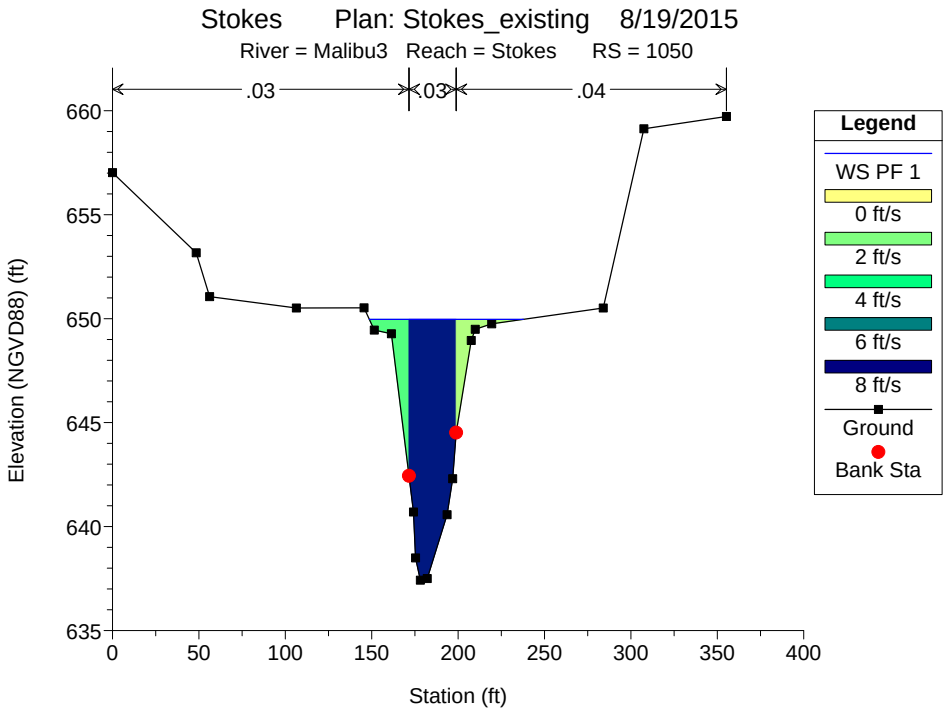

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1508
.015
.015
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
Ground
Bank Sta

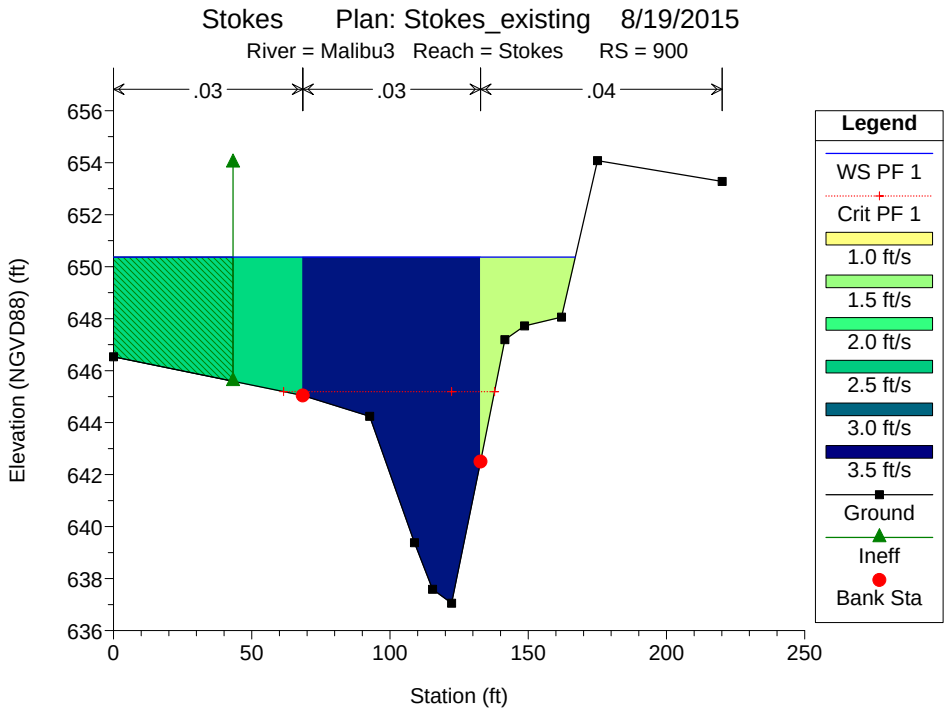

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1395
.03
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

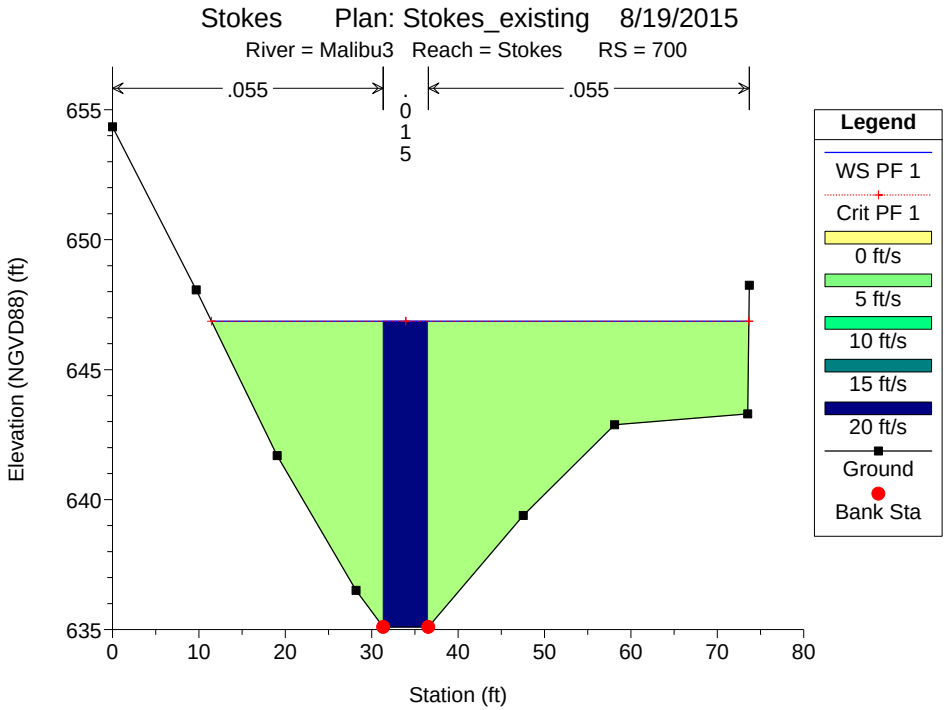

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1233
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta

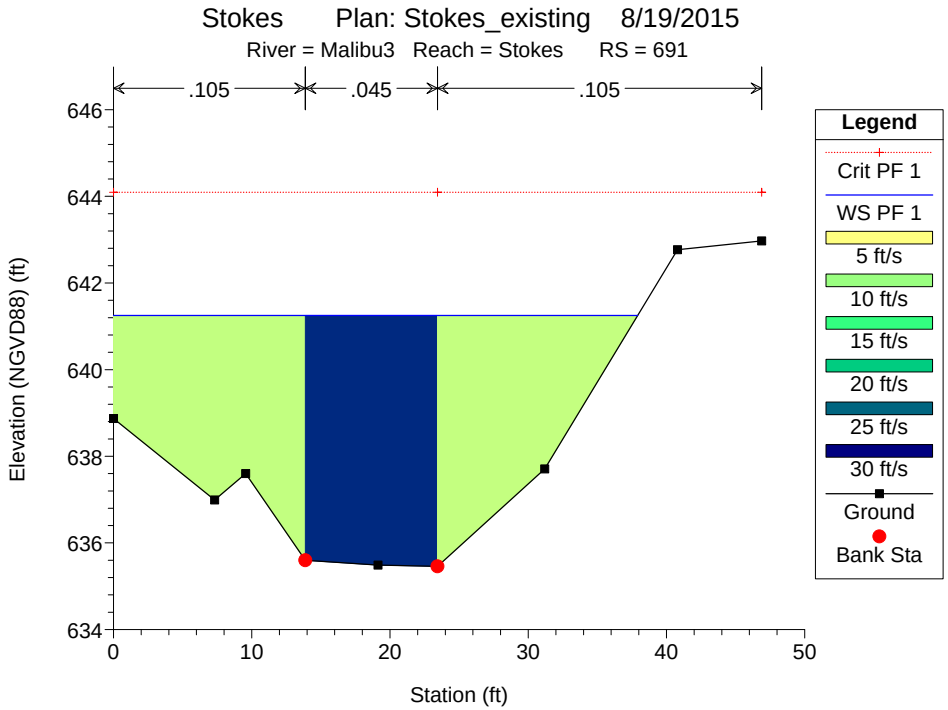

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1221
.04
.015
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

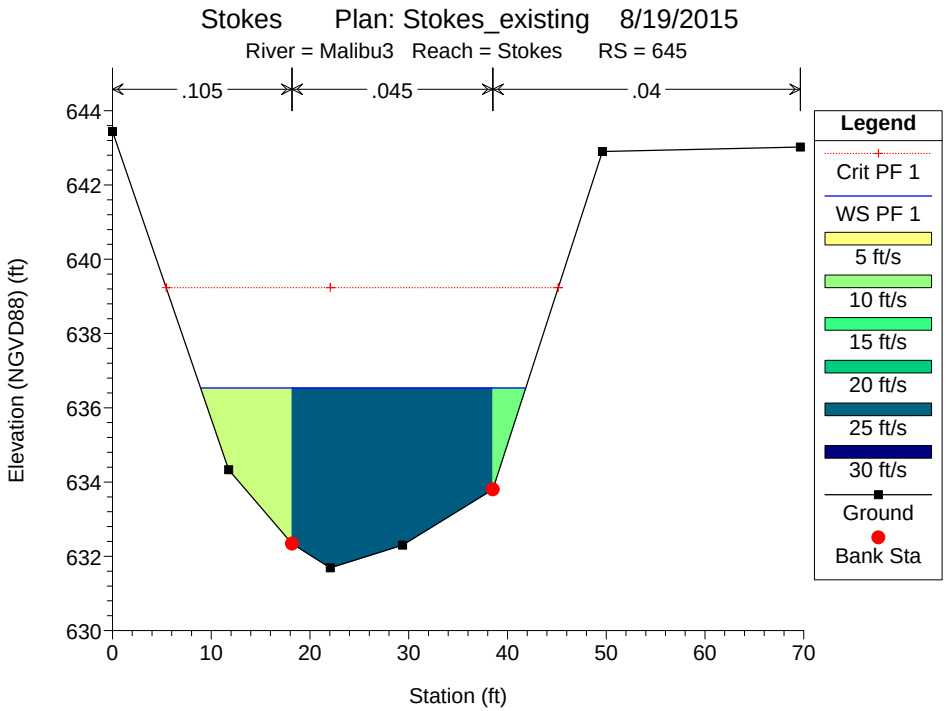

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1178
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
Ground
Bank Sta

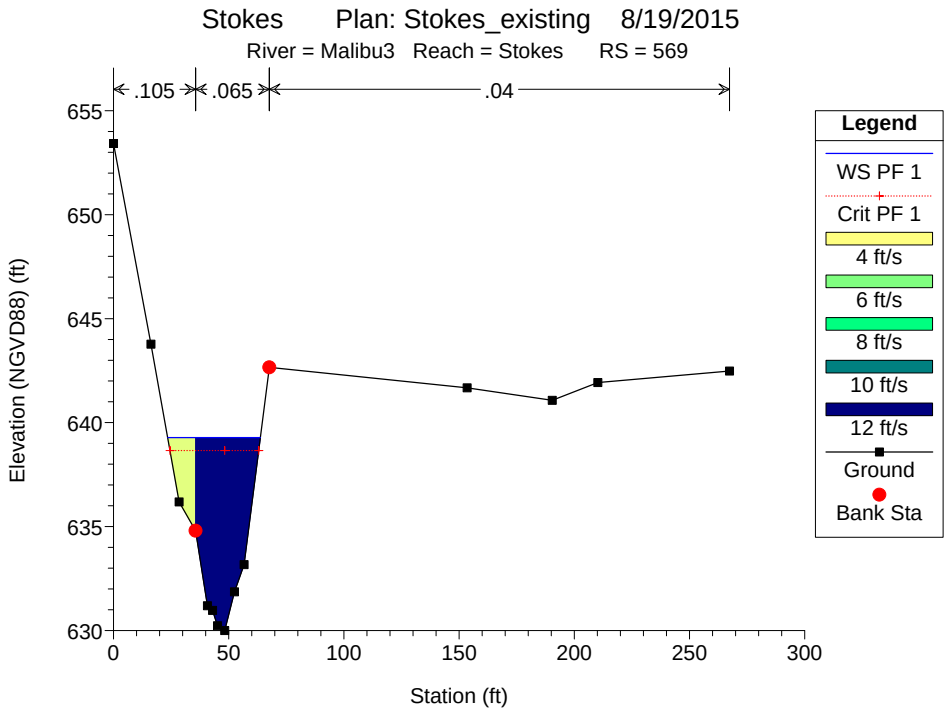

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1050
.03
.03
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

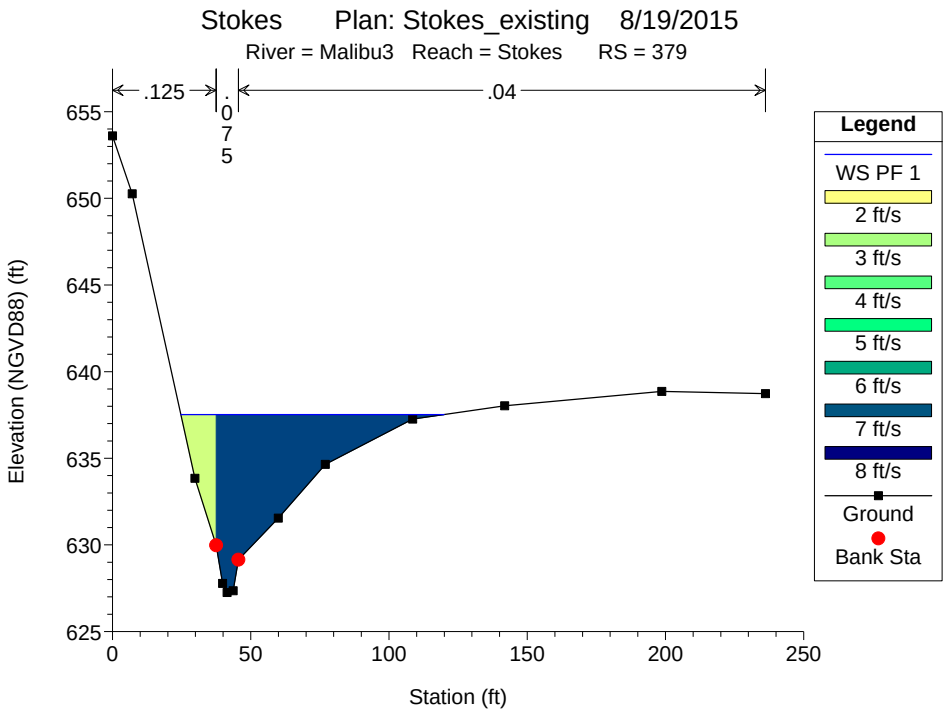

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 900
.03
.03
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
Ground
Ineff
Bank Sta

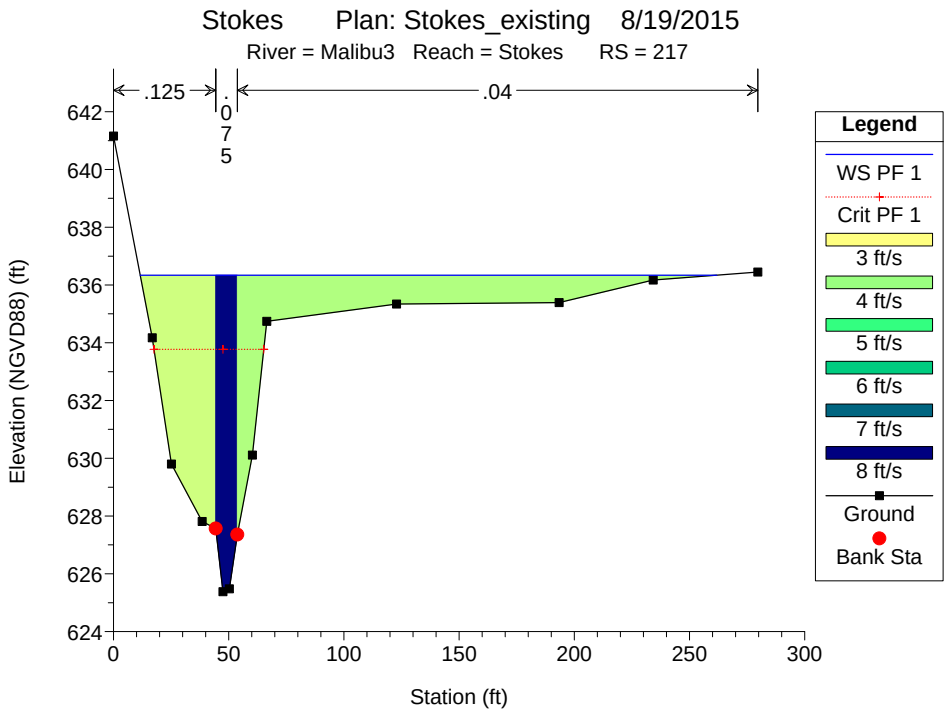

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 700
.055
.015
.055
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

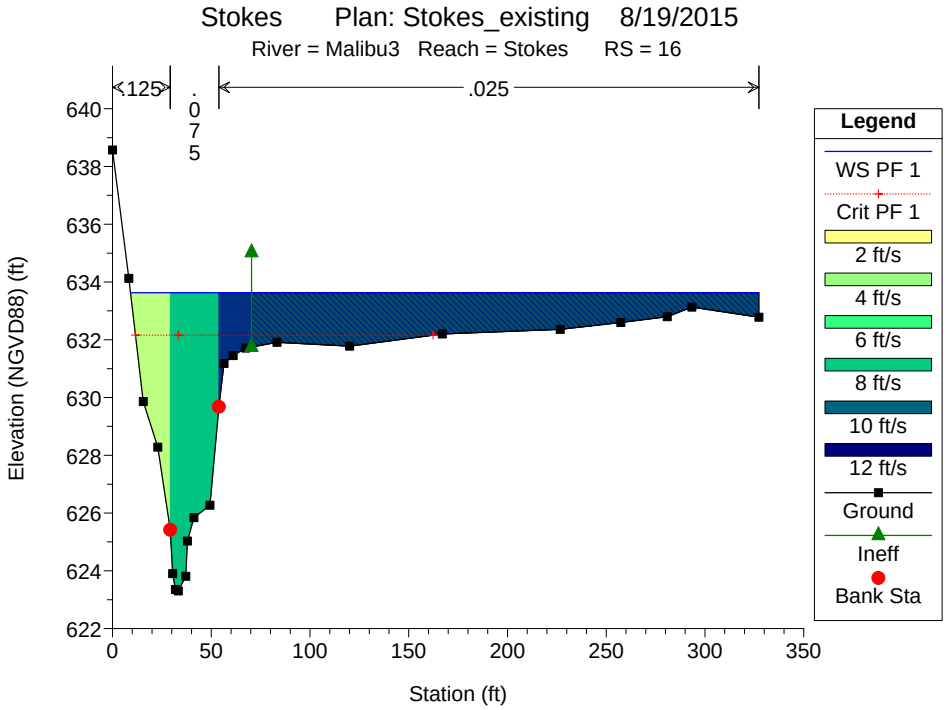

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 691
.105
.045
.105
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
30 ft/s
Ground
Bank Sta


Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 645
.105
.045
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
30 ft/s
Ground
Bank Sta

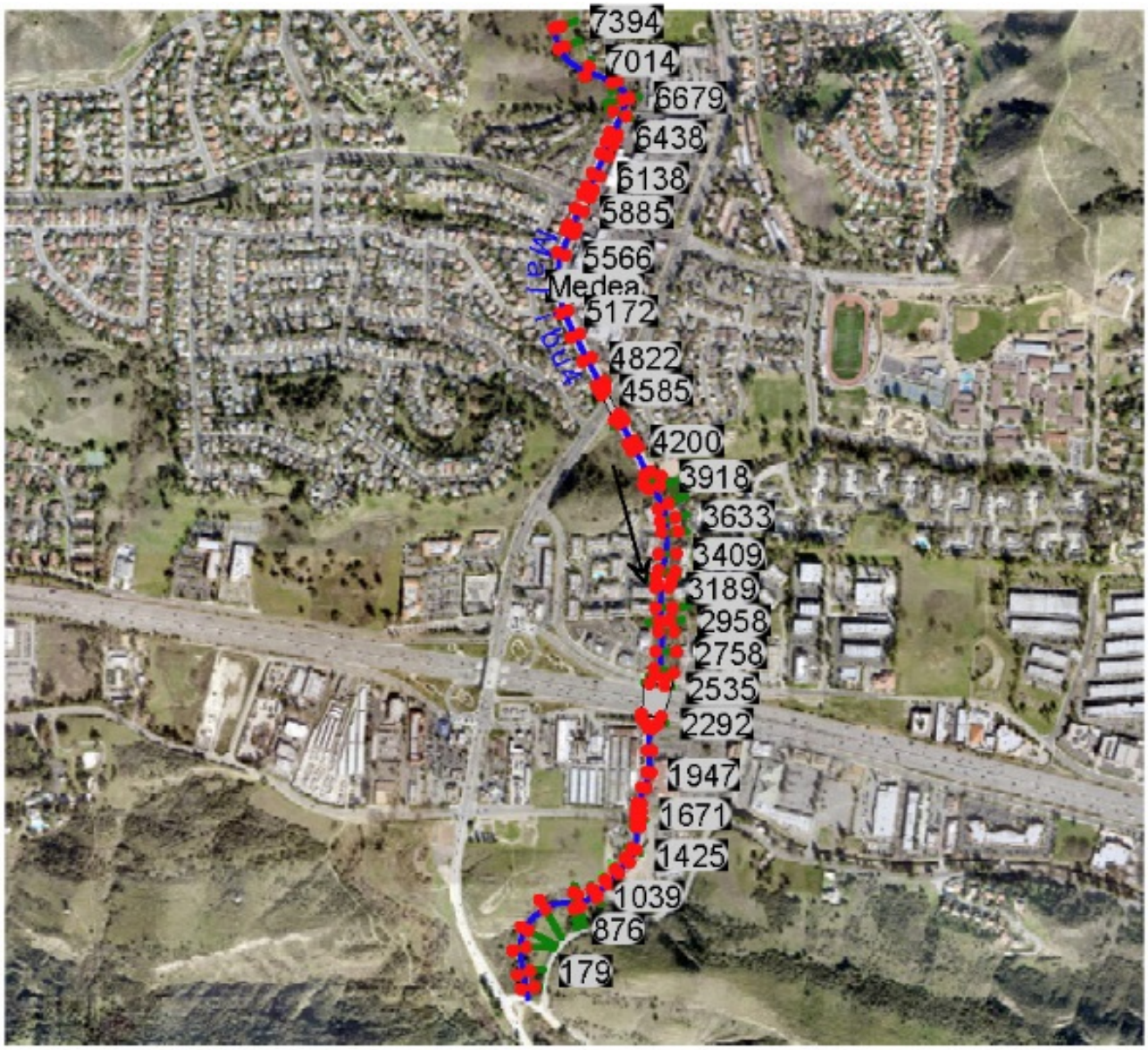

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 569
.105
.065
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

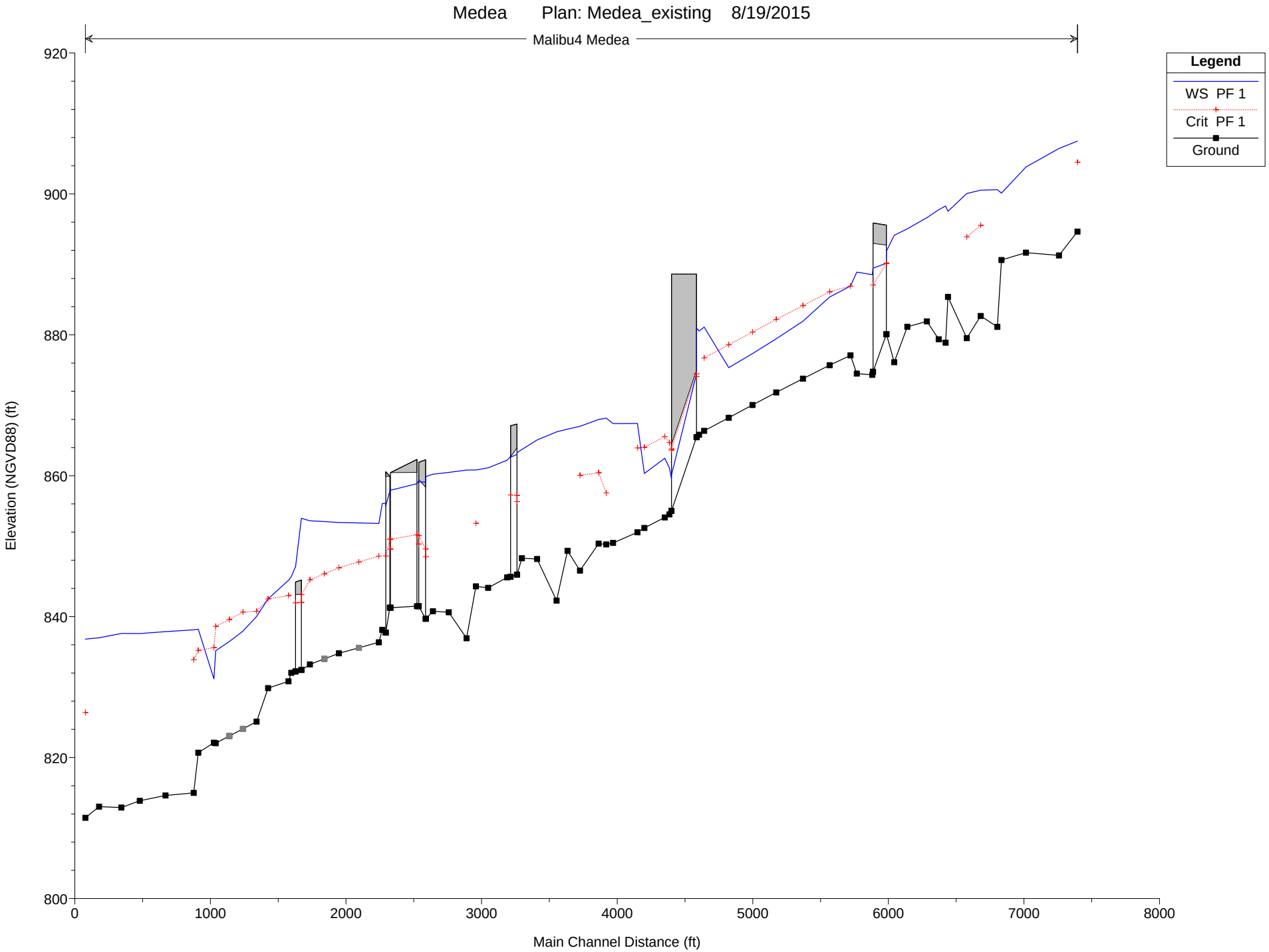

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 379
.125
.075
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
Ground
Bank Sta


Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 217
.125
.075
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
Ground
Bank Sta


Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 16
.125
.075
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

MEDEA CREEK


7394
7014
6679
6438
6138
5885
5566
Medea
5172
4822
4585
4200
3918
3633
3409
3189
2958
2758
2535
2292
1947
1671
1425
1039
876
179
Main

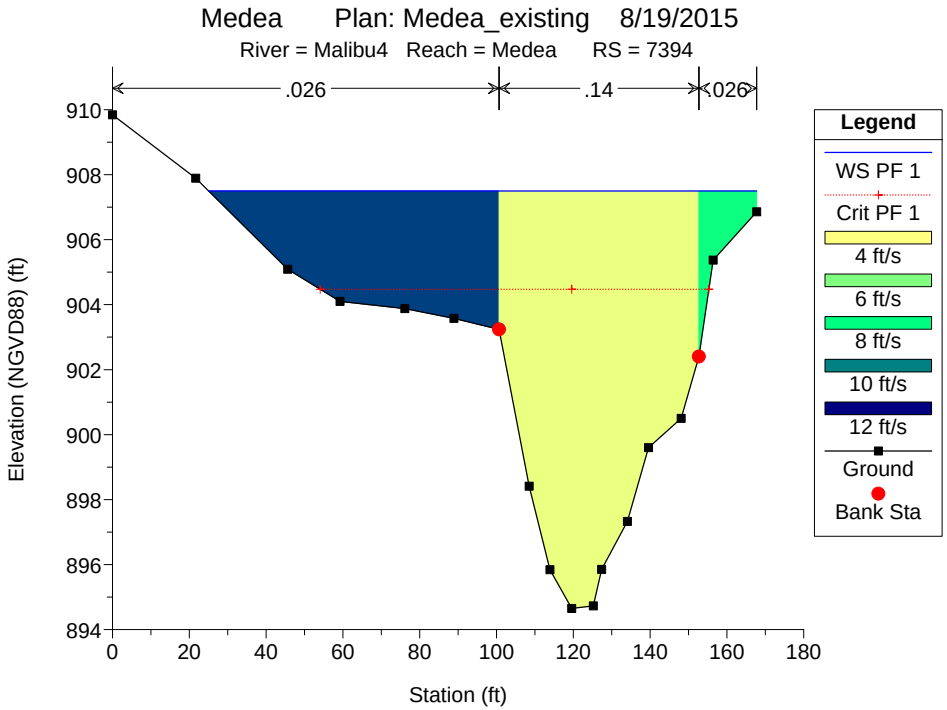

Medea Plan: Medea_existing 8/19/2015
Malibu4 Medea
Legend
WS PF 1
Crit PF 1
Ground
Elevation (NGVD88) (ft)
Main Channel Distance (ft)
920
900
880
860
840
820
800
0
1000
2000
3000
4000
5000
6000
7000
8000

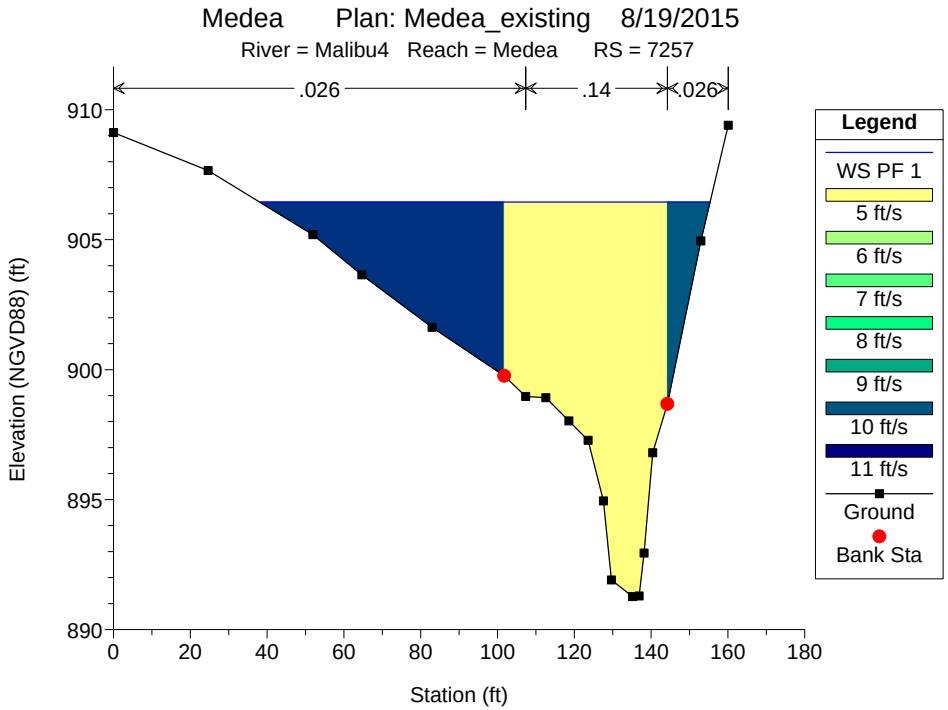
HEC-RAS Plan: Medea_exist River: Malibu4 Reach: Medea Profile: PF 1

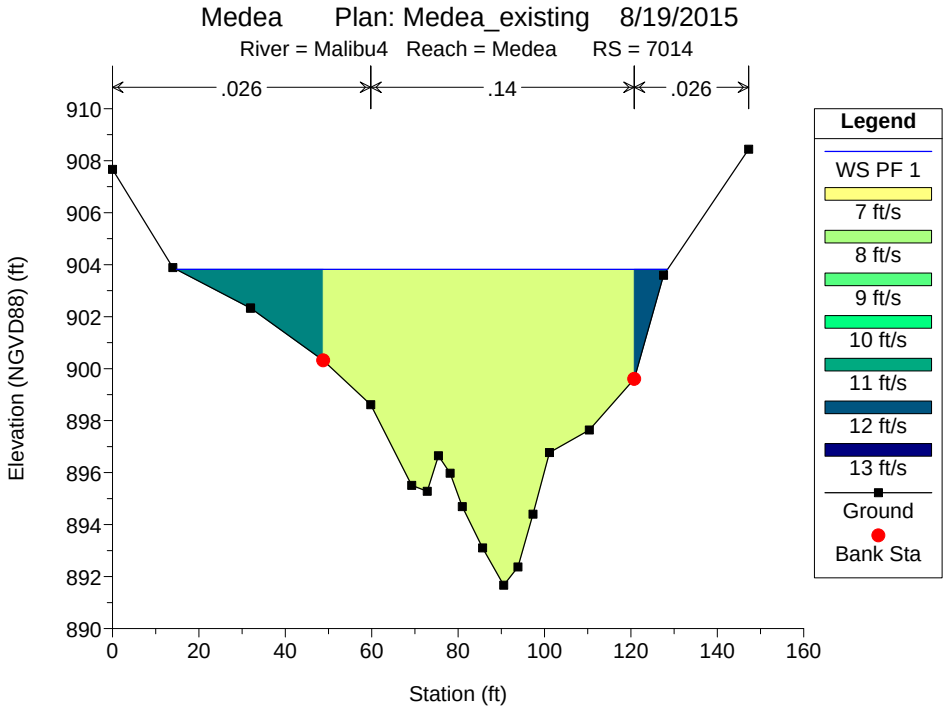
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Medea	7394	PF 1	4757.00	894.65	907.50	904.48	908.63	0.008991	4.31	738.95	142.71	0.25
Medea	7257	PF 1	4757.00	891.27	906.45		907.54	0.006709	5.01	679.27	117.35	0.28
Medea	7014	PF 1	4757.00	891.67	903.82		904.89	0.021416	7.43	601.37	113.74	0.48
Medea	6833	PF 1	4757.00	890.63	900.12		901.51	0.016006	4.34	776.35	161.30	0.31
Medea	6803	PF 1	4757.00	881.13	900.60		900.91	0.008913	4.07	1092.82	159.50	0.24
Medea	6679	PF 1	4757.00	882.68	900.52	895.55	900.78	0.000370	4.57	1423.71	223.66	0.23
Medea	6578	PF 1	4757.00	879.53	900.05	893.90	900.67	0.002516	4.21	1015.88	136.05	0.24
Medea	6438	PF 1	5946.00	885.39	897.54		899.68	0.018897	11.75	506.22	55.56	0.69
Medea	6421	PF 1	5946.00	878.90	898.27		899.33	0.000478	8.26	720.02	64.03	0.41
Medea	6370	PF 1	5946.00	879.38	897.76		899.23	0.008155	9.73	611.32	63.87	0.53
Medea	6283	PF 1	5946.00	881.91	896.63		898.36	0.011659	10.53	565.70	79.88	0.59
Medea	6138	PF 1	5946.00	881.14	895.05		896.70	0.010955	10.32	579.54	84.20	0.58
Medea	6042	PF 1	5946.00	876.12	894.12		895.64	0.010348	9.92	602.91	82.59	0.54
Medea	5985	PF 1	5960.00	880.09	891.89	890.14	894.48	0.022592	12.91	461.76	51.88	0.76
Medea	5935		Bridge									
Medea	5885	PF 1	5960.00	874.76	889.45		891.78	0.001885	12.25	486.46	51.08	0.70
Medea	5881	PF 1	5960.00	874.32	888.53		891.56	0.003014	13.97	426.60	49.63	0.84
Medea	5766	PF 1	5960.00	874.50	888.90		891.04	0.001685	11.76	506.93	52.69	0.67
Medea	5719	PF 1	5960.00	877.08	886.93	886.93	890.79	0.002022	15.76	378.14	49.14	1.00
Medea	5566	PF 1	6720.00	875.70	885.36	886.11	890.32	0.002613	17.87	375.98	48.76	1.13
Medea	5369	PF 1	6720.00	873.77	881.92	884.15	889.39	0.004677	21.94	306.30	45.89	1.50
Medea	5172	PF 1	6720.00	871.83	879.43	882.18	888.22	0.005918	23.80	282.37	45.00	1.67
Medea	4997	PF 1	6720.00	870.04	877.34	880.39	887.03	0.006797	24.97	269.09	44.42	1.79
Medea	4822	PF 1	6720.00	868.24	875.35	878.59	885.71	0.007492	25.83	260.15	44.03	1.87
Medea	4640	PF 1	6720.00	866.38	881.09	876.72	882.74	0.000560	10.28	653.67	60.61	0.55
Medea	4603	PF 1	6720.00	865.82	880.54		882.66	0.000747	11.68	575.15	44.44	0.57
Medea	4585	PF 1	6720.00	865.47	880.94	874.07	882.24	0.000432	9.17	733.15	47.80	0.41
Medea	4492		Bridge									
Medea	4399	PF 1	6720.00	855.02	859.65	863.63	874.86	0.016880	31.31	214.65	47.80	2.60
Medea	4384	PF 1	6720.00	854.51	861.13	864.70	873.02	0.009082	27.68	242.81	40.80	2.00
Medea	4350	PF 1	6720.00	854.09	862.49	865.58	872.08	0.006413	24.85	270.41	40.57	1.70
Medea	4200	PF 1	6720.00	852.59	860.33	864.03	870.92	0.007682	26.13	257.22	44.11	1.91
Medea	4148	PF 1	6720.00	851.98	867.43	863.95	868.87	0.000421	10.02	738.89	74.64	0.51
Medea	3969	PF 1	6720.00	850.47	867.41		868.78	0.000316	9.50	738.27	56.39	0.45
Medea	3918	PF 1	6720.00	850.26	868.18	857.56	868.43	0.000161	4.05	1657.95	152.55	0.18
Medea	3862	PF 1	6720.00	850.36	867.99	860.43	868.39	0.007334	5.21	1355.67	203.32	0.25
Medea	3725	PF 1	6720.00	846.54	867.01	860.05	867.70	0.003507	3.30	1422.95	210.02	0.16
Medea	3633	PF 1	6720.00	849.35	866.63		867.24	0.006204	4.16	1341.67	156.10	0.22
Medea	3552	PF 1	6720.00	842.29	866.23		866.68	0.006012	4.17	1455.13	138.87	0.21
Medea	3409	PF 1	6720.00	848.18	865.08		865.53	0.011308	5.40	1245.10	113.25	0.29
Medea	3296	PF 1	6720.00	848.30	863.72		864.20	0.012308	5.57	1209.75	115.66	0.30
Medea	3261	PF 1	6720.00	845.97	863.28	856.34	863.77	0.011912	5.62	1196.65	112.24	0.30

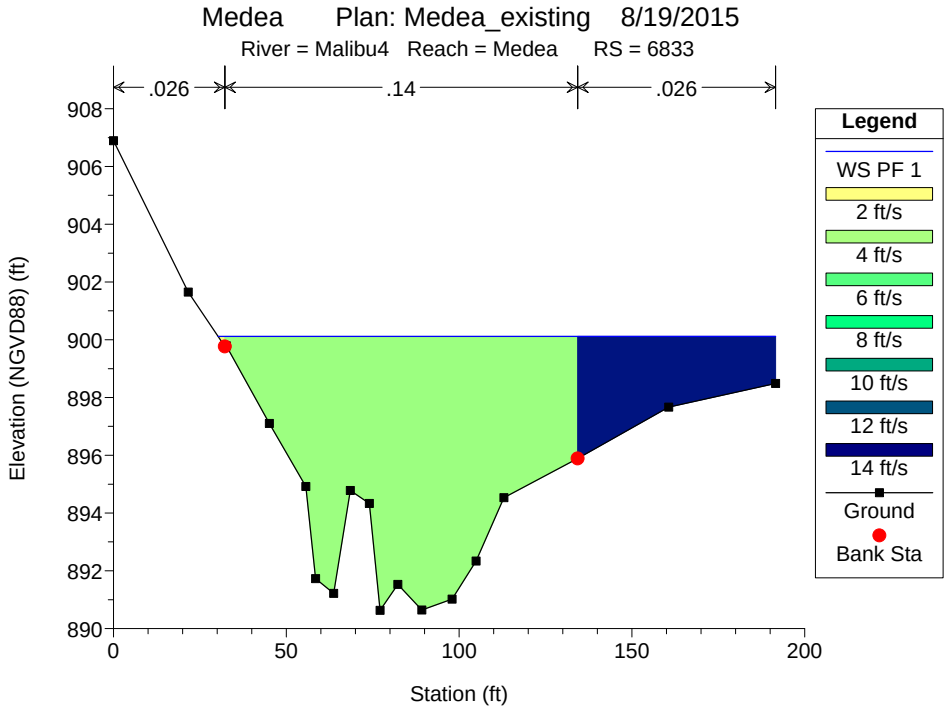
HEC-RAS Plan: Medea_exist River: Malibu4 Reach: Medea Profile: PF 1 (Continued)

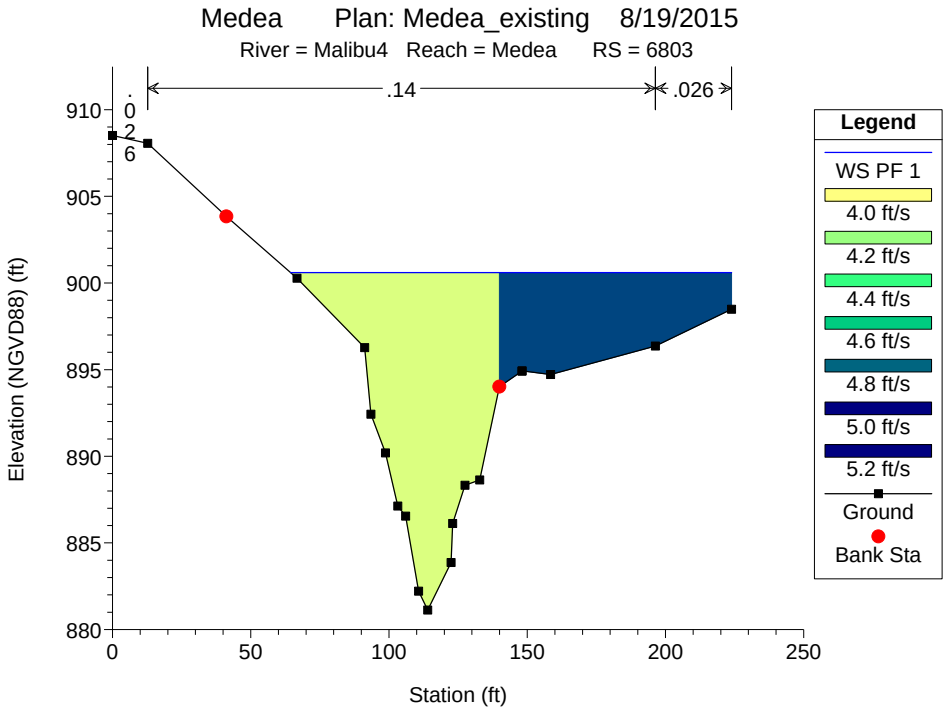
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Medea	3237		Bridge									
Medea	3213	PF 1	6720.00	845.67	862.76		863.44	0.016936	6.61	1027.76	101.39	0.35
Medea	3212	PF 1	6720.00	845.67	862.69		863.41	0.020723	6.79	998.94	101.38	0.37
Medea	3189	PF 1	6720.00	845.57	862.21		862.96	0.018636	6.95	975.27	93.87	0.37
Medea	3048	PF 1	6720.00	844.10	861.13		861.75	0.004750	3.56	1479.54	164.67	0.19
Medea	2958	PF 1	6720.00	844.31	860.83	853.26	861.40	0.003062	3.31	1650.85	204.13	0.16
Medea	2889	PF 1	6720.00	836.94	860.80		861.05	0.004184	4.02	1728.93	127.91	0.18
Medea	2758	PF 1	6720.00	840.62	860.48		860.63	0.002228	3.07	2235.22	160.38	0.14
Medea	2641	PF 1	6720.00	840.77	860.22		860.37	0.002192	3.12	2181.57	147.16	0.14
Medea	2589	PF 1	6720.00	839.70	859.89	848.50	860.20	0.002452	4.59	1601.98	131.27	0.20
Medea	2562		Bridge									
Medea	2535	PF 1	6720.00	841.49	859.23	850.32	859.66	0.000433	5.27	1290.97	112.35	0.26
Medea	2432		Bridge									
Medea	2328	PF 1	6720.00	841.27	858.20	849.60	858.65	0.000511	5.39	1245.96	110.22	0.28
Medea	2310		Bridge									
Medea	2292	PF 1	6720.00	837.74	856.08		856.62	0.000442	5.90	1139.03	99.29	0.31
Medea	2267	PF 1	6720.00	838.14	856.07		856.60	0.000338	5.90	1174.37	85.30	0.27
Medea	2242	PF 1	7060.00	836.37	853.23	848.59	856.33	0.001030	14.13	499.53	63.56	0.61
Medea	2094.5*	PF 1	7060.00	835.58	853.30	847.76	856.10	0.000857	13.41	526.45	59.57	0.56
Medea	1947	PF 1	7060.00	834.79	853.37	846.96	855.90	0.000736	12.77	552.85	55.58	0.52
Medea	1840.5*	PF 1	7060.00	834.01	853.50	846.09	855.74	0.000603	12.01	587.69	58.03	0.48
Medea	1734	PF 1	7060.00	833.23	853.61	845.23	855.61	0.000505	11.35	622.28	60.48	0.45
Medea	1671	PF 1	7060.00	832.44	853.95	843.11	855.22	0.000289	9.06	779.44	70.83	0.35
Medea	1649		Bridge									
Medea	1626	PF 1	7060.00	832.23	847.08		849.89	0.001082	13.47	524.10	94.84	0.62
Medea	1596	PF 1	7060.00	832.04	845.68		849.55	0.001579	15.77	447.72	67.10	0.76
Medea	1576	PF 1	7060.00	830.82	845.16	843.00	849.47	0.001746	16.65	424.03	70.02	0.78
Medea	1425	PF 1	13800.00	829.86	842.53	842.53	848.86	0.003349	20.73	684.42	55.04	1.03
Medea	1340	PF 1	13800.00	825.10	840.03	840.76	848.39	0.002912	23.20	595.94	58.91	1.07
Medea	1239.66*	PF 1	13800.00	824.08	837.95	840.65	847.90	0.003892	25.30	545.73	43.49	1.21
Medea	1139.33*	PF 1	13800.00	823.06	836.47	839.60	847.38	0.004444	26.50	520.70	39.39	1.28
Medea	1039	PF 1	13800.00	822.04	835.17	838.63	846.84	0.004918	27.42	503.33	38.88	1.34
Medea	1026	PF 1	13800.00	822.12	831.18	835.62	846.36	0.027774	31.27	441.28	101.48	1.98
Medea	910	PF 1	13800.00	820.70	838.23	835.22	839.54	0.003652	9.41	1505.82	222.75	0.45
Medea	876	PF 1	13800.00	814.99	838.13	833.87	839.34	0.007309	6.10	1854.25	235.13	0.30
Medea	668	PF 1	13800.00	814.63	837.87		838.53	0.001764	3.38	2507.90	272.30	0.15
Medea	478	PF 1	13800.00	813.87	837.60		838.25	0.001368	3.23	2466.75	247.08	0.13
Medea	343	PF 1	13800.00	812.90	837.62		838.05	0.000921	2.74	3210.71	275.07	0.11
Medea	179	PF 1	13800.00	813.05	837.00		837.81	0.001822	3.55	2606.66	188.52	0.14
Medea	78	PF 1	13800.00	811.46	836.82	826.38	837.47	0.005002	6.78	2272.16	141.65	0.27

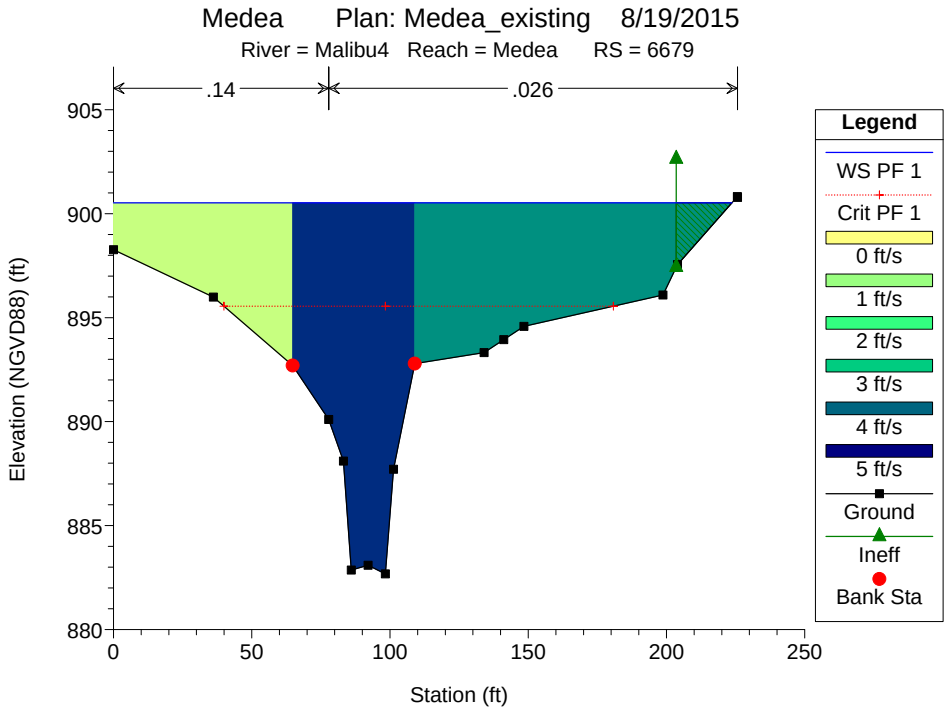

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 7394
.026
.14
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

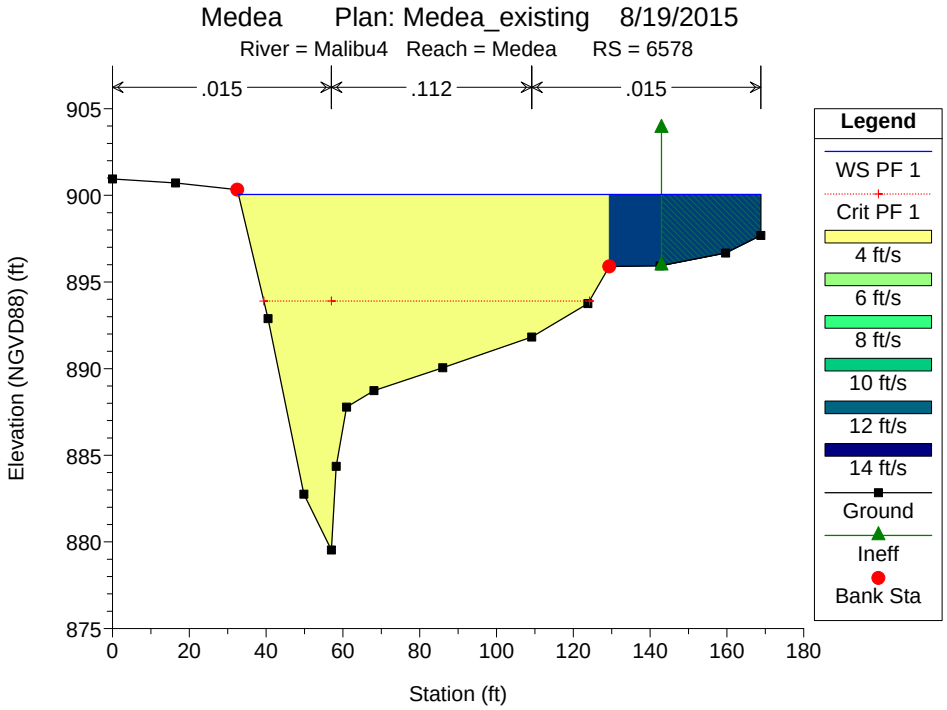

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 7257
.026
.14
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta

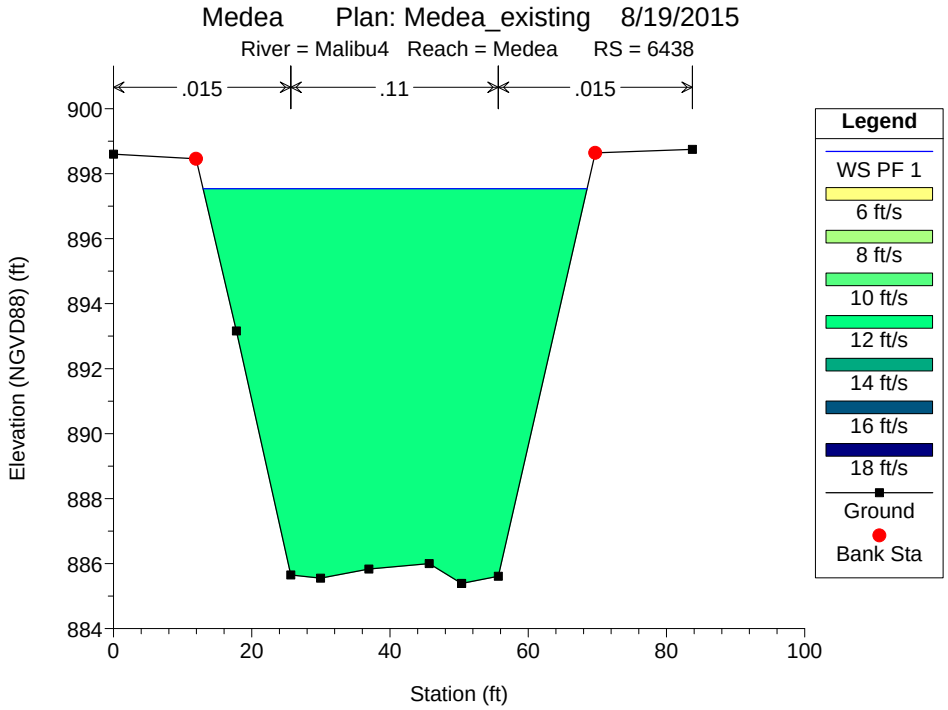

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 7014
.026
.14
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
Ground
Bank Sta

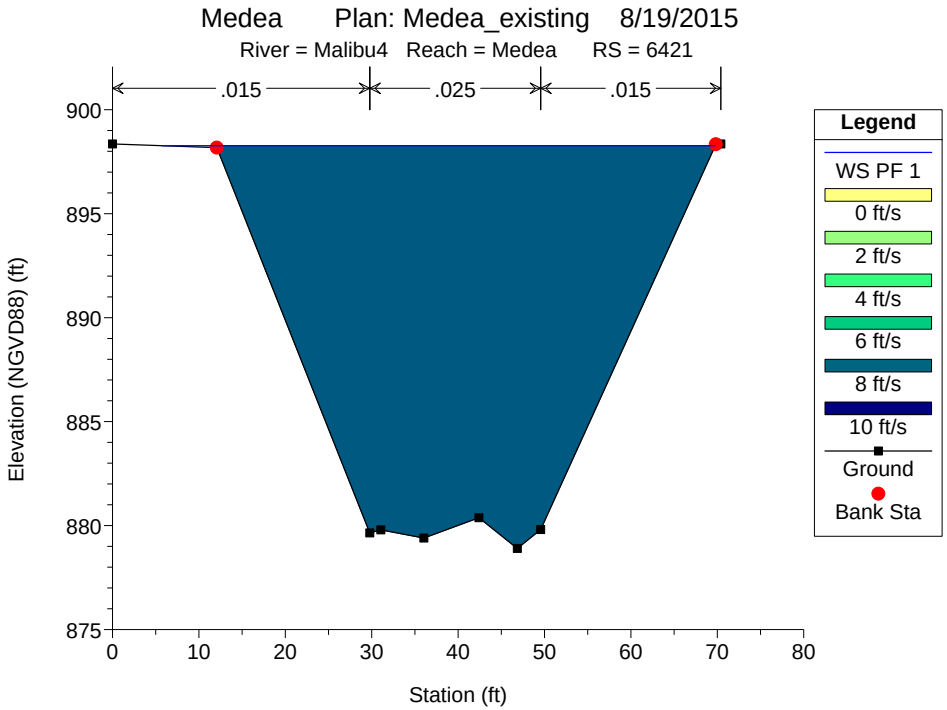

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6833
.026
.14
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

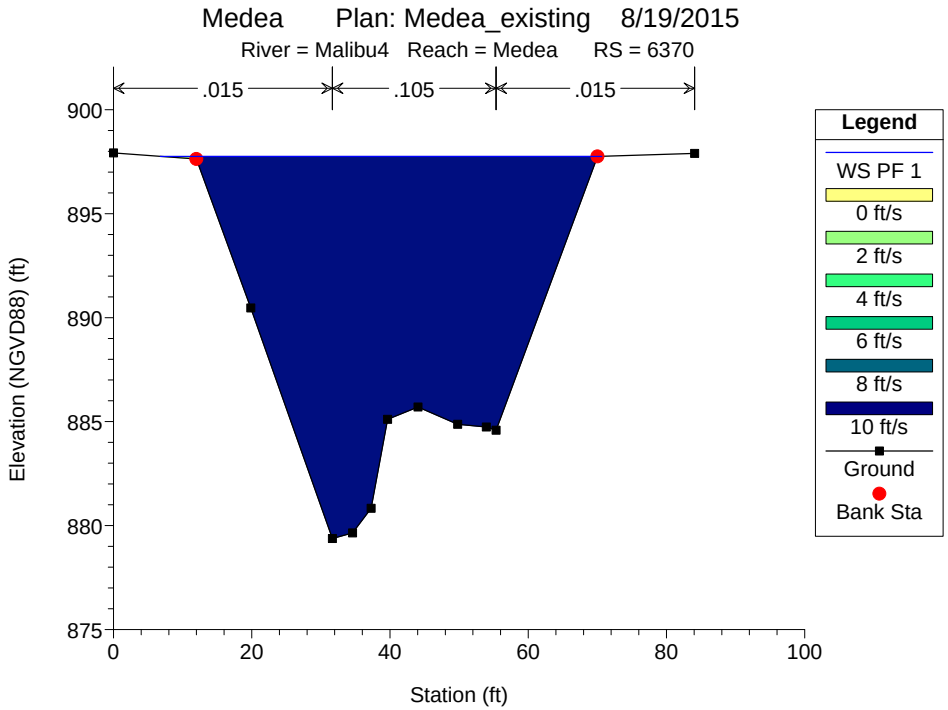

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6803
.14
.026
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
4.0 ft/s
4.2 ft/s
4.4 ft/s
4.6 ft/s
4.8 ft/s
5.0 ft/s
5.2 ft/s
Ground
Bank Sta

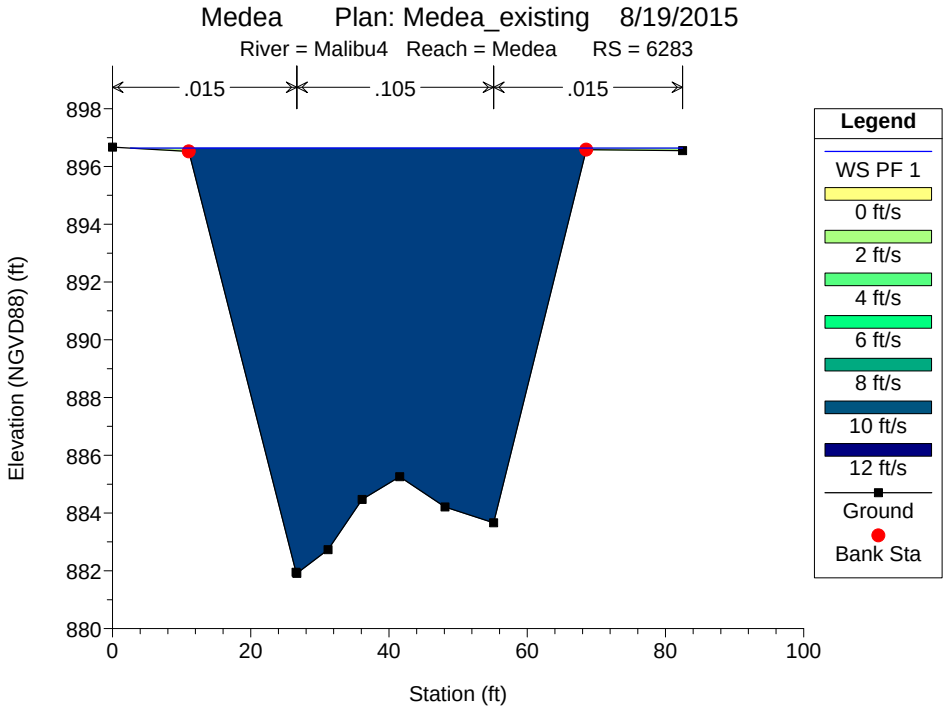

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6679
.14
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
Ground
Ineff
Bank Sta

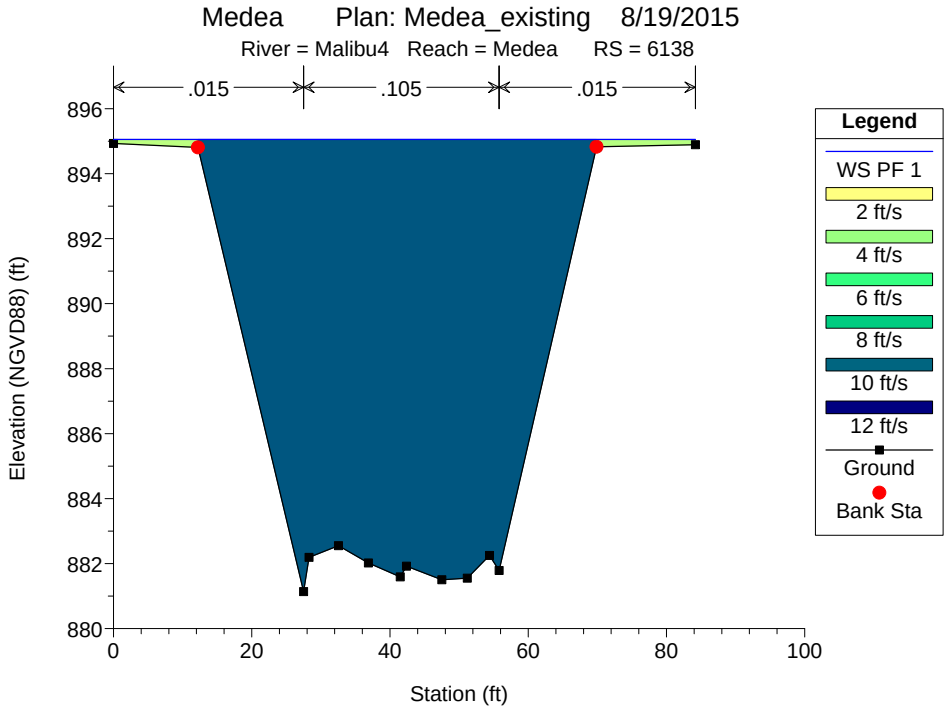

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6578
.015
.112
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Ineff
Bank Sta

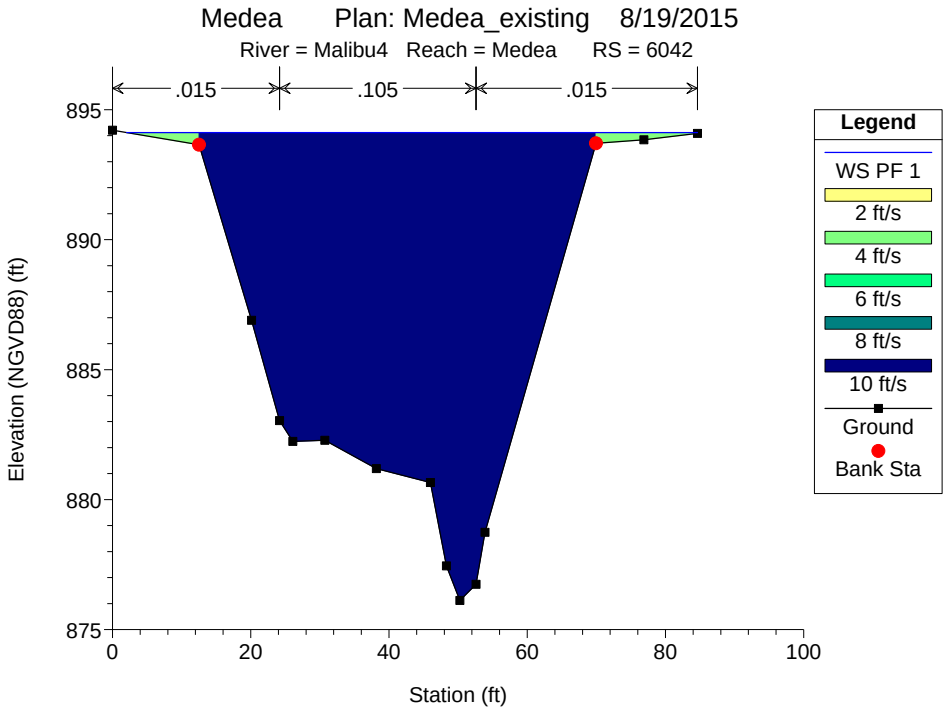

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6438
.015
.11
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

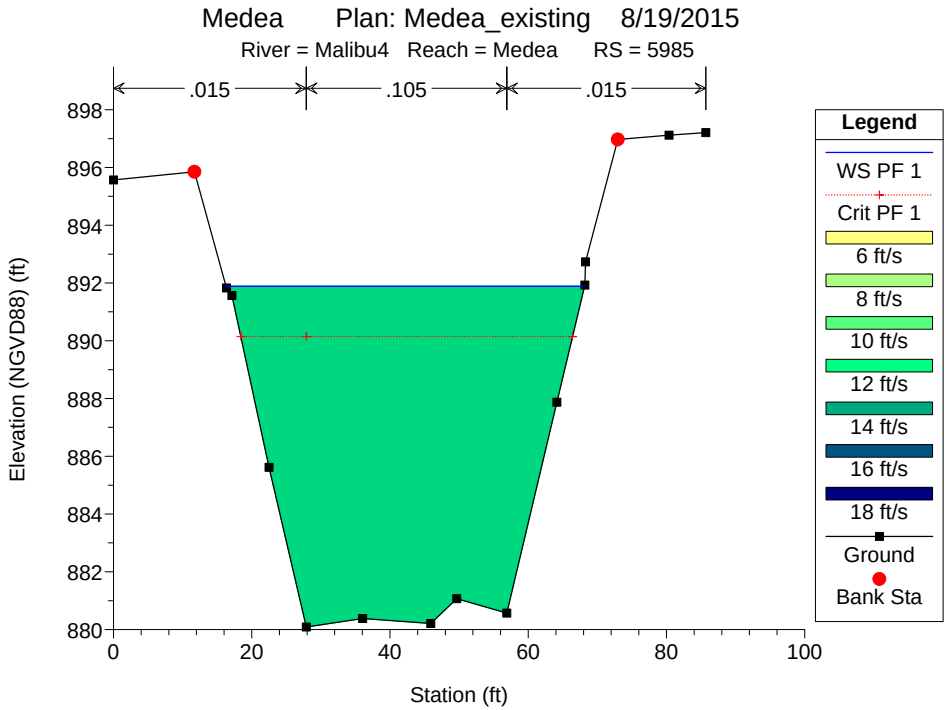

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6421
.015
.025
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta

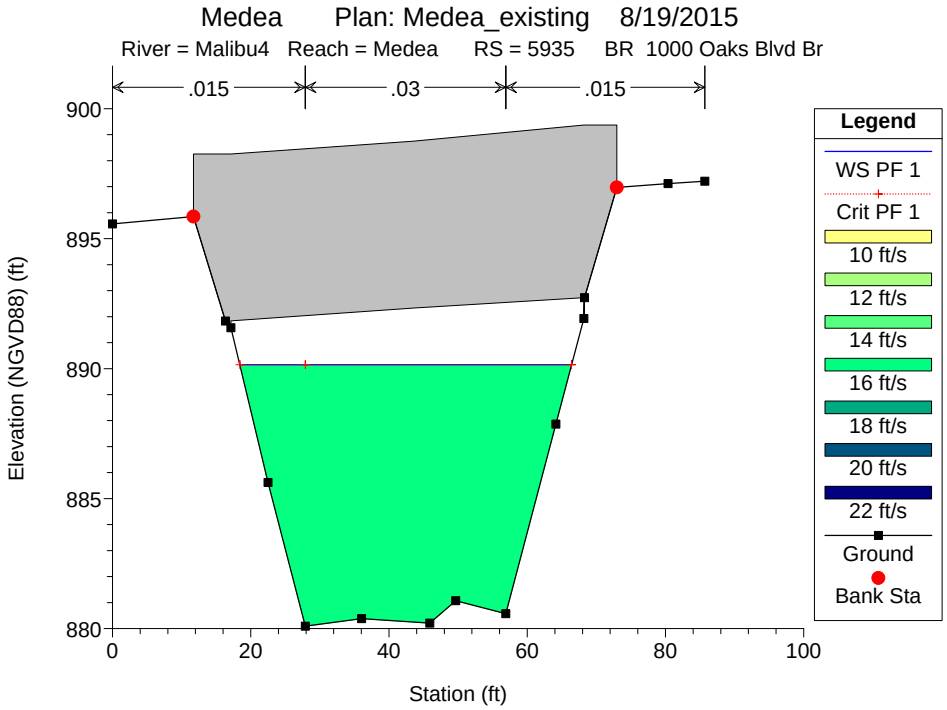

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6370
.015
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta

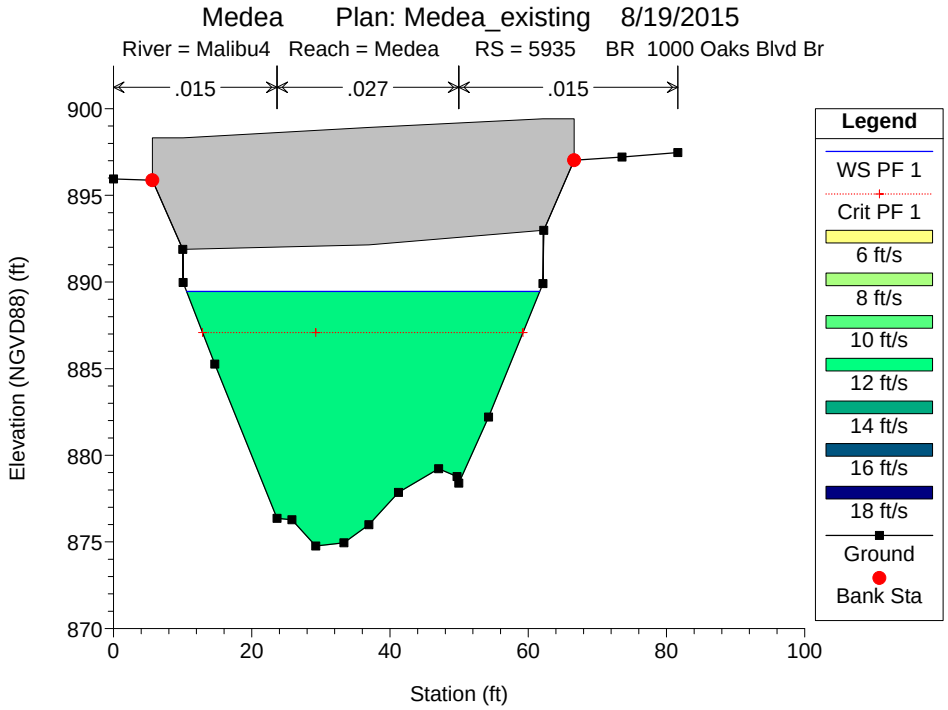

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6283
.015
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

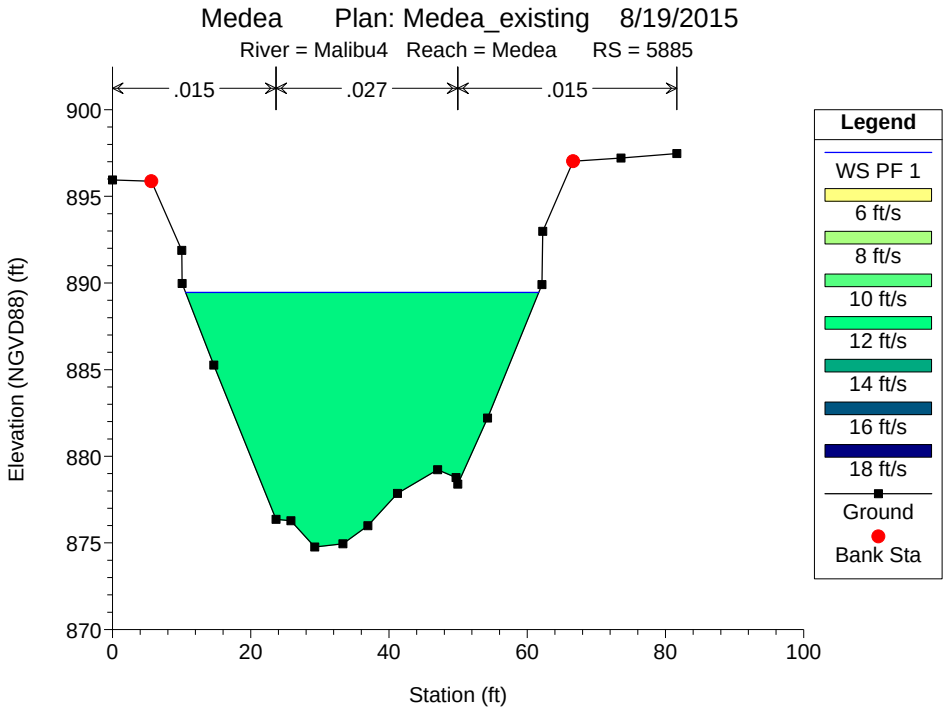

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6138
.015
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

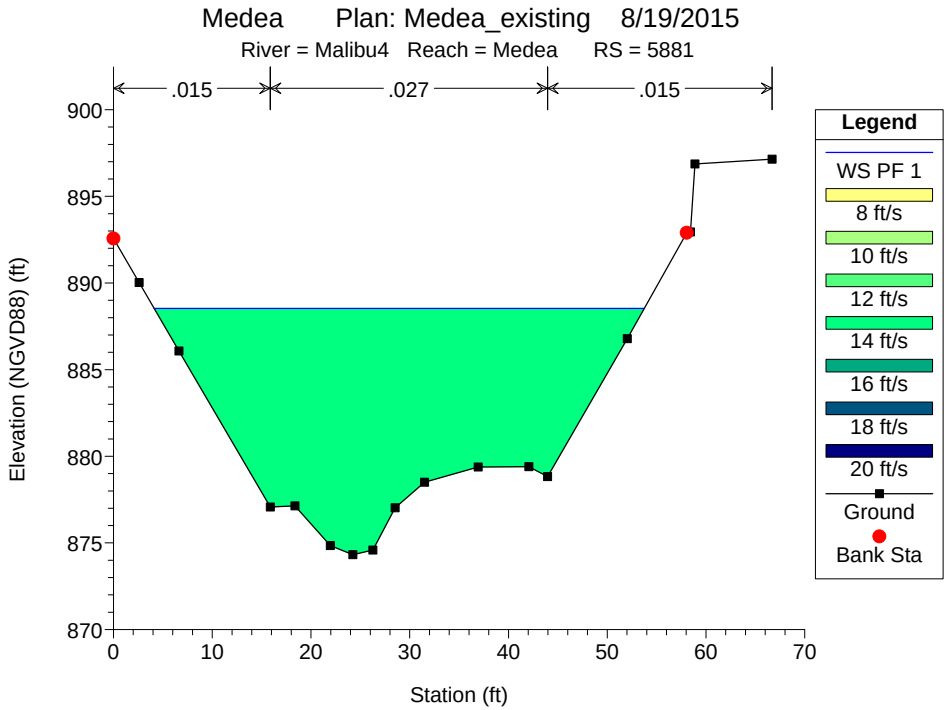

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6042
.015
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta

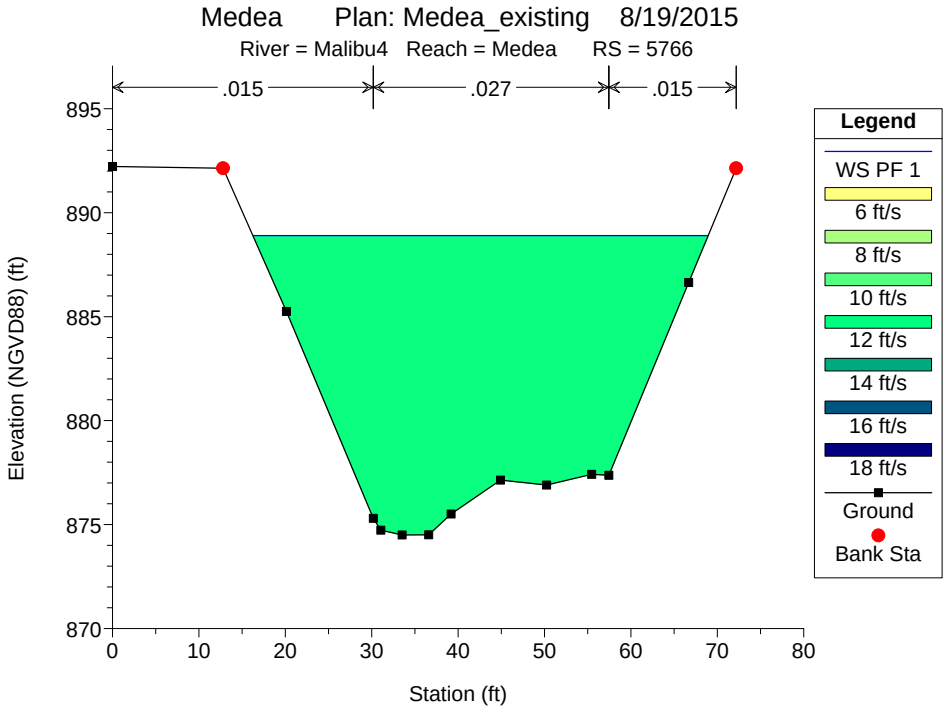

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5985
.015
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

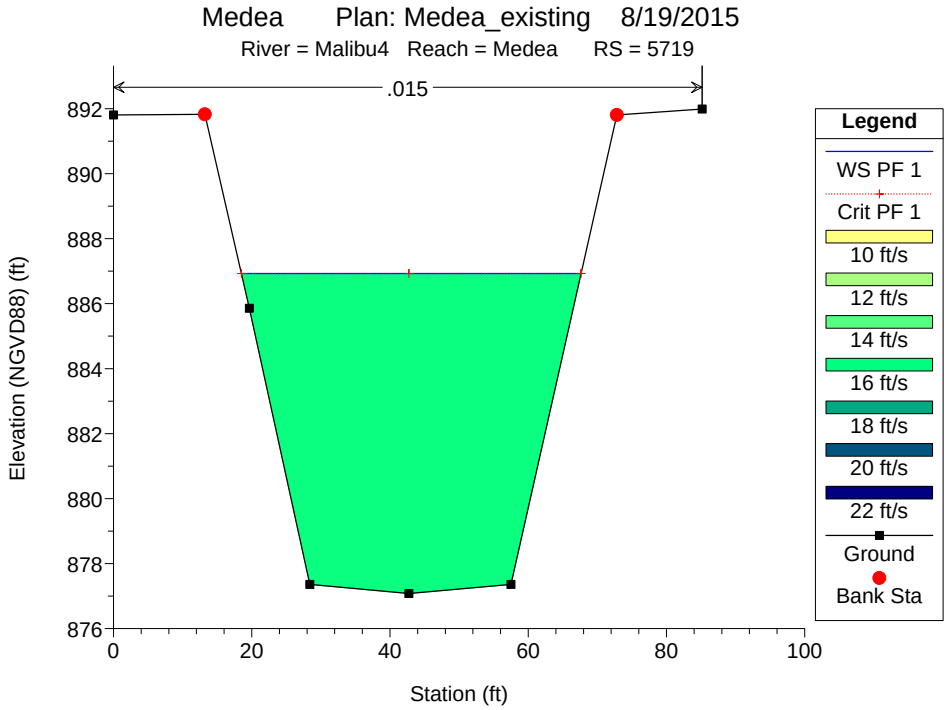

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5935 BR 1000 Oaks Blvd Br
.015
.03
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Bank Sta

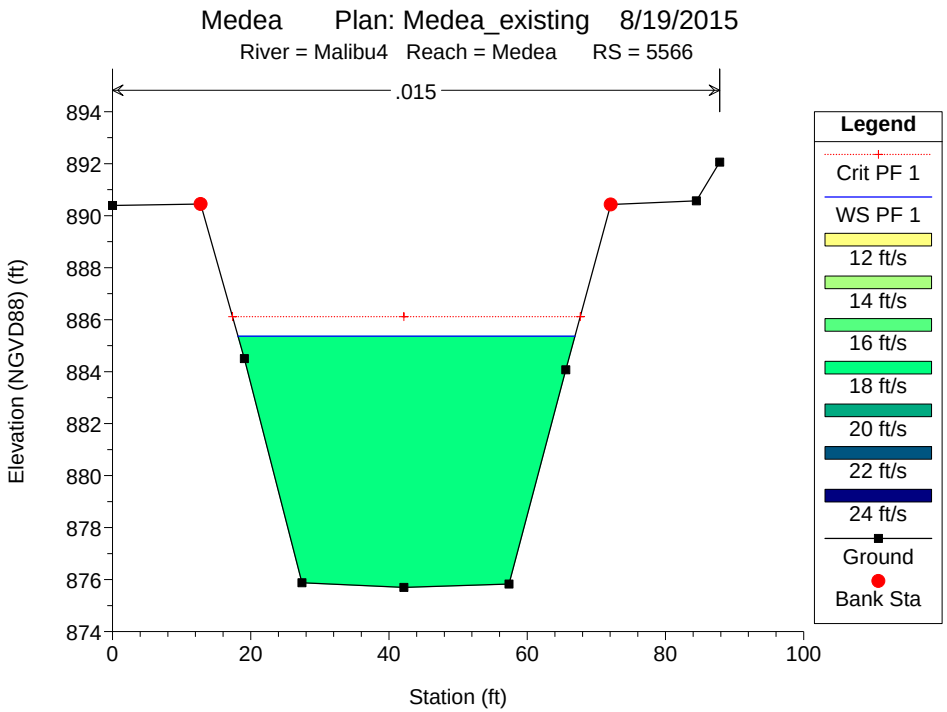

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5935 BR 1000 Oaks Blvd Br
.015
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

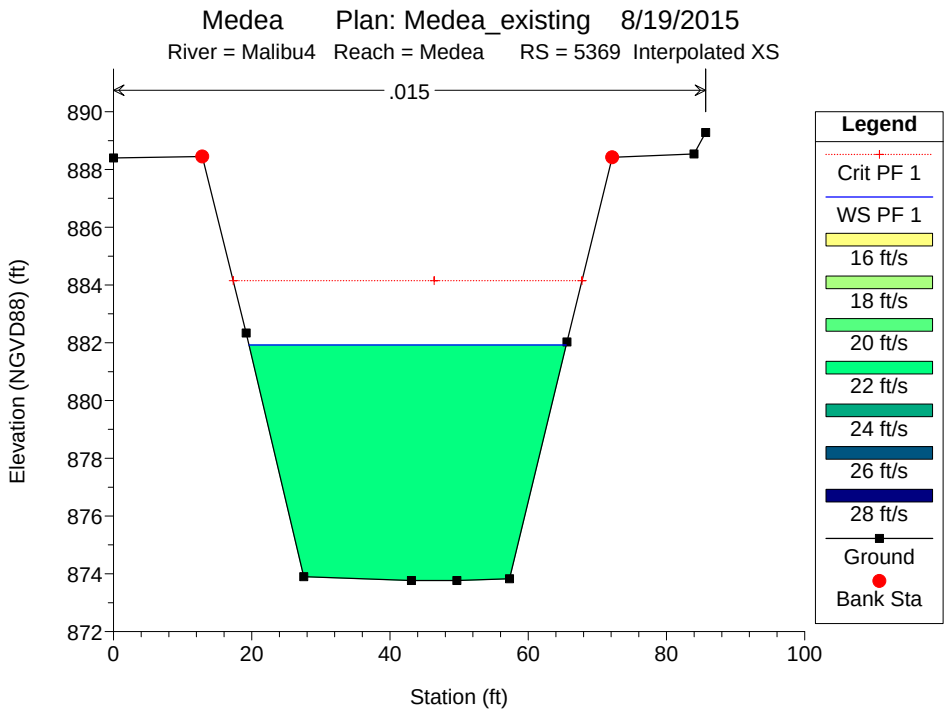

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5885
.015
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

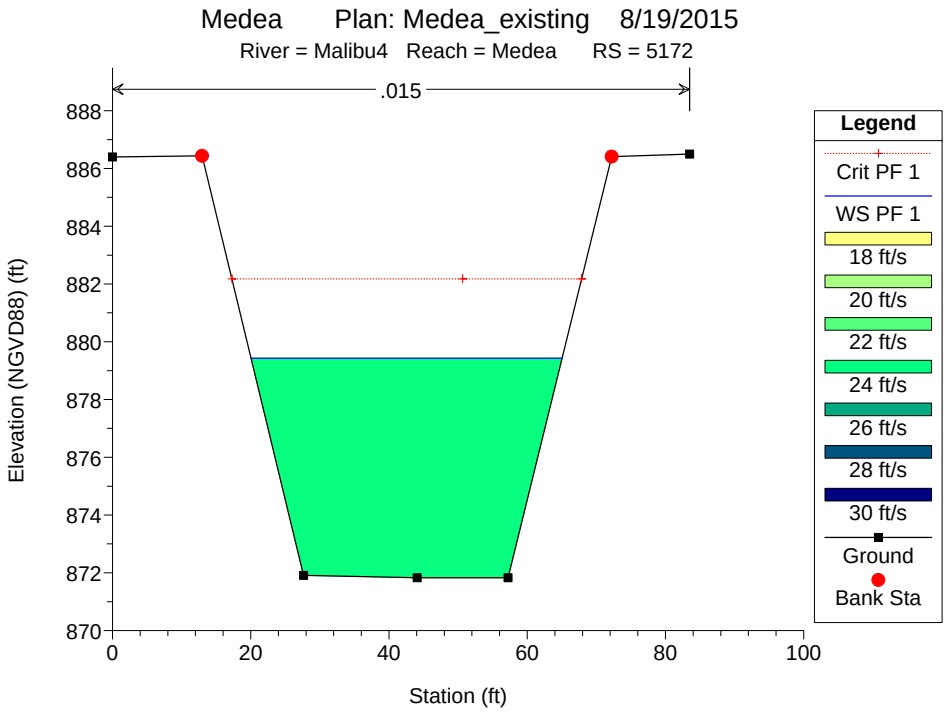

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5881
.015
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Bank Sta

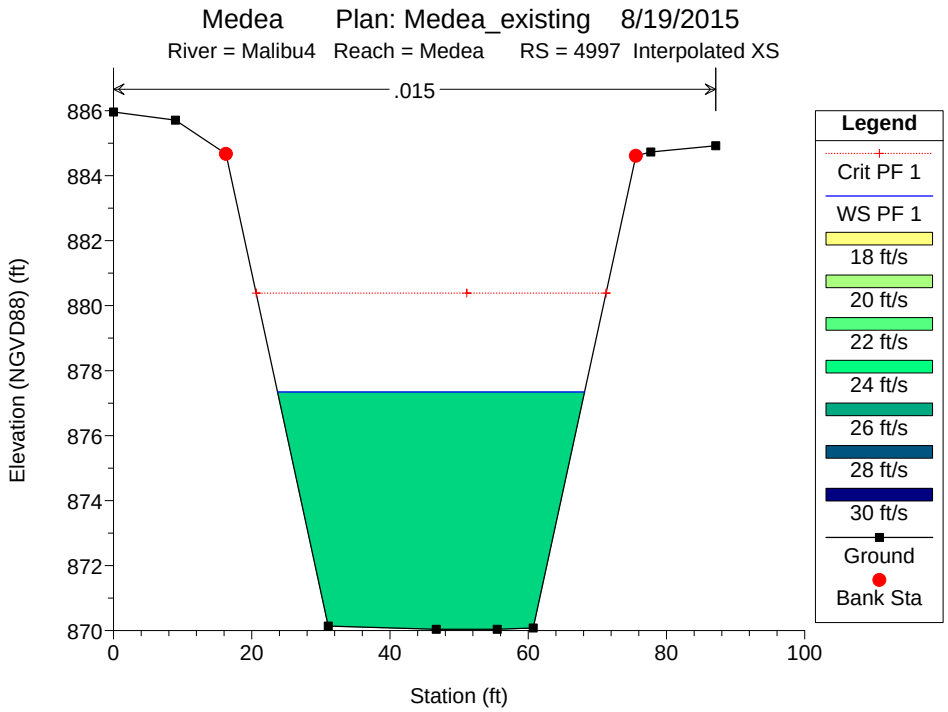

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5766
.015
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

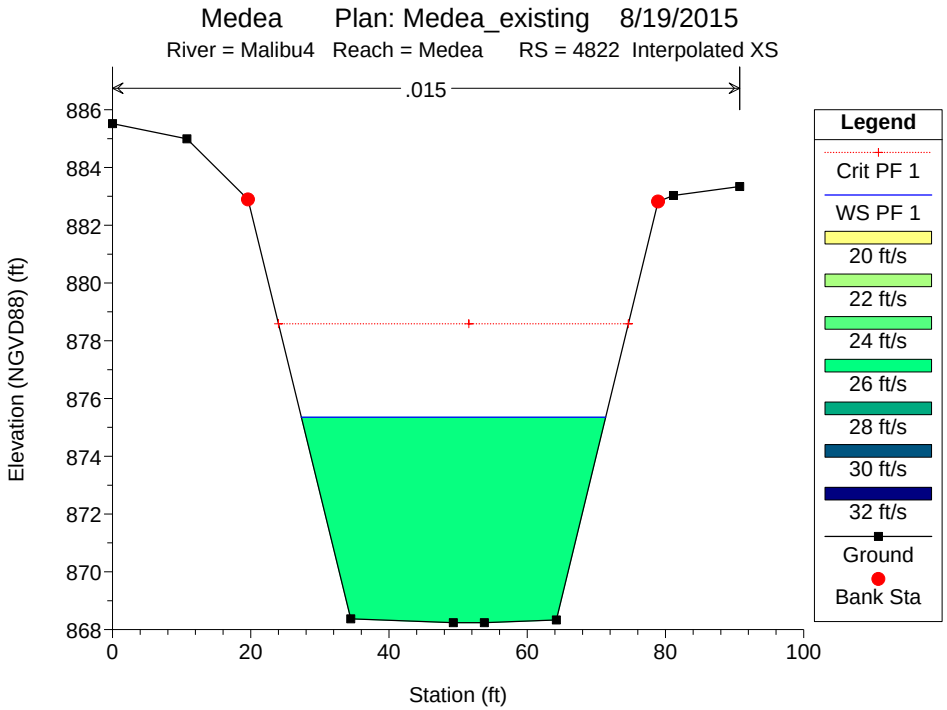

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5719
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Bank Sta

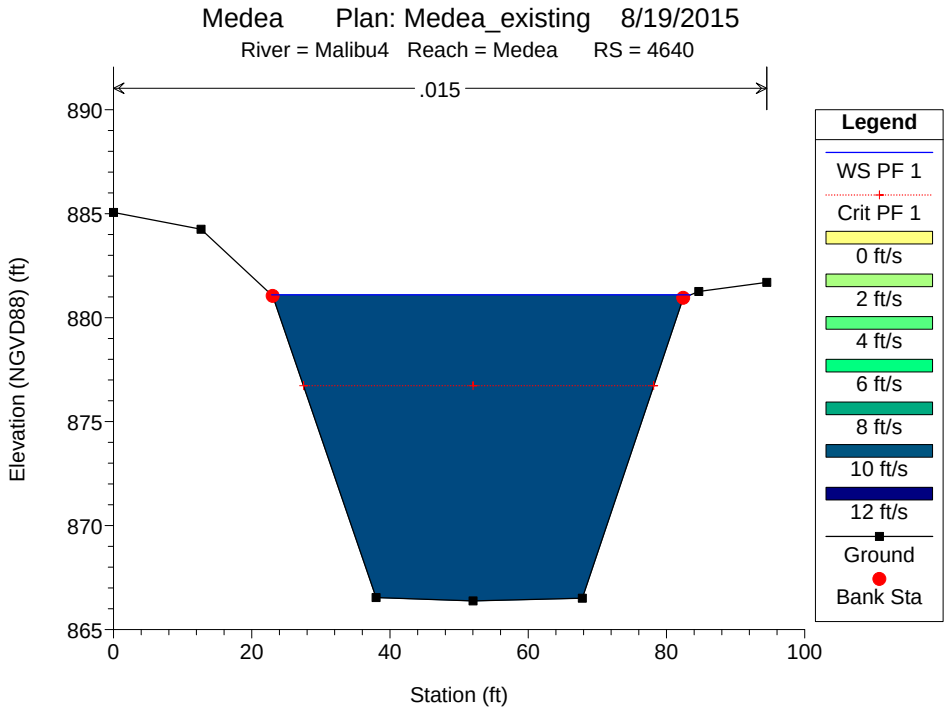

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5566
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
Ground
Bank Sta

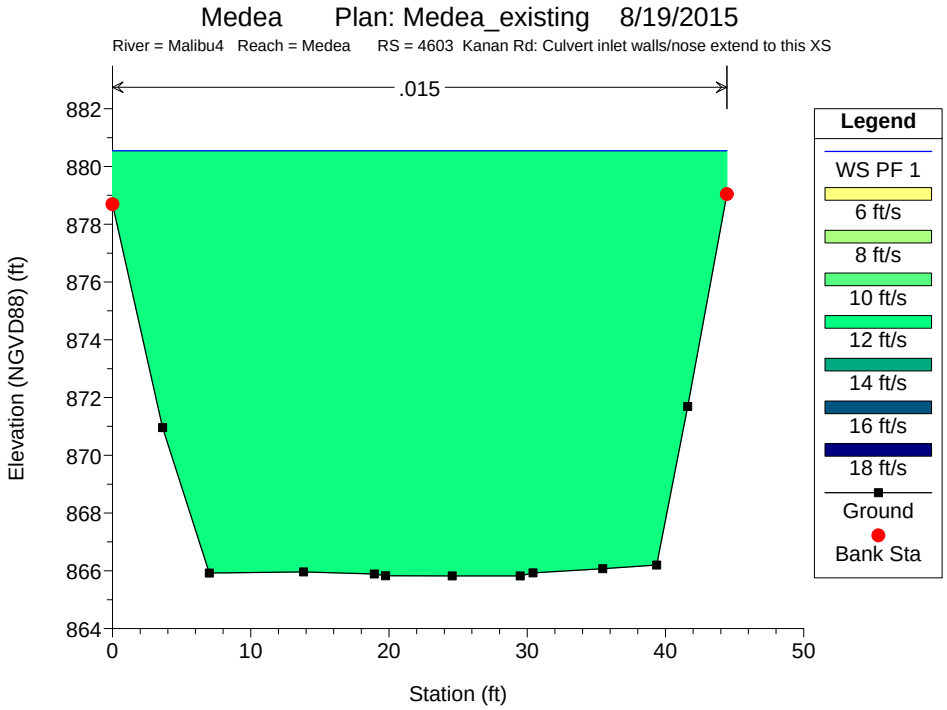

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5369 Interpolated XS
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
Ground
Bank Sta

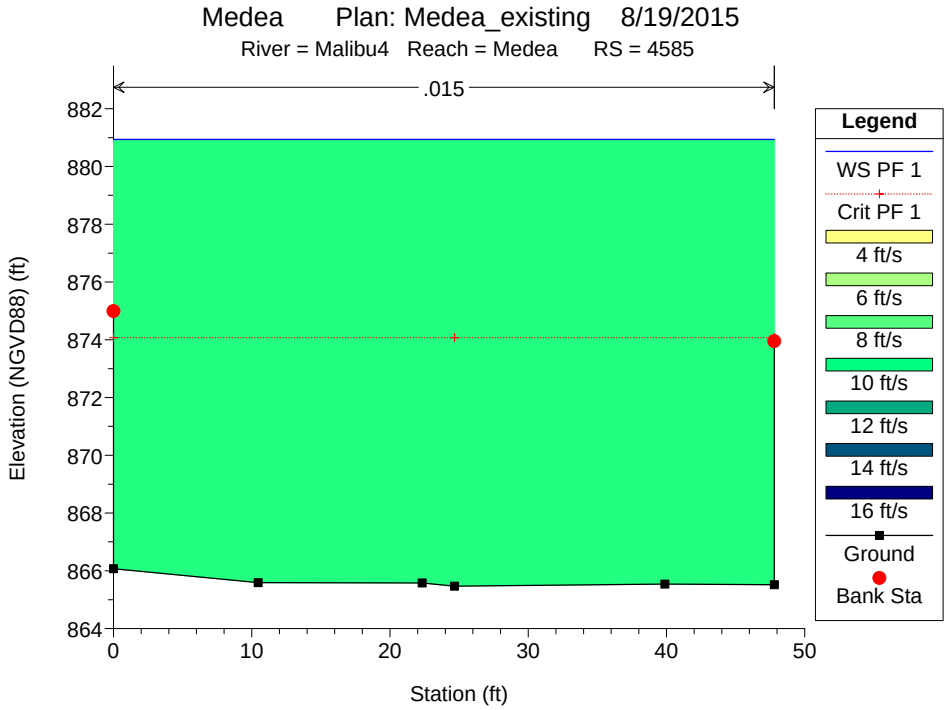

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5172
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta

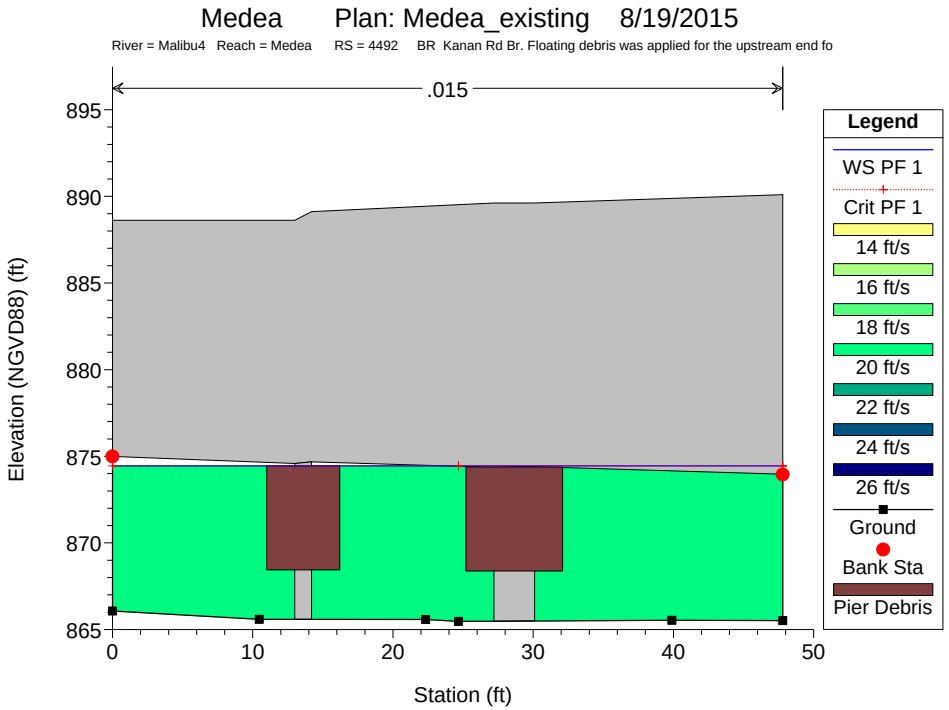

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4997 Interpolated XS
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta

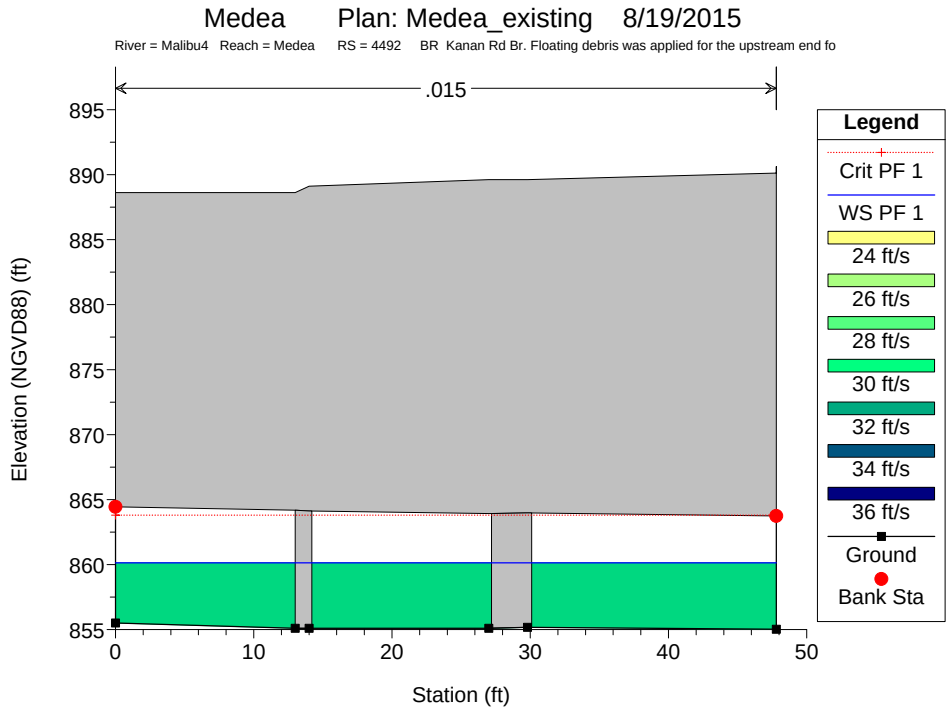

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4822 Interpolated XS
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
Ground
Bank Sta

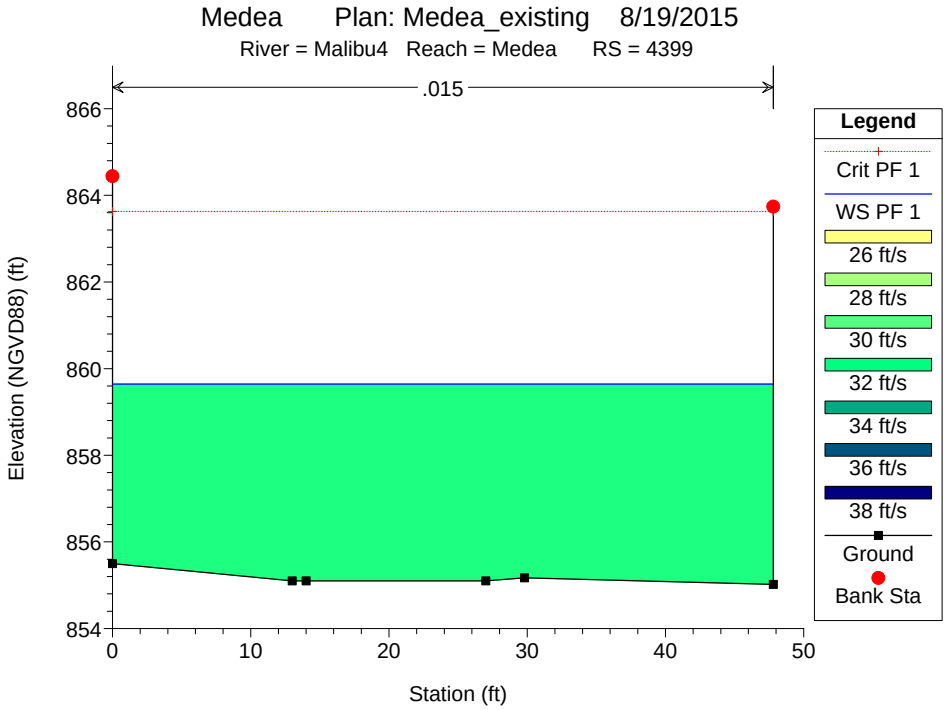

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4640
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

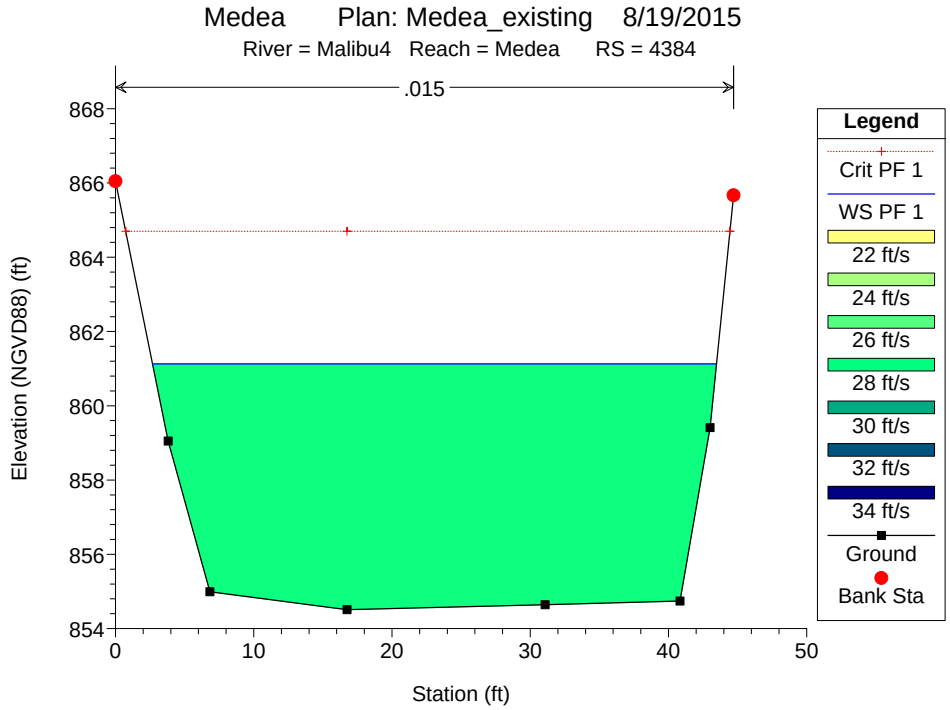

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4603 Kanan Rd: Culvert inlet walls/nose extend to this XS
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

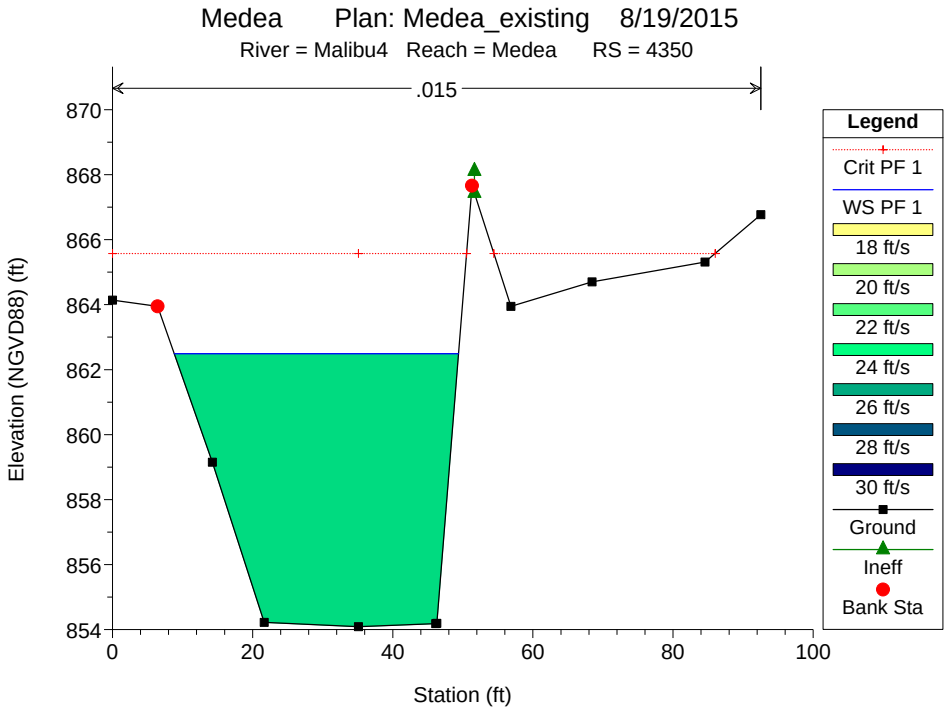

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4585
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

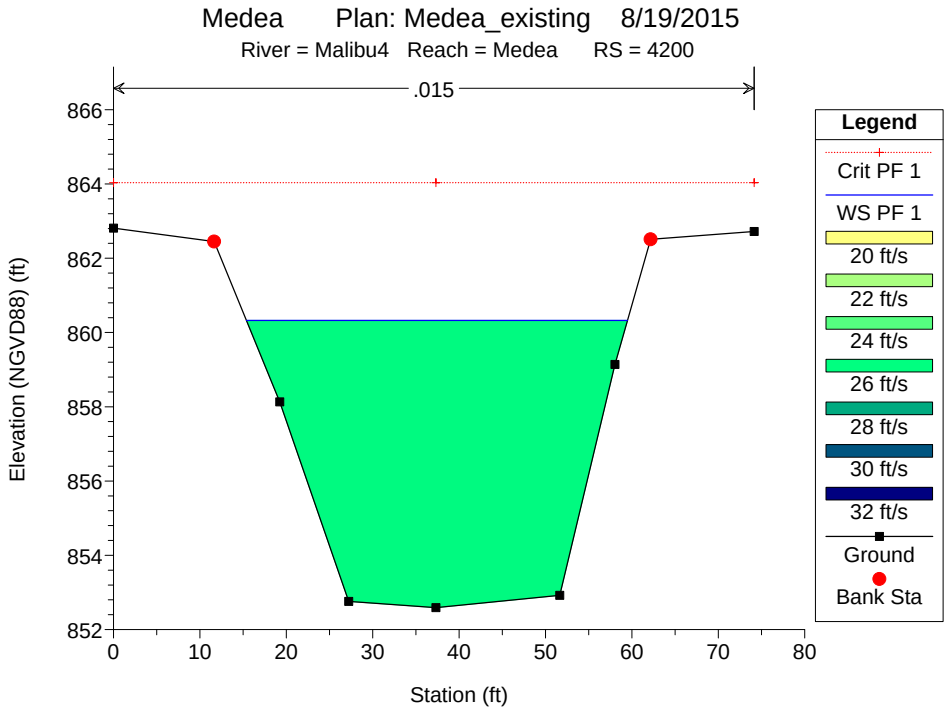

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4492 BR Kanan Rd Br. Floating debris was applied for the upstream end fo
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
Ground
Bank Sta
Pier Debris

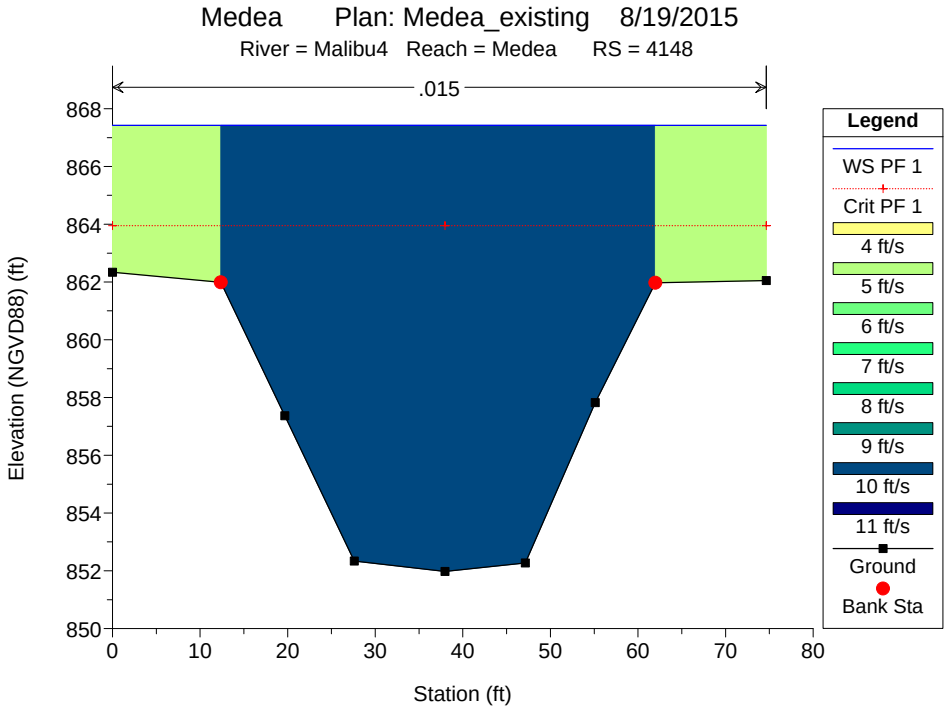

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4492 BR Kanan Rd Br. Floating debris was applied for the upstream end fo
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
34 ft/s
36 ft/s
Ground
Bank Sta

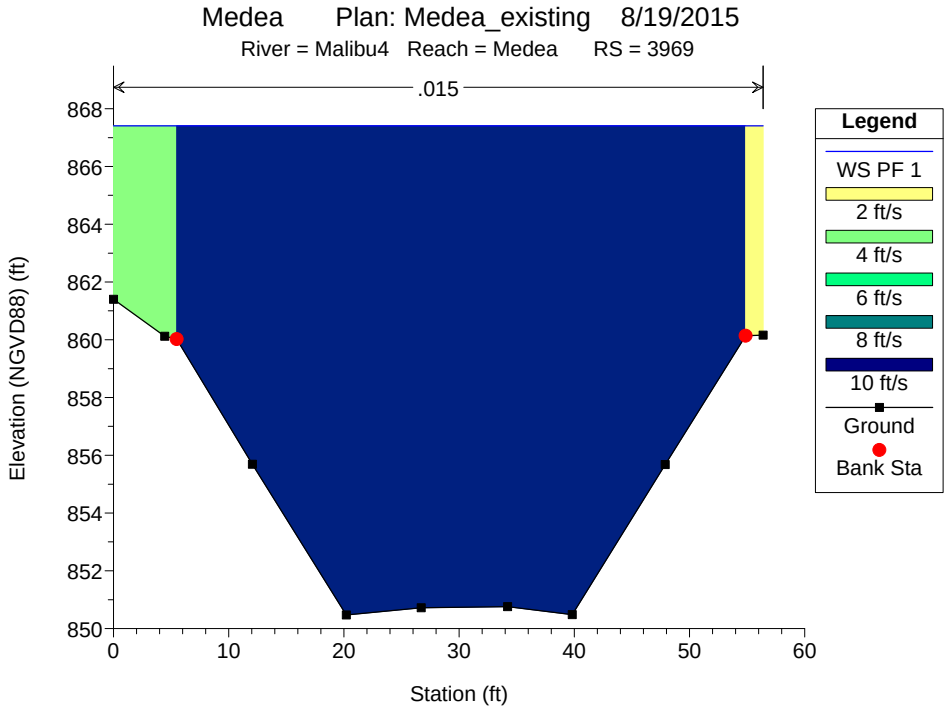

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4399
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
26 ft/s
28 ft/s
30 ft/s
32 ft/s
34 ft/s
36 ft/s
38 ft/s
Ground
Bank Sta

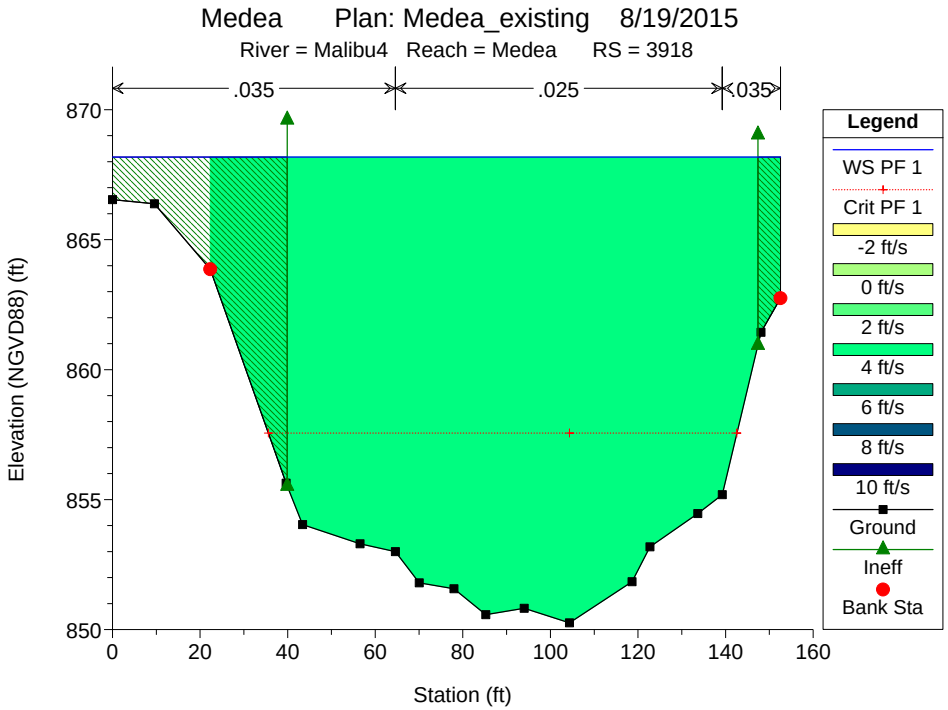

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4384
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
34 ft/s
Ground
Bank Sta

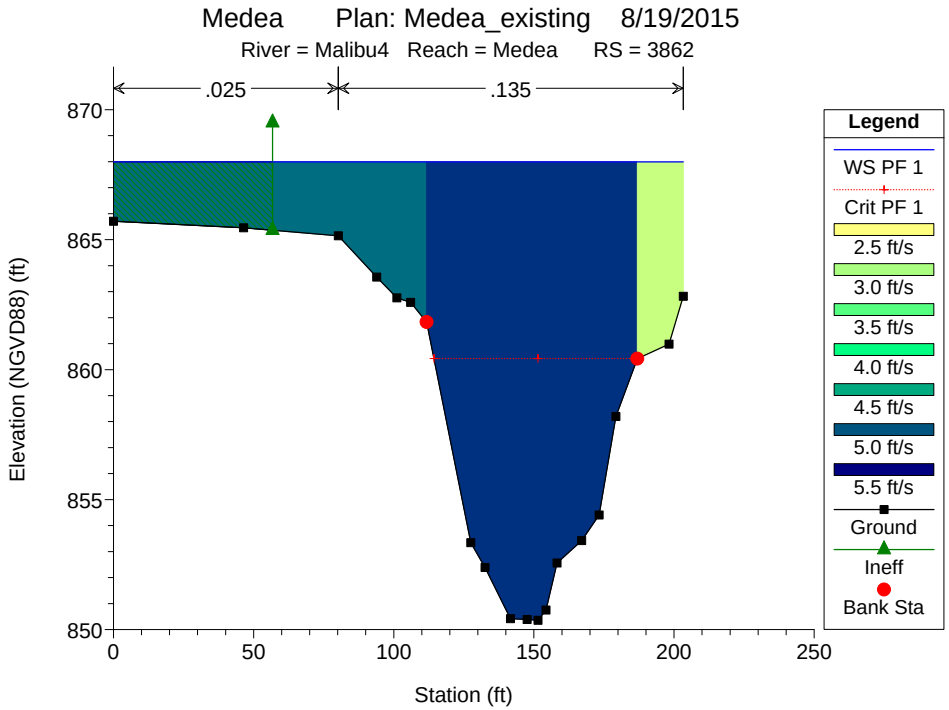

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4350
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Ineff
Bank Sta

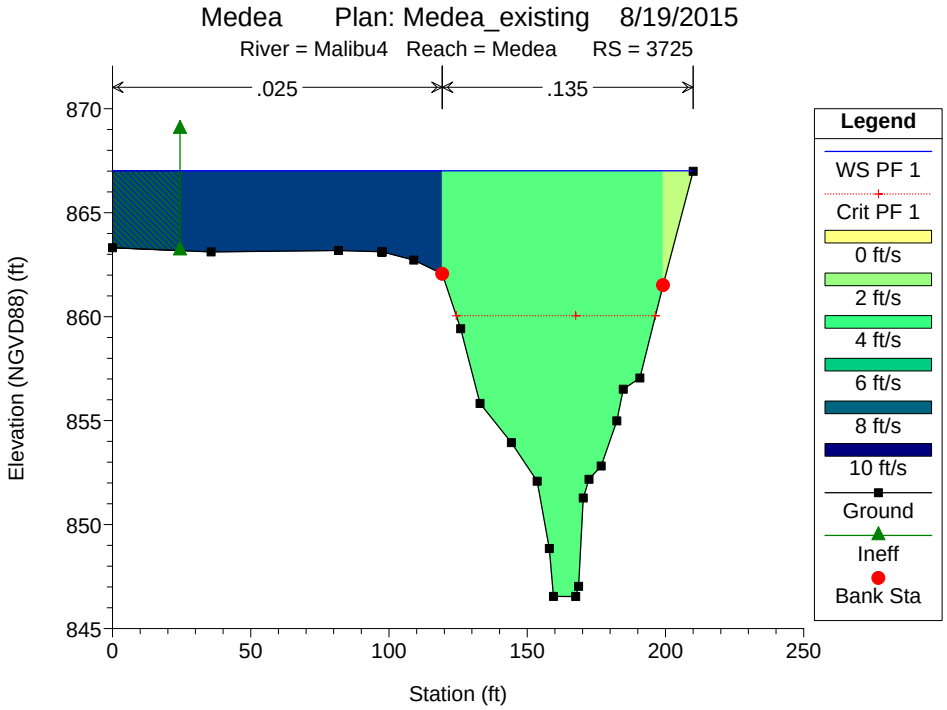

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4200
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
Ground
Bank Sta

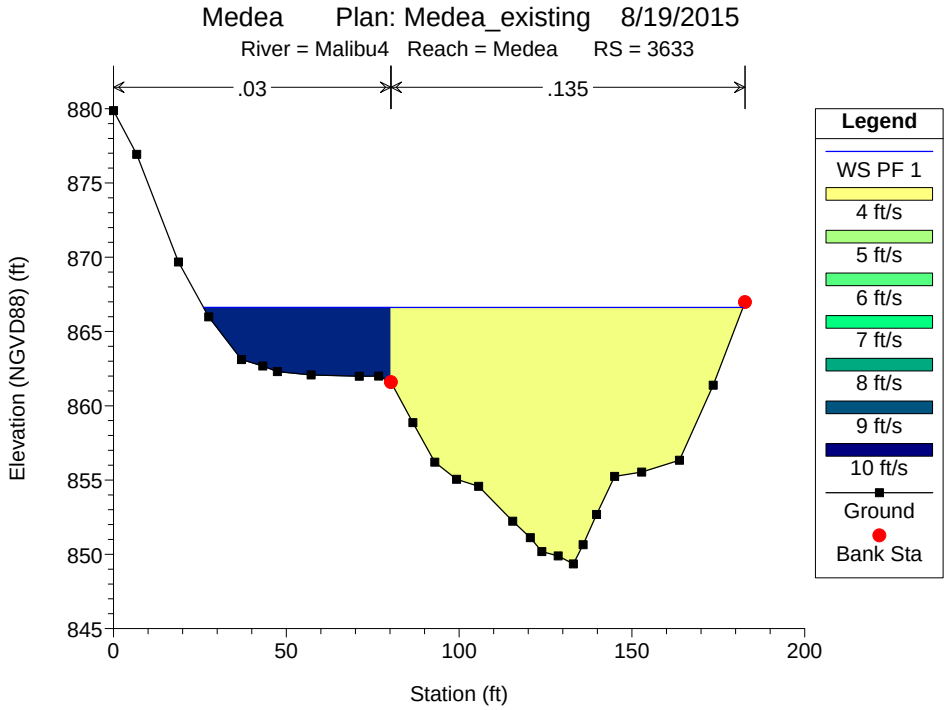

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4148
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta

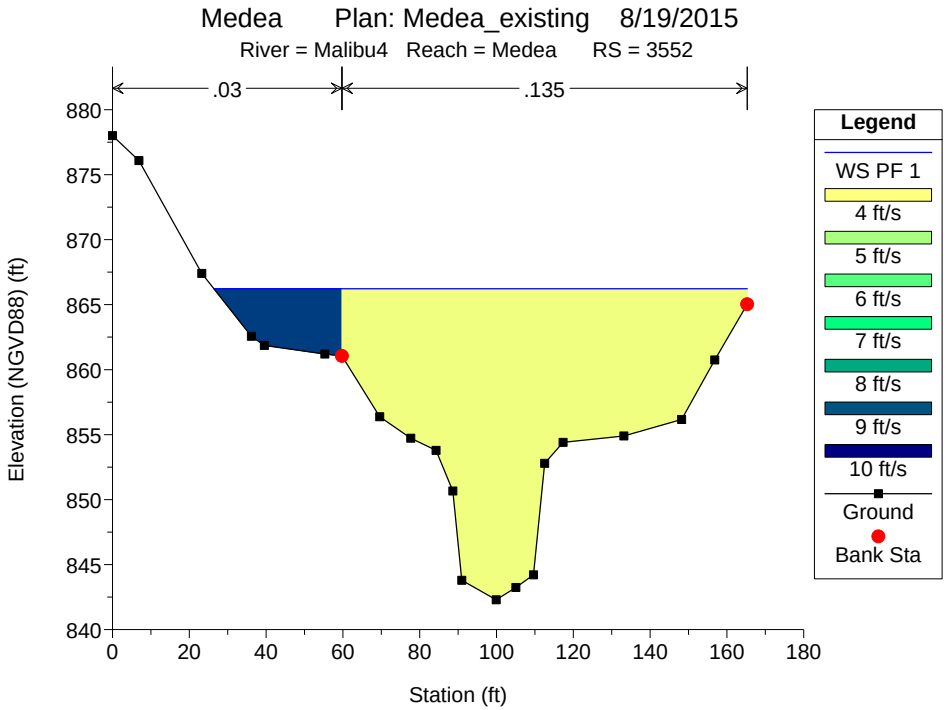

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3969
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta

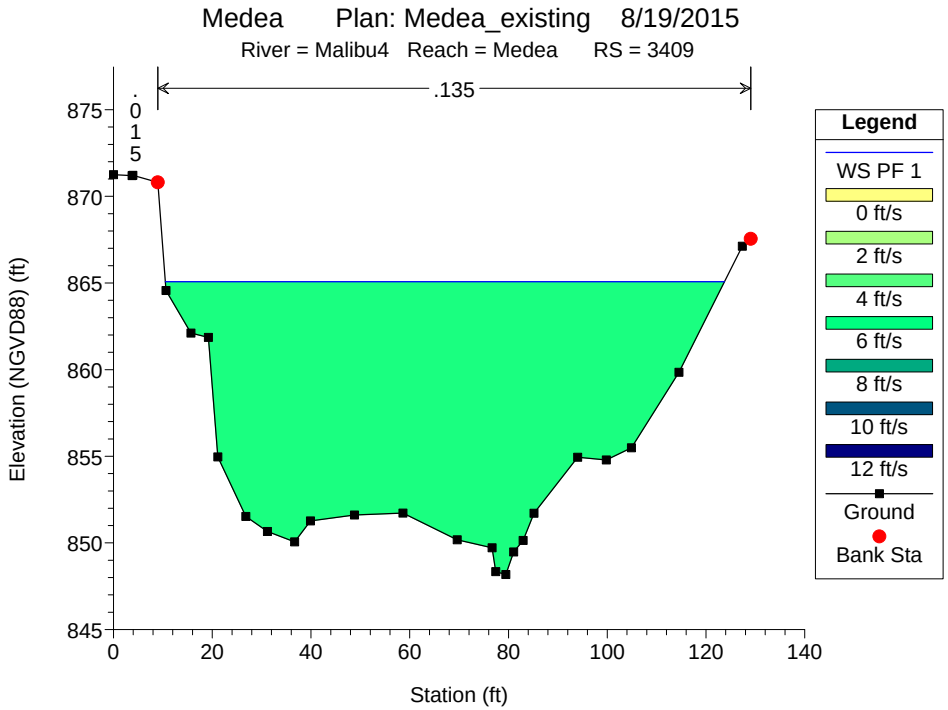

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3918
.035
.025
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

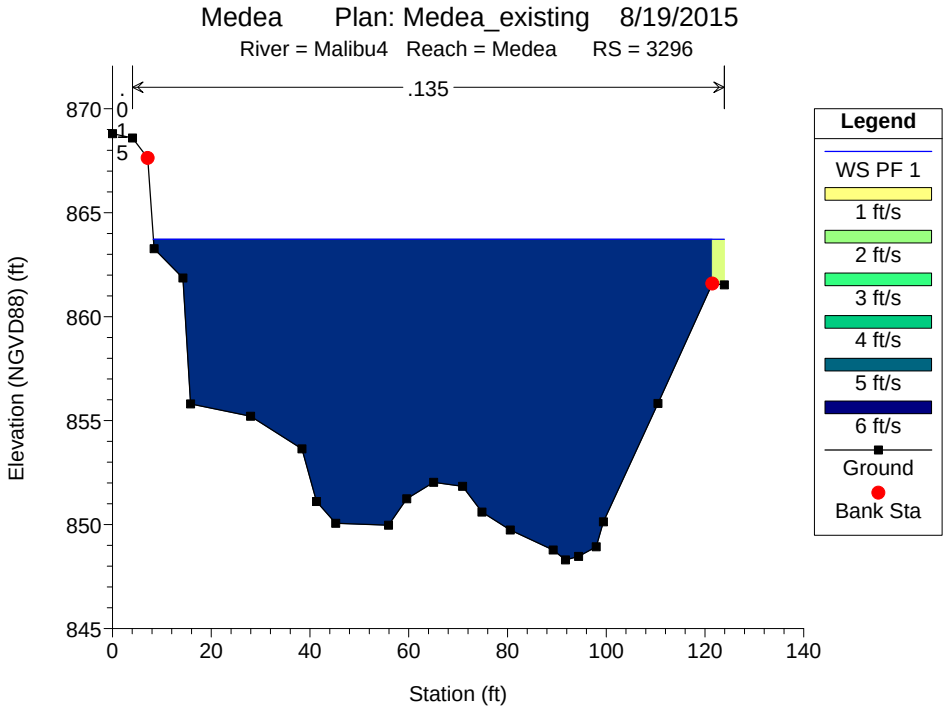

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3862
.025
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2.5 ft/s
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
Ground
Ineff
Bank Sta

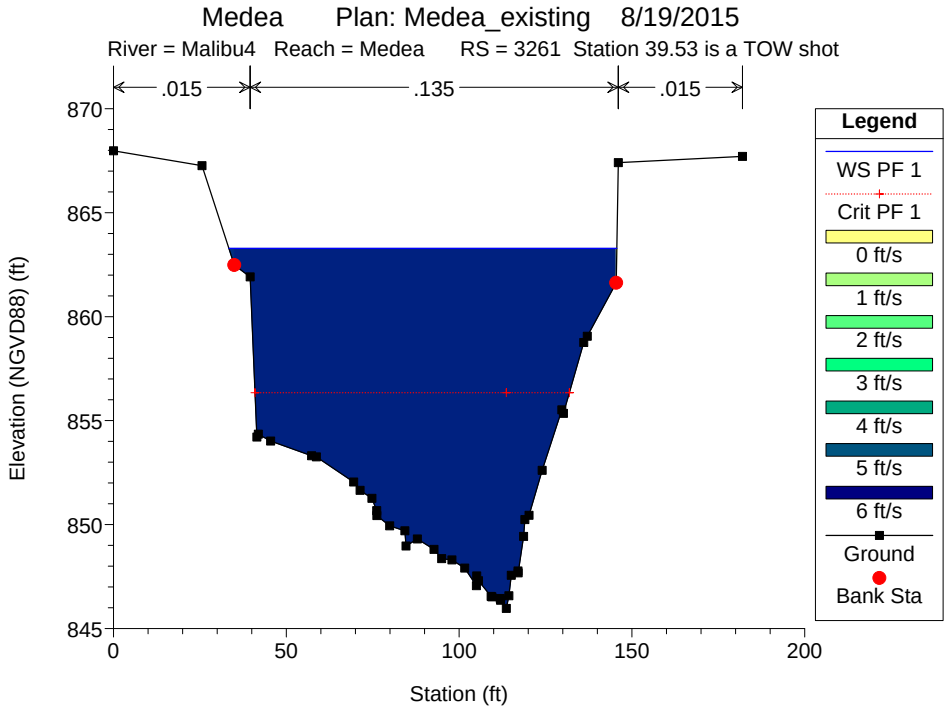

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3725
.025
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

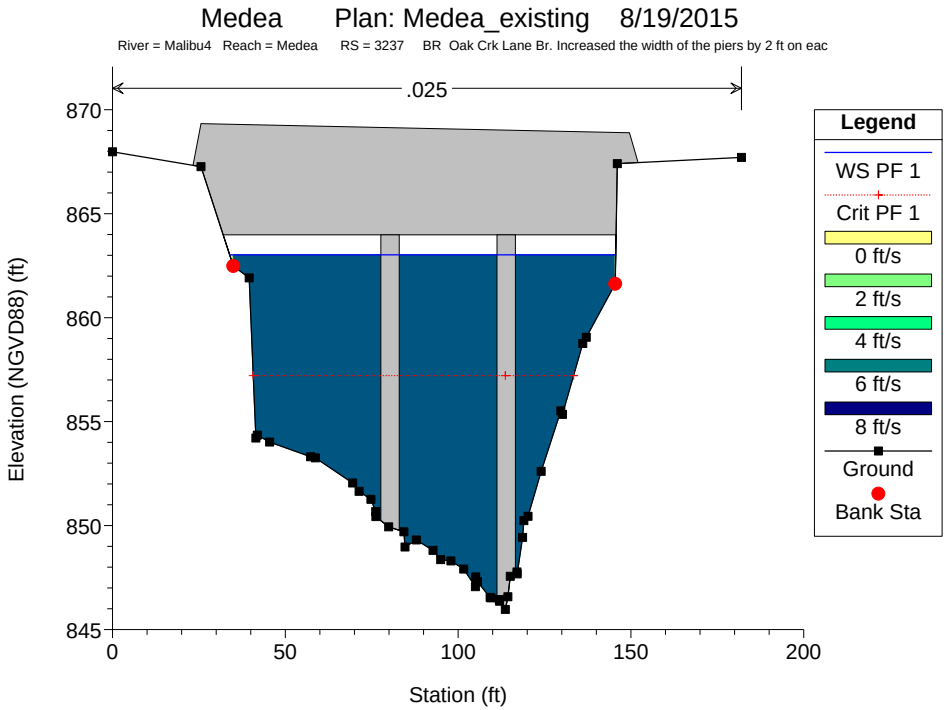

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3633
.03
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

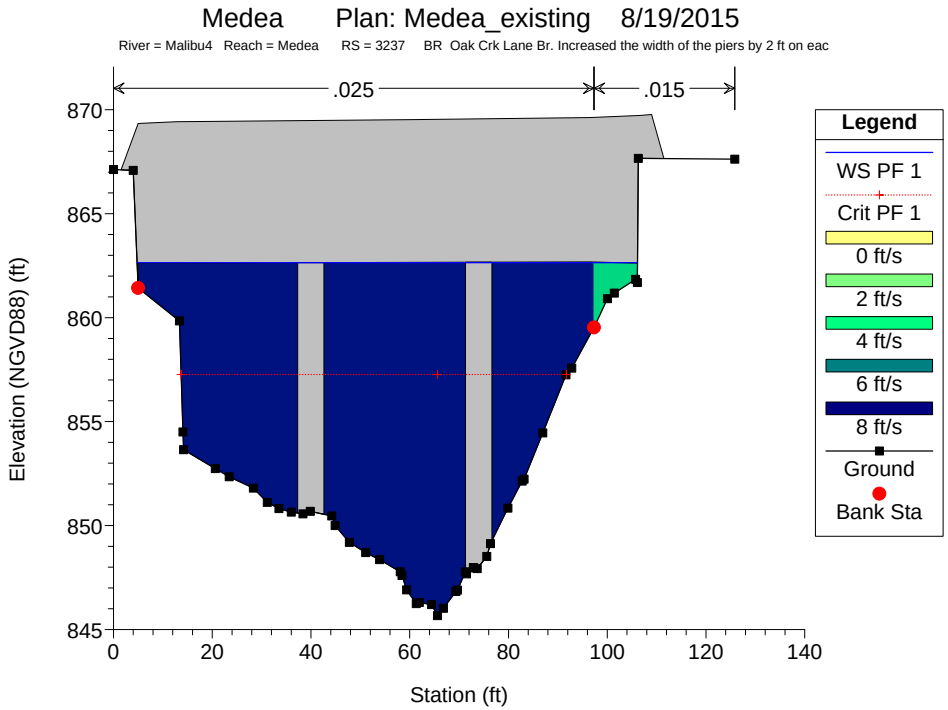

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3552
.03
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

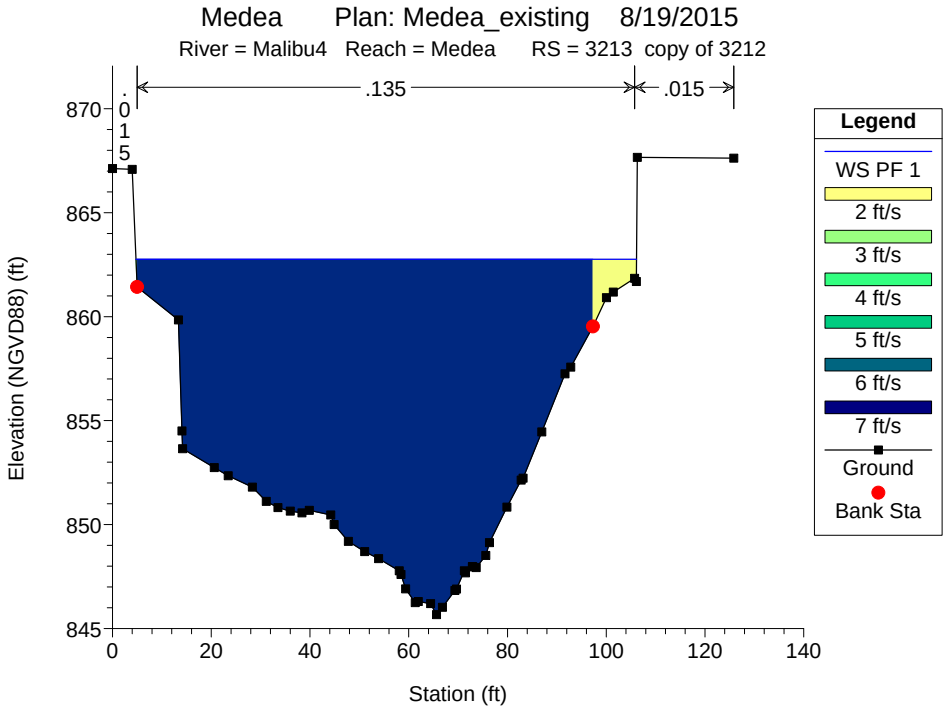

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3409
.015
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

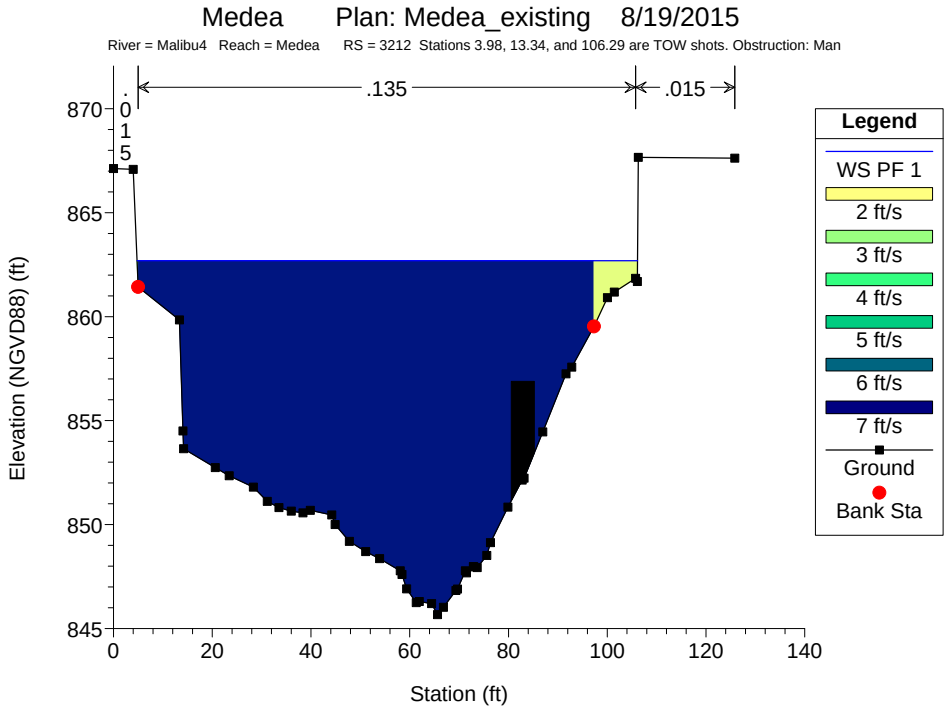

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3296
.015
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
Ground
Bank Sta

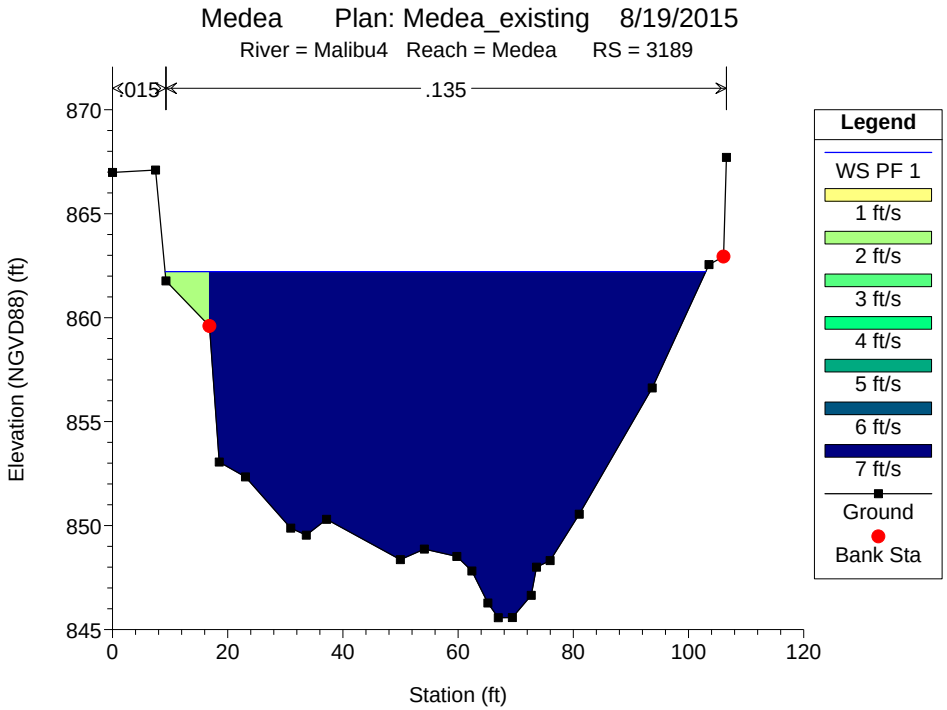

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3261 Station 39.53 is a TOW shot
.015
.135
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
Ground
Bank Sta

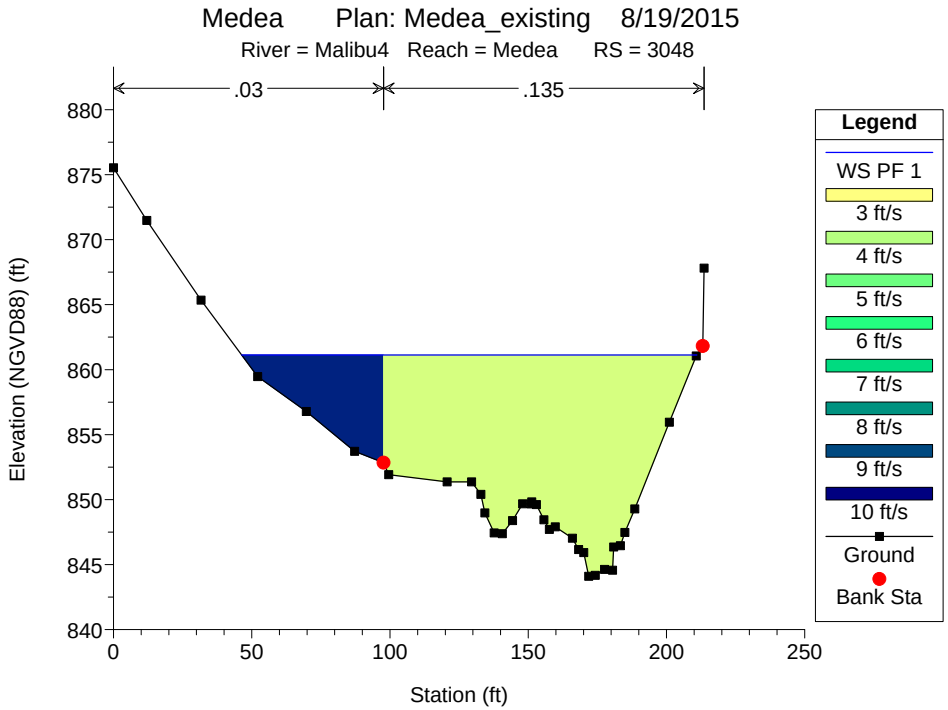

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3237 BR Oak Crk Lane Br. Increased the width of the piers by 2 ft on eac
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

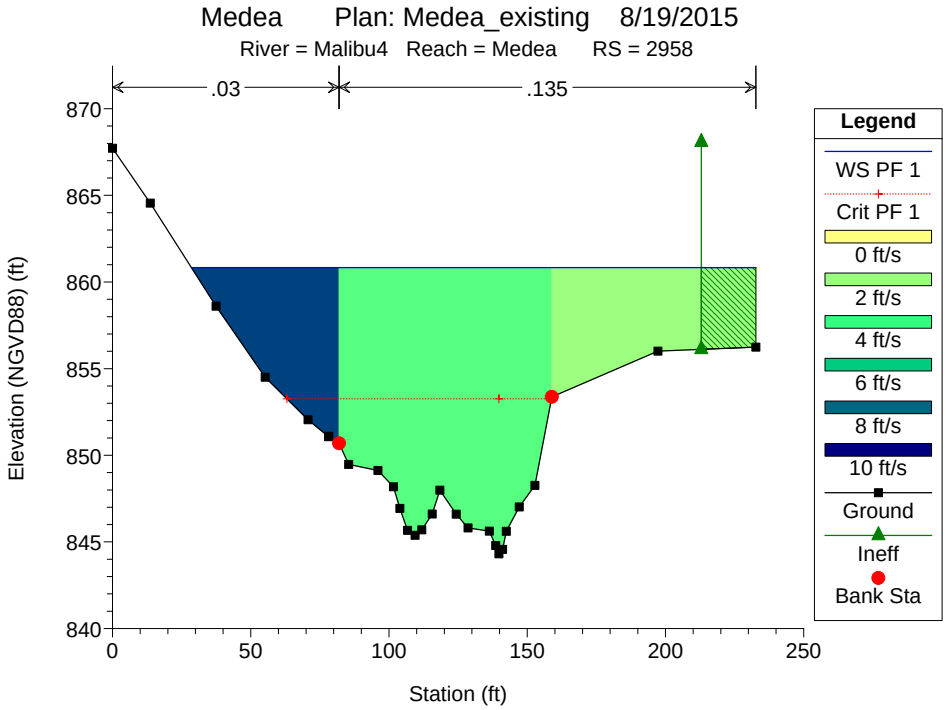

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3237 BR Oak Crk Lane Br. Increased the width of the piers by 2 ft on eac
.025
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

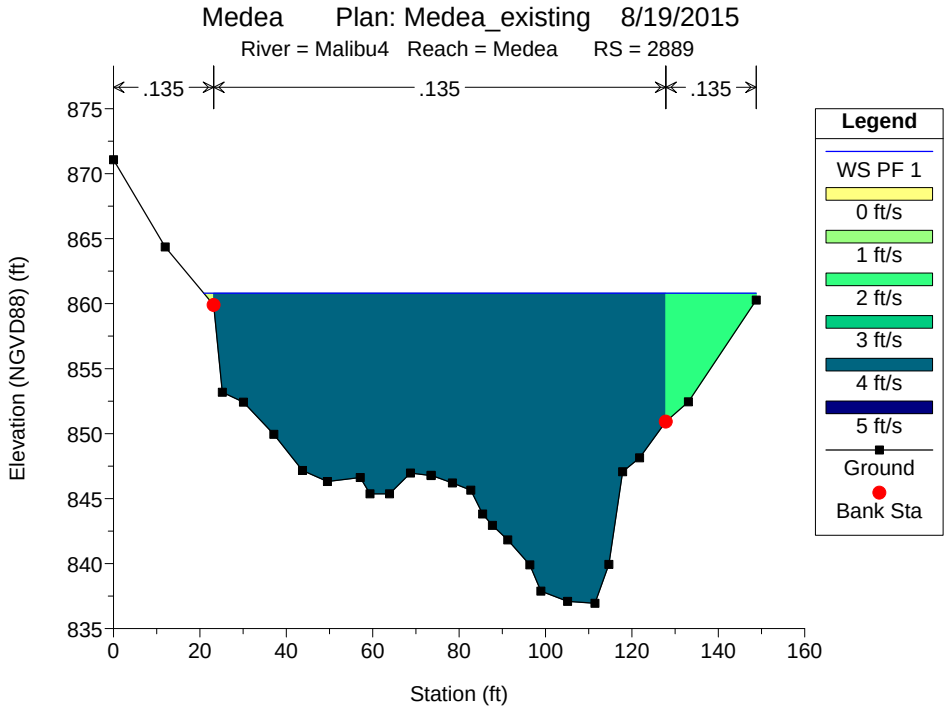

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3213 copy of 3212
.015
.135
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta

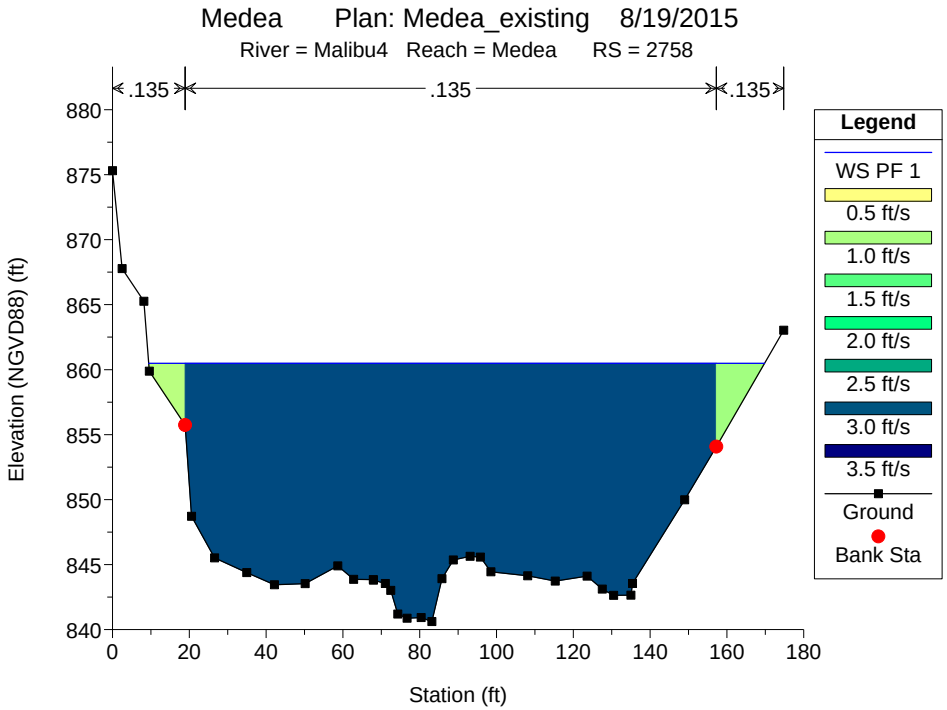

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3212 Stations 3.98, 13.34, and 106.29 are TOW shots. Obstruction: Man
.015
.135
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta

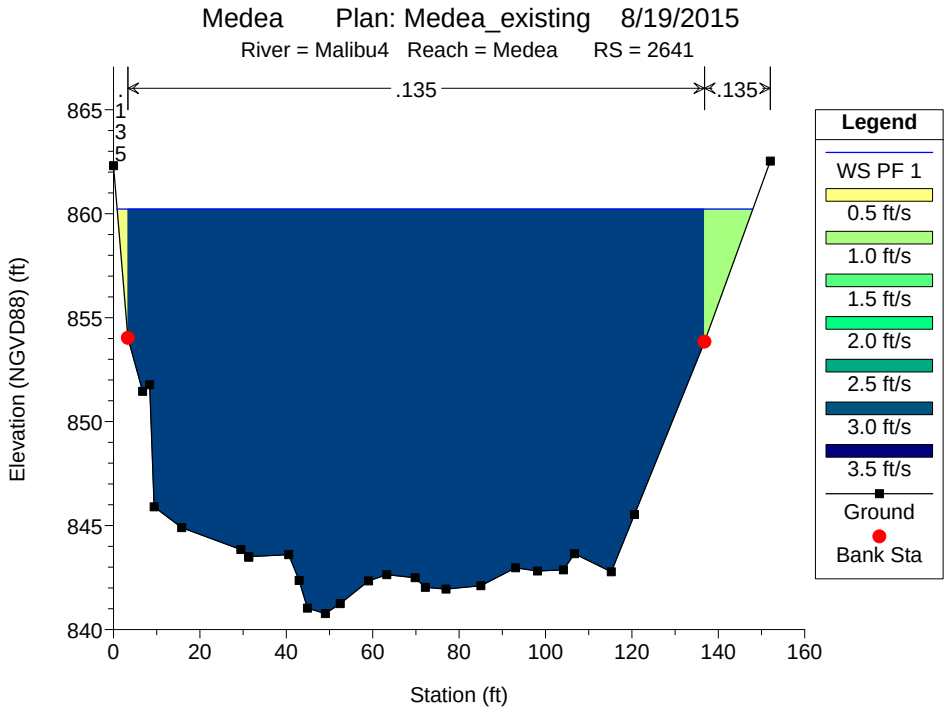

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3189
.015
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta

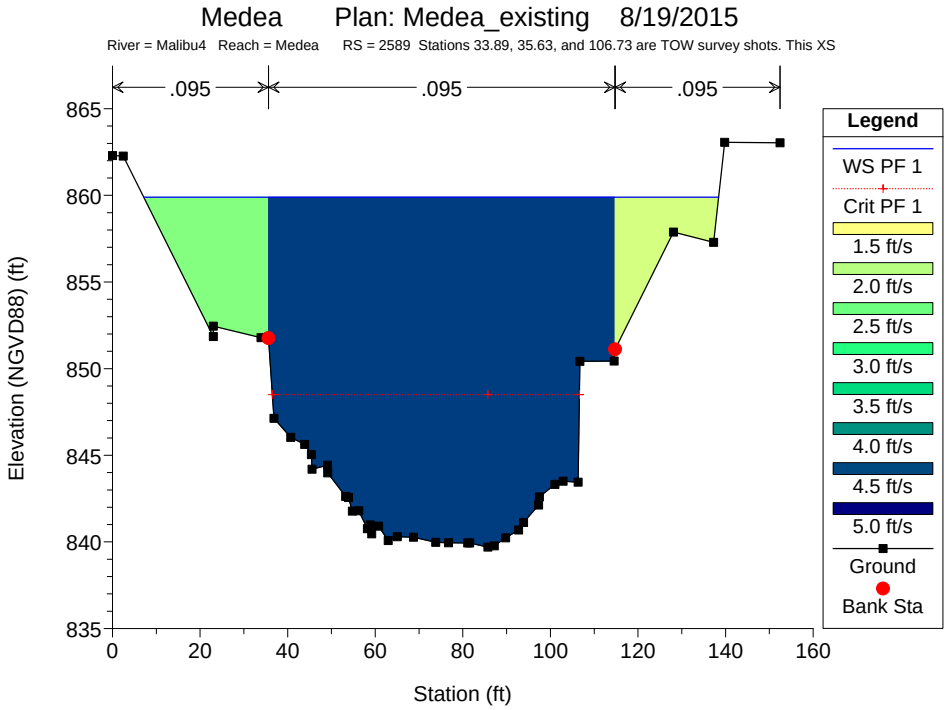

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3048
.03
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

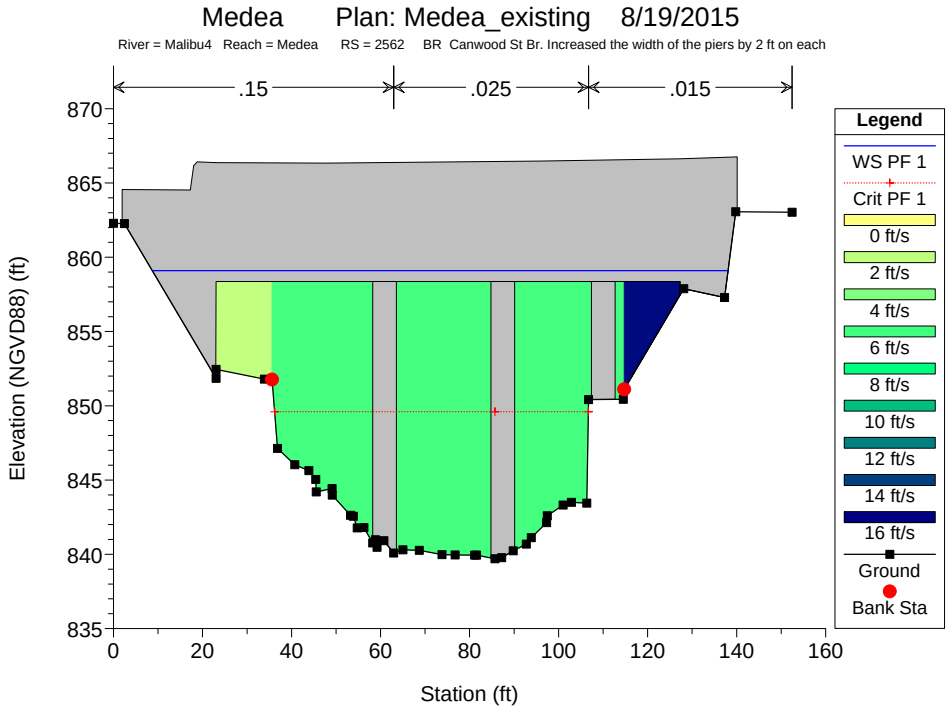

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2958
.03
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

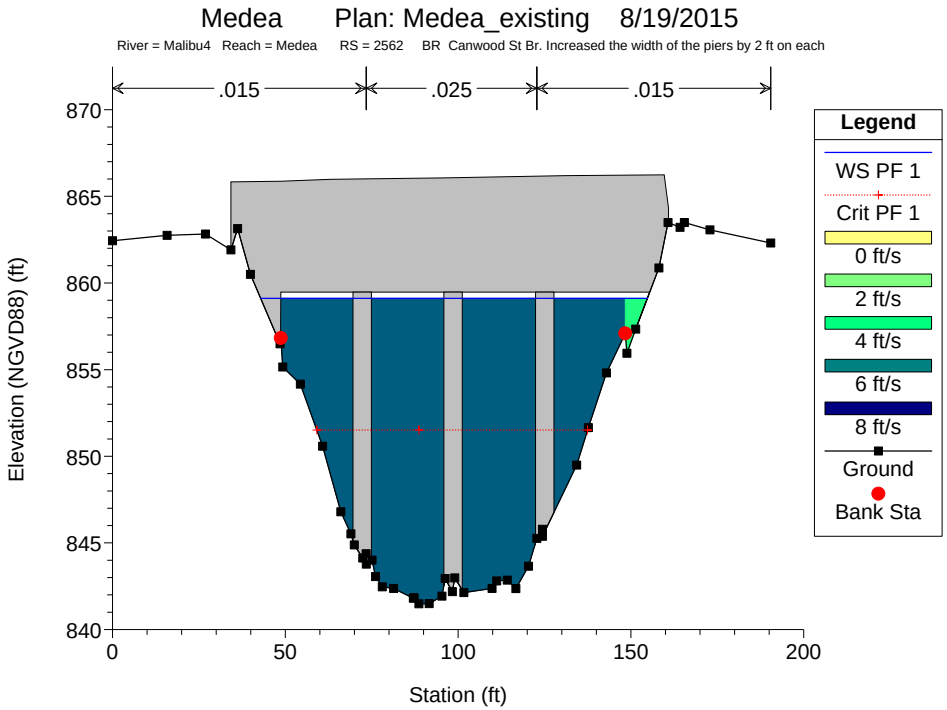

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2889
.135
.135
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
Ground
Bank Sta

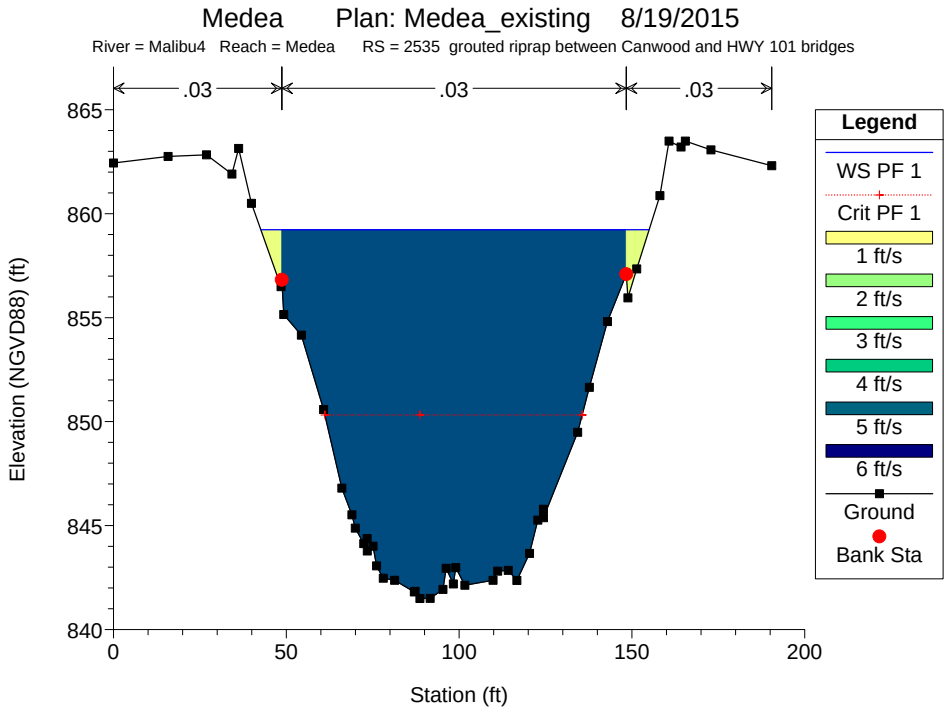

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2758
.135
.135
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
Ground
Bank Sta

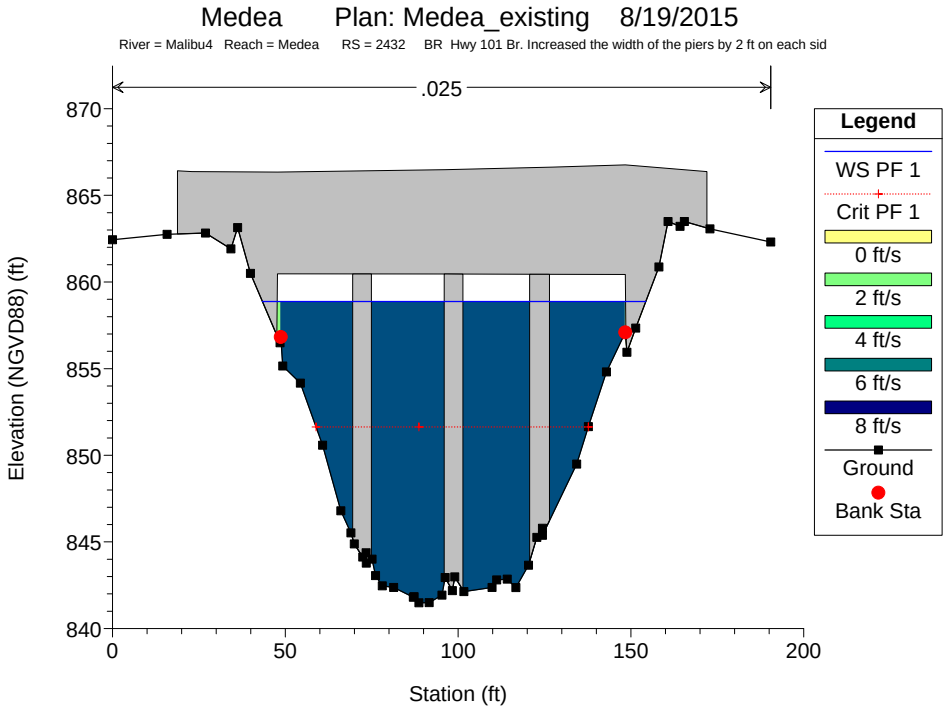

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2641
.135
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
Ground
Bank Sta

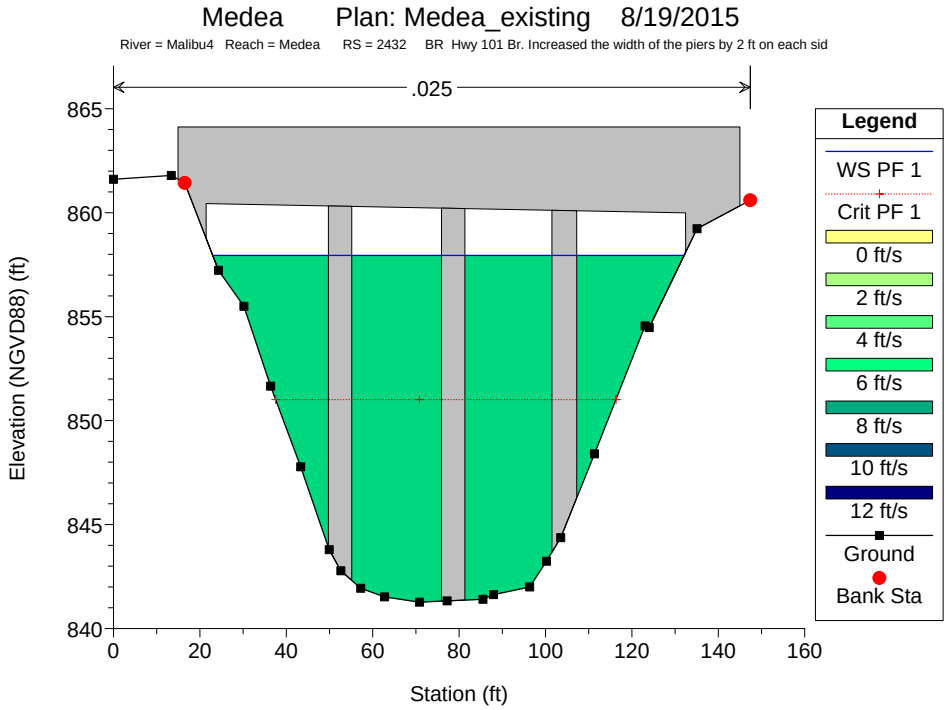

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2589 Stations 33.89, 35.63, and 106.73 are TOW survey shots. This XS
.095
.095
.095
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
Ground
Bank Sta

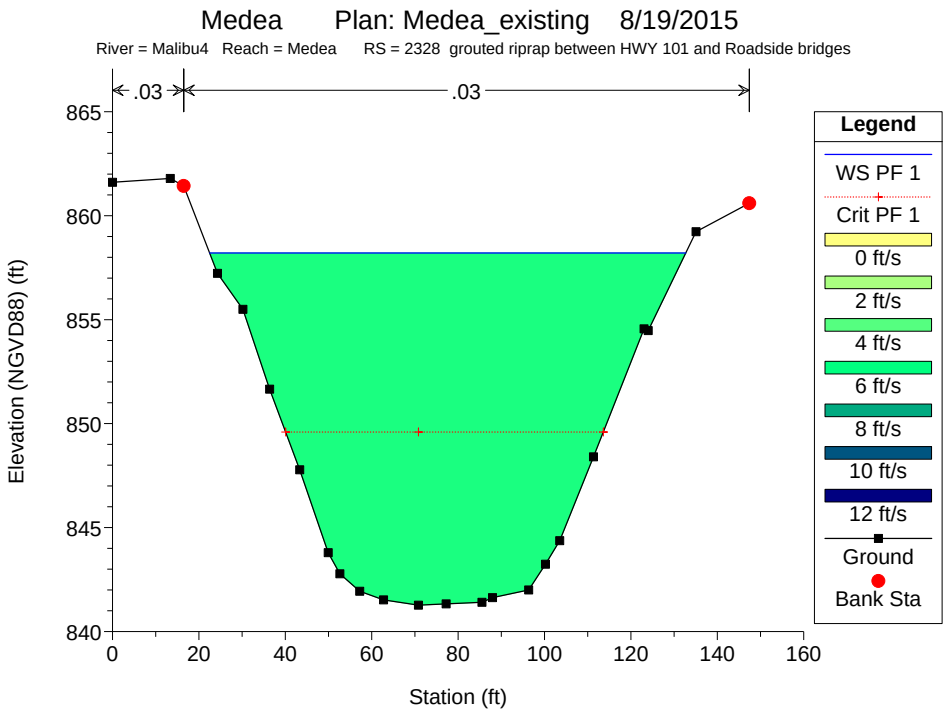

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2562 BR Canwood St Br. Increased the width of the piers by 2 ft on each
.15
.025
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

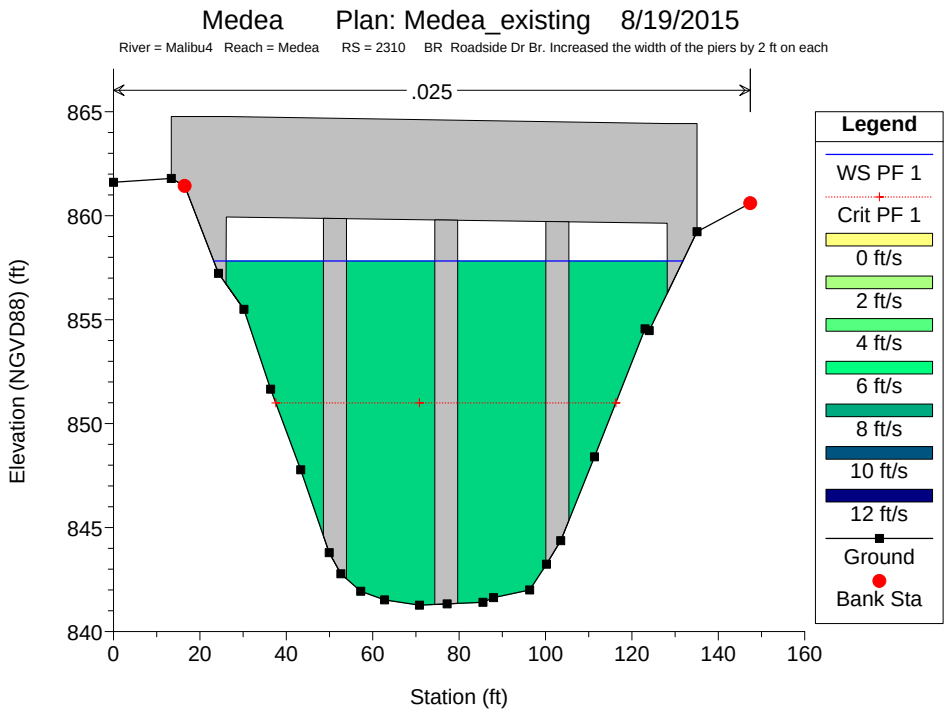

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2562 BR Canwood St Br. Increased the width of the piers by 2 ft on each
.015
.025
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

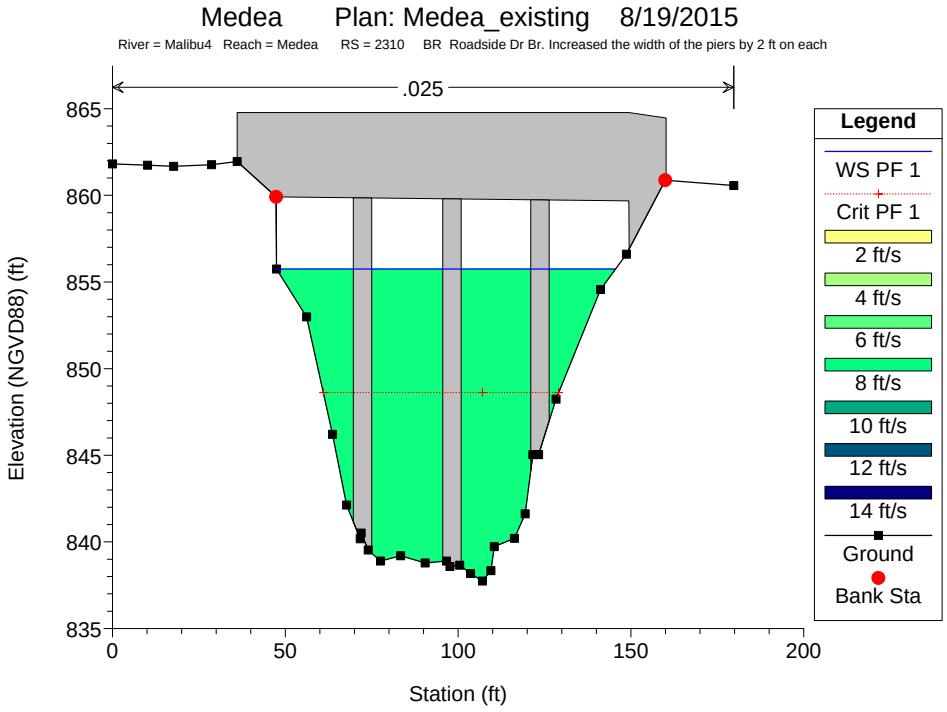

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2535 grouted riprap between Canwood and HWY 101 bridges
.03
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
Ground
Bank Sta

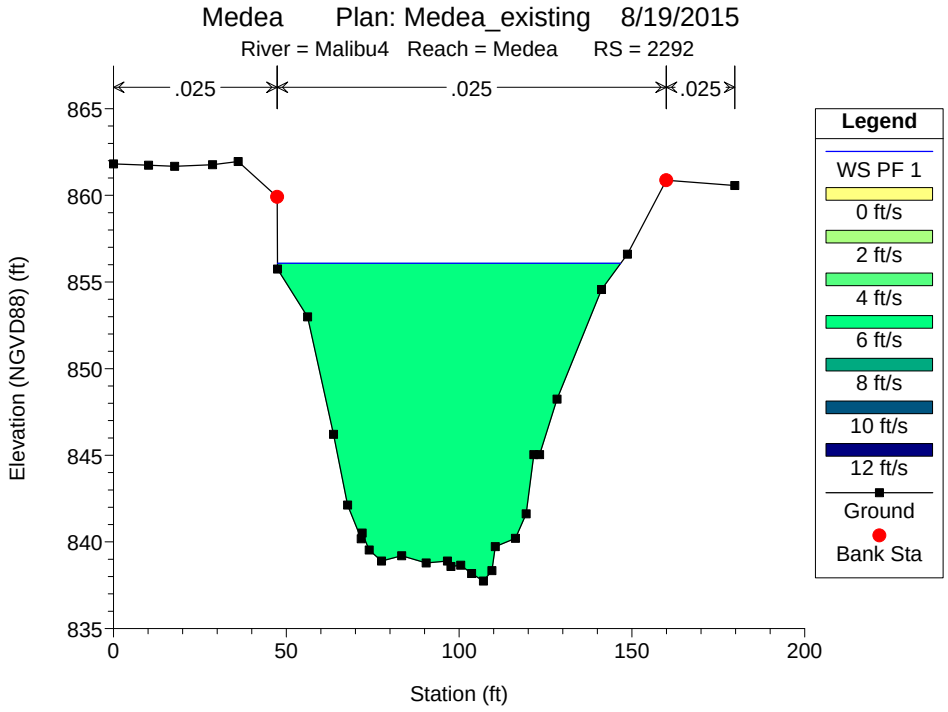

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2432 BR Hwy 101 Br. Increased the width of the piers by 2 ft on each sid
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

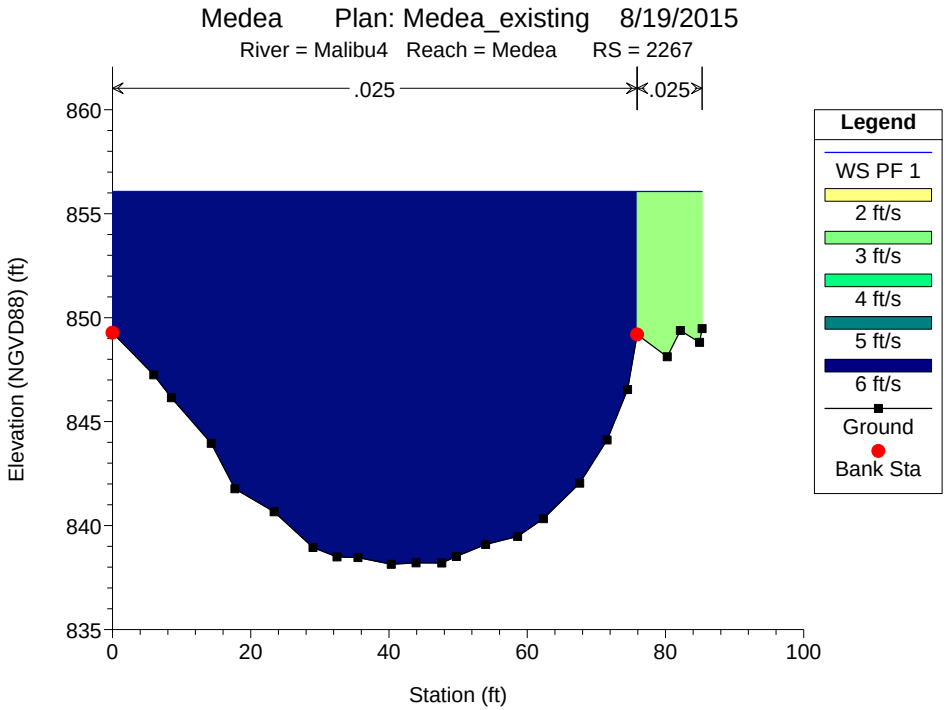

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2432 BR Hwy 101 Br. Increased the width of the piers by 2 ft on each sid
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

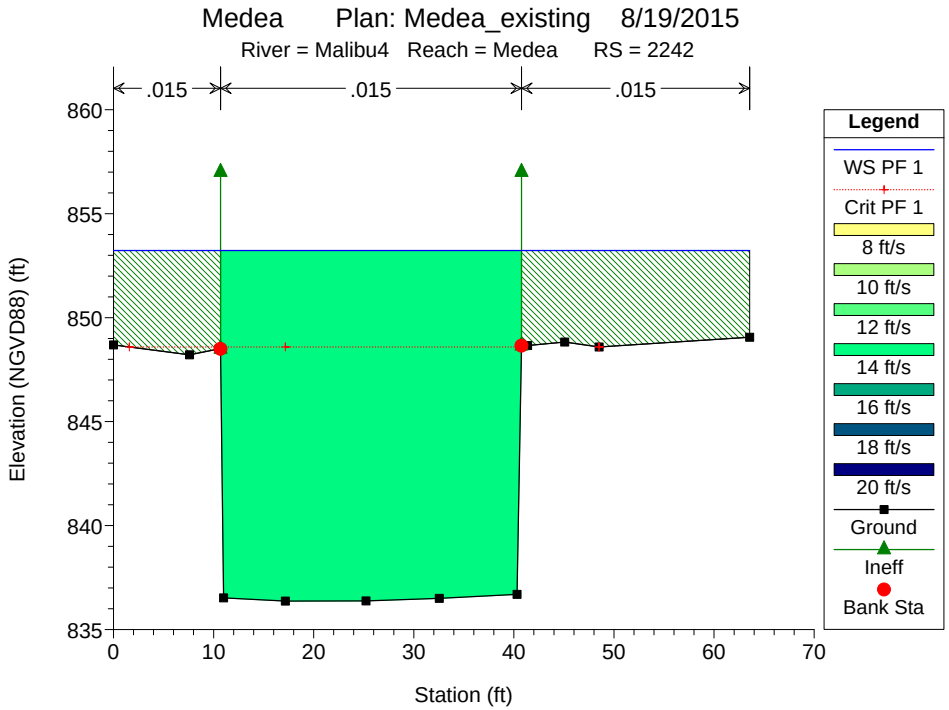

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2328 grouted riprap between HWY 101 and Roadside bridges
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

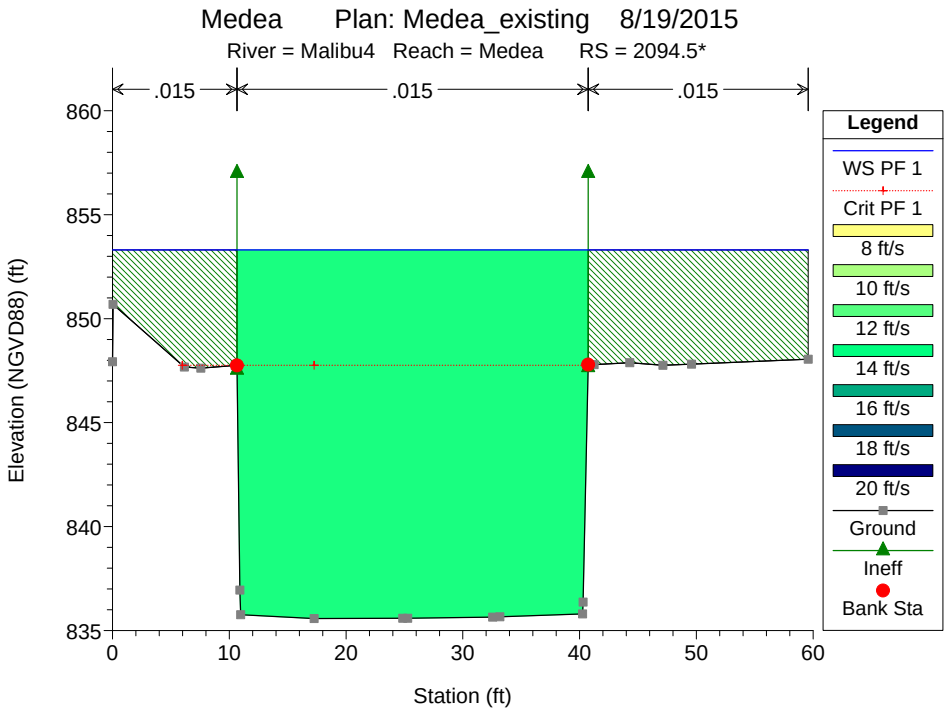

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2310 BR Roadside Dr Br. Increased the width of the piers by 2 ft on each
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

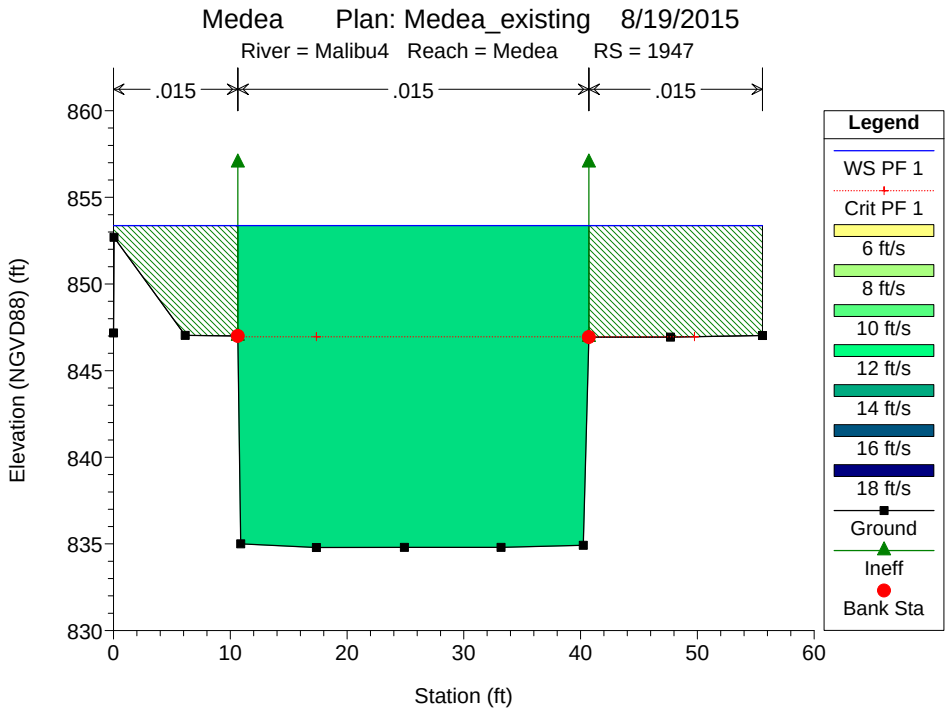

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2310 BR Roadside Dr Br. Increased the width of the piers by 2 ft on each
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

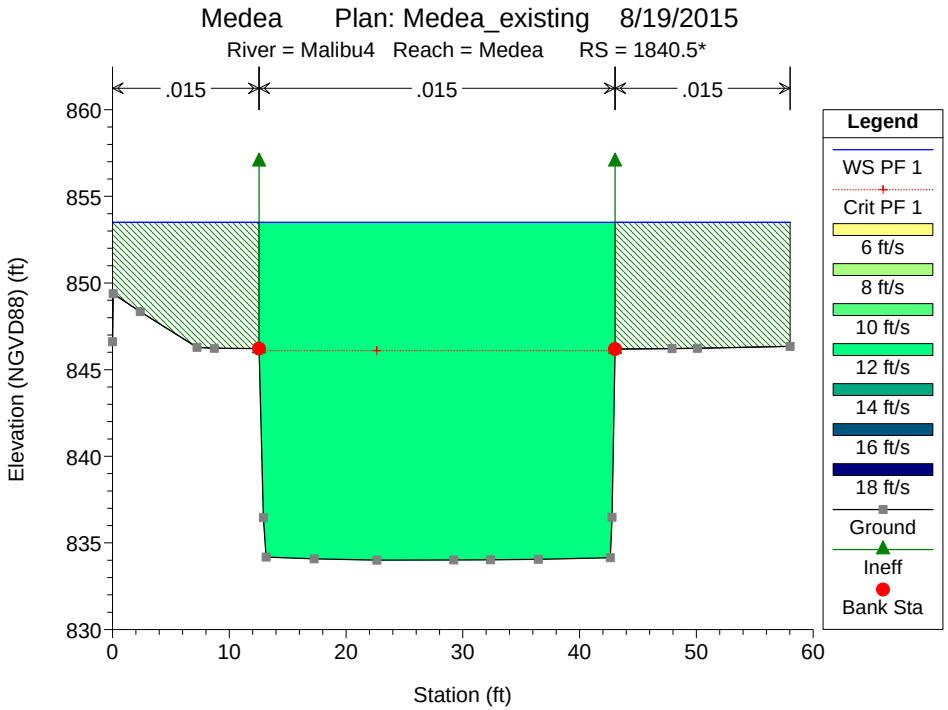

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2292
.025
.025
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

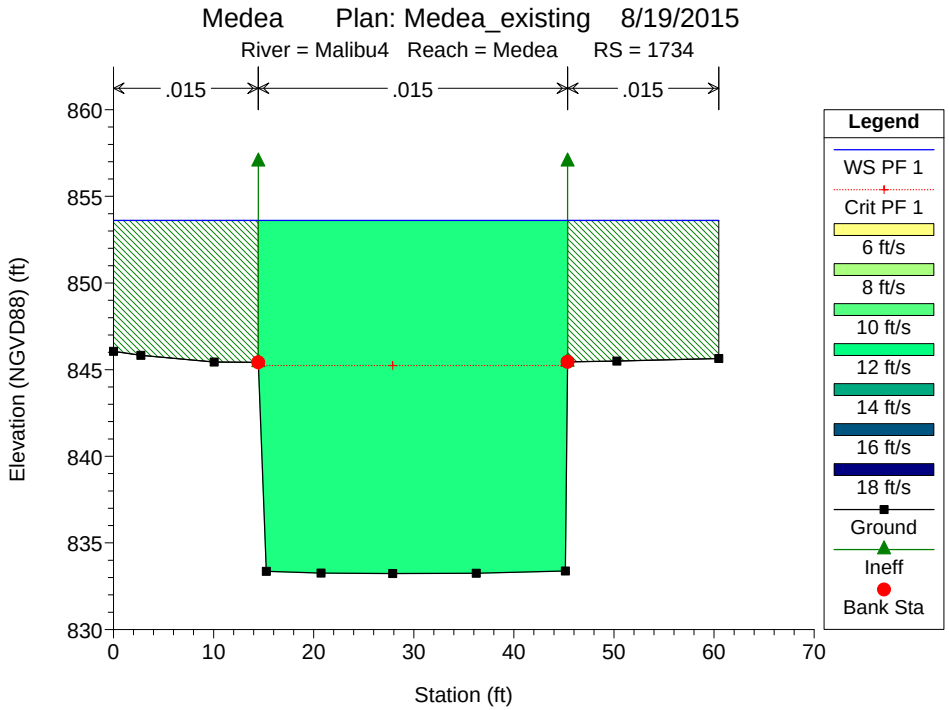

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2267
.025
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
Ground
Bank Sta

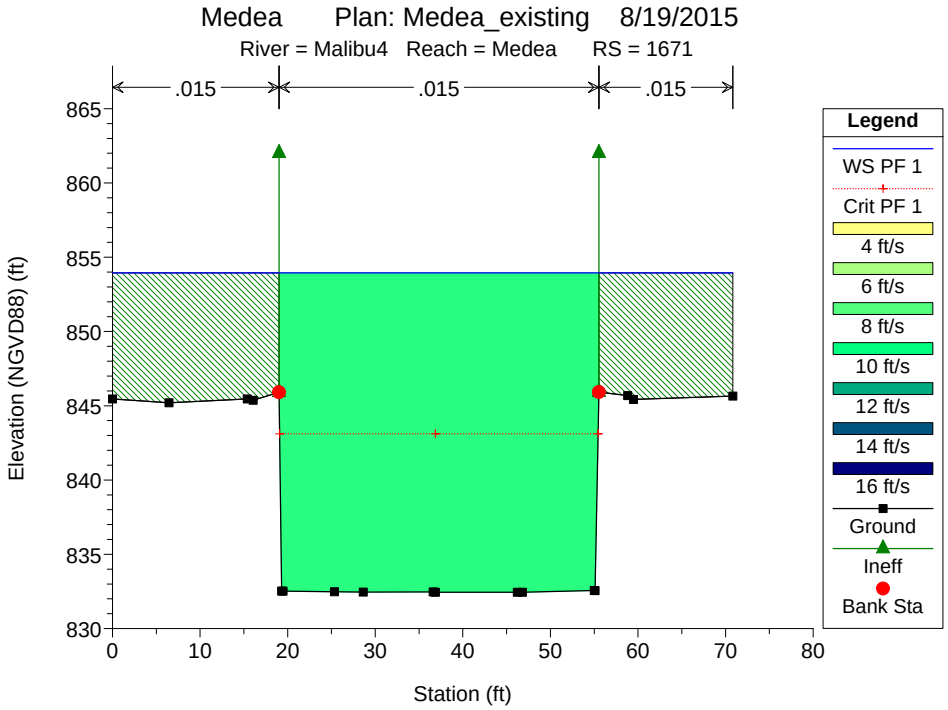

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2242
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

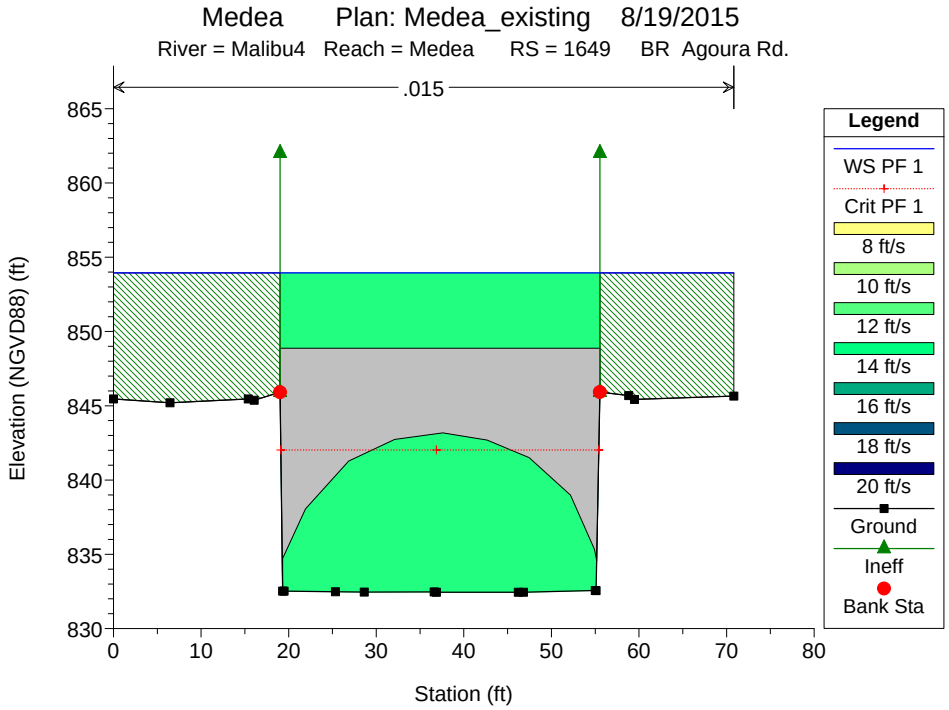

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2094.5*
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

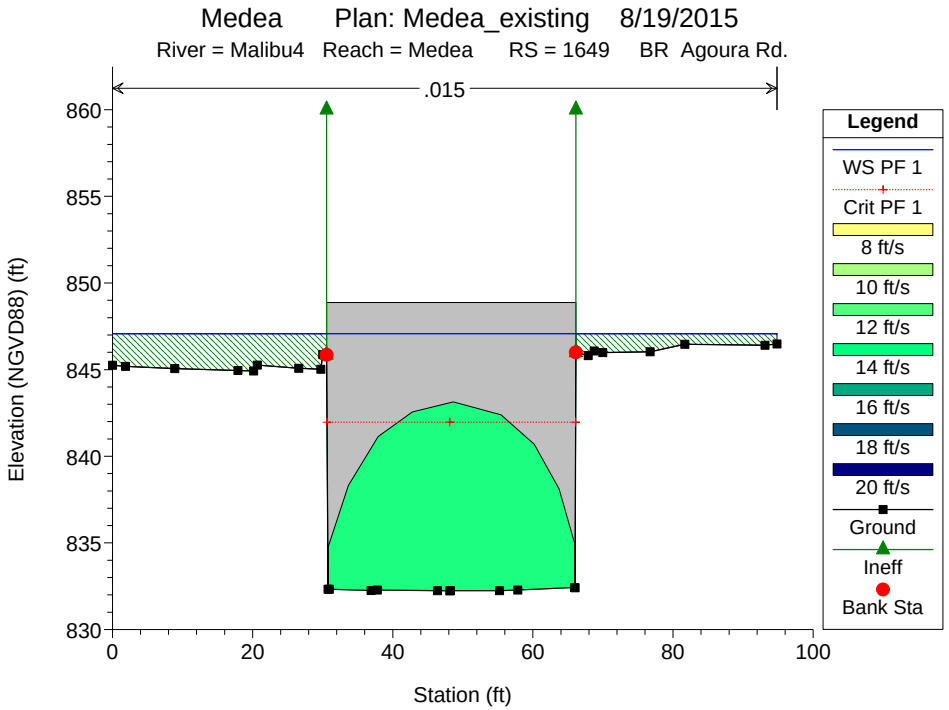

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1947
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Ineff
Bank Sta

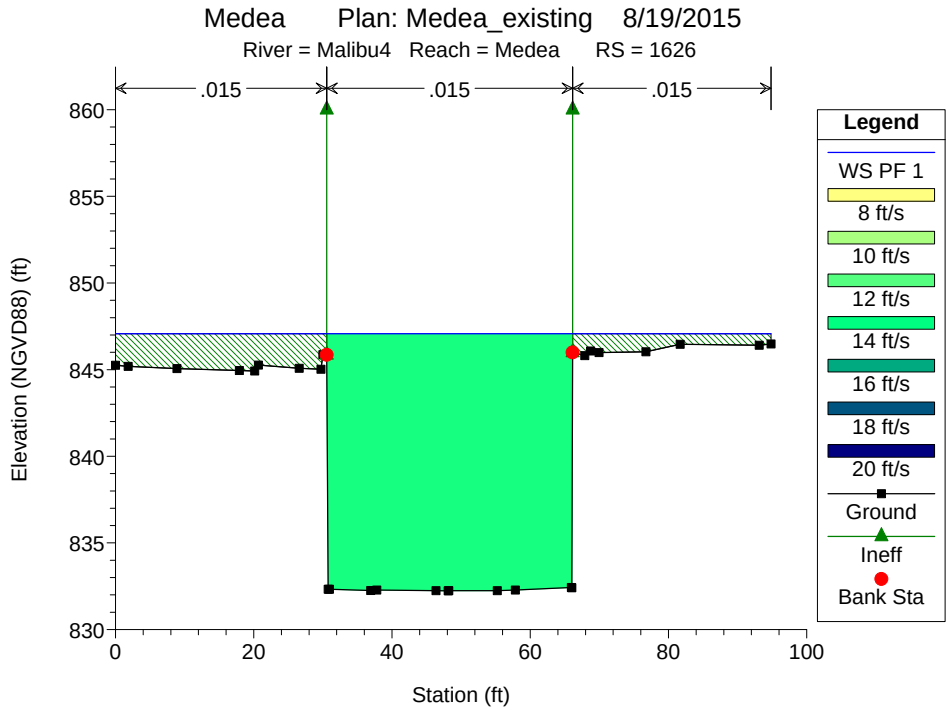

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1840.5*
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Ineff
Bank Sta

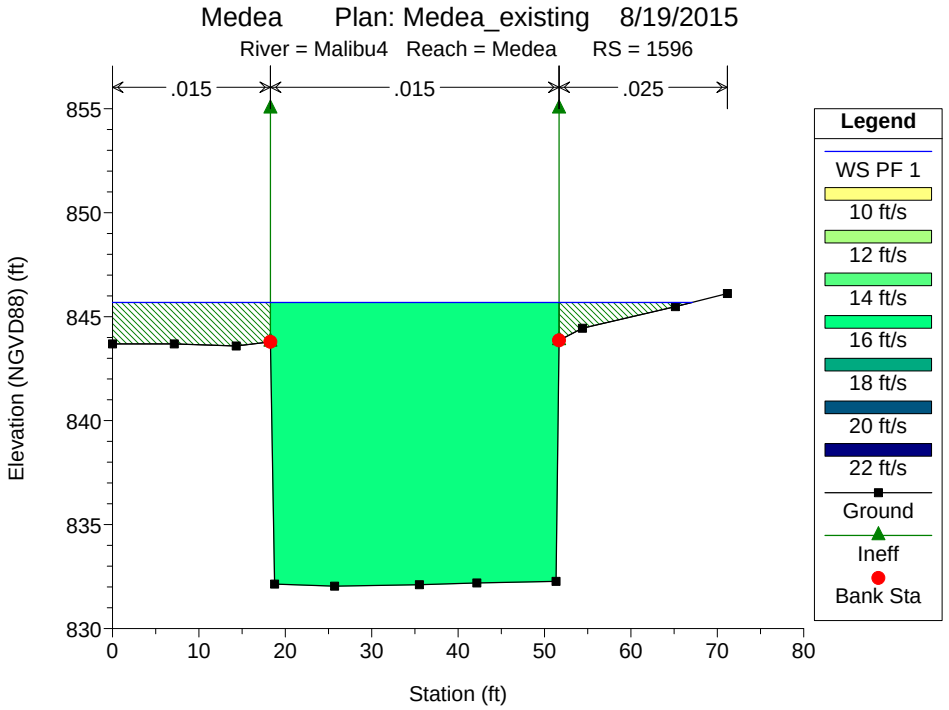

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1734
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Ineff
Bank Sta

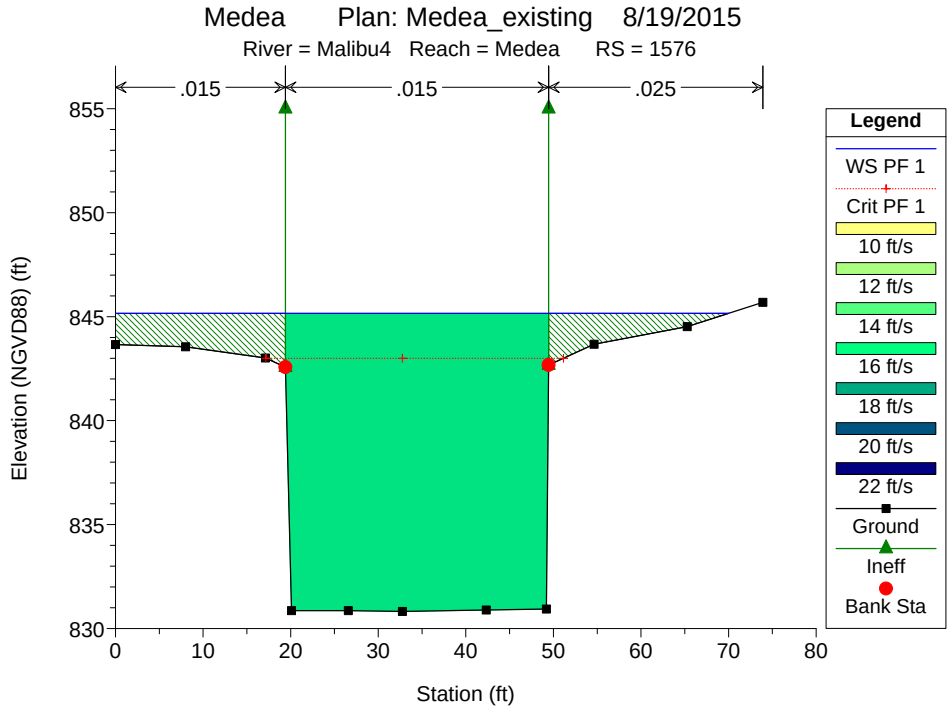

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1671
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Ineff
Bank Sta

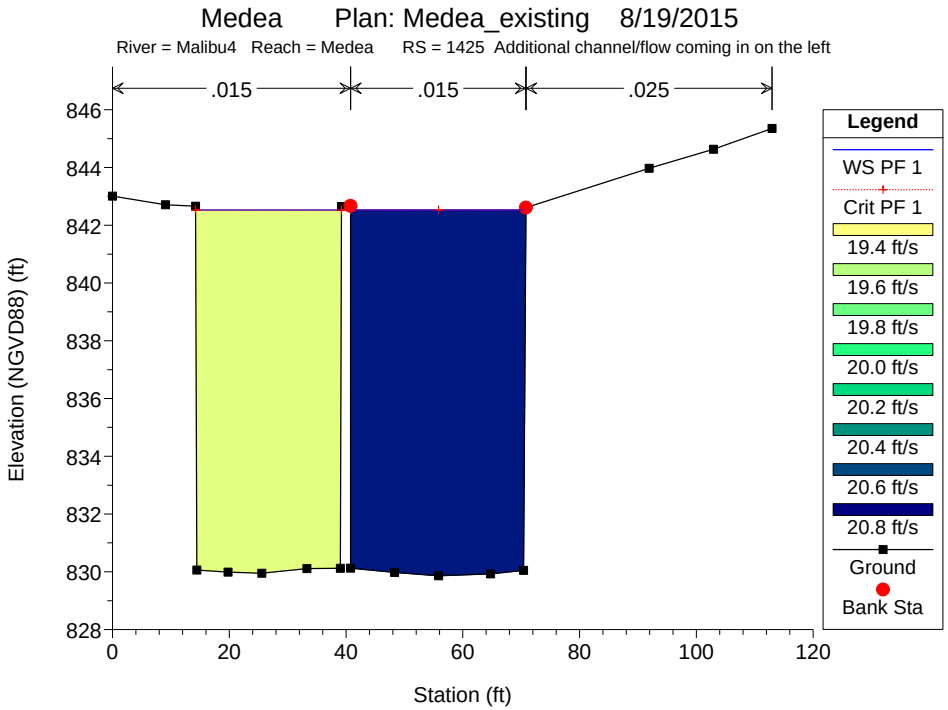

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1649 BR Agoura Rd.
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

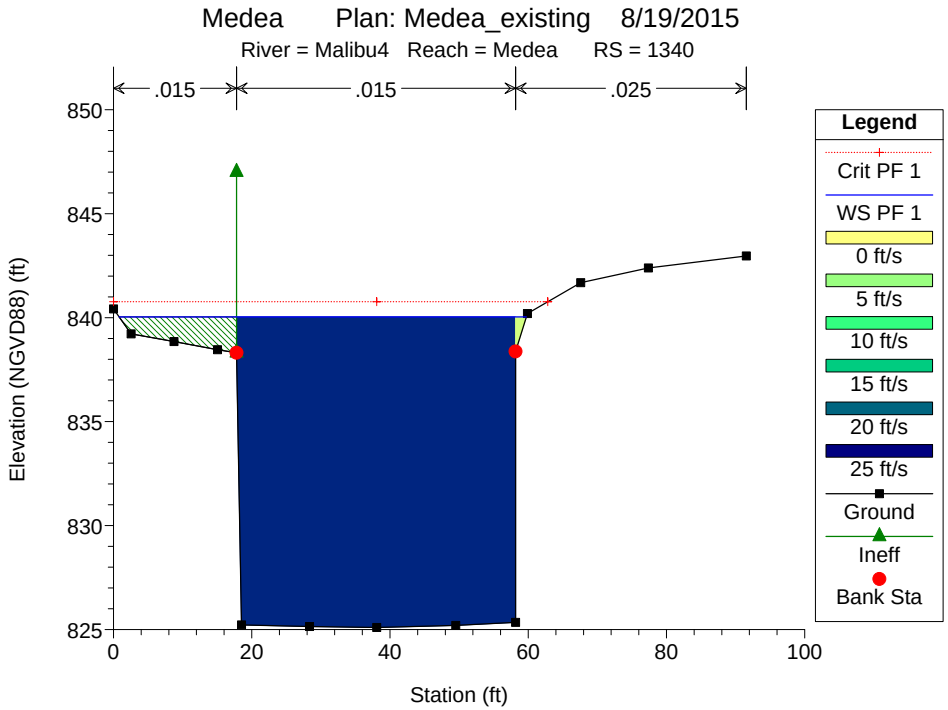

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1649 BR Agoura Rd.
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

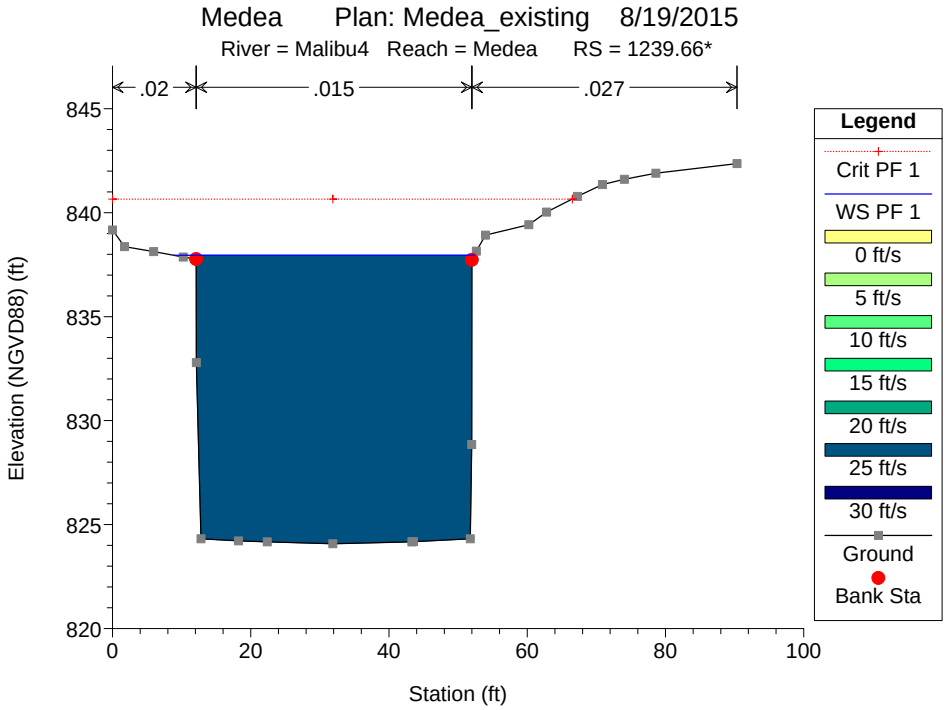

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1626
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

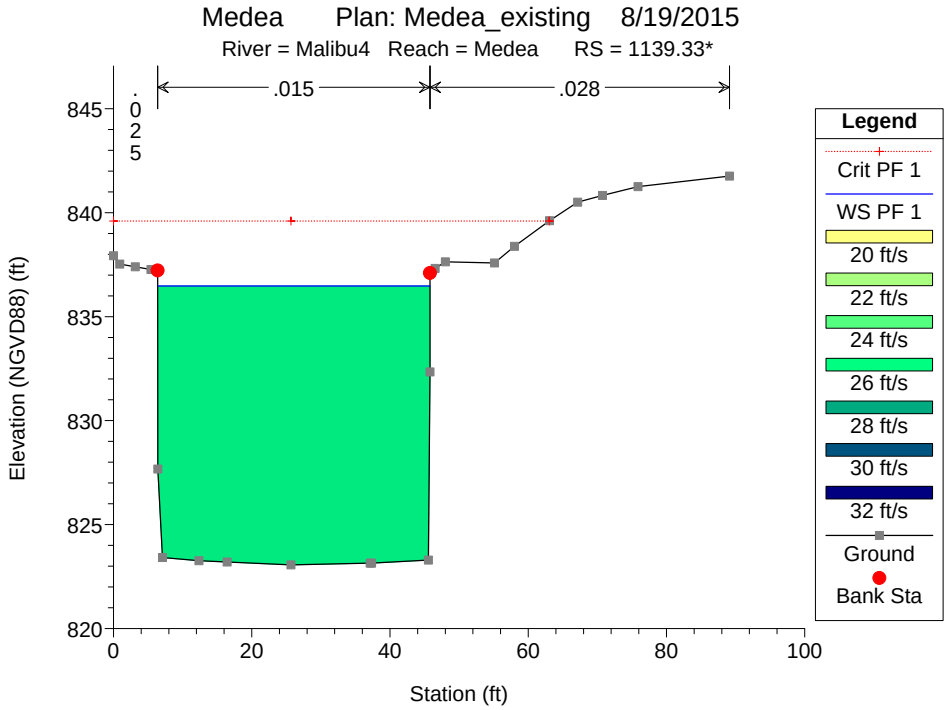

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1596
.015
.015
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Ineff
Bank Sta

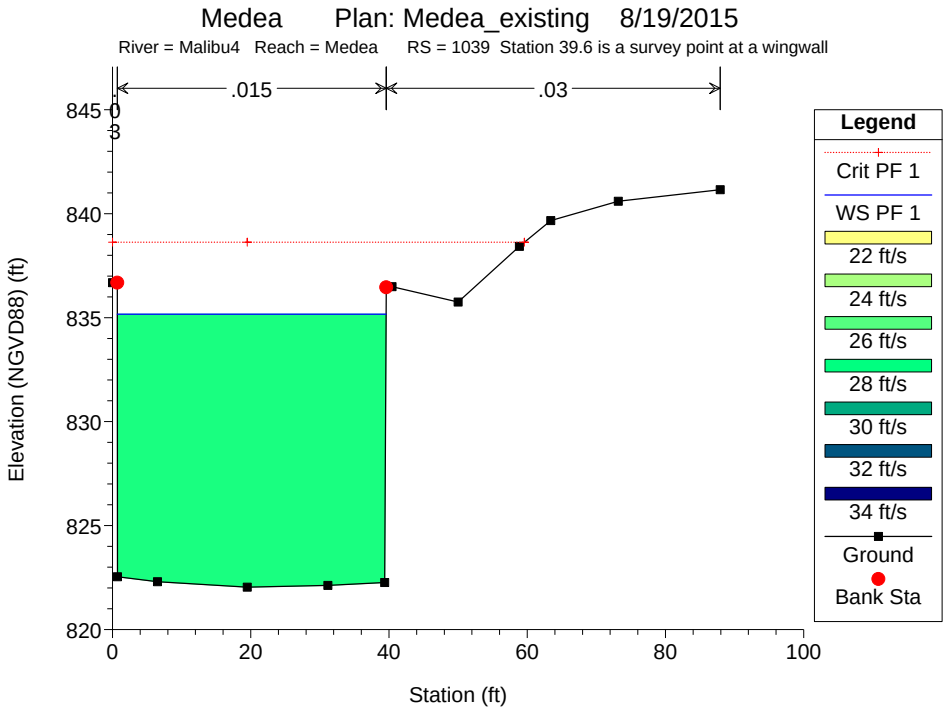

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1576
.015
.015
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Ineff
Bank Sta

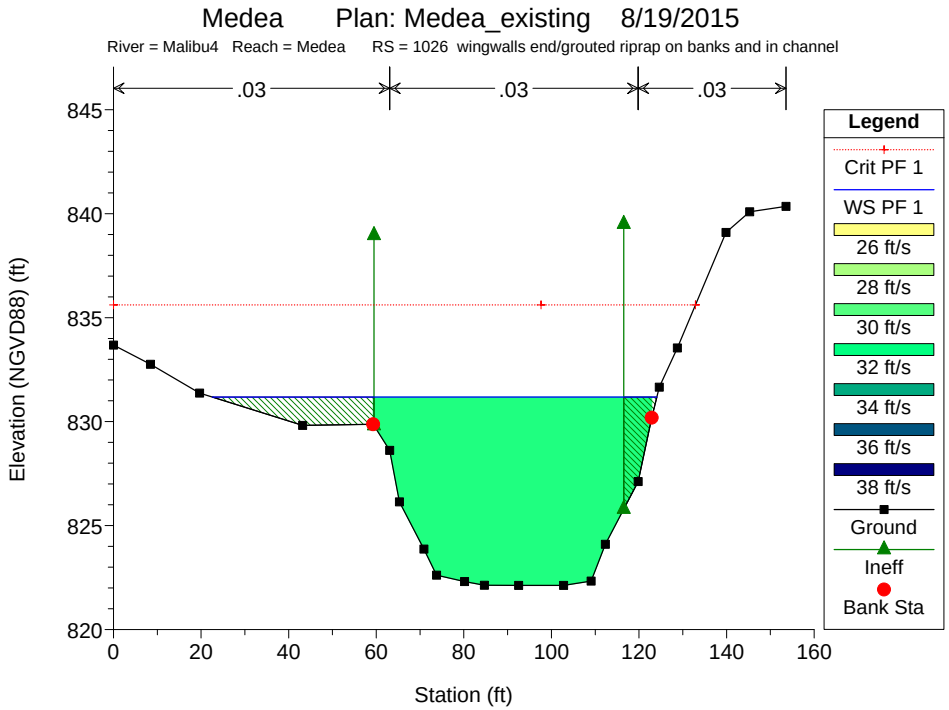

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1425 Additional channel/flow coming in on the left
.015
.015
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
19.4 ft/s
19.6 ft/s
19.8 ft/s
20.0 ft/s
20.2 ft/s
20.4 ft/s
20.6 ft/s
20.8 ft/s
Ground
Bank Sta

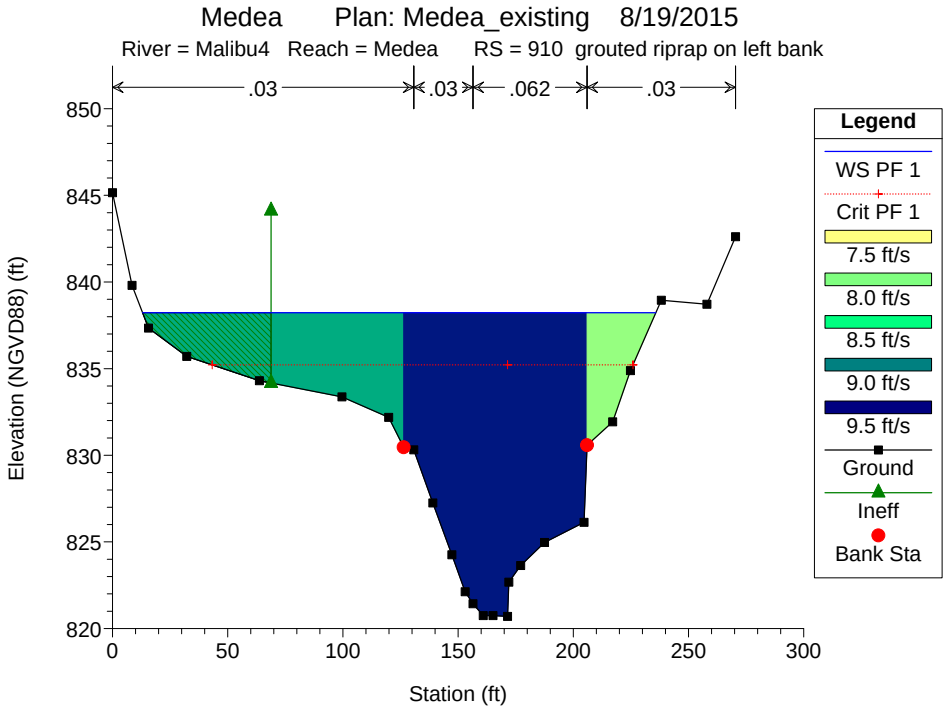

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1340
.015
.015
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
Ground
Ineff
Bank Sta

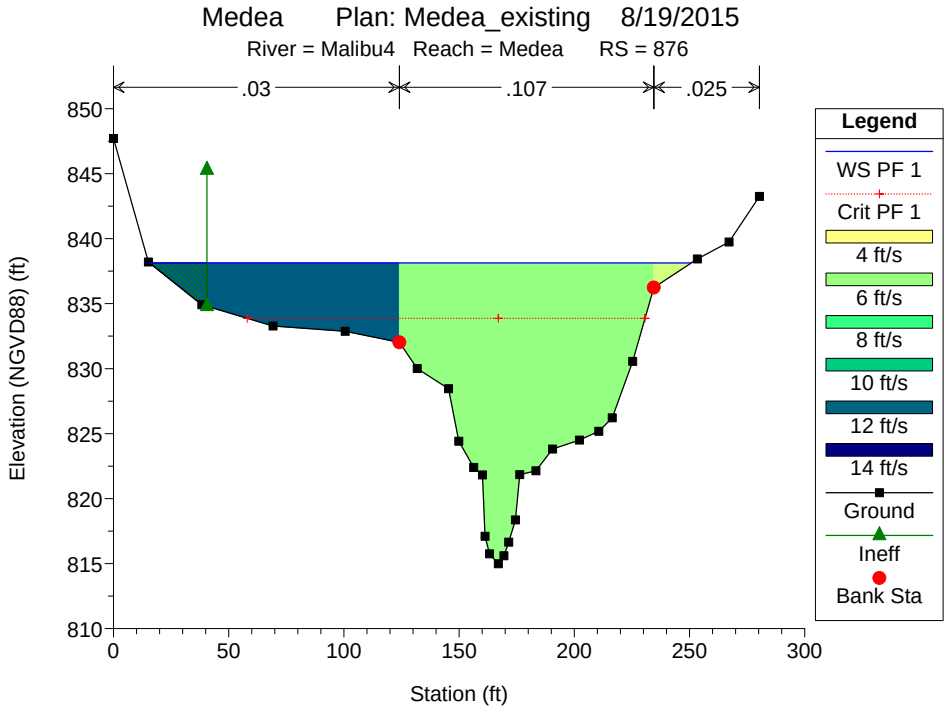

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1239.66*
.02
.015
.027
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
30 ft/s
Ground
Bank Sta

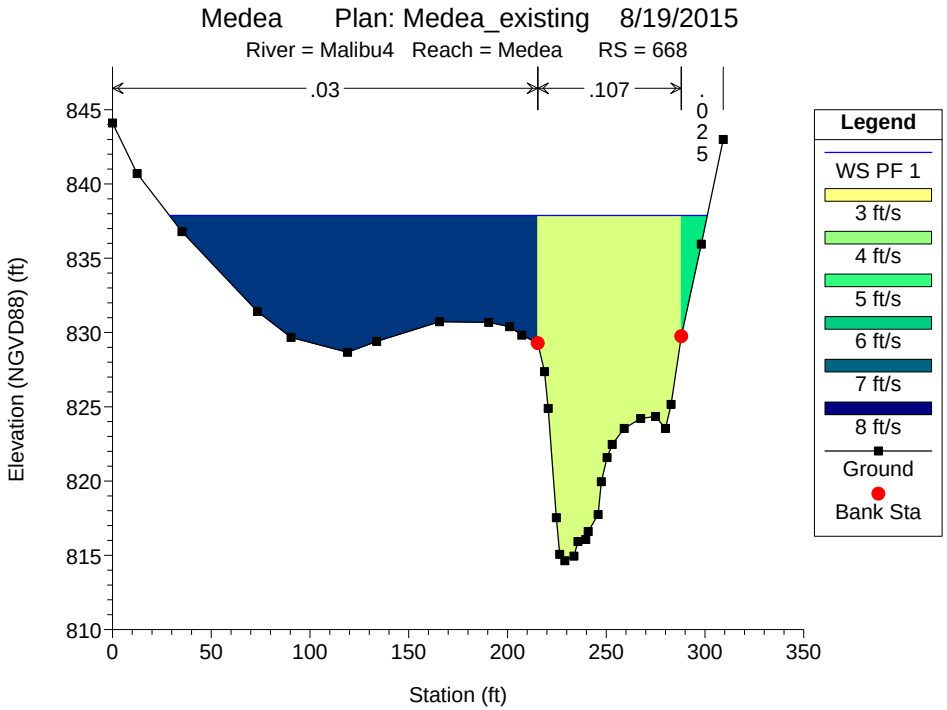

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1139.33*
.025
.015
.028
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
Ground
Bank Sta

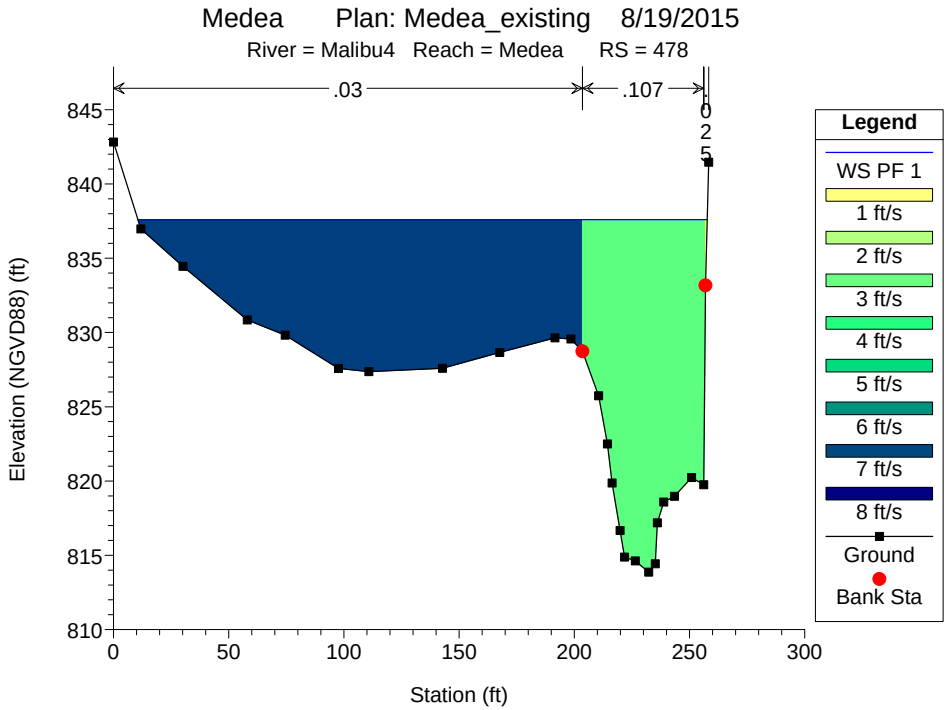

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1039 Station 39.6 is a survey point at a wingwall
.015
.03
0.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
34 ft/s
Ground
Bank Sta

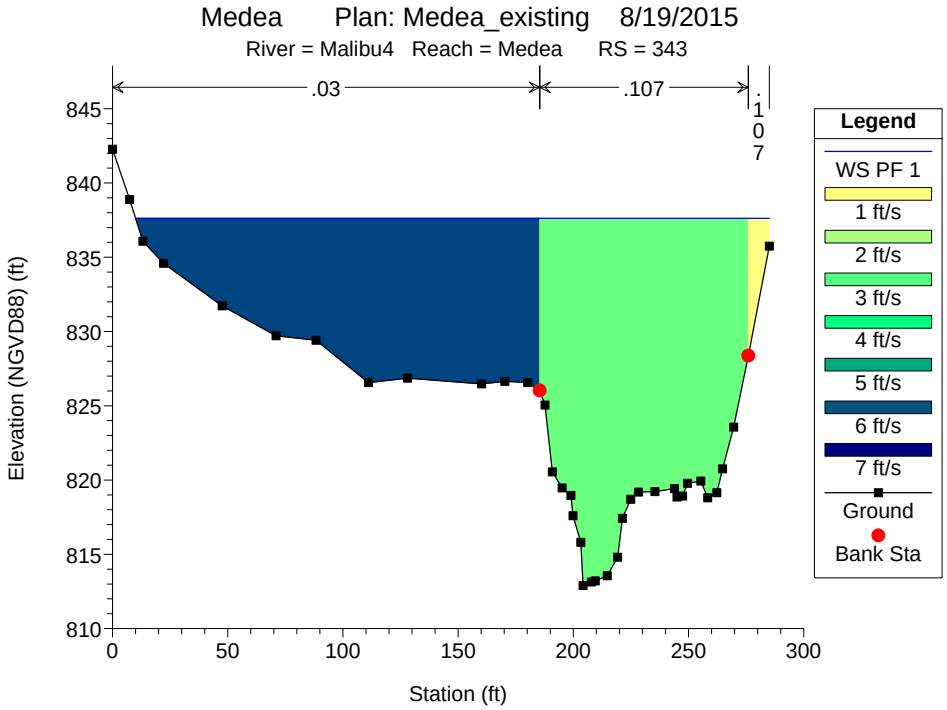

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1026 wingwalls end/grouted riprap on banks and in channel
.03
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
26 ft/s
28 ft/s
30 ft/s
32 ft/s
34 ft/s
36 ft/s
38 ft/s
Ground
Ineff
Bank Sta

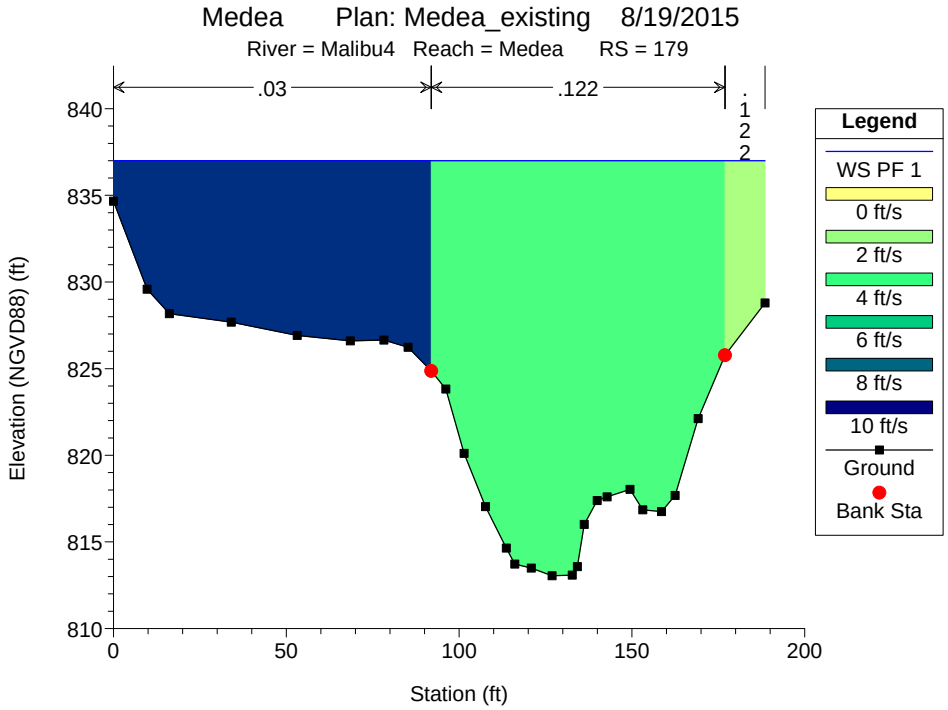

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 910 grouted riprap on left bank
.03
.03
.062
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
7.5 ft/s
8.0 ft/s
8.5 ft/s
9.0 ft/s
9.5 ft/s
Ground
Ineff
Bank Sta

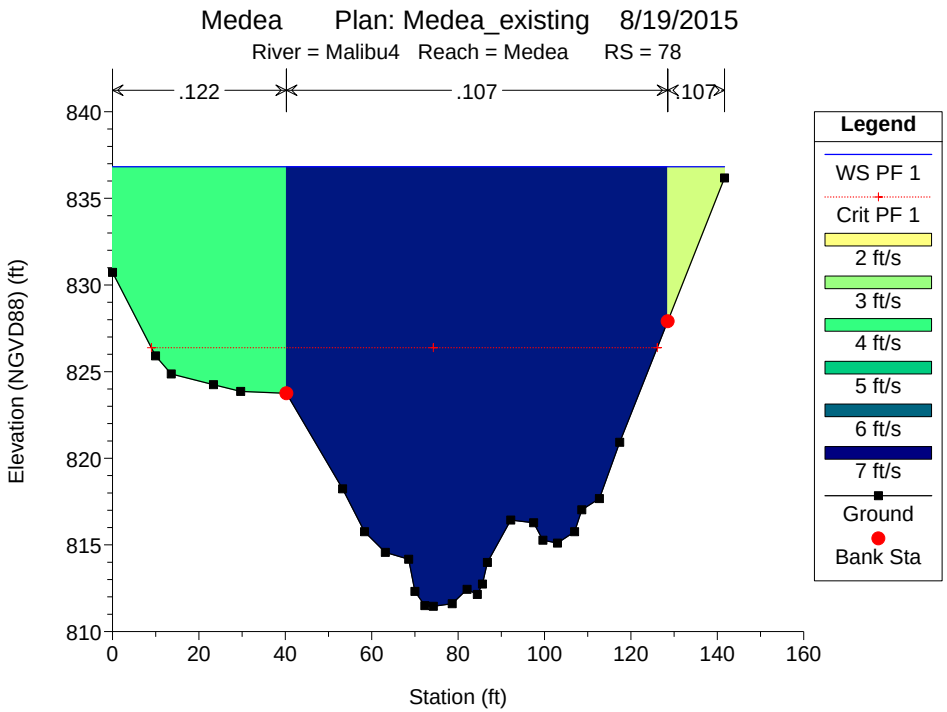

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 876
.03
.107
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Ineff
Bank Sta


Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 668
.03
.107
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
Ground
Bank Sta


Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 478
.03
.107
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
Ground
Bank Sta

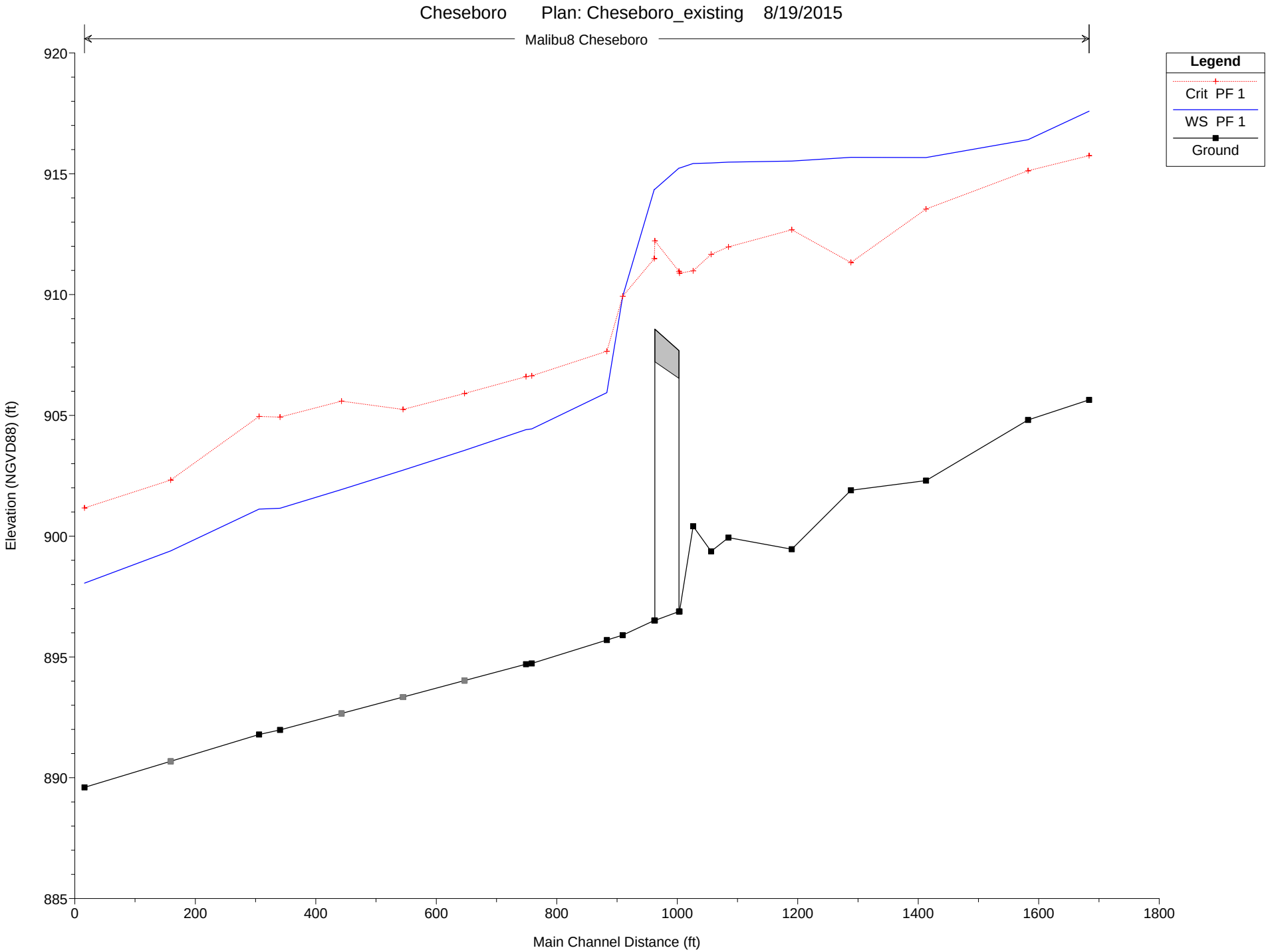

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 343
.03
.107
.107
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta


Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 179
.03
.122
.122
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta


Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 78
.122
.107
107
Elevation (NGVD88) (ft)
840
835
830
825
820
815
810
0
20
40
60
80
100
120
140
160
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta

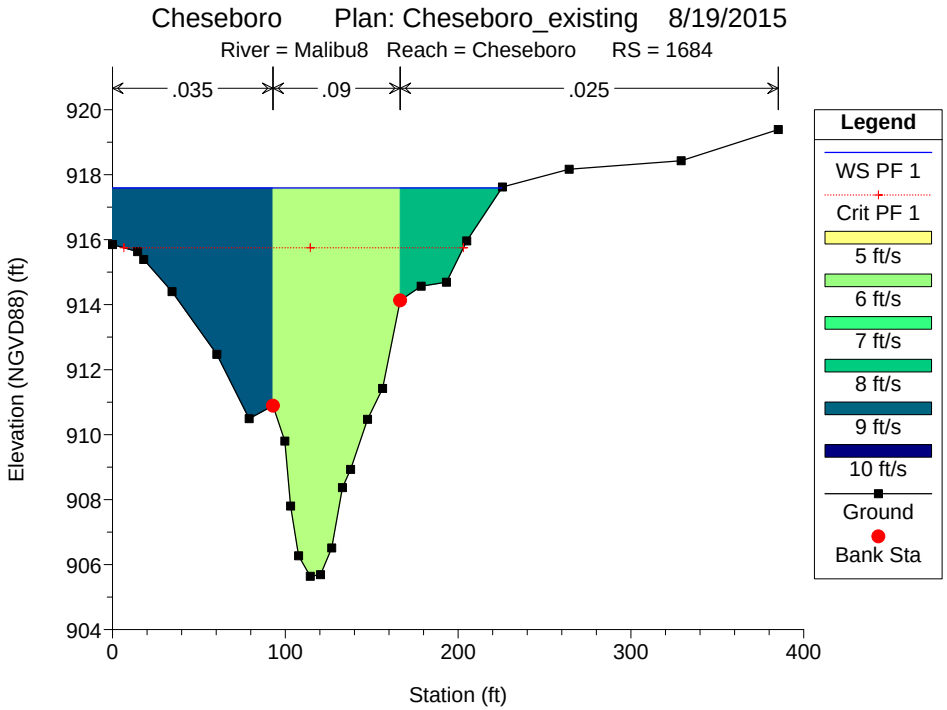
CHESEBORO CREEK MAIN CHANNEL INLET

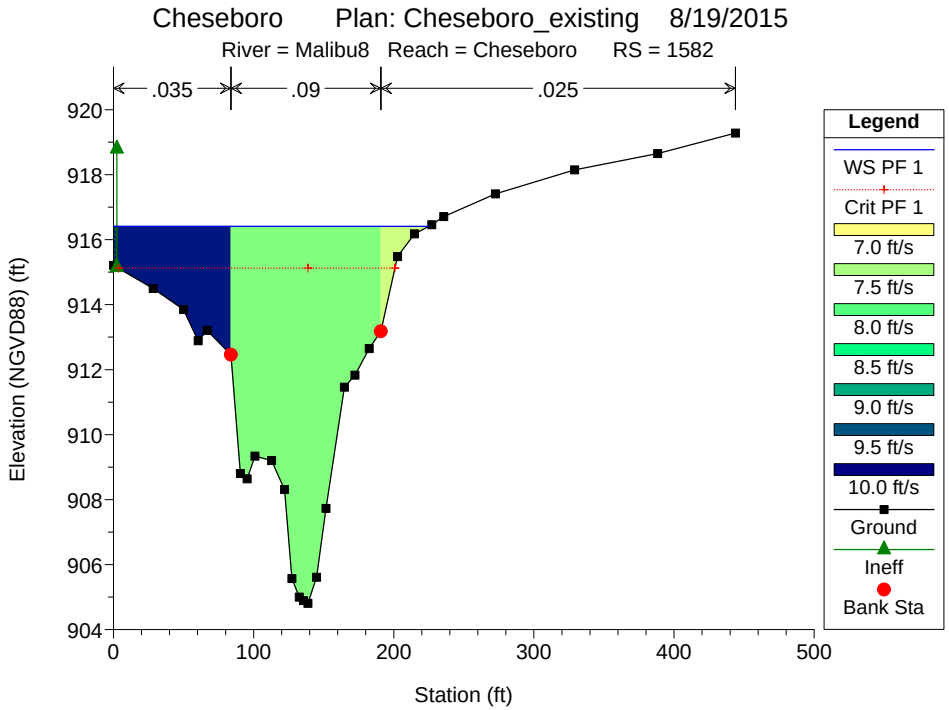

1684
1582
1413
1190
1085
1026
1004
962
758
646.75*
544.5*
442.25*
340
159
16

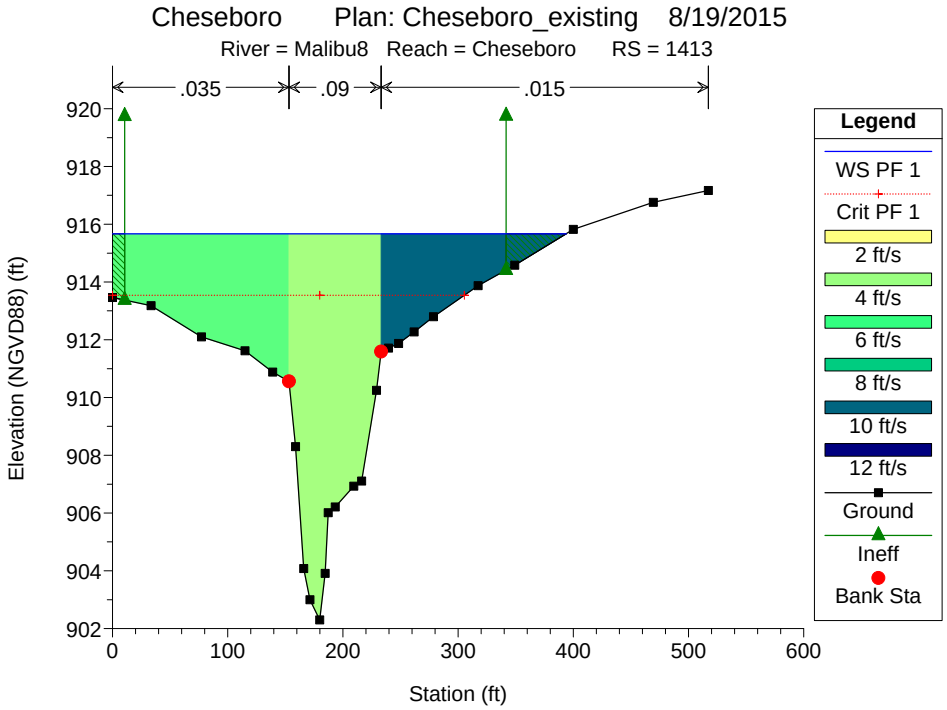

Cheseboro Plan: Cheseboro_existing 8/19/2015
Malibu8 Cheseboro
Legend
Crit PF 1
WS PF 1
Ground
Elevation (NGVD88) (ft)
Main Channel Distance (ft)
920
915
910
905
900
895
890
885
0
200
400
600
800
1000
1200
1400
1600
1800

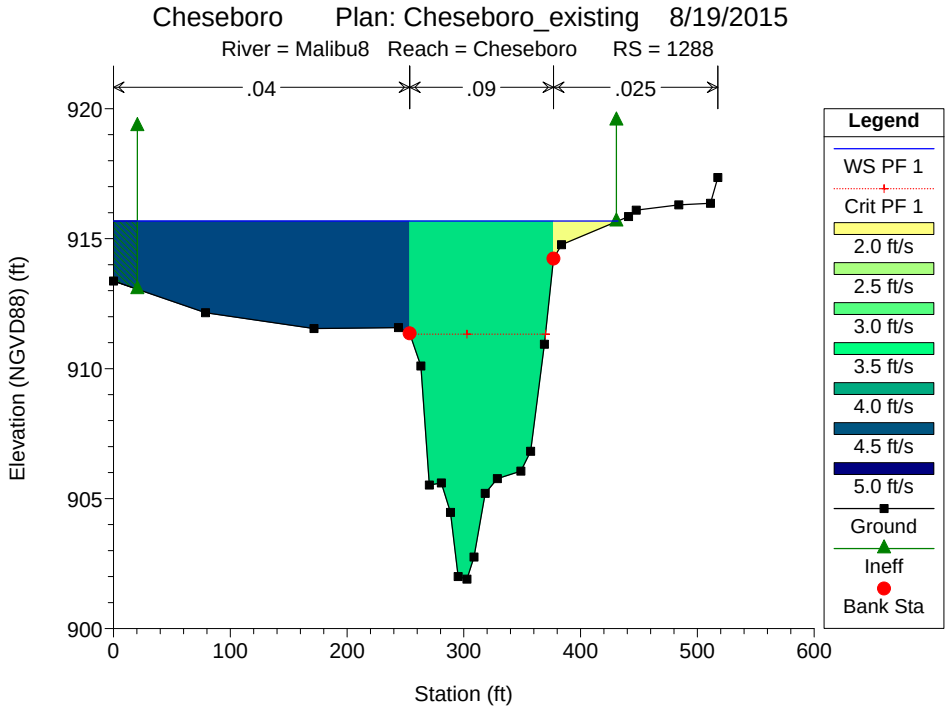
HEC-RAS Plan: Cheseboro_exist River: Malibu8 Reach: Cheseboro Profile: PF 1

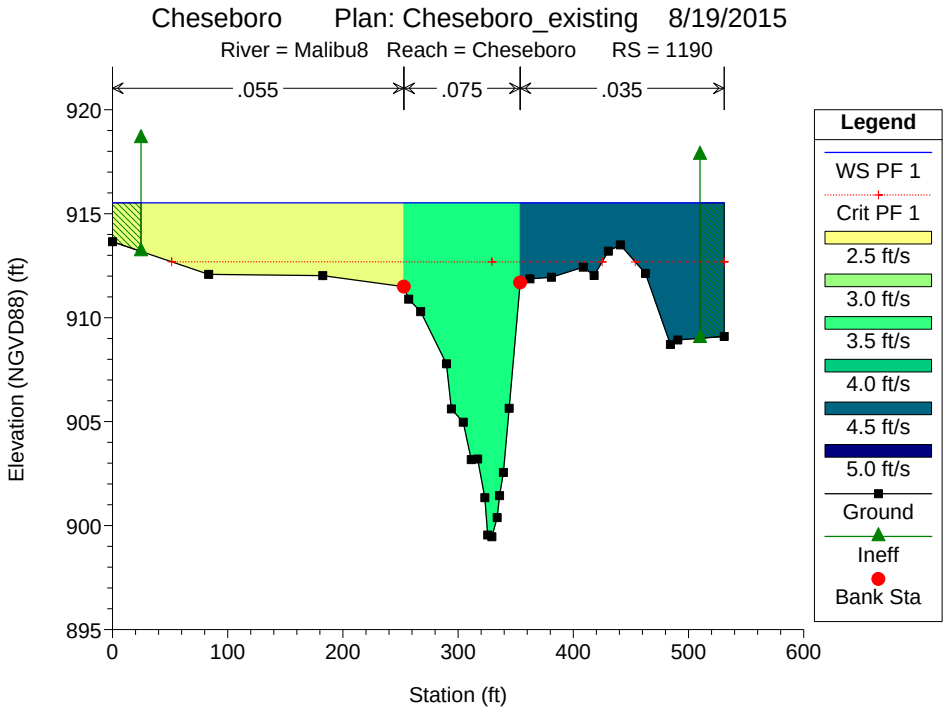
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Cheseboro	1684	PF 1	8310.00	905.64	917.59	915.75	918.51	0.006893	5.71	1163.08	225.34	0.34
Cheseboro	1582	PF 1	8310.00	904.81	916.41	915.13	917.48	0.015938	7.73	1020.19	224.92	0.50
Cheseboro	1413	PF 1	8310.00	902.30	915.67	913.54	916.42	0.002787	3.74	1535.74	393.83	0.22
Cheseboro	1288	PF 1	8310.00	901.90	915.68	911.33	915.95	0.002610	3.68	2058.73	432.05	0.21
Cheseboro	1190	PF 1	8310.00	899.46	915.53	912.68	915.74	0.001803	3.64	2354.79	530.91	0.21
Cheseboro	1085	PF 1	8310.00	899.94	915.48	911.97	915.65	0.000406	3.23	2550.73	526.13	0.18
Cheseboro	1056	PF 1	8310.00	899.37	915.45	911.66	915.64	0.000474	3.75	2413.81	453.59	0.19
Cheseboro	1026	PF 1	8310.00	900.41	915.42	910.98	915.63	0.000164	4.33	2528.27	477.73	0.22
Cheseboro	1004	PF 1	8310.00	896.88	915.24	910.89	915.58	0.000158	6.01	1965.82	346.57	0.25
Cheseboro	981		Bridge									
Cheseboro	962	PF 1	8310.00	896.51	914.36	911.49	915.50	0.000426	9.80	1138.96	161.40	0.42
Cheseboro	909	PF 1	8310.00	895.90	909.93	909.93	914.44	0.001841	17.67	525.55	72.07	0.83
Cheseboro	883	PF 1	8310.00	895.70	905.94	907.65	914.01	0.004152	22.80	364.46	62.51	1.26
Cheseboro	758	PF 1	8310.00	894.73	904.44	906.64	913.37	0.004913	23.98	346.48	45.00	1.37
Cheseboro	749	PF 1	8310.00	894.70	904.41	906.60	913.32	0.004994	23.96	346.77	39.99	1.37
Cheseboro	646.75*	PF 1	8310.00	894.02	903.55	905.91	912.77	0.005200	24.37	341.01	36.39	1.40
Cheseboro	544.5*	PF 1	8310.00	893.34	902.73	905.25	912.21	0.005409	24.70	336.43	36.52	1.43
Cheseboro	442.25*	PF 1	8310.00	892.66	901.93	905.59	911.63	0.005604	24.99	332.53	36.63	1.46
Cheseboro	340	PF 1	8310.00	891.98	901.15	904.93	911.03	0.005789	25.22	329.49	36.74	1.48
Cheseboro	306	PF 1	8310.00	891.79	901.12	904.96	910.76	0.005603	24.92	333.43	36.22	1.45
Cheseboro	159*	PF 1	8310.00	890.68	899.39	902.32	909.81	0.006382	25.90	320.81	39.90	1.61
Cheseboro	16	PF 1	8310.00	889.60	898.06	901.17	908.78	0.007586	26.28	316.22	43.72	1.72

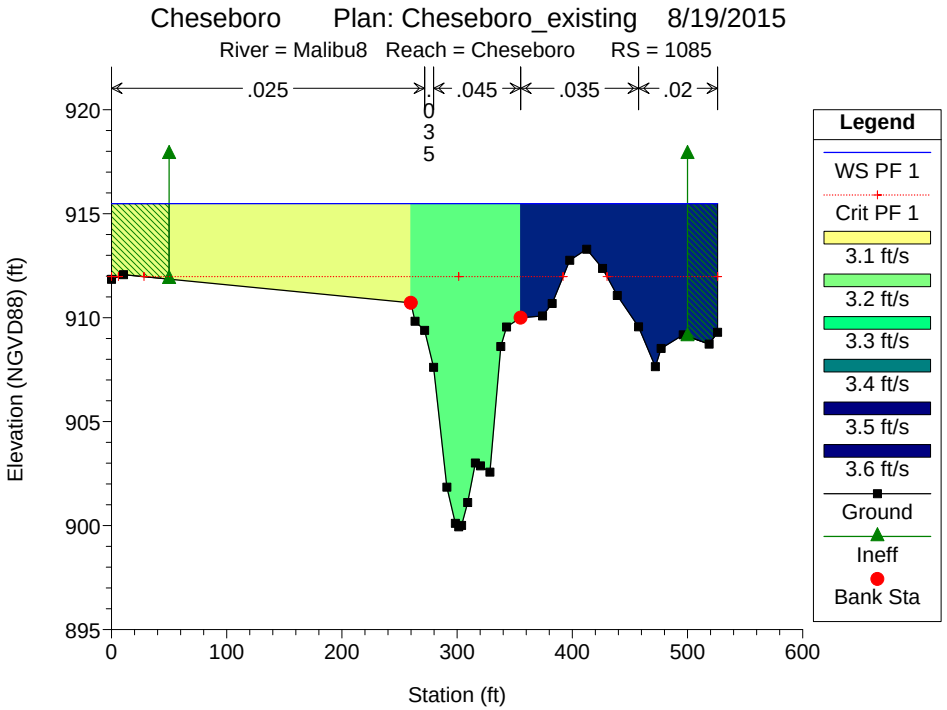

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1684
.035
.09
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

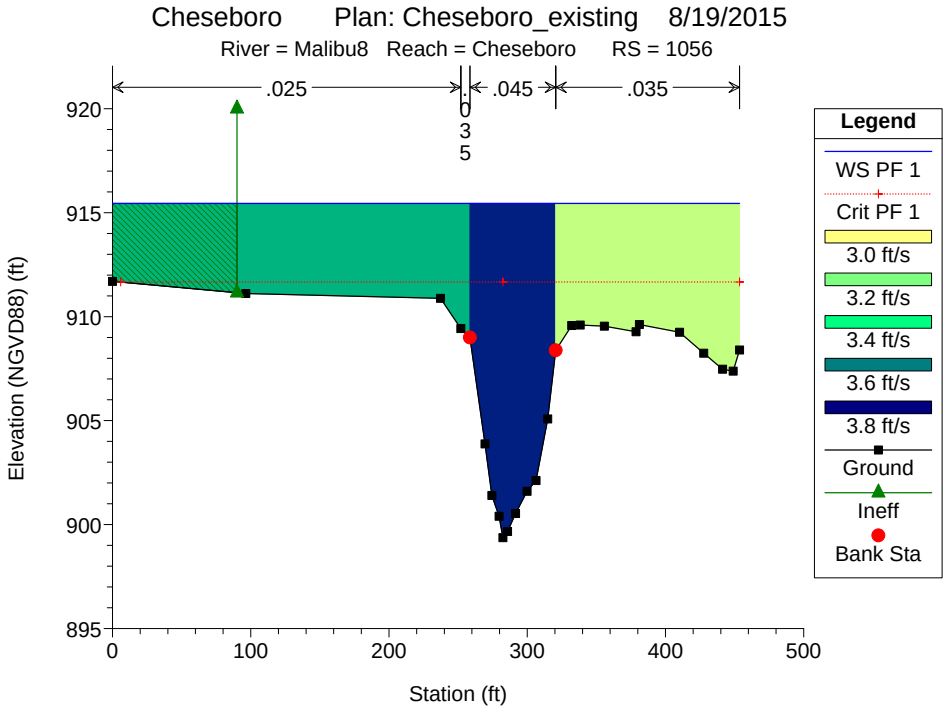

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1582
.035
.09
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
7.0 ft/s
7.5 ft/s
8.0 ft/s
8.5 ft/s
9.0 ft/s
9.5 ft/s
10.0 ft/s
Ground
Ineff
Bank Sta

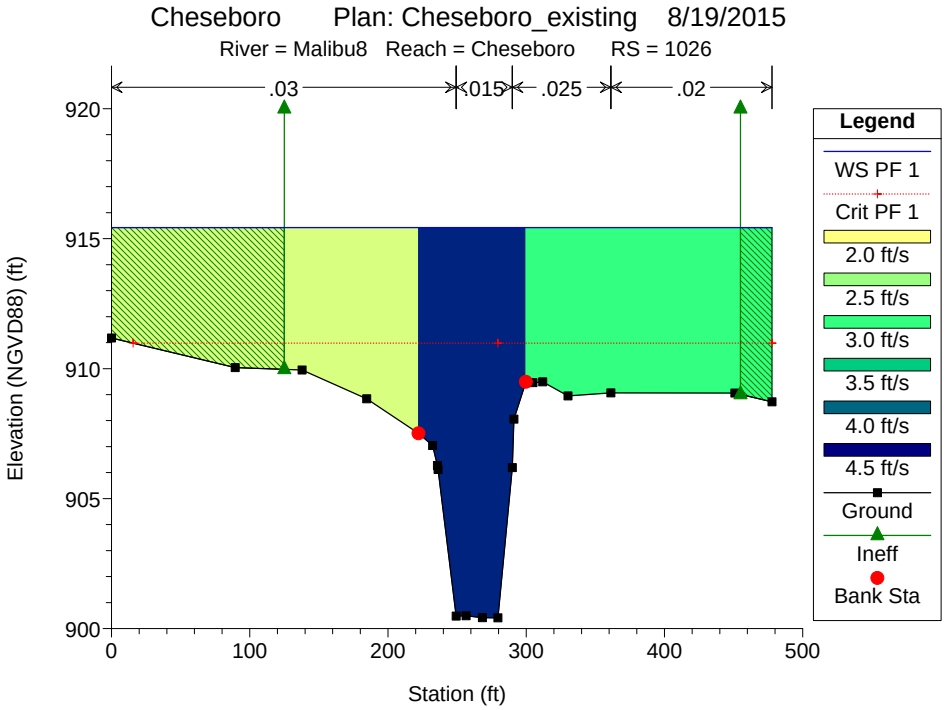

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1413
.035
.09
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

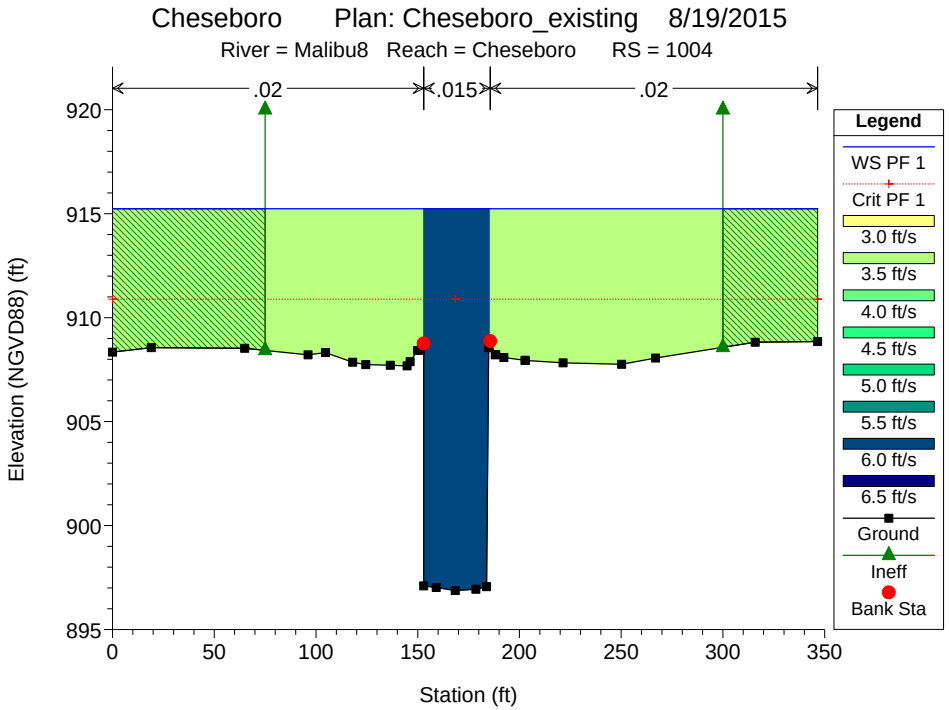

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1288
.04
.09
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
Ground
Ineff
Bank Sta

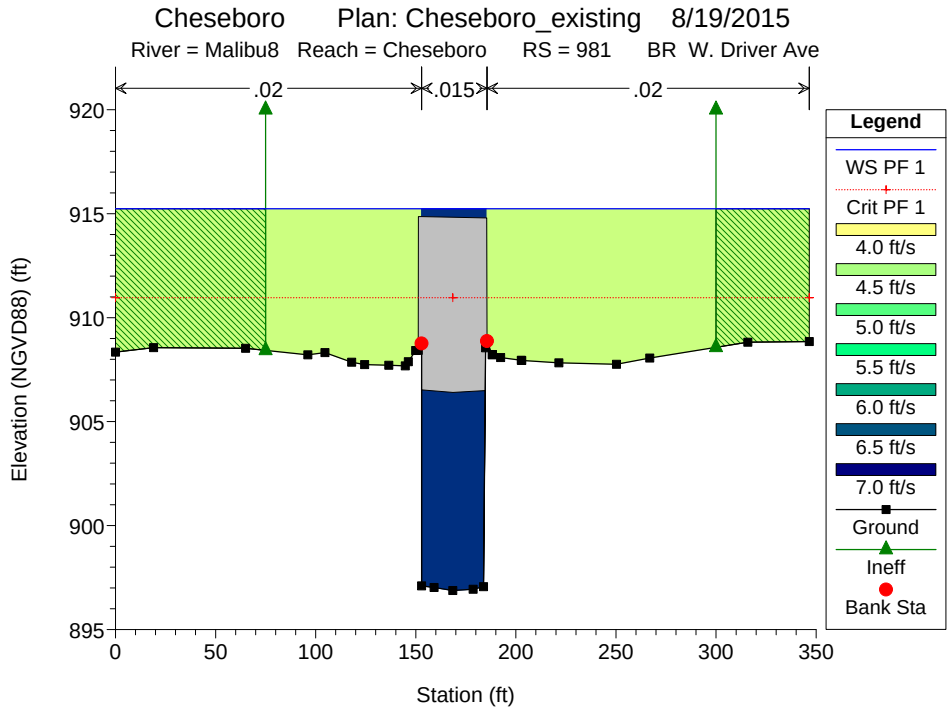

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1190
.055
.075
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2.5 ft/s
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
Ground
Ineff
Bank Sta

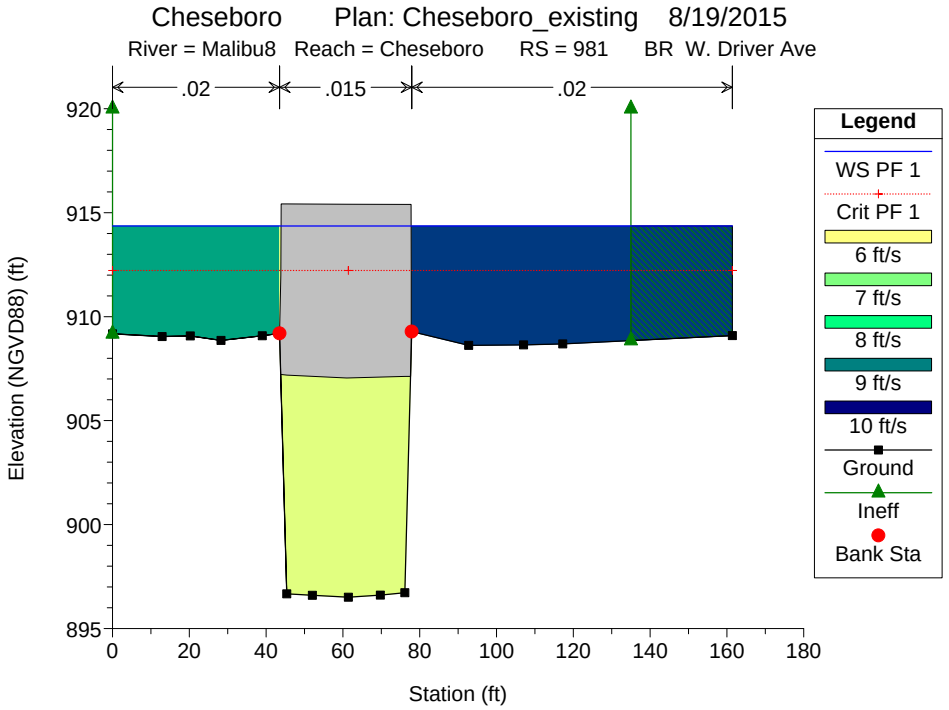

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1085
.025
.045
.035
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
3.1 ft/s
3.2 ft/s
3.3 ft/s
3.4 ft/s
3.5 ft/s
3.6 ft/s
Ground
Ineff
Bank Sta

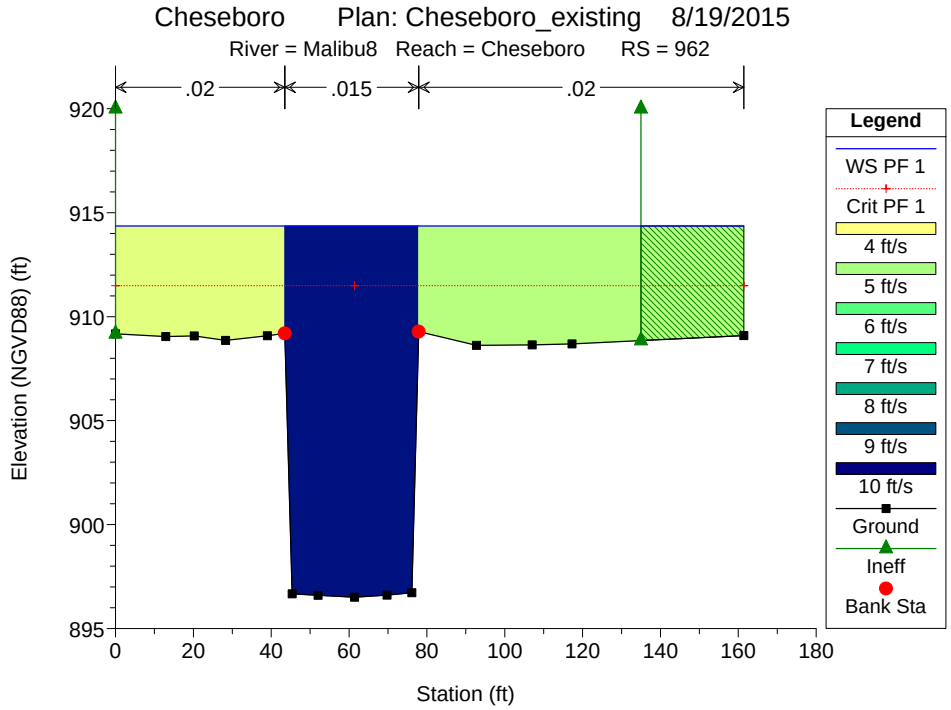

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1056
.025
.045
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
3.0 ft/s
3.2 ft/s
3.4 ft/s
3.6 ft/s
3.8 ft/s
Ground
Ineff
Bank Sta

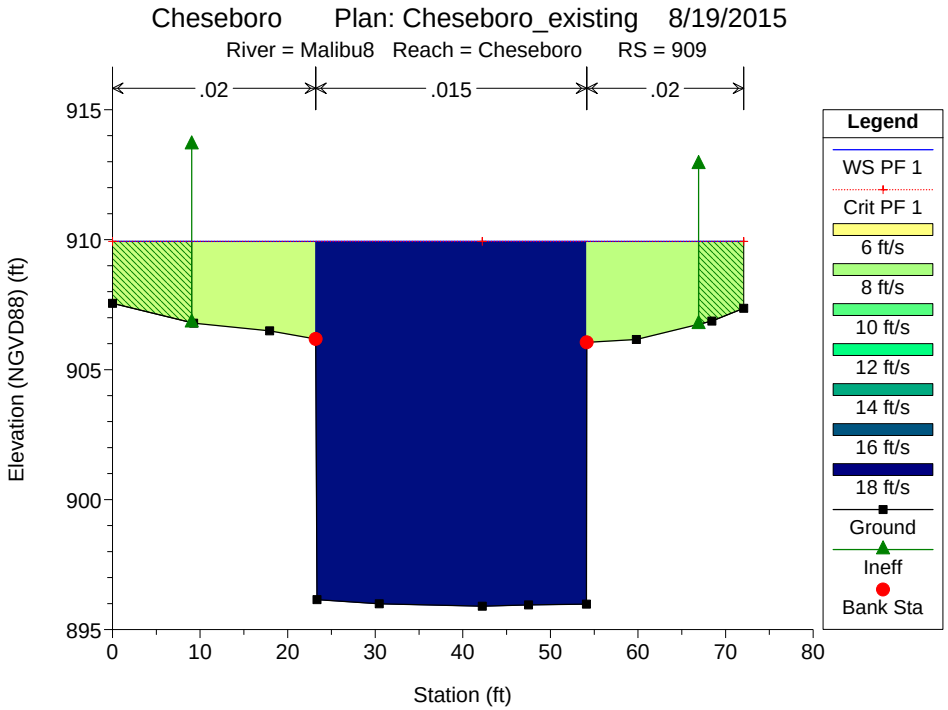

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1026
.03
.025
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
Ground
Ineff
Bank Sta

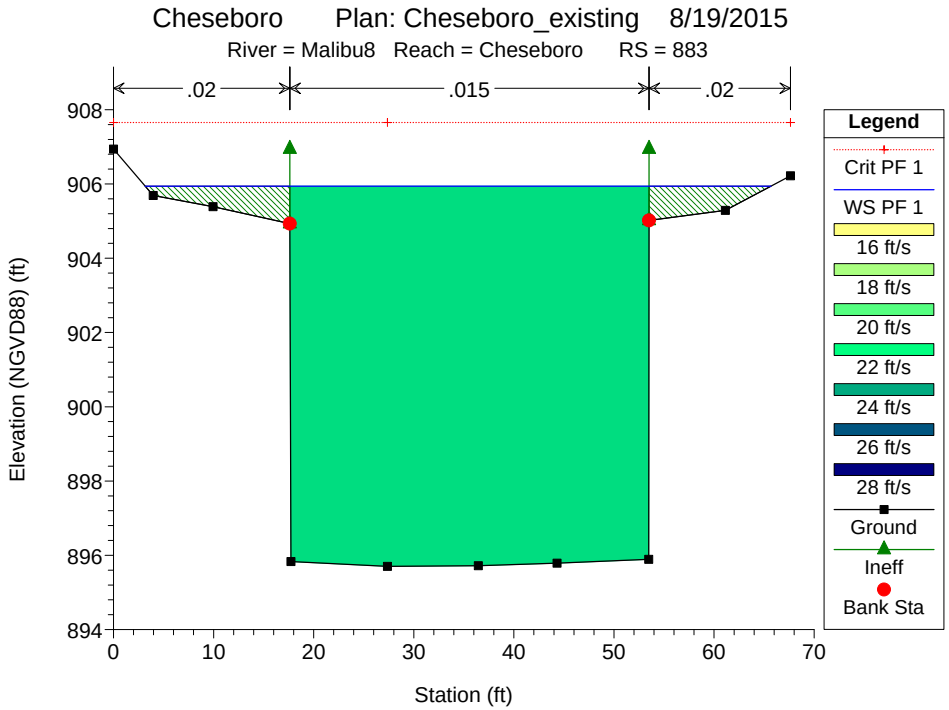

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1004
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
Ground
Ineff
Bank Sta

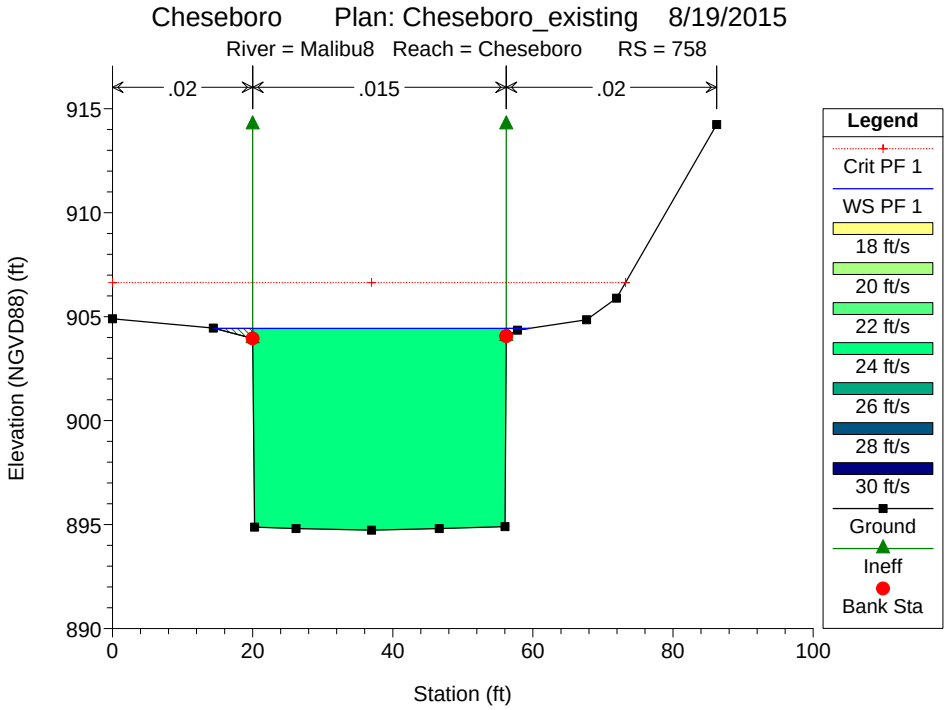

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 981 BR W. Driver Ave
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
7.0 ft/s
Ground
Ineff
Bank Sta

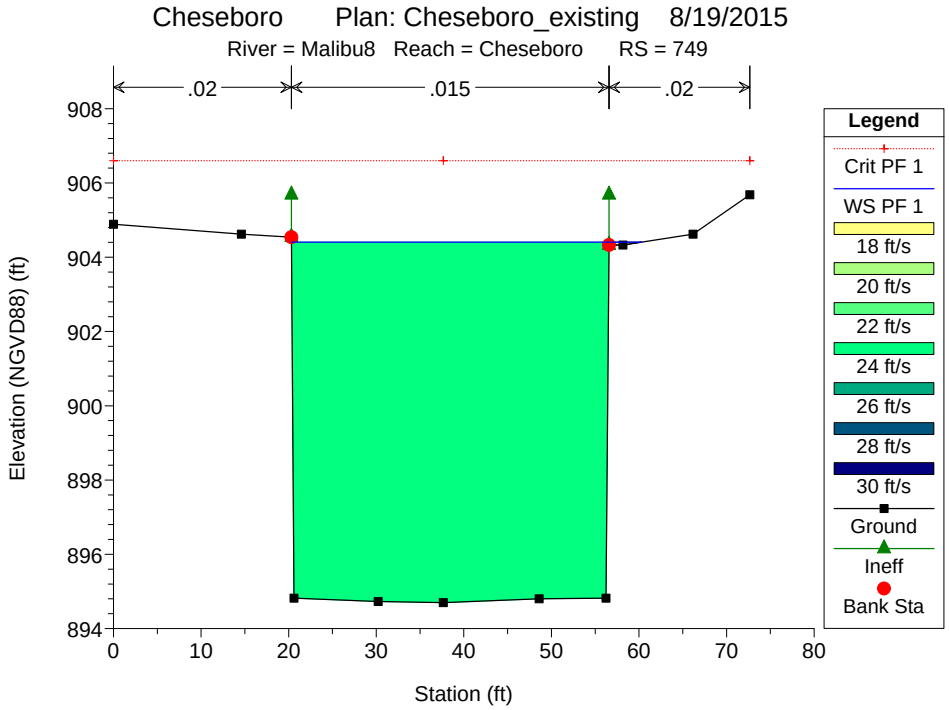

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 981 BR W. Driver Ave
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Ineff
Bank Sta

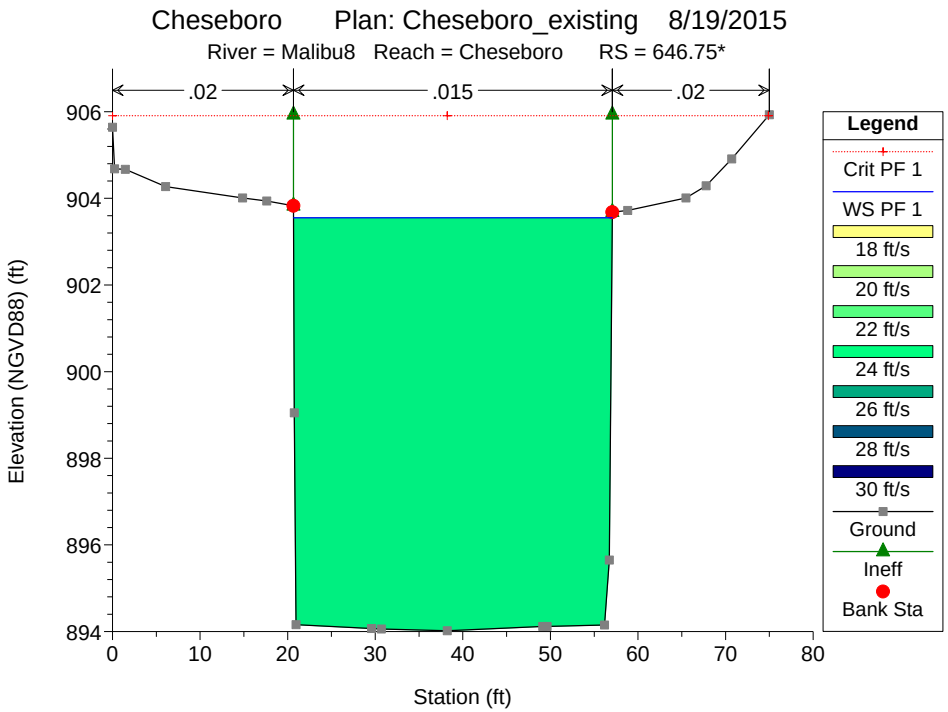

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 962
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Ineff
Bank Sta

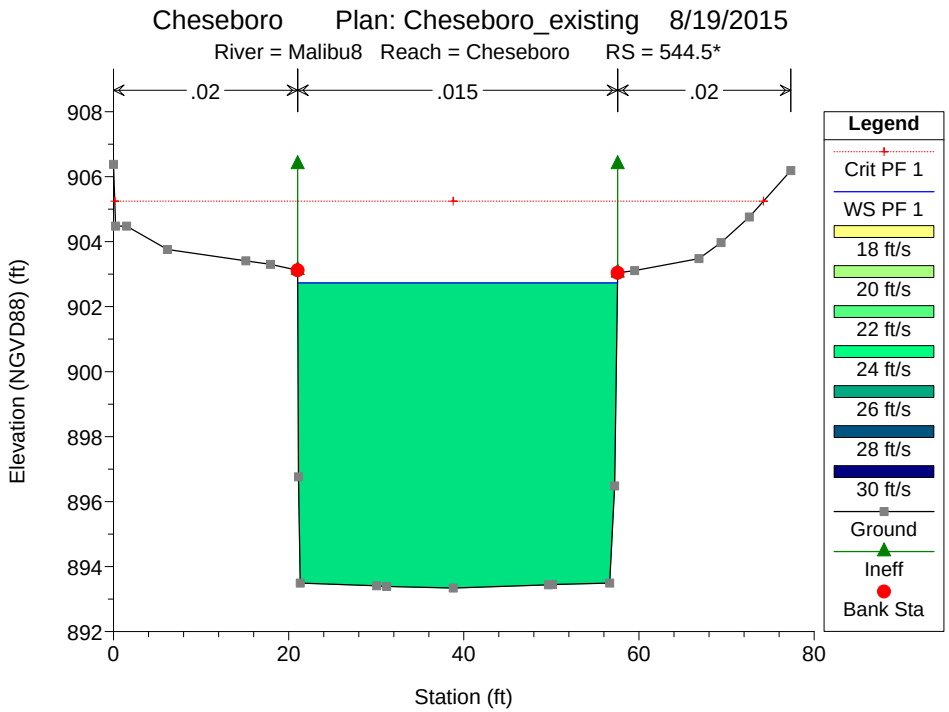

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 909
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Ineff
Bank Sta

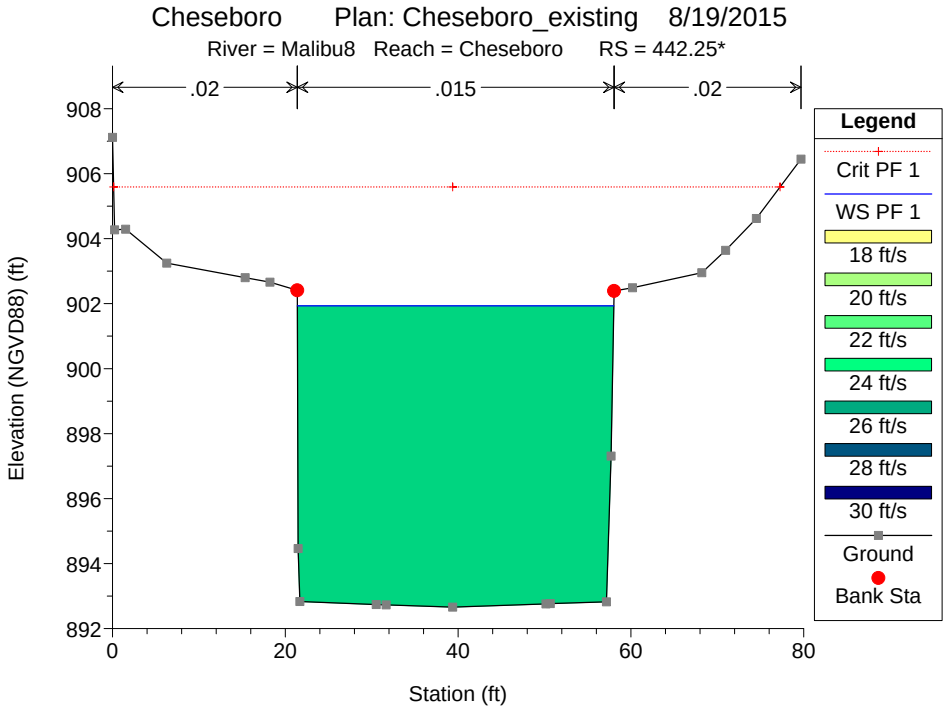

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 883
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
Ground
Ineff
Bank Sta

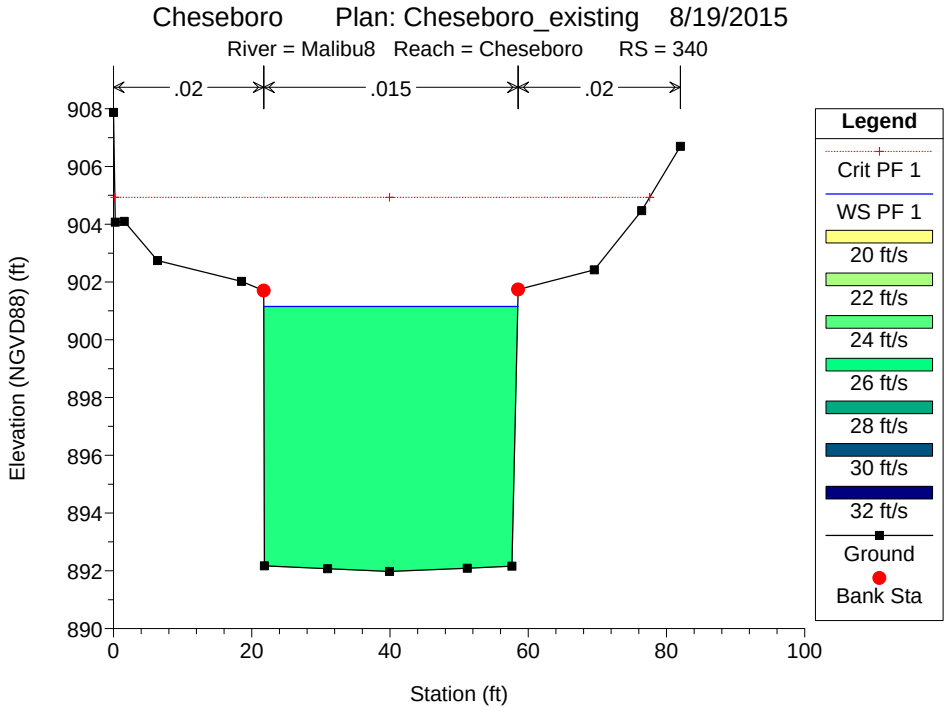

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 758
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Ineff
Bank Sta

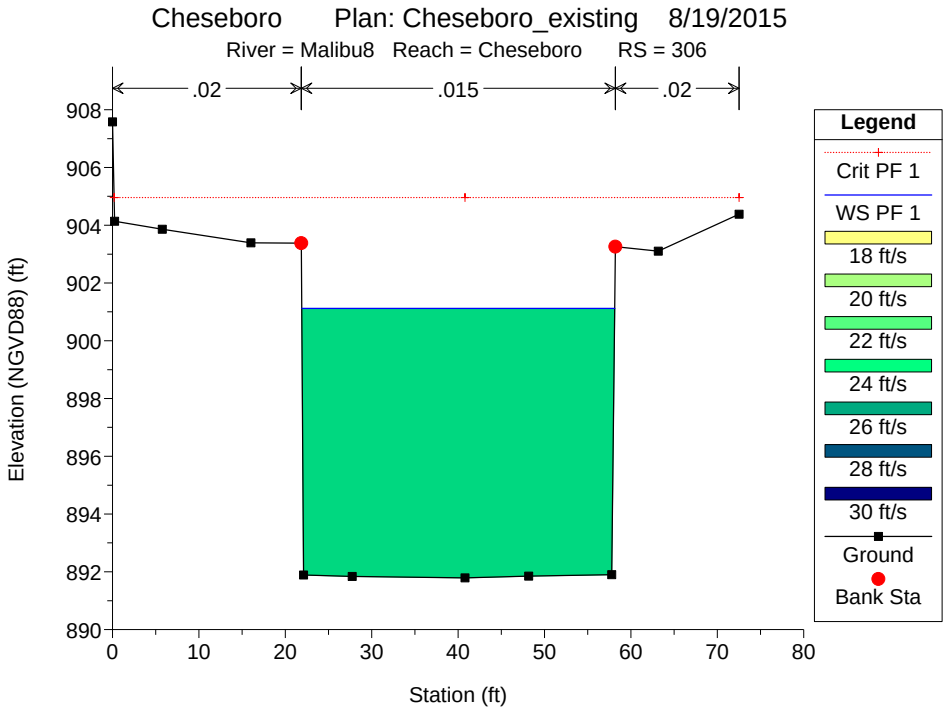

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 749
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Ineff
Bank Sta

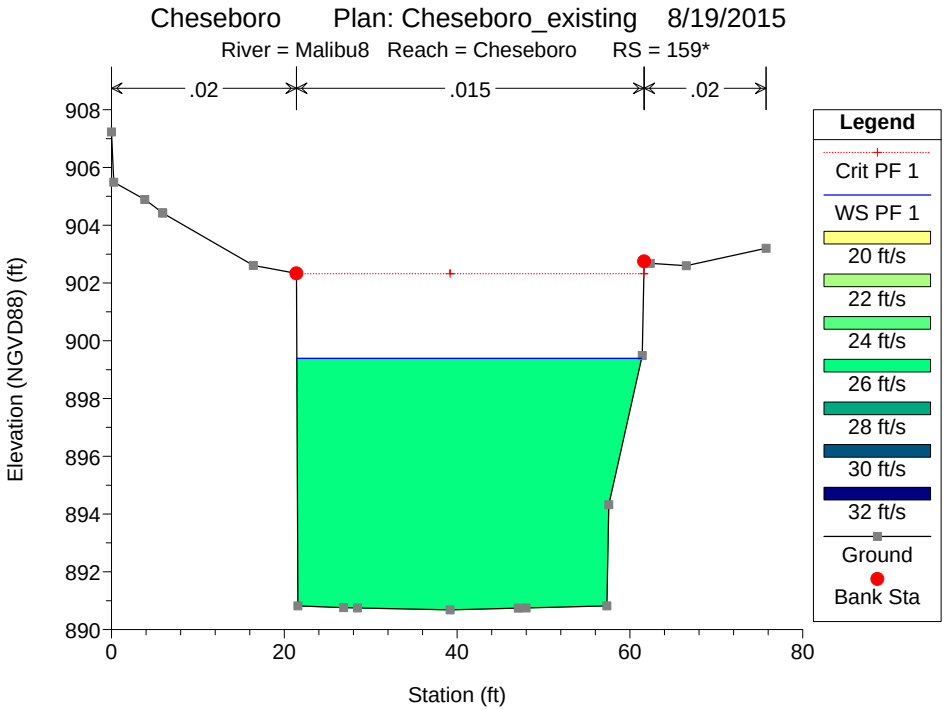

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 646.75*
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Ineff
Bank Sta

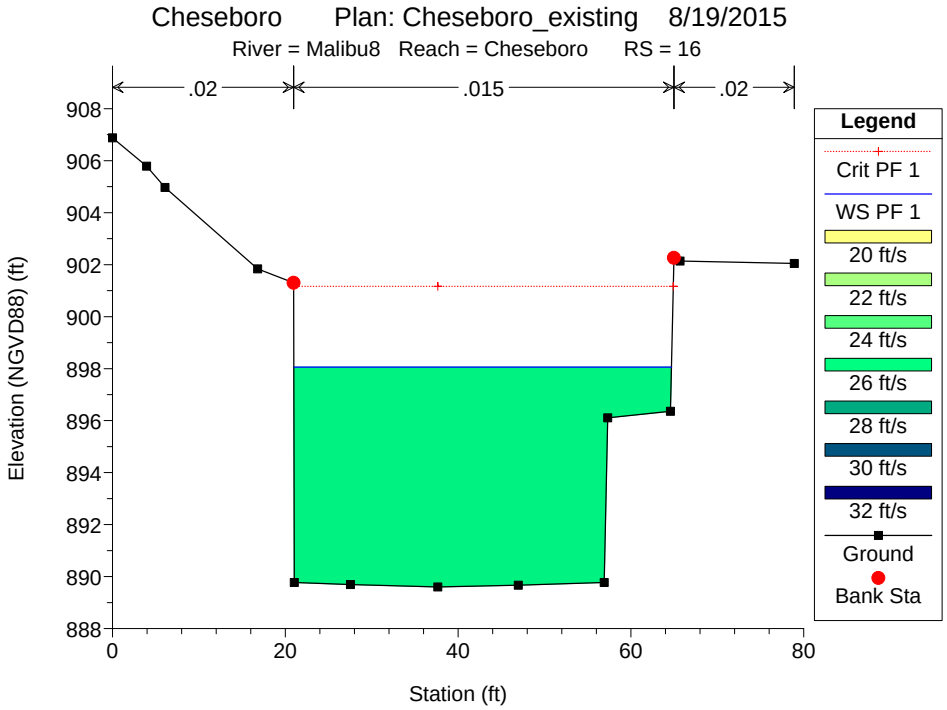

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 544.5*
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Ineff
Bank Sta


Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 442.25*
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta

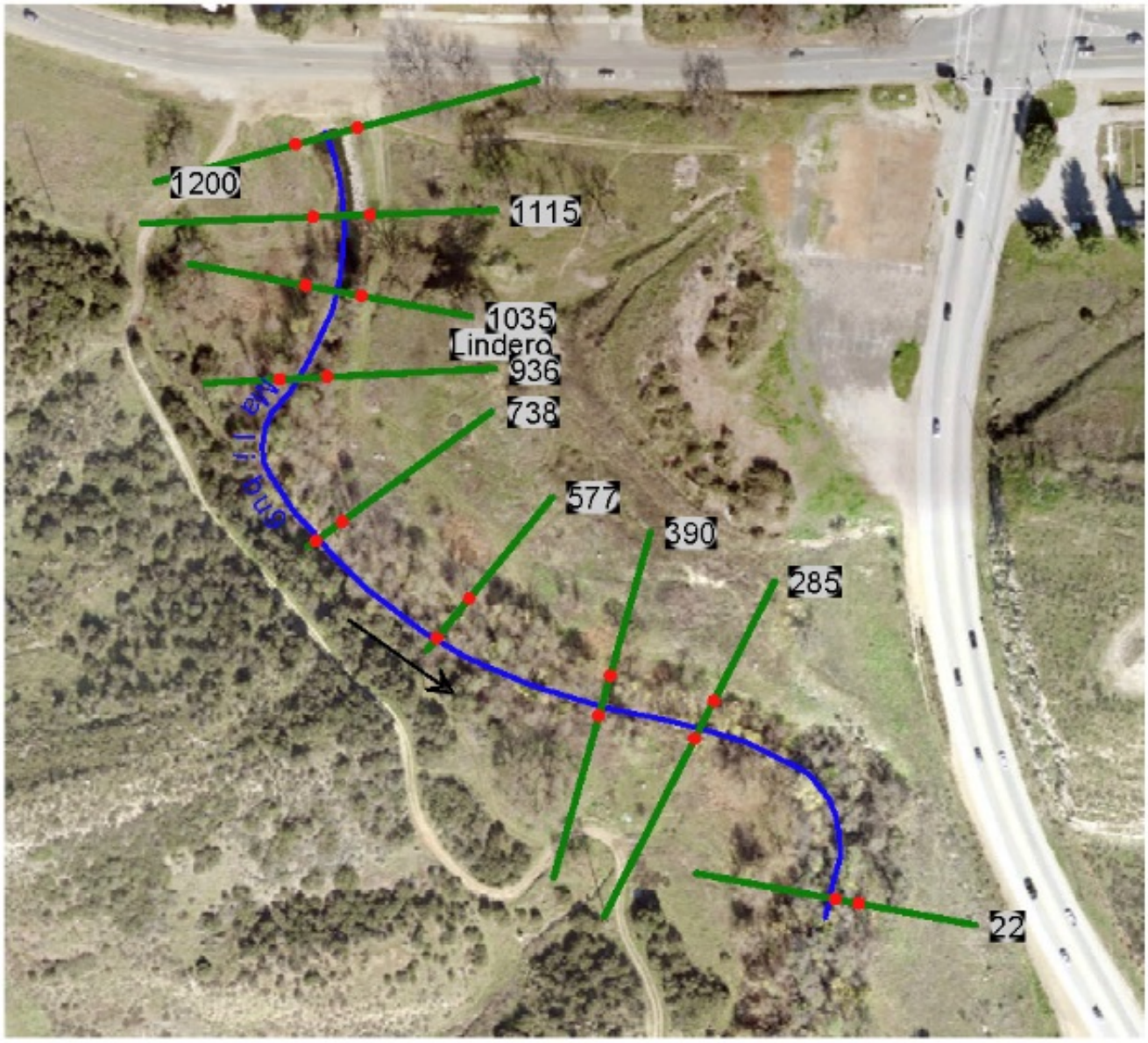

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 340
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
Ground
Bank Sta

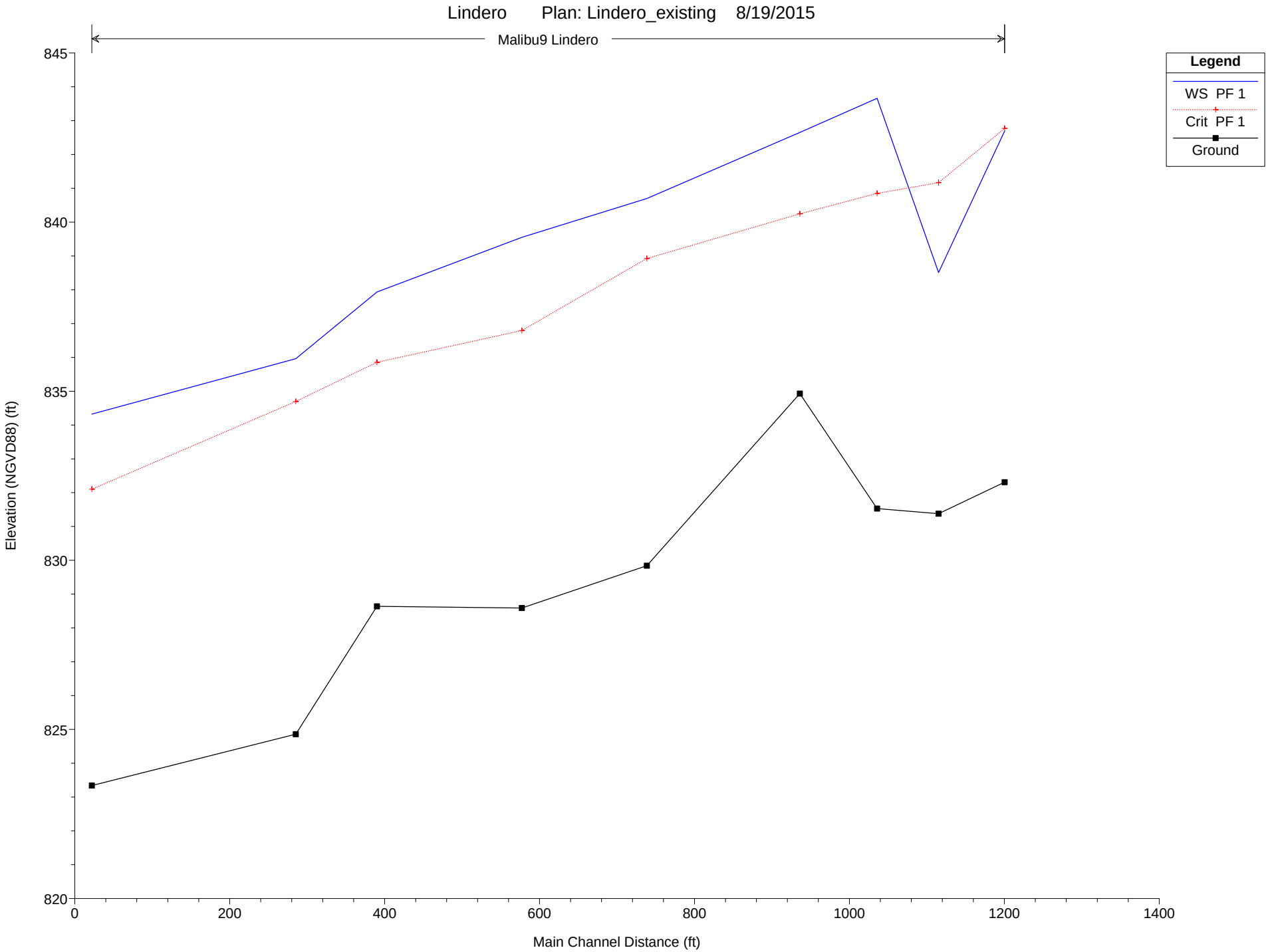

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 306
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta


Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 159*
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
Ground
Bank Sta


Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 16
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
Ground
Bank Sta

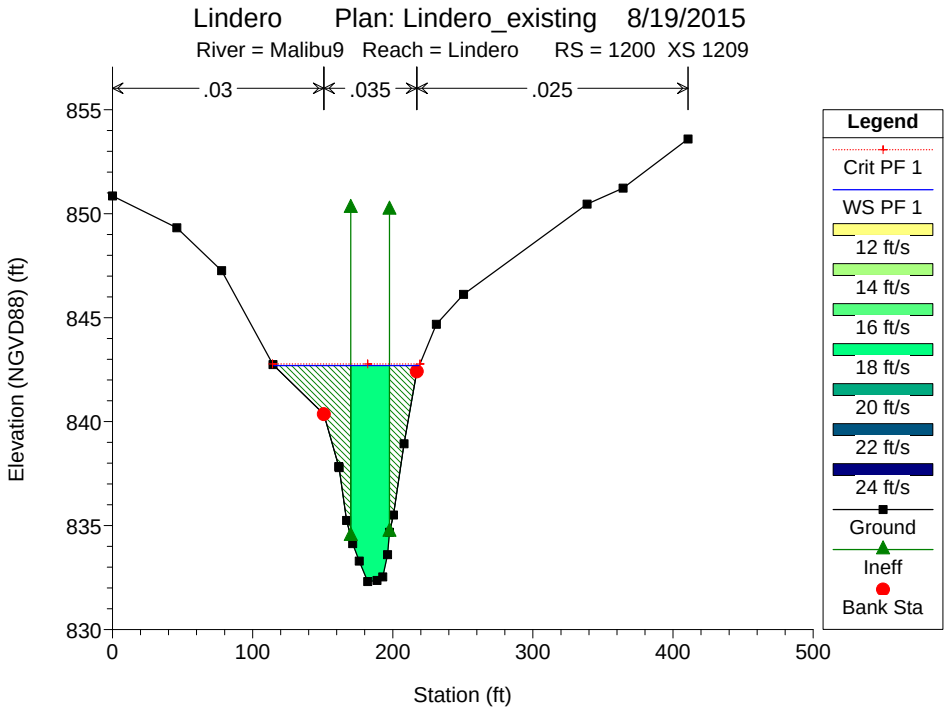
LINDERO CREEK MAIN CHANNEL OUTLET

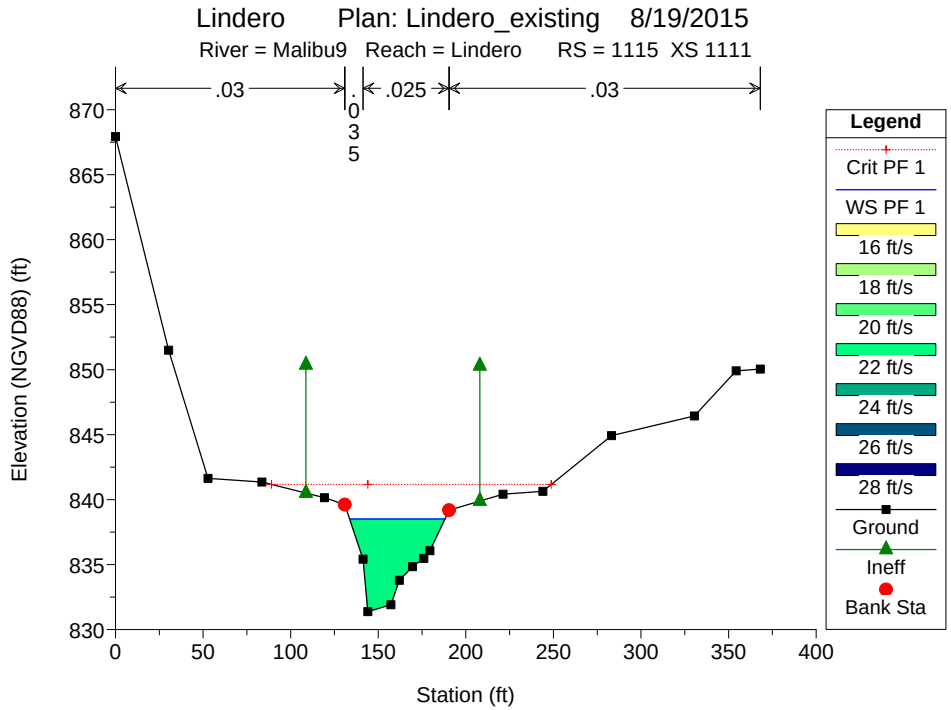

1200
1115
1035
Lindero
936
738
577
390
285
22
Main

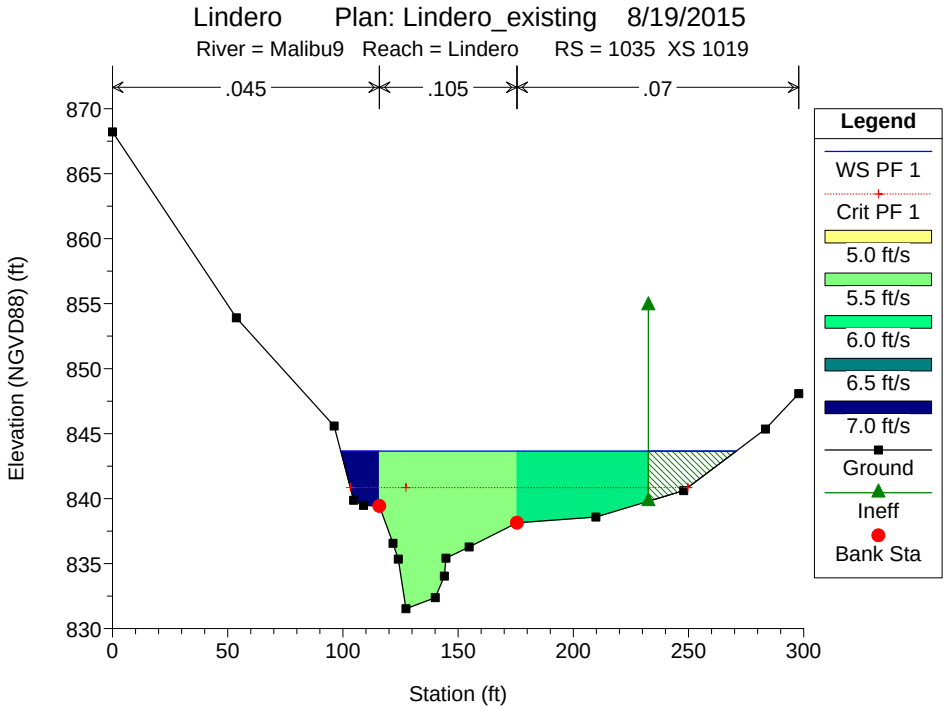

Lindero Plan: Lindero_existing 8/19/2015
Malibu9 Lindero
Legend
WS PF 1
Crit PF 1
Ground
Elevation (NGVD88) (ft)
845
840
835
830
825
820
0
200
400
600
800
1000
1200
1400
Main Channel Distance (ft)

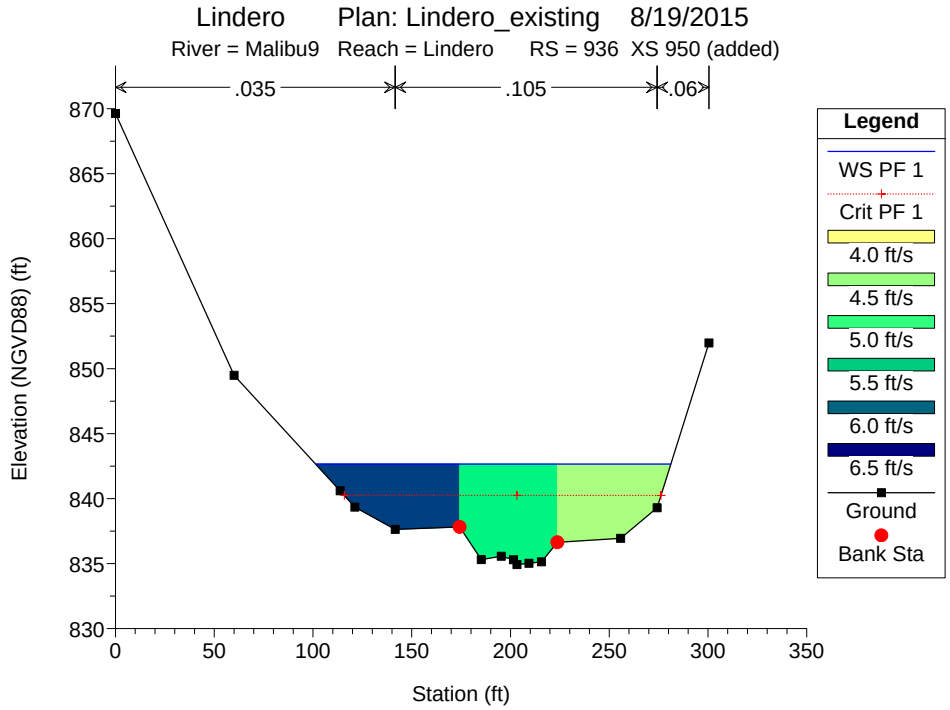
HEC-RAS Plan: Lindero_exist River: Malibu9 Reach: Lindero Profile: PF 1

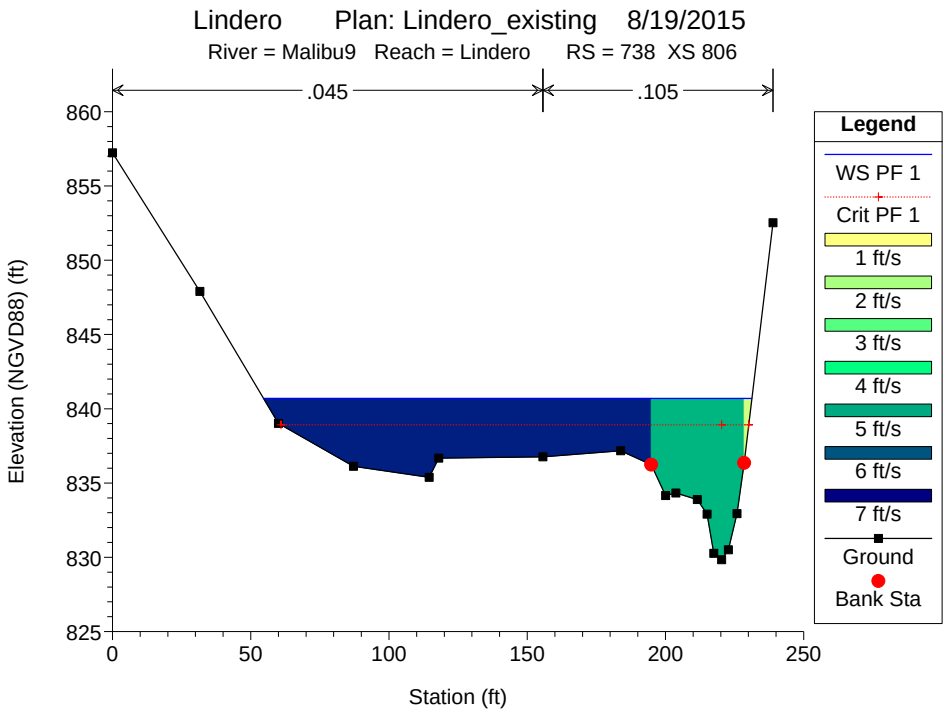
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lindero	1200	PF 1	4810.00	832.31	842.70	842.77	847.66	0.008850	17.88	269.05	103.81	1.01
Lindero	1115	PF 1	4810.00	831.38	838.51	841.17	846.16	0.027153	22.20	216.66	54.48	1.96
Lindero	1035	PF 1	4810.00	831.53	843.66	840.85	844.18	0.009672	5.45	834.04	171.67	0.33
Lindero	936	PF 1	4810.00	834.93	842.65	840.24	843.11	0.010587	5.30	908.29	179.87	0.35
Lindero	738	PF 1	4810.00	829.84	840.70	838.92	841.30	0.009484	4.85	796.81	176.63	0.31
Lindero	577	PF 1	4810.00	828.59	839.55	836.79	840.12	0.006095	4.28	871.63	159.18	0.27
Lindero	390	PF 1	4810.00	828.64	837.93	835.85	838.57	0.012978	6.55	766.55	164.14	0.40
Lindero	285	PF 1	4810.00	824.86	835.96	834.70	837.09	0.014667	6.24	611.26	142.21	0.39
Lindero	22	PF 1	4810.00	823.34	834.32	832.10	834.82	0.005800	4.16	888.66	197.96	0.25

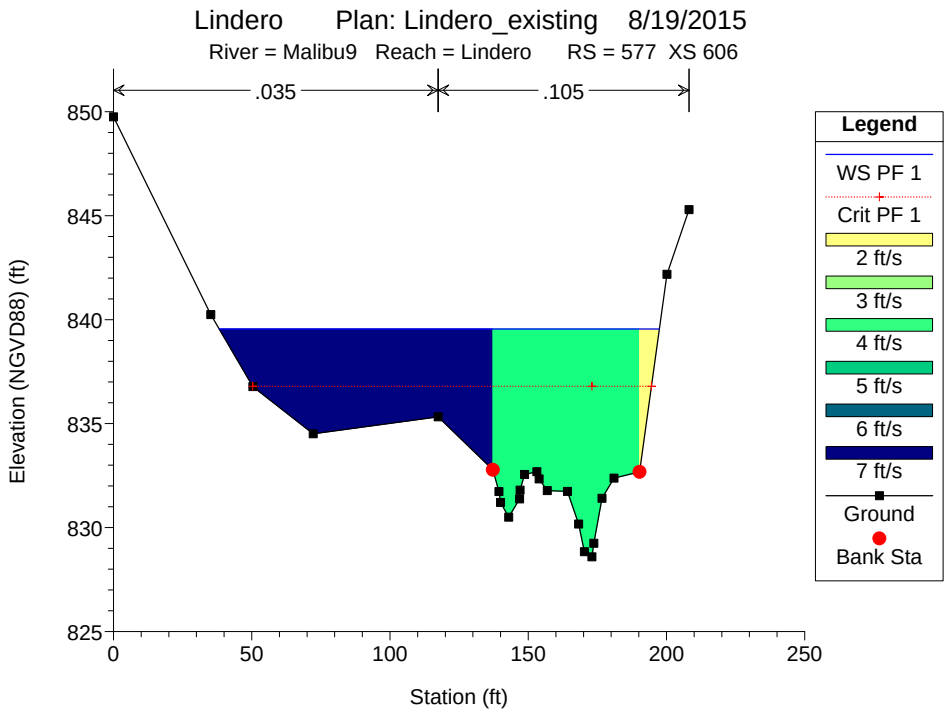

Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 1200 XS 1209
.03
.035
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
Ground
Ineff
Bank Sta


Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 1115 XS 1111
.03
.025
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
Ground
Ineff
Bank Sta


Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 1035 XS 1019
.045
.105
.07
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
7.0 ft/s
Ground
Ineff
Bank Sta


Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 936 XS 950 (added)
.035
.105
.06
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
Ground
Bank Sta


Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 738 XS 806
.045
.105
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta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.035
.105
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Station (ft)
Legend
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Crit PF 1
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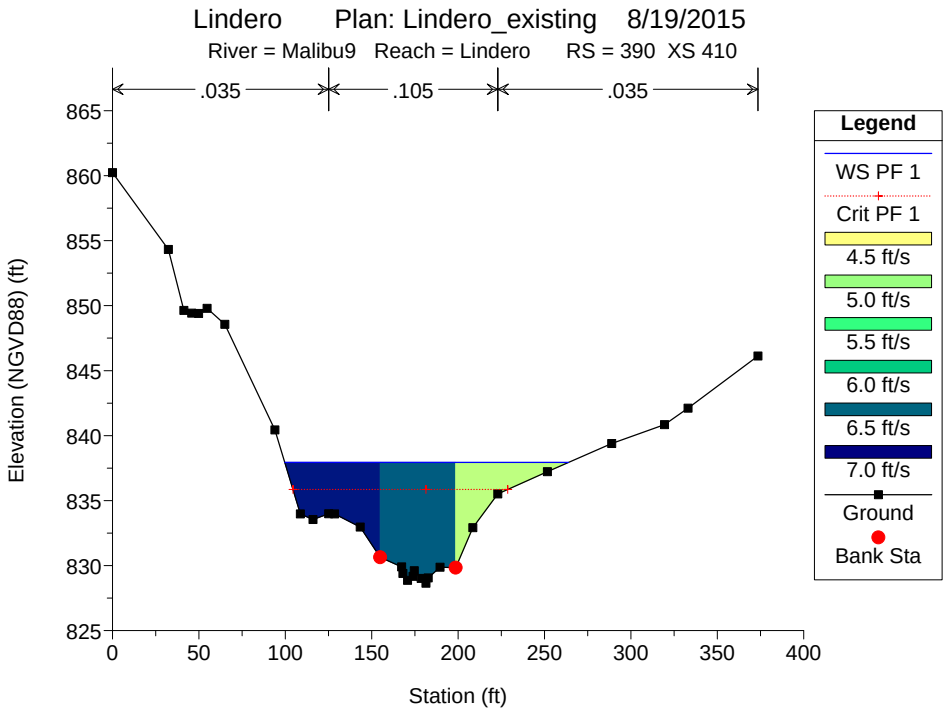
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta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.035
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Station (ft)
Legend
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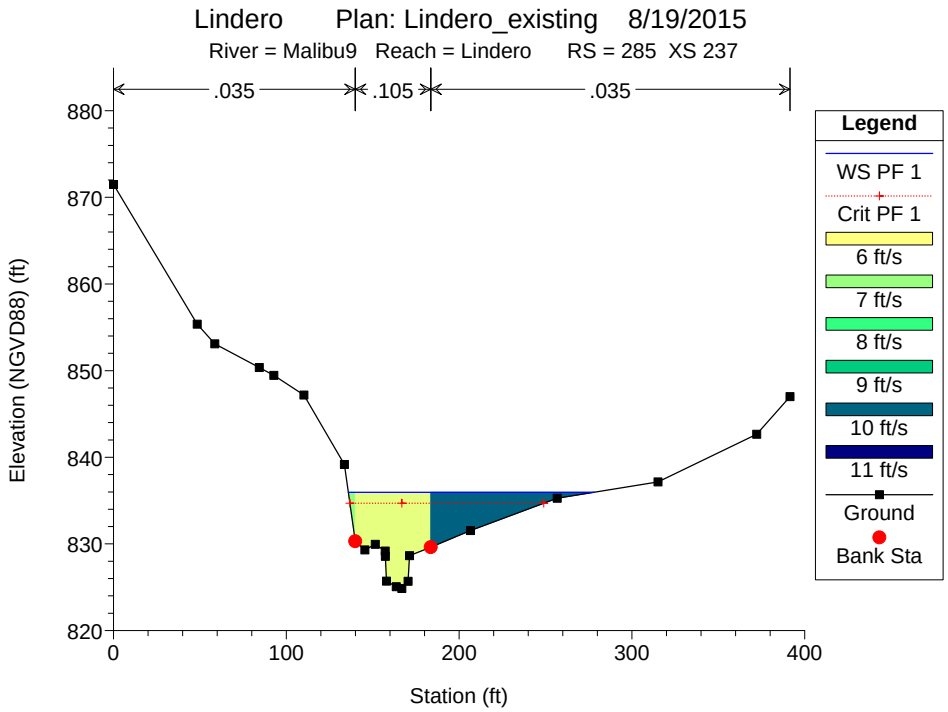
6.5 ft/s
7.0 ft/s
Ground
Bank Sta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.035
.105
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
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Crit PF 1
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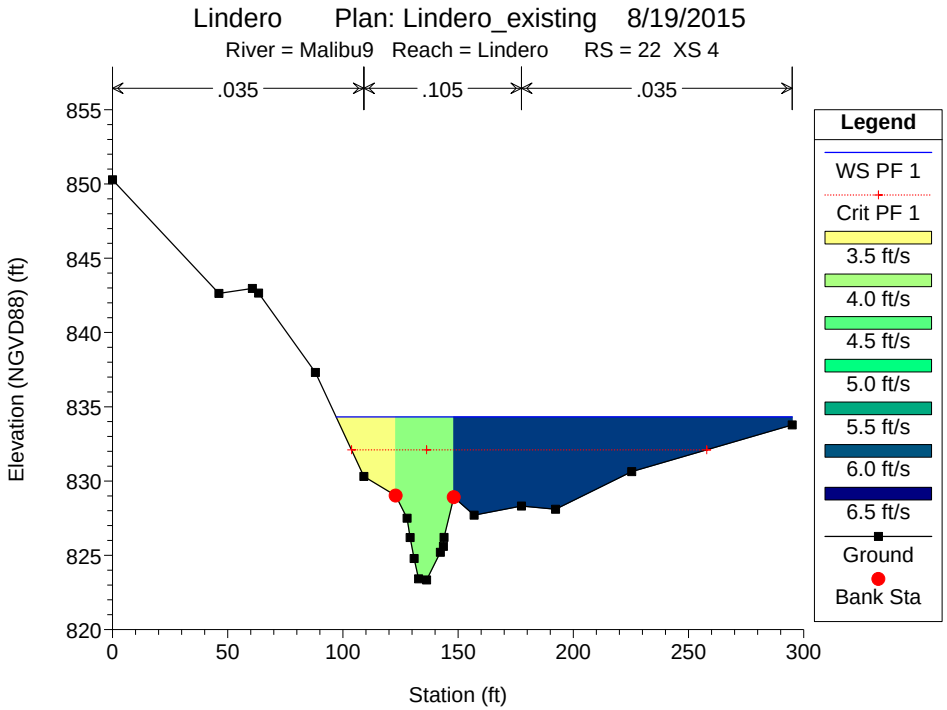
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta


Lindero Plan: Lindero_existing 8/19/2015
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.035
.105
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
Ground
Bank Sta

APPENDIX C

WATER QUALITY MONITORING REPORT (2014-15 and 2015-16)

Appendix C
Malibu Creek and Dominguez Channel Watersheds – Earth-Bottom Channels
Water Quality Monitoring Report
2014-15 and 2015-16 Maintenance Activities

Pursuant to Condition 49 of the Waste Discharge Requirements Order No. R4-2010-0021 (WDR), the Los Angeles County Flood Control District (LACFCD) conducted water quality monitoring during the 2015 clearance season within the Malibu Creek Watershed at all earth-bottom channels cleared during that season. As set forth in the Study Workplan approved by the Regional Board, the results of the monitoring events are set forth in the table below, which reflects the reaches analyzed; sampling dates; sampling parameters; results from upstream, within the project work area, and downstream monitoring stations; and observations and comments.

In the 2014-15 maintenance clearing, water quality monitoring and sampling were conducted at the following SBC Reaches:

Reach 26 – Project 74
Reach 34 – Medea Creek (PD T1005)
Reach 35 – Medea Creek (Under Route 101)
Reach 37 – Medea Creek (d/s of Agoura Road)
Reach 38 – Lindero Creek

In the 2014-15 maintenance clearing, water quality monitoring and sampling were conducted at the following SBC Reaches:

Reach 26 – Project 74
Reach 38 – Lindero Creek

General Observations and Comments

In evaluating the results of the monitoring events, the LACFCD has the following general observations and comments:

- BMPs used included fiber rolls placed perpendicular to and across the creek downstream from active clearing activities. Steps were also taken to minimize contact with water flowing within the reaches and to reduce unnecessary sediment disturbance. BMPs were generally effective in addressing the impacts of maintenance activities in the earth-bottom channel reaches. Additionally, upon noticing elevated turbidity levels, monitoring personnel notified Flood

Maintenance Division (FMD) field personnel who acted to modify BMPs and rectify the identified exceedances. However, BMPs were not always sufficient to achieve attainment of the water quality limits set forth in the WDR.

- Sampling was conducted once within seven days prior to work (preconstruction sampling), daily during the first week of maintenance activities, weekly following the first week of maintenance activities (if applicable), and once within seven days after project completion (post-construction sampling).

Specific Reach Observations and Comments

Reach 26 (2014-15): Preconstruction sampling was conducted within seven days prior to the start of maintenance activities. Turbidity ranged from 5.22 NTU upstream of the work site to 8.68 NTU for the preconstruction upstream and midpoint samples, respectively. A downstream sample was not collected during preconstruction sampling and four of the five construction days as no water was not present downstream of the work site. No downstream turbidity or TSS exceedances occurred during the five days of maintenance activities. After construction, the work area was returned to its pre-maintenance condition and BMPs were removed. Post-construction sampling results were generally consistent with preconstruction baseline sampling levels; midpoint turbidity levels were higher than upstream turbidity levels and TSS thresholds were exceeded at both the upstream and midpoint sampling locations. No exceedances were recorded at the downstream location; therefore, water quality was not being adversely impacted downstream, and no actions were taken.

Reach 26 (2015-16): Pre-construction downstream turbidity (27.7 NTU) exceeded the upstream turbidity threshold (3.64 NTU) prior to any vegetation clearing activities taking place. Due to this initial exceedance, it was advised to the FMD staff to implement some construction BMPs to reduce turbidity measurements throughout the reach. A construction boom was placed at the upstream location, another boom at the midpoint location, and two sets of sand bags and a fiber roll at the downstream location. With all these BMPs in place, there was still a turbidity exceedance on September 30, 2015 at the downstream sampling location (48.8 NTU) compared to the upstream turbidity (21.6 NTU). On October 1, 2015, there was another turbidity exceedance of 42.6 NTU at the downstream compared to 13.9 NTU at the upstream. On October 2, 2015, a final turbidity exceedance of 48.7 NTU at the downstream compared to 13.3 NTU at the upstream occurred. Two additional fiber rolls were implemented at the downstream sampling location.

After all BMPs were in place, there were no additional downstream turbidity exceedances. It is likely that the high turbidity measurements are due to natural conditions of the creek. As shown by the pre-construction baseline result, natural turbidity levels at the downstream were higher than turbidity levels at the upstream. Parts of the reach were polluted with garbage and debris, with lots of floating plants, leaves, and film. The water was very murky and mostly stagnant throughout. The turbidity measurements throughout the reach were irregularly high on various sampling days, so it was difficult to attribute the high turbidity to one cause. It is likely, however, that the high turbidity measurements were not attributable to the construction activities taking place in the reach.

The downstream TSS value of 29 mg/L taken during the pre-construction sampling event was used as the baseline threshold value for TSS threshold exceedances. There occurred one TSS exceedance at the downstream location on October 21, 2015 where the downstream TSS was 150 mg/L. This TSS measurement was taken after two fiber rolls and two sets of sand bags had been implemented a couple weeks before due to turbidity exceedances. The multiple construction BMPs in place at the downstream significantly hindered the flow of water, causing most of the water to puddle up before the fiber rolls and collect lots of sediment, and only allowing a small flow of water to trickle through into a thin stream. Water after the downstream BMPs had high amounts of floating film and algae in the thin stream. Since the sampling stream was so small, most of this film and algae was inadvertently collected in the sample and is likely the cause of the TSS exceedance as no construction activities were taking place at the time of sampling.

Reach 34: Downstream TSS levels exceeded maximum receiving level thresholds (> 10 mg/L) during preconstruction, both days of construction and post-construction sampling. On all of these days, downstream TSS levels were higher than midpoint and upstream levels, suggesting the source of the exceedance was attributed to maintenance activities occurring at the construction site (midpoint sample location). However, during pre-construction, downstream TSS levels were 770 mg/L, which is 77 times higher than the acceptable maximum limit and indicates a baseline TSS level exceedance. Further, the TSS level during post-construction was 730 mg/L, which is 40 mg/L less than the downstream measurement recorded during pre-construction. This suggests a return back to baseline TSS exceedance conditions. During the November 10, 2014 follow-up site visit, downstream TSS levels had dropped to 13 mg/L, which although still exceeds maximum receiving levels, is 50 times less than preconstruction TSS levels. TSS exceedances were recorded upon receipt of the analytical results from the lab and reported to FMD staff in the sampling results memo prepared for this reach.

Midpoint and downstream turbidity exceeded upstream turbidity during preconstruction sampling and was recorded as a baseline condition. During the first day of construction, a turbidity exceedance occurred and was reported to FMD field personnel. It was conveyed that the exceedance was consistent with the preconstruction exceedance for the downstream location; therefore, it would be safe to assume that this is a natural variability that occurs in that reach of the creek. The downstream turbidity level (7.45 NTU) was also lower than the midpoint (9.05 NTU), indicating the fiber roll downstream was effectively reducing turbidity. This downstream turbidity level (7.45 NTU) was also lower than the downstream turbidity level measured during pre-construction activities (9.22 NTU). No turbidity exceedance occurred on the second day of construction. Turbidity thresholds were also exceeded during post-construction sampling; both midpoint and downstream activities (25.2 NTU; 21.9 NTU) were higher than upstream turbidity levels (6.01 NTU) and preconstruction levels. On the November 10, 2014 post-construction follow-up site visit, no downstream turbidity exceedances occurred.

Reach 35: Both days of construction resulted in downstream TSS exceedances; upstream TSS levels were below threshold levels. However, these TSS measurements were 14 mg/L and 19 mg/L, which are relatively close in comparison with the maximum allowable receiving levels (10 mg/L or greater is considered an exceedance). Further, upstream TSS levels during preconstruction measurements showed a level of 14 mg/L at the upstream sampling point, suggesting natural TSS level variation in the stream. TSS exceedances were reported to FMD staff in writing upon receipt of the analytical results from the lab. No turbidity threshold exceedances occurred at Reach 35.

Reach 37: During preconstruction sampling, although baseline TSS levels exceeded the maximum receiving level of 10 mg/L or higher for the upstream and midpoint locations, the baseline downstream TSS levels did not exceed the maximum receiving level. During the first two days of construction, downstream TSS levels were 45 mg/L and 18 mg/L, respectively. Comparing this to midpoint levels those same days (660 mg/L and 110 mg/L, respectively) indicates that BMPs were effectively reducing TSS levels downstream, however, these downstream TSS levels still exceeded the upstream reference sample which was <10 mg/L. During post-construction, the downstream exceedance was 10 mg/L, which is barely above the TSS threshold. TSS exceedances were reported to FMD staff in writing upon receipt of the analytical results from the lab.
Turbidity thresholds were exceeded during both construction days and post-construction. It is important to note that during the first day of construction, the midpoint turbidity level was measured at 74.4 NTU and the downstream turbidity level was measured at 19.5 NTU, indicating that downstream BMPs were effectively reducing turbidity by approximately 74 percent. The turbidity exceedance was reported to FMD field staff. On the second day of construction, midpoint and downstream turbidity levels

improved significantly, and downstream turbidity exceeded upstream levels but only by an increase of less than 2 NTU, which is considered relatively minor. The case is the same for post-construction (0.94 NTU compared to 2.47 NTU).

Reach 38 (2014-15): No downstream TSS exceedances occurred during construction; therefore, BMPs were effectively reducing TSS levels downstream. A turbidity threshold exceedance (20 percent increase of upstream measurement) occurred downstream during construction (2.76 NTU). However, the upstream turbidity measurement was very low (1.34 NTU); therefore, this exceedance was of a relatively low magnitude and not likely detrimental to channel health. Measures to reduce turbidity in response to the exceedance included installation of two fiber rolls placed perpendicular to and across the stream. Downstream turbidity levels during post-construction sampling were comparable to upstream and preconstruction levels.

Reach 38 (2015-16): Baseline TSS measurements were taken within seven days before construction began in the reach. All baseline TSS values were below 10 mg/L throughout the stream. No downstream TSS exceedances occurred during or after construction; therefore, construction fiber rolls were effectively reducing TSS levels before reaching the downstream. Turbidity measurements remained relatively low at the downstream sampling location. A turbidity threshold exceedance occurred on the pre-construction sampling event where the downstream turbidity (2.26 NTU) was greater than a 20% increase of the upstream turbidity (1.46 NTU). This turbidity exceedance only minimally exceeded the allowable threshold and was likely due to natural variability since construction had not begun at the time of sampling. The exceedance was noted and was used as a baseline reference for future turbidity measurements. In addition, the FMD staff was notified of the turbidity exceedance and two fiber rolls were implemented in the stream to reduce any flowing solids. As a result, no further turbidity exceedances occurred at the downstream during any of the other sampling events.

2014-15 Maintenance Activities

Reach 26 (Project 74) Sampling Results

Sampler	Date	Time	Type of Sampling Visit	Sampling Location	Altitude (ft)	GPS Points		Water Temp (F)	DO	pH	Turbidity (NTU)	Exceed Turbdity Thresholds?	TSS (mg/L)	Exceed TSS thresholds?	Visual Observations	Summary/Notes
						Latitude	Longitude									
Paige Anderson	9/15/2014	10:30AM	Pre C	US	30	33º 52' 27" N	118º 17' 26" W	75.05	8.45	8.84	5.22	Reference	38	Yes	Shaded. Little water present, much litter in water and on bank slopes. Small fish in water. Heron present futher downstream	A turbidity exceedance did not occur; as no water was present downstream, a downstream sample could not be taken. Midpoint turbidity was higher than upstream turbidity. Both upstream and midpoint TSS levels exceeded the threshold. No action was necessary; this data was collected to establish a baseline of water quality parameters in the creek.
Paige Anderson	9/15/2014	10:45AM	Pre C	MP	33	33º 52' 23" N	118º 17' 26" W	72.65	2.3	7.05	8.68	N/A	13	Yes	Shaded. Deep, mostly standing water present. Litter on bank slopes.	
Paige Anderson	9/15/2014	11:10AM	Pre C	DS	25	33º 52' 17" N	118º 17' 25" W	No water present	No water present	No water present	No water present	No water present	No water present	N/A	Unshaded; near pilar. Dry; no water present.	
Andrew Paden	9/16/2014	2:40PM	DC	US	30	33º 52' 28" N	118º 17' 24" W	91.8	2.08	8.21	8.33	Reference	340	Yes	Very shallow, standing puddles from very slowly flowing box culvert in direct sunlight. Highly disturbed/turbid water from construction activity upstream.	A turbidity exceedance did not occur; as no water was present downstream, a downstream sample could not be taken. Upstream turbidity was higher than midpoint turbidity. TSS thresholds were exceeded upstream. No action was necessary.
Andrew Paden	9/16/2014	3:00PM	DC	MP	33	33º 52' 23" N	118º 17' 26" W	77.3	9.7	7.37	7.57	N/A	<10	No	Deep, shaded standing pool of water in soft bottom channel.	
Andrew Paden	9/16/2014	3:17PM	DC	DS	25	33º 52' 17" N	118º 17' 25" W	No water present	No water present	No water present	No water present	No water present	No water present	N/A	Unshaded; near pilar. Dry; no water present.	
Andrew Paden	9/17/2014	11:26AM	DC	US	30	33º 52' 28" N	118º 17' 25" W	84.48	3.85	7.98	6.27	Reference	1200	Yes	Very shallow, semi-shaded standing puddles from very slowly flowing box culvert.	A turbidity exceedance did not occur; as no water was present downstream, a downstream sample could not be taken. Turbidity was higher at the midpoint than upstream. TSS thresholds were excceeded upstream. No action was necessary.
Andrew Paden	9/17/2014	12:03PM	DC	MP	33	33º 52' 23" N	118º 17' 26" W	78.21	2.19	7.7	11	N/A	<10	No	Deep, shaded standing pool of water in soft bottom channel.	
Andrew Paden	9/17/2014	12:33PM	DC	DS	25	33º 52' 17" N	118º 17' 25" W	No water present	No water present	No water present	No water present	No water present	No water present	N/A	Unshaded; near pilar. Dry; no water present.	
Andrew Paden	9/18/2014	10:48AM	DC	US	30	33º 52' 28" N	118º 17' 25" W	72.07	6.3	8.34	1.78	Reference	550	Yes	Very shallow, semi-shaded standing puddles from very slowly flowing box culvert.	A turbidity exceedance did not occur; as no water was present downstream, a downstream sample could not be taken. Turbidity was higher at the midpoint than upstream. TSS thresholds were exceeded upstream. No action was necessary.
Andrew Paden	9/18/2014	11:10AM	DC	MP	33	33º 52' 23" N	118º 17' 26" W	73.21	4.26	7.4	31.5	N/A	<10	No	Deep, shaded standing pool of water in soft bottom channel.	
Andrew Paden	9/18/2014	11:25AM	DC	DS	25	33º 52' 17" N	118º 17' 25" W	No water present	No water present	No water present	No water present	No water present	No water present	N/A	Unshaded; near pilar. Dry; no water present.	
Andrew Paden	9/25/2014	12:30PM	DC	US	30	33º 52' 28" N	118º 17' 26" W	73.45	8.71	8.8	5.99	Reference	18	Yes	Fast, shallow flow in SBC, directly below box channel. Visually clear water with small plant debris floating on surface.	A turbidity exceedance did not occur. TSS thresholds were exceeded minorly upstream. No action was necessary.
Andrew Paden	9/25/2014	12:55PM	DC	MP	23	33º 52' 23" N	118º 17' 26" W	70.9	3.47	7.31	1.67	N/A	<10	No	Deep, shaded standing pool of water in soft bottom channel.	
Andrew Paden	9/25/2014	1:16PM	DC	DS	12	33º 52' 17" N	118º 17' 25" W	86.9	7.86	9.89	5.82	No	<10	No	Concrete-lined channel with drainages and weep holes feeding into flow. No observed flow out of project.	
Andrew Paden	9/30/2014	11:30AM	DC	US	20	33º 52' 27" N	118º 17' 26" W	71.19	9.12	8.75	3.26	Reference	54	Yes	Fast, shallow flow in SBC, directly below box channel. Visually clear water with small plant debris floating on surface.	A turbidity exceedance did not occur; as no water was present downstream, a downstream sample could not be taken. Midpoint turbidity level was higher than upstream turbidity; however, this does not qualify as an exceedance. TSS thresholds were exceeded at upstream and midpoint locations. No action was necessary.
Andrew Paden	9/30/2014	12:25PM	DC	MP	27	33º 52' 21" N	118º 17' 26" W	68.15	3.5	6.97	20.7	N/A	18	Yes	Deep, shaded standing pool of water in soft bottom channel.	
Andrew Paden	9/30/2014	1:15PM	DC	DS	12	33º 52' 17" N	118º 17' 25" W	No water present	No water present	No water present	No water present	No water present	No water present	N/A	Concrete-lined channel with drainages and weep holes feeding into flow. No observed flow out of project.	
Andrew Paden	10/7/2014	2:30PM	Post C	US	26	33º 52' 27" N	118º 17' 25" W	84.44	12.51	10.08	4.73	Reference	56	Yes	Very shallow, semi-shaded standing puddles from very slowly flowing box culvert.	A turbidity exceedance did not occur; downstream turbidity was lower than upstream turbidity. TSS thresholds were exceeded at the upstream and midpoint locations; however, downstream TSS levels were below the threshold, and therefore, site conditions were not resulting in degradation of downstream water quality. No action was necessary.
Andrew Paden	10/7/2014	2:54PM	Post C	MP	38	33º 52' 23" N	118º 17' 26" W	70.19	8.64	7.58	12.1	N/A	17	Yes	Deep, shaded standing pool of water in soft bottom channel.	
Andrew Paden	10/7/2014	3:28PM	Post C	DS	34	33º 52' 17" N	118º 17' 24" W	83.69	9.84	8.3	2.66	No	<10	No	Concrete-lined channel with drainages and weep holes feeding into flow. Currently flowing.	

Legend: US: Upstream; MP: Midpoint; DS: Downstream; Pre C: Pre-Construction; DC: During Construction; Post C: Post-Construction

Water Temp WQO: Never an increase of 5 degrees or above 80	**DO WQO:** Never less than 5.0 mg/L	**pH WQO:** Between 6.5 and 8.5; can't raise more than 0.5 degrees	**Turbidity WQO:** Increases shall not exceed 20% if upstream is between 0 and 50, and shall not exceed 10% if ambient is greater than 50	**TSS Threshold:** No greater than 10 mg/L

Reach 34 (Chumash Park) Sampling Data

Sampler	Date	Time	Type of Sampling Visit	Sampling Location	Altitude (ft)	GPS Points		Water Temp (F)	DO	pH	Turbidity (NTU)	Exceed Turbdity Thresholds?	TSS (mg/L)	Exceed TSS thresholds?	Visual Observations						Summary/Notes
						Latitude	Longitude								Water clarity	Flow	Stream depth est	Stream width est	Banks	Wildlife Observed	
Andrew Paden	10/15/2014	14:57	Pre C	US	847	34º 08' 59" N	118º 45' 28" W	73.10	7.79	7.1	1.89	Reference	<10	No	relatively clear	medium	4 inches	2 feet	cement	none	Midpoint and downstream turbidity levels were higher than upstream turbidity, and a baseline turbidity exceedance was noted. Midpoint and downstream TSS levels exceeded TSS thresholds. No action was necessary; this data was collected to establish a baseline of water quality parameters in the creek.
Andrew Paden	10/15/2014	15:17	Pre C	MP	859	34º 08' 58" N	118º 45' 28" W	72.20	9.3	7.74	3.1	N/A	61	Yes	murky	slow	2.5 feet	20 feet	rocky	mosquito fish	
Andrew Paden	10/15/2014	15:30	Pre C	DS	851	34º 08' 58" N	118º 45' 27" W	72.23	5.75	7.76	9.22	Yes	770	Yes	algae, duckweed	slow	2 feet	6 feet	grassy/dirty	mosquito fish	
Paige Anderson	10/16/2014	14:23	DC	US	867	34º 09' 00" N	118º 45' 28" W	80.50	10	8.25	5.01	Reference	39	Yes	relatively clear	medium	5 inches	1 foot	concrete	mosquito fish	A turbidity exceedance occurred and was reported to FMD staff. However, the downstream turbidity level measured during construction (7.45 NTU) was lower than the downstream turbidity level measured during pre-construction activities (9.22 NTU). Therefore, this exceedance can be attrbuted to natural variation in the creek. Upstream, midpoint and downstream TSS levels exceeded thresholds. Downstream TSS levels were higher than midpoint and upstream levels, suggesting the source of the exceedance was not solely attributed to construction activities occurring at the midpoint location.
Paige Anderson	10/16/2014	14:36	DC	MP	848	34º 08' 58" N	118º 45' 28" W	80.01	6.77	7.95	9.05	N/A	82	Yes	algae on top, somewhat clear	slow	2.5 feet	20 feet	rocky	mosquito fish	
Paige Anderson	10/16/2014	14:45	DC	DS	861	34º 08' 58" N	118º 45' 28" W	79.50	6.25	7.92	7.45	Yes	170	Yes	no algae, somewhat clear	slow	2.5 feet	7 feet	grassy/muddy	mosquito fish	
Paige Anderson	10/17/2014	10:15	DC	US	863	34º 09' 00" N	118º 45' 29" W	73.29	8.3	8.11	4.18	Reference	19	Yes	relatively clear	medium	4 inches	2 feet	cement	mosquito fish	A turbidity exceedance did not occur. TSS thresholds were exceeded upstream, midpoint and downstream; and were lowest at the midpoint location. Therefore, it's not likely that the downstream TSS exceedance is attributed to construction activities. No action was necessary.
Paige Anderson	10/17/2014	10:32	DC	MP	844	34º 08' 58" N	118º 45' 28" W	70.98	9.86	8.04	6.42	N/A	11	Yes	murky	slow	2.5 feet	20 feet	rocky	mosquito fish	
Paige Anderson	10/17/2014	10:40	DC	DS	866	34º 08' 57" N	118º 45' 28" W	69.01	8.86	8	4.18	No	27	Yes	somewhat clear	slow/medium	2 feet	6 feet	grassy/dirty	none	
Andrew Paden	10/24/2014	15:00	Post-C	US	837	34º 08' 59" N	118º 45' 28" W	74.01	11.03	7.71	6.01	Reference	25	Yes	clear with scattered surface debris	medium	4 inches	15 feet	cement	none	A turbidity exceedance occurred. Downstream turbidity, although lower than midpoint turbidity, was significantly higher than upstream turbidity. However, this downstream turbidity exceedance could be attributed to the natural increase in turbidity levels from the upstream to downstream locations, as exemplified by the preconstruction turbidity levels. TSS thresholds were exceeded upstream, midpoint and downstream. Downstream TSS levels were higher than midpoint and upstream levels, suggesting the source of the exceedance was not solely attributed to construction activities occurring at the midpoint location. A follow-up visit was scheduled to determine whether the turbidity exceedance persisted.
Andrew Paden	10/24/2014	15:15	Post-C	MP	858	34º 08' 59" N	118º 45' 28" W	73.02	3.16	7.66	25.2	N/A	17	Yes	apparently clear; some small plant debris	nearly still	2 feet	23 feet	dirt/grass	none	
Andrew Paden	10/24/2014	15:25	Post-C	DS	858	34º 08' 58" N	118º 45' 27" W	75.36	6.86	7.65	21.9	Yes	730	Yes	apparently clear; some small plant debris	nearly still	1.5 foot	8 feet	dirt/grass	none	
Paige Anderson	11/10/2014	9:57	Post-C	US	845	34º 08' 59" N	118º 45' 29" W	66.75	13	8.26	3.13	Reference	54	Yes	somewhat clear	slow moving	8 inches	15 feet	concrete	mosquito fish	A turbidity exceedance did not occur. TSS exceedances occurred upstream, at the midpoint, and downstream. However, TSS exceedances downstream were lower than midpoint and upstream levels; therefore, the TSS exceedance cannot be attributed to construction activities. Post-construction downstream turbidity and TSS levels were below preconstruction levels. No action was necessary.
Paige Anderson	11/10/2014	10:09	Post-C	MP	841	34º 08' 59" N	118º 45' 28" W	could not reach sufficient depth for probe to obtain sample without slipping	could not reach sufficient depth for probe to obtain sample without slipping	could not reach sufficient depth for probe to obtain sample without slipping	3.68	N/A	120	Yes	somewhat murky	slow moving (almost ponded)	1 foot	13 feet	silty	none	
Paige Anderson	11/10/2014	10:20	Post-C	DS	835	34º 08' 58" N	118º 45' 28" W	65.5	13.08	8.04	4.04	No	13	Yes	somewhat murky/oily	ponded	10 inches	7 feet	silty/grassy	none	

Legend: US: Upstream; MP: Midpoint; DS: Downstream; Pre C: Pre-Construction; DC: During Construction; Post C: Post-Construction

Water Temp WQO: Never an increase of 5 degrees or above 80	**DO WQO:** Never less than 5.0 mg/L	**pH WQO:** Between 6.5 and 8.5; can't raise more than 0.5 degrees	**Turbidity WQO:** Increases shall not exceed 20% if upstream is between 0 and 50, and shall not exceed 10% if ambient is greater than 50	**TSS Threshold:** No greater than 10 mg/L

Reach 35 (Medea Creek - Main) Sampling Results

Sampler	Date	Time	Type of Sampling Visit	Sampling Location	Altitude (ft)	GPS Points		Water Temp (F)	DO	pH	Turbidity (NTU)	Exceed Turbdity Thresholds?	TSS (mg/L)	Exceed TSS thresholds?	Visual Observations						Summary/Notes
						Latitude	Longitude								Water clarity	Flow	Stream depth est	Stream width est	Banks	Wildlife Observed	
Paige Anderson	10/17/2014	11:08	Pre C	US	912	34º 08' 59" N	118º 45' 28" W	66.03	4.04	7.74	3.06	Reference	14	Yes	somewhat murky	slow, pooled	1.5 feet	25 feet	muddy/ slippery	none	A turbidity exceedance did not occur. TSS thresholds were exceeded upstream. No action was necessary; this data was collected to establish a baseline of water quality parameters in the creek.
Paige Anderson	10/17/2014	11:24	Pre C	MP	858	34º 08' 58" N	118º 45' 28" W	72.2	9.3	7.74	1.76	N/A	<10	No	somewhat clear	slow, pooled	1.5 feet	12 feet	rock	crawdads	
Paige Anderson	10/17/2014	11:35	Pre C	DS	858	34º 08' 58" N	118º 45' 27" W	72.23	5.75	7.76	2.01	No	<10	No	somewhat clear	medium	6 inches	20 feet	cement	none	
Andrew Paden	10/20/2014	13:59	DC	US	853	34º 08' 42" N	118º 45' 27" W	65.47	5.45	7.23	2.87	Reference	<10	No	murky	slow, pooled	2 feet	30 feet	muddy	a few unidentified fish (ca. 1 ft long)	A turbidity exceedance did not occur. TSS thresholds were exceeded slightly downstream. No action was necessary.
Andrew Paden	10/20/2014	14:10	DC	MP	860	34º 08' 43" N	118º 45' 28" W	65.65	5.77	7.55	1.9	N/A	<10	No	somewhat clear	slow, pooled	2 feet	20 feet	rock	none	
Andrew Paden	10/20/2014	14:25	DC	DS	848	34º 08' 42" N	118º 45' 28" W	67.47	8.16	7.79	2.85	No	14	Yes	somewhat clear	medium	6 inches	20 feet	cement	none	
Paige Anderson	10/21/2014	10:58	DC	US	867	34º 08' 45" N	118º 45' 29" W	65.25	4.2	7.85	2.58	Reference	<10	No	murky	slow/ stagnant	1.5 feet	15 feet	muddy	none	A turbidity exceedance did not occur. TSS thresholds were exceeded slightly downstream. No action was necessary.
Paige Anderson	10/21/2014	10:44	DC	MP	862	34º 08' 43" N	118º 45' 28" W	64.74	5.9	7.51	1.92	N/A	<10	No	somewhat murky	slow/ stagnant	1 foot	10 feet	rocky	crawdads	
Paige Anderson	10/21/2014	10:32	DC	DS	842	34º 08' 41" N	118º 45' 29" W	65	5.93	7.87	1.71	No	19	Yes	relatively clear	medium	9 inches	15 feet	concrete	none	
Andrew Paden	10/28/2014	14:20	Post-C	US	858	34º 08' 42" N	118º 45' 27" W	62.11	3.93	7.4	3.15	Reference	<10	No	murky	slow/ stagnant	1.5 feet	15 feet	muddy	none	A turbidity exceedance did not occur. No TSS exceedances occurred. Post-construction downstream turbidity and TSS levels were comparable to or below preconstruction levels. No action was necessary.
Andrew Paden	10/28/2014	14:35	Post-C	MP	850	34º 08' 43" N	118º 45' 28" W	62.59	6.69	7.54	1.84	N/A	<10	No	somewhat murky	slow/ stagnant	1 foot	10 feet	rocky	none	
Andrew Paden	10/28/2014	14:55	Post-C	DS	848	34º 08' 42" N	118º 45' 28" W	63.28	8.22	7.63	1.33	No	<10	No	relatively clear	medium	9 inches	15 feet	concrete	none	

Legend: US: Upstream; MP: Midpoint; DS: Downstream; Pre C: Pre-Construction; DC: During Construction; Post C: Post-Construction

Water Temp WQO:	**DO WQO:**	**pH WQO:**	**Turbidity WQO:**	**TSS Threshold:**
Never an increase of 5 degrees or above 80 degrees	Never less than 5 mg/L	Between 6.5 and 8.5; can't raise more than 0.5	Increases shall not exceed 20% if upstream is between 0 and 50 NTU, and shall not exceed 10% if ambient is greater than 50 NTU	Less than 10 mg/L

Reach 37 (Medea Creek and Cheseboro Outlet) Sampling Results

Sampler	Date	Time	Type of Sampling Visit	Sampling Location	Altitude (ft)	GPS Points		Water Temp (F)	DO	pH	Turbidity (NTU)	Exceed Turbdity Thresholds?	TSS (mg/L)	Exceed TSS thresholds?	Visual Observations						Summary/Notes
						Latitude	Longitude								Water clarity	Flow	Stream depth est	Stream width est	Banks	Wildlife Observed	
Paige Anderson	10/21/2014	11:18	Pre C	US	776	34º 08' 31" N	118º 45' 32" W	66.27	9.37	8.07	12.2	Reference	47	Yes	somewhat clear (algae chunks)	medium	7 inches	15 feet	cement	none	A turbidity exceedance did not occur. TSS exceedances occurred at upstream and midpoint locations. No action was necessary; this data was collected to establish a baseline of water quality parameters in the creek.
Paige Anderson	10/21/2014	11:23	Pre C	MP	814	34º 08' 31" N	118º 45' 33" W	65.97	9.63	7.99	2.69	N/A	18	Yes	somewhat murky	slow	1.5 feet	23 feet	rubble rock	mosquito fish	
Paige Anderson	10/21/2014	11:36	Pre C	DS	818	34º 08' 31" N	118º 45' 35" W	64.94	8.12	7.99	2.93	No	<10	No	somewhat murky	medium	1 foot	8 feet	dirt/grass	mosquito fish	
Andrew Paden	10/23/2014	13:00	DC	US	812	34º 08' 31" N	118º 45' 32" W	76.25	9.29	7.95	4.7	Reference	<10	No	clear with scattered surface debris	medium	7 inches	15 feet	cement	none	A turbidity exceedance occurred. TSS exceedances occurred at midpoint and downstream locations. However, downstream turbidity levels were over four times lower than midpoint turbidity levels (19.5 NTU versus 74.4 NTU). Further, downstream TSS levels were over 14 times lower than midpoint levels (14 mg/L versus 660 mg/L). This data indicates that BMPs were effectively reducing turbidity and TSS by significant amounts. The exceedances were reported to FMD staff.
Andrew Paden	10/23/2014	13:10	DC	MP	812	34º 08' 31" N	118º 45' 33" W	76.88	7.05	7.96	74.4	N/A	660	Yes	high amounts of sediment and debris	slow	1.5 feet	23 feet	rubble rock	crawdad	
Andrew Paden	10/23/2014	13:15	DC	DS	807	34º 08' 31" N	118º 45' 35" W	75.7	5.73	7.9	19.5	Yes	45	Yes	somewhat murky	medium	1 foot	8 feet	dirt/grass	none	
Andrew Paden	10/24/2014	14:00	DC	US	812	34º 08' 31" N	118º 45' 32" W	74.3	9.01	7.96	2.14	Reference	<10	No	clear with scattered surface debris	medium	6 inches	15 feet	cement	none	A turbidity exceedance occurred, but only by an increase of less than 2 NTU (from 2.14 NTU upstream to 4.02 NTU downstream), which is considered a relatively minor exceedance. TSS levels were over 6 times lower than midpoint levels (18 mg/L versus 110 mg/L). This data indicates that downstream BMPs were effectively reducing turbidity and TSS. No action was necessary.
Andrew Paden	10/24/2014	14:15	DC	MP	812	34º 08' 31" N	118º 45' 33" W	75.03	7.83	8.02	5.09	N/A	110	Yes	apparently clear; some small plant debris	nearly still	6 inches	23 feet	rubble rock	none	
Andrew Paden	10/24/2014	14:20	DC	DS	805	34º 08' 31" N	118º 45' 35" W	74.03	6.96	7.94	4.02	Yes	18	Yes	apparently clear; some small plant debris	medium	1 foot	8 feet	dirt/grass	none	
Andrew Paden	10/28/2014	13:00	Post-C	US	812	34º 08' 31" N	118º 45' 32" W	76.05	12.28	8.13	0.97	Reference	<10	No	clear with scattered surface debris	medium	6 inches	15 feet	cement	none	A turbidity exceedance occurred, but only by an increase of less than 2 NTU (from 0.97 to 2.47 upstream), which is considered a relatively minor exceedance. Further, downstream turbidity was higher than midpoint turbidity, indicating its increase could at least partially be attributed to existing variation in the stream. A TSS exceedance occurred downstream at 10 mg/L, which barely exceeds the TSS threshold and the reference sample. Post-construction downstream turbidity and TSS levels were comparable to preconstruction levels. No action was necessary.
Andrew Paden	10/28/2014	13:10	Post-C	MP	812	34º 08' 31" N	118º 45' 33" W	76.42	11.26	8.16	1.27	N/A	<10	No	apparently clear; some small plant debris	medium	6 inches	23 feet	rubble rock	none	
Andrew Paden	10/28/2014	13:20	Post-C	DS	805	34º 08' 31" N	118º 45' 35" W	74.8	8.01	8.09	2.47	Yes	10	Yes	apparently clear; some small plant debris	medium	1 foot	8 feet	dirt/grass	none	

Legend: US: Upstream Pre C: Pre-Construction
MP: Midpoint DC: During Construction
DS: Downstream Post C: Post-Construction

Water Temp WQO:	**DO WQO:**	**pH WQO:**	**Turbidity WQO:**	**TSS Threshold:**
Never an increase of 5 degrees or above 80 degrees	Never less than 5 mg/L	Between 6.5 and 8.5; can't raise more than 0.5	Increases shall not exceed 20% if upstream is between 0 and 50 NTU, and shall not exceed 10% if ambient is greater than 50 NTU	Less than 10 mg/L

Reach 38 (Lindero Canyon Outlet) Sampling Results

Sampler	Date	Time	Type of Sampling Visit	Sampling Location	Altitude (ft)	GPS Points		Water Temp (F)	DO	pH	Turbidity (NTU)	Exceed Turbdity Thresholds?	TSS (mg/L)	Exceed TSS Thresholds?	Visual Observations	Summary/Notes
						Latitude	Longitude									
Paige Anderson	9/25/2014	10:28 AM	Pre C	US	837	34º 08' 34" N	118º 45' 52" W	64.5	13.2	8.29	1.68	Reference	<10	No	Lots of algae on water surface; deep cold water.	A turbidity exceedance did not occur. TSS thresholds were not exceeded. No action was necessary; this data was collected to establish a baseline of water quality parameters in the creek.
Paige Anderson	9/25/2014	10:41 AM	Pre C	MP	847	34º 08' 35" N	118º 45' 51" W	63.4	9.5	8.36	0.99	N/A	<10	No	Algae lining banks and rooted to base of channel; narrow flow.	
Paige Anderson	9/25/2014	10:59 AM	Pre C	DS	852	34º 08' 33" N	118º 45' 51" W	62.8	6.78	8.19	0.96	No	<10	No	Shaded; clear water; banks lined with reeds and leaf litter; no algae.	
Nicolle Steiner	9/29/2014	1:11 AM	DC	US	837	34º 8' 35" N	118º 45' 50" W	64.20	7.85	8.15	1.34	Reference	74	Yes	Standing pool of water in soft bottom channel.	Downstream turbidity exceeded upstream turbidity; however, both values were very low and the downstream exceedance was not determined to be detrimental to channel health. Measures to reduce turbidity in response to the exceedance included installation of two fiber rolls placed across the stream. TSS levels at the upstream and midpoint locations exceeded the TSS threshold; however, downstream TSS was below the threshold. No further action was necessary.
Nicolle Steiner	9/29/2014	1:15 AM	DC	MP	835	34º 8' 35" N	118º 45' 50" W	65.54	7.60	8.02	1.87	N/A	22	Yes	Slow flowing water in soft bottom channel.	
Nicolle Steiner	9/29/2014	1:28 AM	DC	DS	846	34º 58' 33" N	118º 45' 50" W	62.92	7.49	8.03	2.76	Yes	<10	No	Flowing water in soft bottom channel. Two fiber rolls placed on stream. Sample taken downstream of rolls.	
Paige Anderson	10/3/2014	10:20 AM	Post C	US	846	34º 08' 35" N	118º 45' 50" W	61.51	10.82	8.33	1.12	Reference	<10	No	Algae on surface; slow flow.	A turbidity exceedance did not occur. TSS thresholds were not exceeded. No action was necessary.
Paige Anderson	10/3/2014	10:31 AM	Post C	MP	838	34º 08' 35" N	118º 45' 50" W	61.32	9.71	8.1	1.4	N/A	<10	No	Water flowing faster than upstream; narrow channe; algae along banks and within stream.	
Paige Anderson	10/3/2014	10:55 AM	Post C	DS	861	34º 08' 33" N	118º 45' 52" W	60.01	6.79	8.13	1.32	No	<10	No	Narrow flow; shaded; leaf litter along banks; appeared less deep than midpoint; fiber rolls present adjacent to creek	

Legend: US: Upstream; MP: Midpoint; DS: Downstream; Pre C: Pre-Construction; DC: During Construction; Post C: Post-Construction

Water Temp WQO: Never an increase of 5 degrees or above 80	**DO WQO:** Never less than 5.0 mg/L	**pH WQO:** Between 6.5 and 8.5; can't raise more than 0.5 degrees	**Turbidity WQO:** Increases shall not exceed 20% if upstream is between 0 and 50, and shall not exceed 10% if ambient is greater than 50	**TSS Threshold:** No greater than 10 mg/L

2015-16 Maintenance Activities

Dominguez Channel Watershed

Water Quality Monitoring Results (2015-16)

Reach No. and Name	DATE	Sampling Parameters	Sample Location			COMMENT
			Upstream of Project (u/s)	Within Project	Downstream of Project (d/s)	
Reach 26 - Project 74	9/24/2015	TIME	10:25 AM	10:38 AM	10:58 AM	Baseline/Pre-Work
		SAMPLE NO.	26-1	26-2	26-3	
		TEMP (°C)	23.38	22.71	23.74	
		pH	7.95	7.1	7	
		Turbidity (NTUs)	3.64	11.1	27.7	
		Dissolved O2 (mg/L)	8.82	0.97	3.3	Debris in and around water at upstream location. Also a lot of plants/leaves in water. The midpoint location has very dark soils on the banks and had a lot of mosquitoes.
		Total Suspended Solids (mg/L)	22	27	29	
Reach 26 - Project 74	9/25/2015	TIME	10:43	11:00	11:20	During Work
		SAMPLE NO.	26-1-925	26-2-925	26-3-925	
		TEMP (°C)	22.93	23.02	24.96	
		pH	7.21	7.3	6.94	
		Turbidity (NTUs)	35.3	17.8	33.2	
		Dissolved O2 (mg/L)	4.34	5.06	3.43	
		Total Suspended Solids (mg/L)	19	10	14	
Reach 26 - Project 74	9/29/2015	TIME	10:37	10:59	11:29	During Work
		SAMPLE NO.	26-1-929	26-2-929	26-3-929	
		TEMP (°C)	21.59	22.01	25.37	
		pH	7.69	6.78	6.83	
		Turbidity (NTUs)	38.1	13.3	44.3	
		Dissolved O2 (mg/L)	8.16	2.6	3.44	
		Total Suspended Solids (mg/L)	67	18	20	The upstream sampling location had a construction BMP fiber roll in place. Water had some dirt and floating film layer just in front of the fiber roll. many mosquito fish at this location. The midpoint sampling location had a construction BMP fiber roll in place, and the water was stagnant, not flowing, very murky and had no transparency. The downstream sampling location had construction BMPs in place (two sets of sand bags and a fiber roll) and we sampled about 3 feet in front of the roll. These BMPs were implemented after last week's high turbidity level at the downstream. Due to consistent high levels of turbidity at the up and downstream, we assume that the high turbidity is not due to construction and more likely due to natural conditions.
Reach 26 - Project 74	09/30/2015	TIME	9:11	9:37	10:01	During Work
		SAMPLE NO.	26-1-930	26-2-930	26-3-930	Turbidity exceedance at downstream again, even with BMPs in place Similar water and flow conditions to yesterday. High turbidity throughout the reach, at each sampling location. Turbidity exceedance was reported to field supervisor. Advised more BMPs to be implemented. Retaken sample still showed turbidity exceedance, despite BMPs. Tubidity exceedance likely due to natural conditions and construction related activity.
		TEMP (°C)	20.86	21.65	22.86	
		pH	7.6	6.64	6.73	
		Turbidity (NTUs)	21.6	30.8	48.8	
		Dissolved O2 (mg/L)	4.77	5.2	8.61	
		Total Suspended Solids (mg/L)	33	11	<10	
Reach 26 - Project 74	01/10/2015	TIME	8:43	9:00	9:42	During Work
		SAMPLE NO.	26-1-101	26-2-101	26-3-101	Turbidity exceedance at downstream again, even with BMPs in place Similar water and flow conditions to yesterday. High turbidity throughout the reach, at each sampling location. Turbidity exceedance was reported to field supervisor. Advised more BMPs to be implemented. Retaken sample still showed turbidity exceedance, despite BMPs. Tubidity exceedance likely due to natural conditions and construction related activity.
		TEMP (°C)	20.44	21.52	23.31	
		pH	7.31	6.76	6.75	
		Turbidity (NTUs)	13.9	29.8	42.6	
		Dissolved O2 (mg/L)	5.04	1.15	3.12	
		Total Suspended Solids (mg/L)	10	32	11	
Reach 26 - Project 74	10/02/2015	TIME	8:24	8:36	9:05	During Work
		SAMPLE NO.	26-1-102	26-2-102	26-3-102	Turbidity exceedance at downstream again, even with BMPs in place Similar water and flow conditions to yesterday. High turbidity throughout the reach, at each sampling location. Turbidity exceedance was reported to field supervisor. Advised more BMPs to be implemented. Retaken sample still showed turbidity exceedance, despite BMPs. Tubidity exceedance likely due to natural conditions and construction related activity.
		TEMP (°C)	19.43	21.12	21.78	
		pH	7.35	6.78	6.83	
		Turbidity (NTUs)	13.3	47.2	48.7	
		Dissolved O2 (mg/L)	4.45	0.68	2.82	
		Total Suspended Solids (mg/L)	49	12	29	
Reach 26 - Project 74	10/05/2015	TIME	12:25	12:35	12:47	During Work
		SAMPLE NO.	26-1-105	26-2-105	26-3-105	
		TEMP (°C)	19.73	18.2	19.2	
		pH	7.2	6.15	6.74	
		Turbidity (NTUs)	36.6	30	24.6	
		Dissolved O2 (mg/L)	4.47	0.72	1.61	
		Total Suspended Solids (mg/L)	21	20	12	High turbidity throughout the reach, at each sampling location. Two sets of sand bags and two fiber rolls in place for BMPs.
Reach 26 - Project 74	10/13/2015	TIME	12:26	12:37	12:58	During Work
		SAMPLE NO.	26-1-1013	26-2-1013	26-3-1013	
		TEMP (°C)	74.48	71.03	86.34	
		pH	8.21	7.61	8.9	
		Turbidity (NTUs)	19.8	6.48	11.1	
		Dissolved O2 (mg/L)	7.43	2.25	10.26	
		Total Suspended Solids (mg/L)	35	12	29	Two sets of sand bags and two fiber rolls in place for BMPs.
Reach 26 - Project 74	10/21/2015	TIME	12:53	1:05	1:22	Post Work
		SAMPLE NO.	26-1-1021	26-2-1021	26-3-1021	
		TEMP (°C)	70.77	68.65	89.27	
		pH	8.46	7.01	9.53	
		Turbidity (NTUs)	46.7	9.33	7.99	
		Dissolved O2 (mg/L)	8.65	0.66	14.13	Water was mostly stagnant throughout the reach. Lots of floating film and debris at all sampling locations. Algae and floating film layer at downstream.
		Total Suspended Solids (mg/L)	190	69	150	

Malibu Creek Watershed

Water Quality Monitoring Results (2015-16)

Reach No. and Name	DATE	Sampling Parameters	Sample Location			COMMENT
			Upstream of Project (u/s)	Within Project	Downstream of Project (d/s)	
Reach 38 Lindero Creek	18/09/2015	TIME	9:25 AM	9:40 AM	9:50 AM	**Baseline/Pre-Work**
		SAMPLE NO.	38-1 US	38-2 W	38-3 DS	
		TEMP (°C)	65.0 F	64.5 F	63.4 F	
		pH	7.16	7.82	7.69	
		Turbidity (NTUs)	1.46	1.99	2.26	
		Dissolved O2 (mg/L)	8.57	5.35	1.86	
		Total Suspended Solids (mg/L)	< 10 mg/L	< 10 mg/L	< 10 mg/L	Baseline (pre-clearing); no BMPs placed downstream
Reach 38 Lindero Creek	9/23/2015	TIME	8:45 AM	8:52 AM	9:03 AM	**During Work/Last Day of Work**
		SAMPLE NO.	38-1-923	38-2-923	38-3-923	
		TEMP (°C)	64.4 F	64.3 F	64.7 F	
		pH	6.58	6.99	7.25	
		Turbidity (NTUs)	11	1.33	1.37	
		Dissolved O2 (mg/L)	4.5	5.1	1.46	
		Total Suspended Solids (mg/L)	< 10	30	< 10	Construction crew started working. BMP in place at the time of sampling. Very low turbidity at the downstream. Steady flow throughout the reach.
Reach 38 Lindero Creek	9/24/2015	TIME	9:05 AM	9:12 AM	9:19 AM	**Post Work**
		SAMPLE NO.	38-1-924	38-2-924	38-3-924	
		TEMP (°C)	63.48 F	63.89 F	64.12 F	
		pH	6.7	7.12	7.51	
		Turbidity (NTUs)	1.77	1.27	1.43	
		Dissolved O2 (mg/L)	5.78	6.15	2.73	Post-work monitoring; all BMPs removed; u/s and internal turbidity readings were below the respective baseline turbidity levesl; d/s turbidity was within the acceptable 20% limit of the basieline turbidity level.
		Total Suspended Solids (mg/L)	<10	<10	<10	

APPENDIX D

PUBLIC COMMENTS AND QUESTIONS WITH LACFCD RESPONSE

Public Meeting

Malibu Creek and Dominguez Channel Feasibility Study Report

May 25, 2016

Public Comments and Questions

1. Why was water turbidity so high downstream of Reaches?

   The water quality results indicated that baseline conditions for Reaches 26, 34, 37, 38 had higher turbidity downstream even before work started. As an example, some portions of Reach 26 were observed having debris, with lots of floating plants, and leaves. The water was very murky and mostly stagnant throughout. The turbidity measurements throughout the reach were irregularly high on various sampling days, so it was difficult to attribute the high turbidity to one cause. Although no water diversion was required, LACFCD took extra steps to install Best Management Practices (BMPs) downstream at these reaches during the maintenance activities before and during work. The BMPs drastically improved the turbidity readings downstream during maintenance activities. Post-maintenance water quality sampling result indicated turbidity readings for some of these channels returned to the elevated pre-maintenance channel condition.

2. Turbidity and TSS should correlate, but in some cases they go totally opposite each other with no correlation. Why does variable measurement range so drastically for pH, DO, turbidity and TSS for Reach 26?

   The varying ranges for pH, DO, turbidity, and TSS for Reach 26 was already observed prior to any vegetation clearing activities. These variations appear to be related to the natural condition of the channel.

   It should be noted that when water was present in the reach, parts of the reach was impacted by plants, leaves, floating algae, and debris. The water was murky and mostly stagnant.

3. Since there were no stream gage data collected, is there a mechanism for validating the HEC-RAS model? Can they be implemented in this case? Methodology is proven to work. However, confirmation is needed to make sure the model is working properly.

   The potential sources of variations in the model include flow, cross section geometry, boundary conditions, and Manning's roughness coefficients. The flows used in the models were the design flows for the channels, therefore this parameter was assumed to be fixed. Potential modeling variations due to boundary condition assumptions was addressed by extending the model boundary approximately 1000

feet upstream and downstream of the reach of interest. The channel geometry was obtained using the most reliable means available (field survey). Finally, model sensitivity runs for the selected Manning's roughness coefficients were conducted to determine whether reasonable variation in the selected value (plus or minus 20%) would change the overall vegetation maintenance recommendations. Model sensitivity runs confirmed that the reach recommendations did not change with this variation in Manning's roughness.

4. Has the LAFCD done any benthic macroinvertebrate sampling? Does the LAFCD use these methods to assess effects of maintenance activities on water quality? Will this method be used to assess effects of proposed modified maintenance practices?

   No, we have not. Macroinvertebrates live in, on, or near the substratum of running water. Most of the reaches in Los Angeles County are dry and maintenance work in them is performed outside and away from any flowing waters, if present. Channel maintenance activities rarely require diversion of water. Maintenance work in each reach takes only a few days to a maximum of a few weeks out of a year, depending on the length of the reach. Benthic macroinvertebrates also take some time to establish in response to changing conditions. Therefore, conducting benthic macroinvertebrates surveys would not result in any measurable value to track effects of maintenance activities.

5. In Stokes canyon (Reach 32) what is the function of the pipe and wire? How does HEC-RAS deal with it? Can we possibly look at future feasibility study to include what we should do with the pipe and wire? Take them out or reconfigure their layout?

   A pipe and wire revetment (P&WR) stabilizes a channel's bank by minimizing erosion. It also minimizes large debris located outside of the revetment from entering and obstructing the channel. Typically, P&WR are acceptable as an economical alternative and may act as a temporary measure until a more permanent structure is put in place in the channels.

   The P&WR in the Stokes Canyon reach appear to have little impact on the channel's hydraulics, whether positive or negative. The existing P&WR will be evaluated to determine if it needs to be replaced to continue providing temporary erosion control.