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.

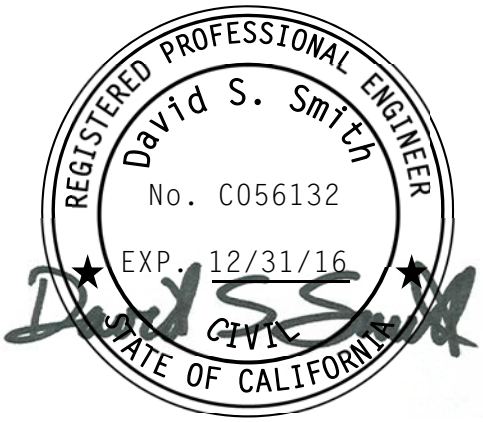
Engineered Earthen-Bottom Flood Control Channels, Malibu Creek and Dominguez Channel Watersheds Hydraulic Analysis and Technical Assessment Report

March 2016

Prepared for:

Los Angeles County Flood Control District
Department of Public Works
900 South Fremont Ave.
Alhambra, CA 91803

Prepared by:



WEST Consultants, Inc.
11440 W. Bernardo Ct, Suite 360
San Diego, CA 92127

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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.

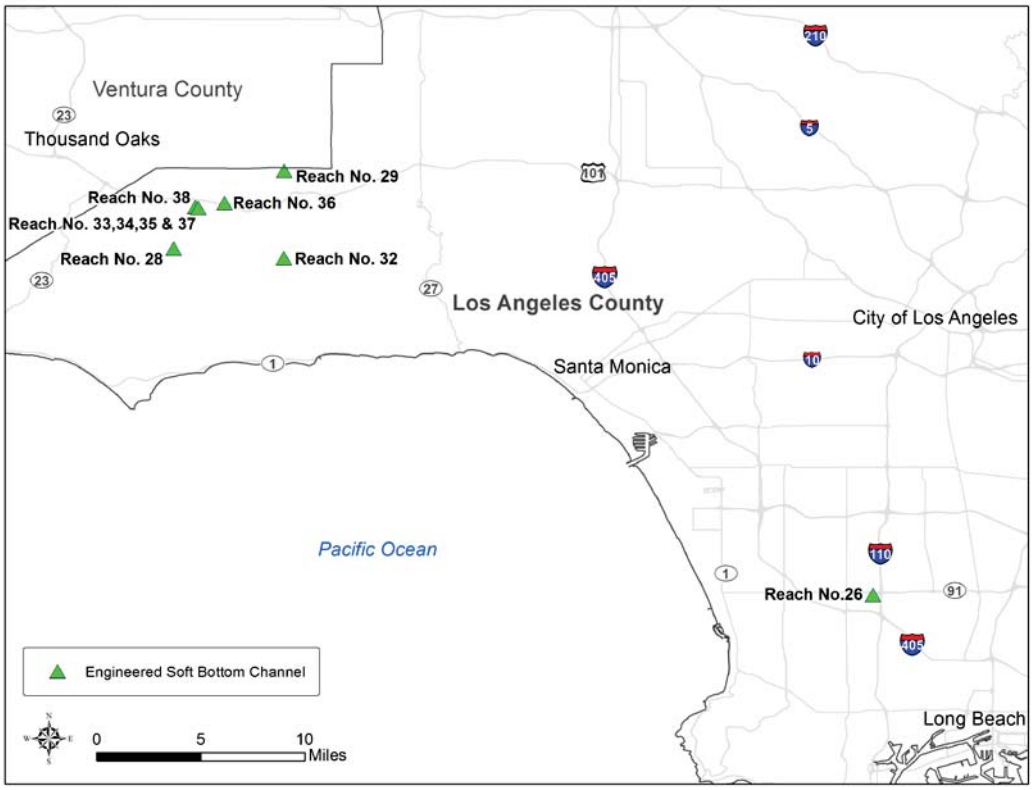


Figure 1-1. Project Location Map

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).

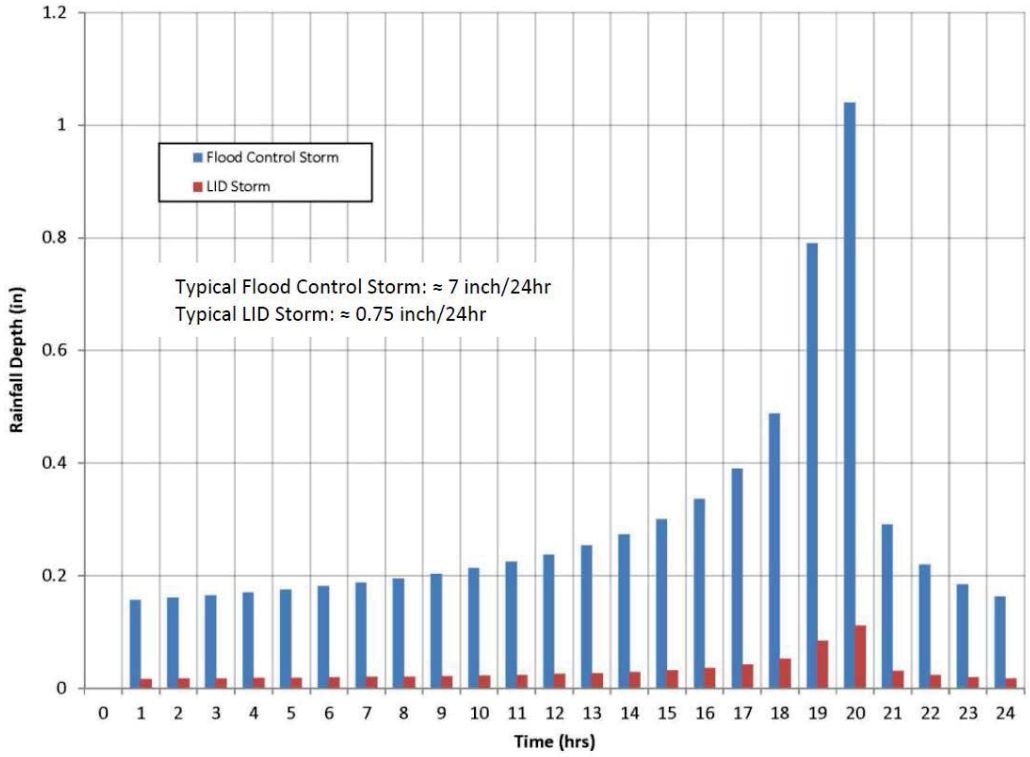


Figure 1-3. Typical Flood Control Storm vs. LID Storm (after LACFCD 2013)

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).

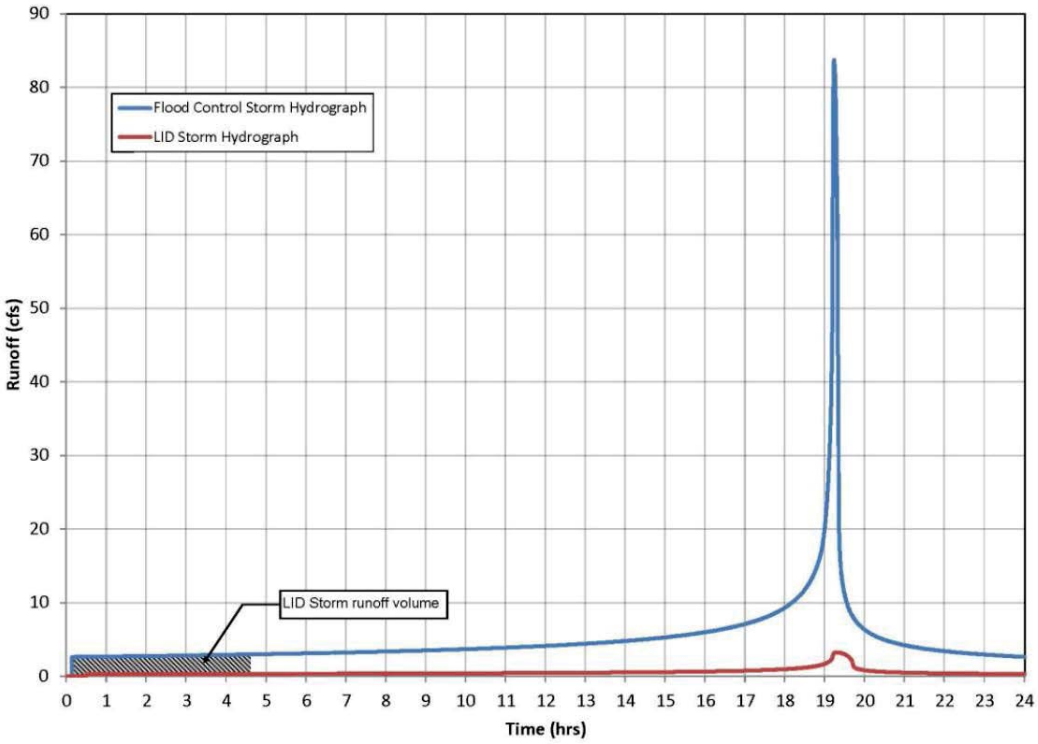


Figure 1-4. Example Watershed Runoff Peaks and Volume (after LACFCD 2013)

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).

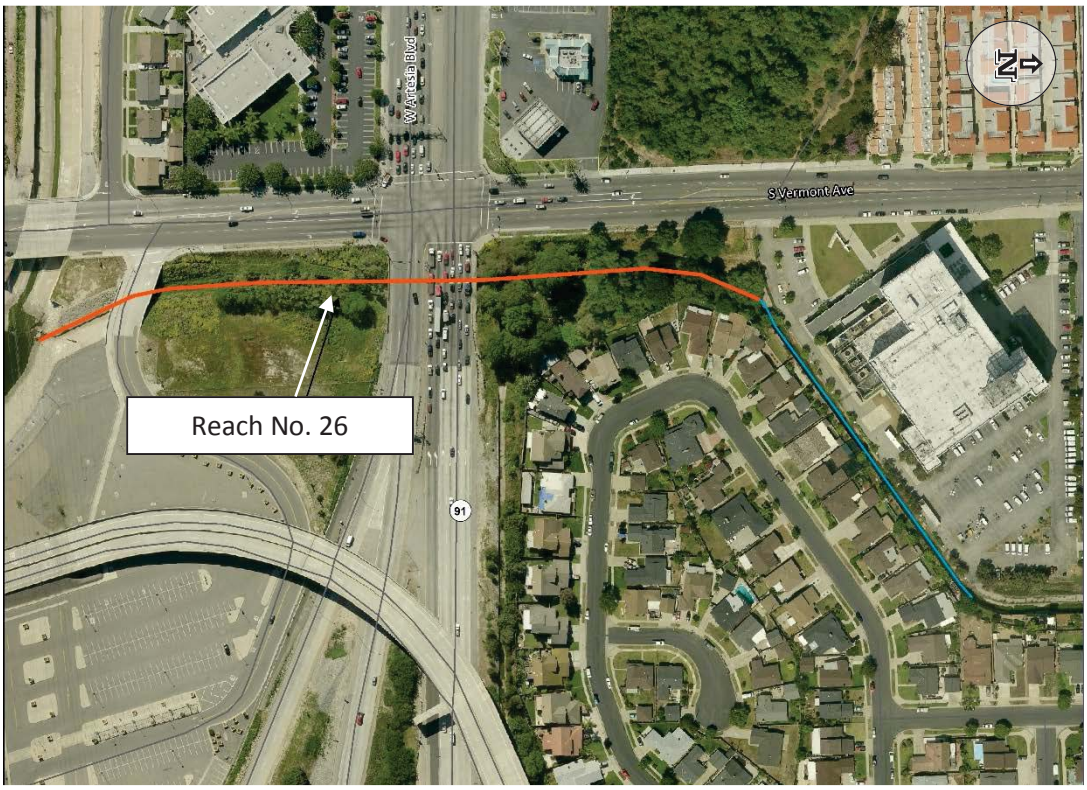


Figure 2-1. Project 74 Soft-bottom Limits

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.

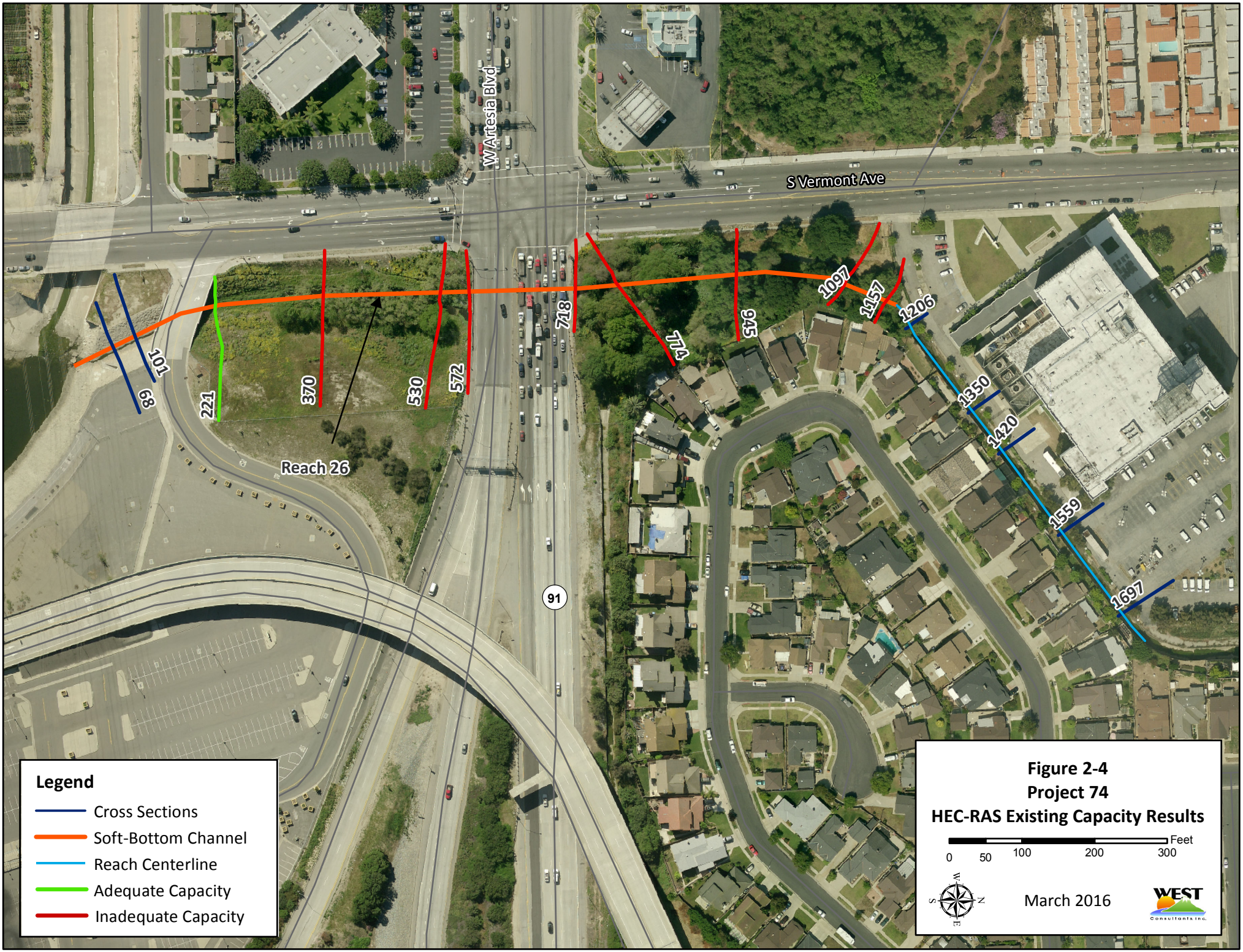
2.5 HYDRAULIC MODEL

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
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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.

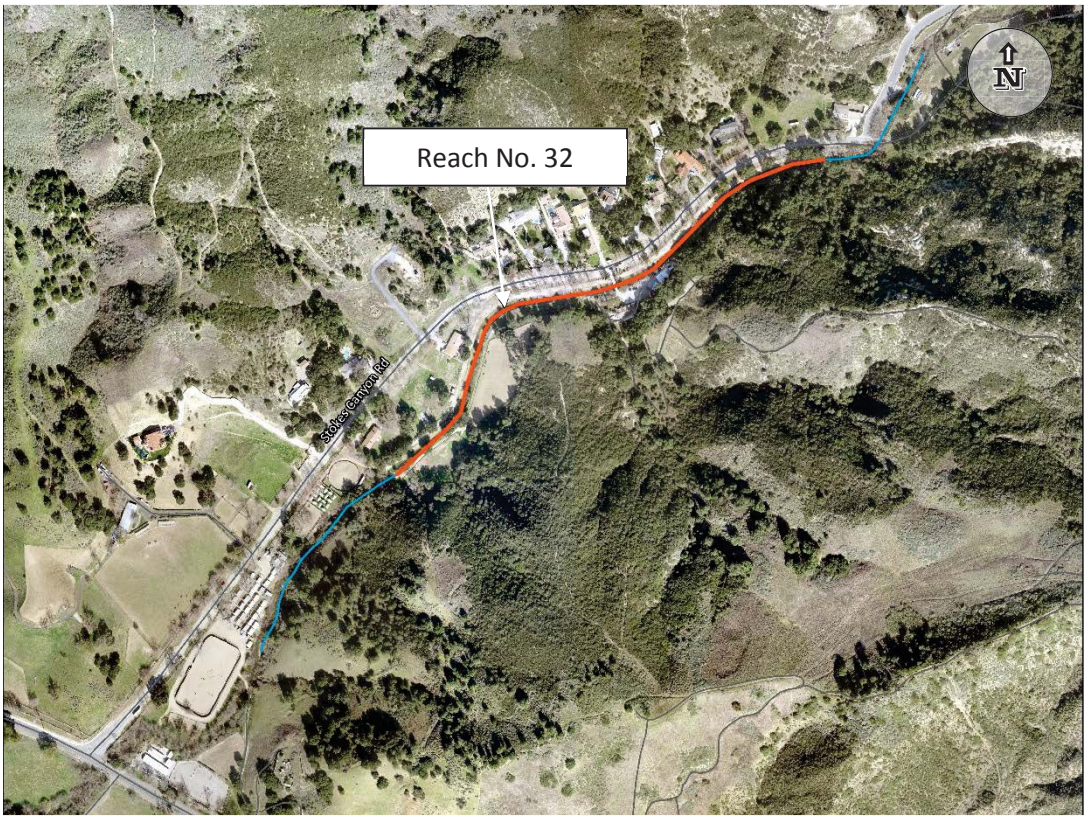


Figure 5-1. Stokes Canyon Channel Soft-Bottom Limits

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.

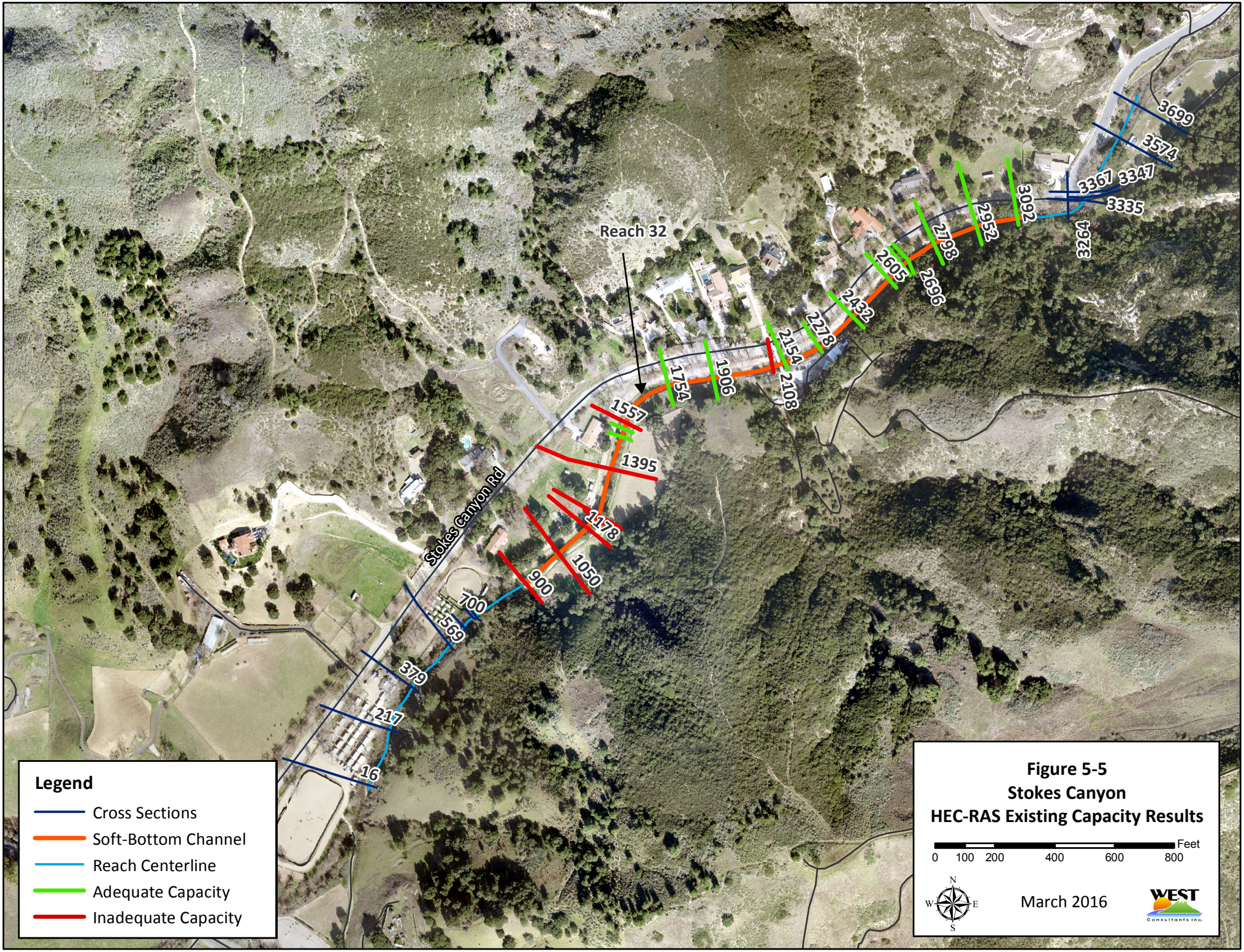

Reach 32
Stokes Canyon Rd
3699
3574
3367
3347
3335
3324
3092
2952
2793
2696
2605
2432
2278
2154
2108
1906
1754
1557
1395
1178
1050
900
700
569
379
217
16
Legend
Cross Sections
Soft-Bottom Channel
Reach Centerline
Adequate Capacity
Inadequate Capacity
Figure 5-5
Stokes Canyon
HEC-RAS Existing Capacity 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

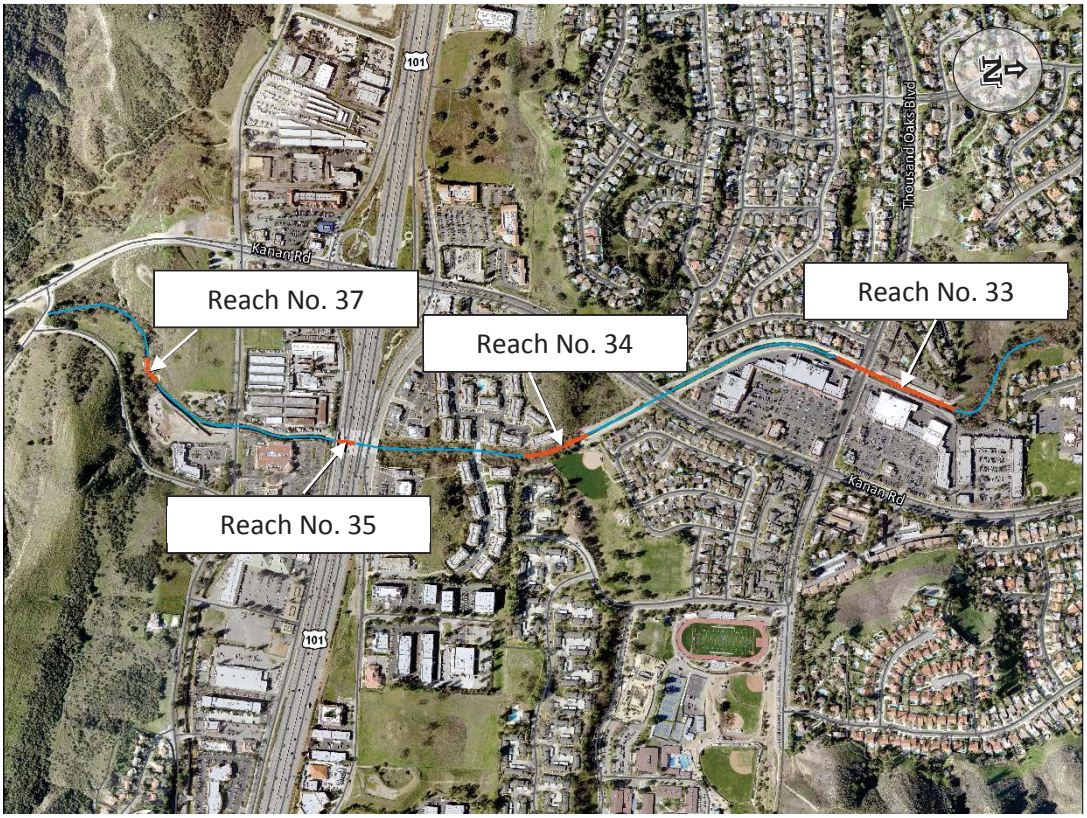


Figure 6-1. Medea Creek Soft-bottom Limits

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.

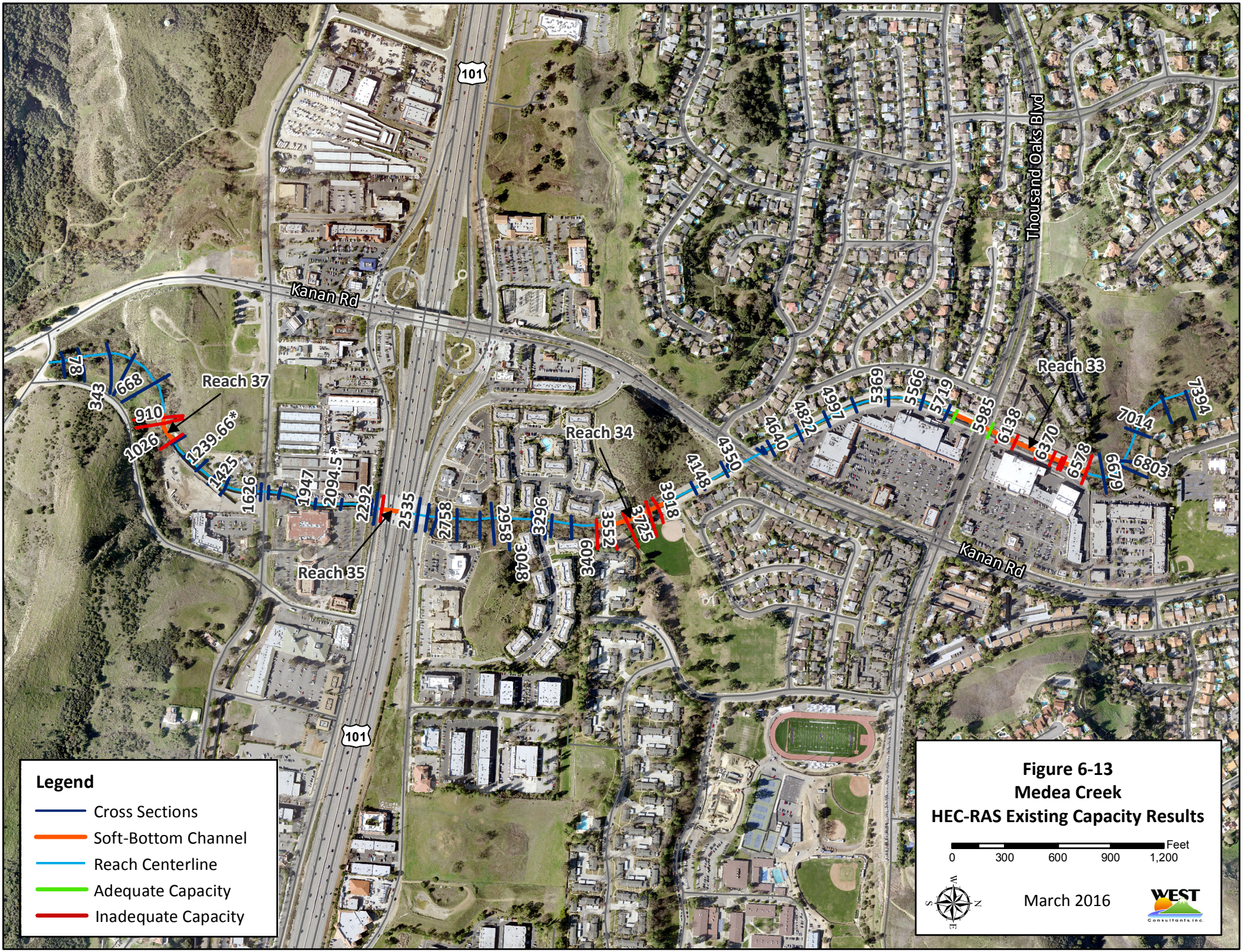

Kanan Rd
101
Thousand Oaks Blvd
Reach 37
Reach 34
Reach 35
Reach 33
87
343
668
910
1026
1239.66*
1425
1626
1947
2094.5*
2292
2535
2758
2958
3048
3293
3403
3552
3725
3918
4148
4350
4640
4822
4997
5369
5566
5719
5985
6138
6370
6578
6679
6803
7014
7394
Legend
Cross Sections
Soft-Bottom Channel
Reach Centerline
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

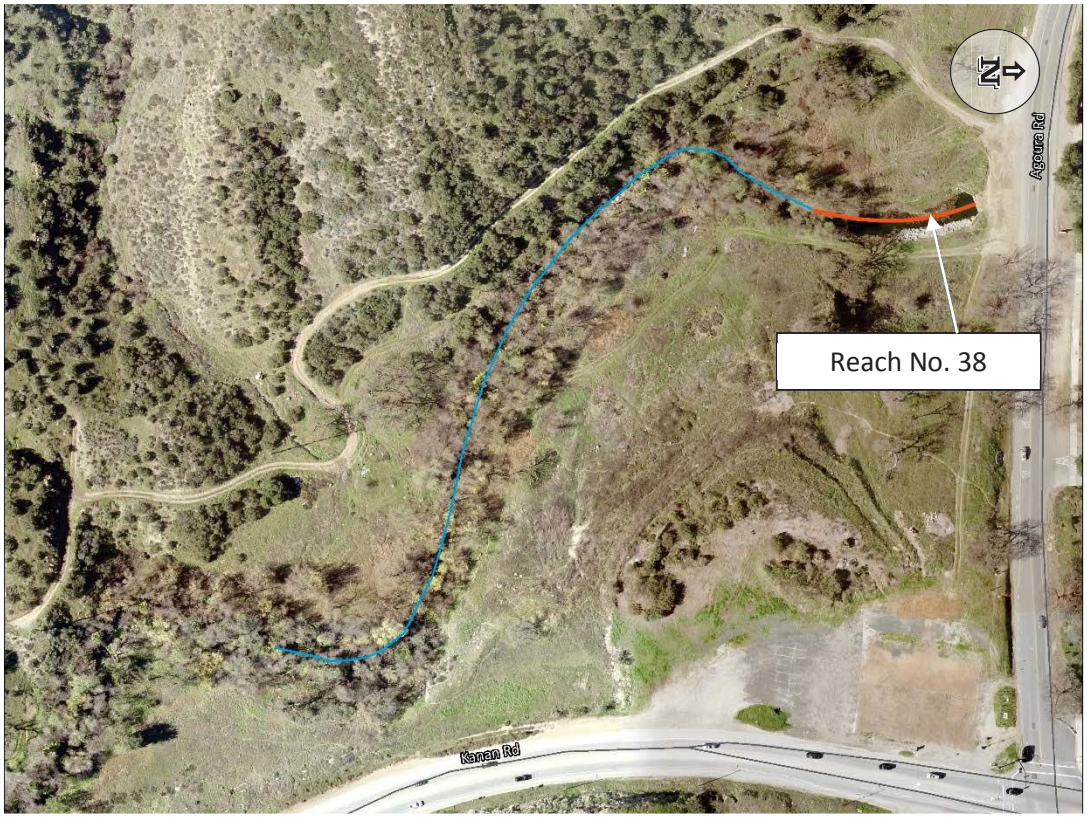


Figure 8-1. Lindero M.C.O. Soft-Bottom Limits

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.

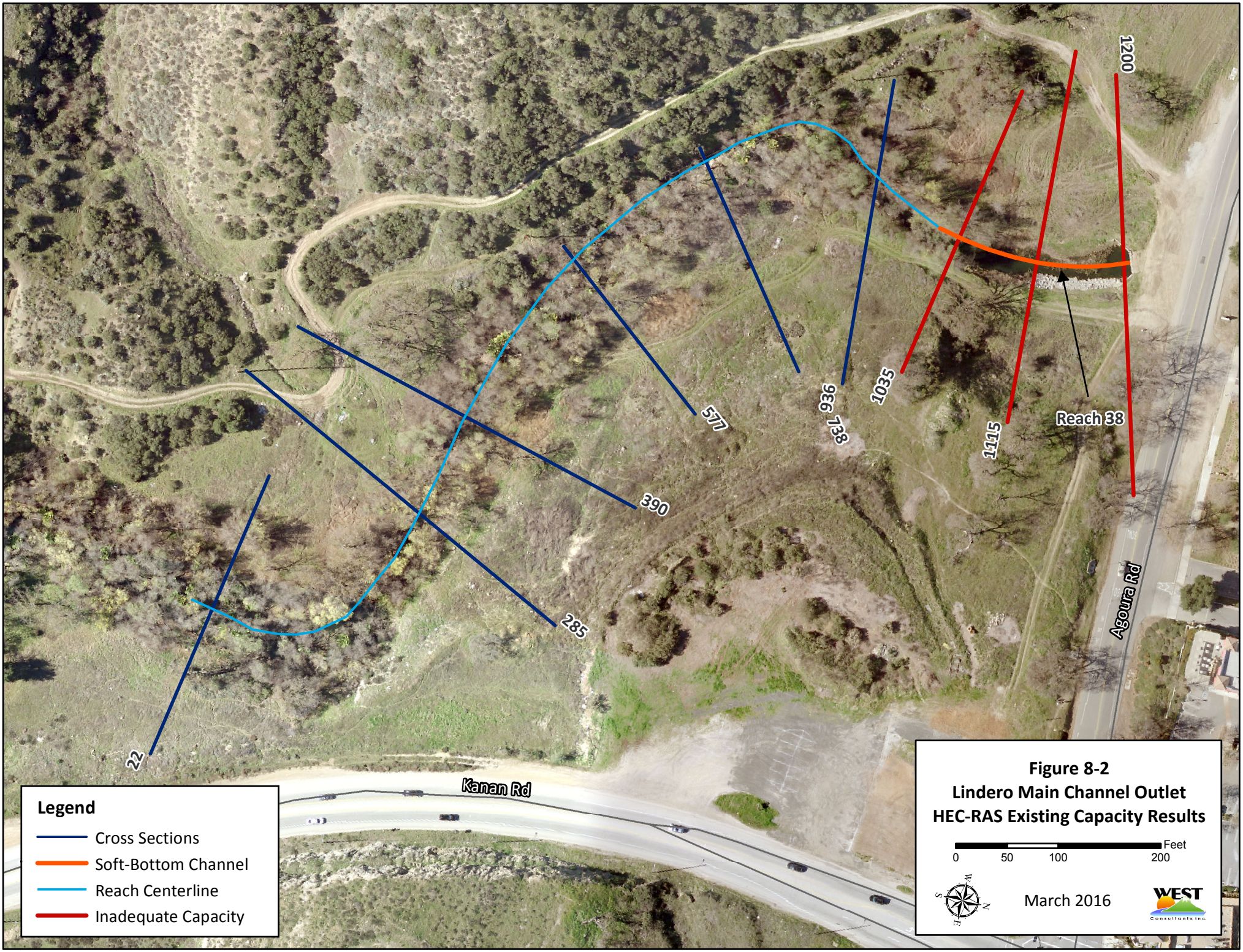
The maximum distance between cross sections was 263 feet. Cross section reach lengths were chosen to ensure a gradually varied flow profile and to adequately represent the channel's geometry and structures along the study reach. The hydraulic model was run under "mixed flow" conditions so potential areas 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

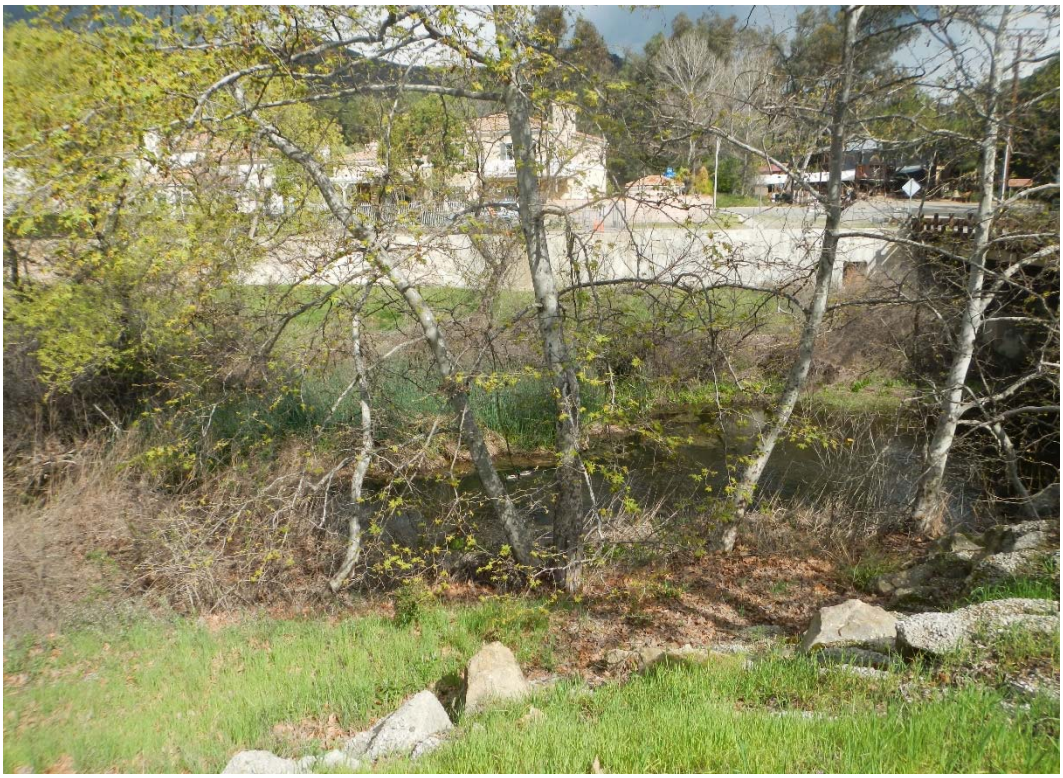
REACH NO. 28

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

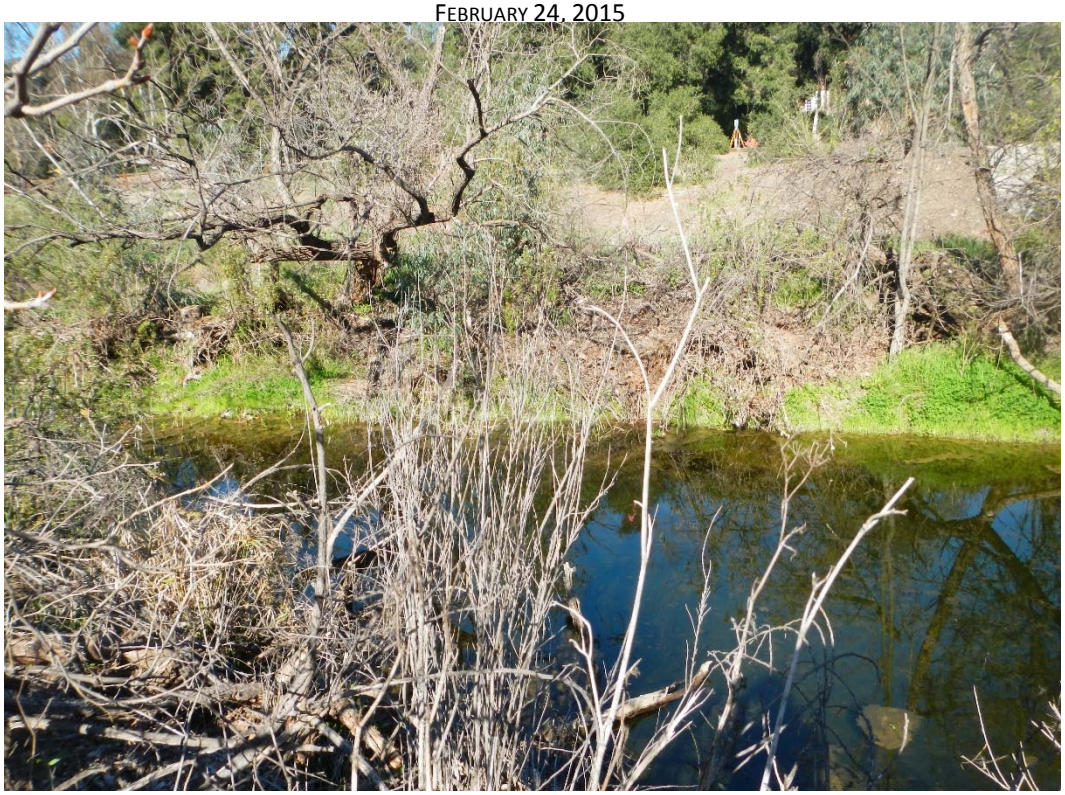
33 FT. UPSTREAM OF HEC-RAS RIVER STATION 7+67, UPSTREAM DIRECTION

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

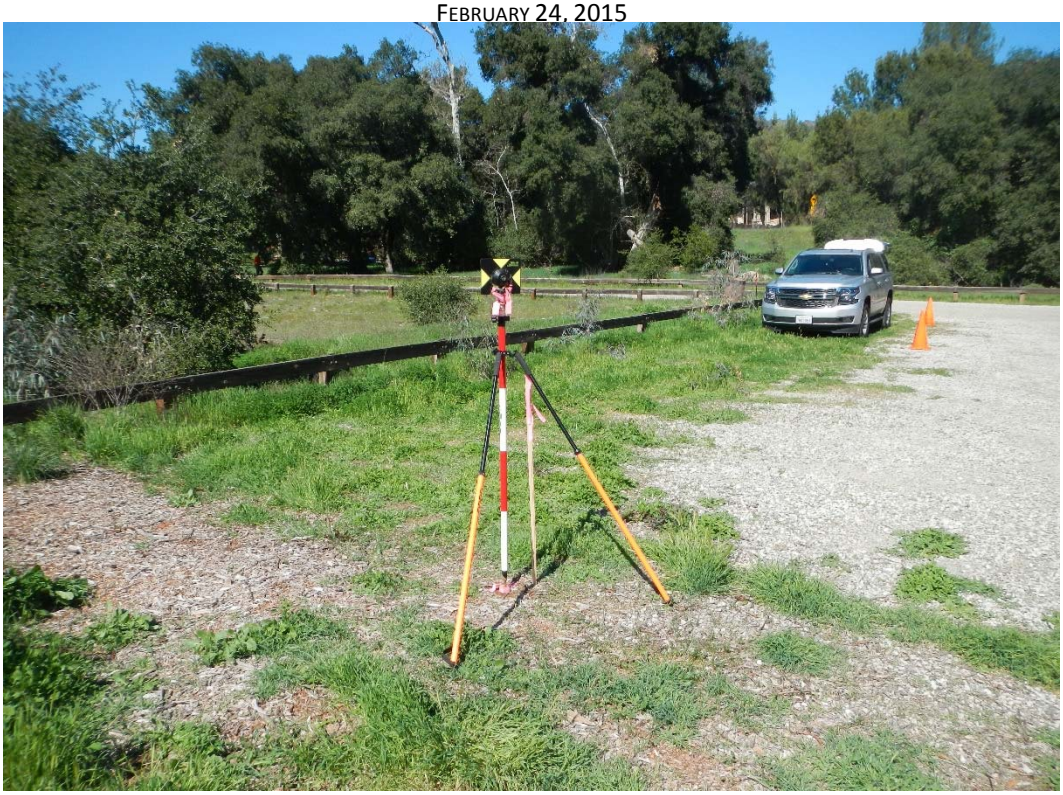
49 FT. UPSTREAM OF HEC-RAS RIVER STATION 4+51, STREAMSIDE, LEFT

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

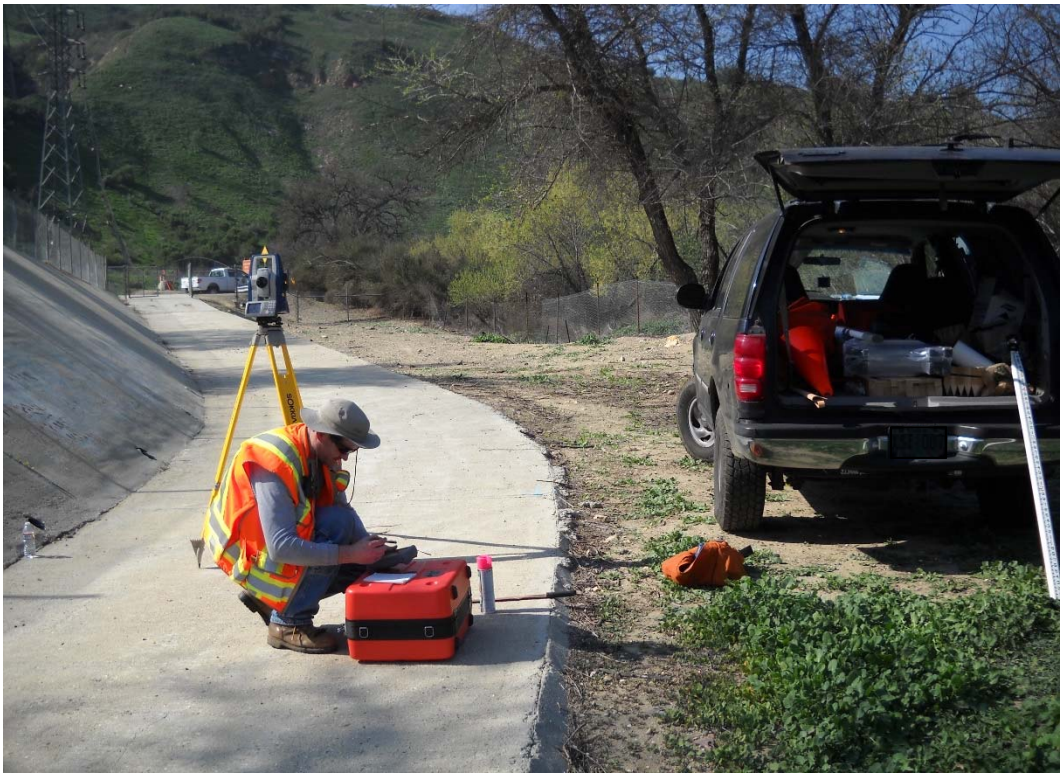
LAS VIRGENES CREEK

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

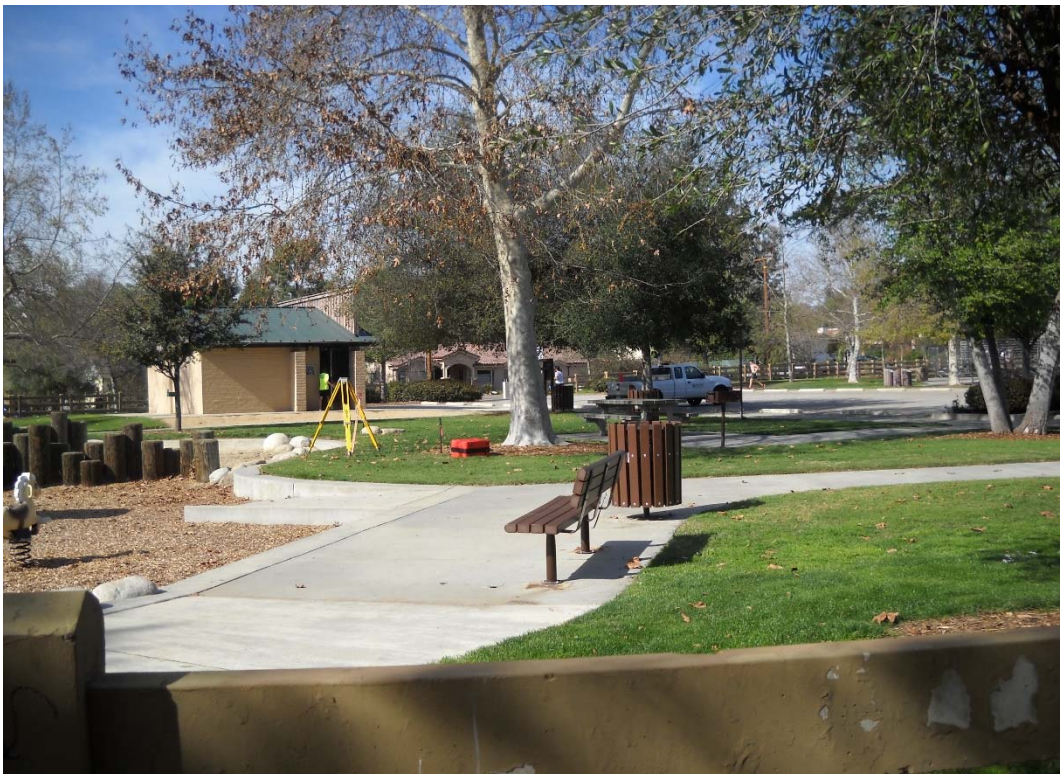
HEC-RAS RIVER STATION 11+90, LEFT OVERBANK

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

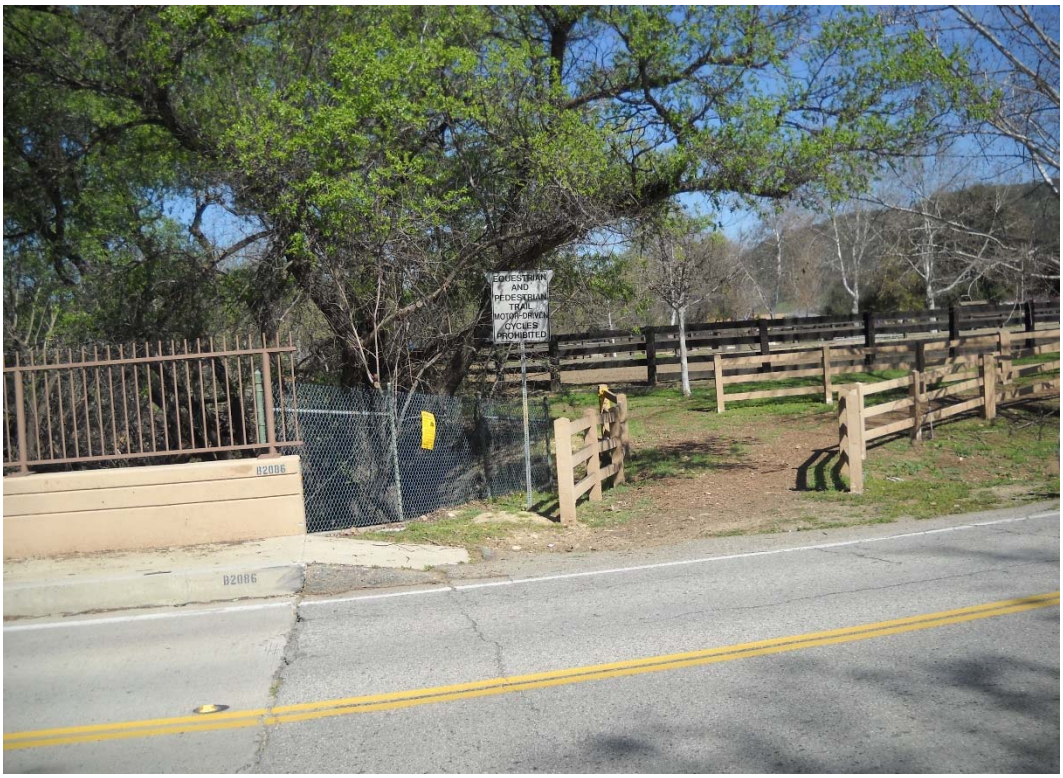
HEC-RAS RIVER STATION 15+82, UPSTREAM DIRECTION

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)

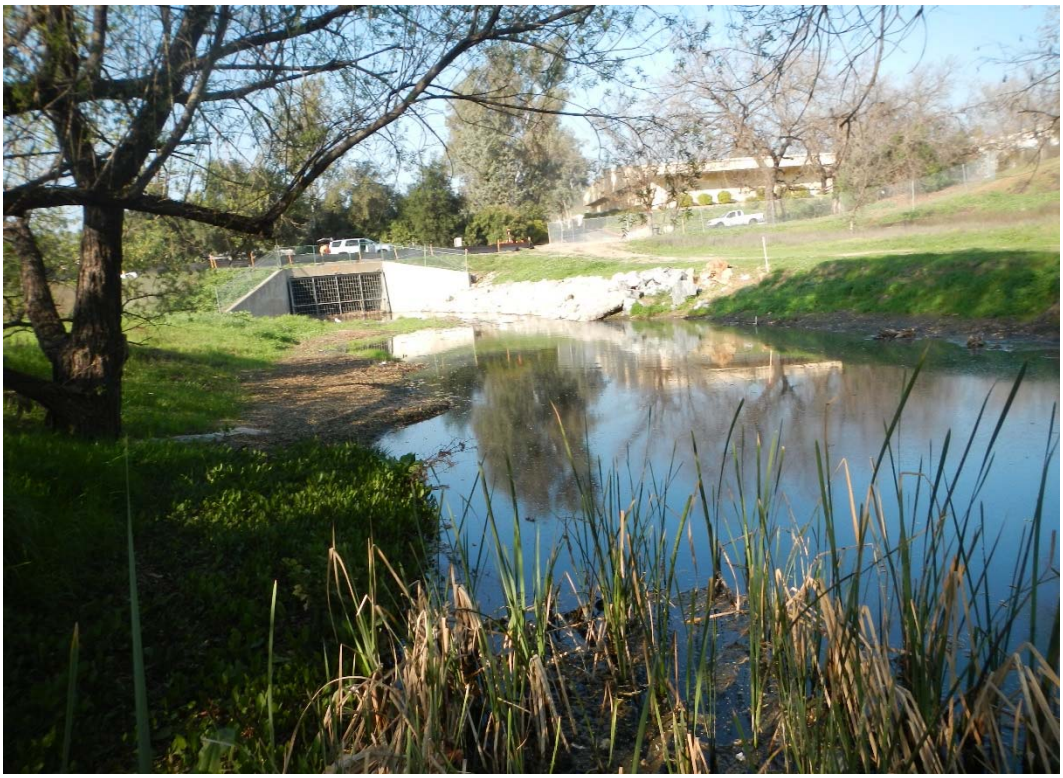
APPENDIX G

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

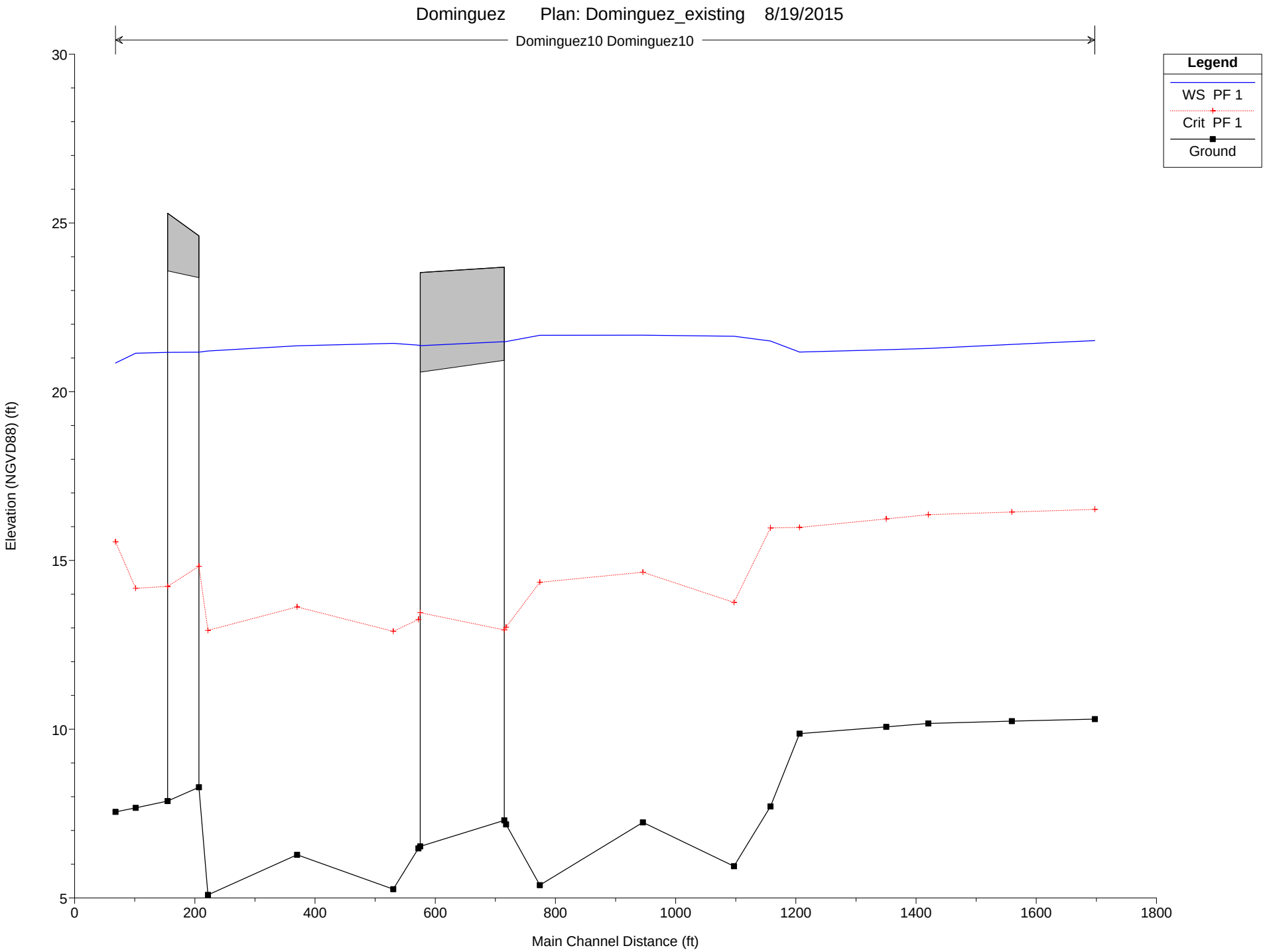
HEC-RAS

OUTPUT FILES

PROJECT 74

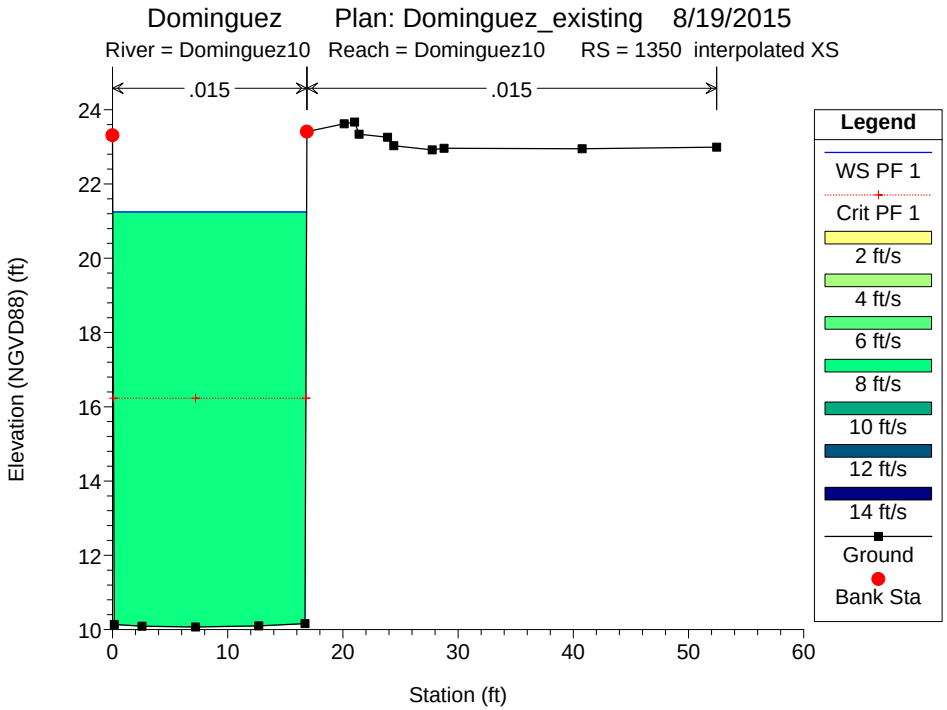
(DOMINGUEZ CHANNEL)

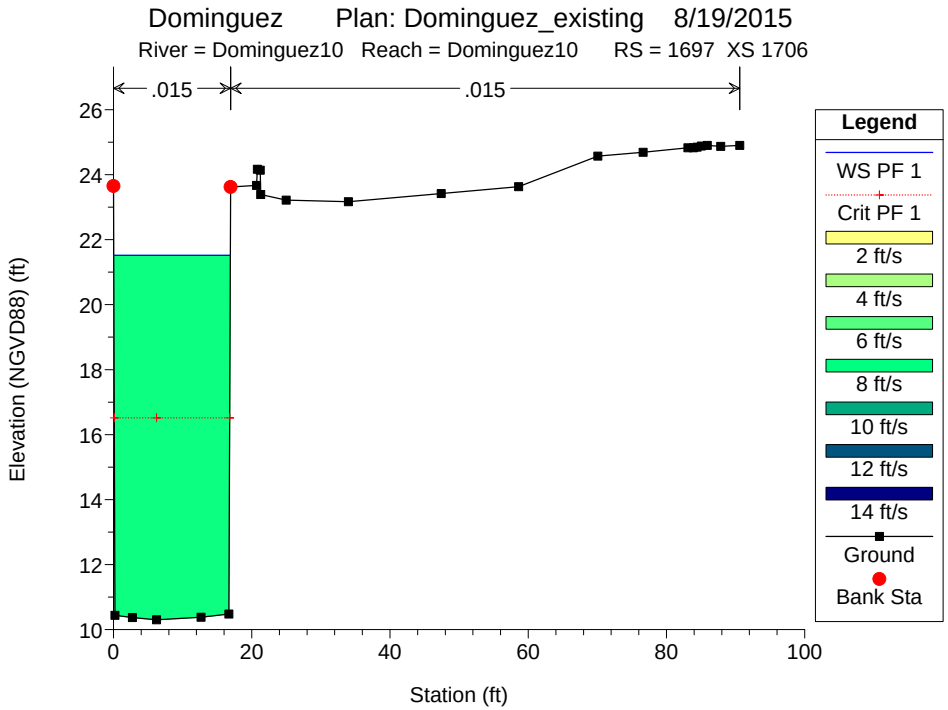

1697
1559
1420
1350
1206
1157
1097
945
774
718
572
530
370
221
101
Dominguez10

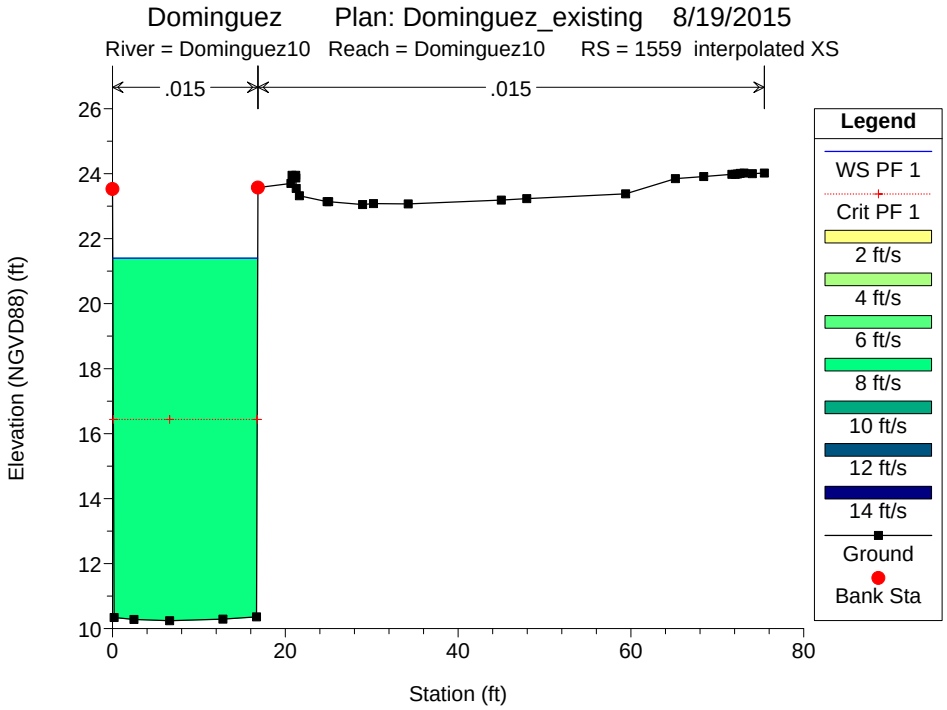

Dominguez Plan: Dominguez_existing 8/19/2015
Dominguez10 Dominguez10
Legend
WS PF 1
Crit PF 1
Ground
Elevation (NGVD88) (ft)
Main Channel Distance (ft)
30
25
20
15
10
5
0
200
400
600
800
1000
1200
1400
1600
1800

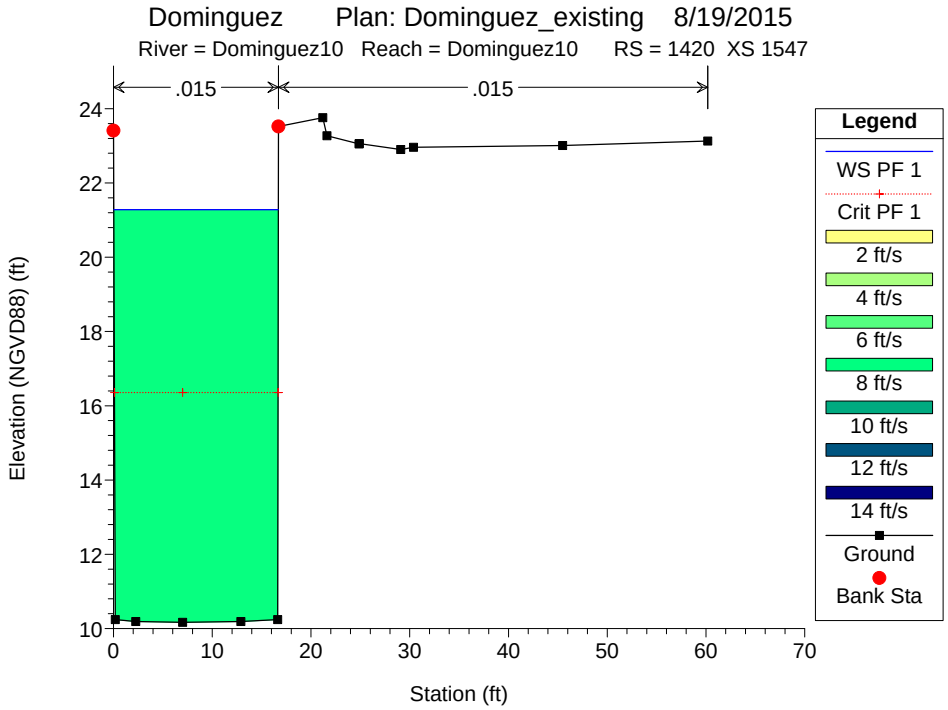
HEC-RAS Plan: Dominguez_exist River: Dominguez10 Reach: Dominguez10 Profile: PF 1

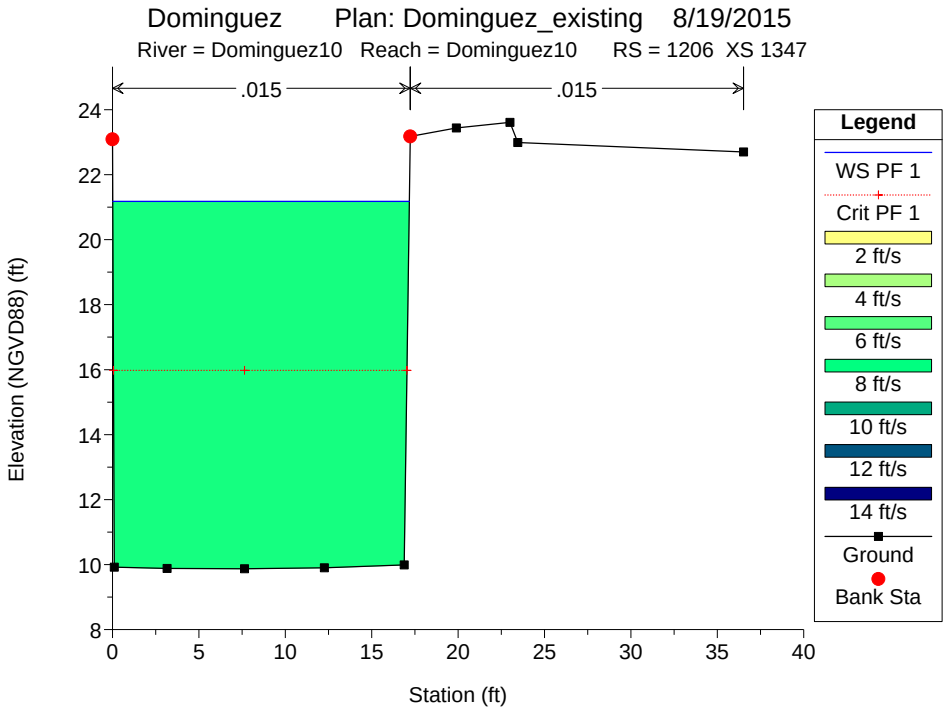
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Dominguez10	1697	PF 1	1436.50	10.30	21.52	16.51	22.44	0.000748	7.72	185.98	16.88	0.41
Dominguez10	1559	PF 1	1436.50	10.24	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

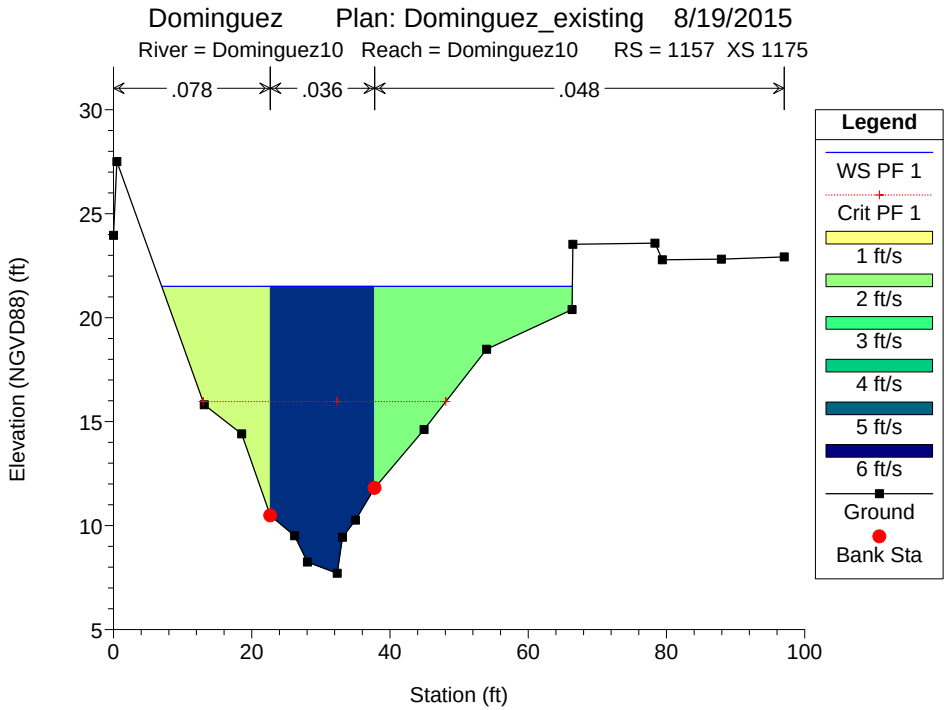

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1350 interpolated XS
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

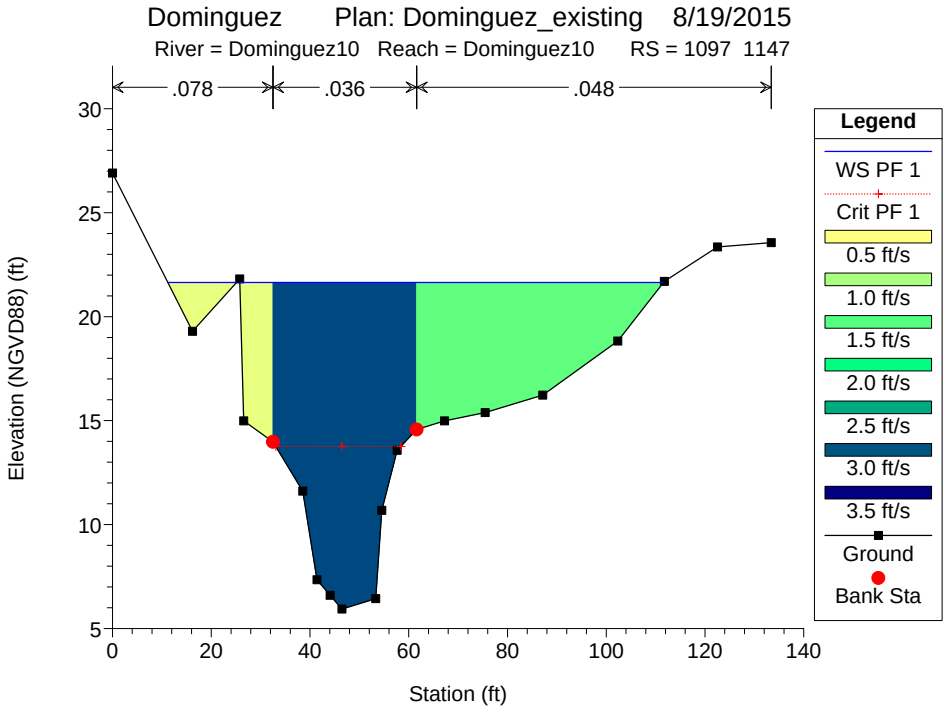

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1697 XS 1706
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

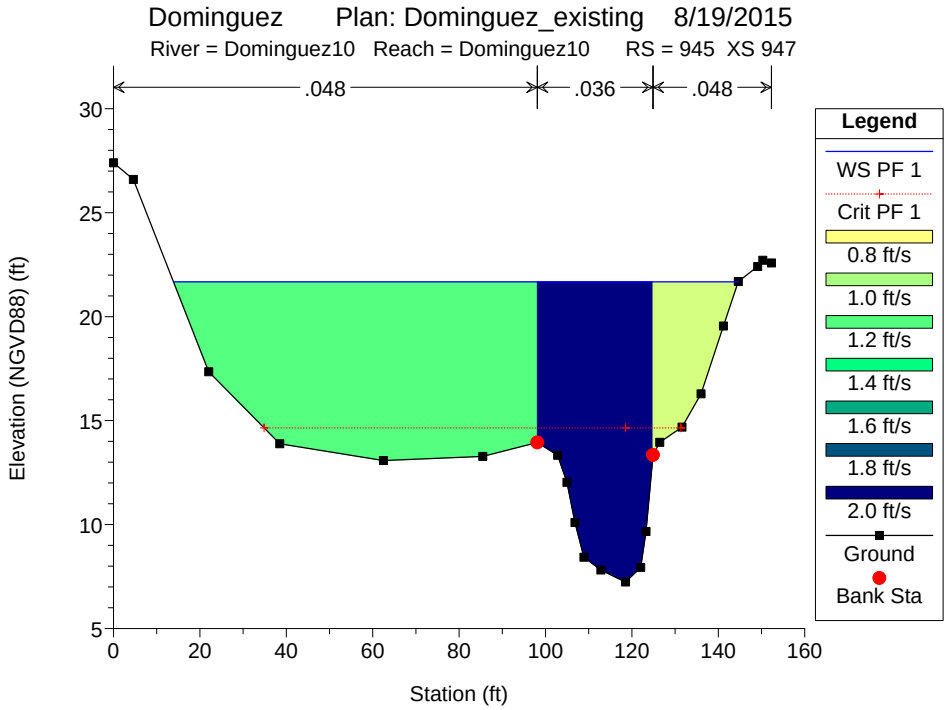

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1559 interpolated XS
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

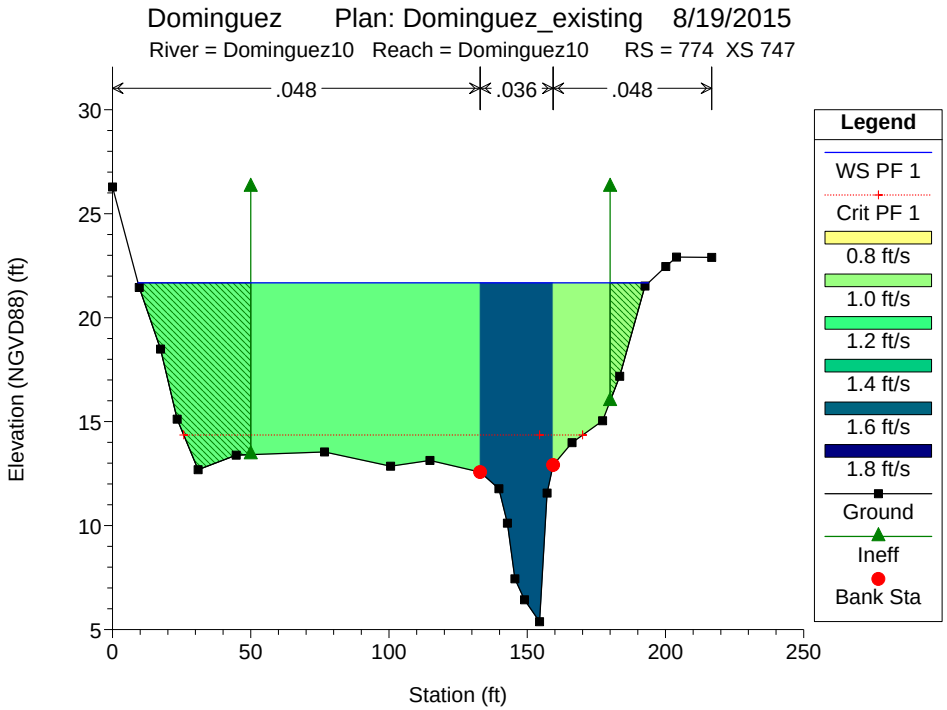

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1420 XS 1547
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

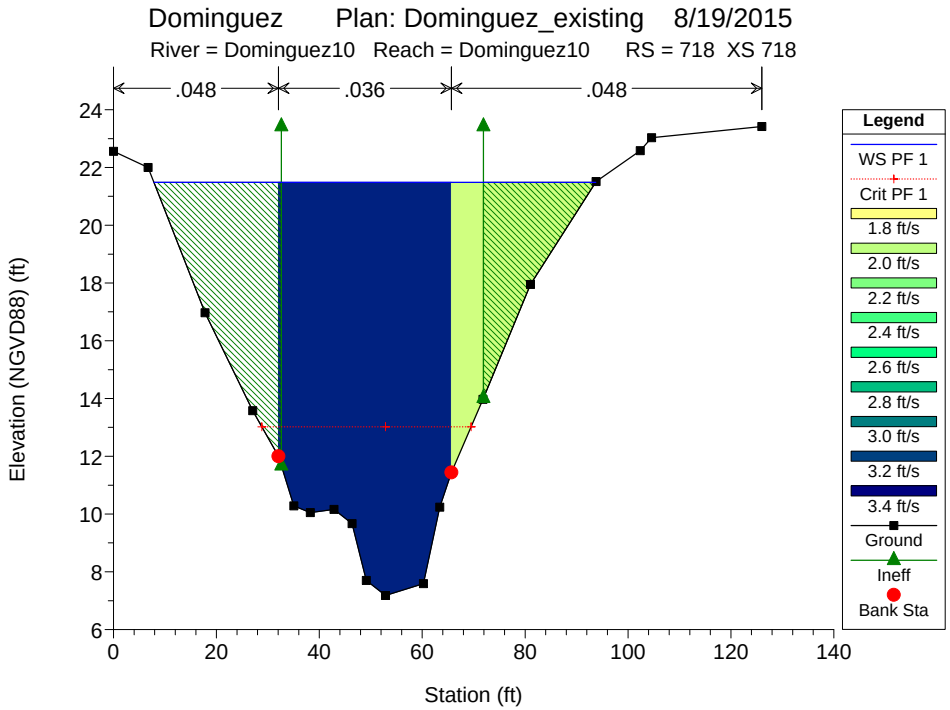

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1206 XS 1347
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

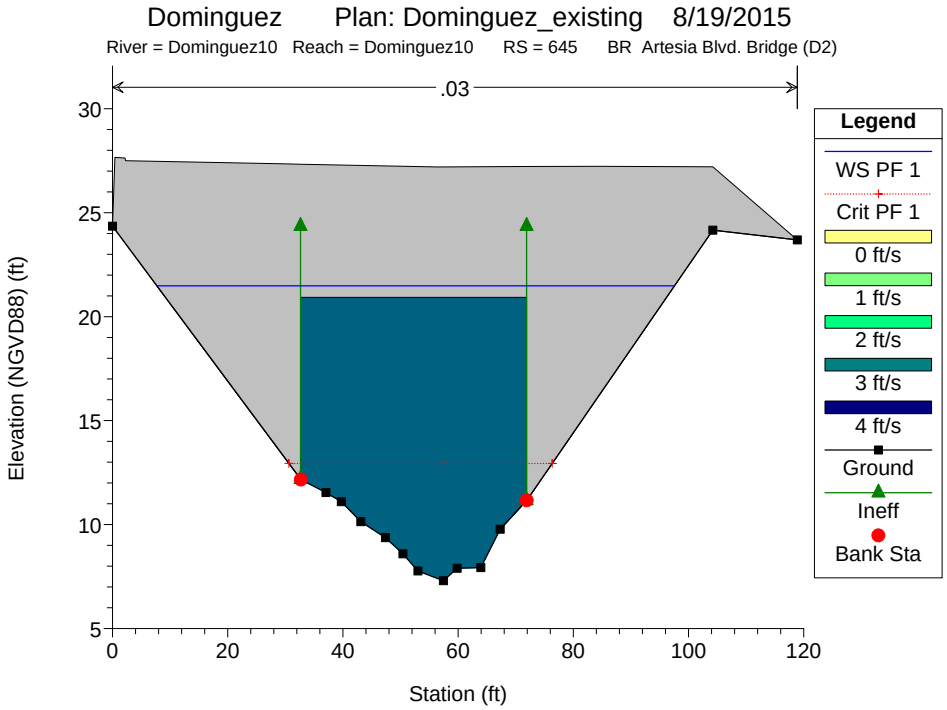

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1157 XS 1175
.078
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
Ground
Bank Sta

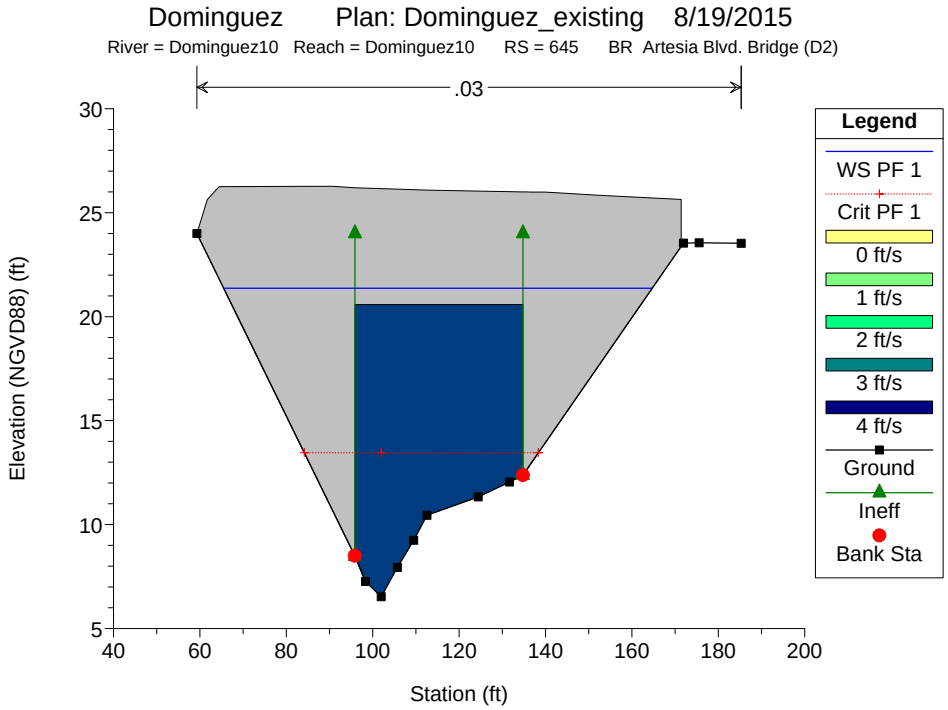

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 1097 1147
.078
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
Ground
Bank Sta

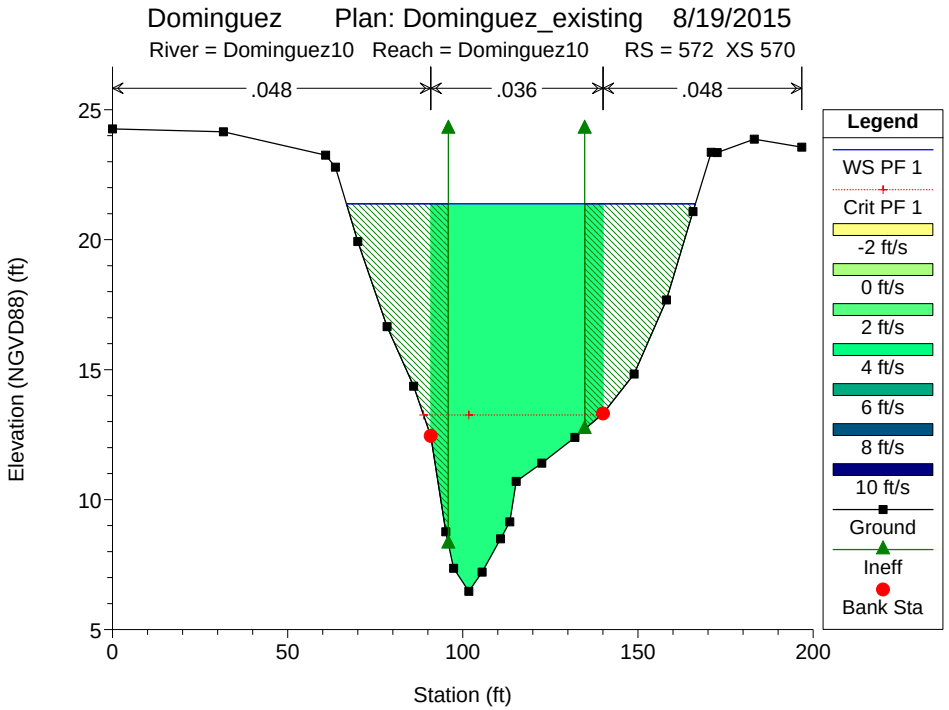

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 945 XS 947
.048
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0.8 ft/s
1.0 ft/s
1.2 ft/s
1.4 ft/s
1.6 ft/s
1.8 ft/s
2.0 ft/s
Ground
Bank Sta

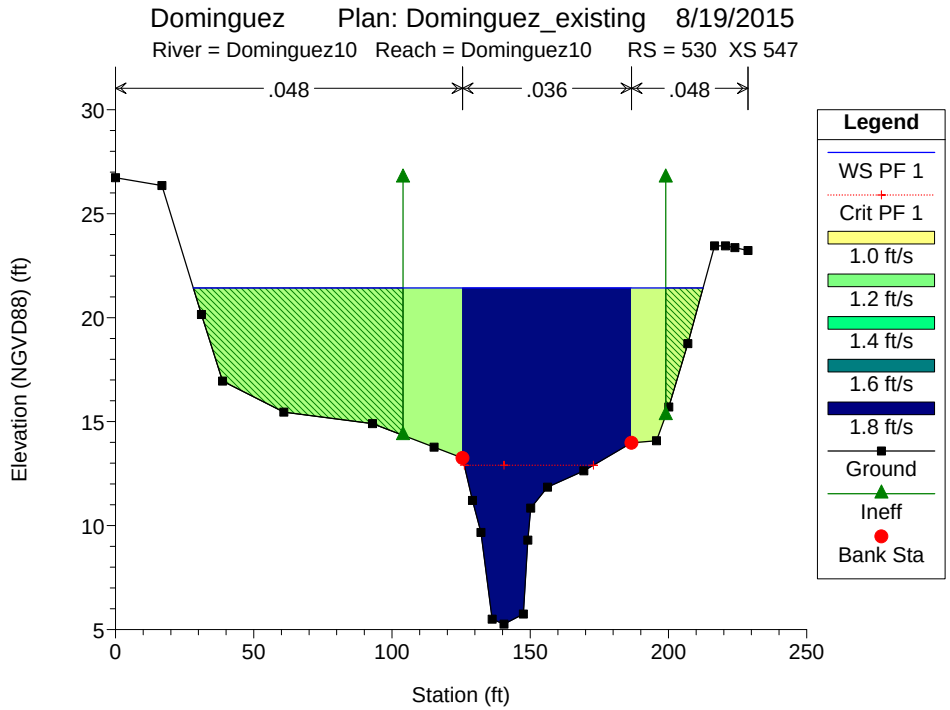

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 774 XS 747
.048
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0.8 ft/s
1.0 ft/s
1.2 ft/s
1.4 ft/s
1.6 ft/s
1.8 ft/s
Ground
Ineff
Bank Sta

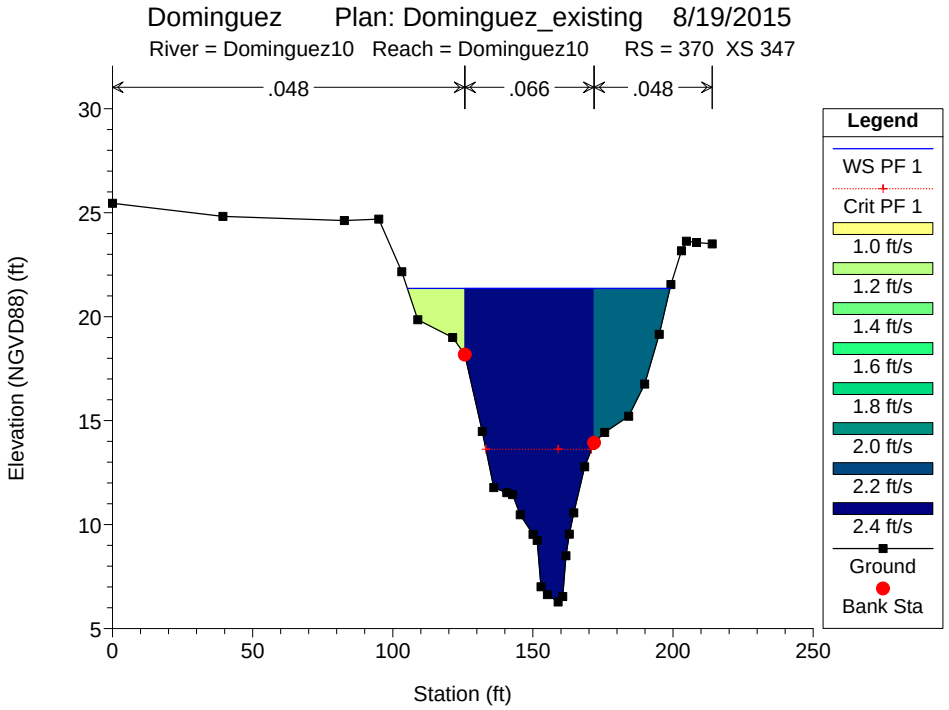

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 718 XS 718
.048
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.8 ft/s
2.0 ft/s
2.2 ft/s
2.4 ft/s
2.6 ft/s
2.8 ft/s
3.0 ft/s
3.2 ft/s
3.4 ft/s
Ground
Ineff
Bank Sta

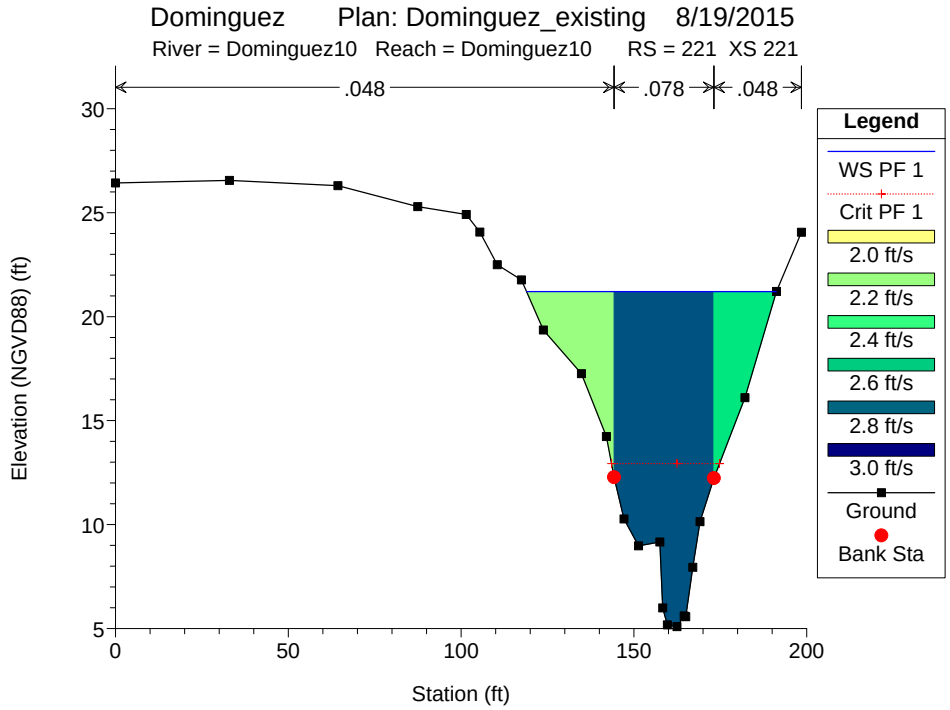

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 645 BR Artesia Blvd. Bridge (D2)
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
Ground
Ineff
Bank Sta

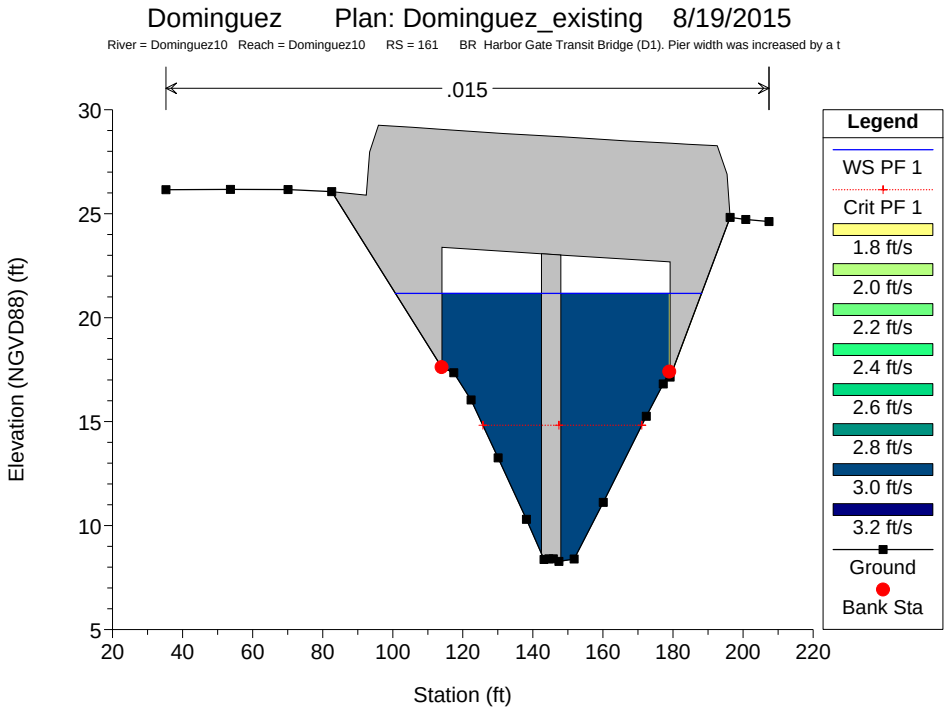

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 645 BR Artesia Blvd. Bridge (D2)
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
Ground
Ineff
Bank Sta

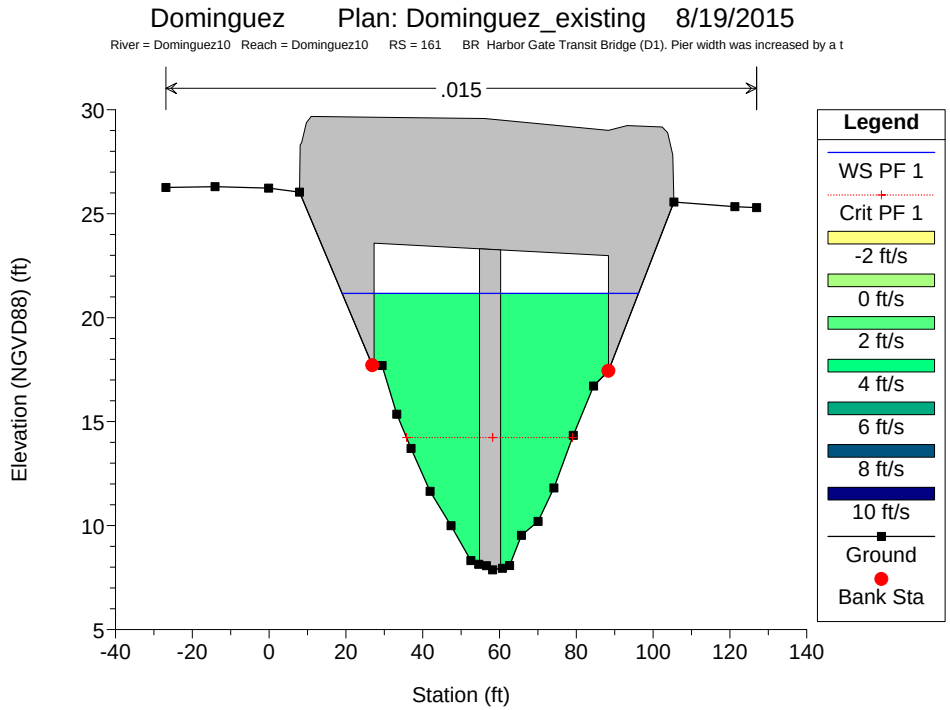

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 572 XS 570
.048
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

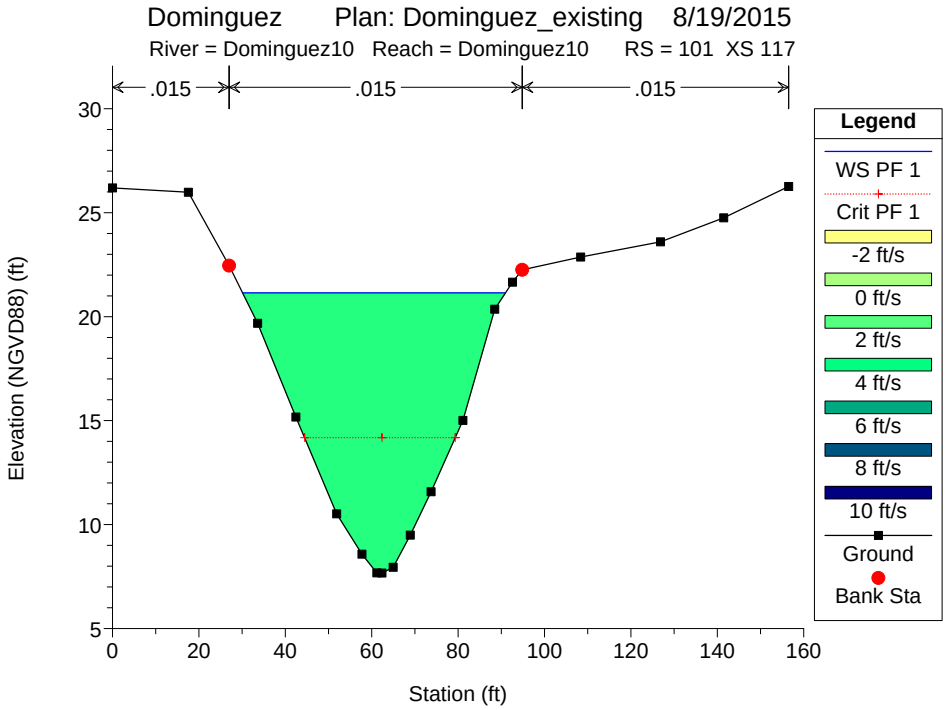

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 530 XS 547
.048
.036
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.0 ft/s
1.2 ft/s
1.4 ft/s
1.6 ft/s
1.8 ft/s
Ground
Ineff
Bank Sta

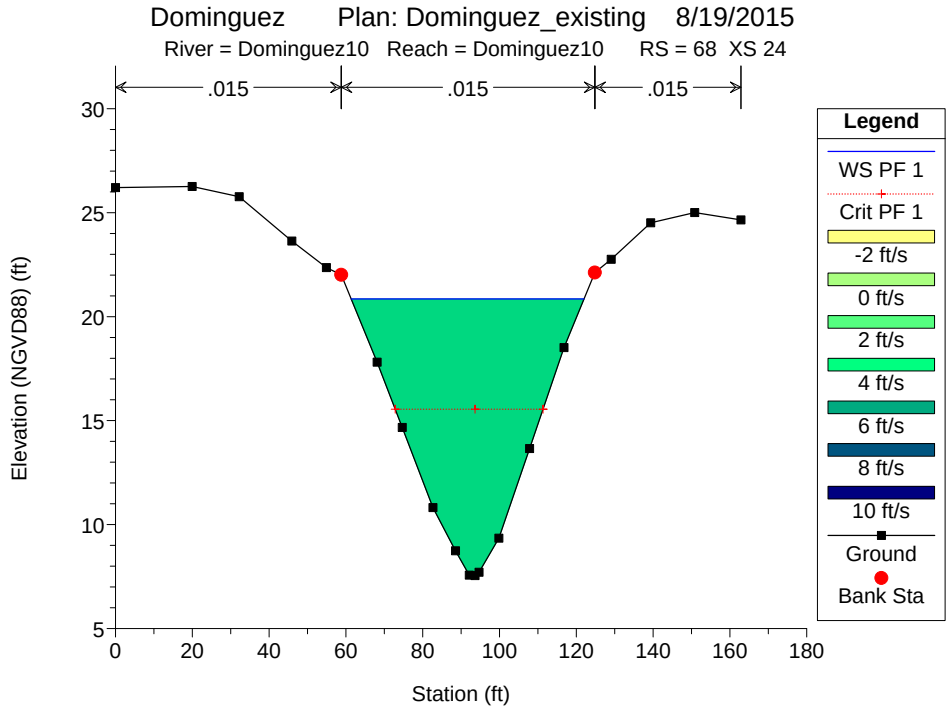

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 370 XS 347
.048
.066
.048
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.0 ft/s
1.2 ft/s
1.4 ft/s
1.6 ft/s
1.8 ft/s
2.0 ft/s
2.2 ft/s
2.4 ft/s
Ground
Bank Sta


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

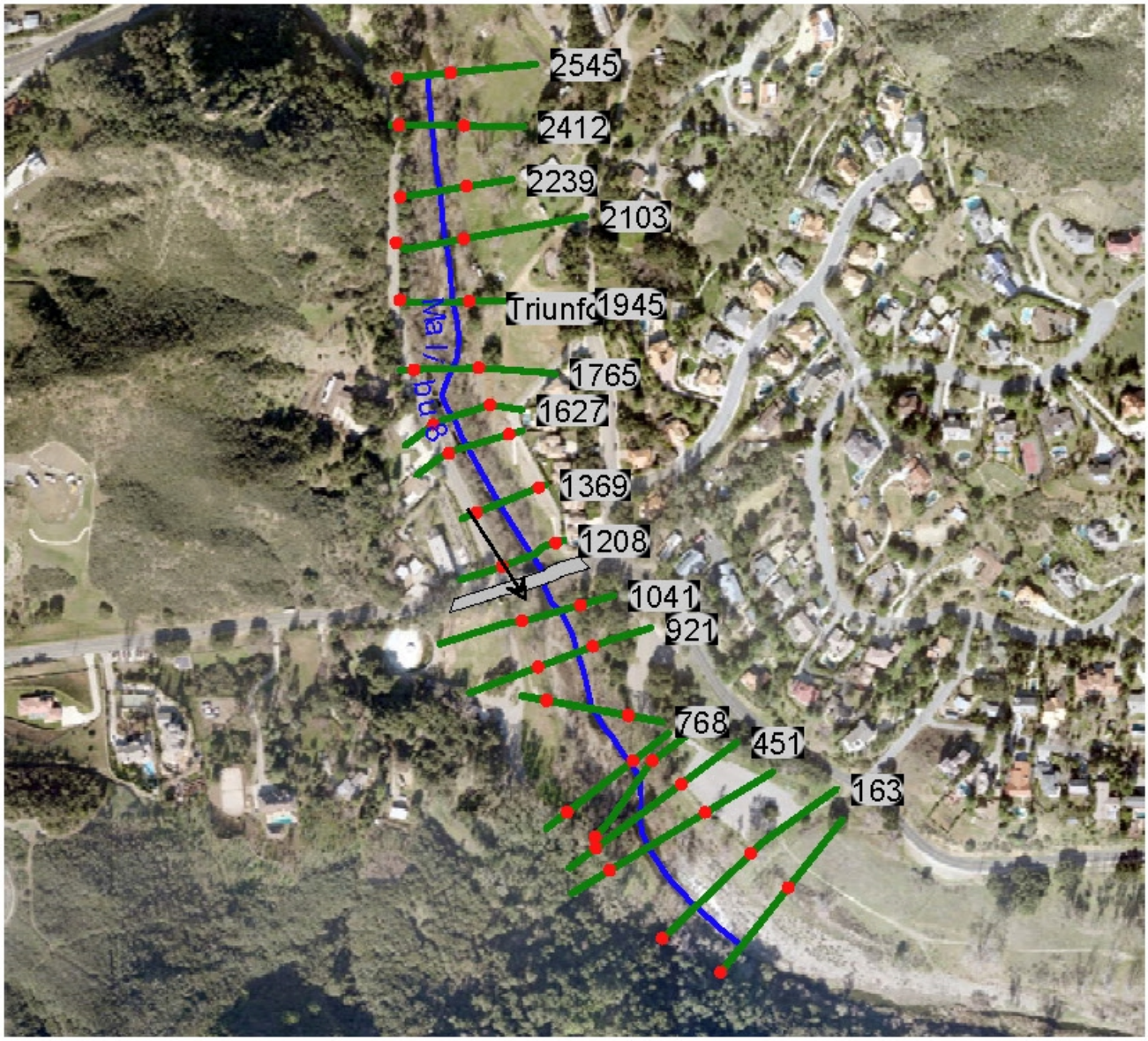

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 161 BR Harbor Gate Transit Bridge (D1). Pier width was increased by a t
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.8 ft/s
2.0 ft/s
2.2 ft/s
2.4 ft/s
2.6 ft/s
2.8 ft/s
3.0 ft/s
3.2 ft/s
Ground
Bank Sta

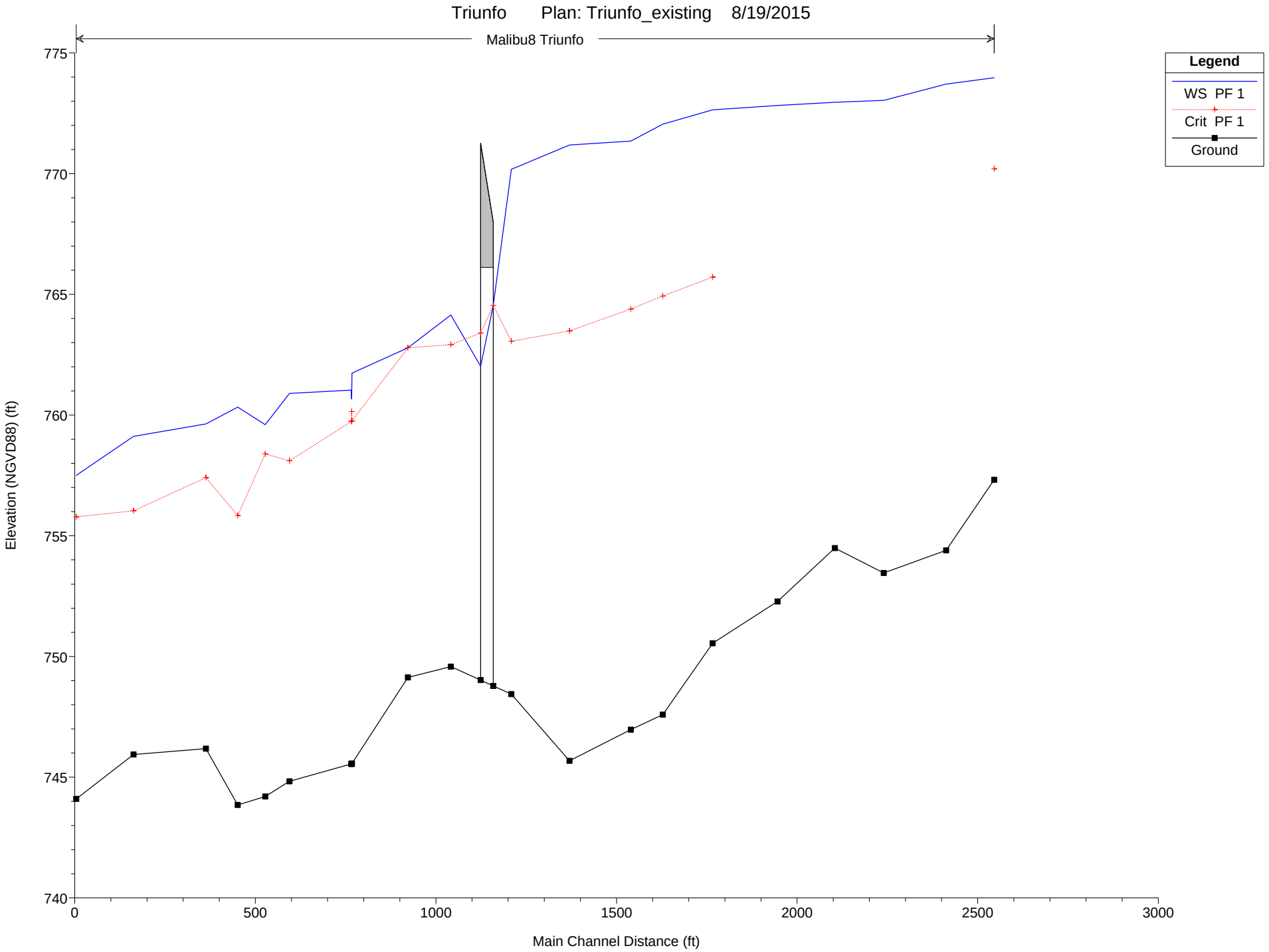

Dominguez Plan: Dominguez_existing 8/19/2015
River = Dominguez10 Reach = Dominguez10 RS = 161 BR Harbor Gate Transit Bridge (D1). Pier width was increased by a t
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta


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

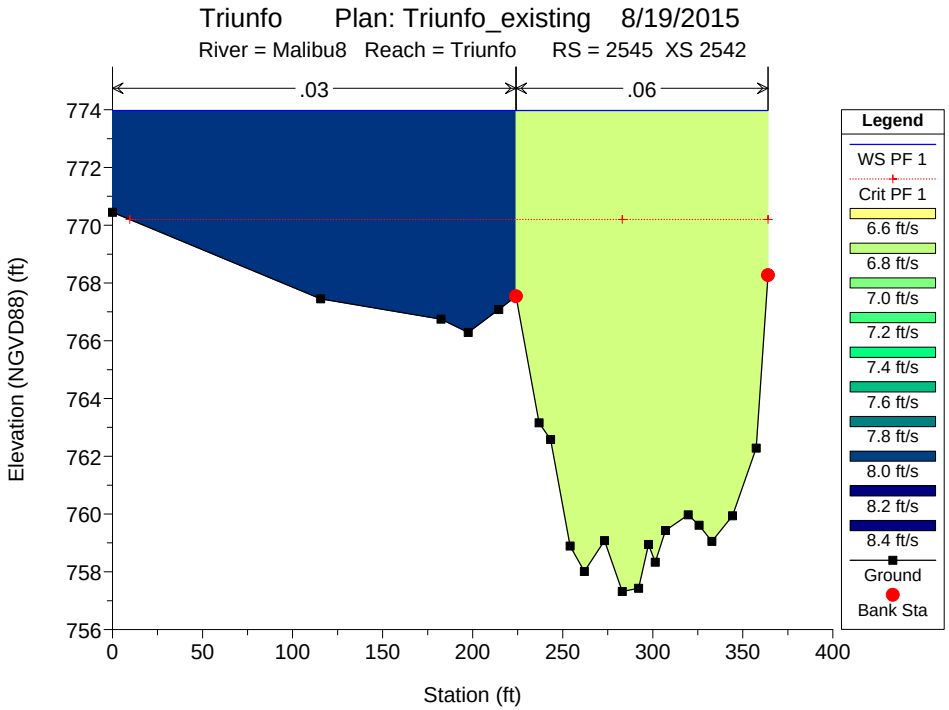
TRIUNFO CREEK

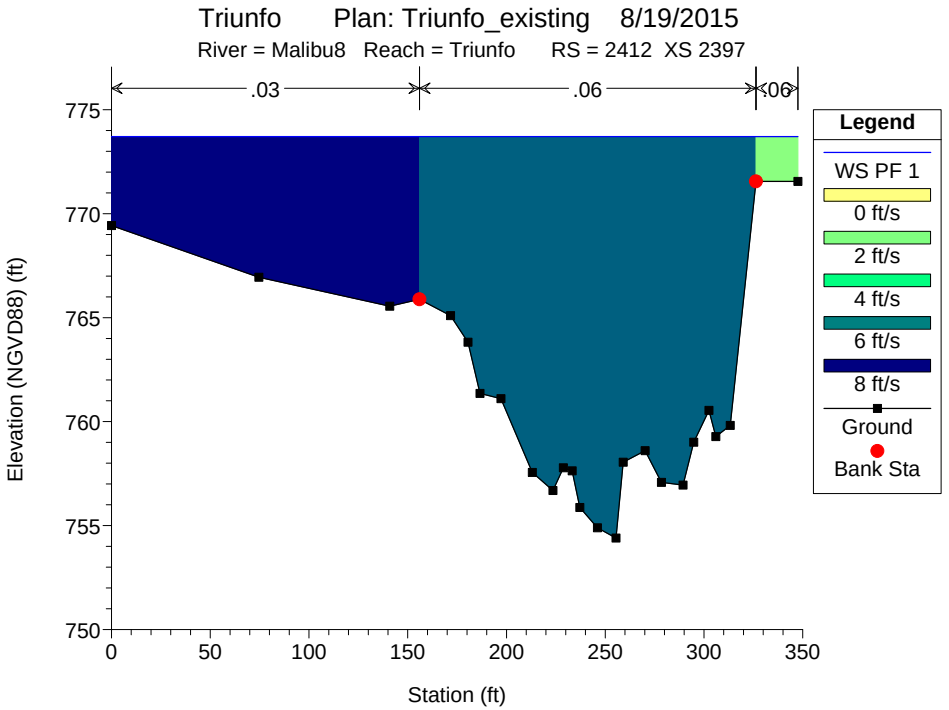

2545
2412
2239
2103
Triunfo
1945
1765
1627
1369
1208
1041
921
768
451
163
Malibu

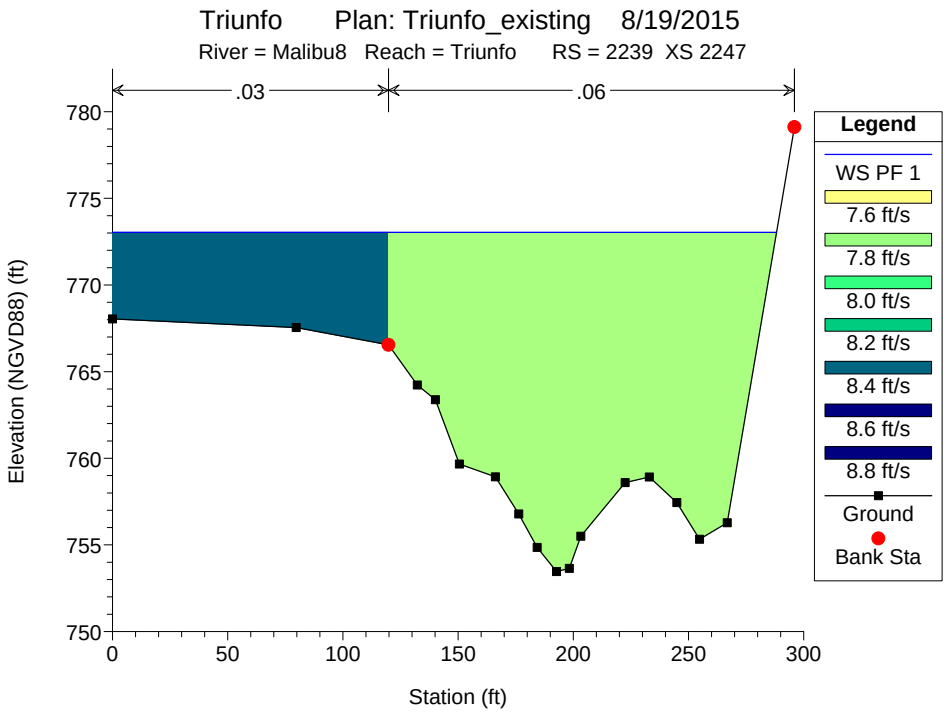

Triunfo Plan: Triunfo_existing 8/19/2015
Malibu8 Triunfo
Legend
WS PF 1
Crit PF 1
Ground
Elevation (NGVD88) (ft)
775
770
765
760
755
750
745
740
0
500
1000
1500
2000
2500
3000
Main Channel Distance (ft)

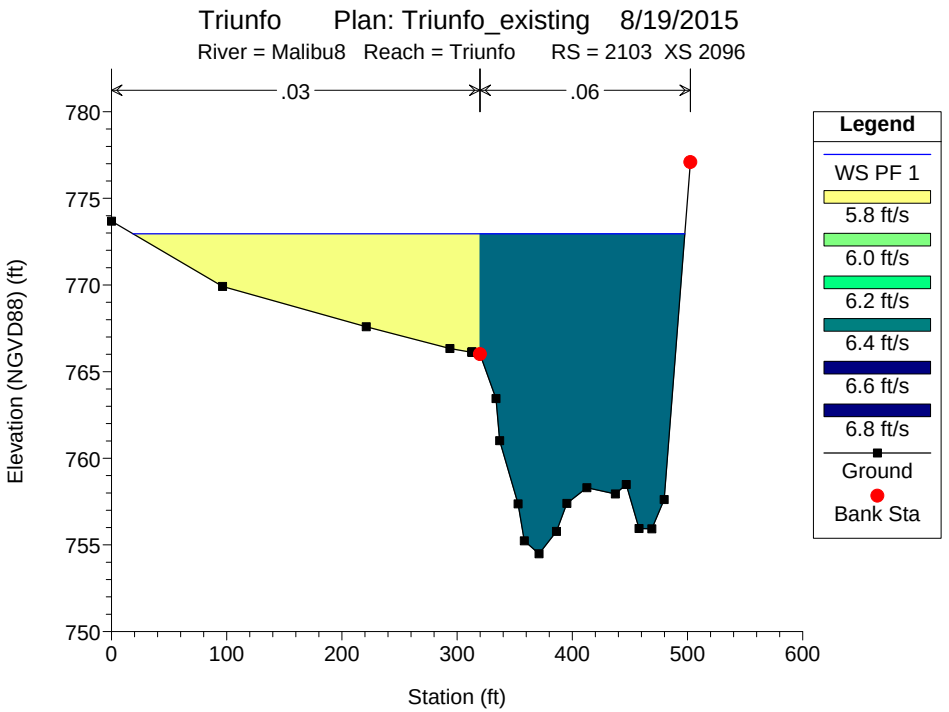
HEC-RAS Plan: Triunfo_exist River: Malibu8 Reach: Triunfo Profile: PF 1

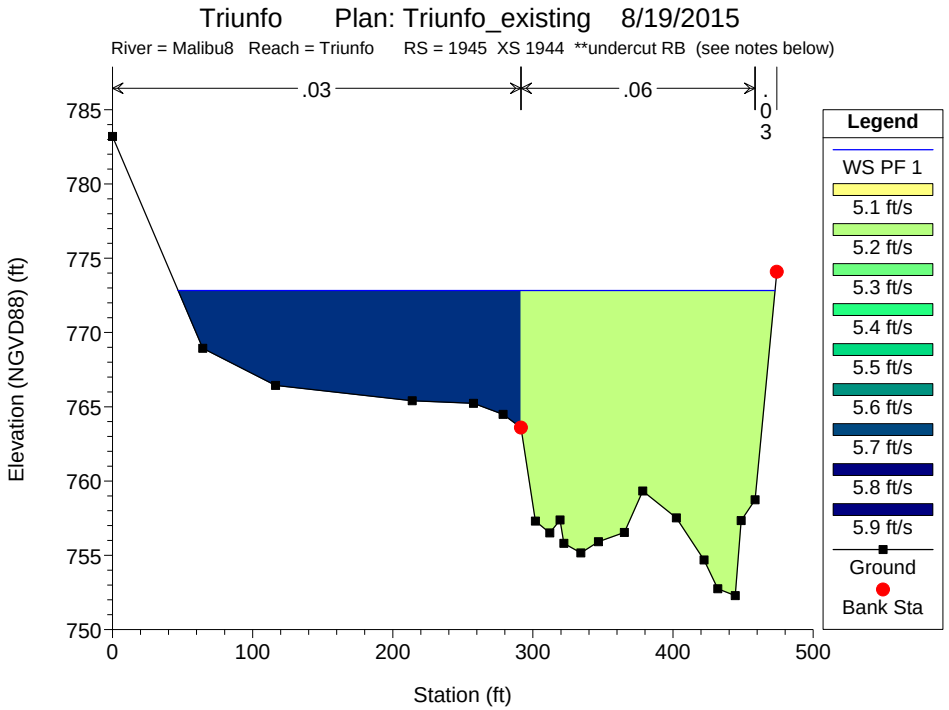
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Triunfo	2545	PF 1	23700.00	757.32	773.97	770.20	774.81	0.002480	6.74	3258.59	364.03	0.32
Triunfo	2412	PF 1	23700.00	754.40	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

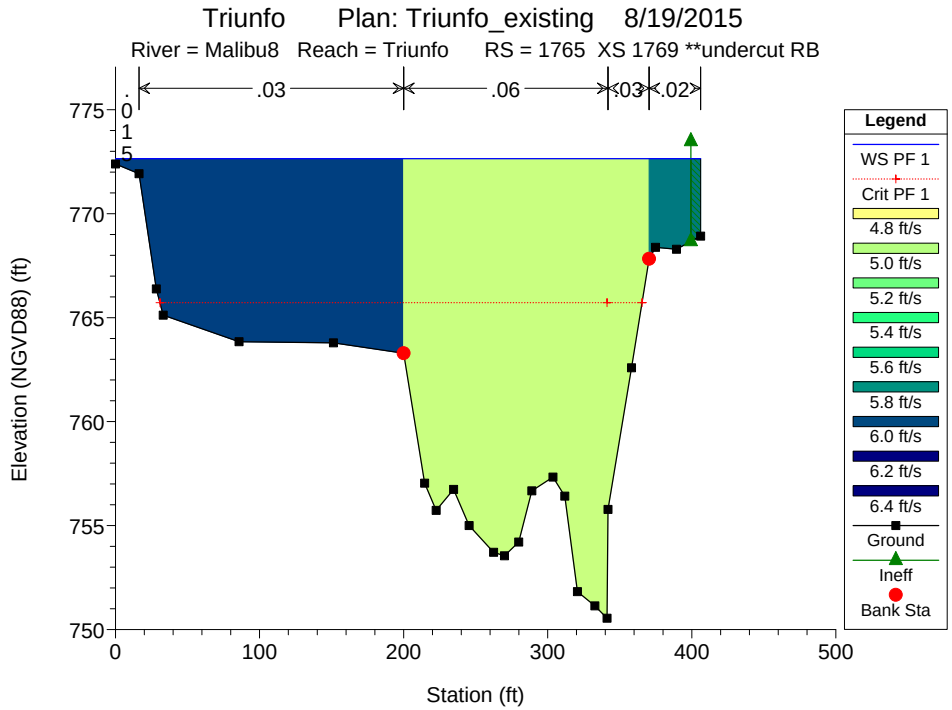

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 2545 XS 2542
.03
.06
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6.6 ft/s
6.8 ft/s
7.0 ft/s
7.2 ft/s
7.4 ft/s
7.6 ft/s
7.8 ft/s
8.0 ft/s
8.2 ft/s
8.4 ft/s
Ground
Bank Sta

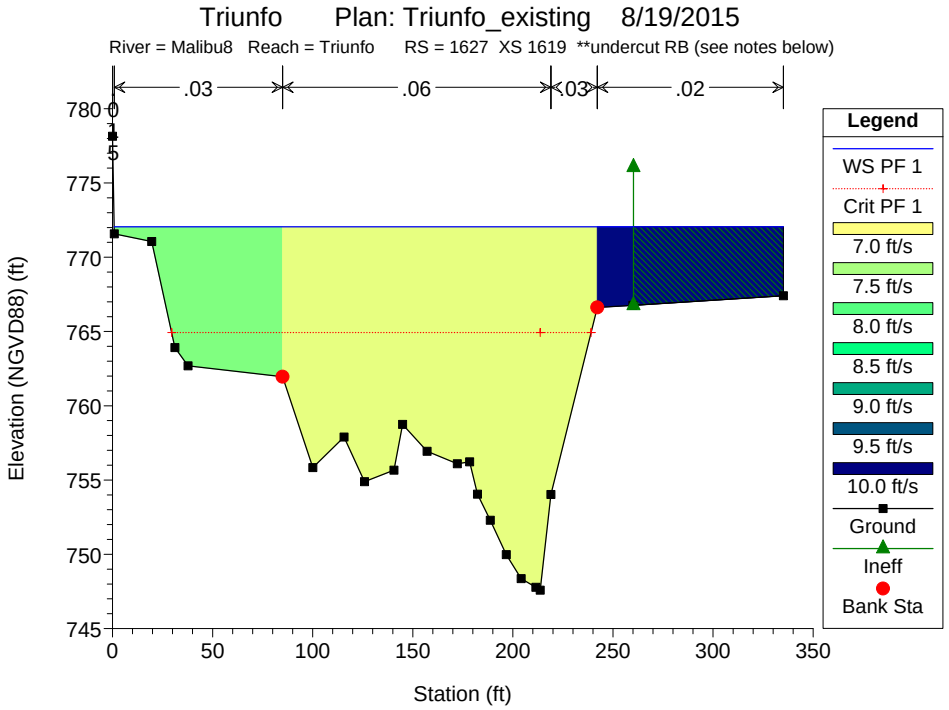

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 2412 XS 2397
.03
.06
.06
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

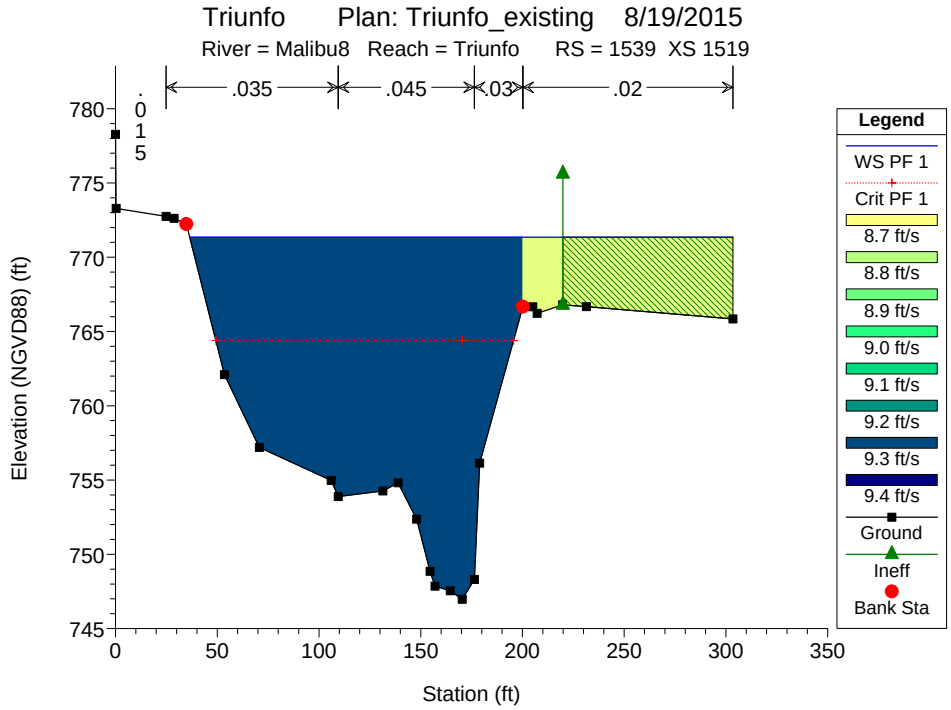

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 2239 XS 2247
.03
.06
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
7.6 ft/s
7.8 ft/s
8.0 ft/s
8.2 ft/s
8.4 ft/s
8.6 ft/s
8.8 ft/s
Ground
Bank Sta

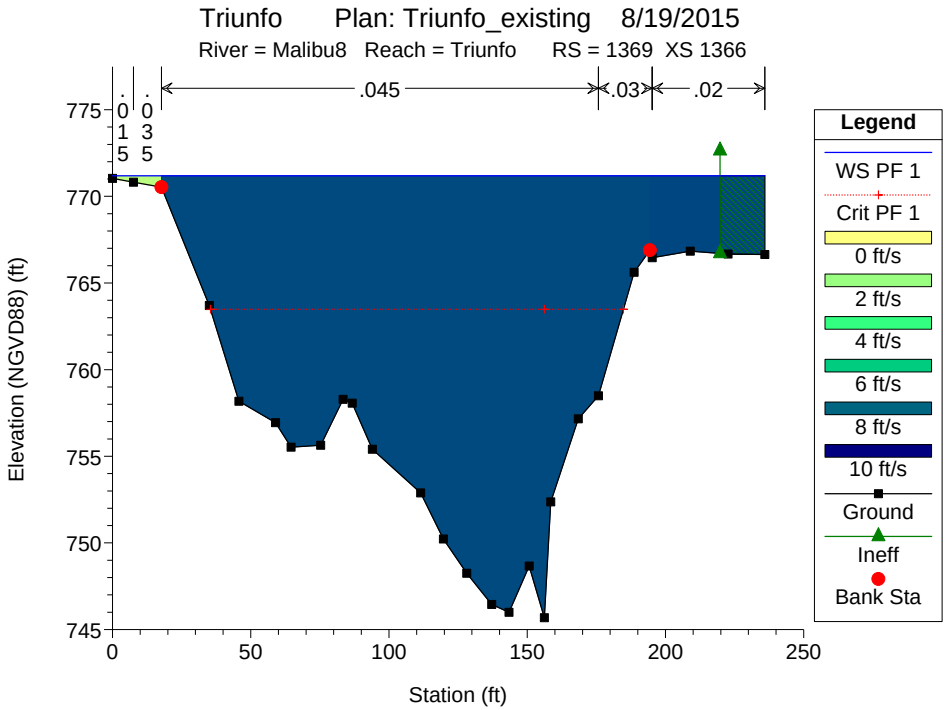

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 2103 XS 2096
.03
.06
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
5.8 ft/s
6.0 ft/s
6.2 ft/s
6.4 ft/s
6.6 ft/s
6.8 ft/s
Ground
Bank Sta

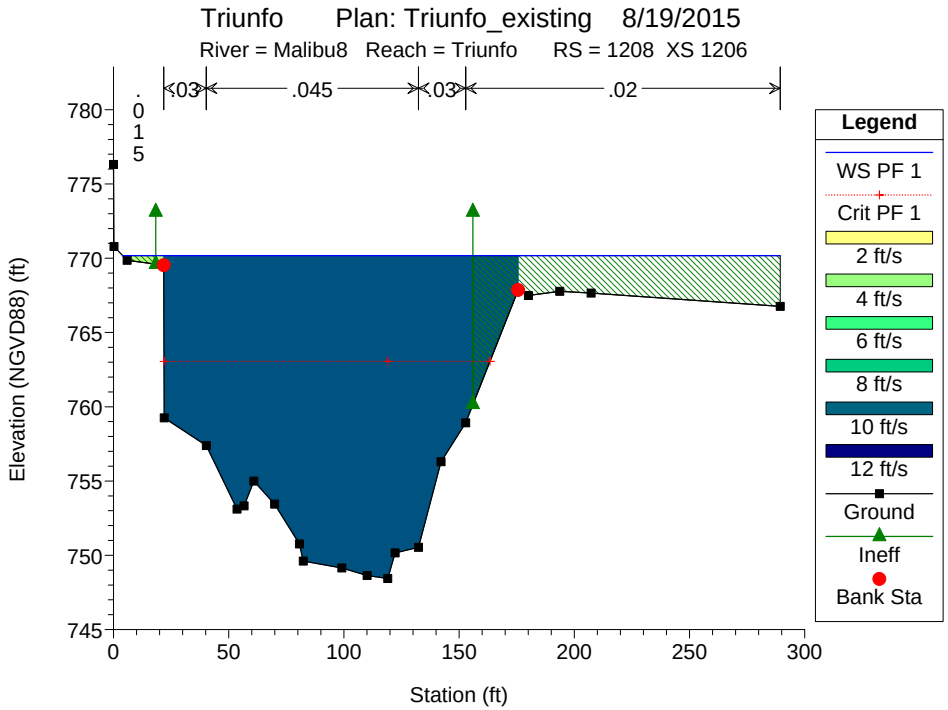

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1945 XS 1944 **undercut RB (see notes below)
.03
.06
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
5.1 ft/s
5.2 ft/s
5.3 ft/s
5.4 ft/s
5.5 ft/s
5.6 ft/s
5.7 ft/s
5.8 ft/s
5.9 ft/s
Ground
Bank Sta

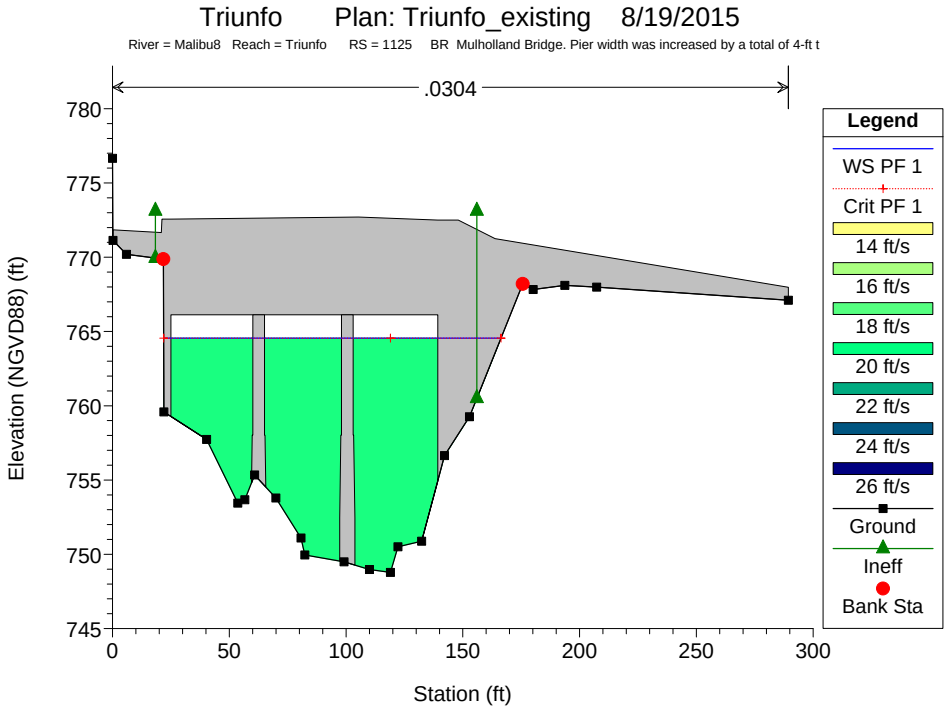

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1765 XS 1769 **undercut RB
.03
.06
.03
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4.8 ft/s
5.0 ft/s
5.2 ft/s
5.4 ft/s
5.6 ft/s
5.8 ft/s
6.0 ft/s
6.2 ft/s
6.4 ft/s
Ground
Ineff
Bank Sta

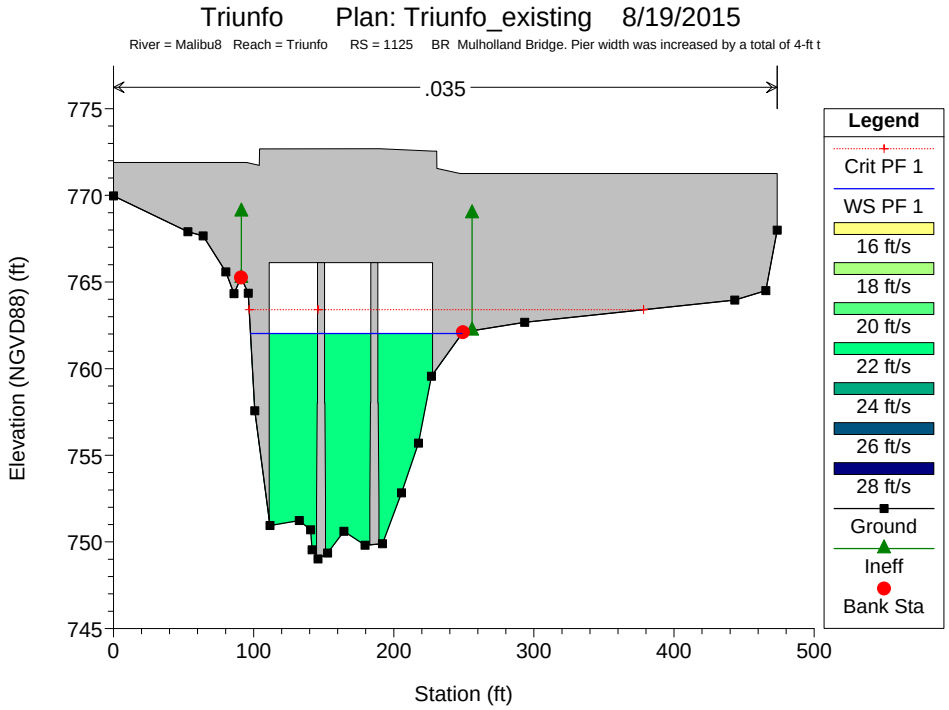

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1627 XS 1619 **undercut RB (see notes below)
.03
.06
.03
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
7.0 ft/s
7.5 ft/s
8.0 ft/s
8.5 ft/s
9.0 ft/s
9.5 ft/s
10.0 ft/s
Ground
Ineff
Bank Sta

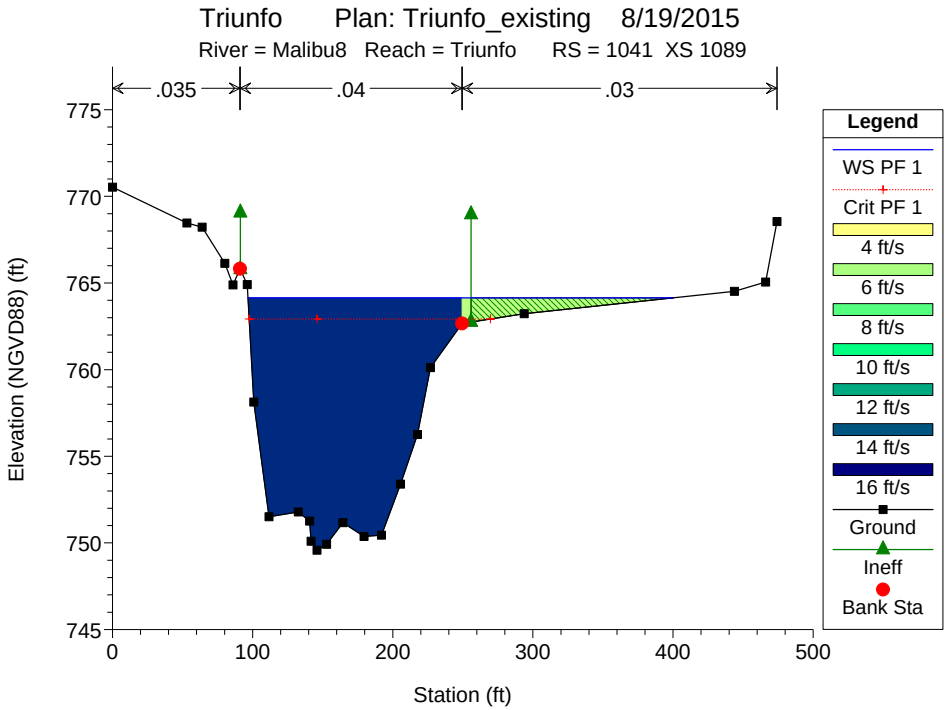

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1539 XS 1519
.035
.045
.03
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
8.7 ft/s
8.8 ft/s
8.9 ft/s
9.0 ft/s
9.1 ft/s
9.2 ft/s
9.3 ft/s
9.4 ft/s
Ground
Ineff
Bank Sta

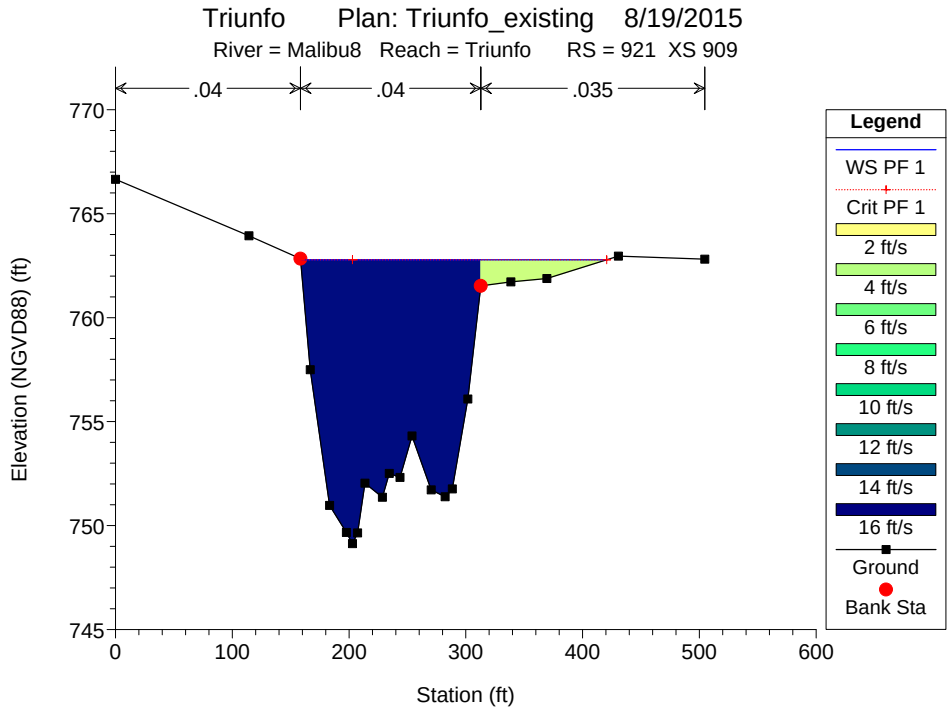

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1369 XS 1366
.045
.03
.02
.015
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

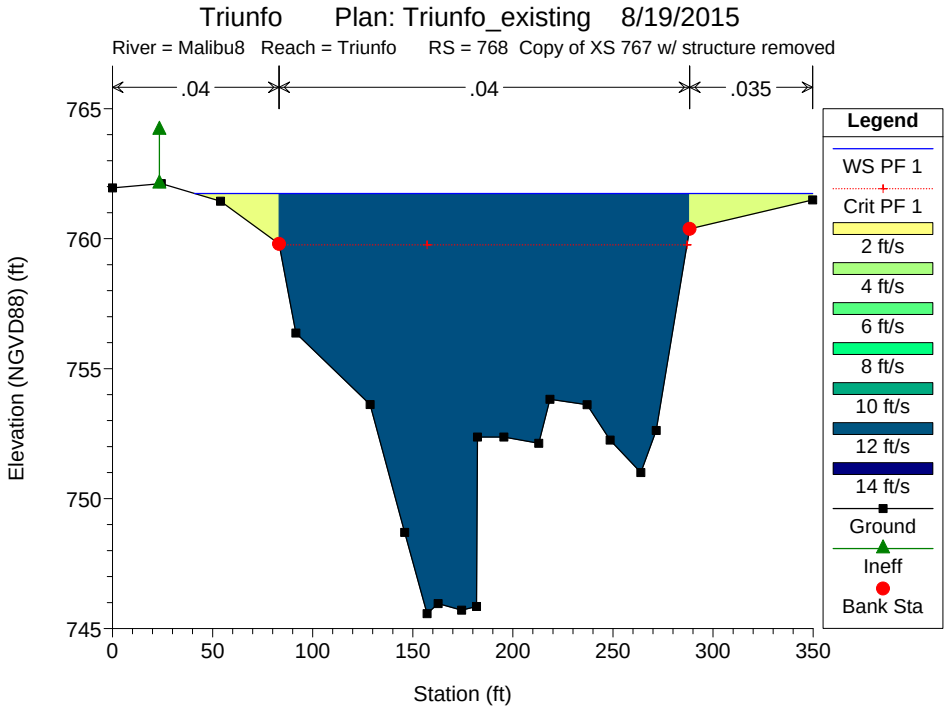

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1208 XS 1206
.03
.045
.03
.02
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

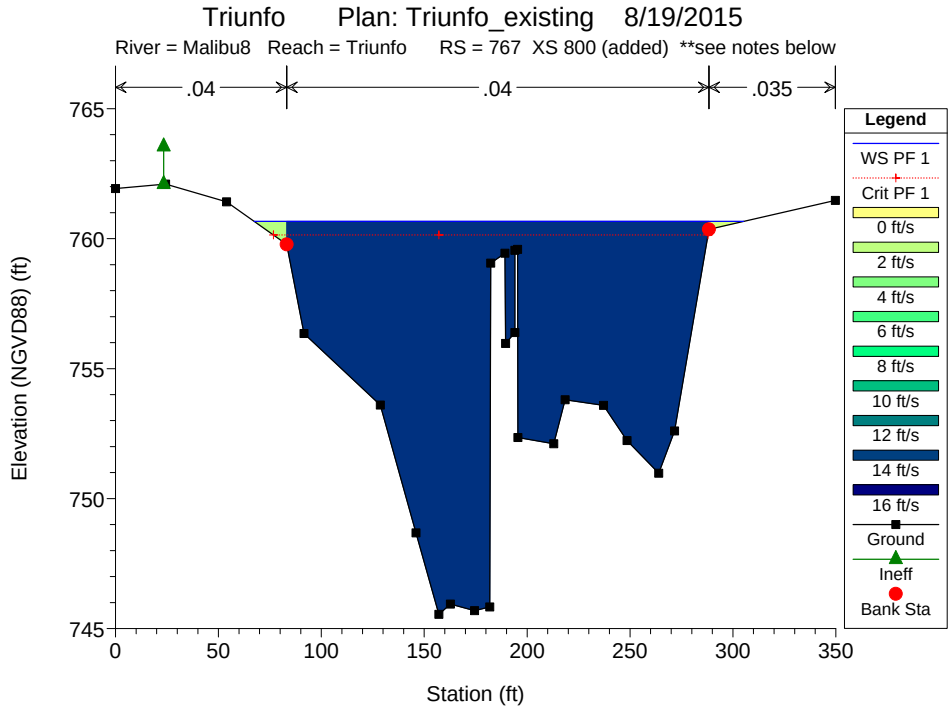

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1125 BR Mulholland Bridge. Pier width was increased by a total of 4-ft t
.0304
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
Ground
Ineff
Bank Sta

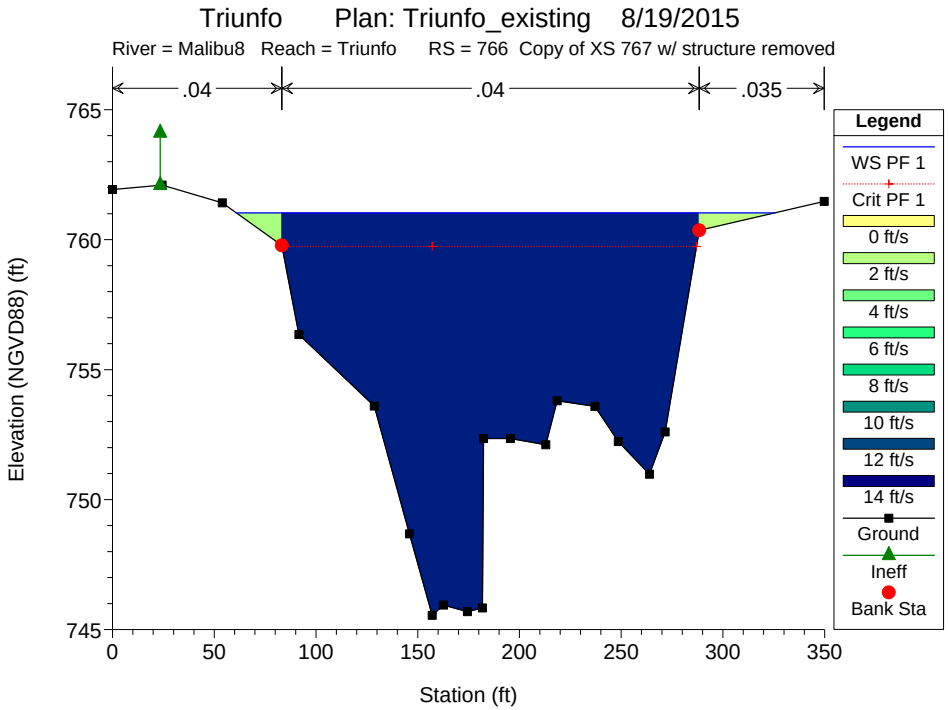

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1125 BR Mulholland Bridge. Pier width was increased by a total of 4-ft t
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
Ground
Ineff
Bank Sta

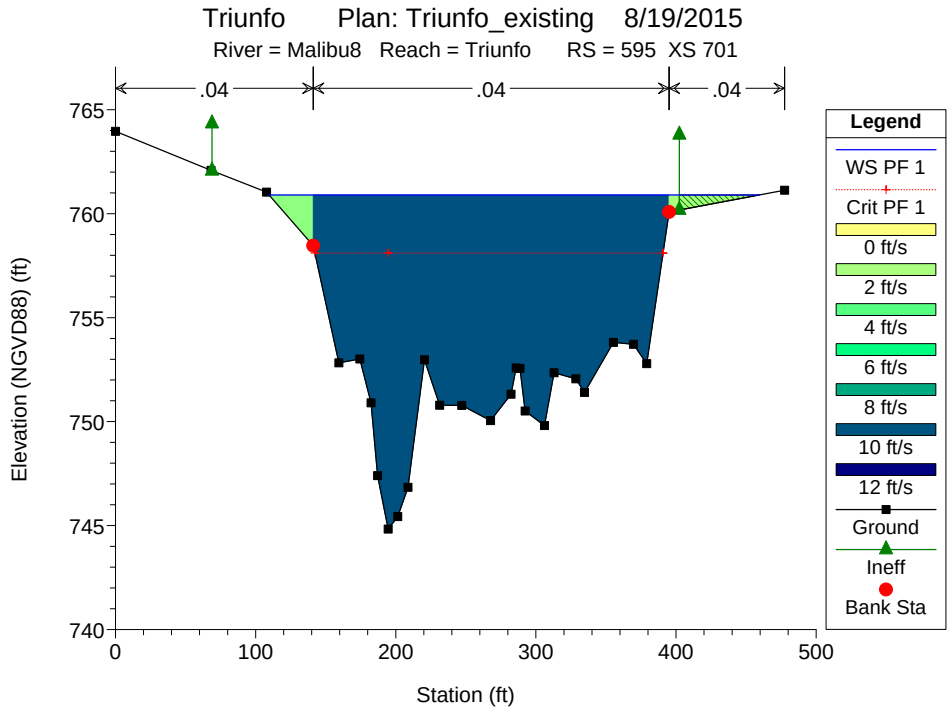

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 1041 XS 1089
.035
.04
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Ineff
Bank Sta

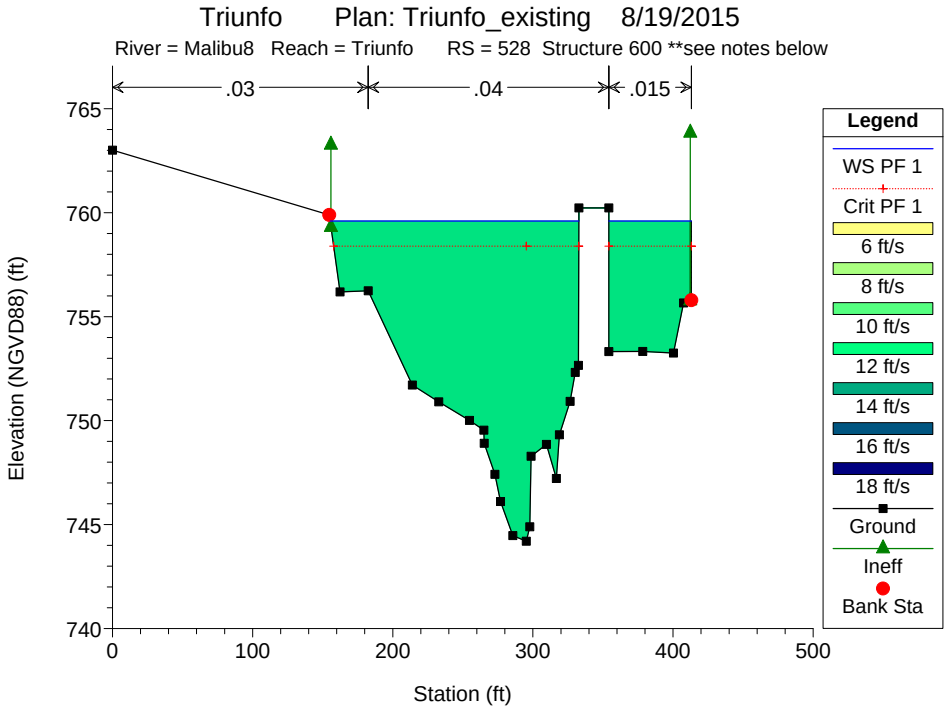

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 921 XS 909
.04
.04
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

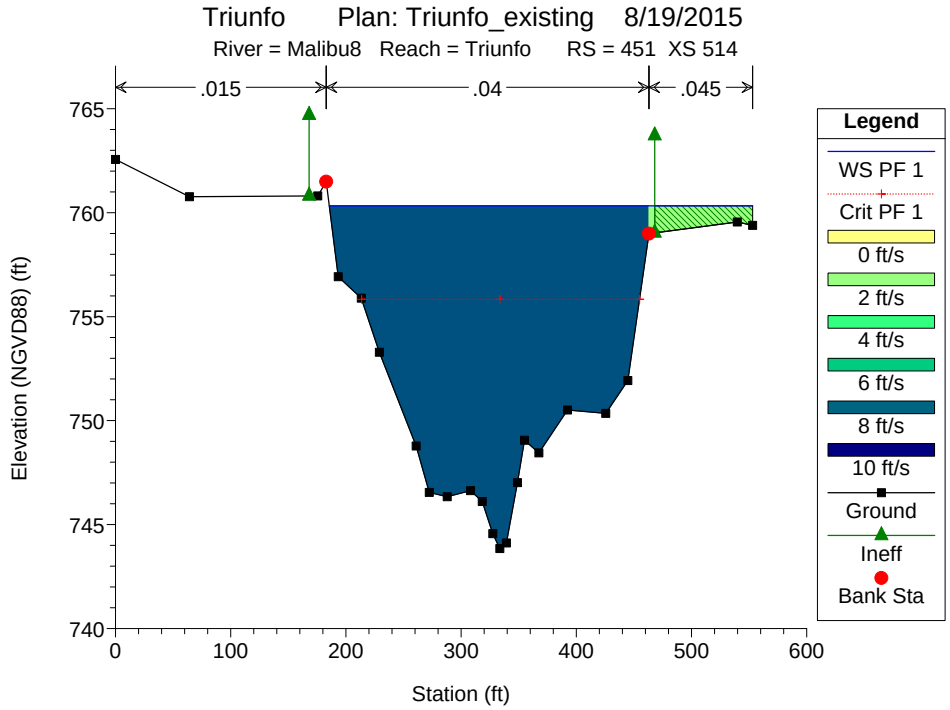

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 768 Copy of XS 767 w/ structure removed
.04
.04
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Ineff
Bank Sta

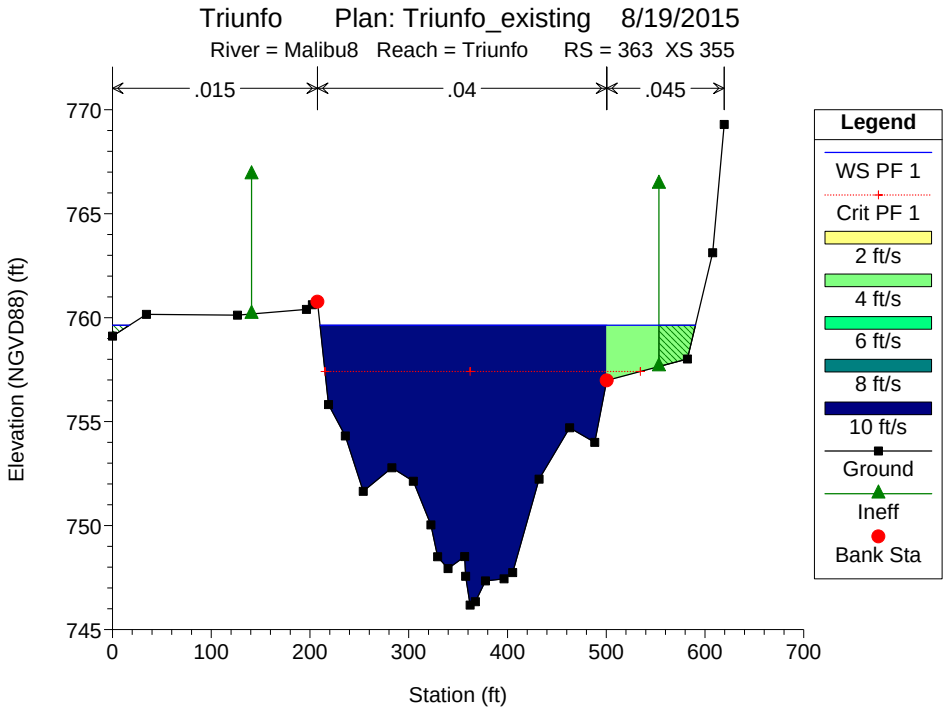

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 767 XS 800 (added) **see notes below
.04
.04
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Ineff
Bank Sta

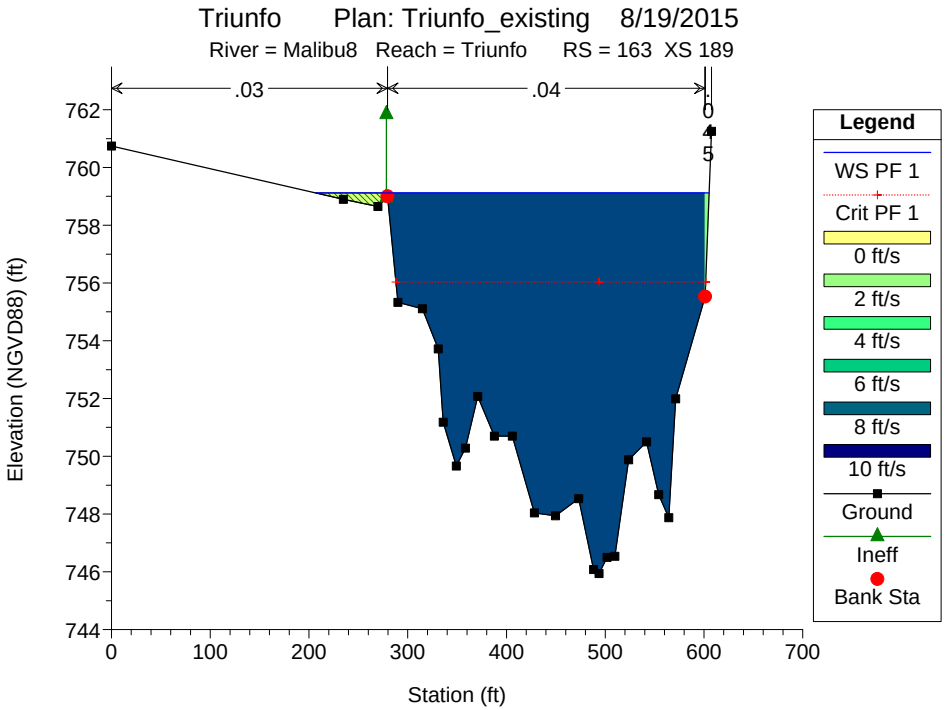

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 766 Copy of XS 767 w/ structure removed
.04
.04
.035
Elevation (NGVD88) (ft)
765
760
755
750
745
0
50
100
150
200
250
300
350
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Ineff
Bank Sta

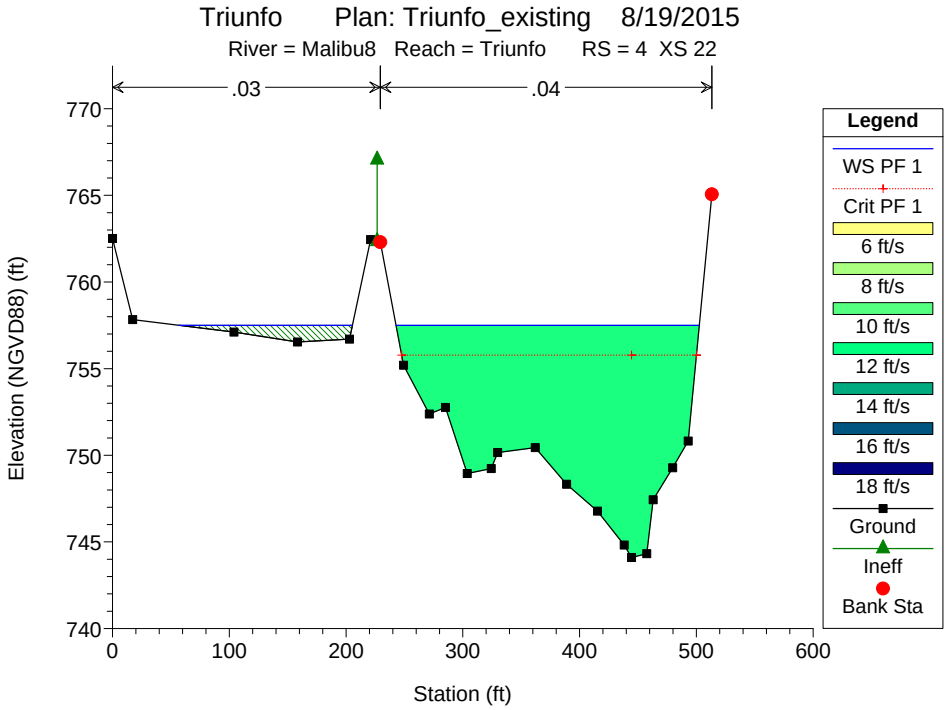

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 595 XS 701
.04
.04
.04
Elevation (NGVD88) (ft)
765
760
755
750
745
740
0
100
200
300
400
500
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta


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

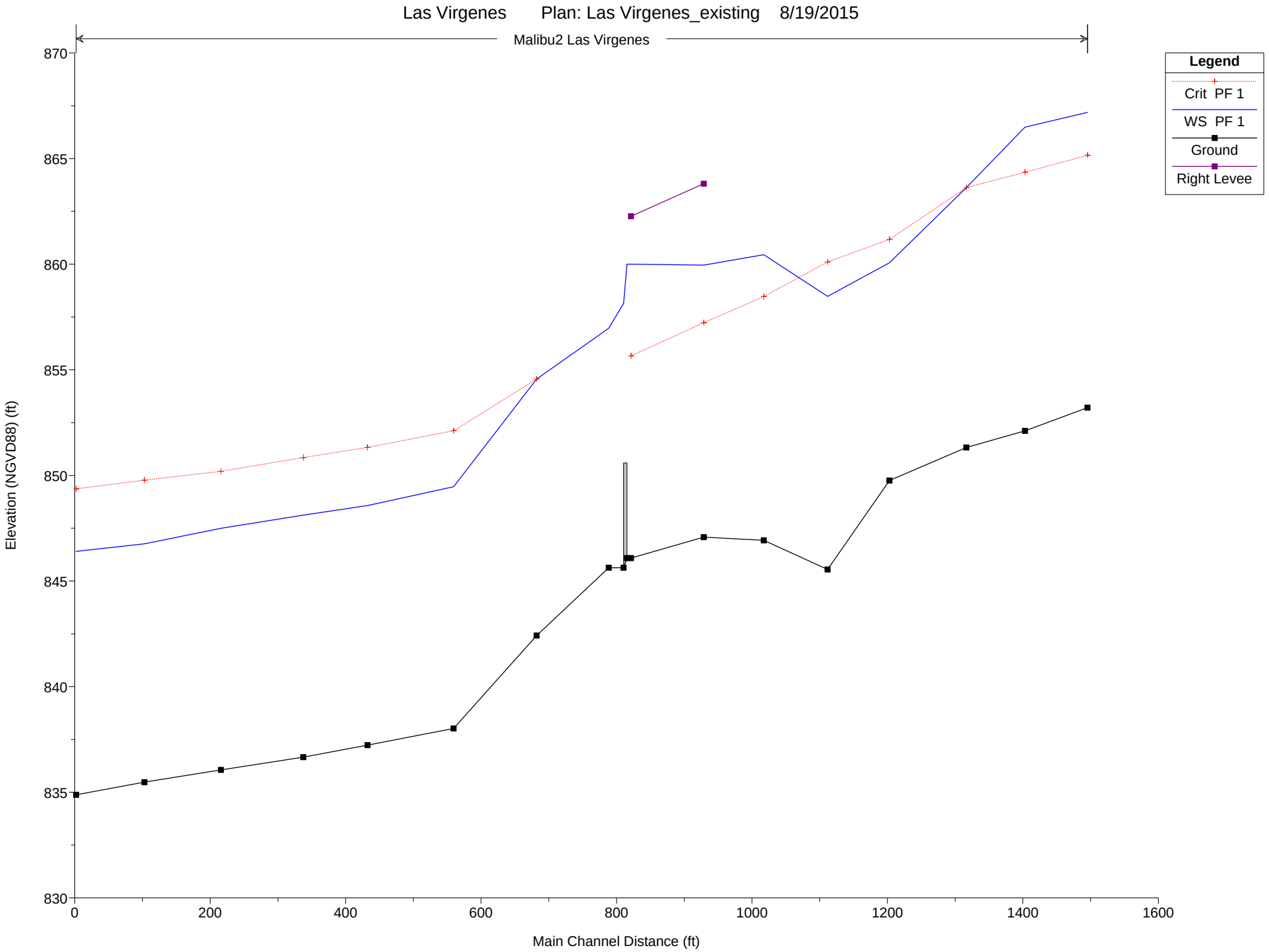

Triunfo Plan: Triunfo_existing 8/19/2015
River = Malibu8 Reach = Triunfo RS = 363 XS 355
.015
.04
.045
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta


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

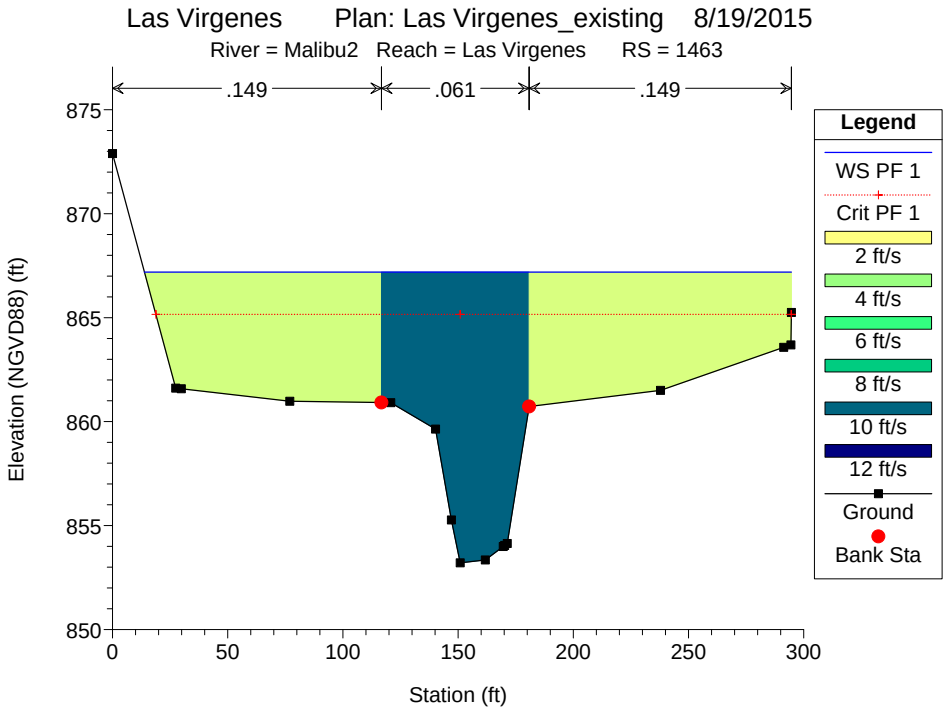
LAS VIRGENES CREEK

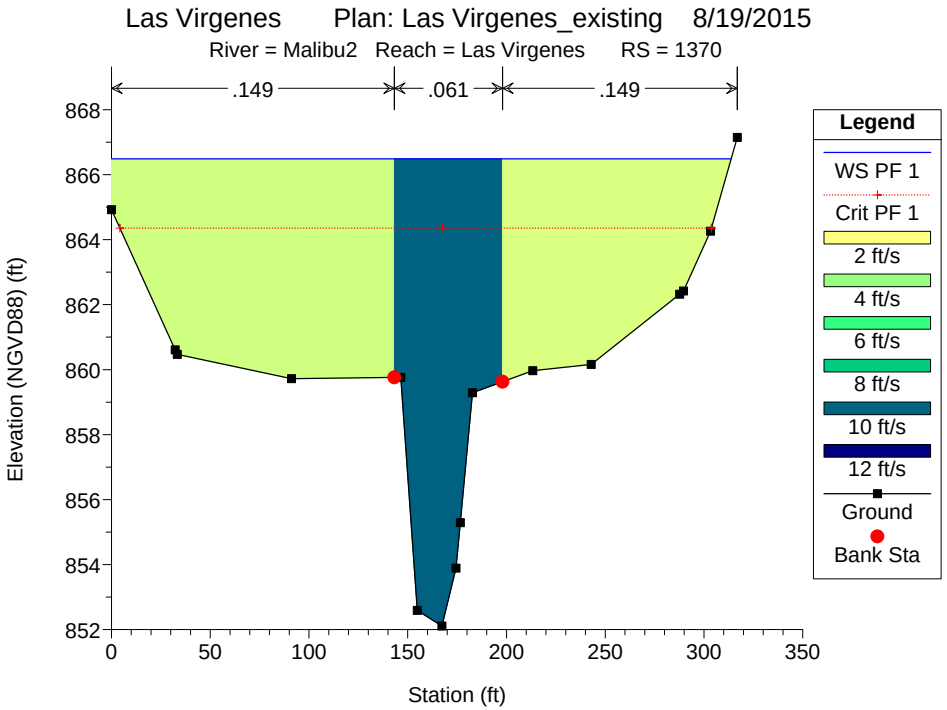

1463
1370
1284
1170
1079
985
Las Virgenes
Malibu
896
821
682
559
432
338
216
103
2

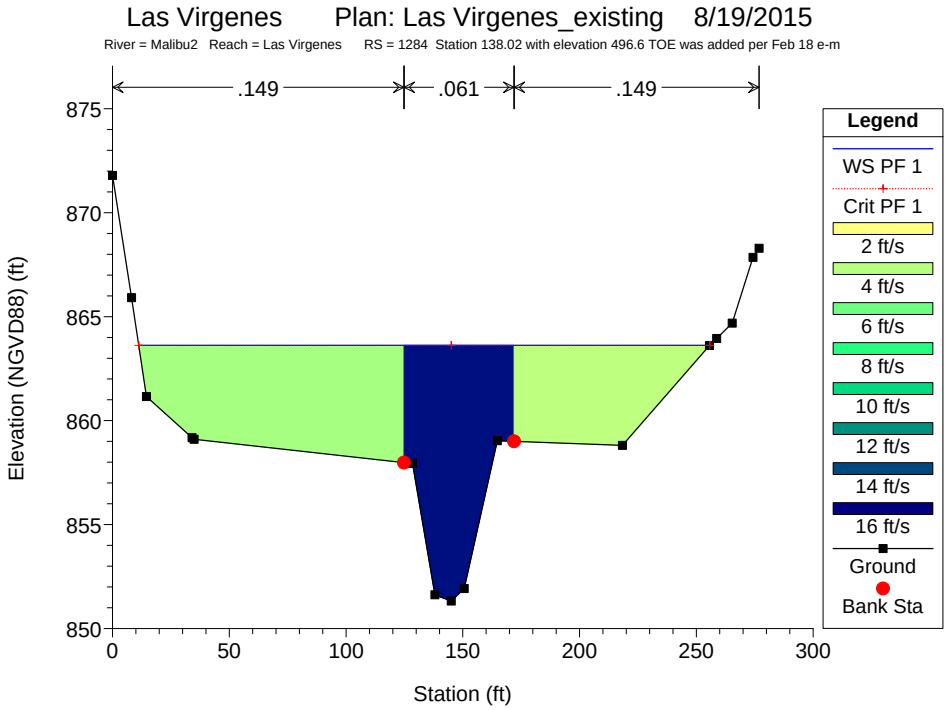

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
Malibu2 Las Virgenes
Legend
Crit PF 1
WS PF 1
Ground
Right Levee
Elevation (NGVD88) (ft)
Main Channel Distance (ft)
870
865
860
855
850
845
840
835
830
0
200
400
600
800
1000
1200
1400
1600

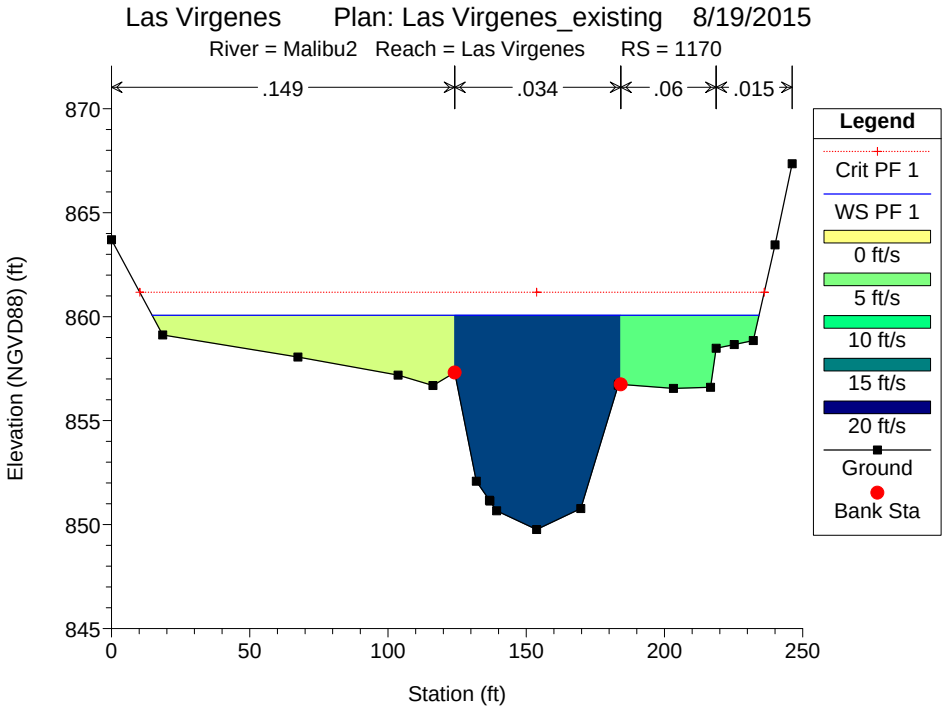
HEC-RAS Plan: L. Virgenes_exst River: Malibu2 Reach: Las Virgenes Profile: PF 1

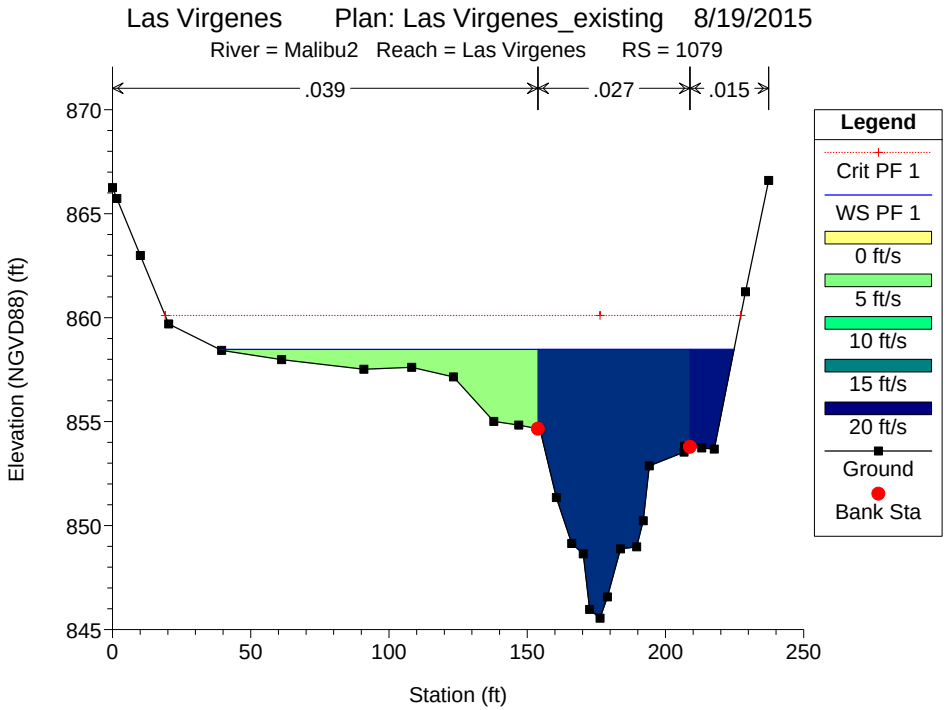
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Las Virgenes	1463	PF 1	9860.00	853.21	867.19	865.16	868.27	0.008459	10.07	1833.06	280.77	0.56
Las Virgenes	1370	PF 1	9860.00	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

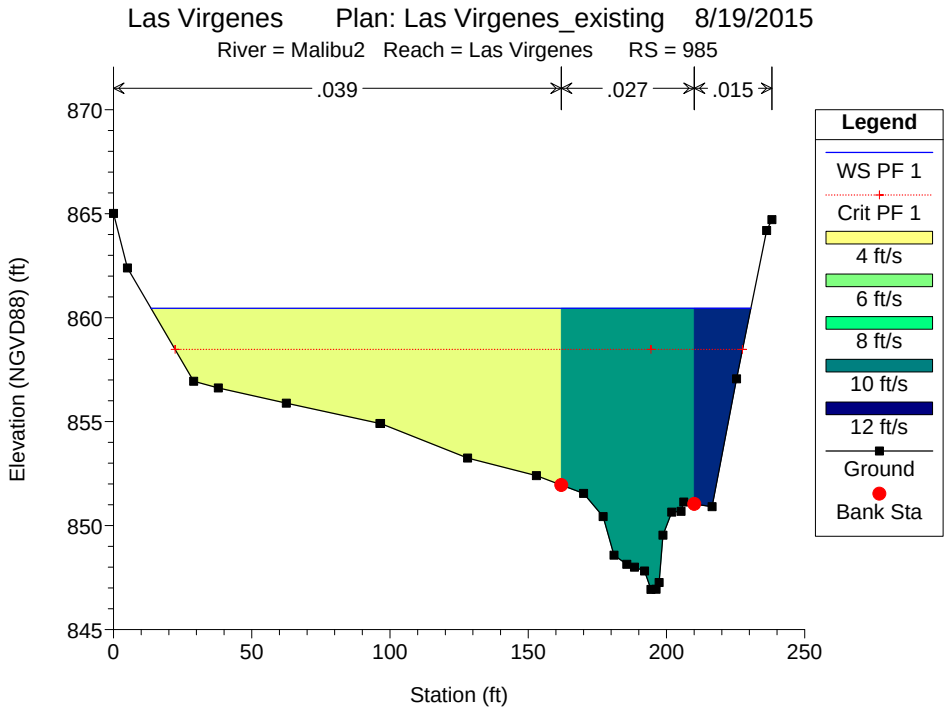

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 1463
.149
.061
.149
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

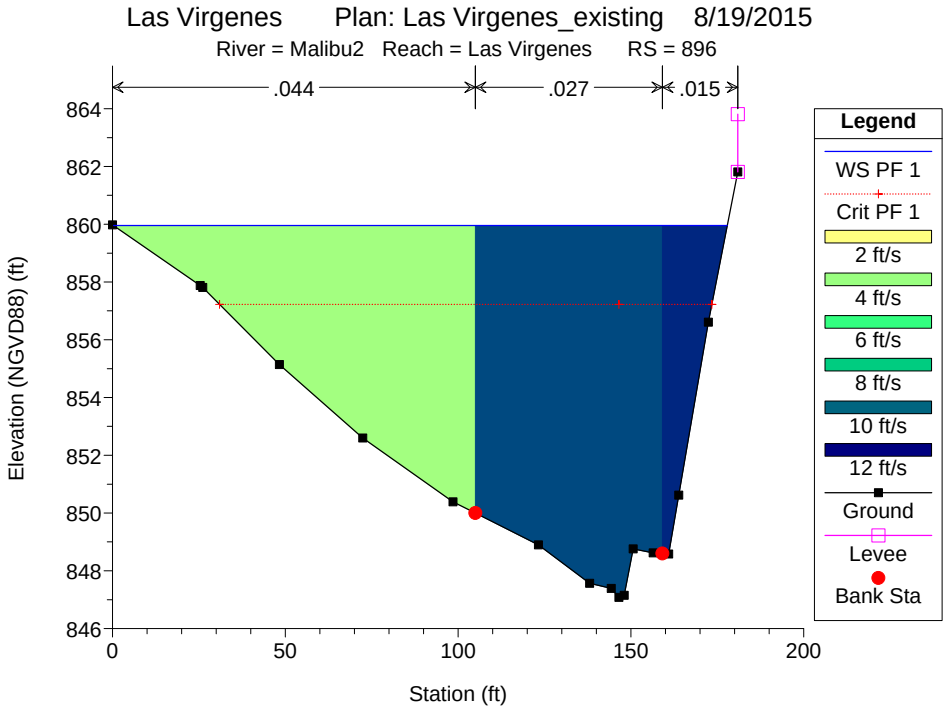

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 1370
.149
.061
.149
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

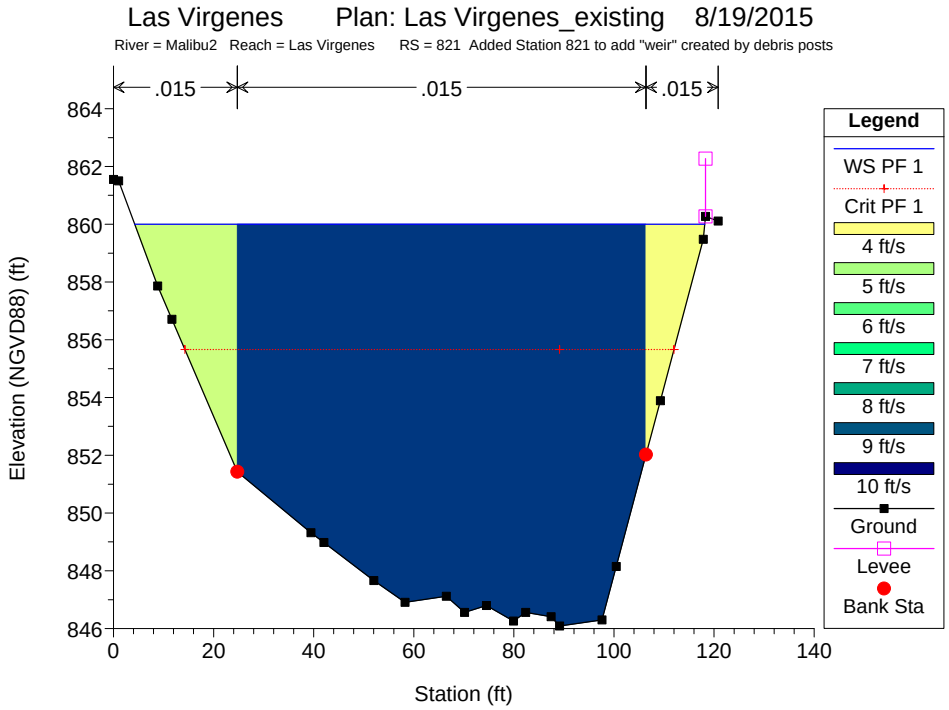

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 1284 Station 138.02 with elevation 496.6 TOE was added per Feb 18 e-m
.149
.061
.149
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

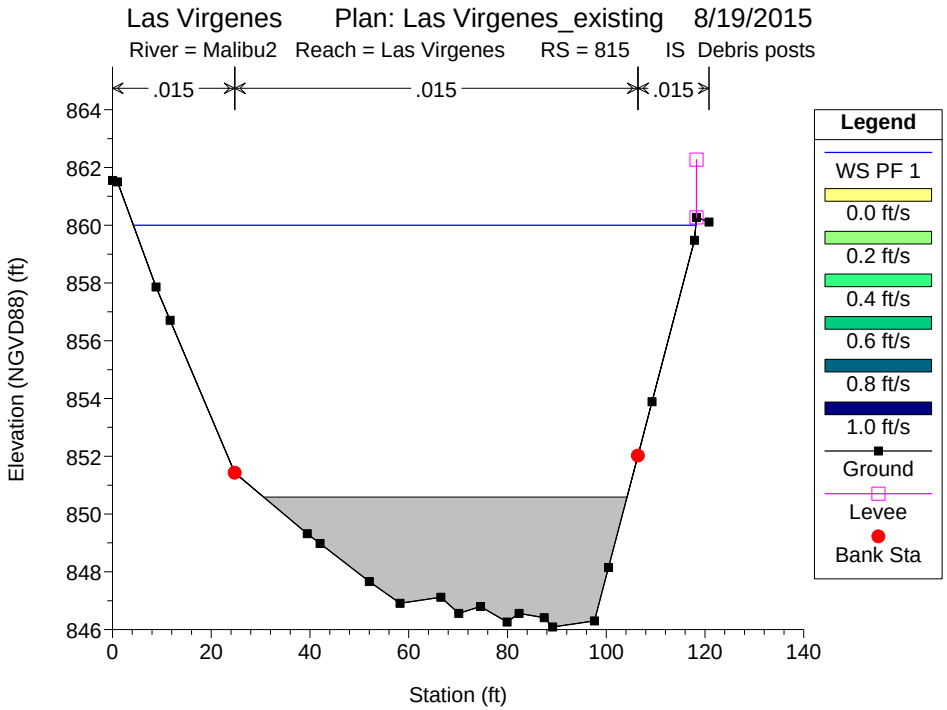

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 1170
.149
.034
.06
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

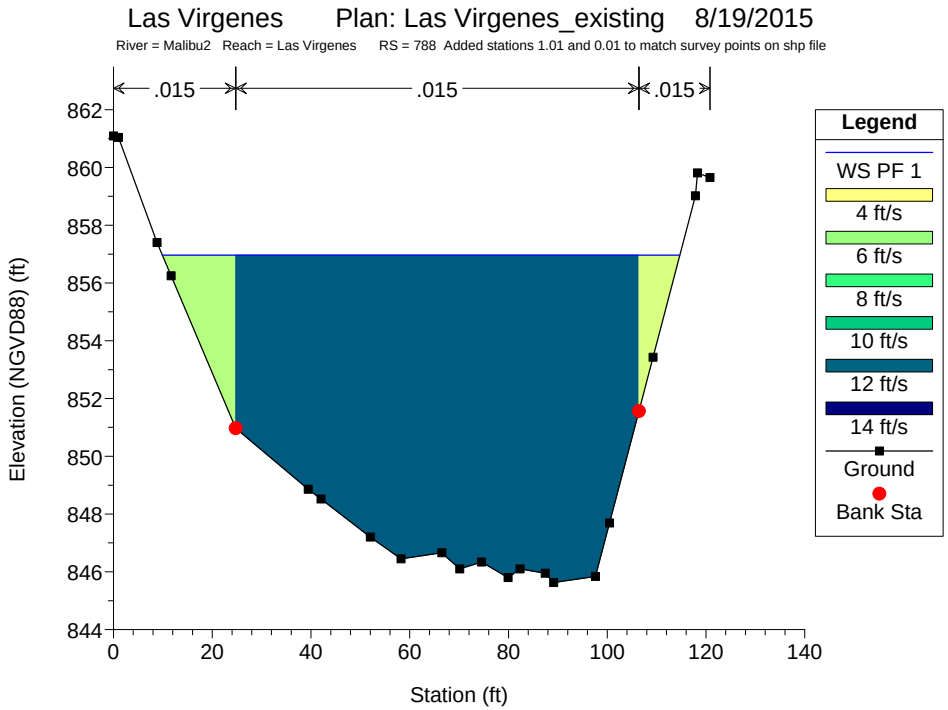

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 1079
.039
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

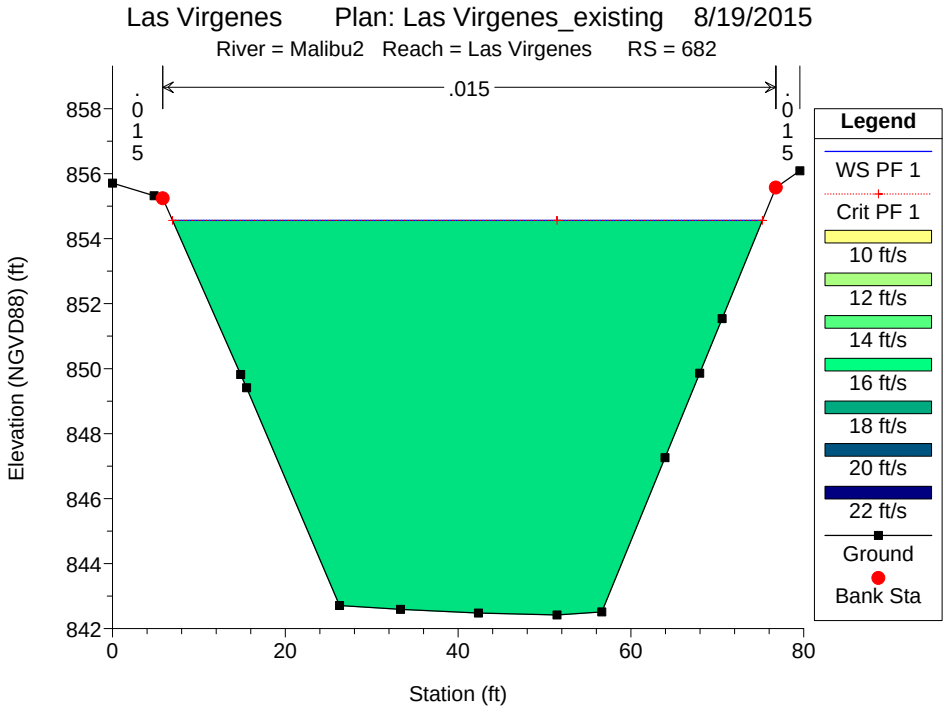

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 985
.039
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

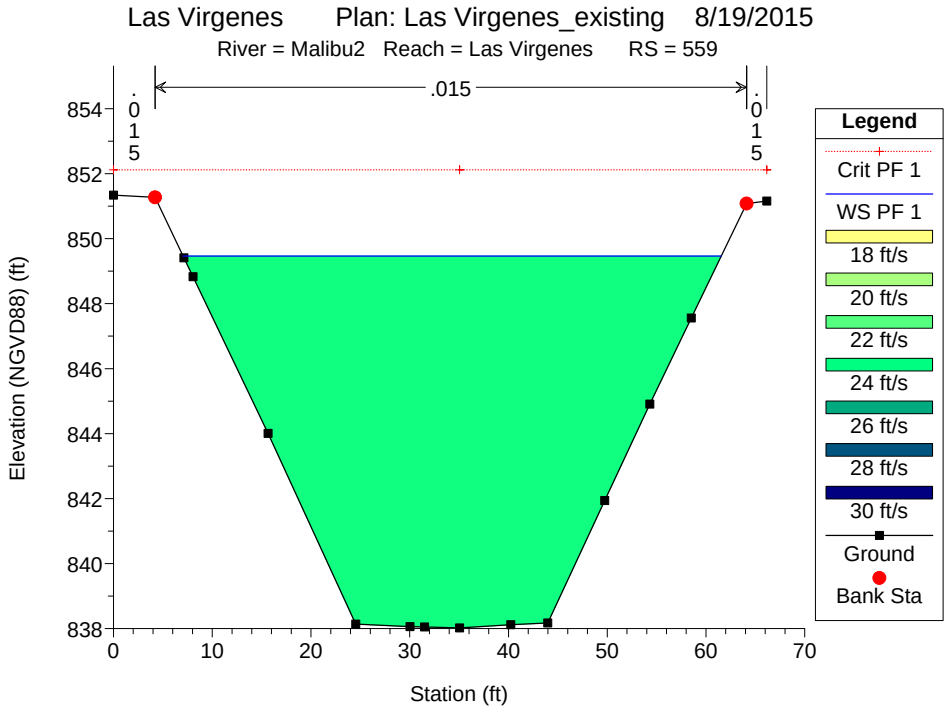

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 896
.044
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Levee
Bank Sta

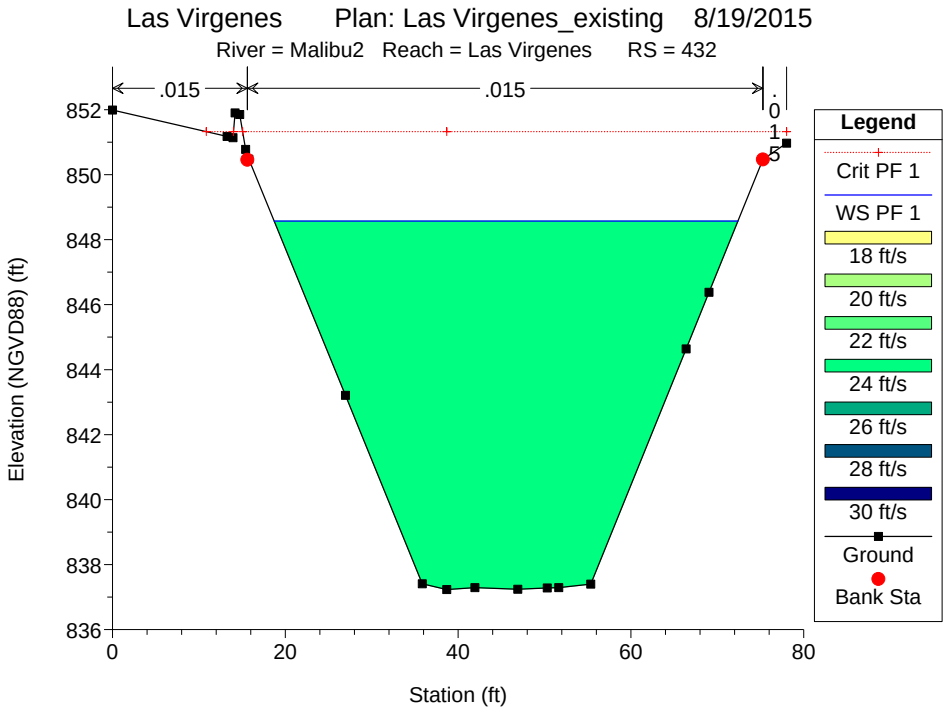

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 821 Added Station 821 to add "weir" created by debris posts
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Levee
Bank Sta

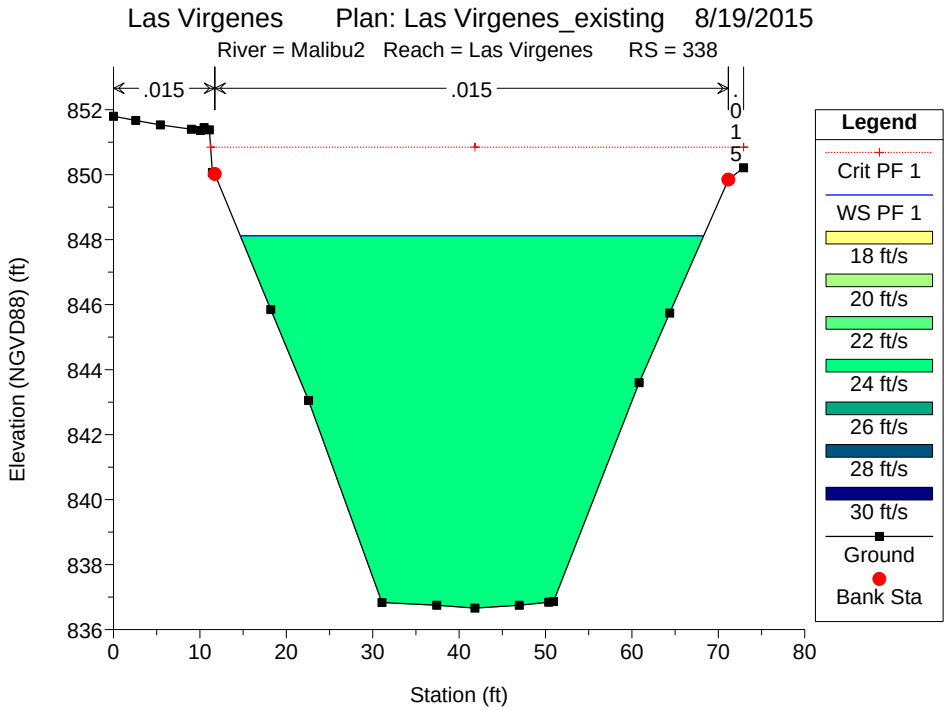

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 815 IS Debris posts
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0.0 ft/s
0.2 ft/s
0.4 ft/s
0.6 ft/s
0.8 ft/s
1.0 ft/s
Ground
Levee
Bank Sta

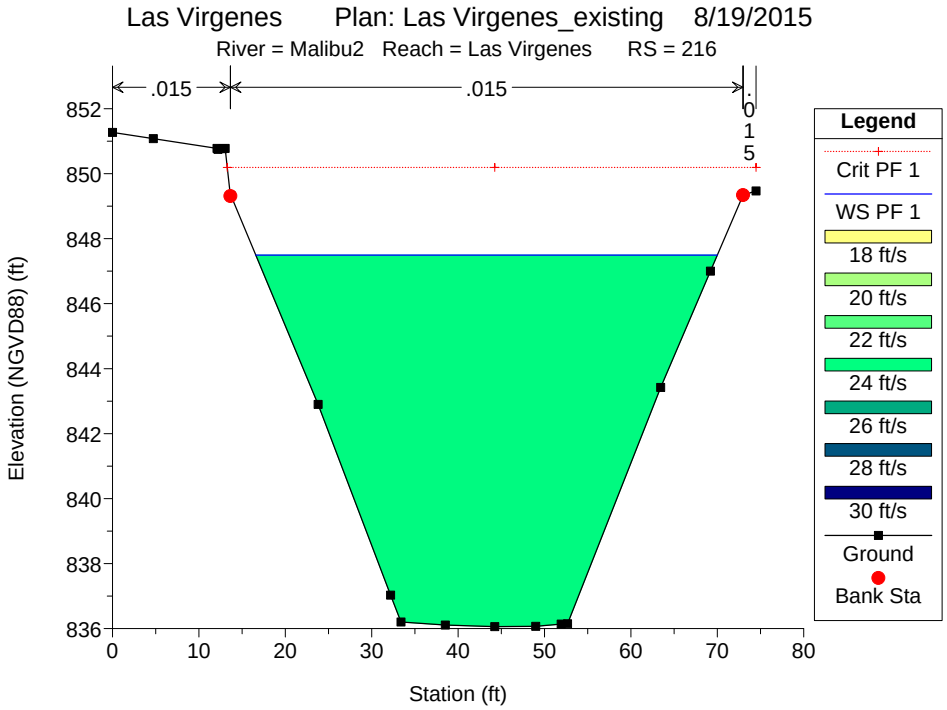

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 788 Added stations 1.01 and 0.01 to match survey points on shp file
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

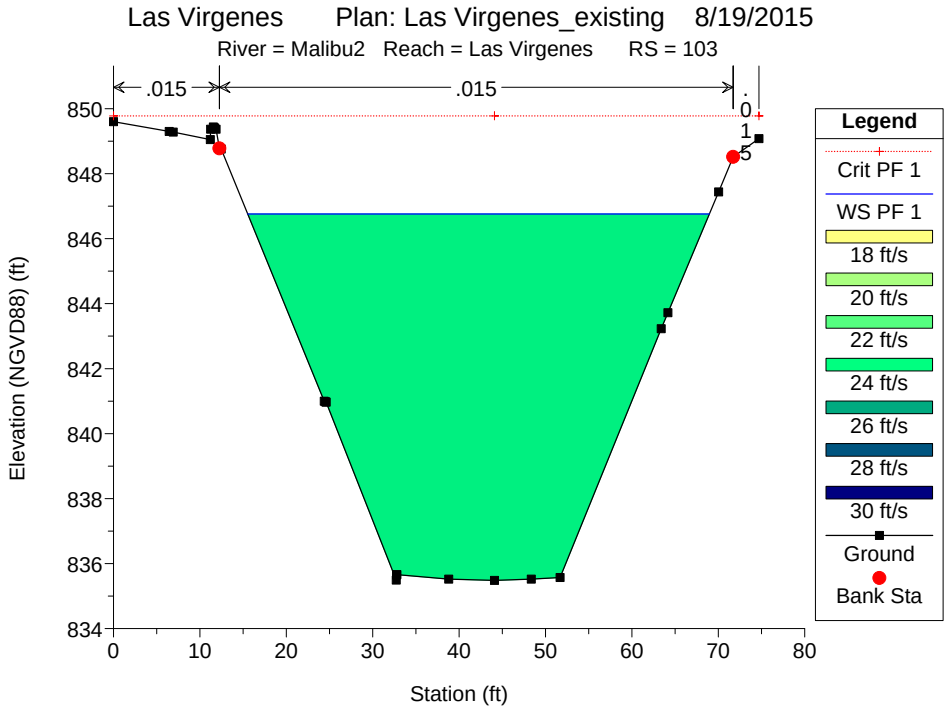

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 682
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Bank Sta

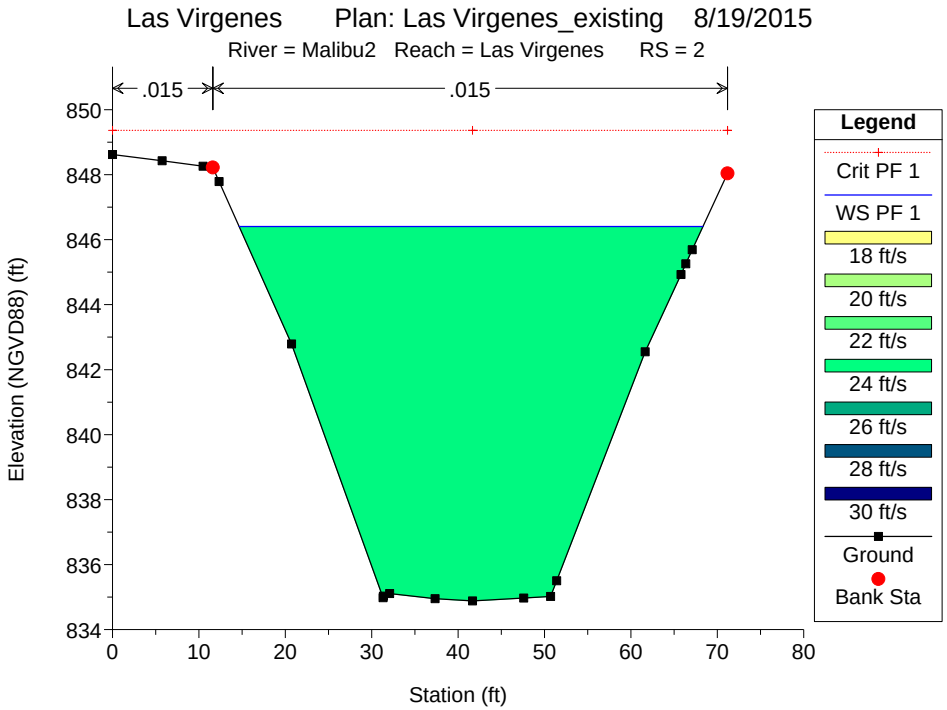

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 559
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta


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

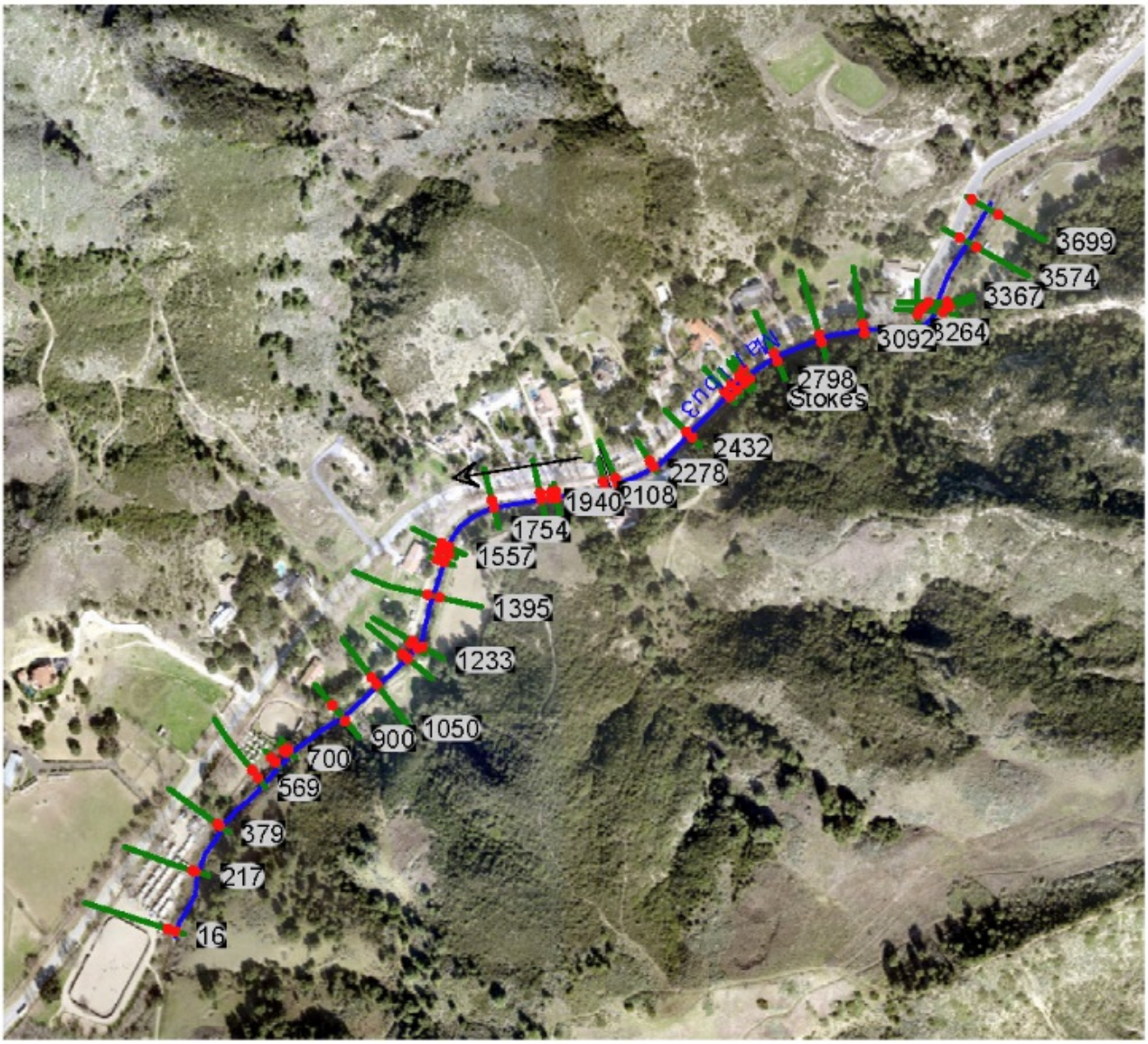

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 338
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta

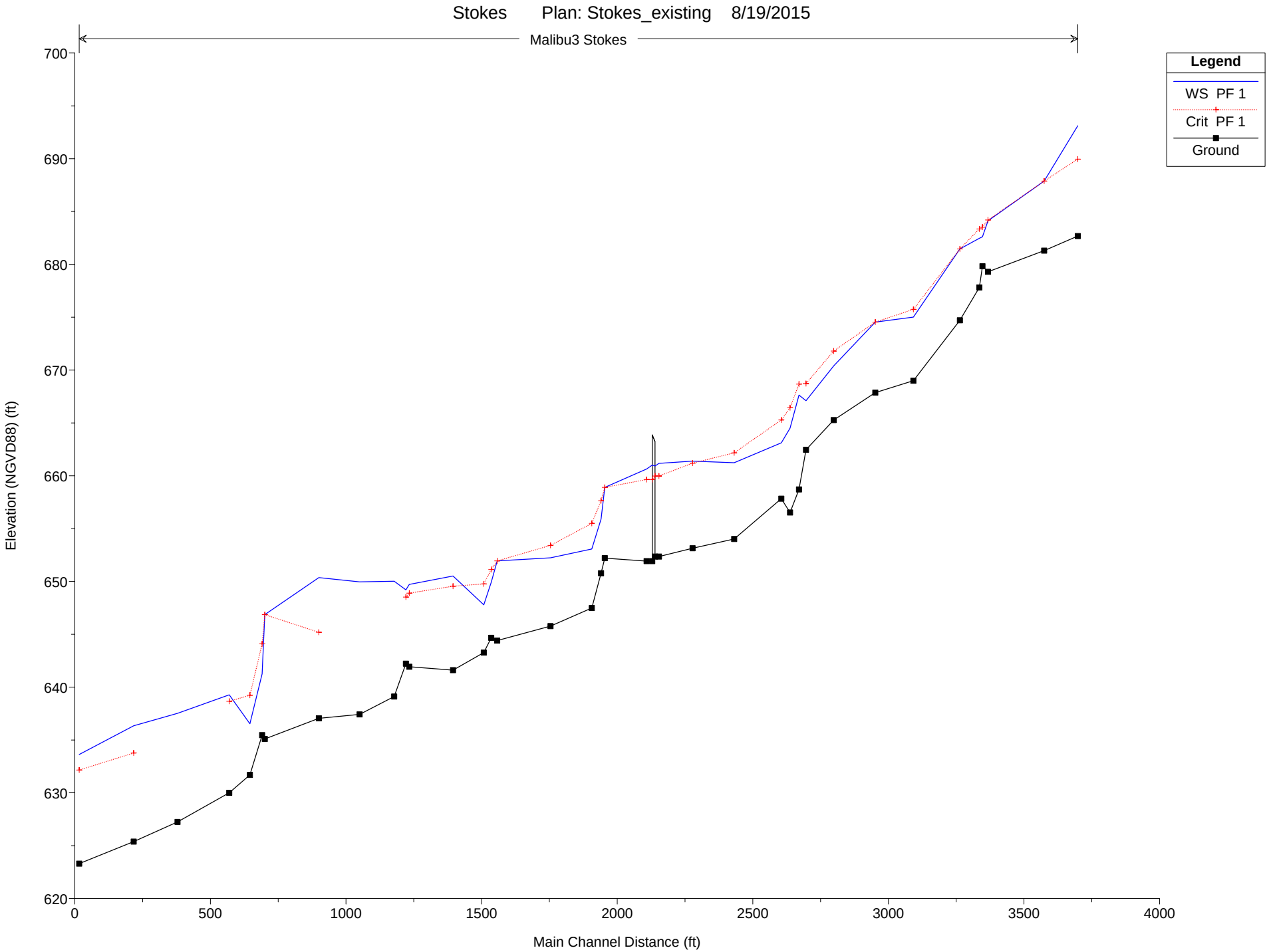

Las Virgenes Plan: Las Virgenes_existing 8/19/2015
River = Malibu2 Reach = Las Virgenes RS = 216
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta


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

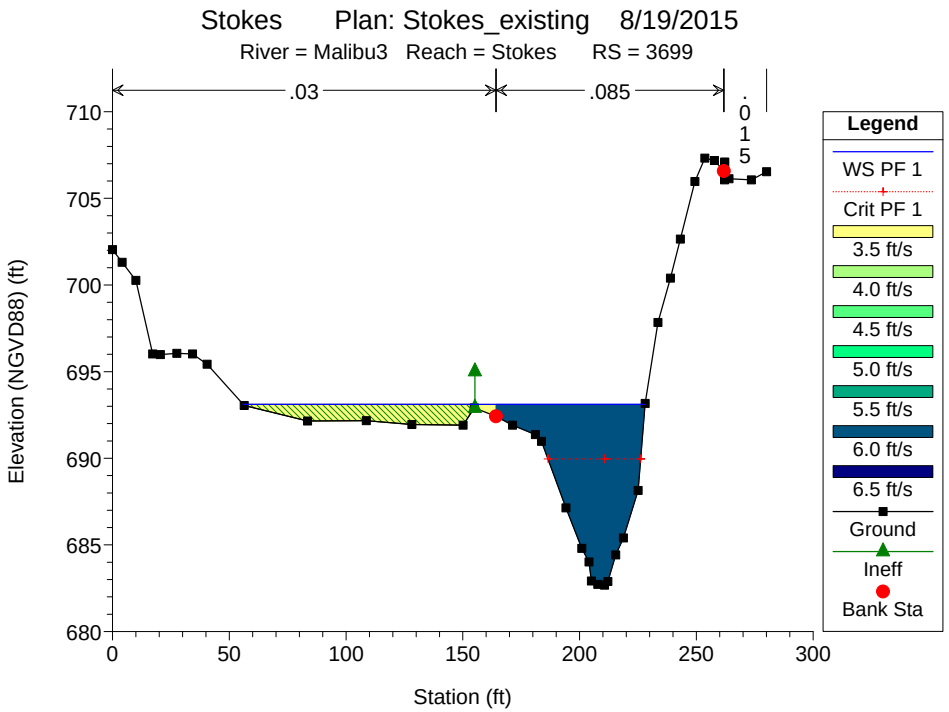
STOKES CANYON CHANNEL

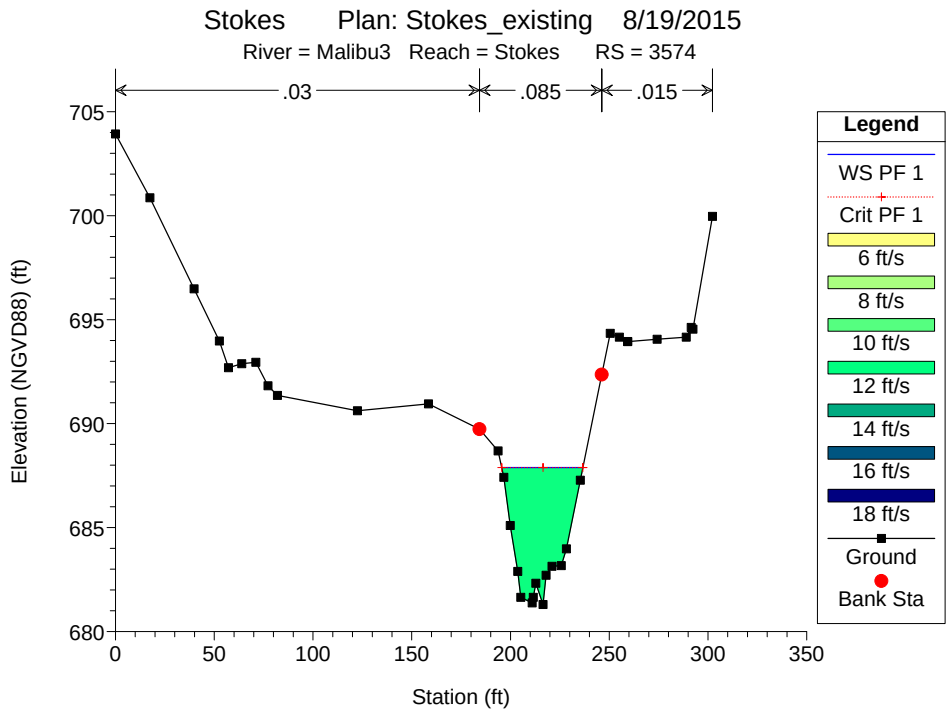

3699
3574
3367
3264
3092
2798
Stokes
2432
2278
2108
1940
1754
1557
1395
1233
1050
900
700
569
379
217
16

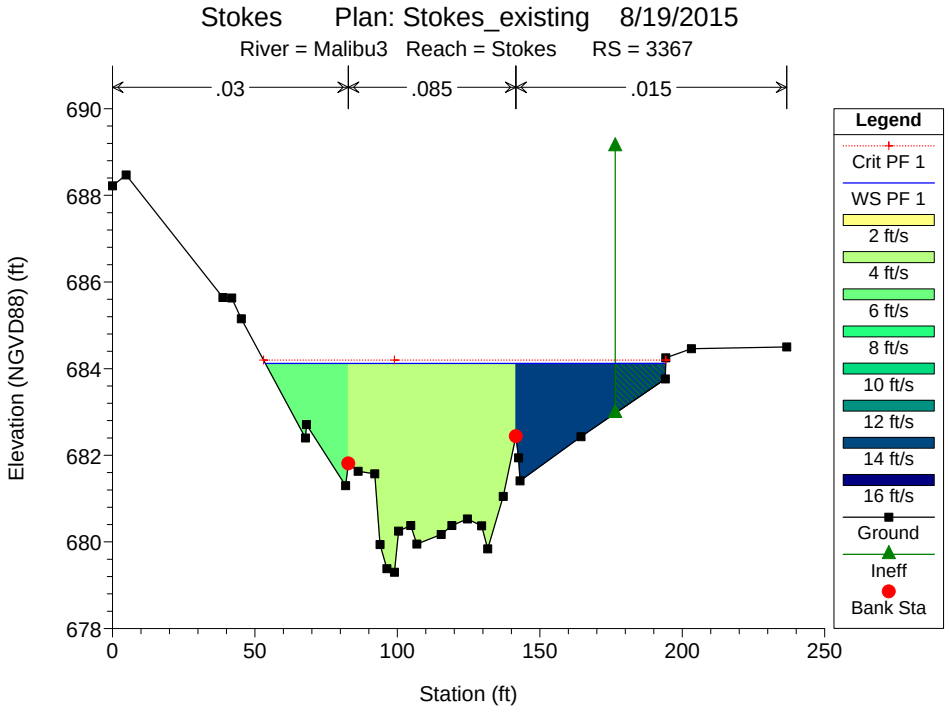

Stokes Plan: Stokes_existing 8/19/2015
Malibu3 Stokes
Legend
WS PF 1
Crit PF 1
Ground
Elevation (NGVD88) (ft)
Main Channel Distance (ft)
700
690
680
670
660
650
640
630
620
0
500
1000
1500
2000
2500
3000
3500
4000

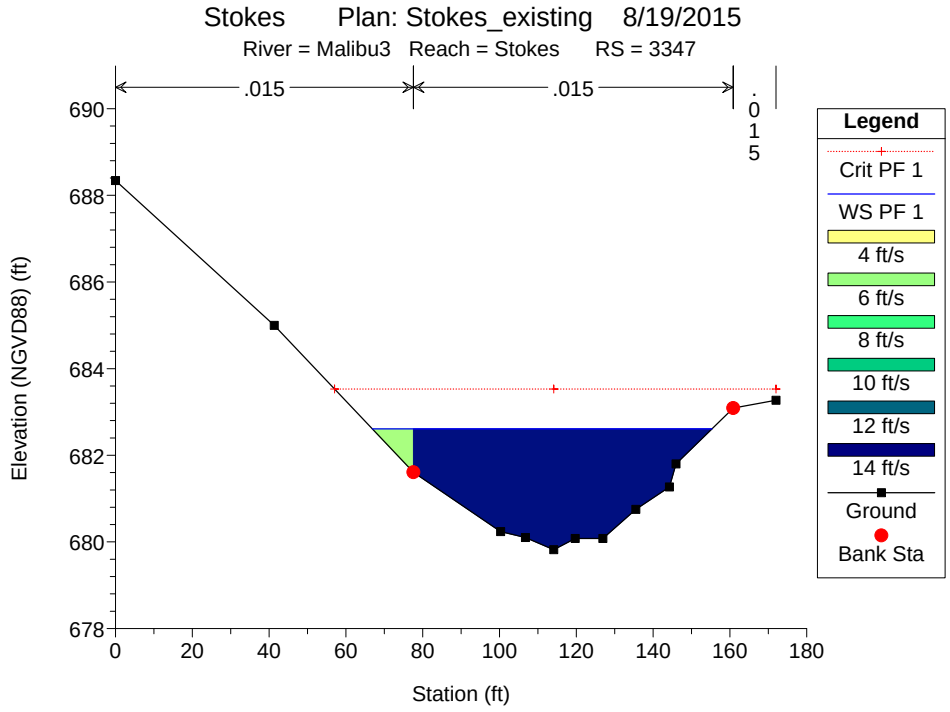
HEC-RAS Plan: Stokes_existing River: Malibu3 Reach: Stokes Profile: PF 1

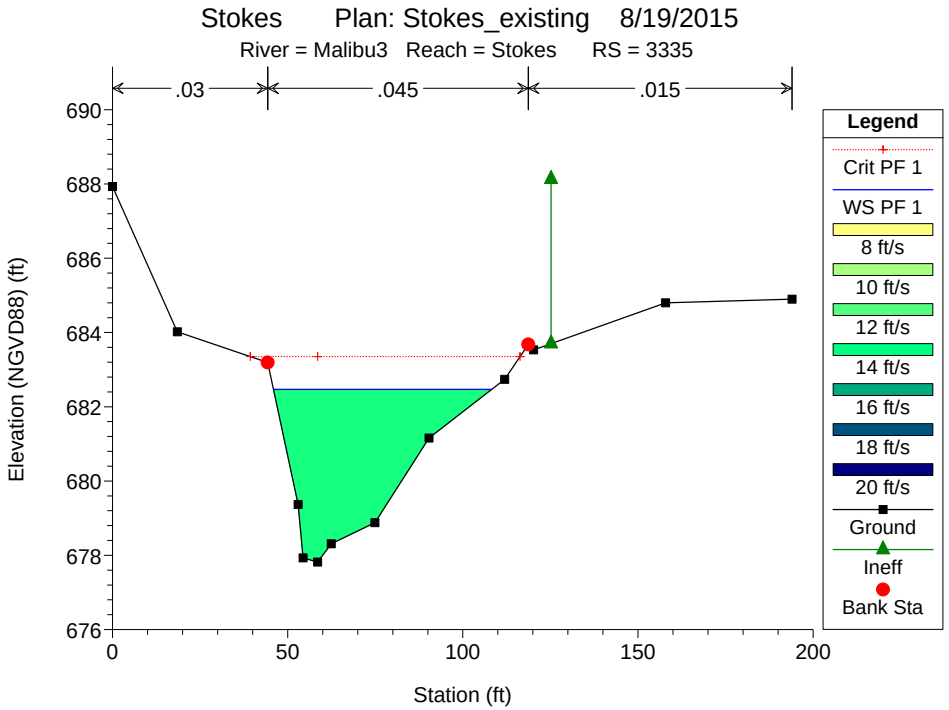
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Stokes	3699	PF 1	2020.00	682.68	693.11	689.96	693.67	0.014675	6.03	336.96	172.08	0.46
Stokes	3574	PF 1	2020.00	681.30	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

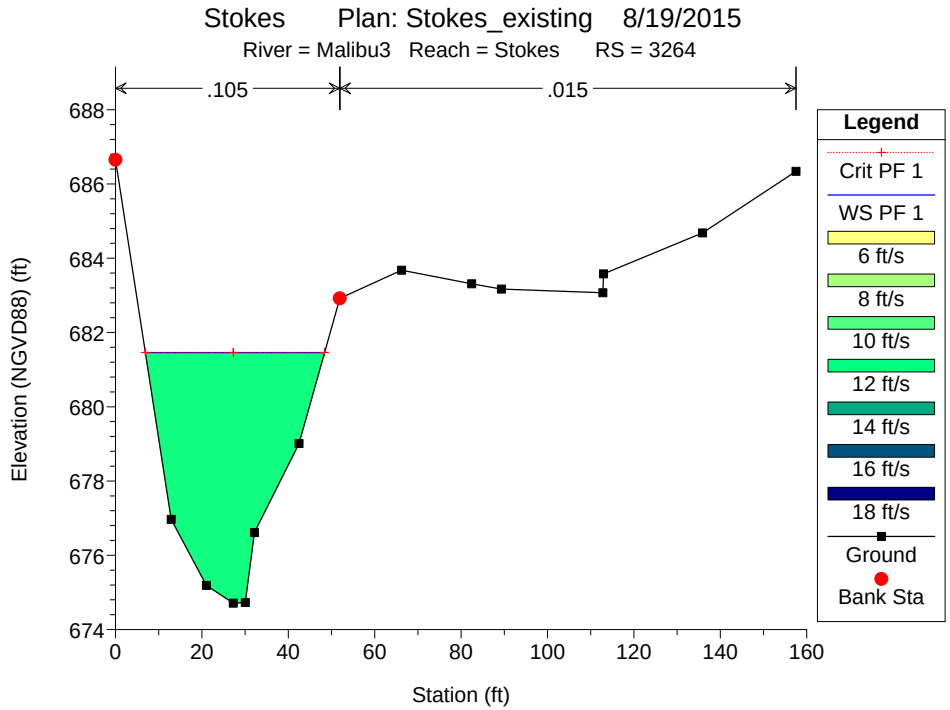

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3699
.03
.085
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
Ground
Ineff
Bank Sta

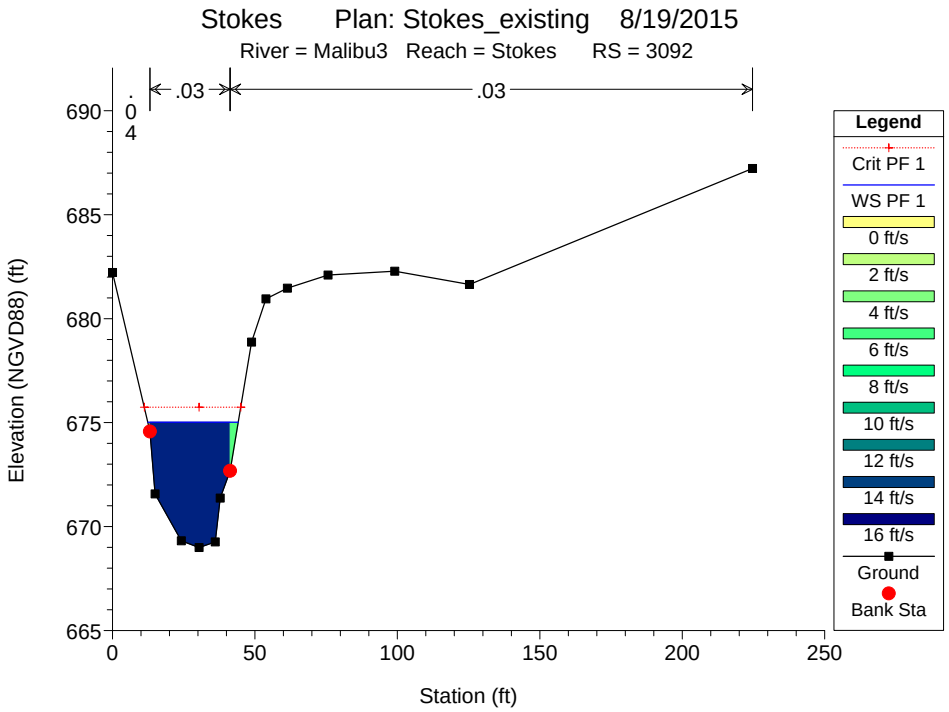

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3574
.03
.085
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

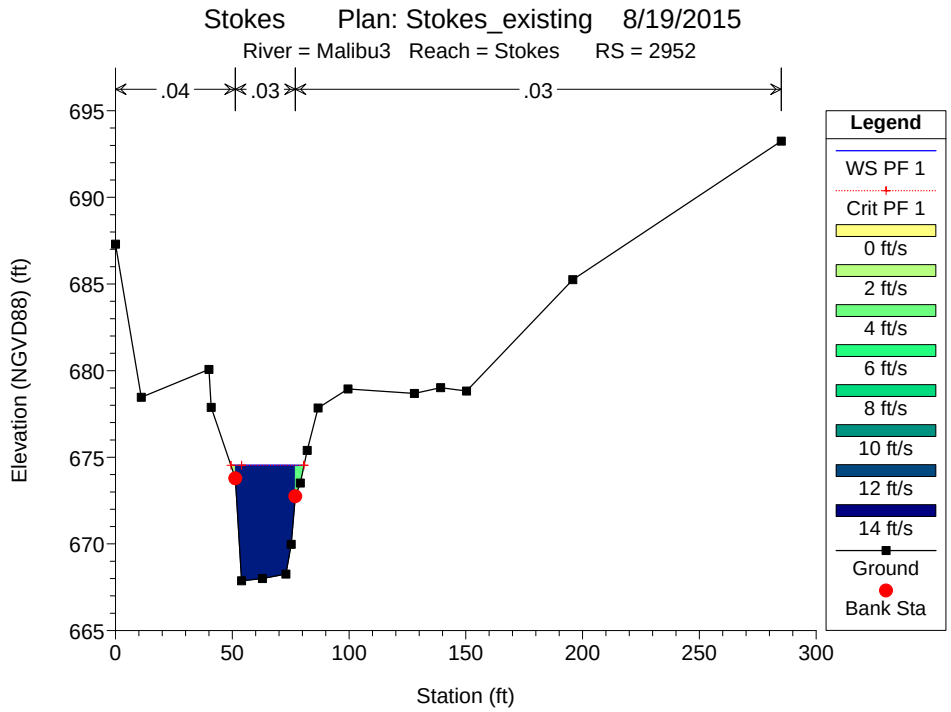

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3367
.03
.085
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Ineff
Bank Sta

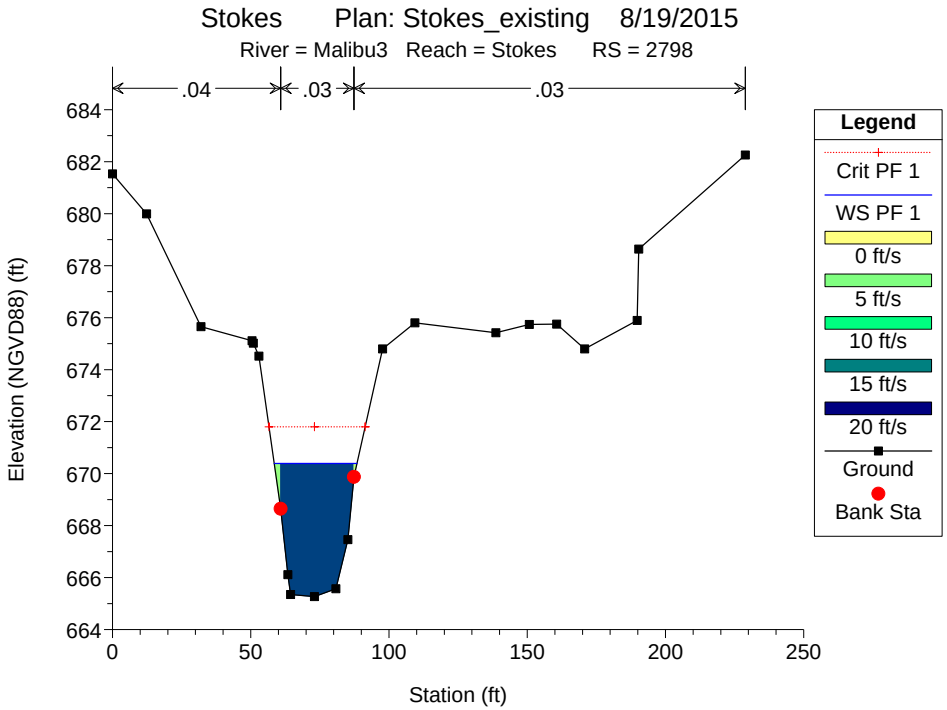

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3347
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

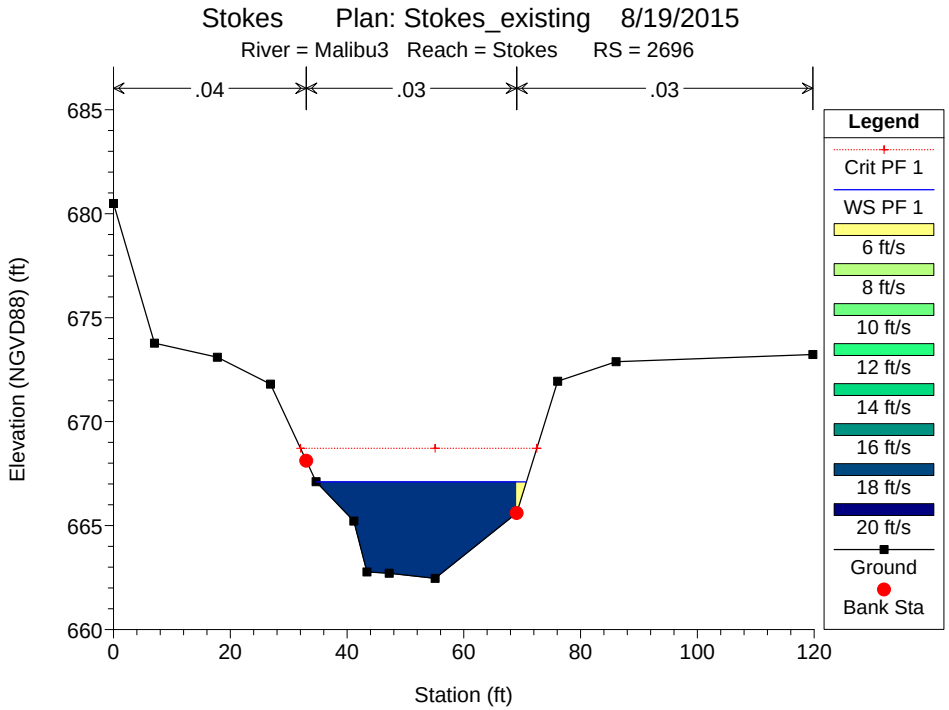

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3335
.03
.045
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

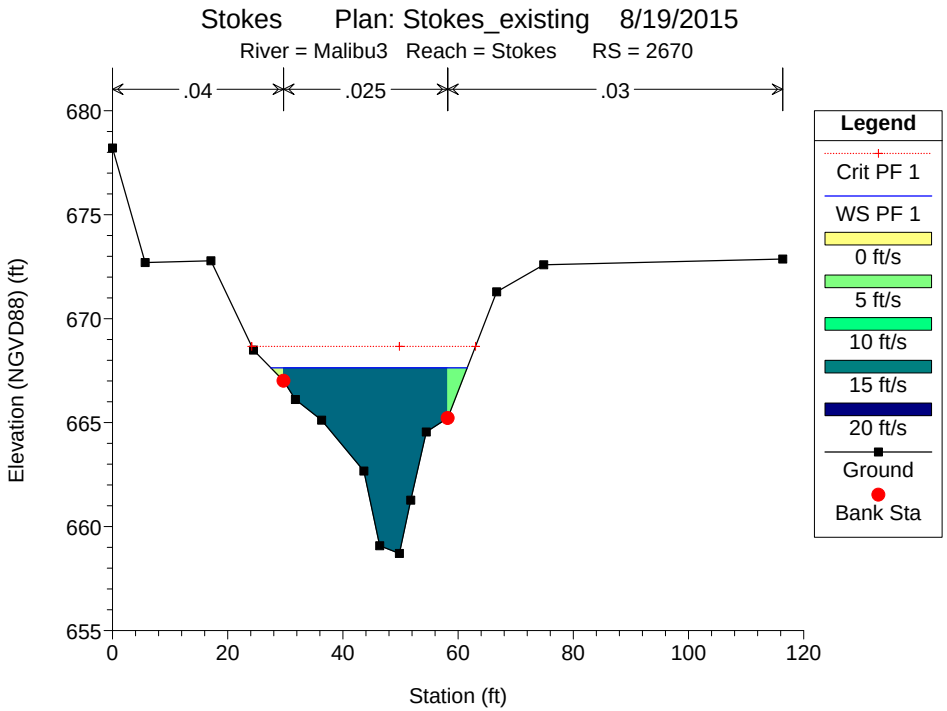

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3264
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

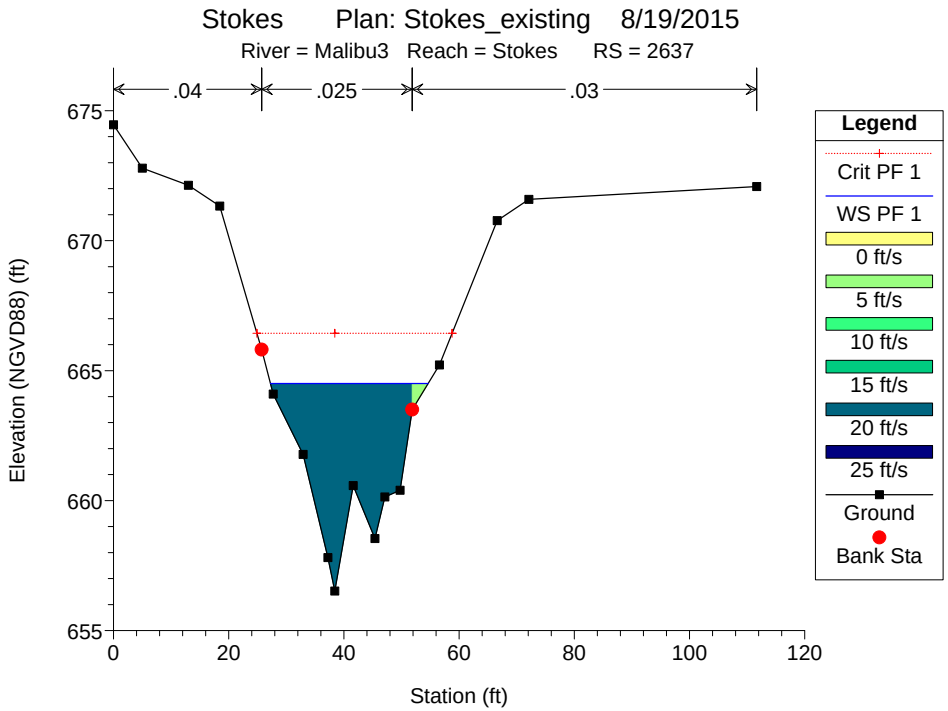

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 3092
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

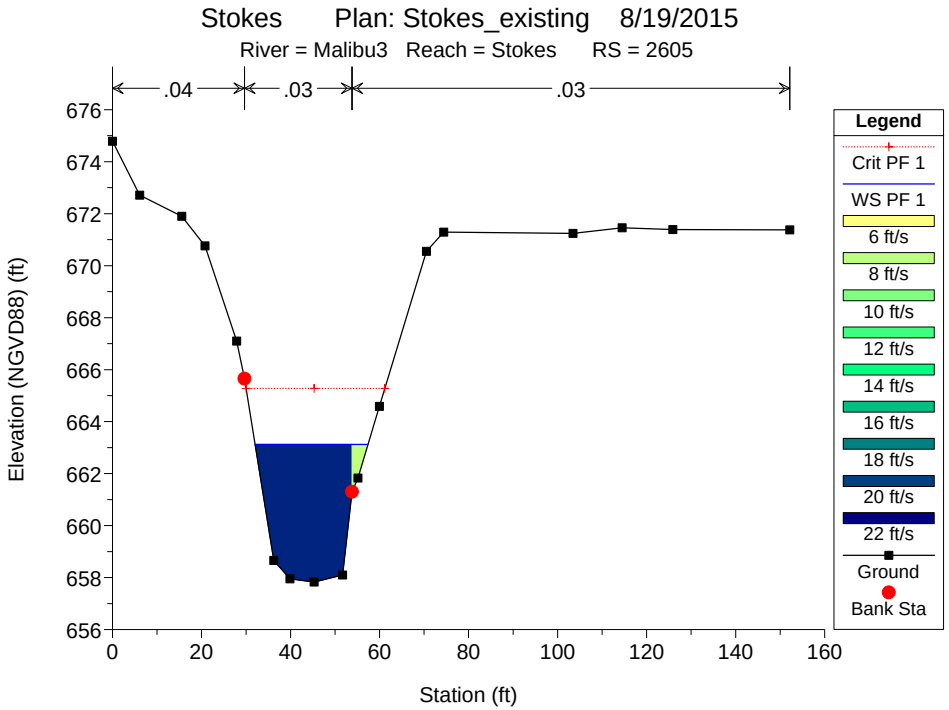

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2952
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

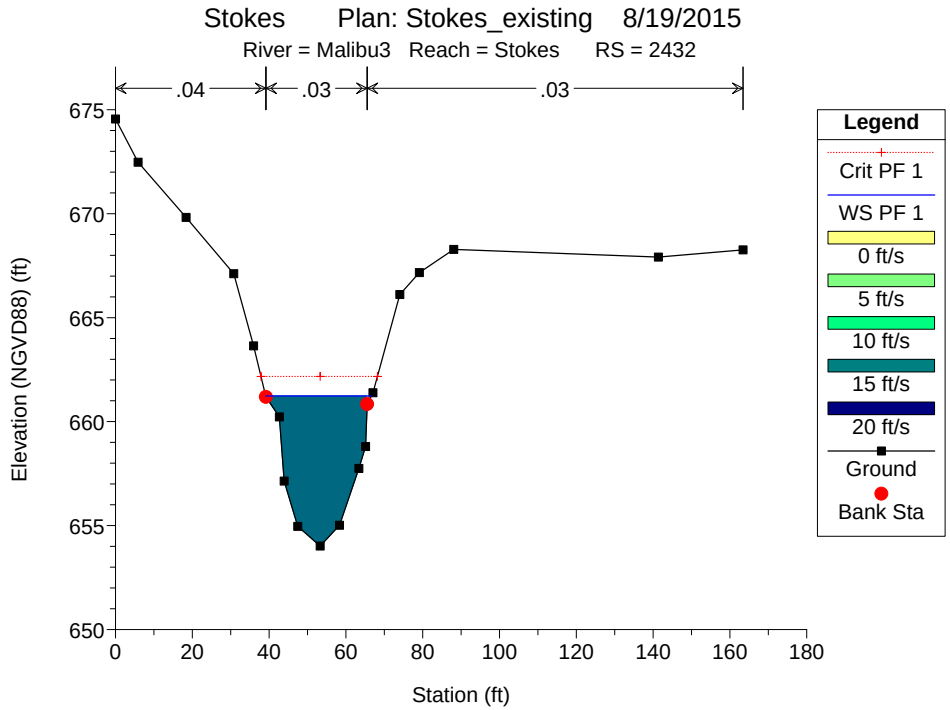

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2798
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

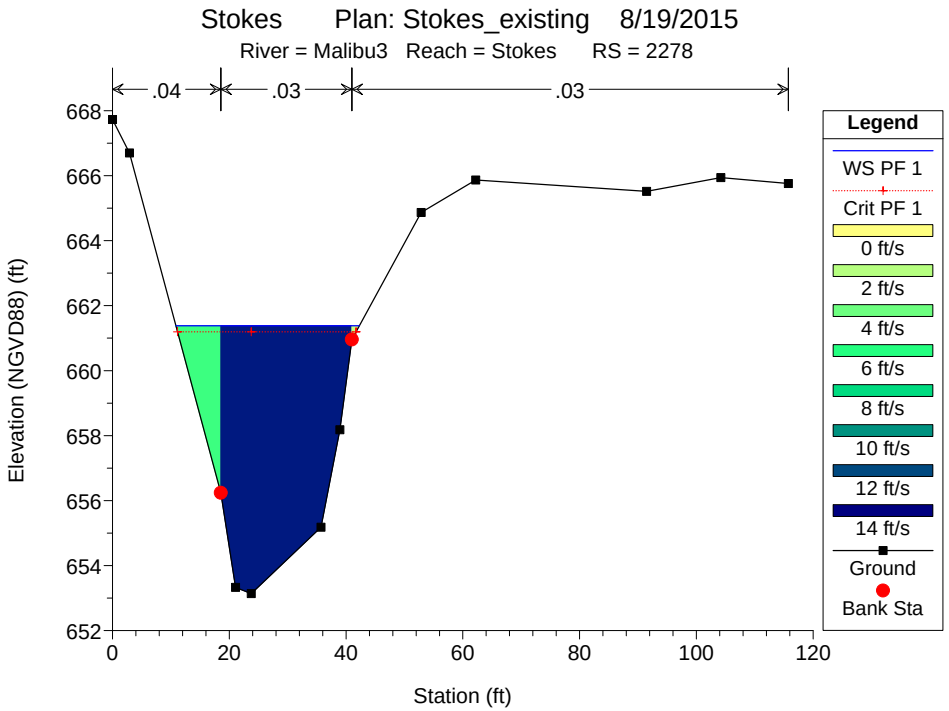

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2696
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Bank Sta

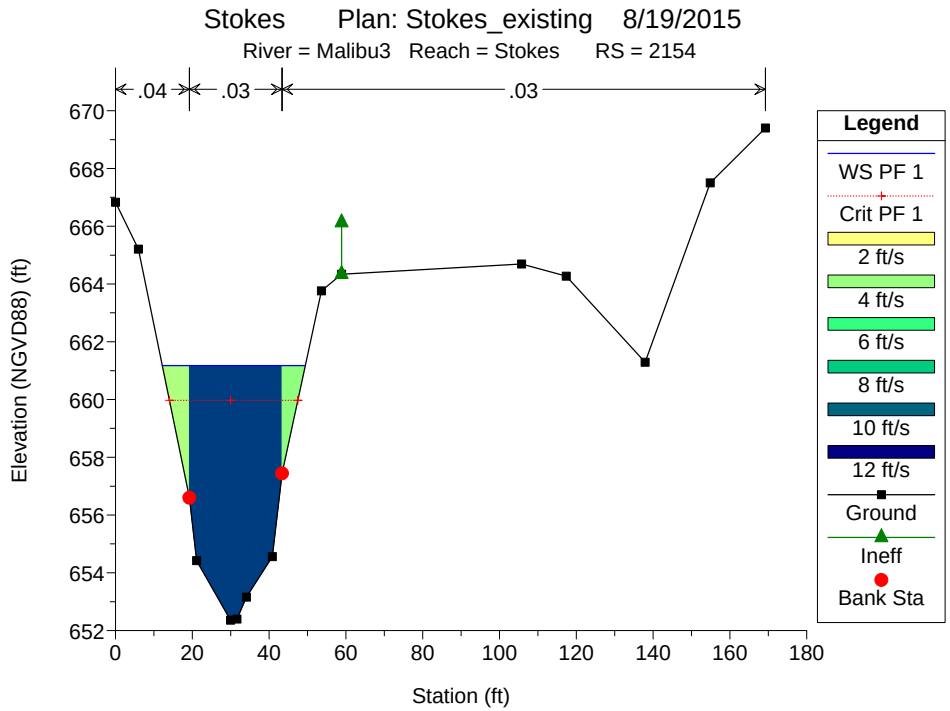

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2670
.04
.025
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

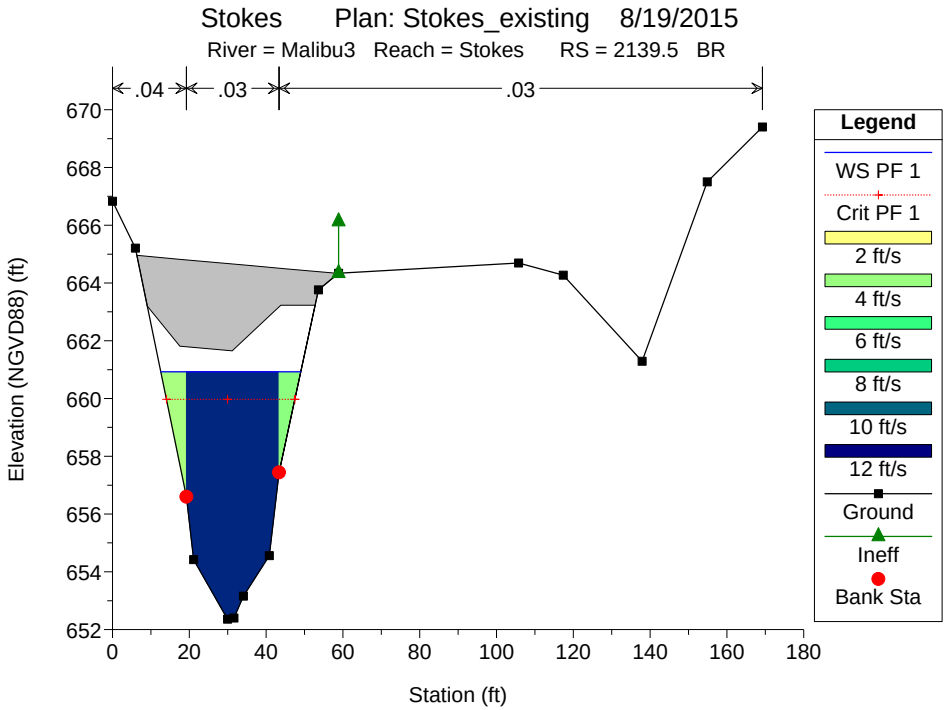

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2637
.04
.025
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
Ground
Bank Sta

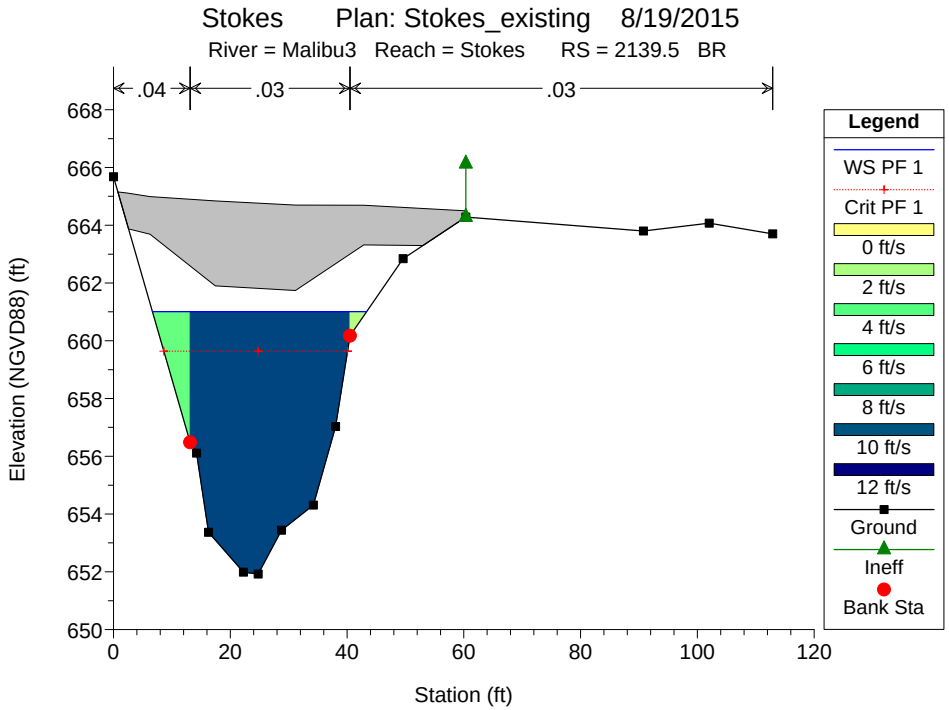

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2605
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Bank Sta

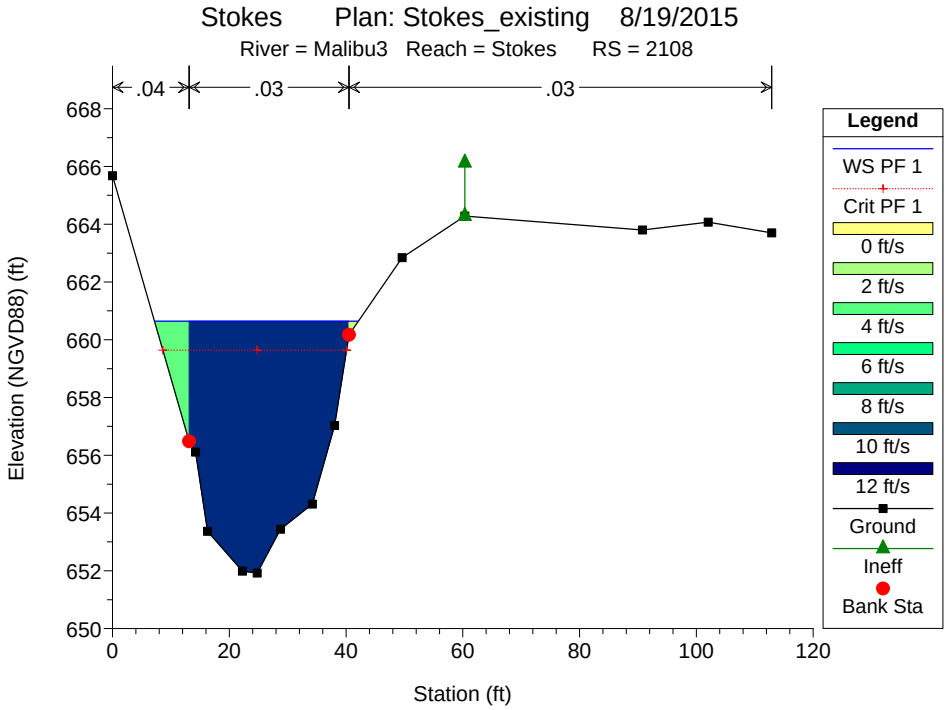

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2432
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

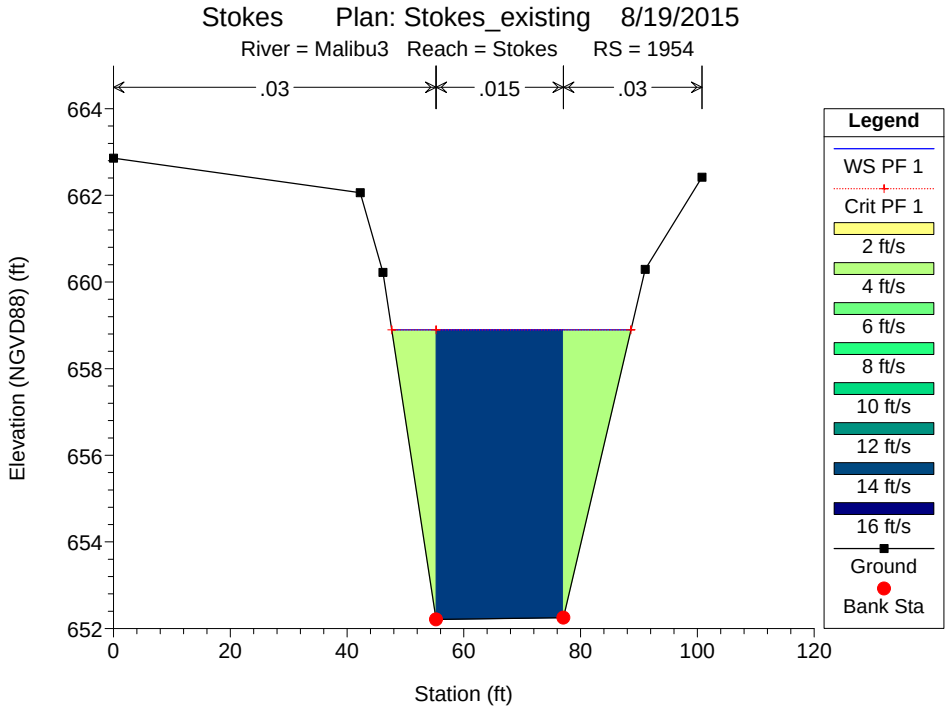

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2278
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

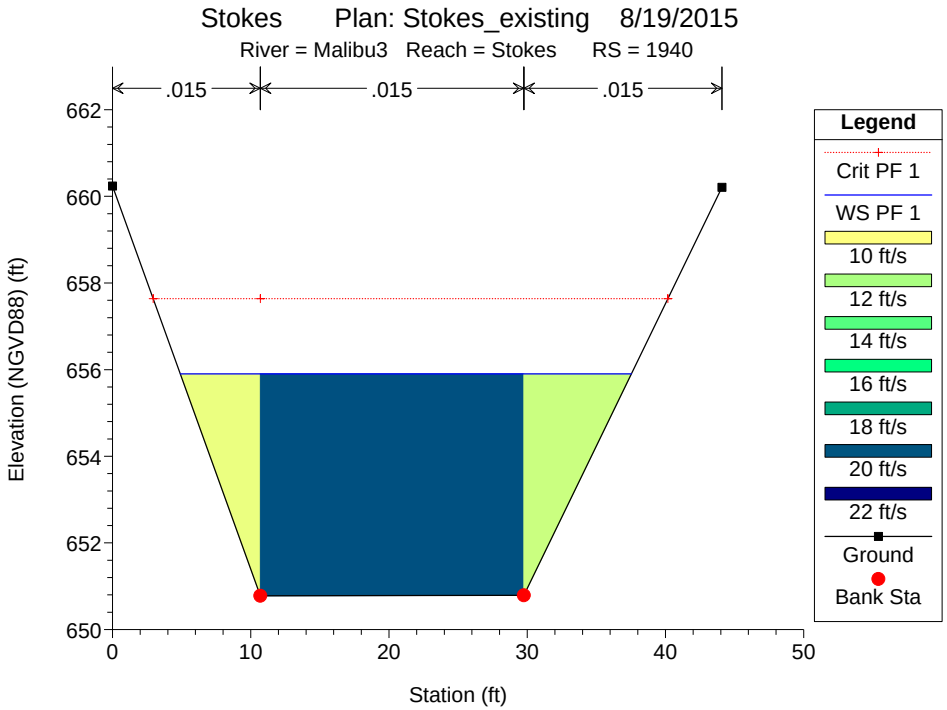

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2154
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

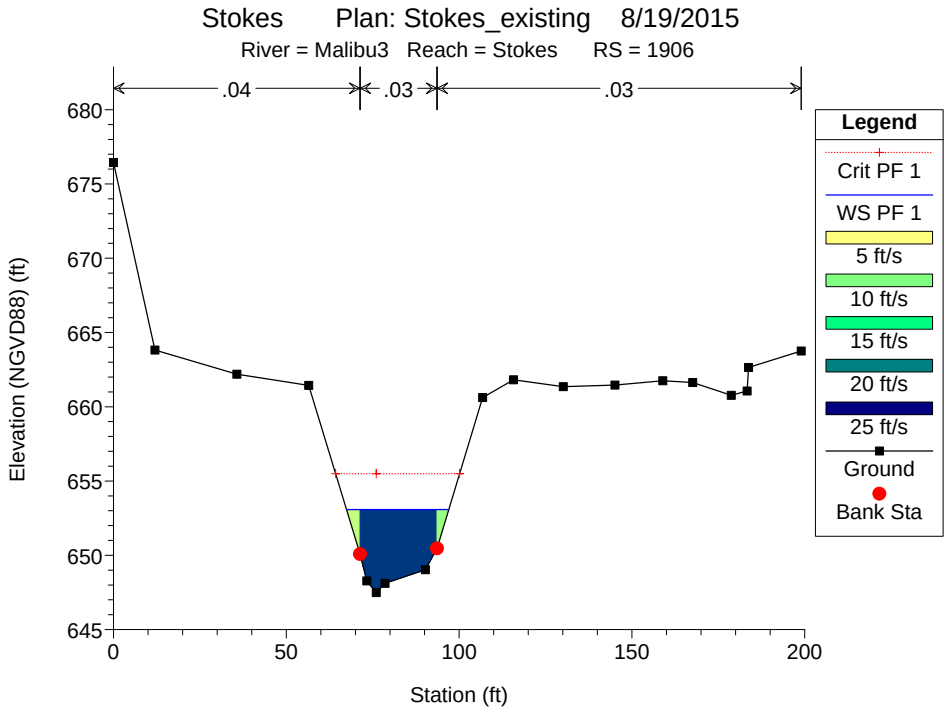

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2139.5 BR
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

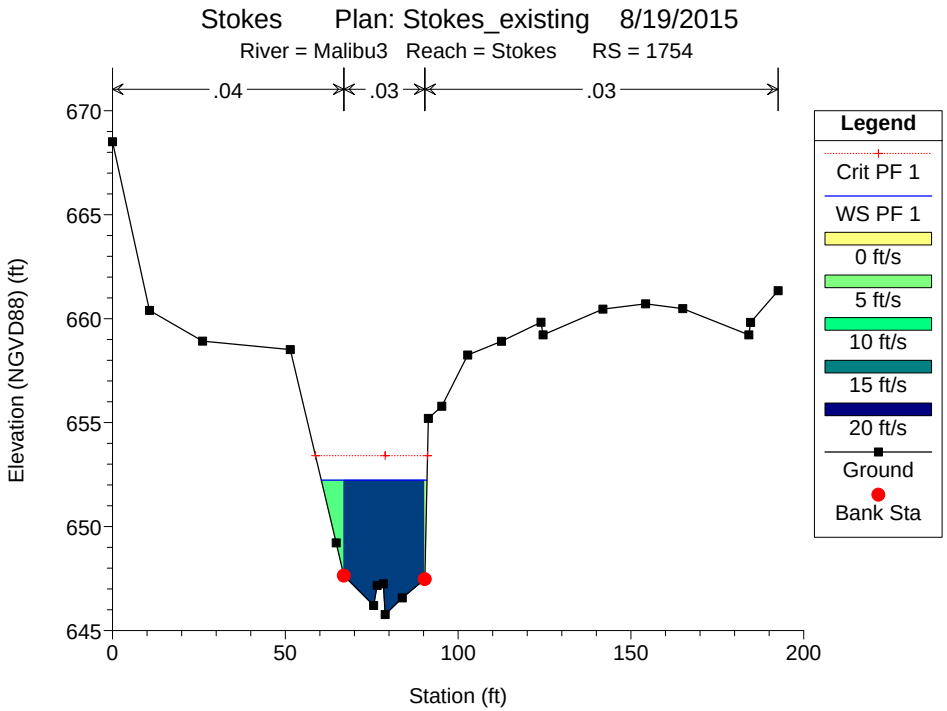

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2139.5 BR
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

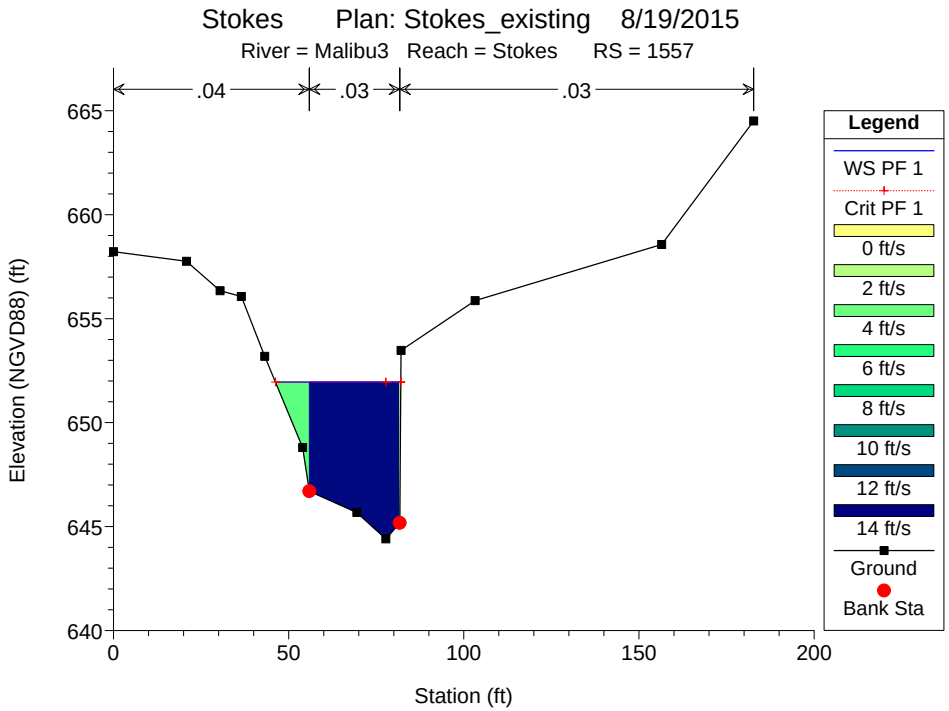

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 2108
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

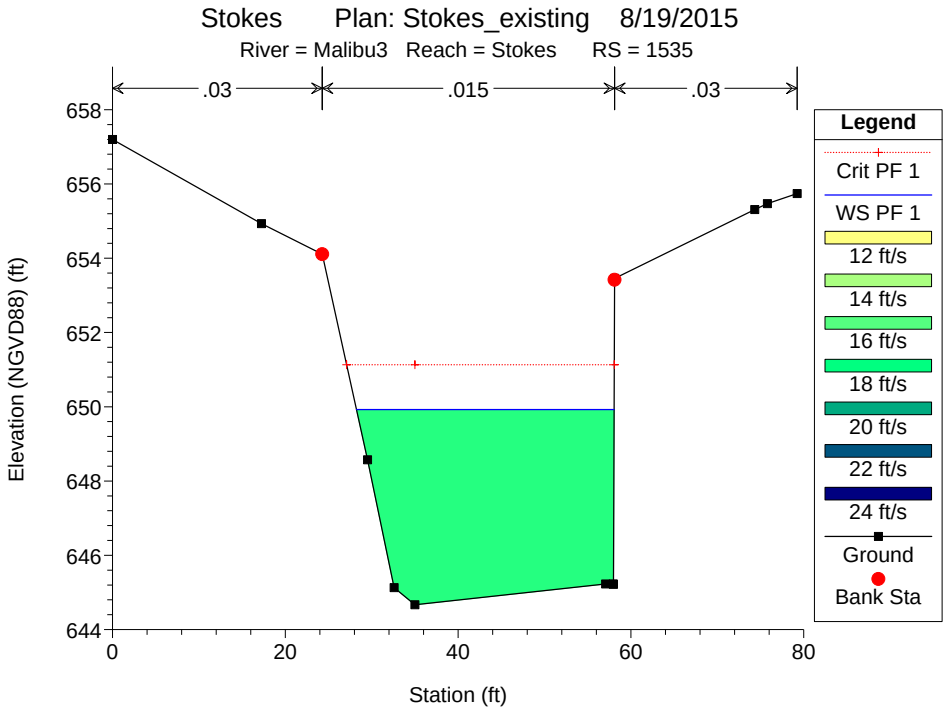

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1954
.03
.015
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

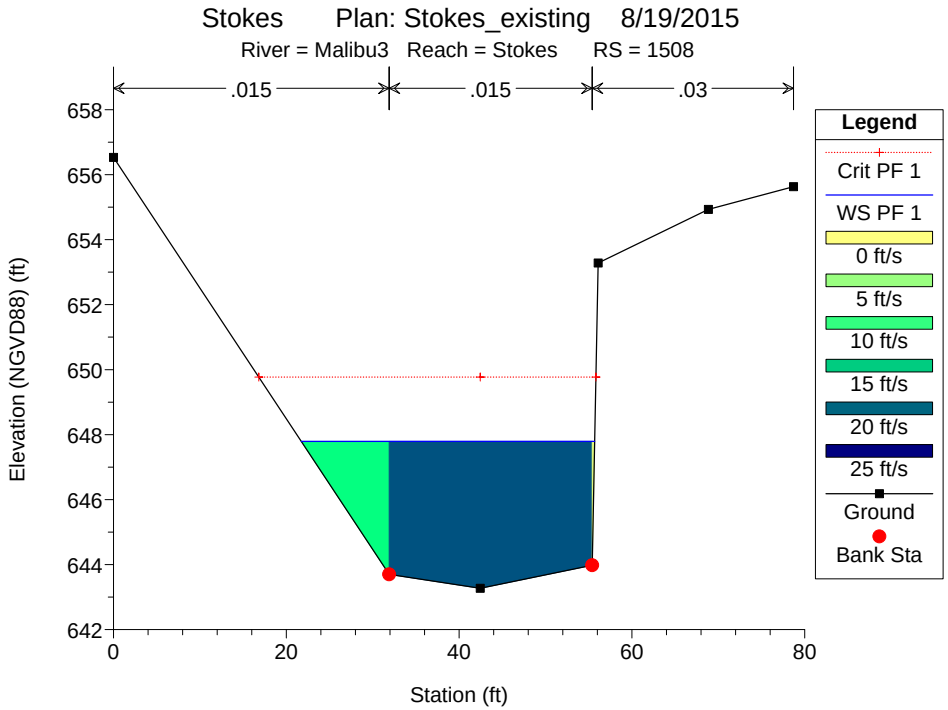

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1940
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Bank Sta

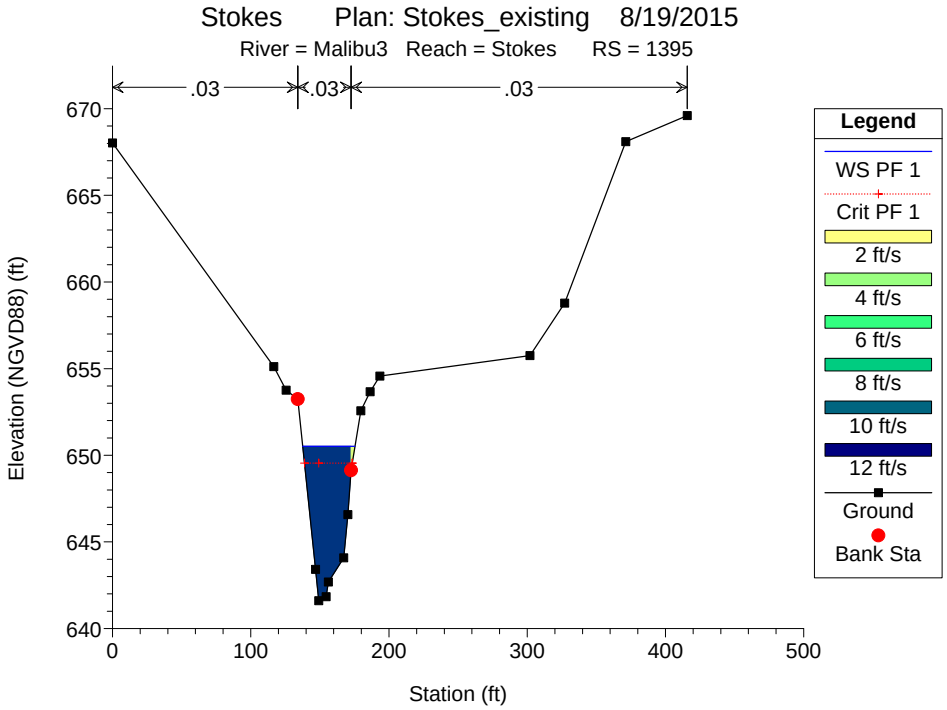

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1906
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
Ground
Bank Sta

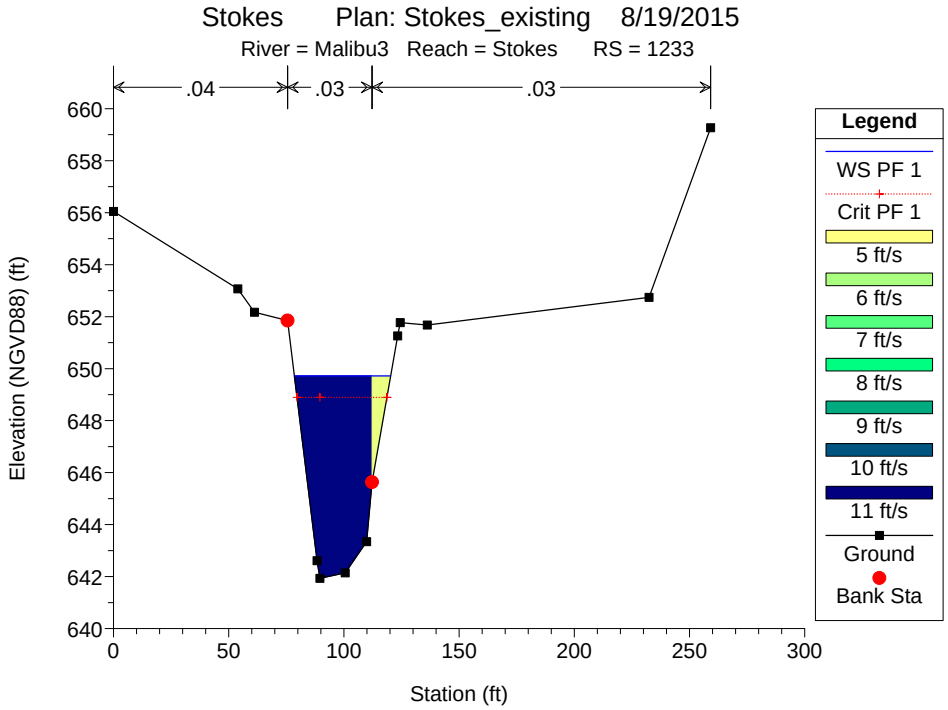

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1754
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

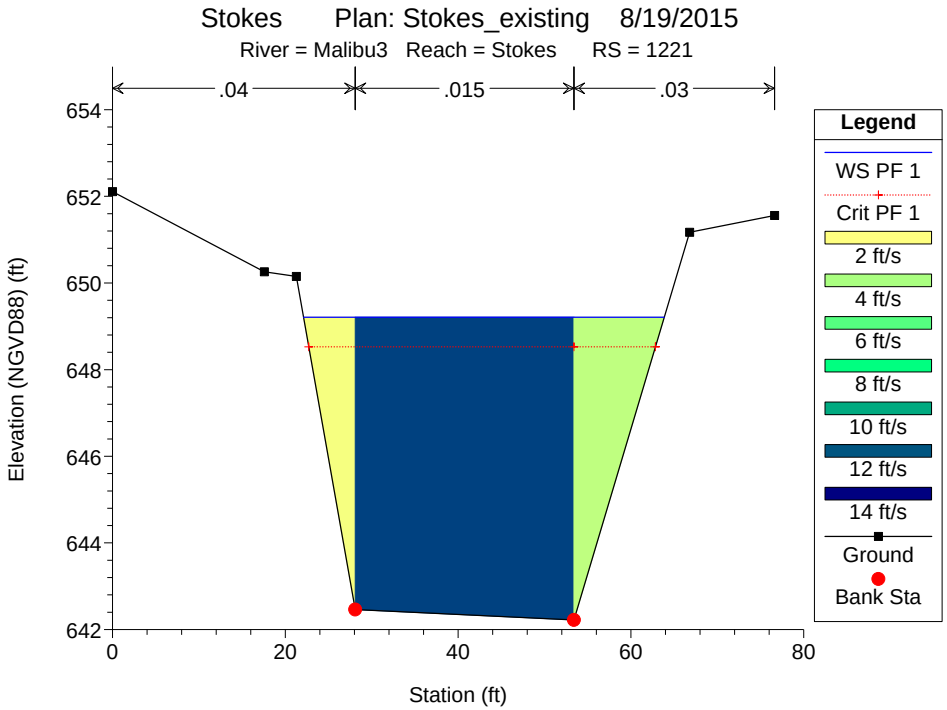

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1557
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

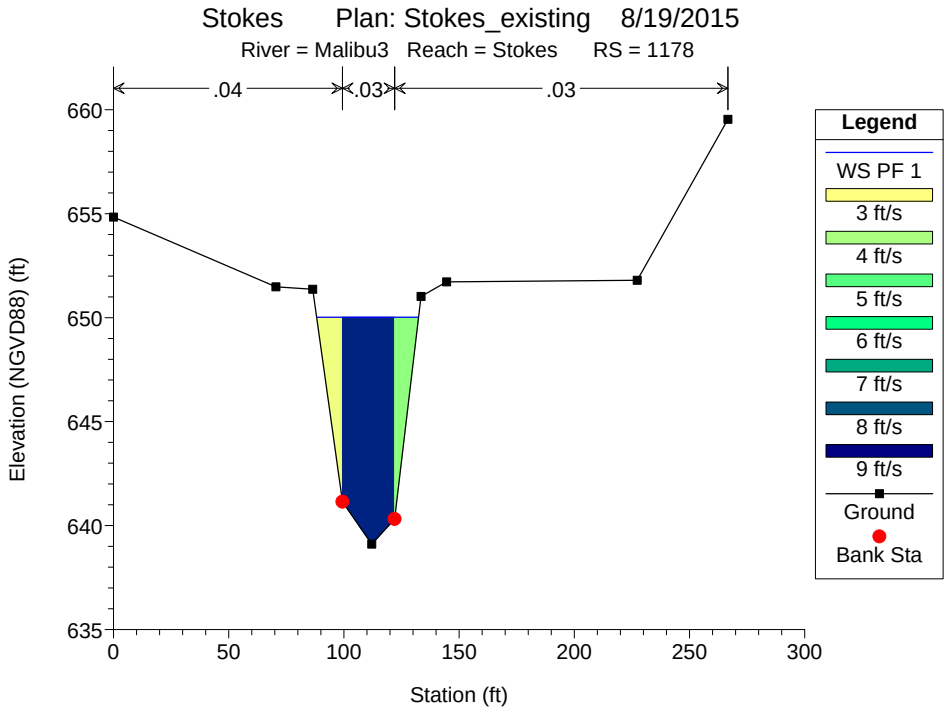

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1535
.03
.015
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
Ground
Bank Sta

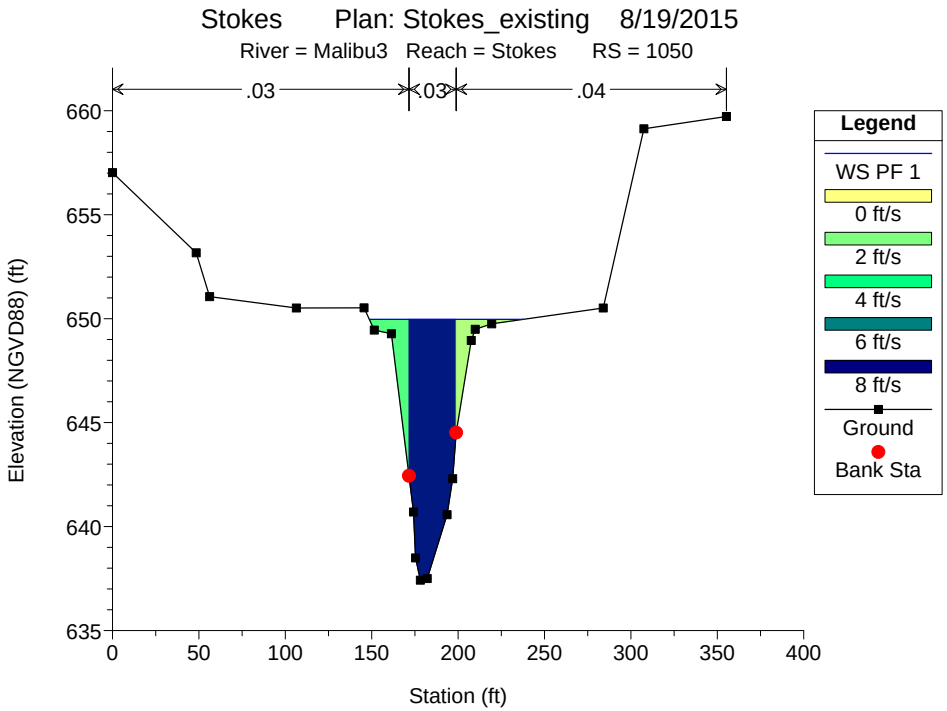

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1508
.015
.015
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
Ground
Bank Sta

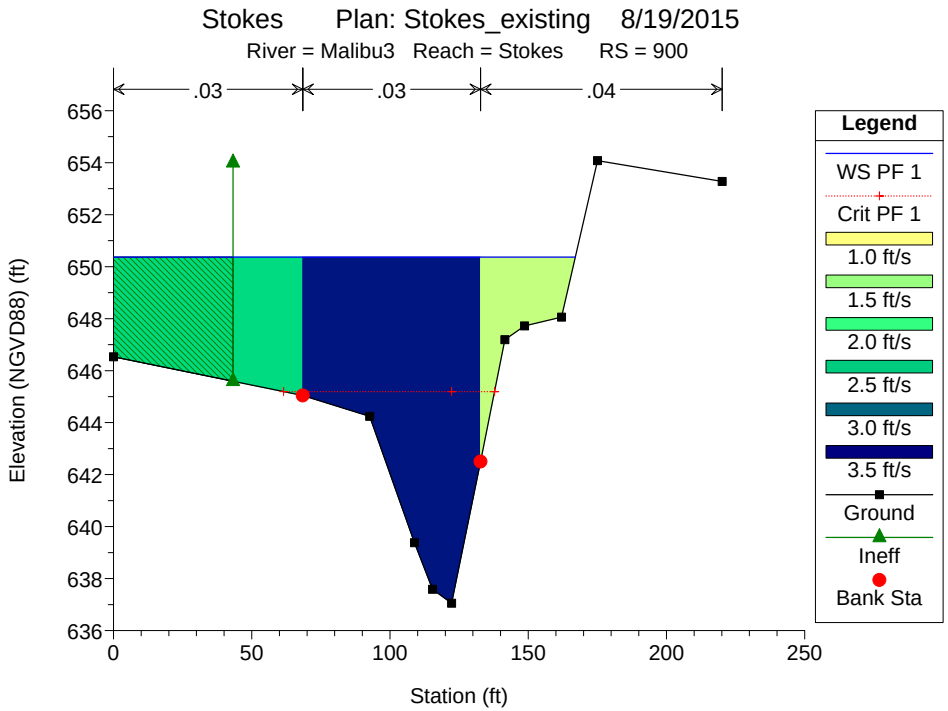

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1395
.03
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

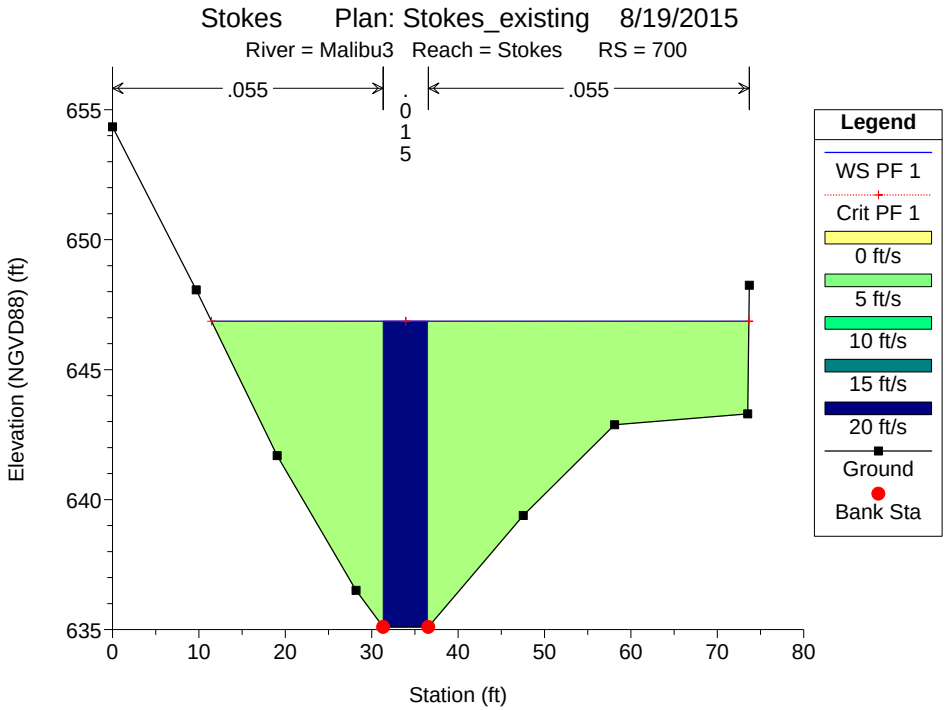

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1233
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta

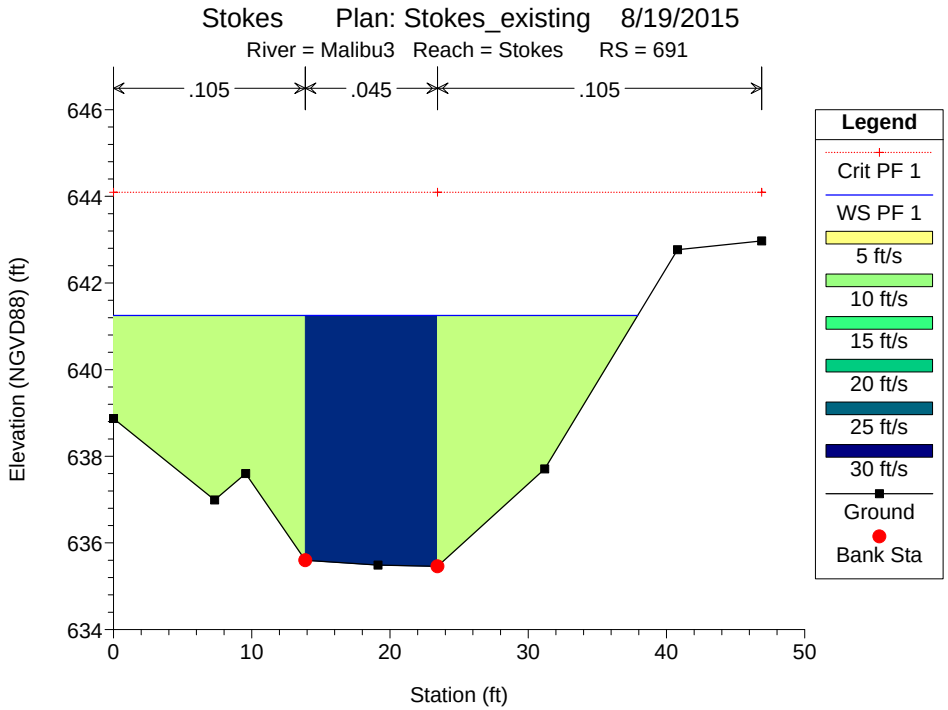

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1221
.04
.015
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

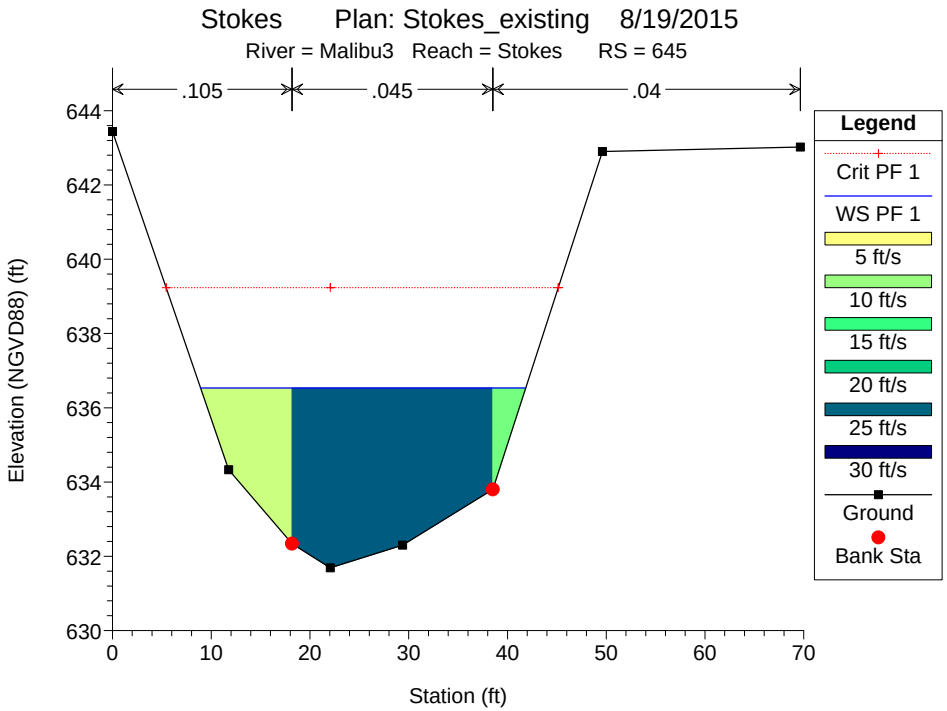

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1178
.04
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
Ground
Bank Sta

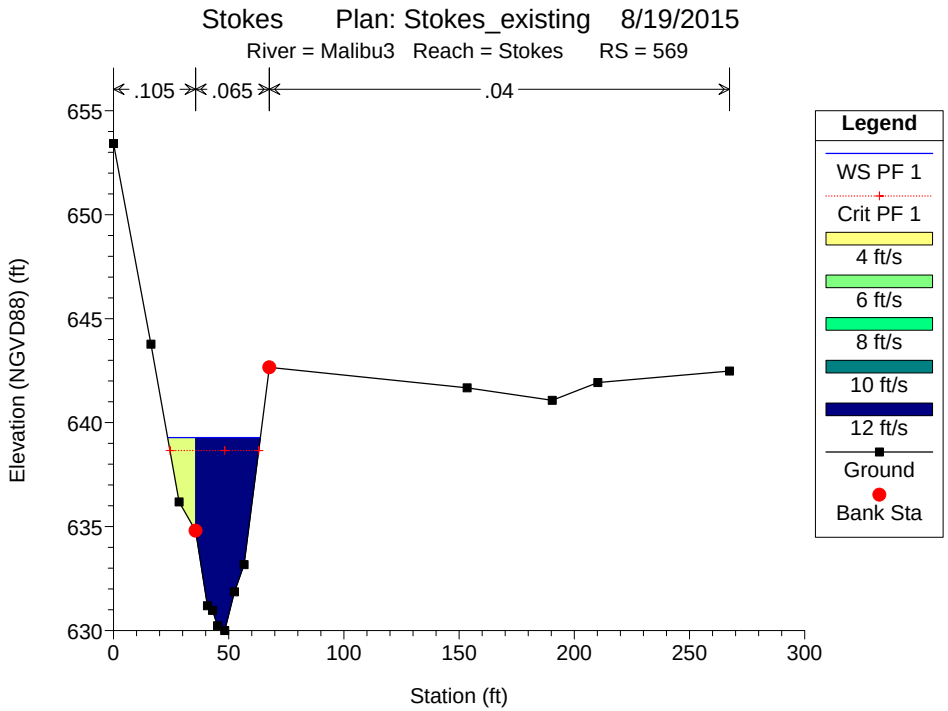

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 1050
.03
.03
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

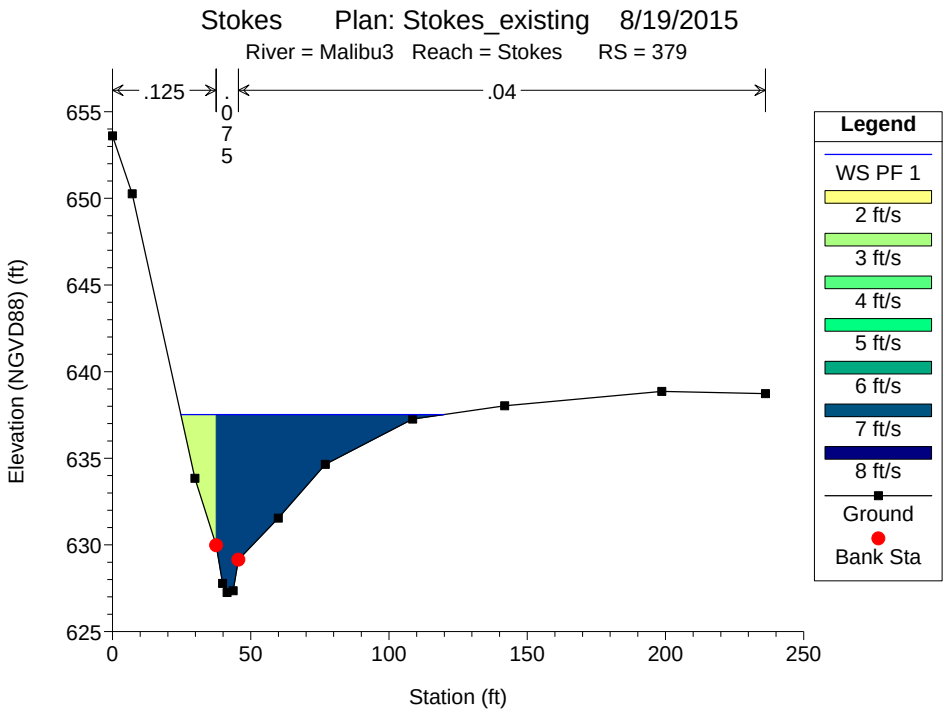

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 900
.03
.03
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
Ground
Ineff
Bank Sta

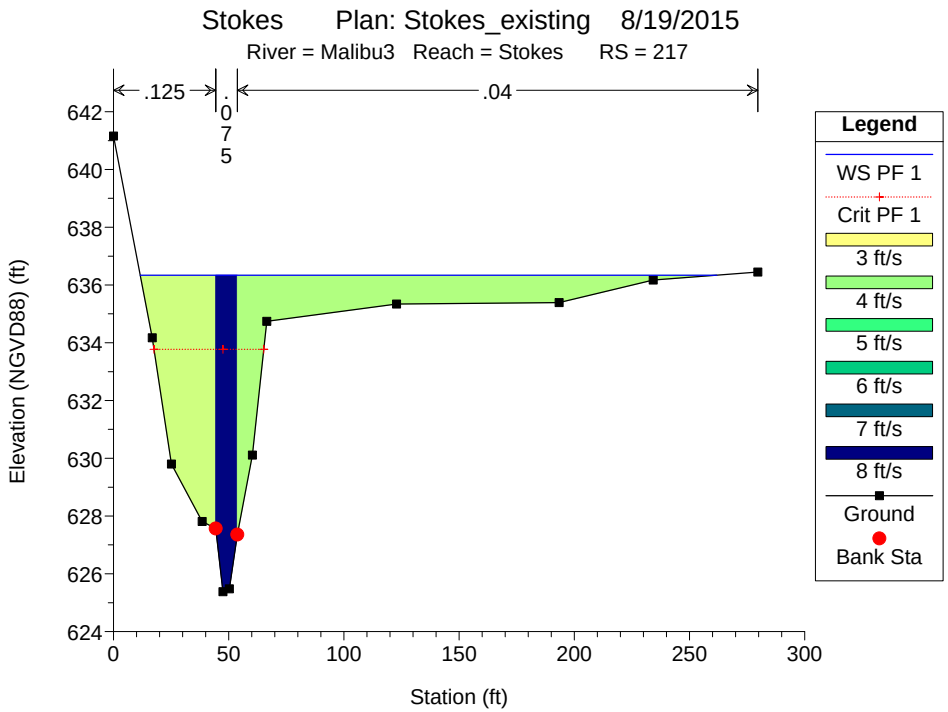

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 700
.055
.015
.055
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
Ground
Bank Sta

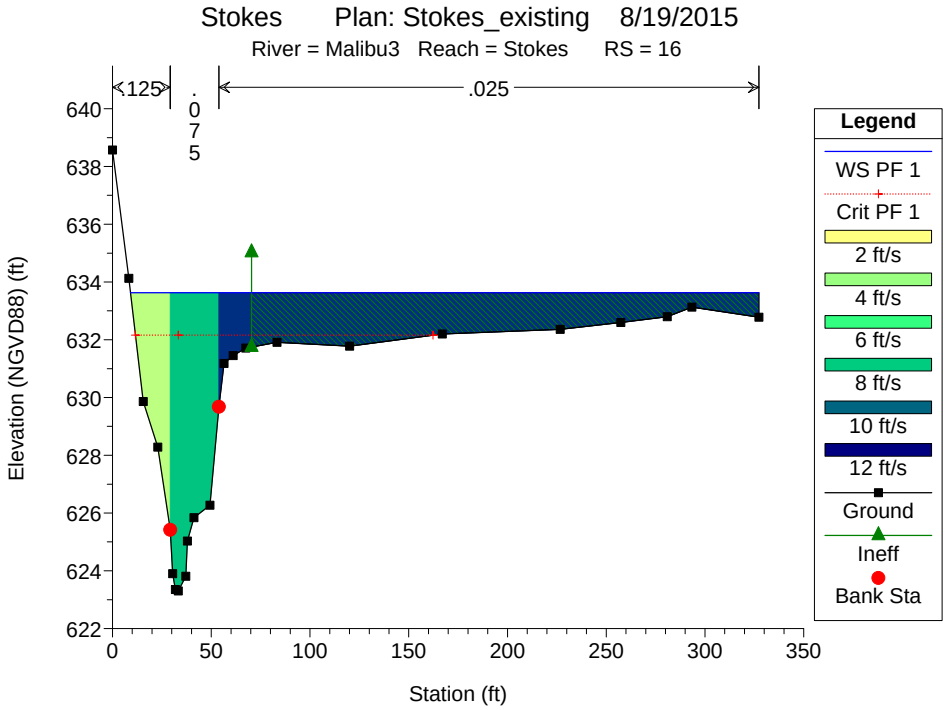

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 691
.105
.045
.105
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
30 ft/s
Ground
Bank Sta


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

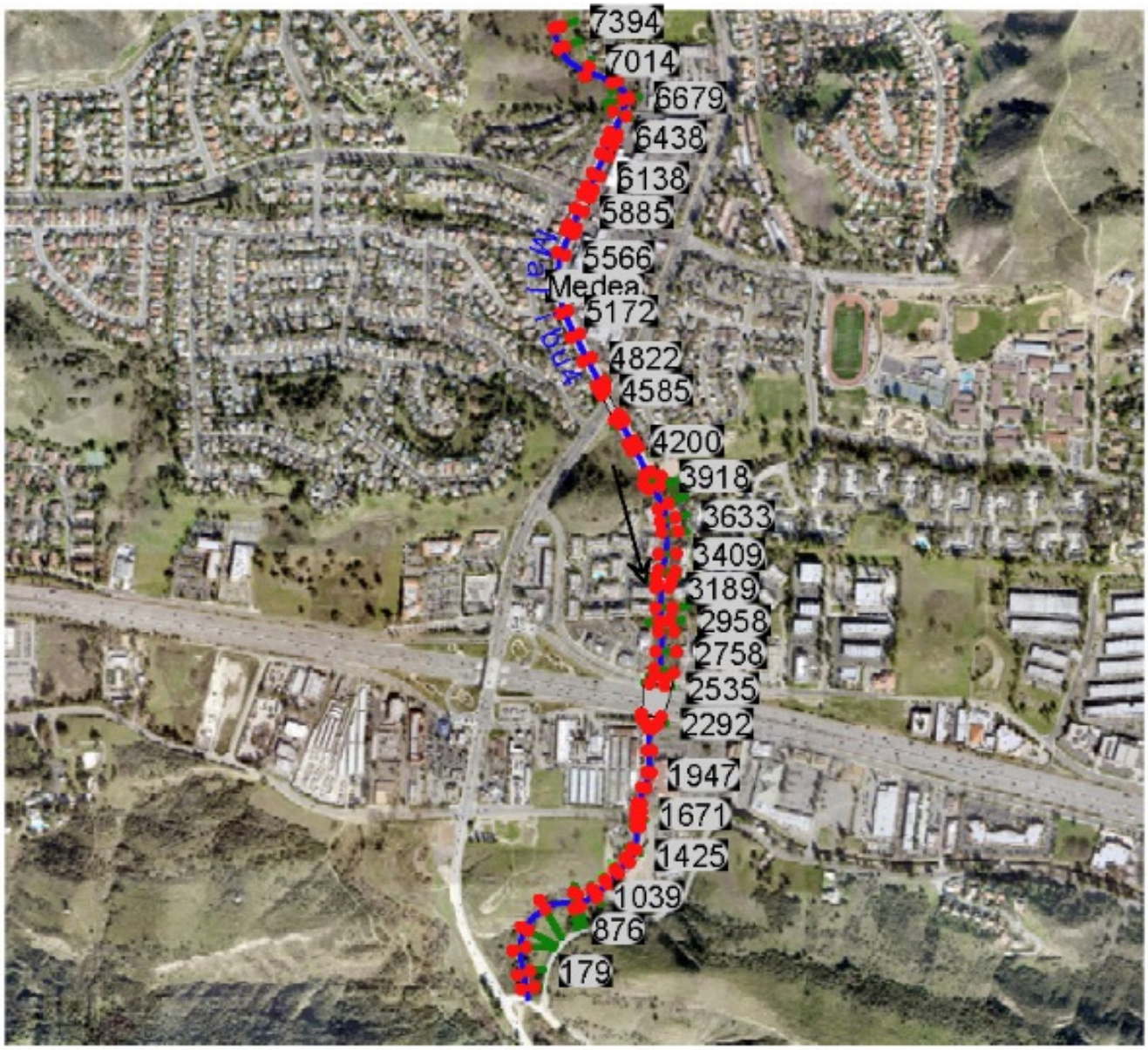

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 569
.105
.065
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

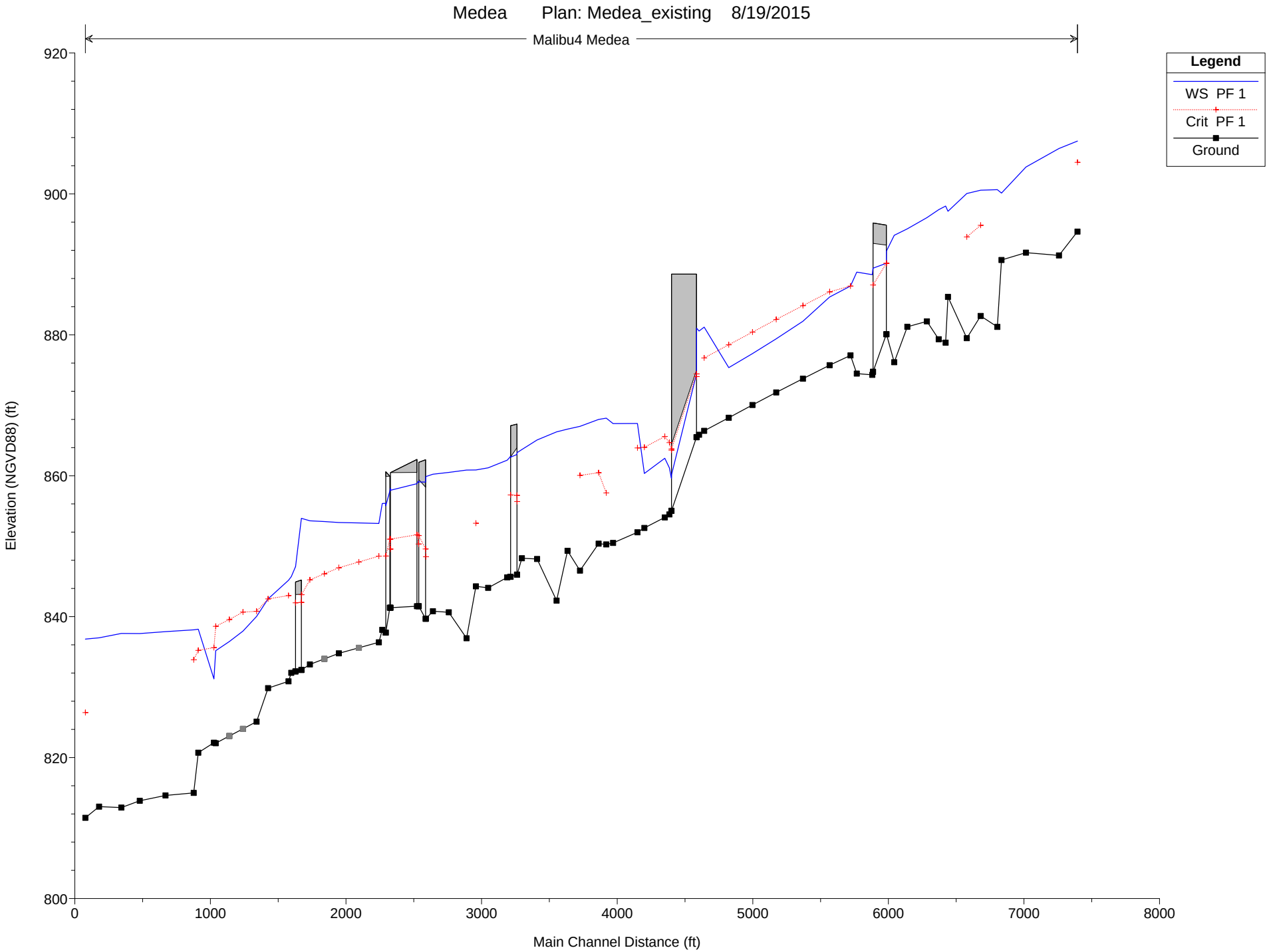

Stokes Plan: Stokes_existing 8/19/2015
River = Malibu3 Reach = Stokes RS = 379
.125
.075
.04
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
Ground
Bank Sta


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

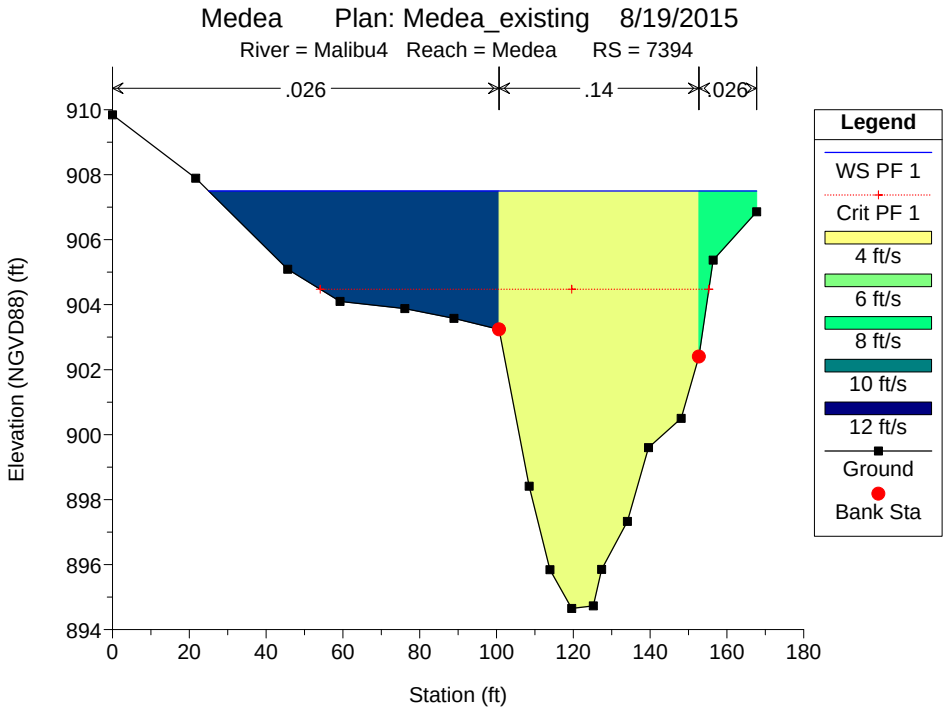

Medea Plan: Medea_existing 8/19/2015
Malibu4 Medea
Legend
WS PF 1
Crit PF 1
Ground
Elevation (NGVD88) (ft)
Main Channel Distance (ft)
920
900
880
860
840
820
800
0
1000
2000
3000
4000
5000
6000
7000
8000

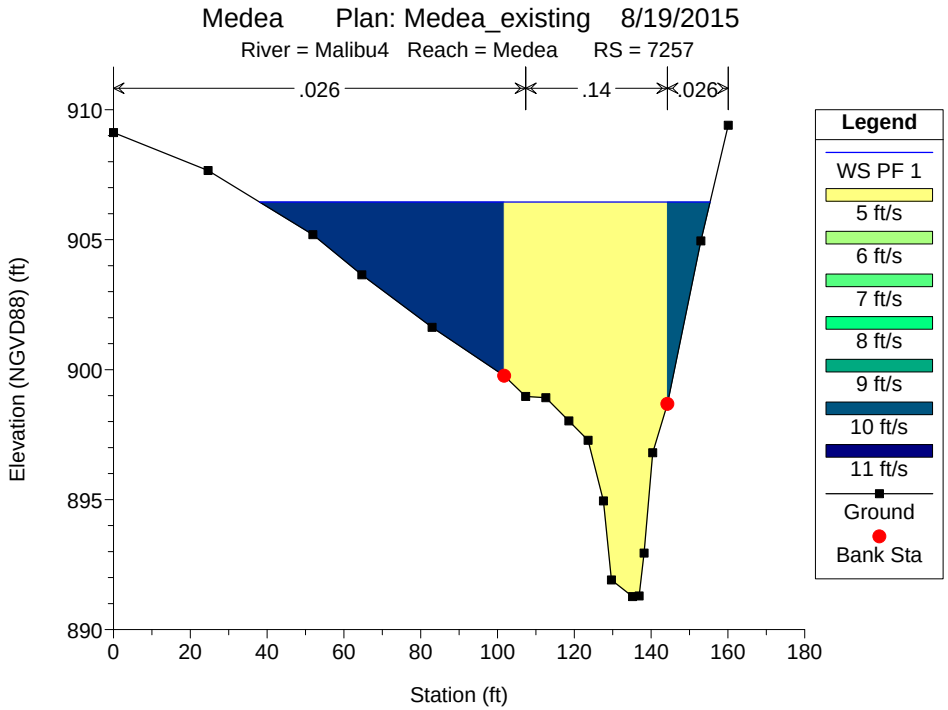
HEC-RAS Plan: Medea_exist River: Malibu4 Reach: Medea Profile: PF 1

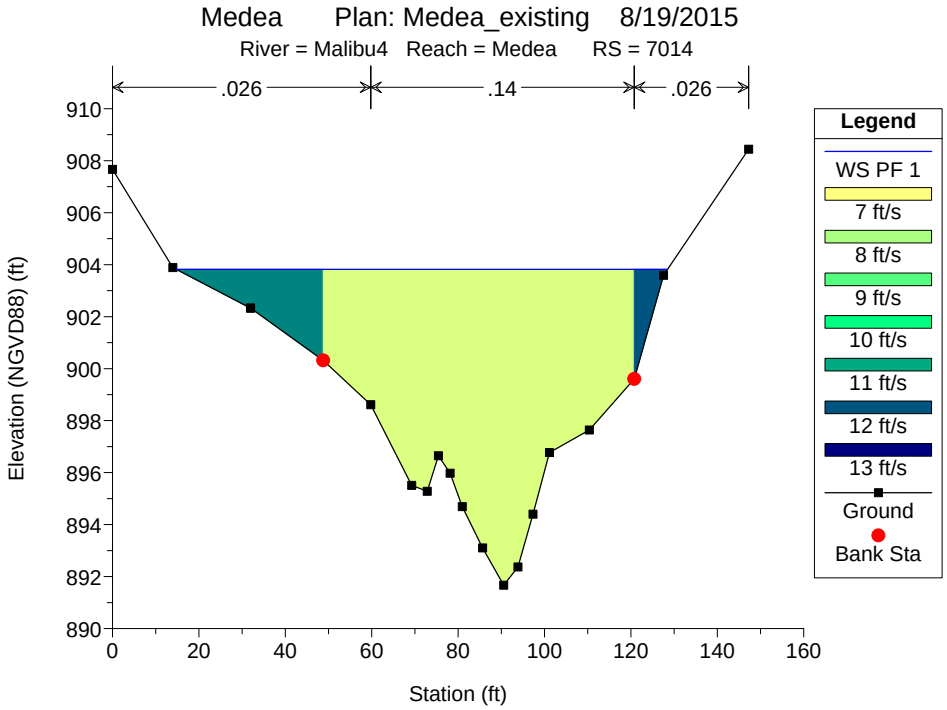
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Medea	7394	PF 1	4757.00	894.65	907.50	904.48	908.63	0.008991	4.31	738.95	142.71	0.25
Medea	7257	PF 1	4757.00	891.27	906.45		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

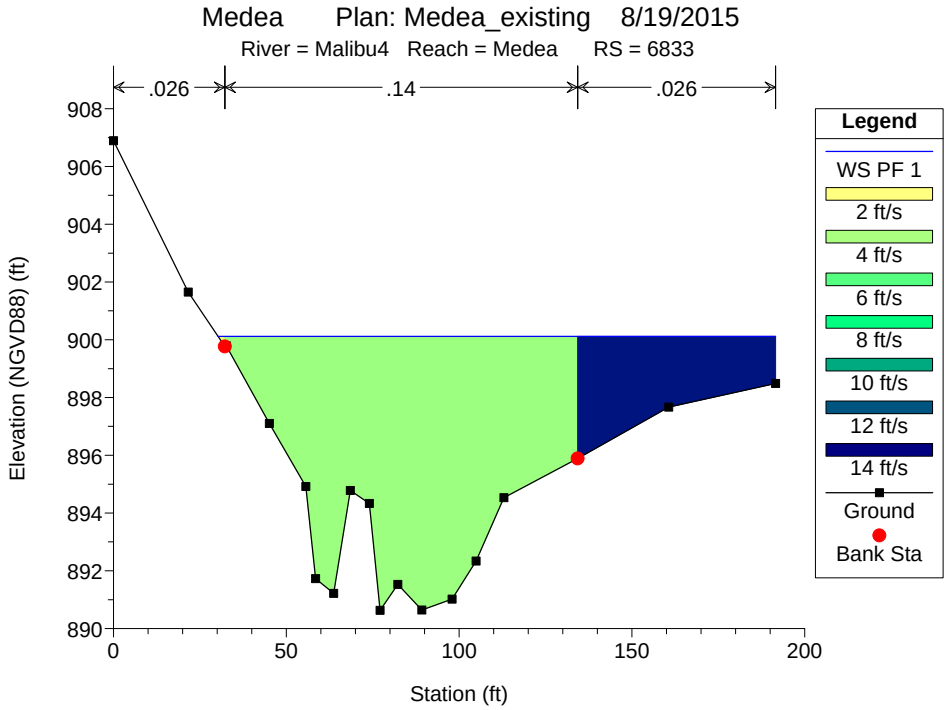
HEC-RAS Plan: Medea_exist River: Malibu4 Reach: Medea Profile: PF 1 (Continued)

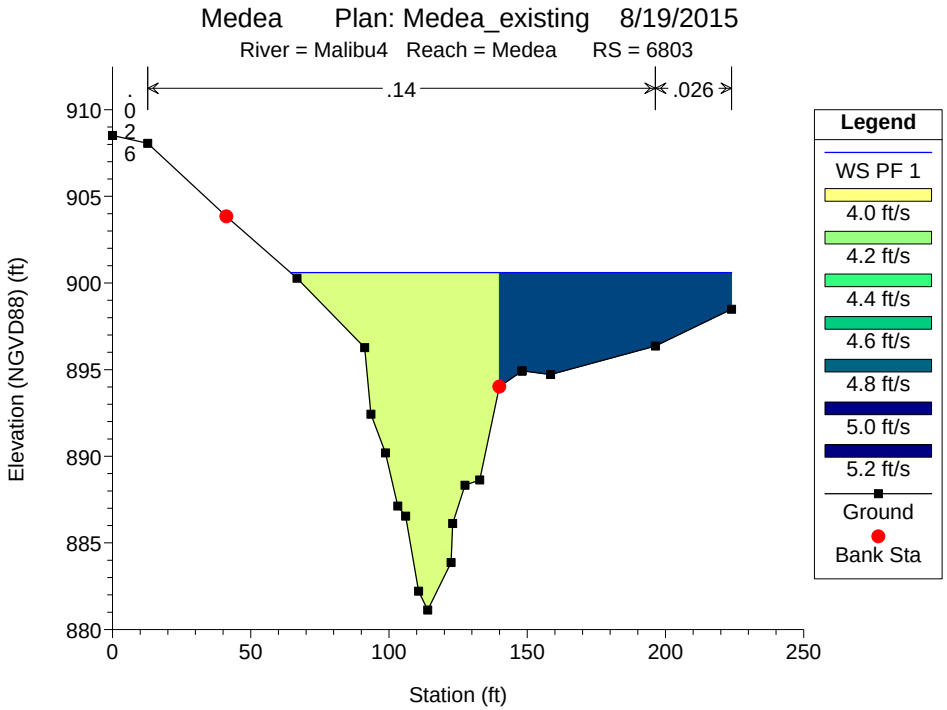
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Medea	3237		Bridge									
Medea	3213	PF 1	6720.00	845.67	862.76		863.44	0.016936	6.61	1027.76	101.39	0.35
Medea	3212	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

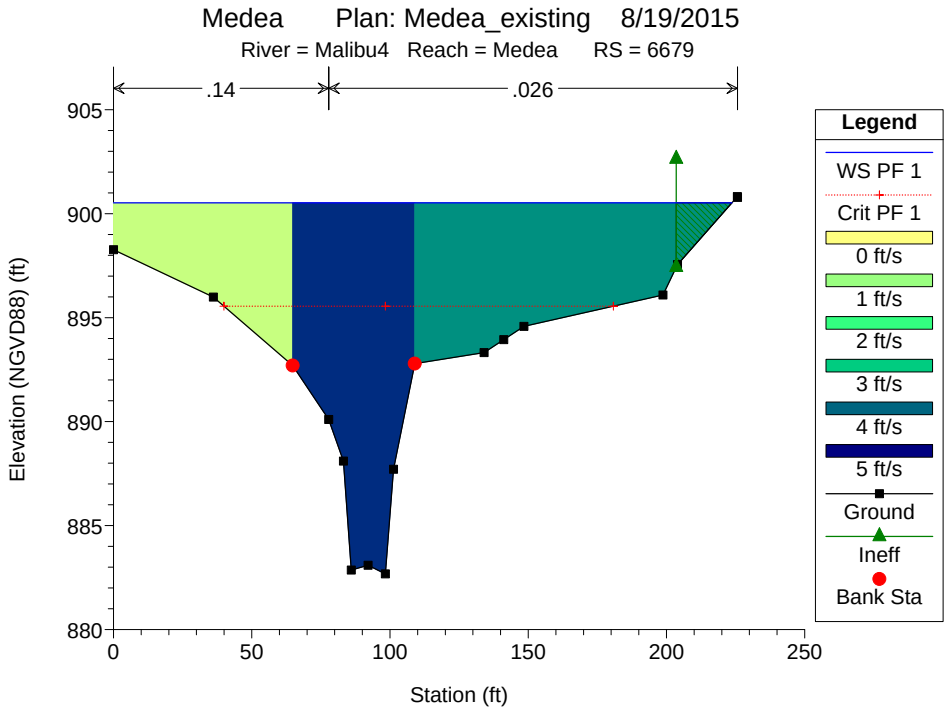

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 7394
.026
.14
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

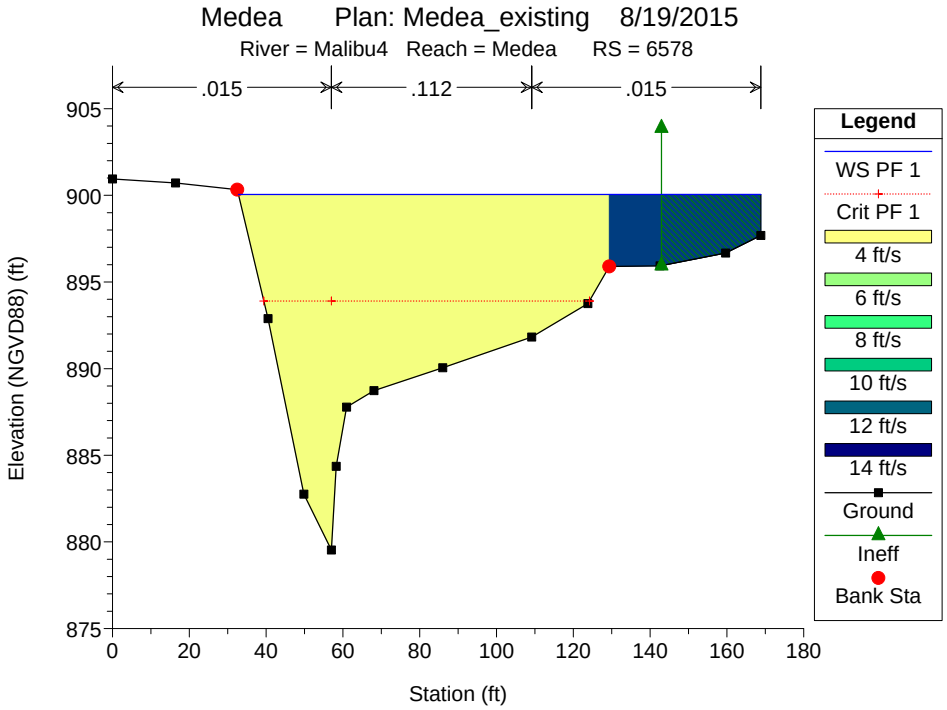

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 7257
.026
.14
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta

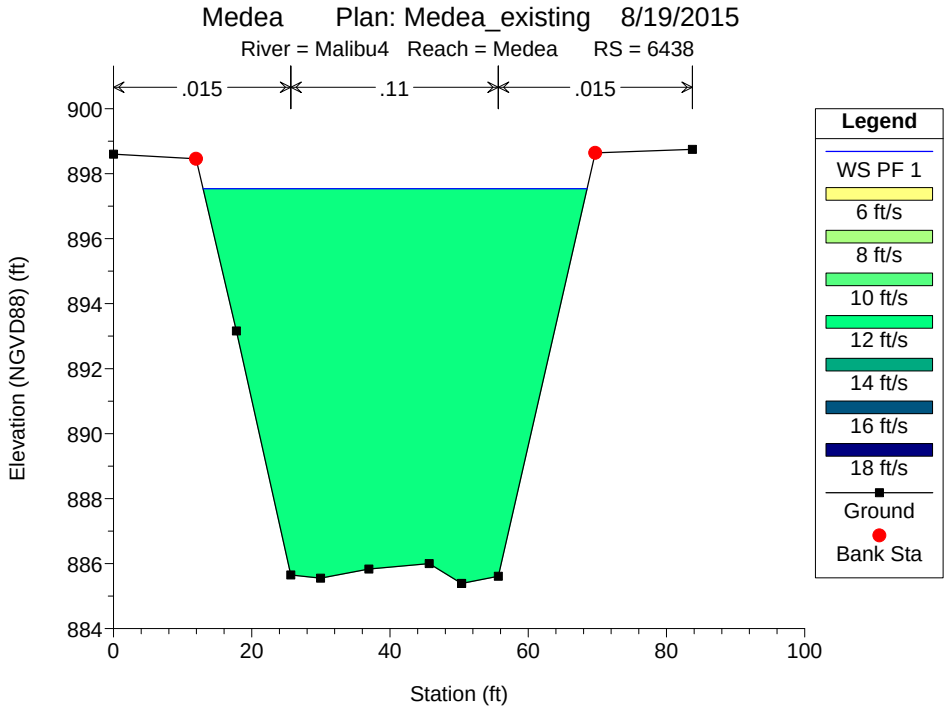

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 7014
.026
.14
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
12 ft/s
13 ft/s
Ground
Bank Sta

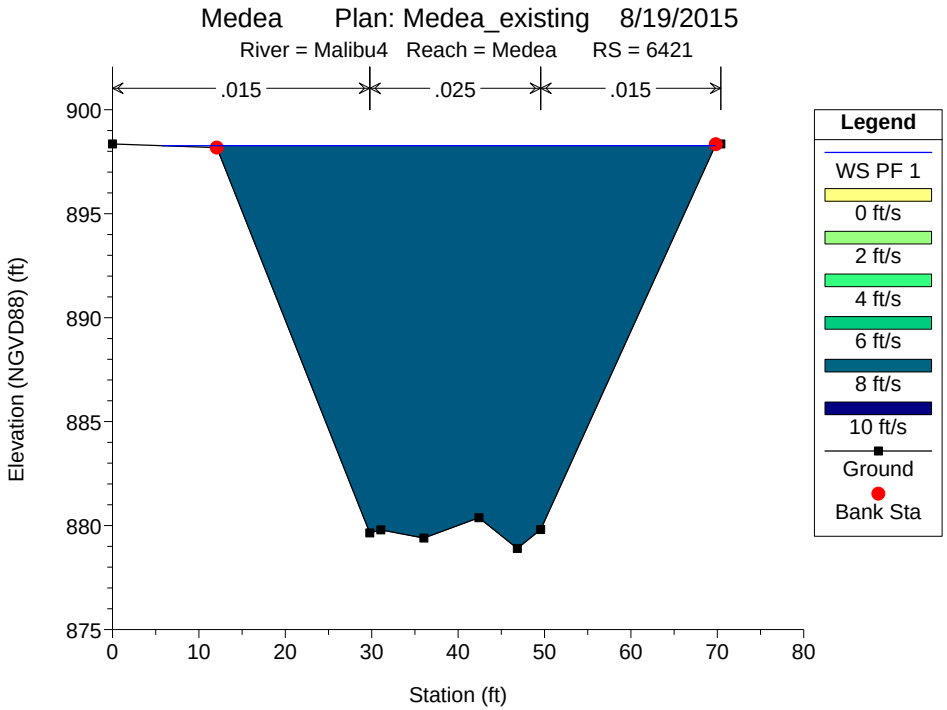

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6833
.026
.14
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

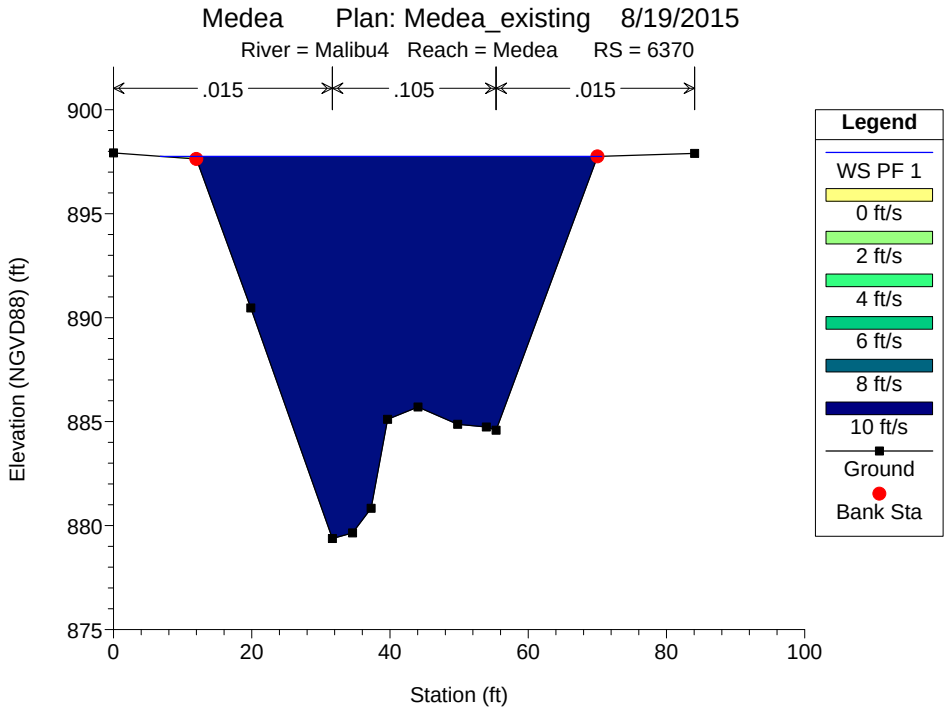

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6803
.14
.026
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
4.0 ft/s
4.2 ft/s
4.4 ft/s
4.6 ft/s
4.8 ft/s
5.0 ft/s
5.2 ft/s
Ground
Bank Sta

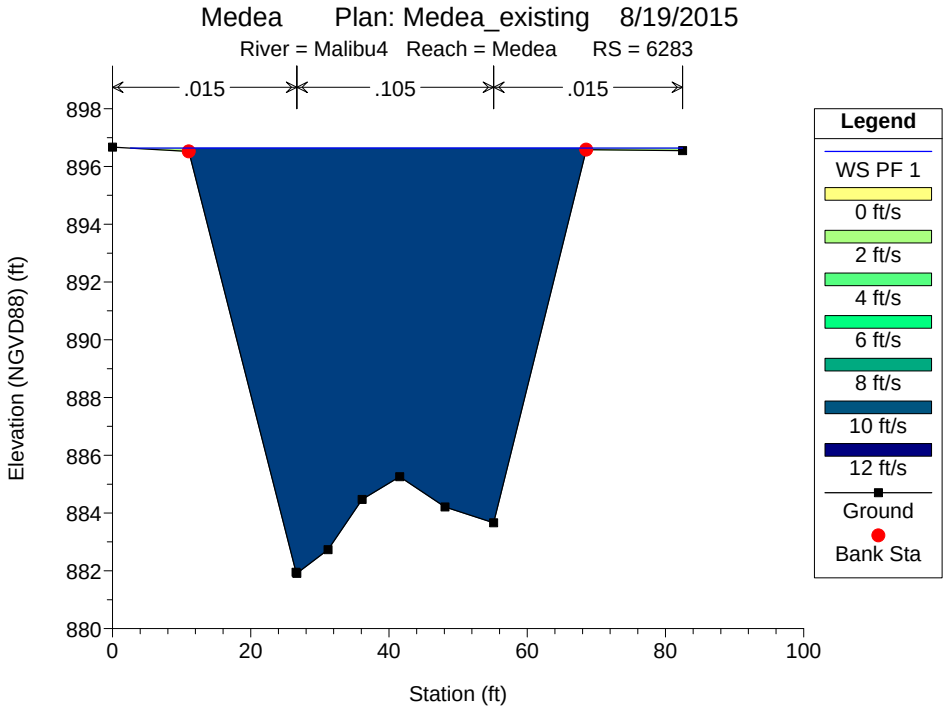

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6679
.14
.026
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
Ground
Ineff
Bank Sta

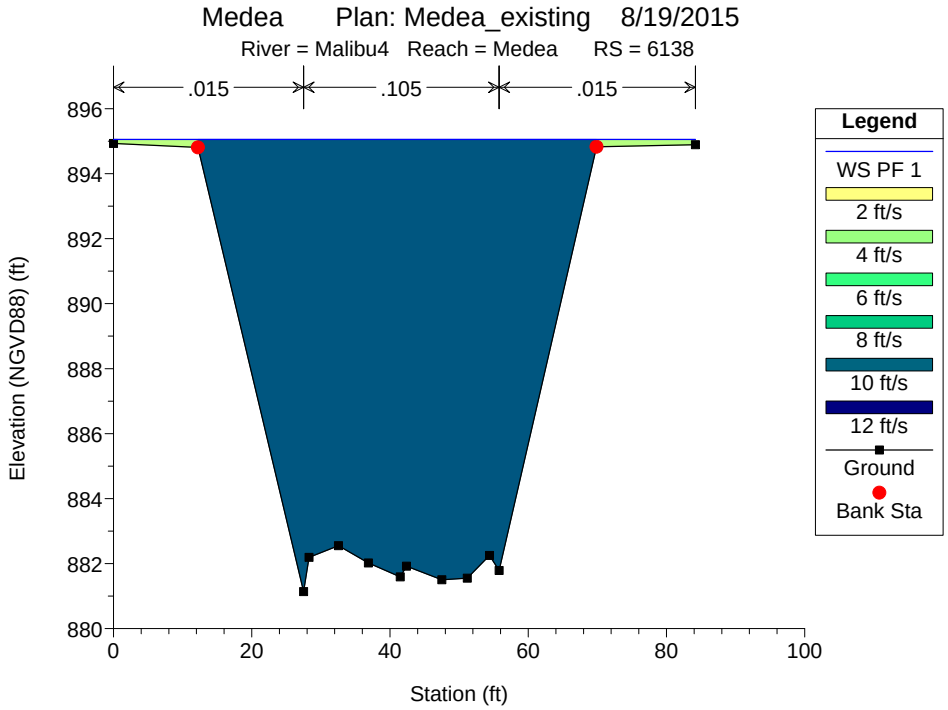

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6578
.015
.112
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Ineff
Bank Sta

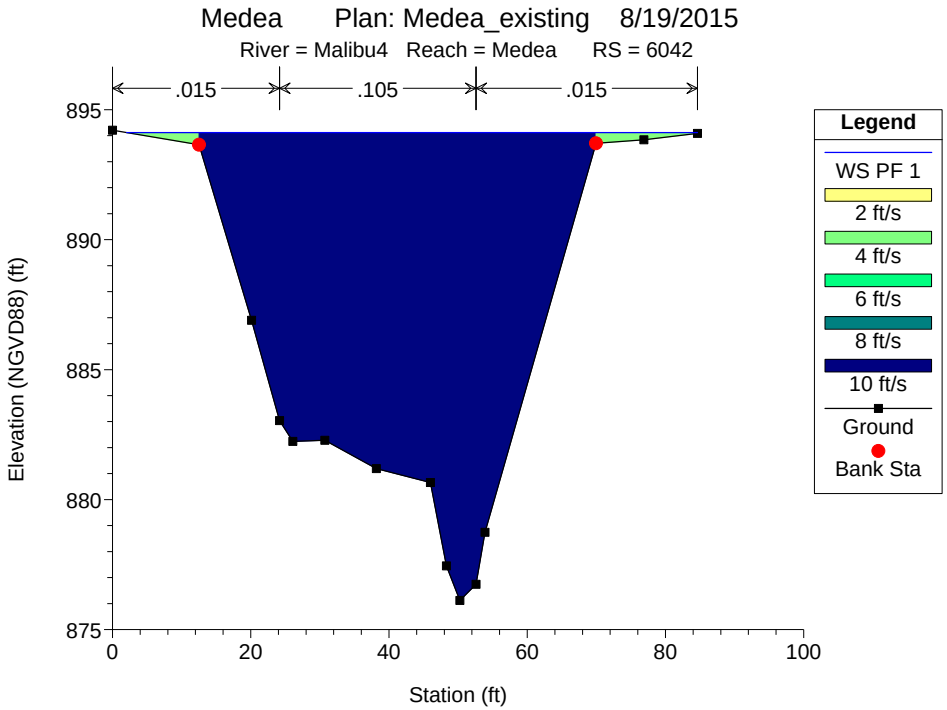

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6438
.015
.11
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

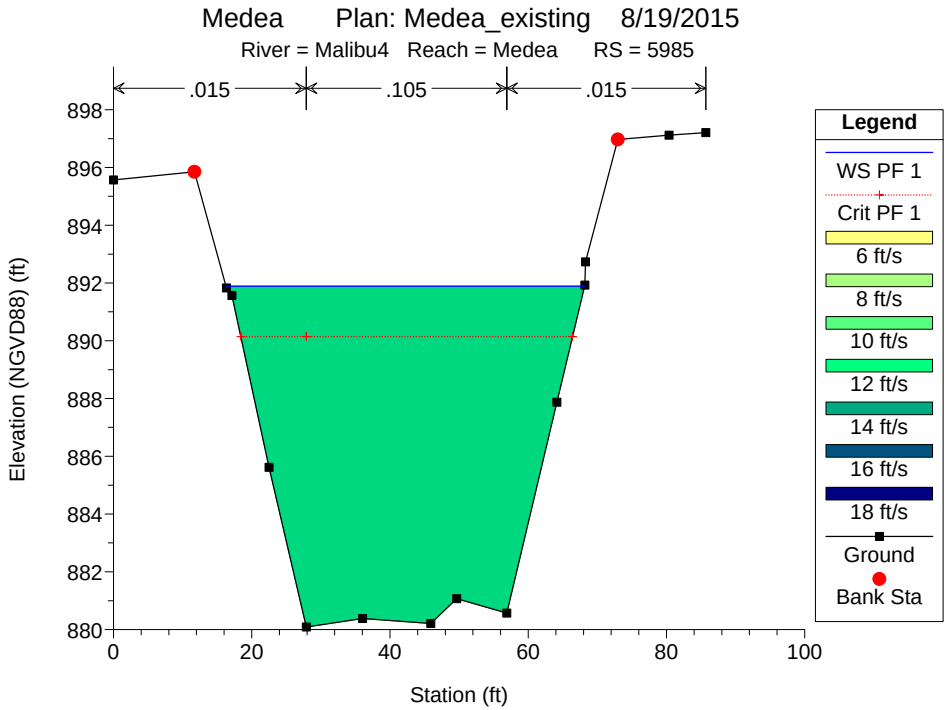

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6421
.015
.025
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta

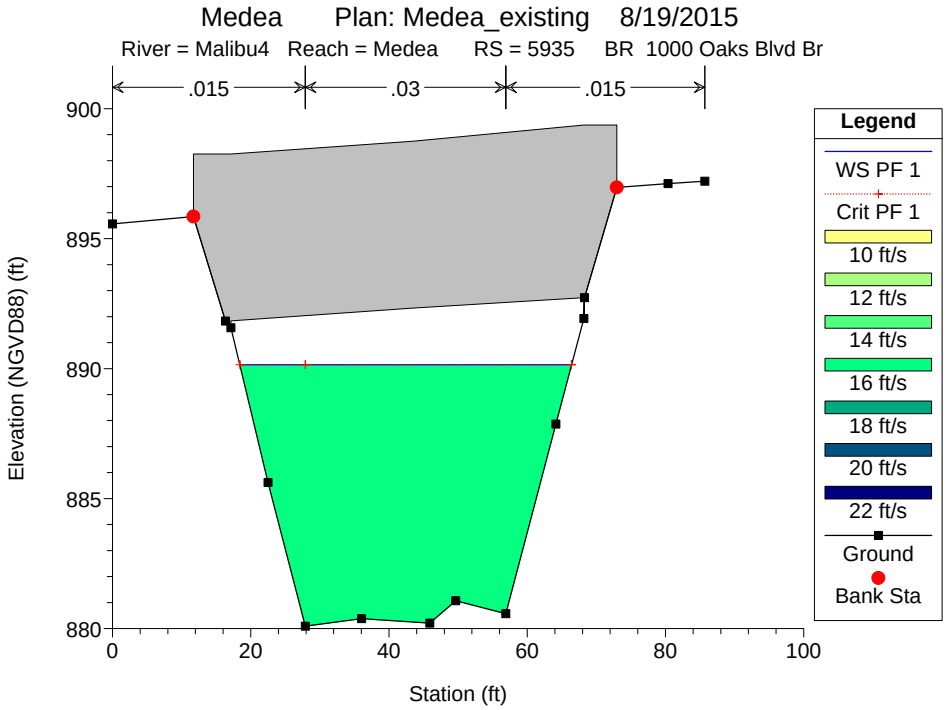

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6370
.015
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta

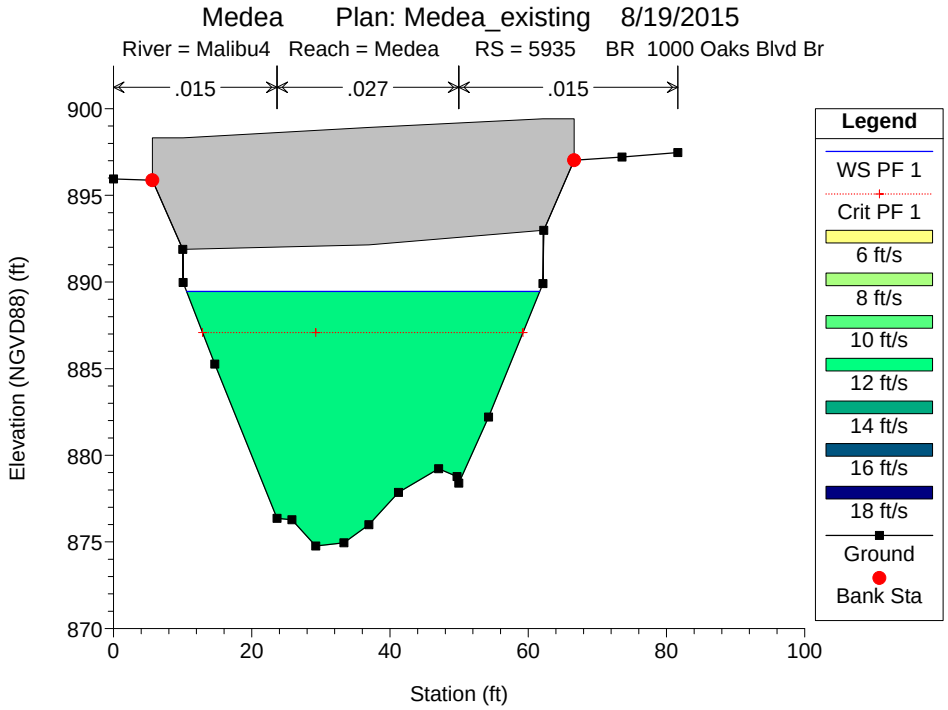

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6283
.015
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

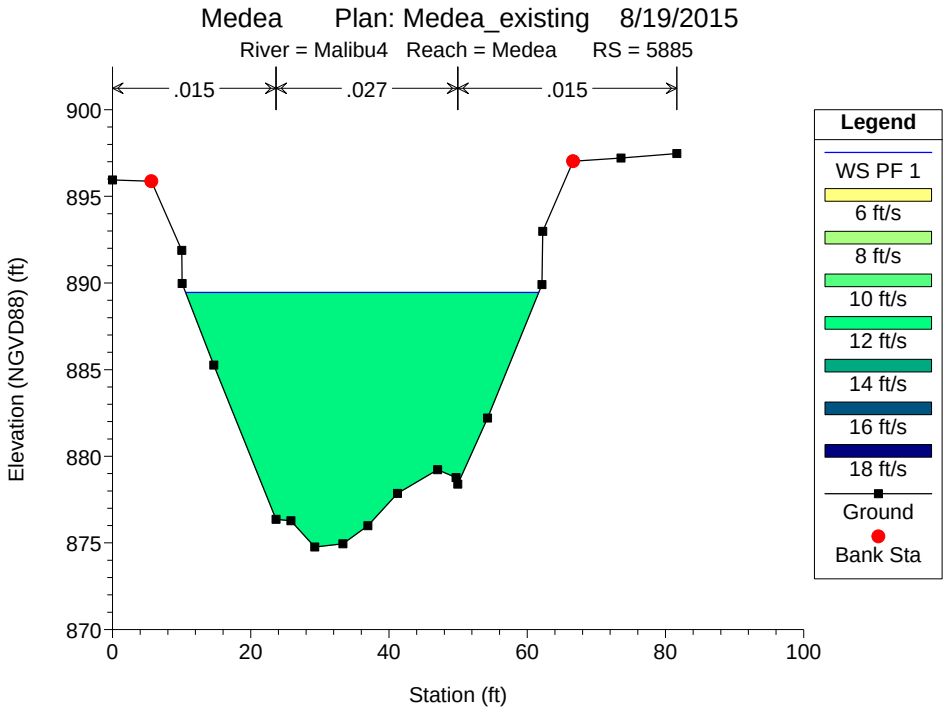

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6138
.015
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

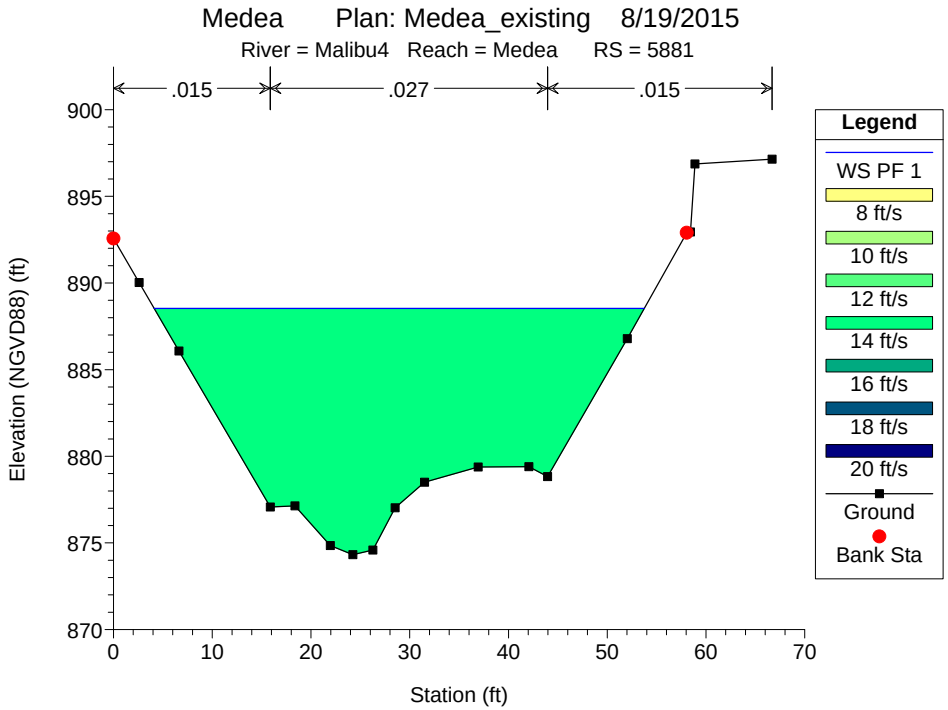

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 6042
.015
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta

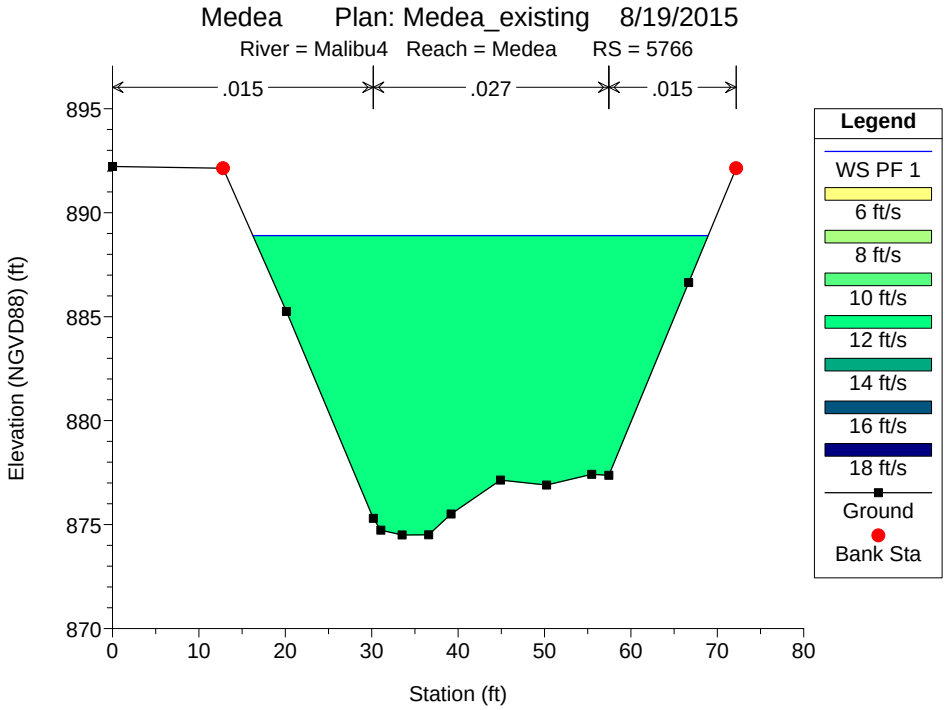

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5985
.015
.105
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

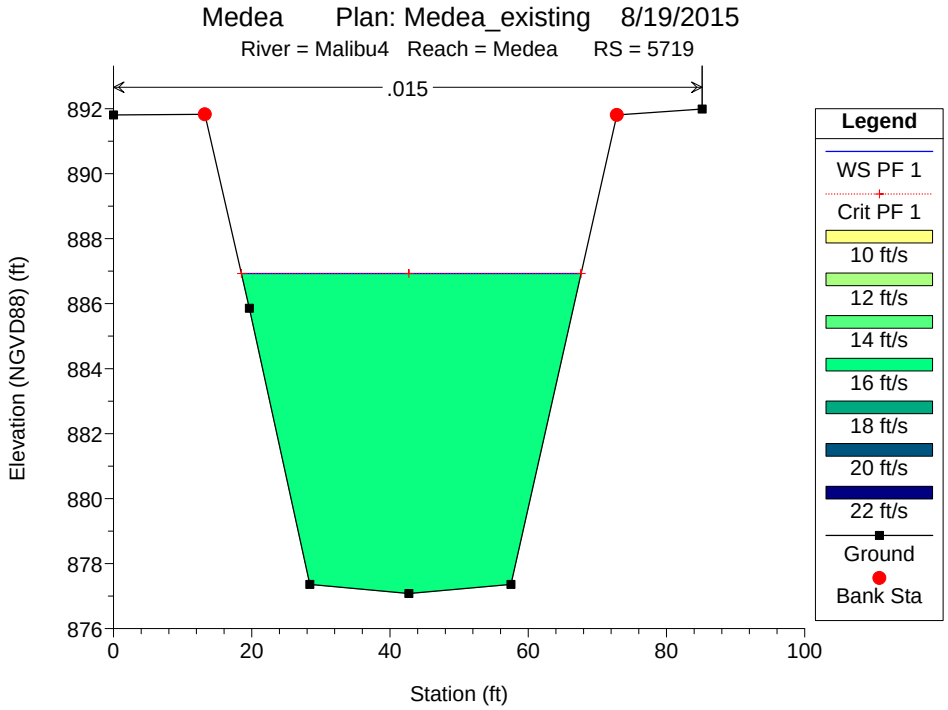

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5935 BR 1000 Oaks Blvd Br
.015
.03
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Bank Sta

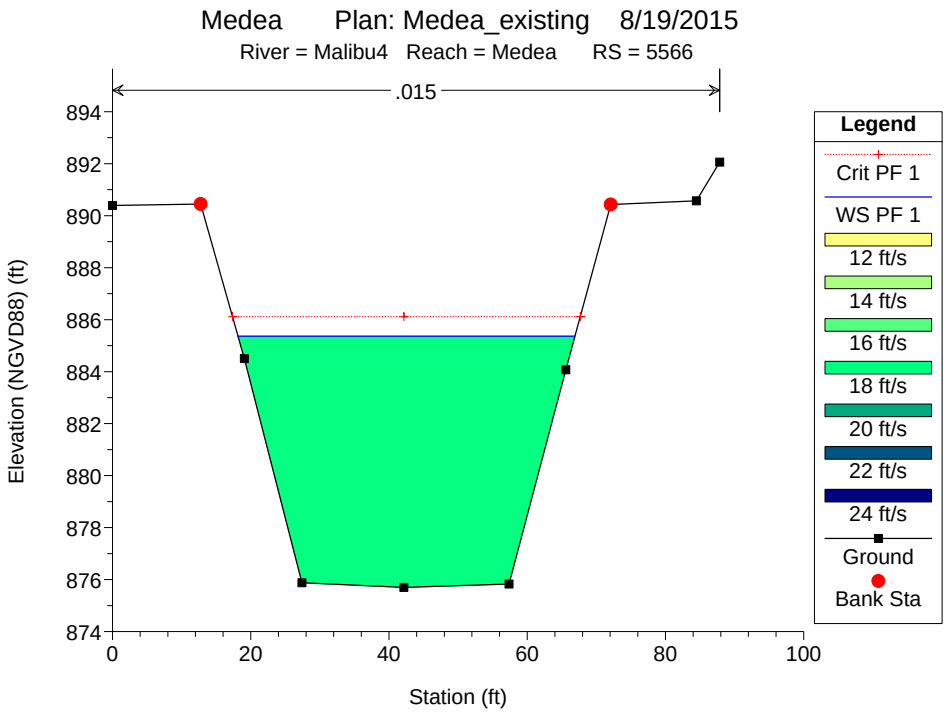

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5935 BR 1000 Oaks Blvd Br
.015
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

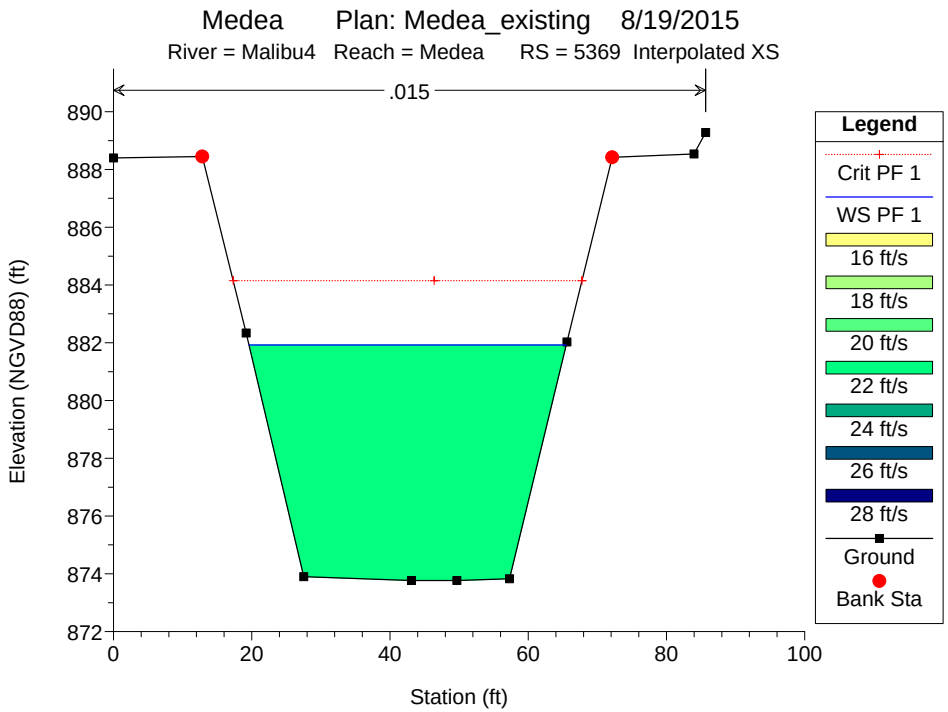

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5885
.015
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

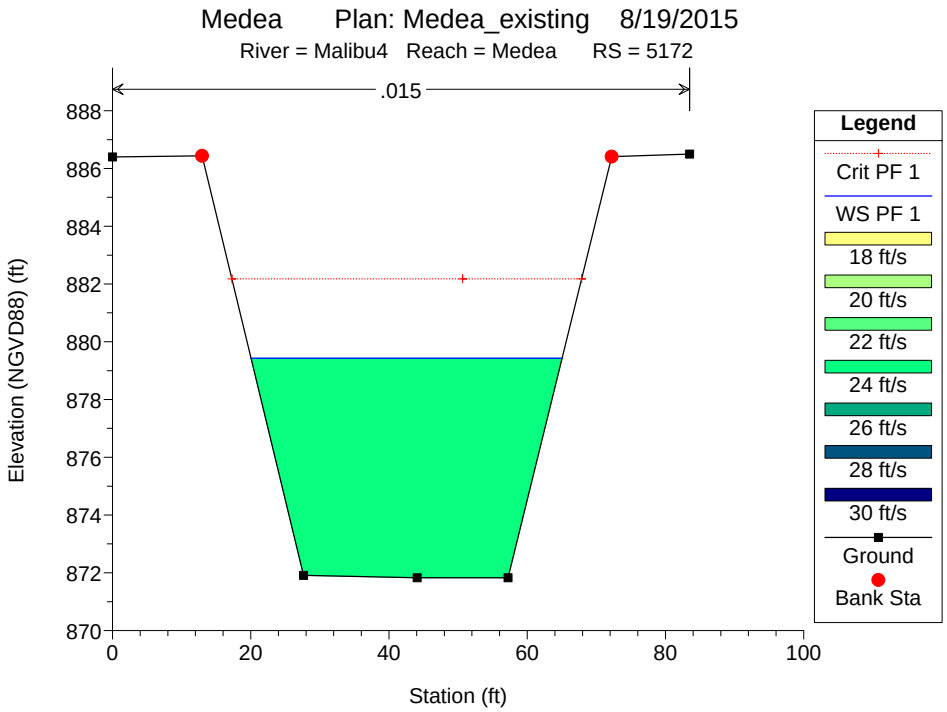

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5881
.015
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Bank Sta

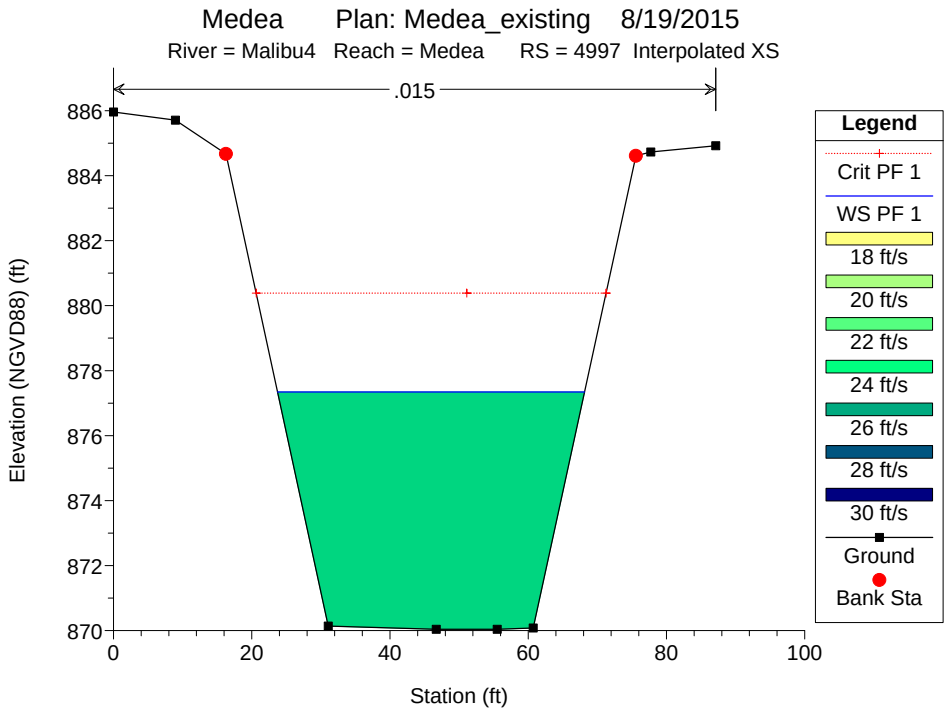

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5766
.015
.027
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

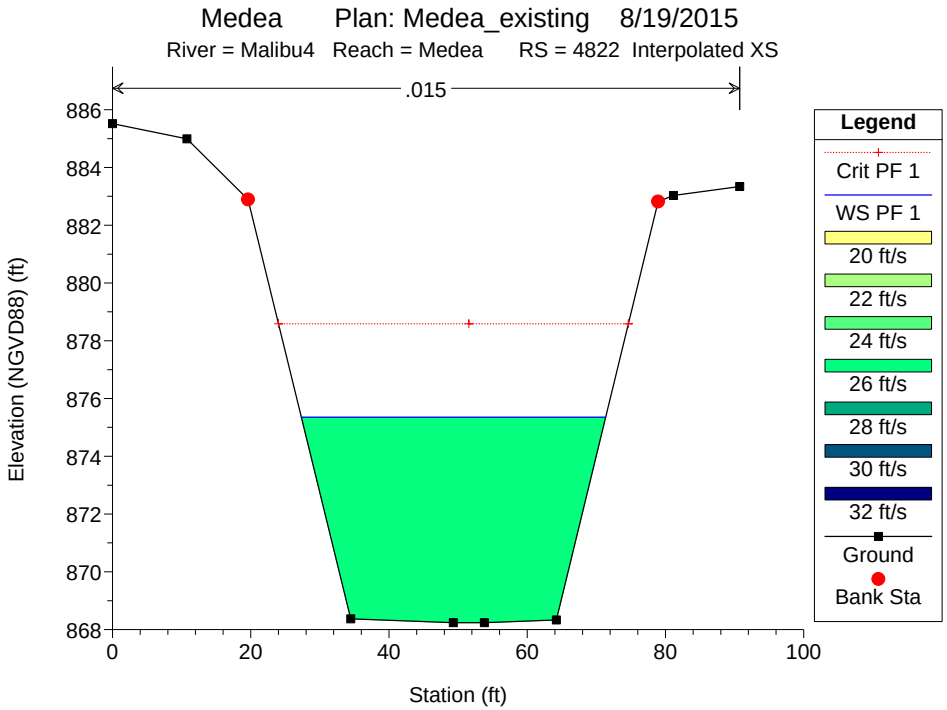

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5719
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Bank Sta

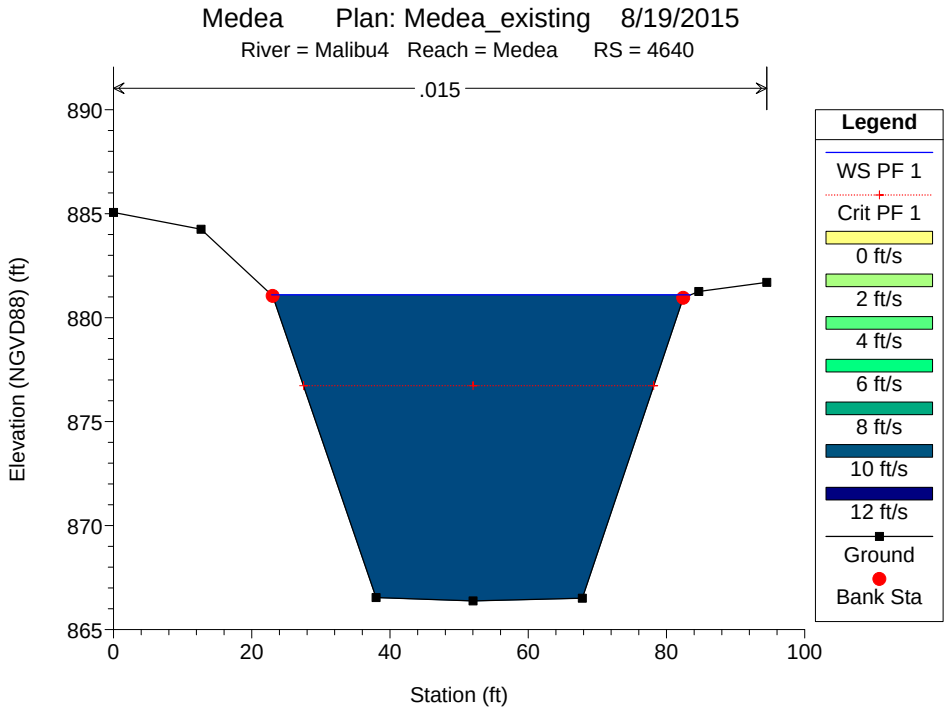

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5566
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
Ground
Bank Sta

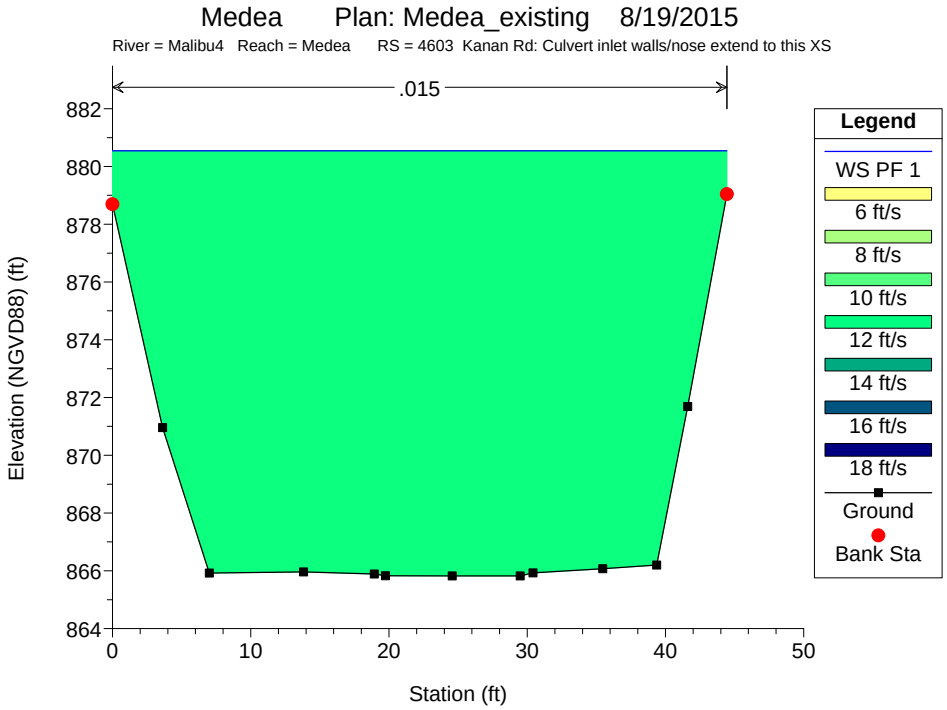

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5369 Interpolated XS
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
Ground
Bank Sta

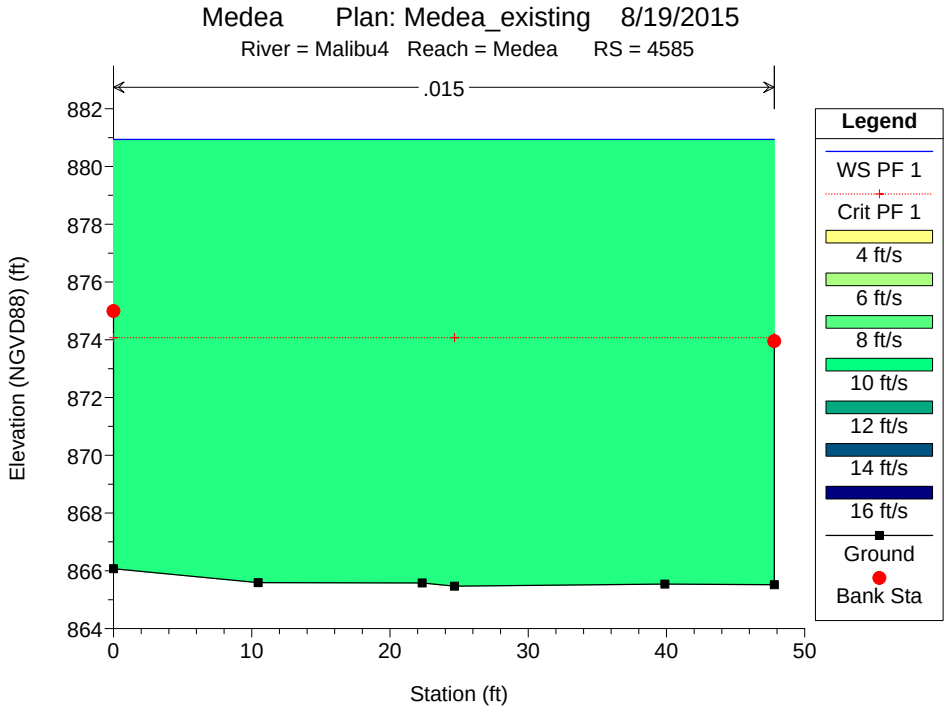

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 5172
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta

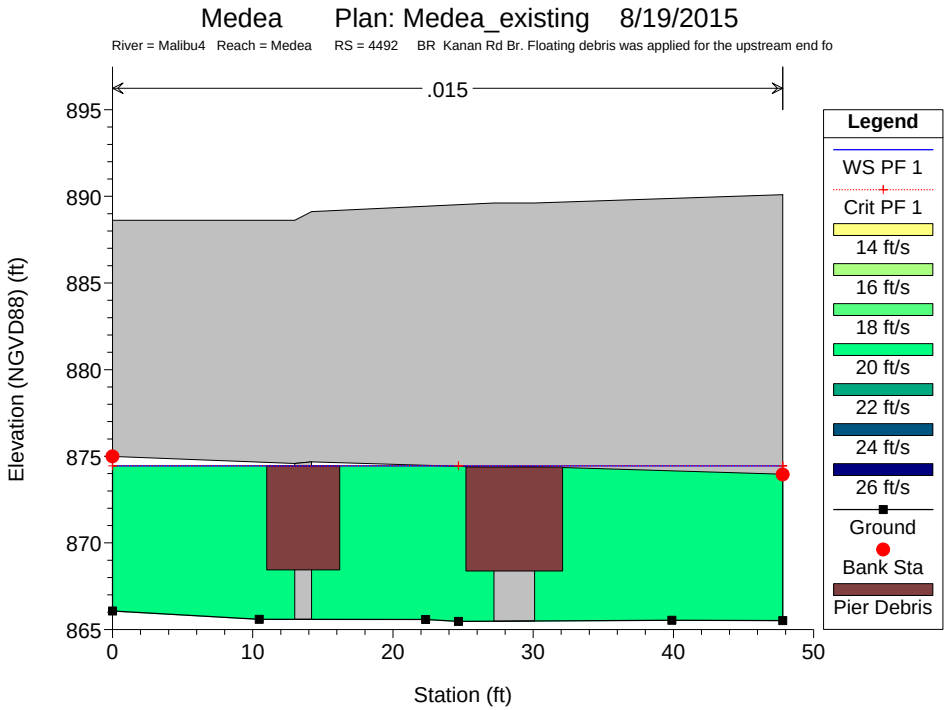

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4997 Interpolated XS
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta

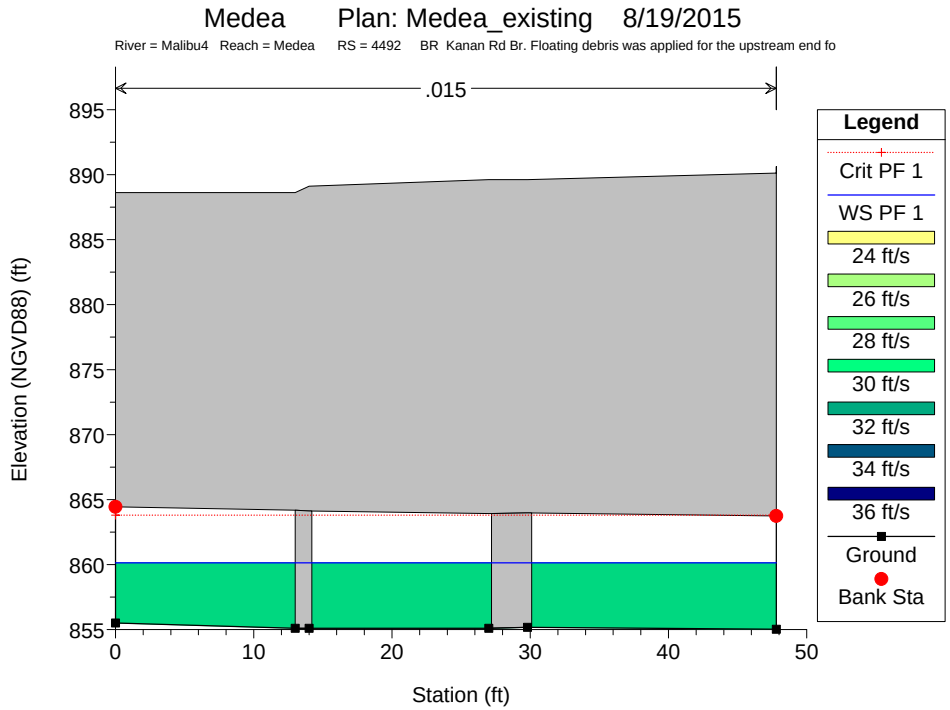

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4822 Interpolated XS
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
Ground
Bank Sta

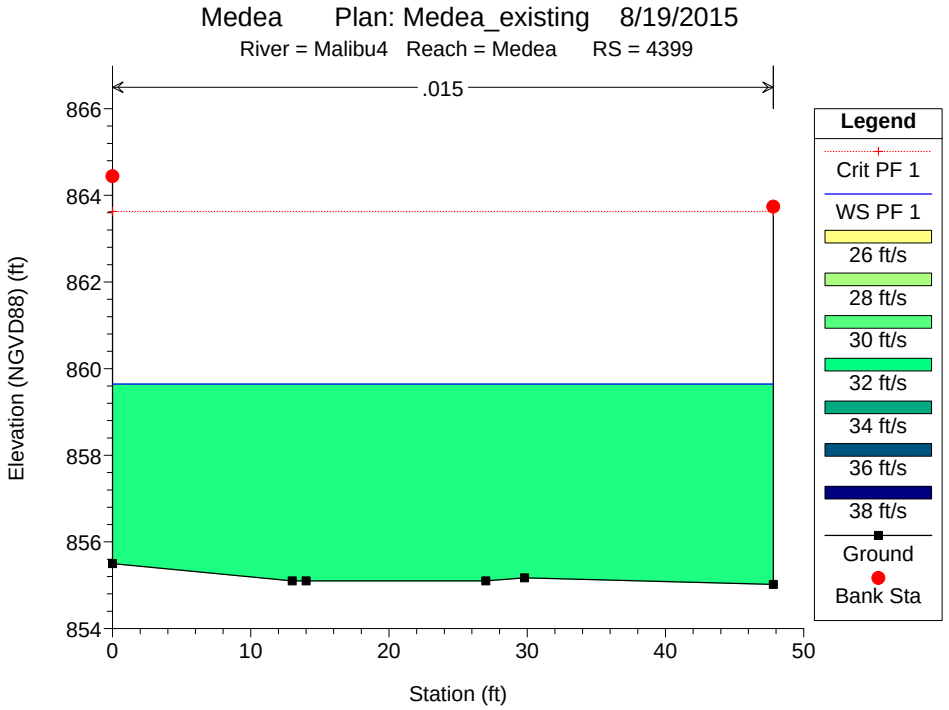

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4640
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

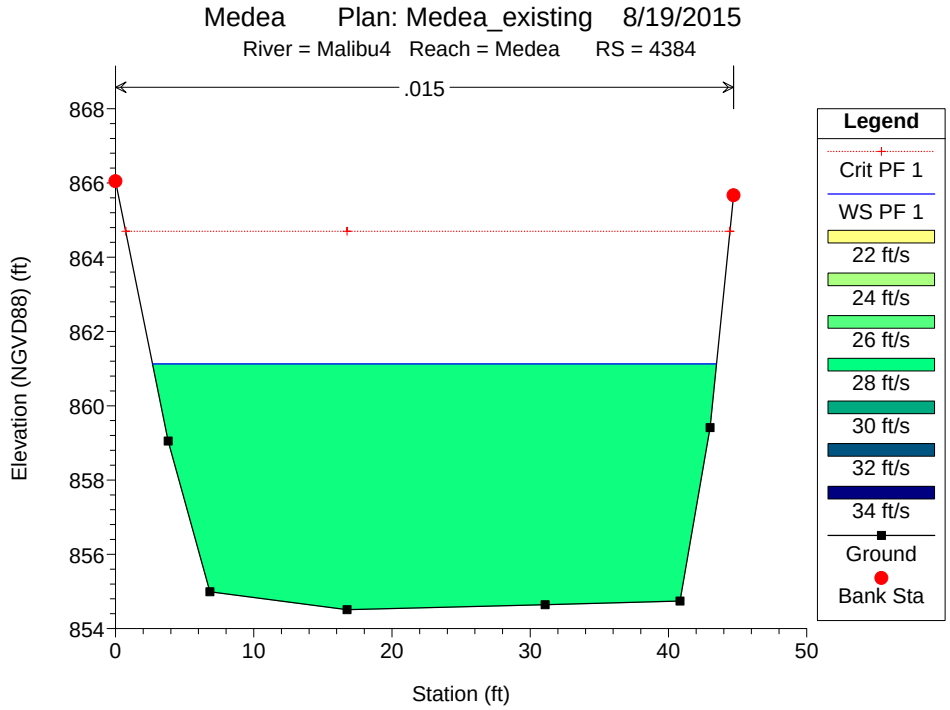

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4603 Kanan Rd: Culvert inlet walls/nose extend to this XS
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Bank Sta

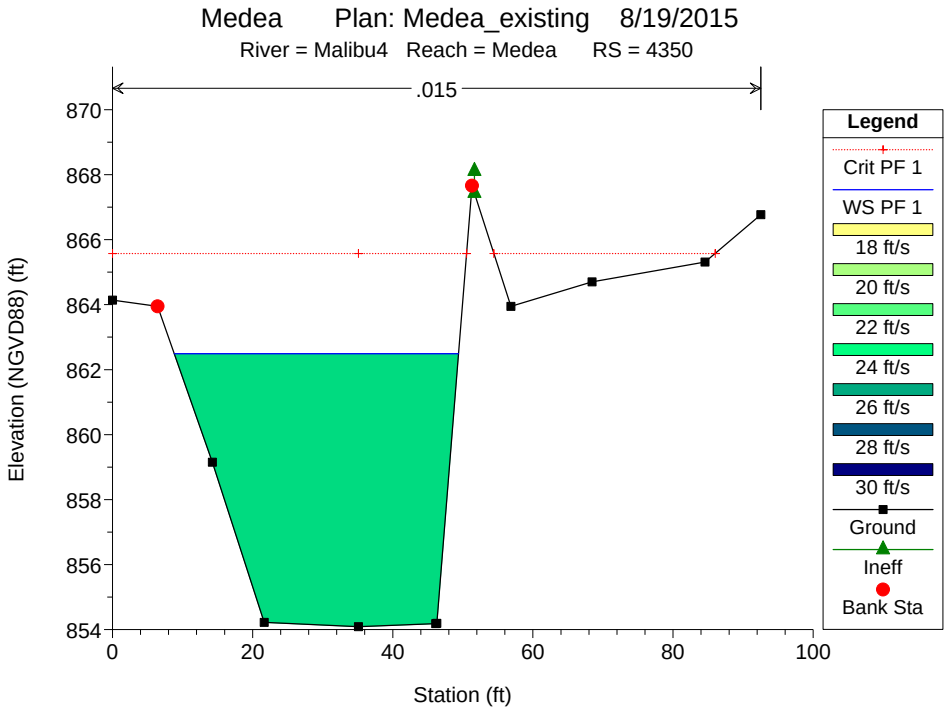

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4585
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

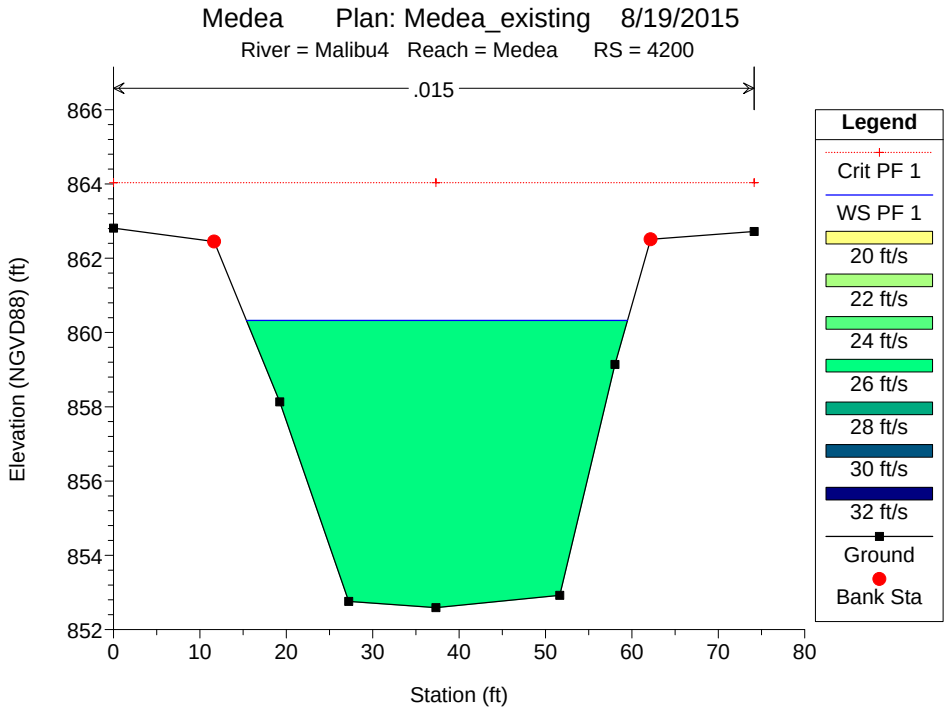

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4492 BR Kanan Rd Br. Floating debris was applied for the upstream end fo
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
Ground
Bank Sta
Pier Debris

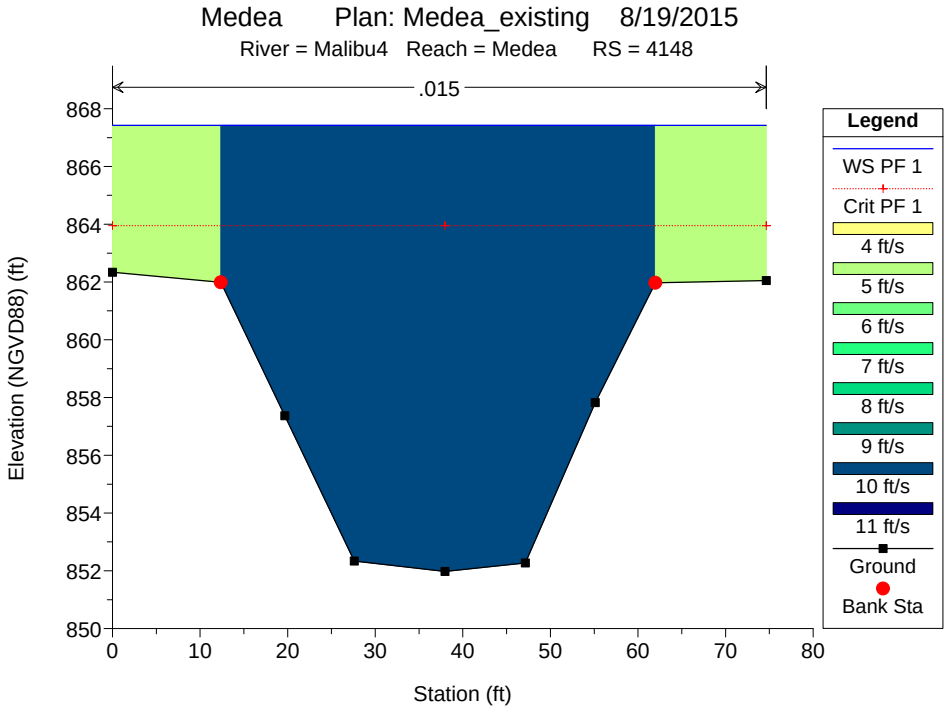

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4492 BR Kanan Rd Br. Floating debris was applied for the upstream end fo
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
34 ft/s
36 ft/s
Ground
Bank Sta

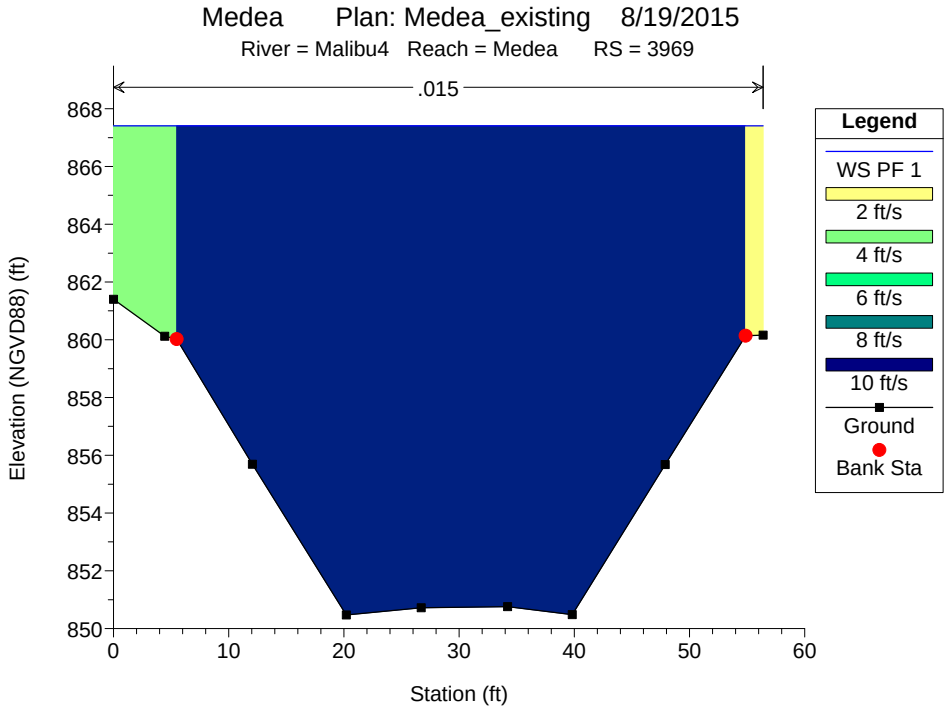

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4399
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
26 ft/s
28 ft/s
30 ft/s
32 ft/s
34 ft/s
36 ft/s
38 ft/s
Ground
Bank Sta

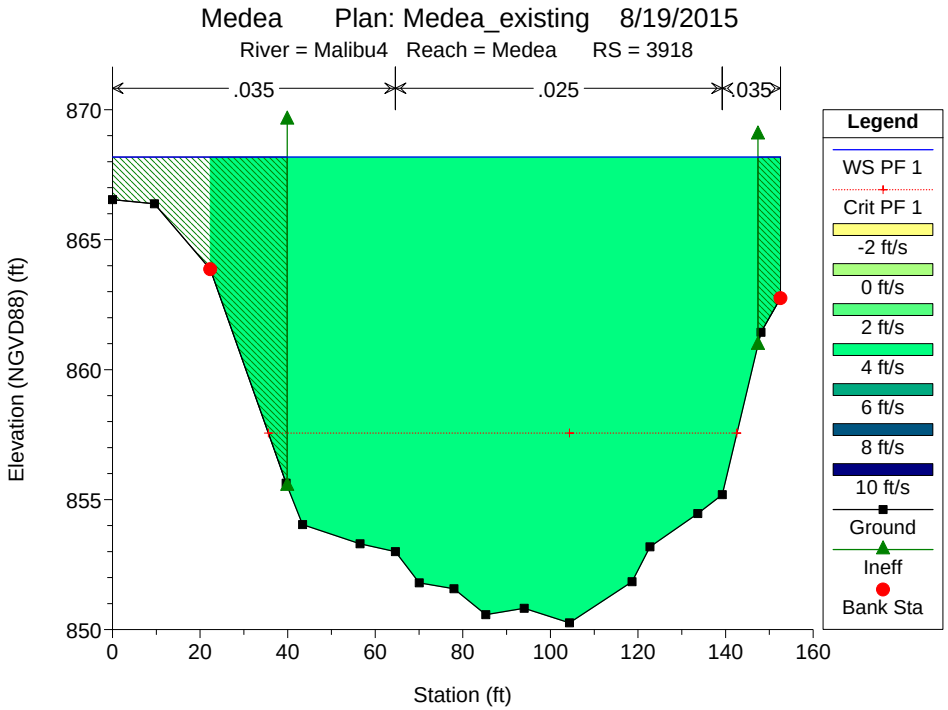

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4384
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
34 ft/s
Ground
Bank Sta

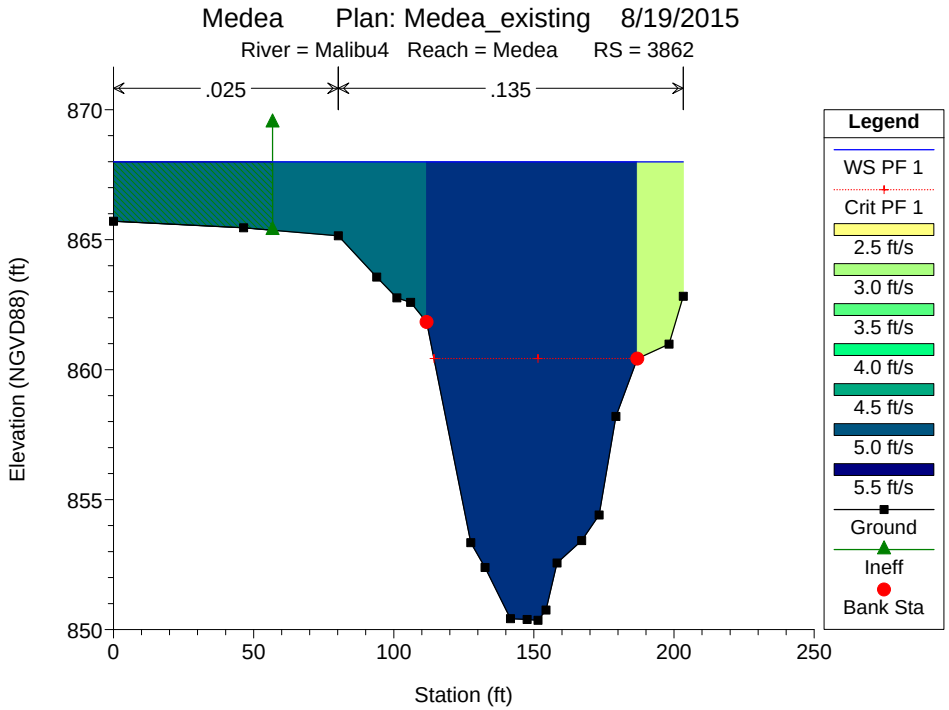

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4350
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Ineff
Bank Sta

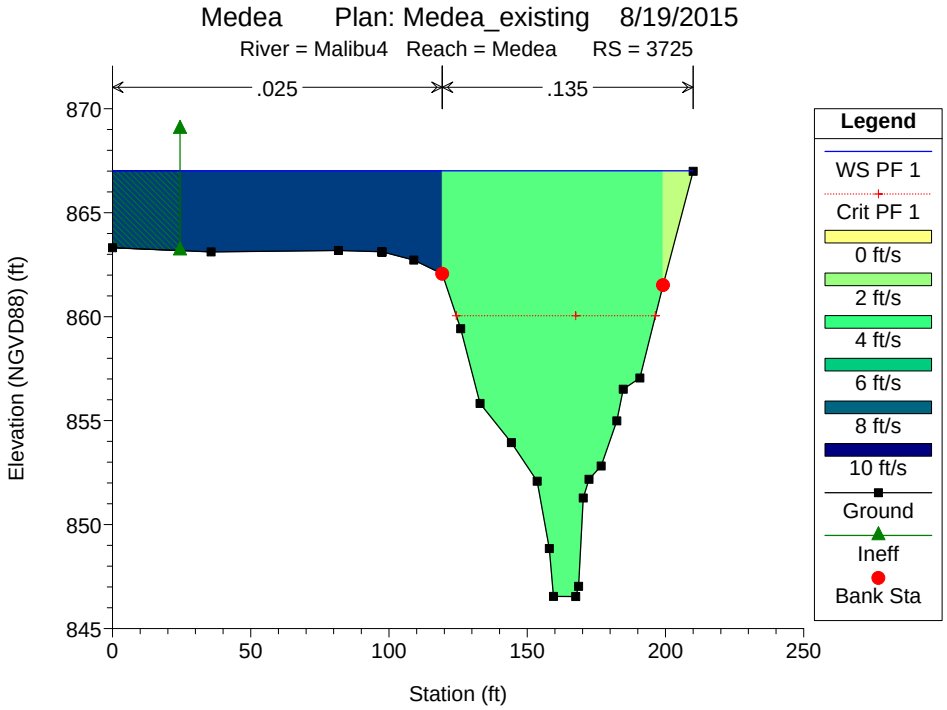

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4200
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
Ground
Bank Sta

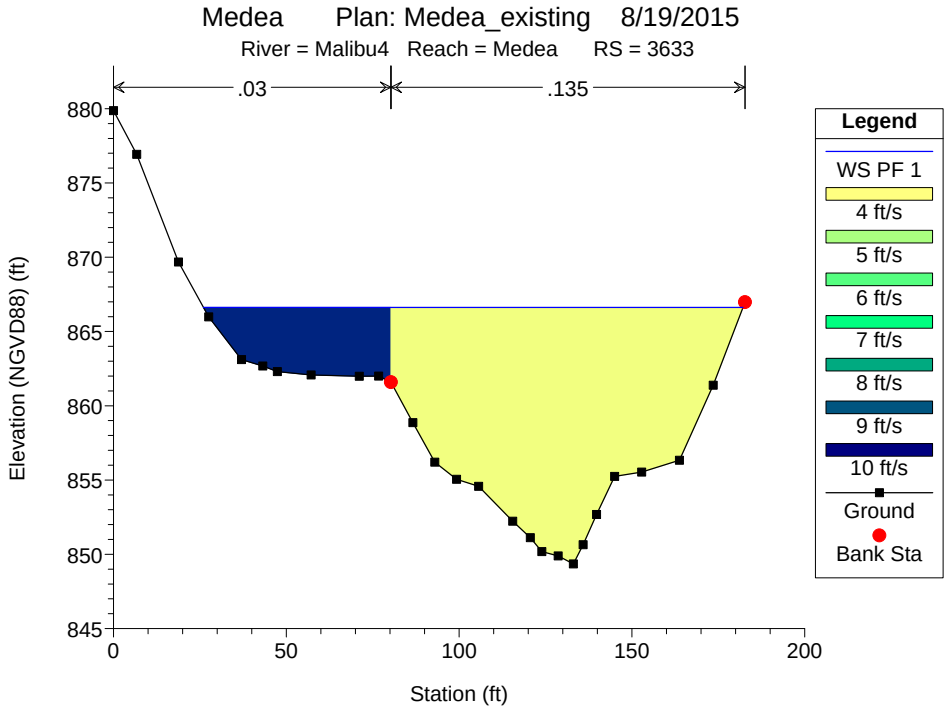

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 4148
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
11 ft/s
Ground
Bank Sta

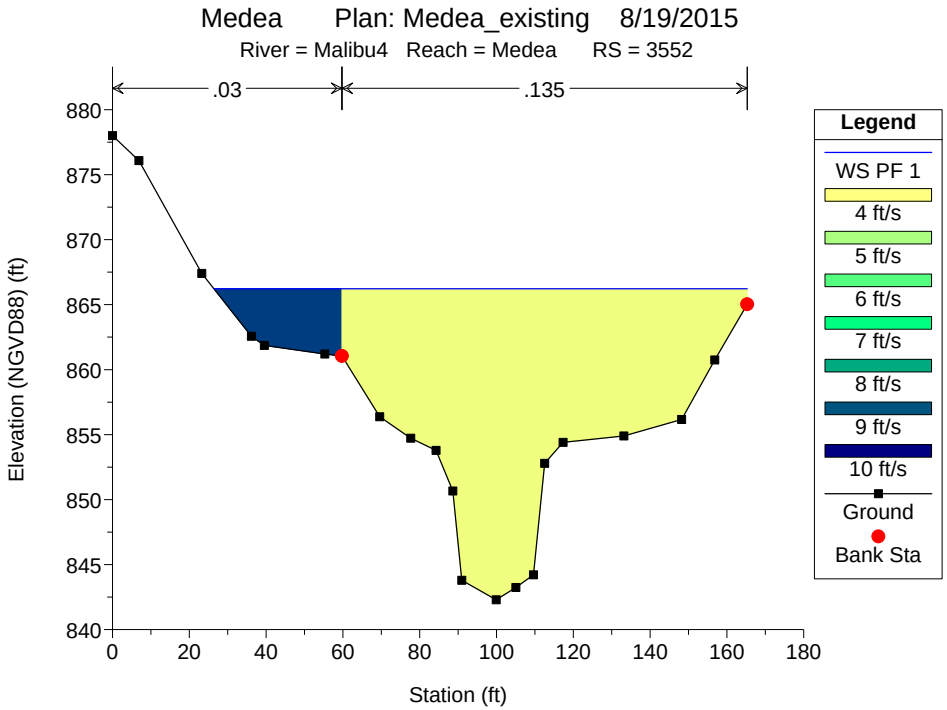

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3969
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Bank Sta

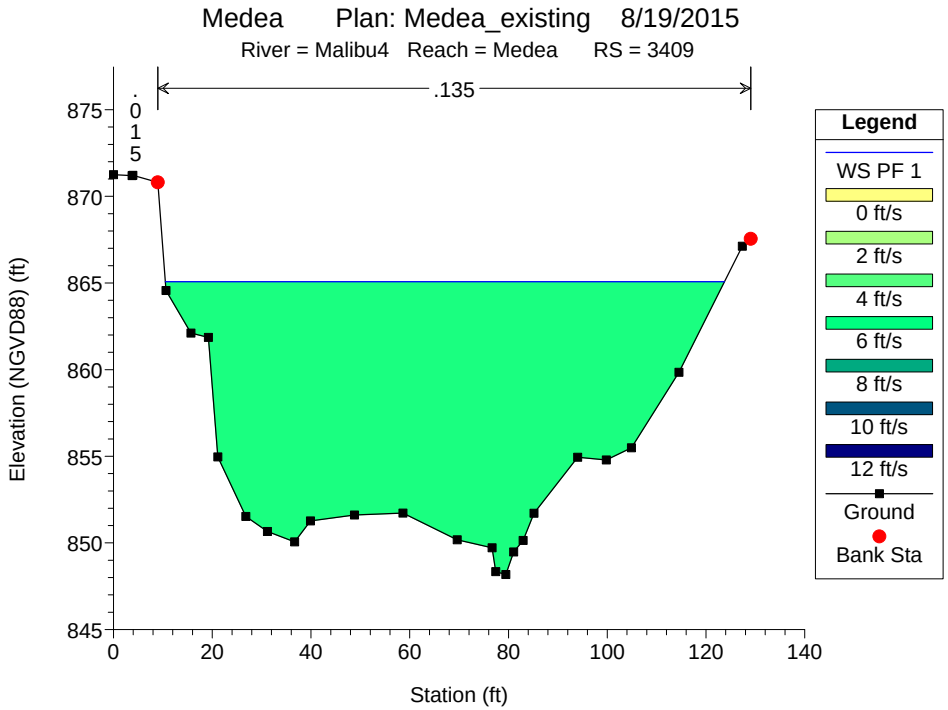

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3918
.035
.025
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
-2 ft/s
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

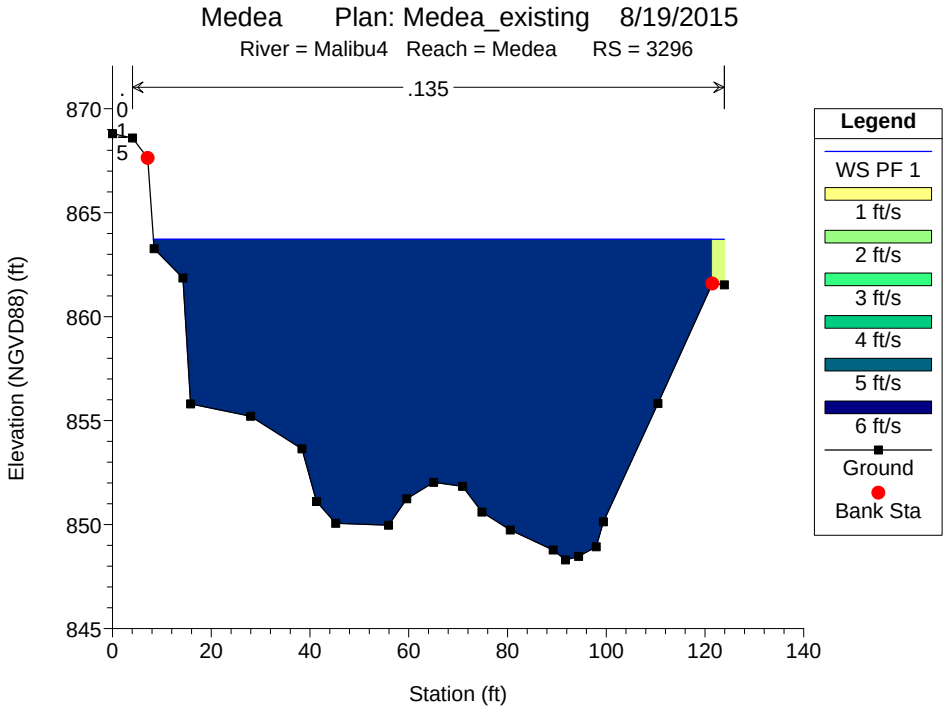

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3862
.025
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2.5 ft/s
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
Ground
Ineff
Bank Sta

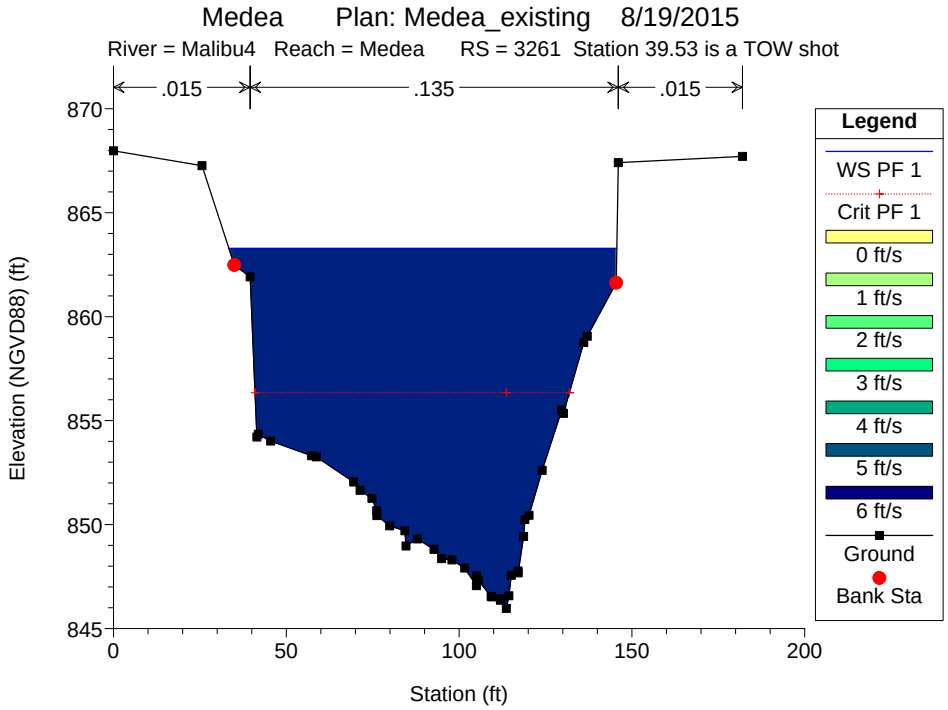

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3725
.025
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

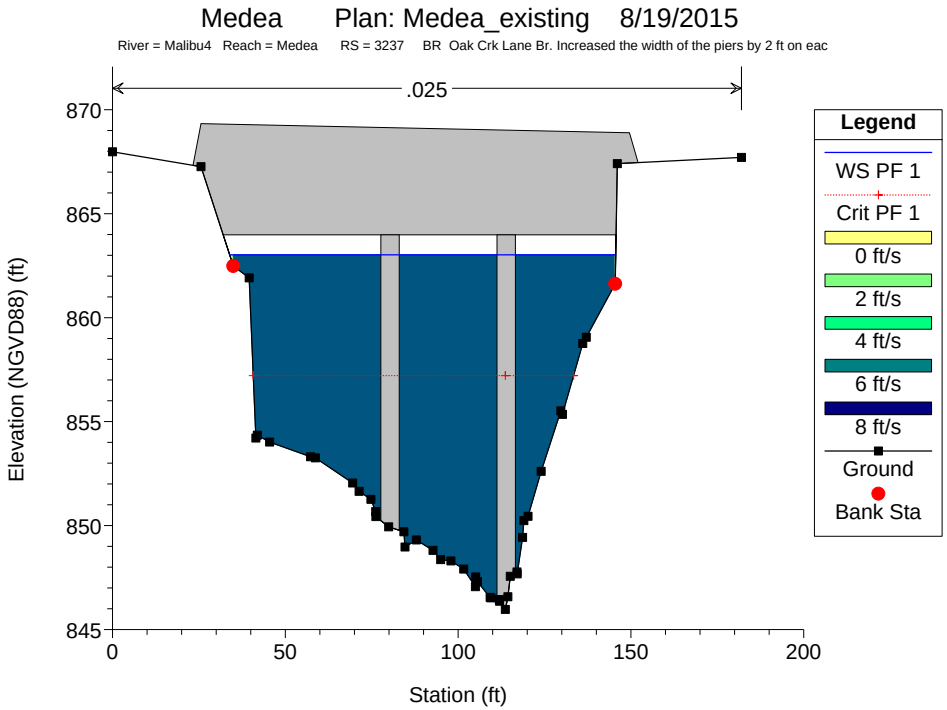

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3633
.03
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

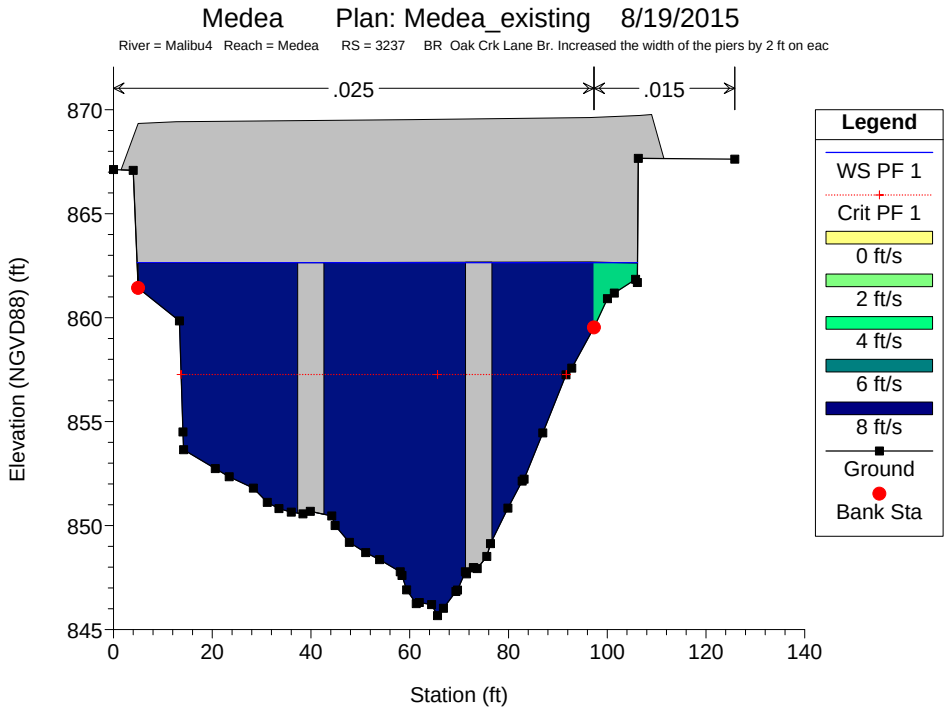

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3552
.03
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

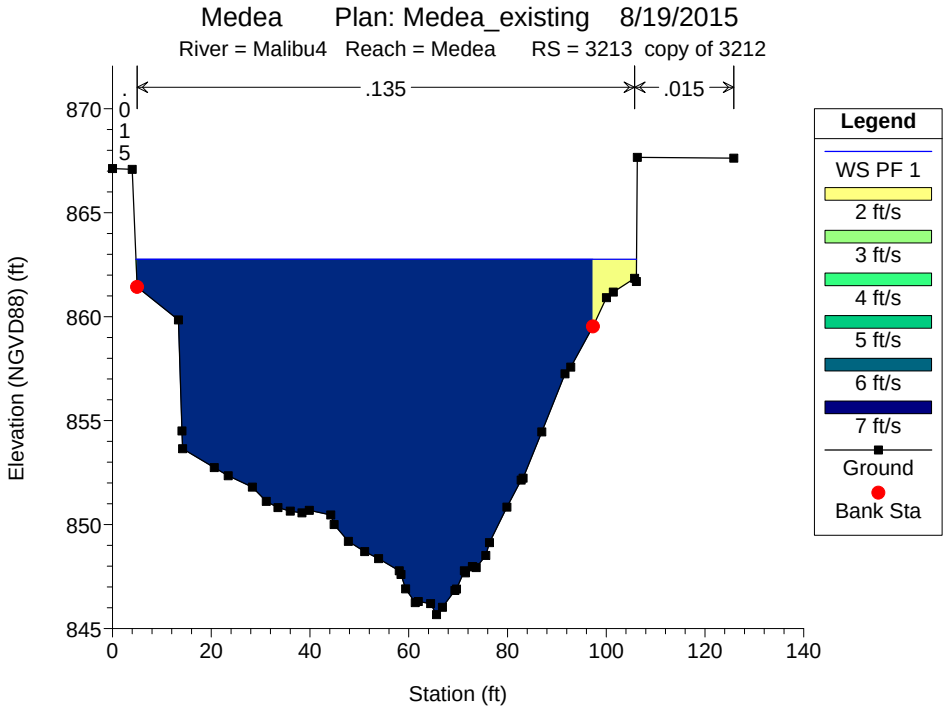

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3409
.015
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

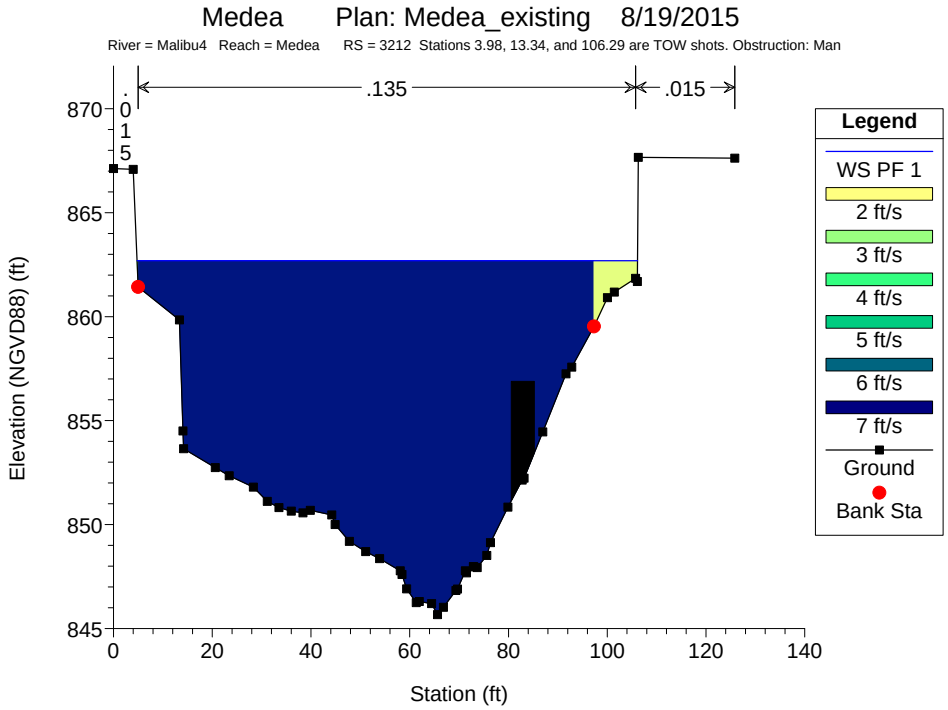

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3296
.015
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
Ground
Bank Sta

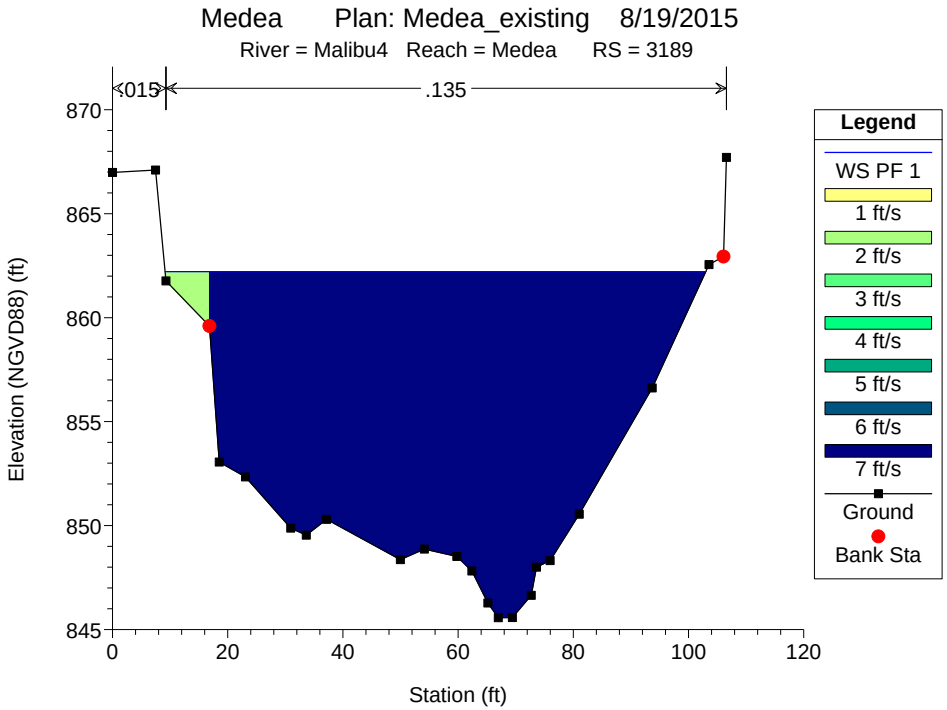

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3261 Station 39.53 is a TOW shot
.015
.135
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
Ground
Bank Sta

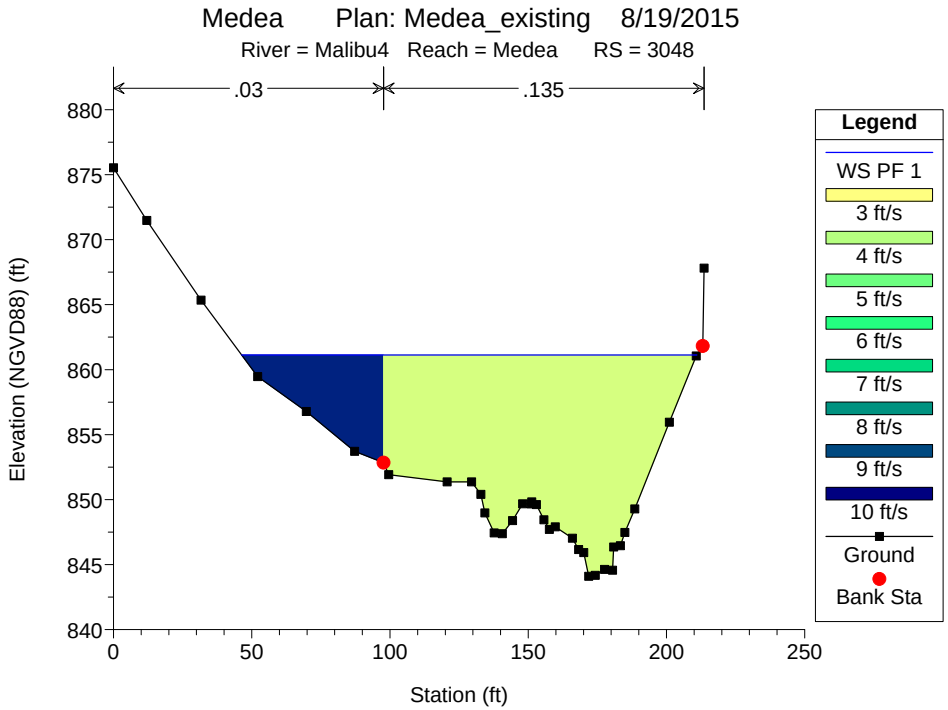

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3237 BR Oak Crk Lane Br. Increased the width of the piers by 2 ft on eac
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

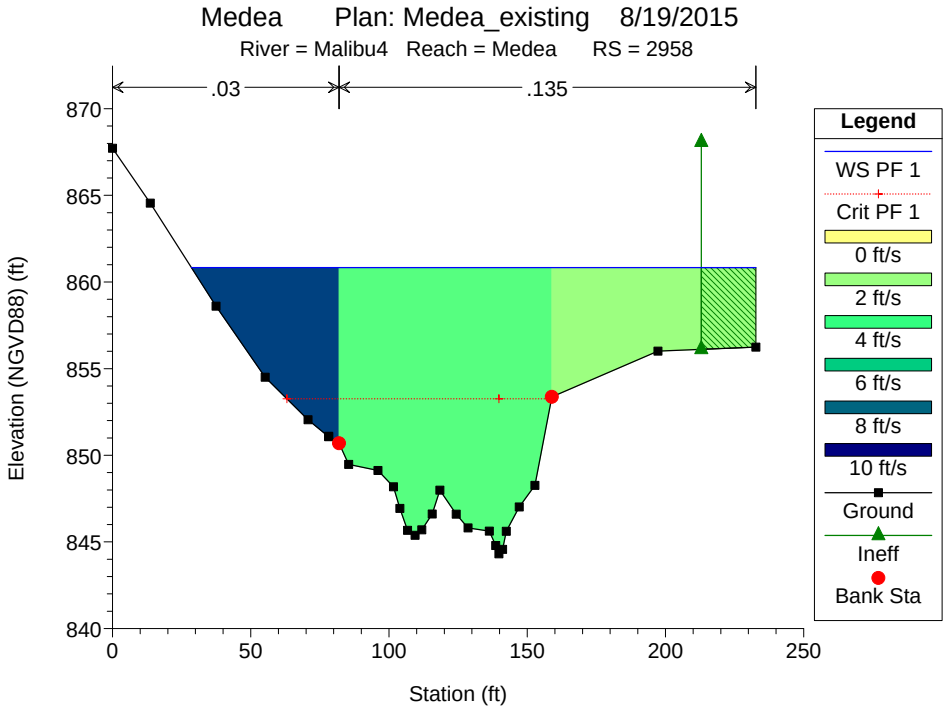

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3237 BR Oak Crk Lane Br. Increased the width of the piers by 2 ft on eac
.025
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

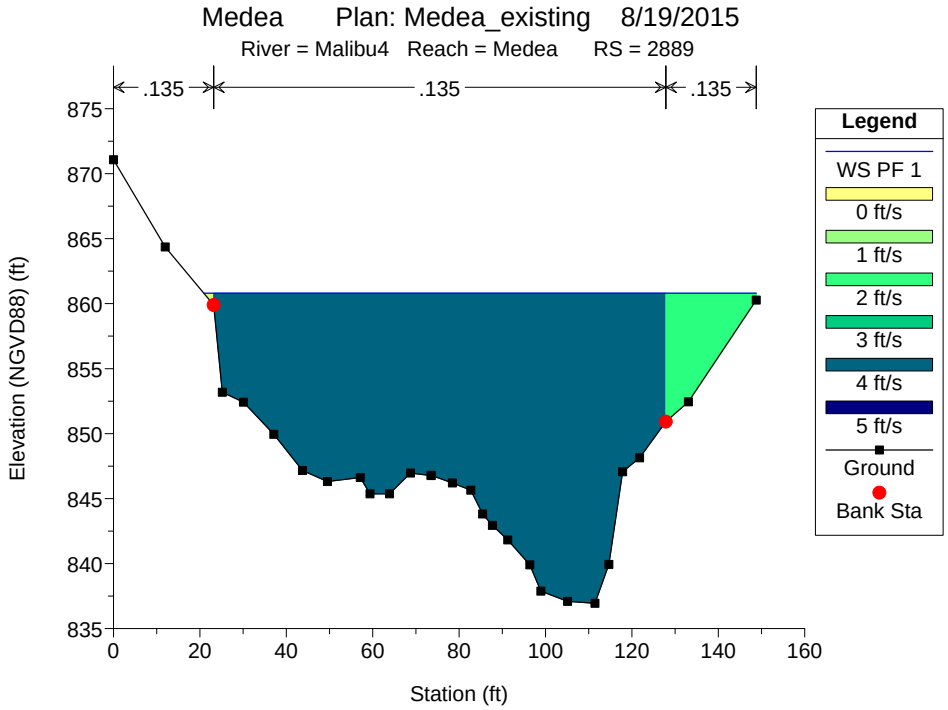

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3213 copy of 3212
.015
.135
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta

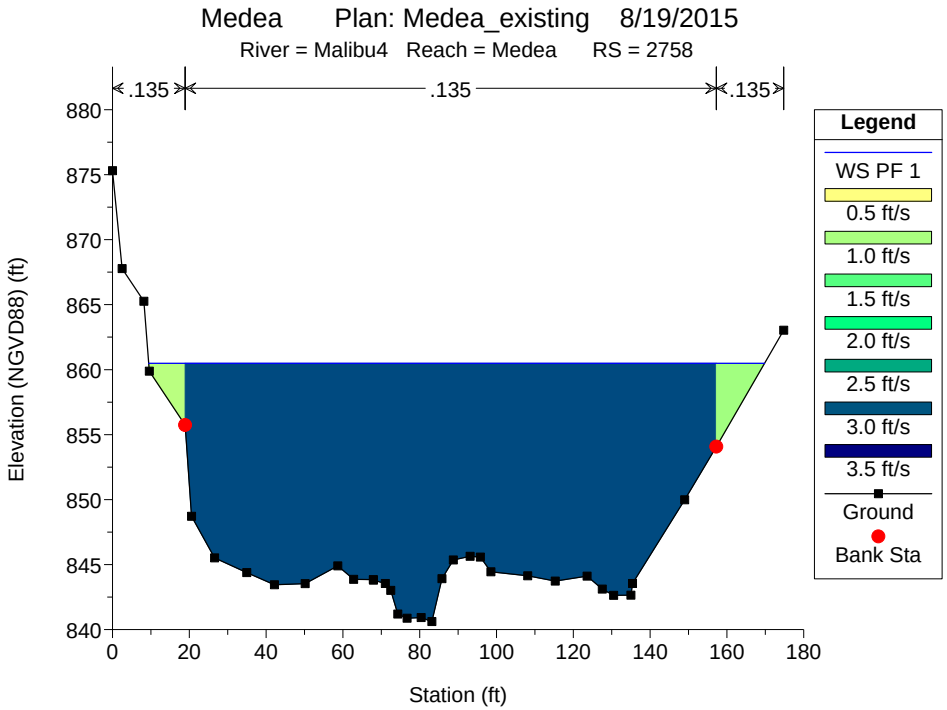

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3212 Stations 3.98, 13.34, and 106.29 are TOW shots. Obstruction: Man
.015
.135
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta

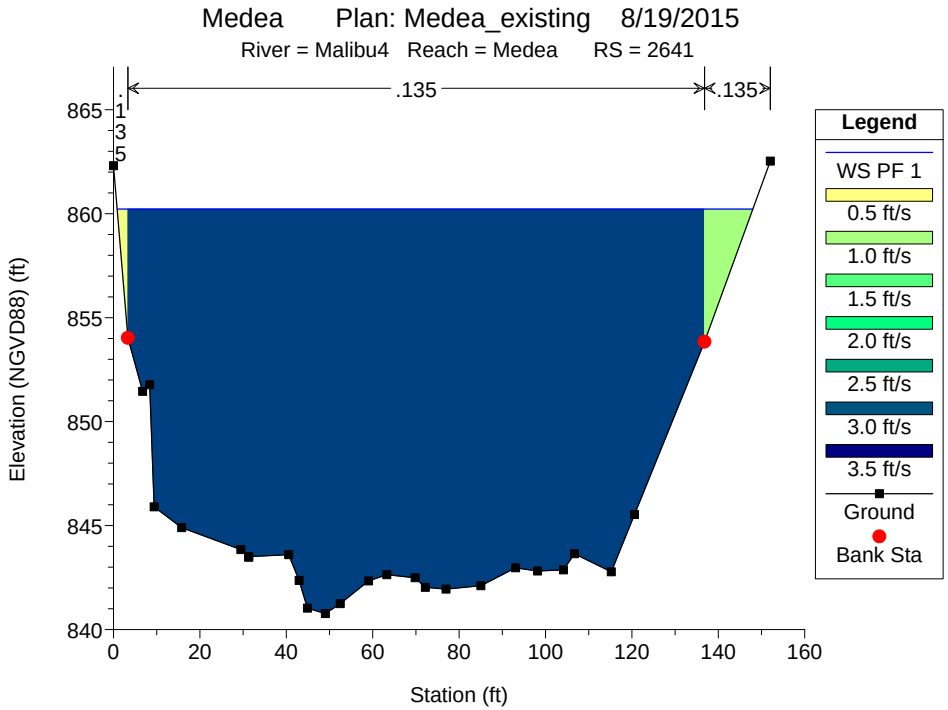

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3189
.015
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta

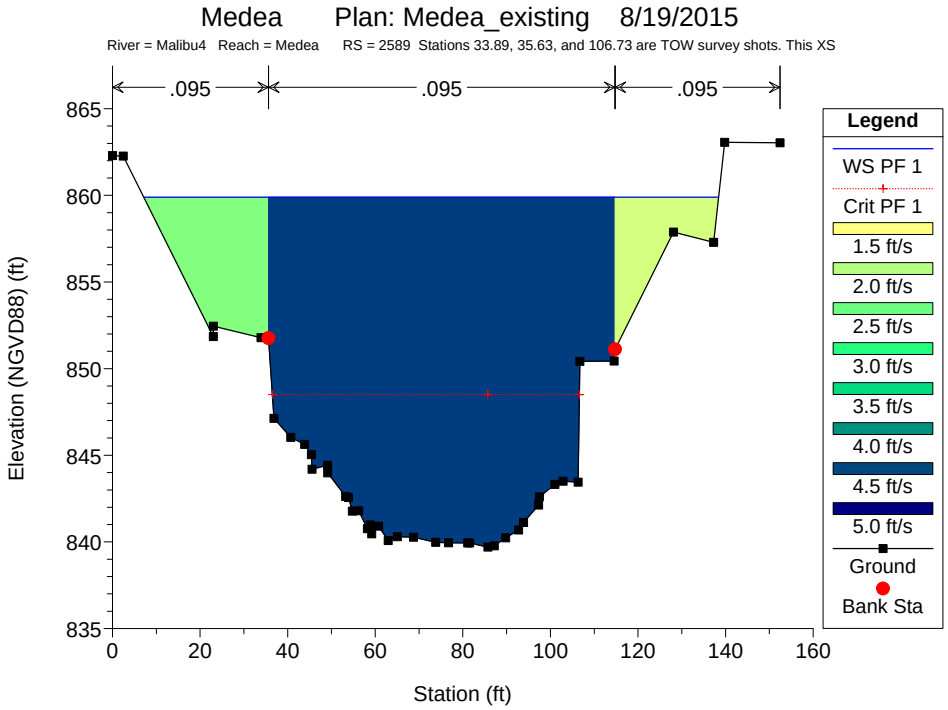

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 3048
.03
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

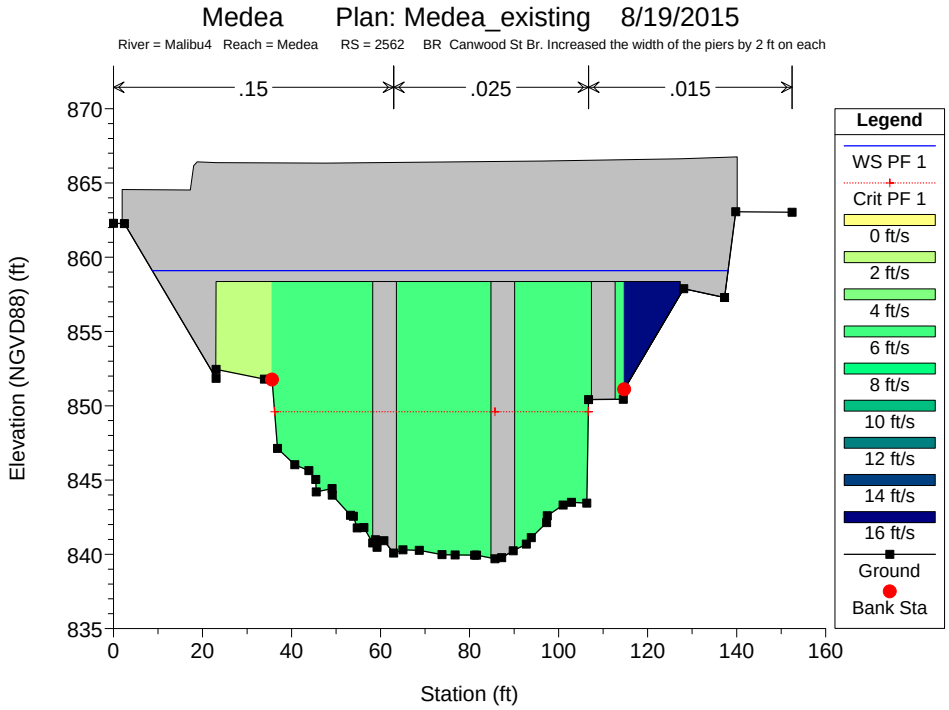

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2958
.03
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
Ground
Ineff
Bank Sta

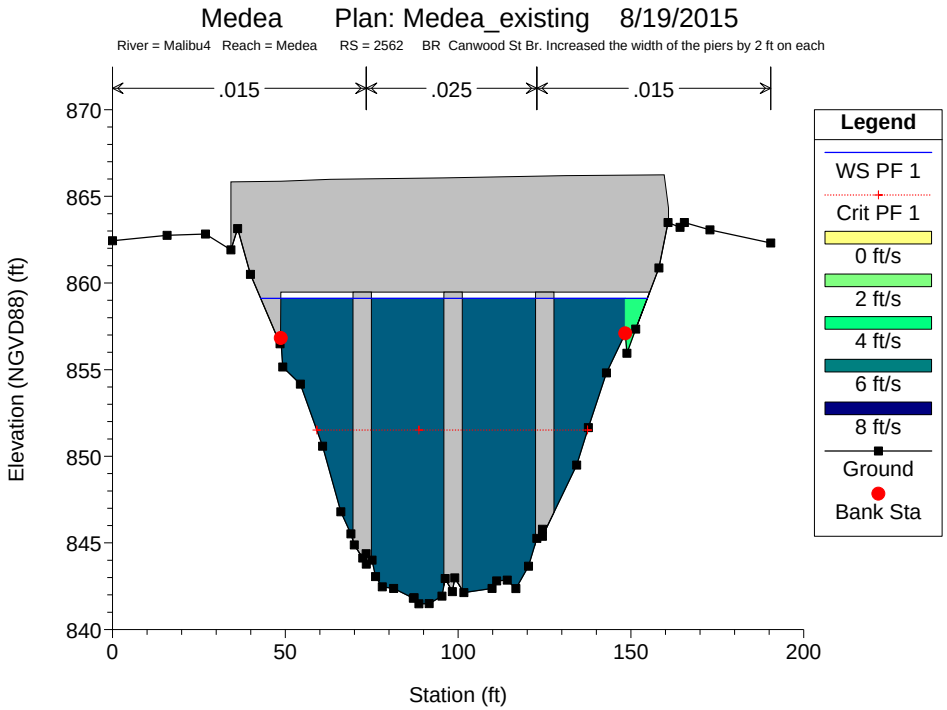

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2889
.135
.135
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
Ground
Bank Sta

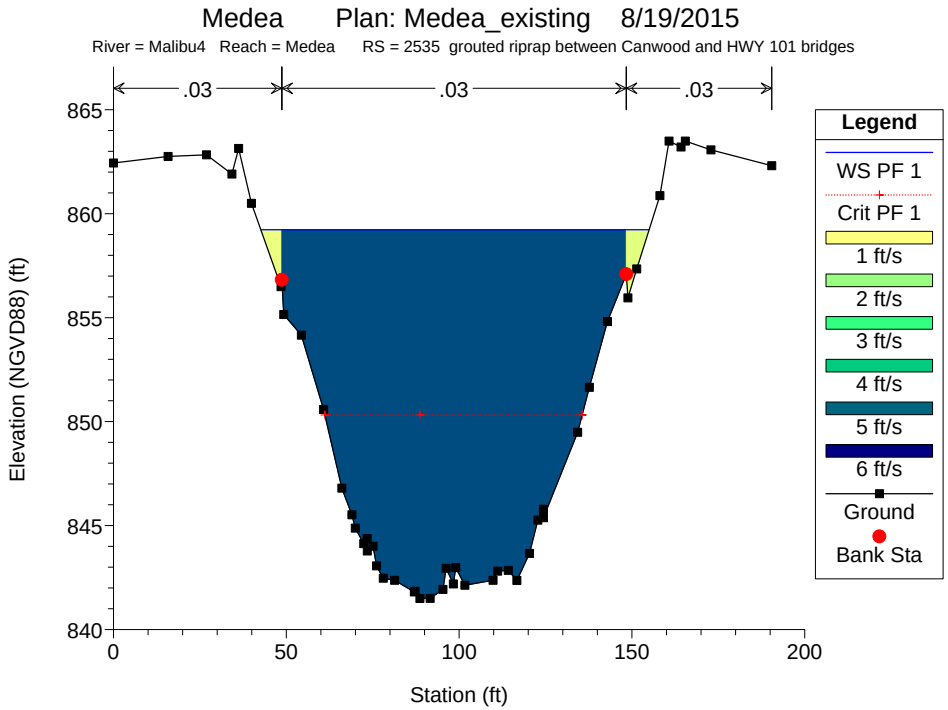

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2758
.135
.135
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
Ground
Bank Sta

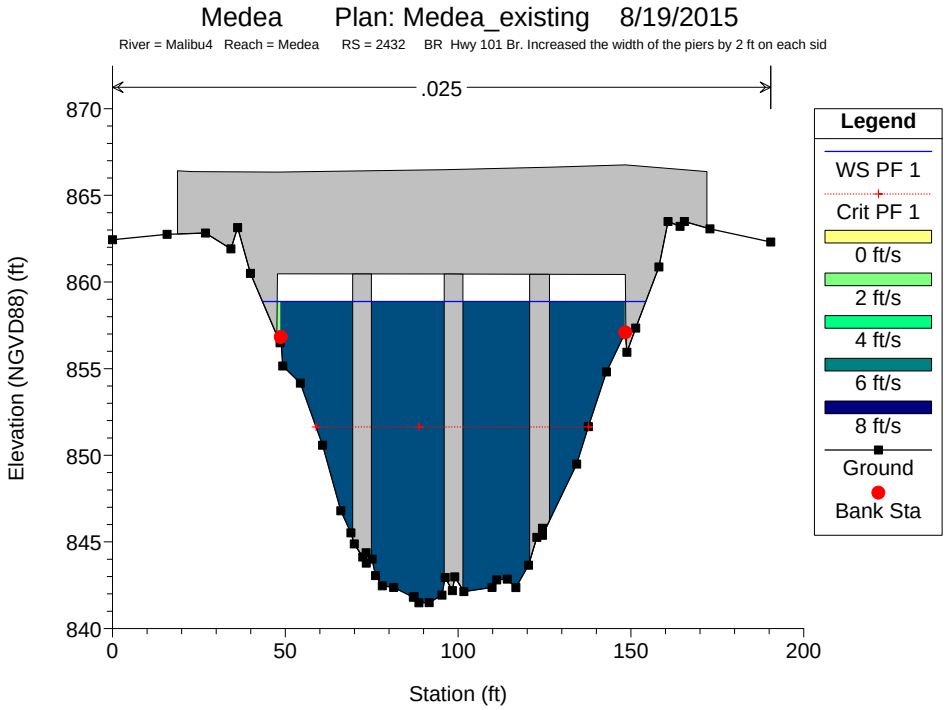

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2641
.135
.135
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0.5 ft/s
1.0 ft/s
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
Ground
Bank Sta

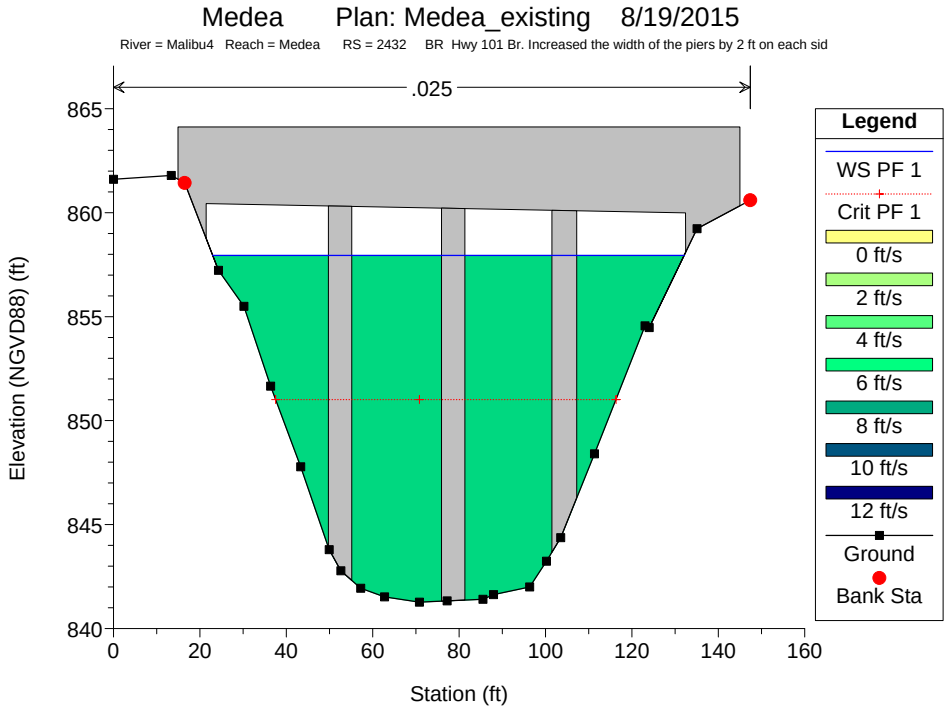

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2589 Stations 33.89, 35.63, and 106.73 are TOW survey shots. This XS
.095
.095
.095
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1.5 ft/s
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
Ground
Bank Sta

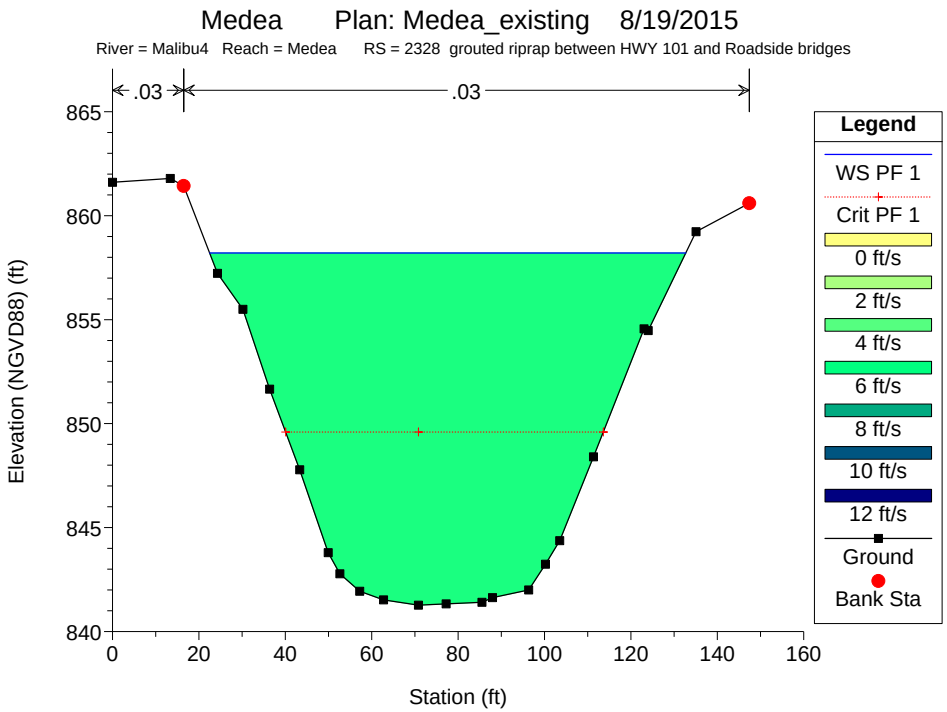

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2562 BR Canwood St Br. Increased the width of the piers by 2 ft on each
.15
.025
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Bank Sta

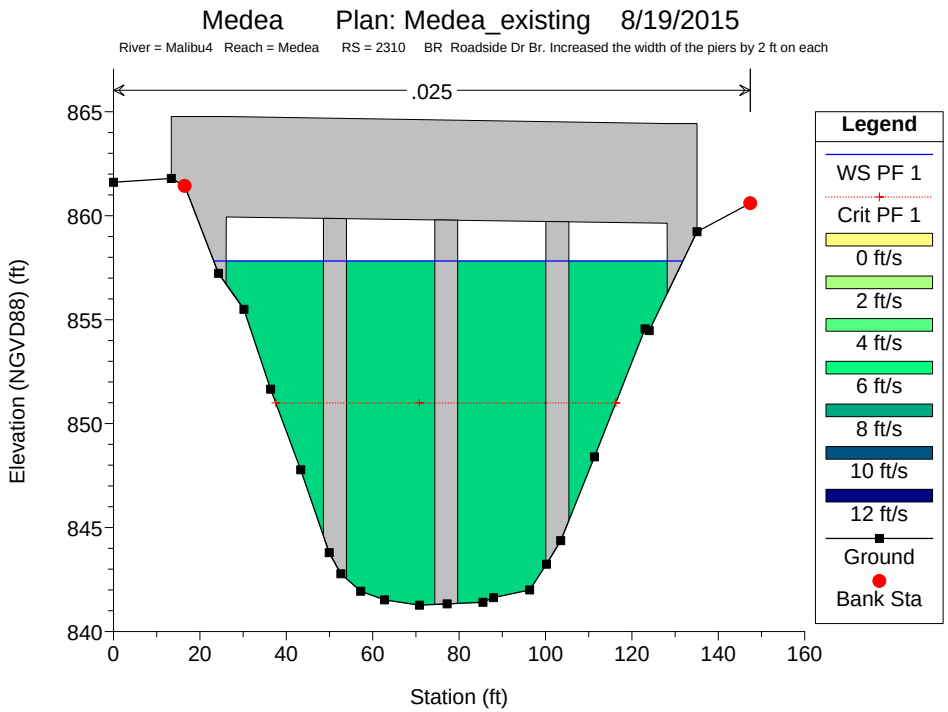

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2562 BR Canwood St Br. Increased the width of the piers by 2 ft on each
.015
.025
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

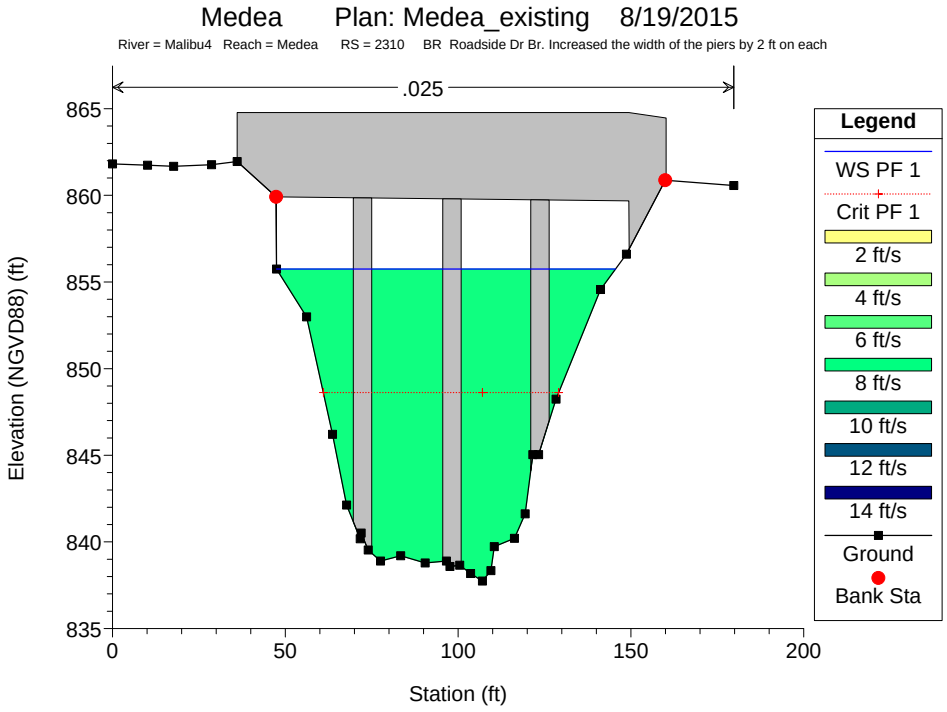

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2535 grouted riprap between Canwood and HWY 101 bridges
.03
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
Ground
Bank Sta

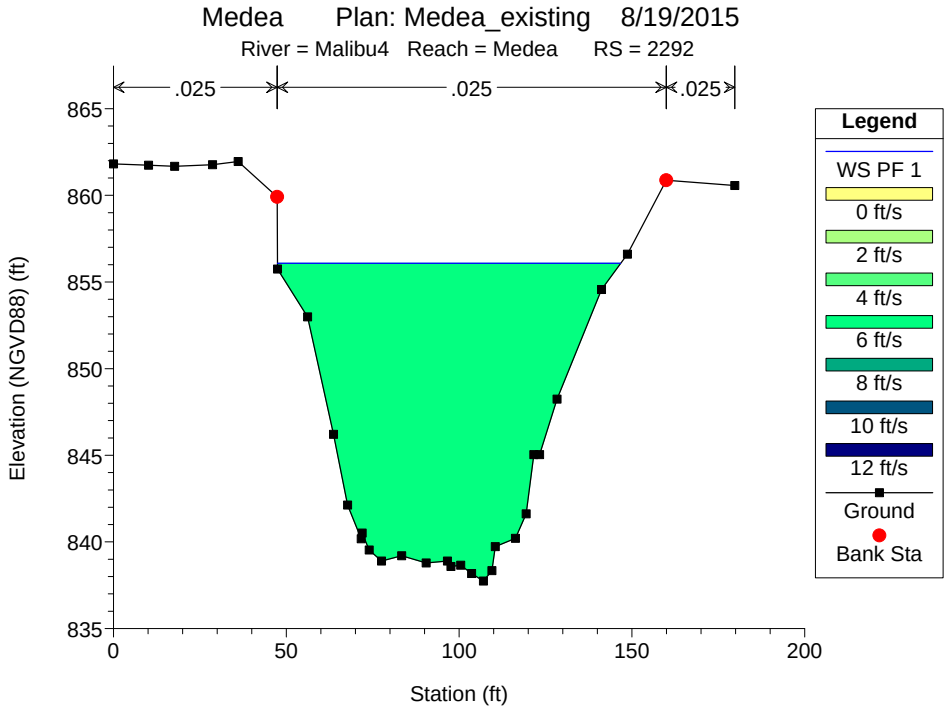

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2432 BR Hwy 101 Br. Increased the width of the piers by 2 ft on each sid
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
Ground
Bank Sta

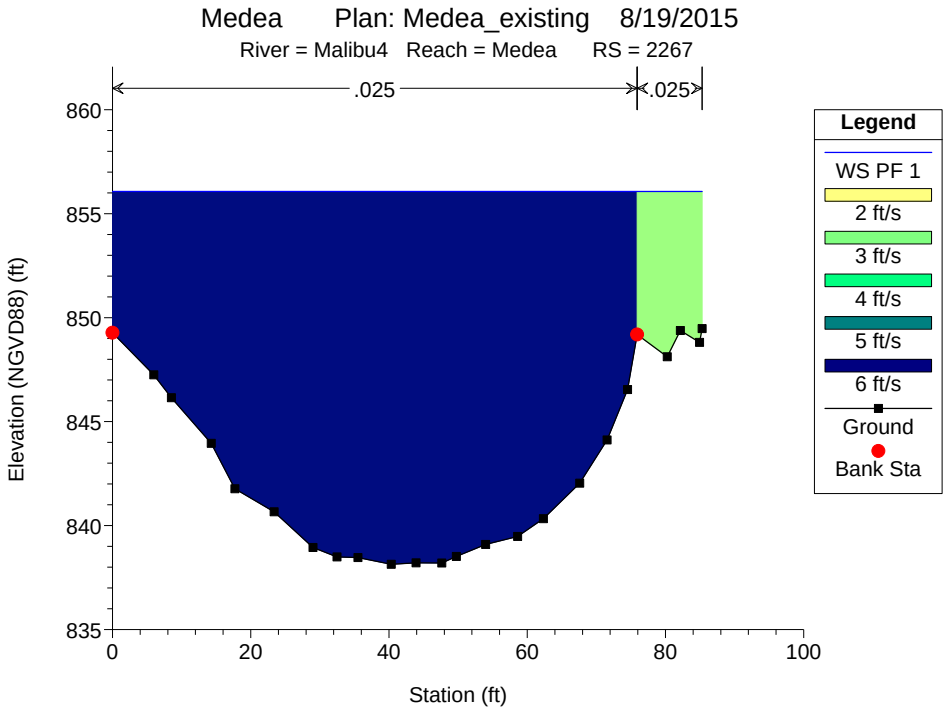

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2432 BR Hwy 101 Br. Increased the width of the piers by 2 ft on each sid
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

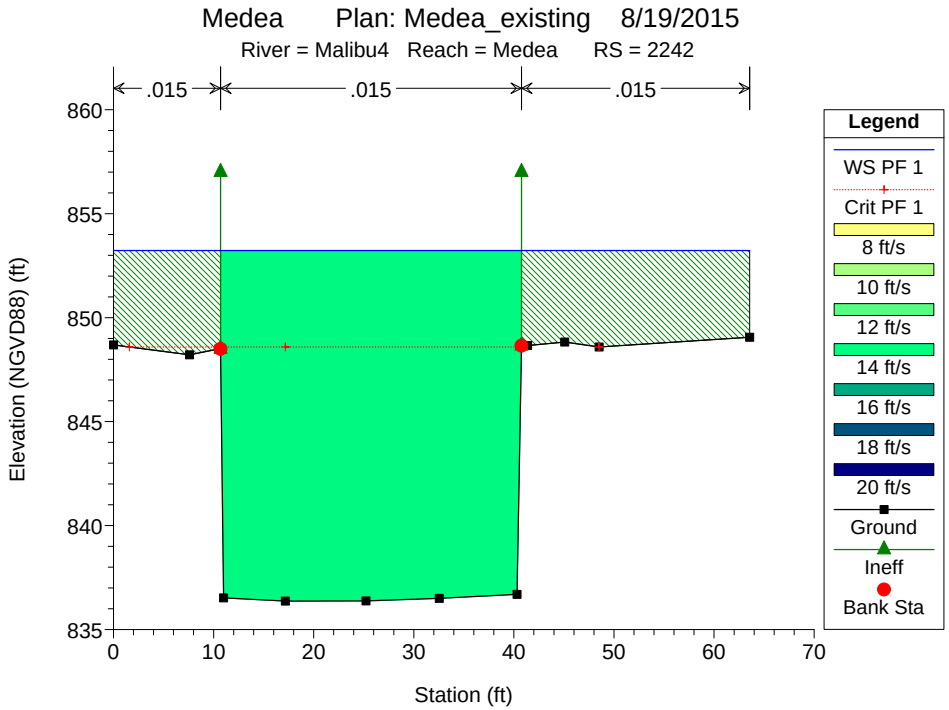

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2328 grouted riprap between HWY 101 and Roadside bridges
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

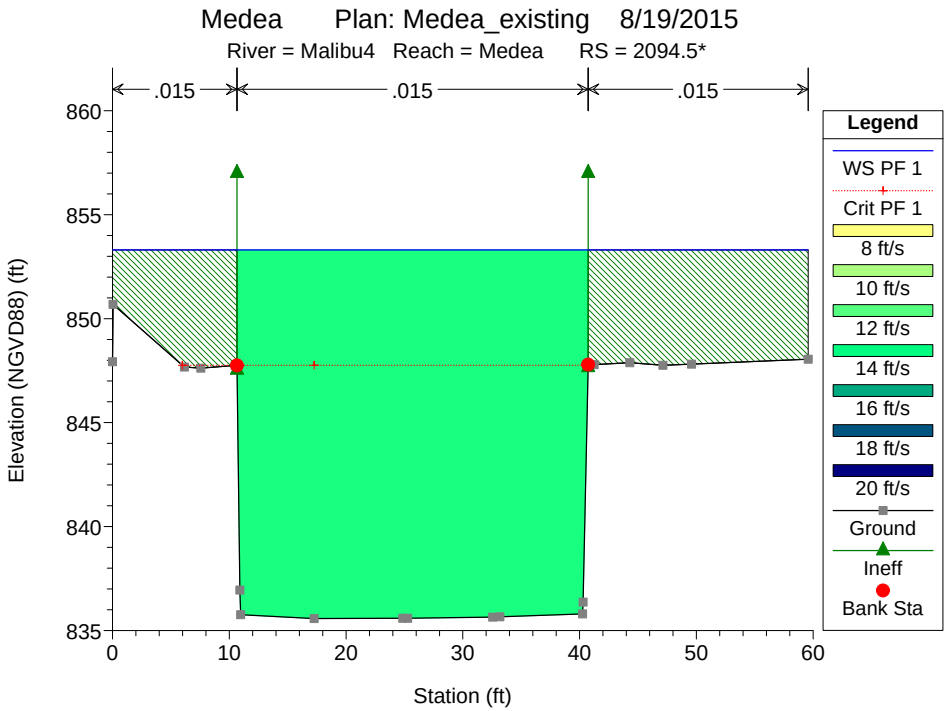

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2310 BR Roadside Dr Br. Increased the width of the piers by 2 ft on each
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

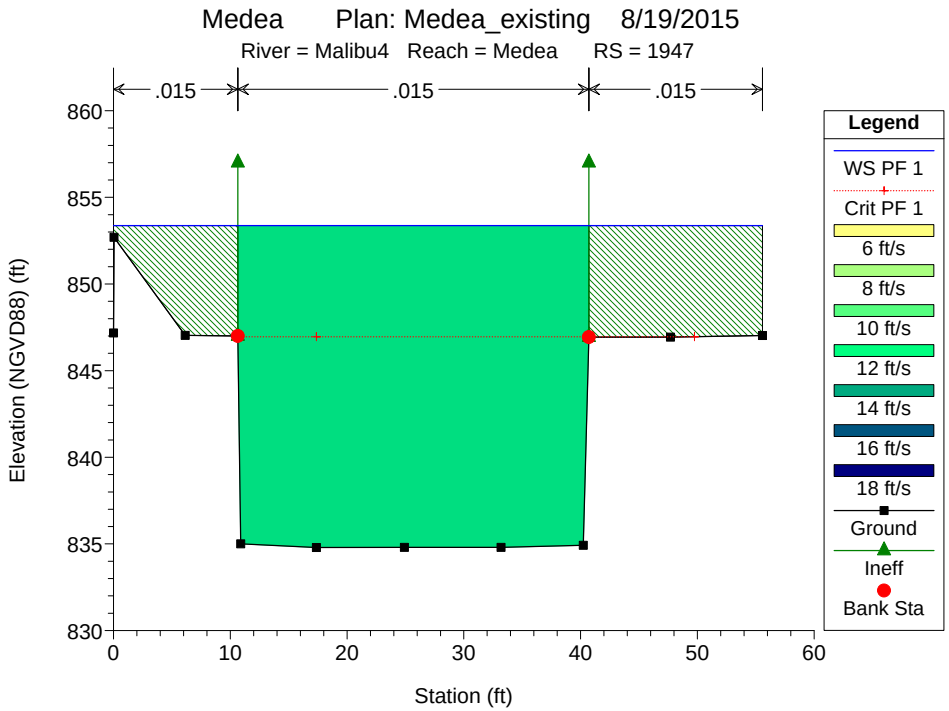

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2310 BR Roadside Dr Br. Increased the width of the piers by 2 ft on each
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Bank Sta

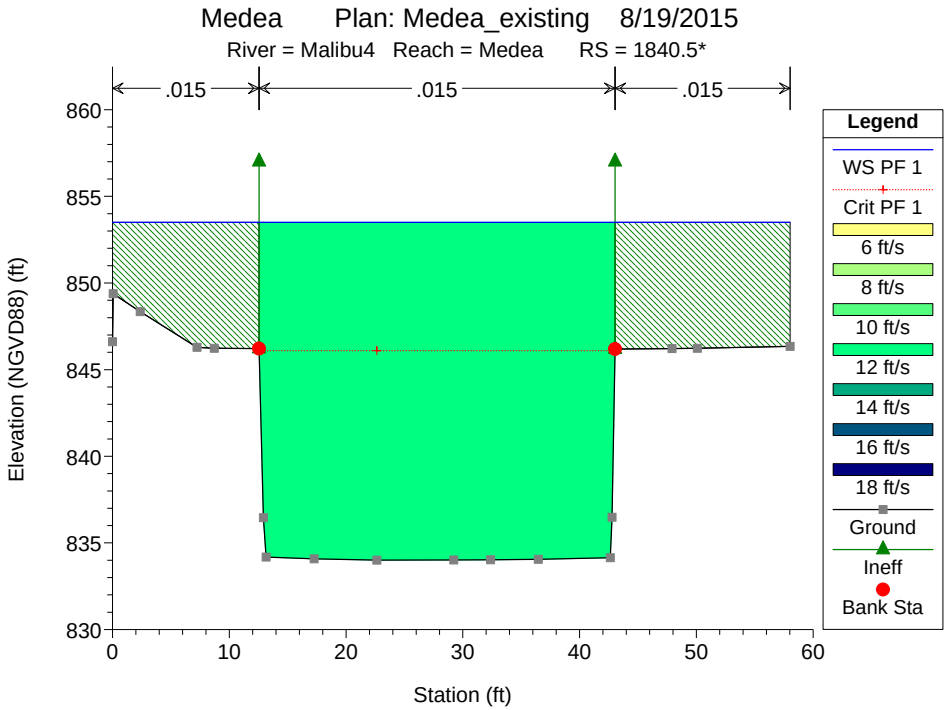

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2292
.025
.025
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
0 ft/s
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Bank Sta

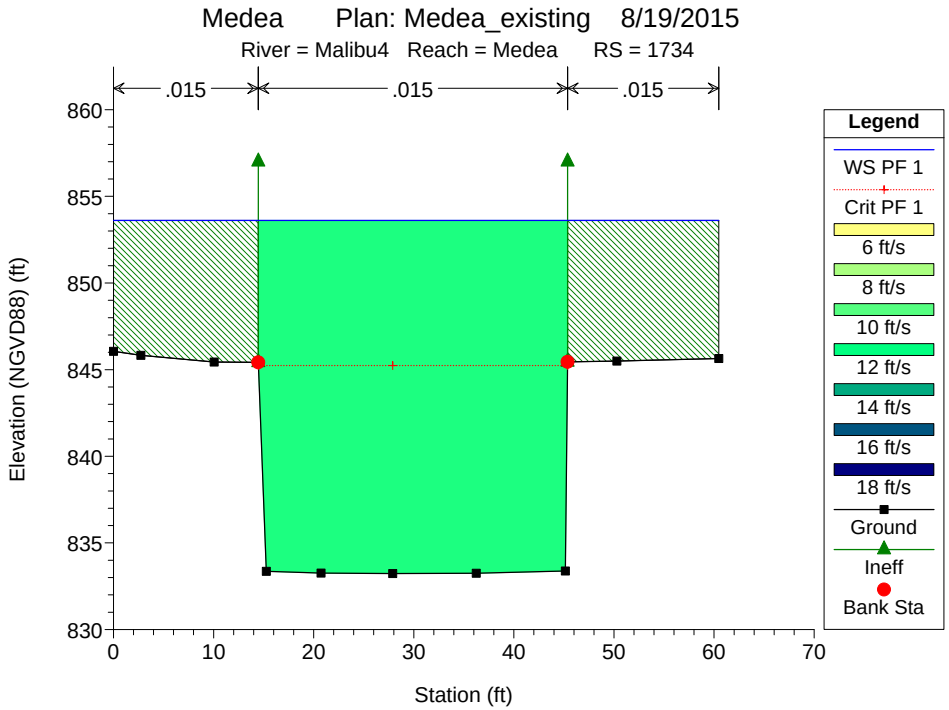

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2267
.025
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
Ground
Bank Sta

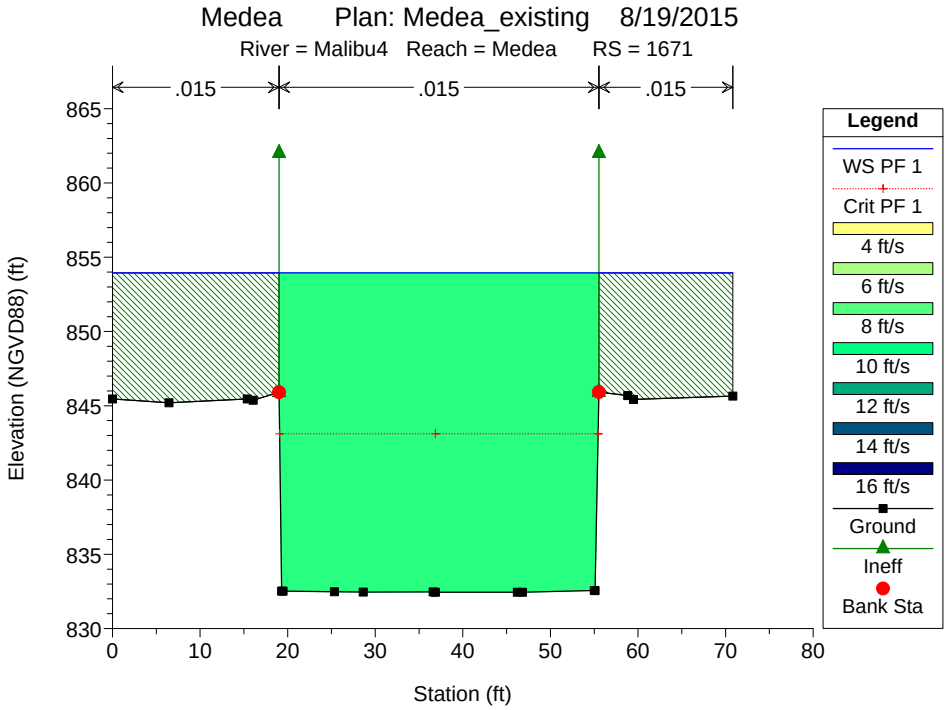

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2242
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

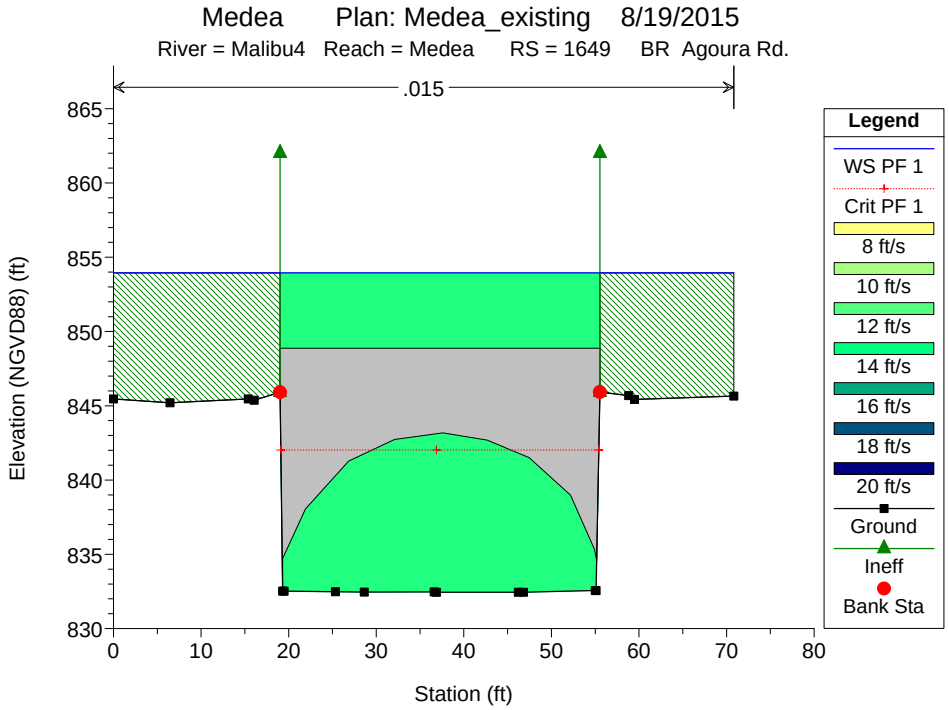

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 2094.5*
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

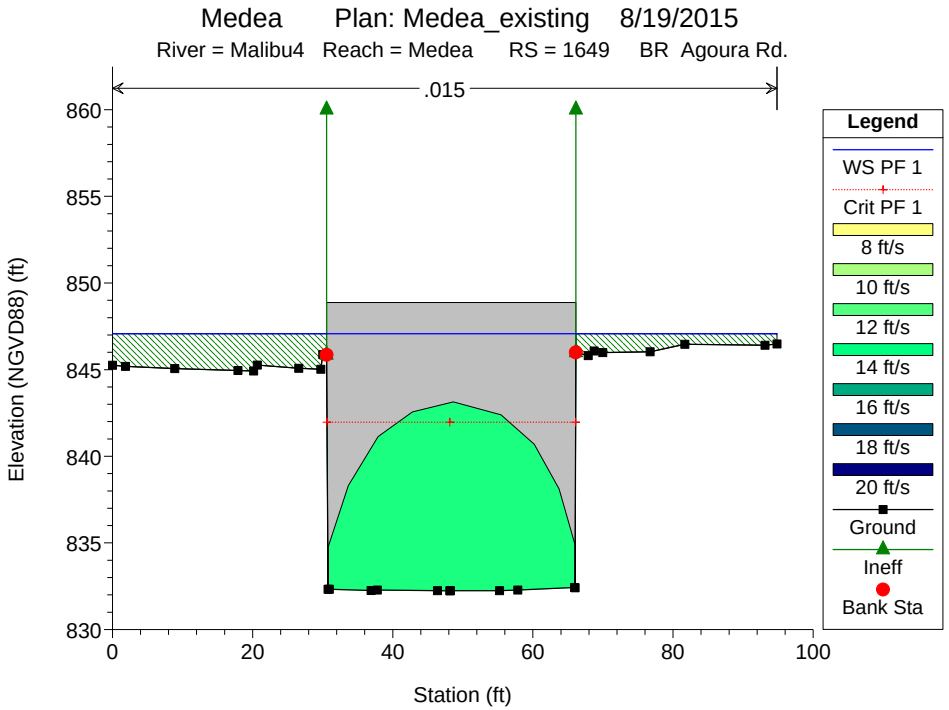

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1947
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Ineff
Bank Sta

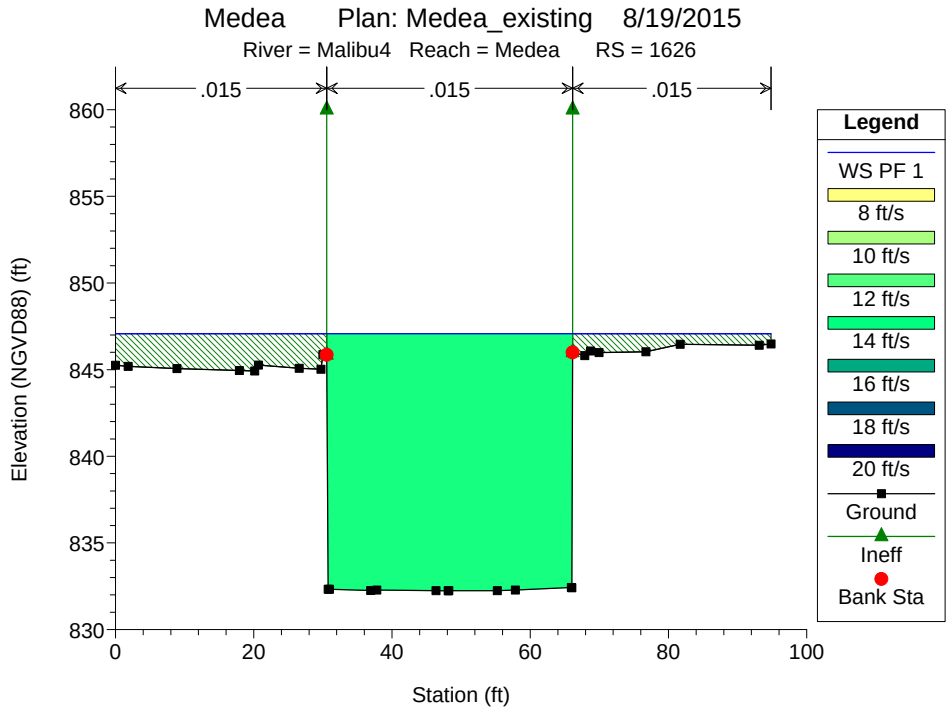

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1840.5*
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Ineff
Bank Sta

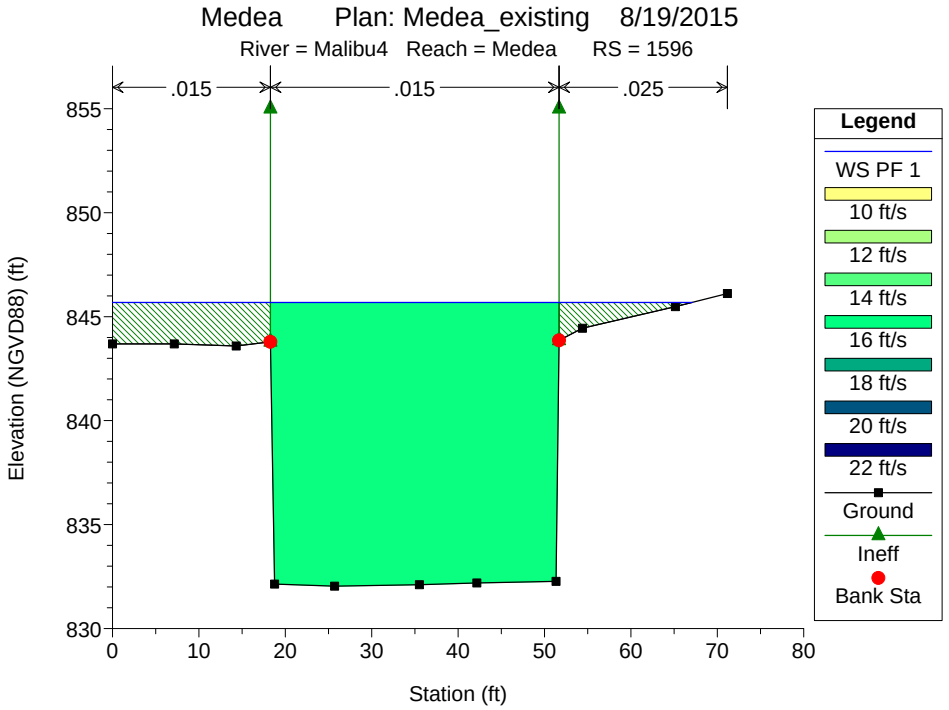

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1734
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Ineff
Bank Sta

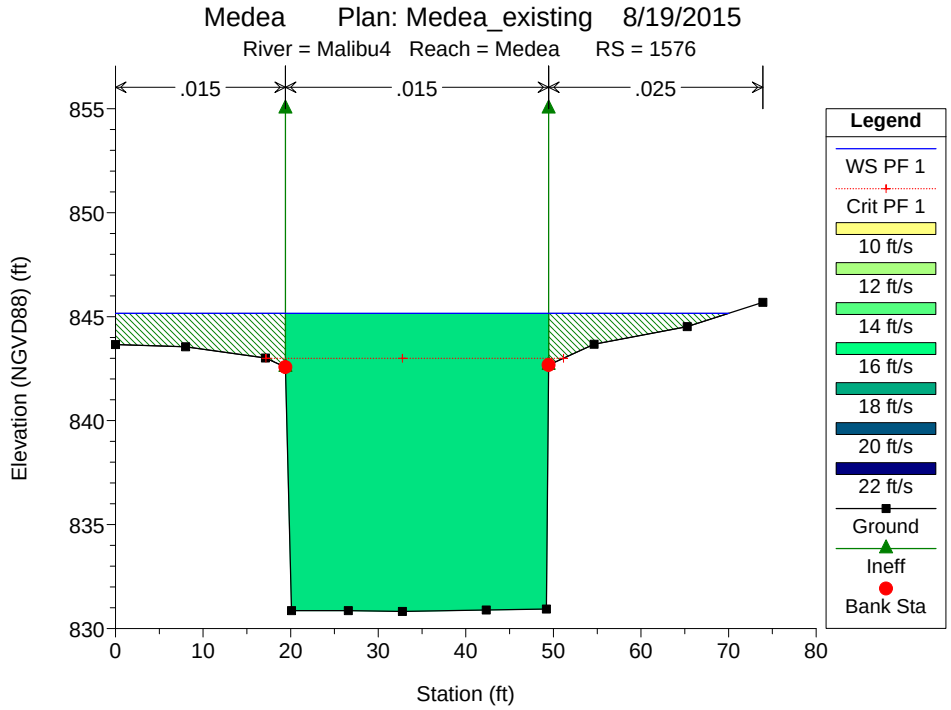

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1671
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
Ground
Ineff
Bank Sta

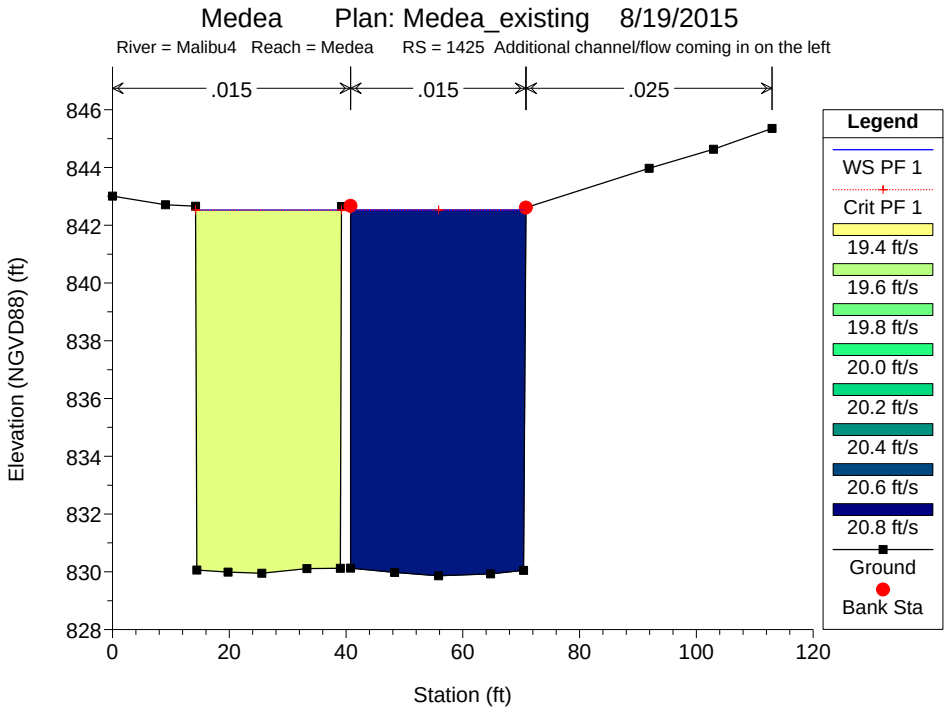

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1649 BR Agoura Rd.
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

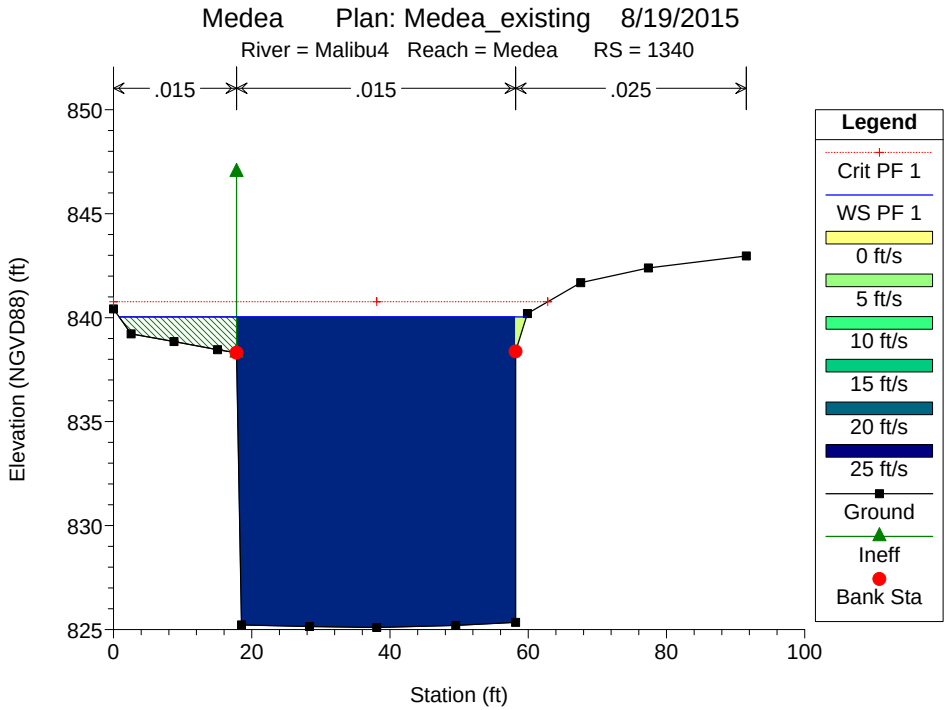

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1649 BR Agoura Rd.
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

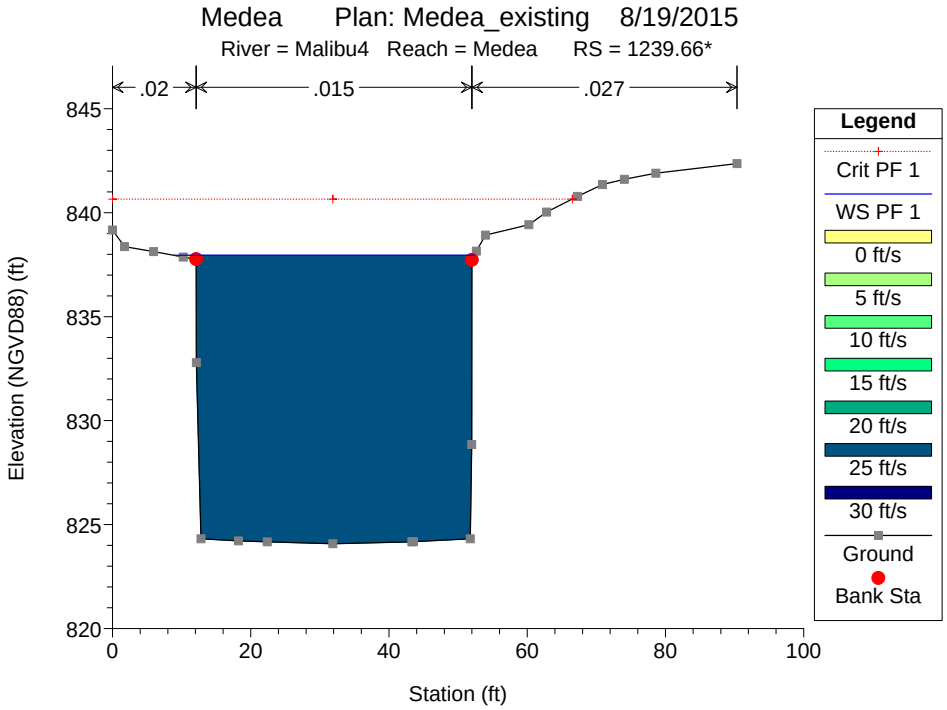

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1626
.015
.015
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
Ground
Ineff
Bank Sta

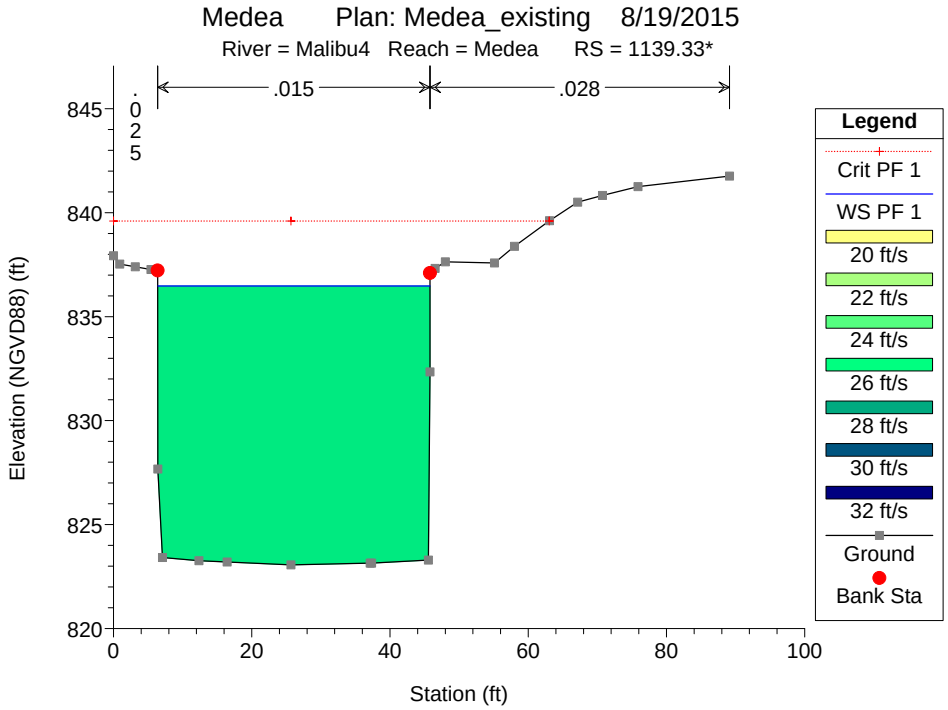

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1596
.015
.015
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Ineff
Bank Sta

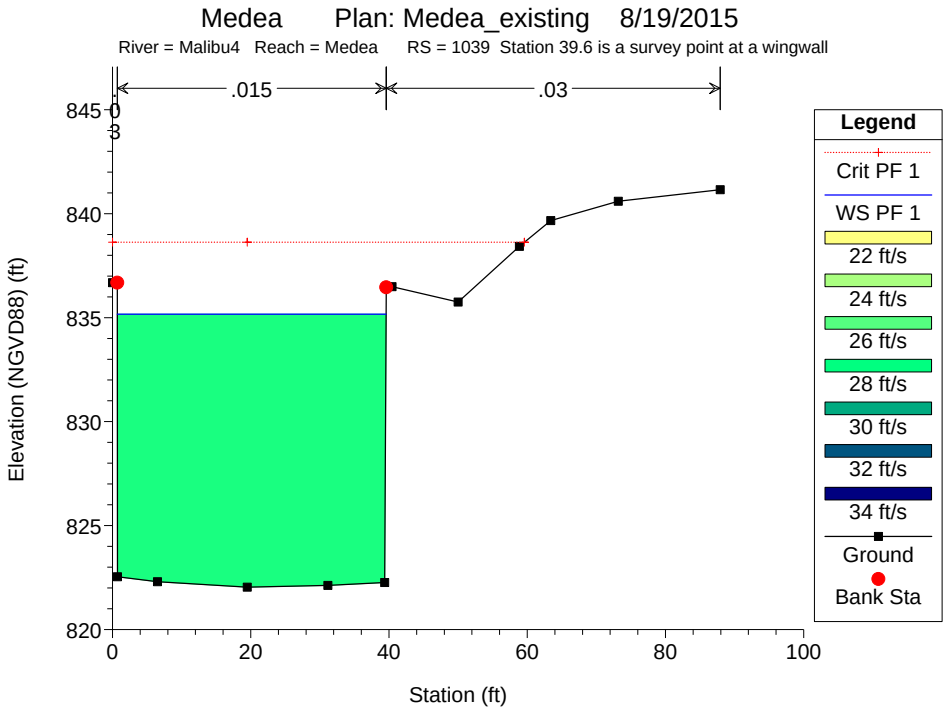

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1576
.015
.015
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
Ground
Ineff
Bank Sta

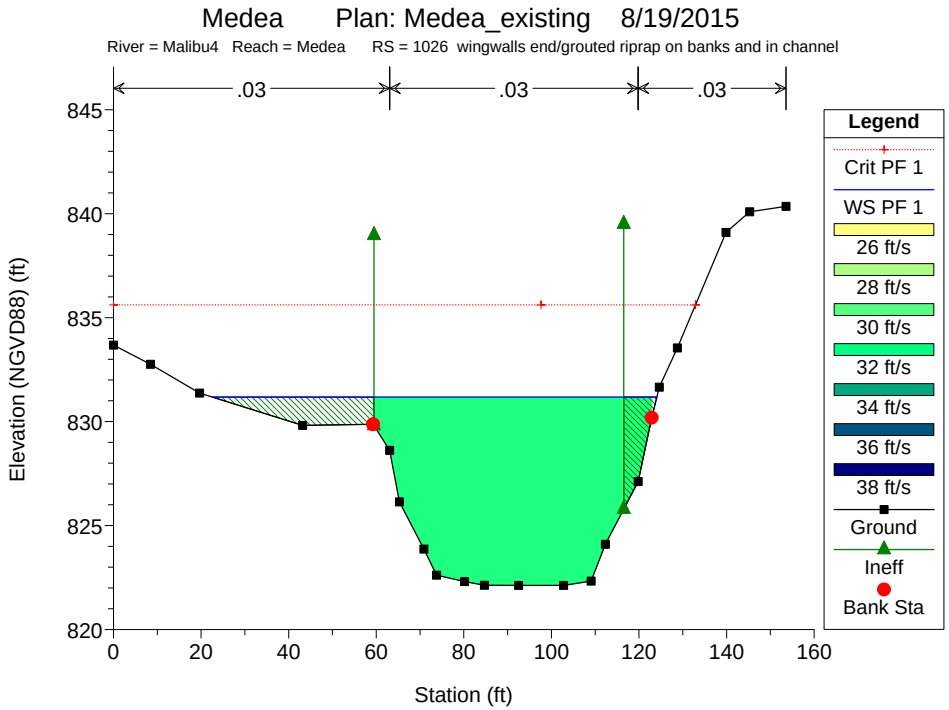

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1425 Additional channel/flow coming in on the left
.015
.015
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
19.4 ft/s
19.6 ft/s
19.8 ft/s
20.0 ft/s
20.2 ft/s
20.4 ft/s
20.6 ft/s
20.8 ft/s
Ground
Bank Sta

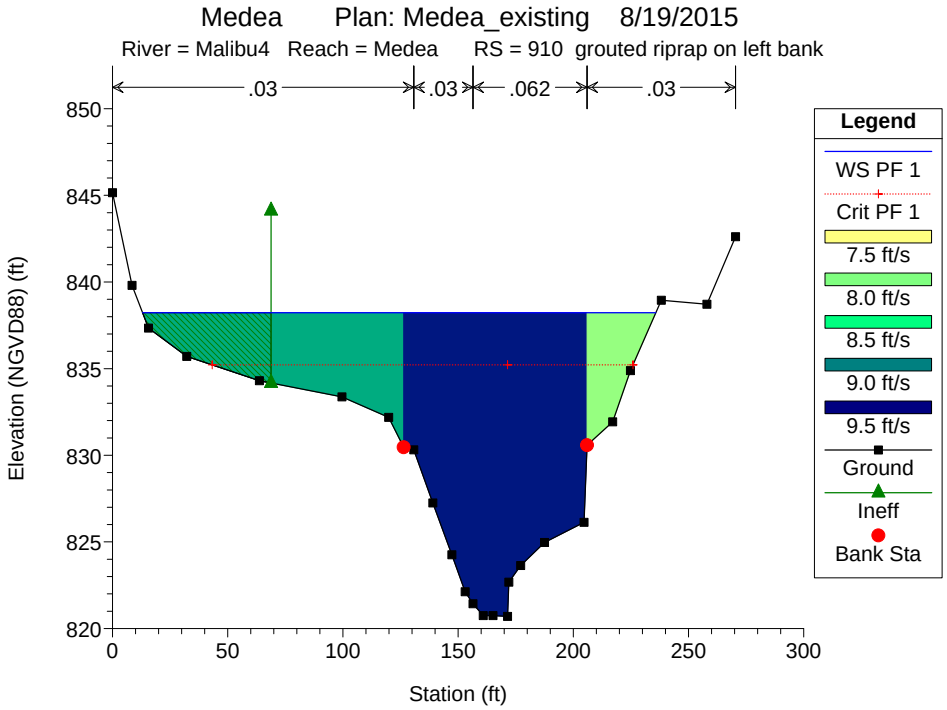

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1340
.015
.015
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
Ground
Ineff
Bank Sta

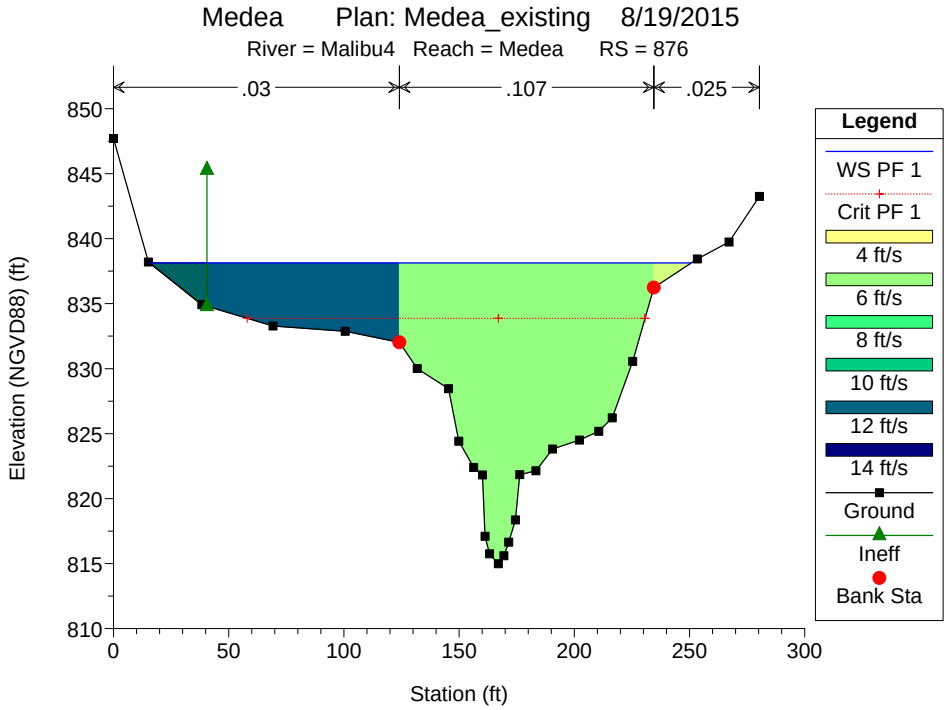

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1239.66*
.02
.015
.027
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
0 ft/s
5 ft/s
10 ft/s
15 ft/s
20 ft/s
25 ft/s
30 ft/s
Ground
Bank Sta

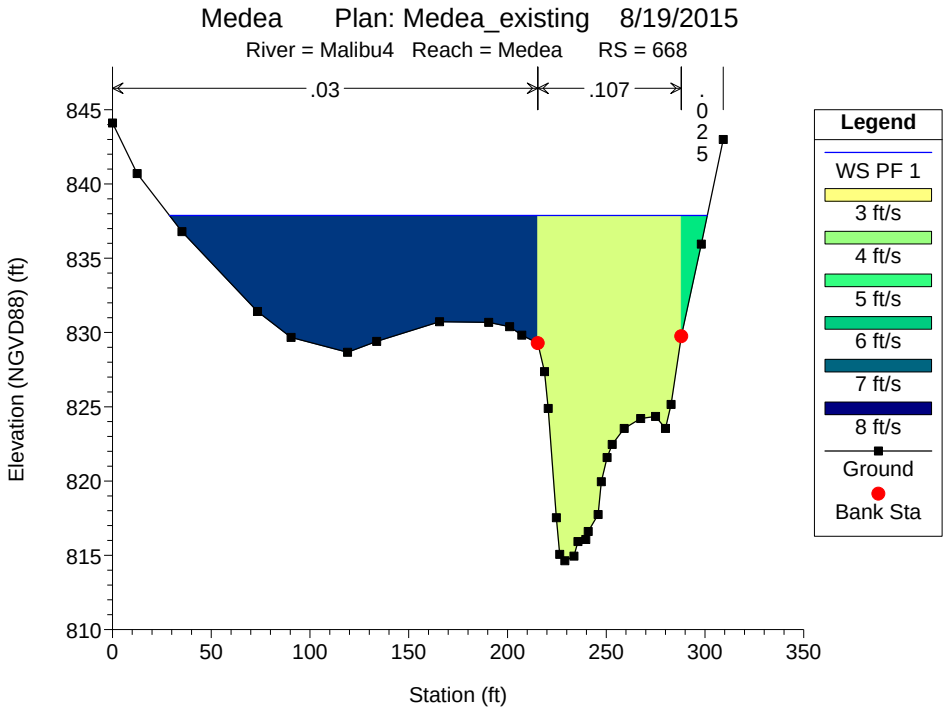

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1139.33*
.025
.015
.028
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
Ground
Bank Sta

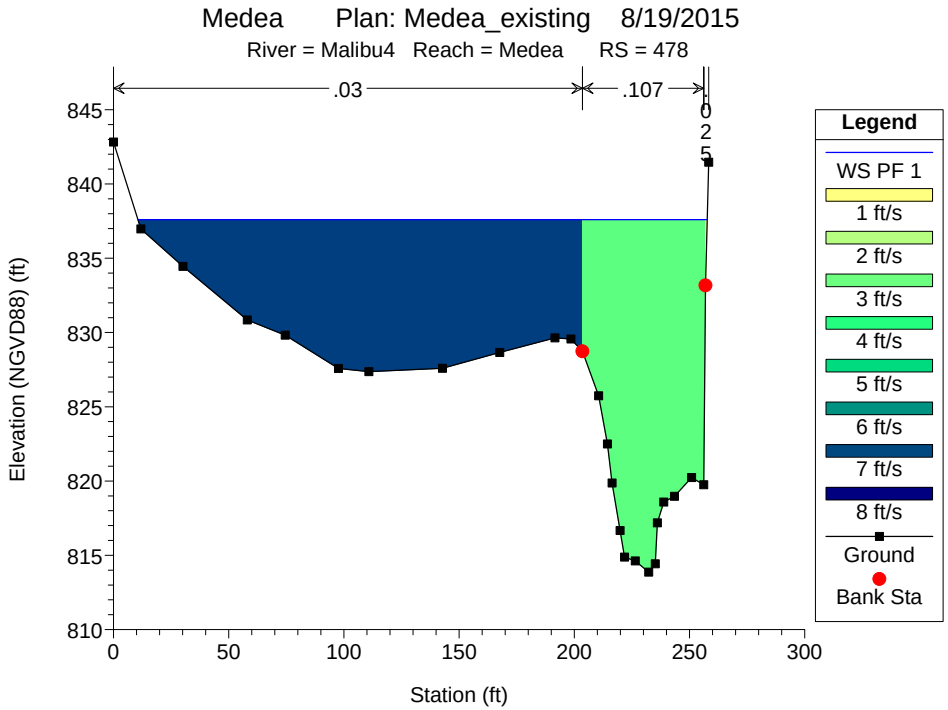

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1039 Station 39.6 is a survey point at a wingwall
.015
.03
0.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
34 ft/s
Ground
Bank Sta

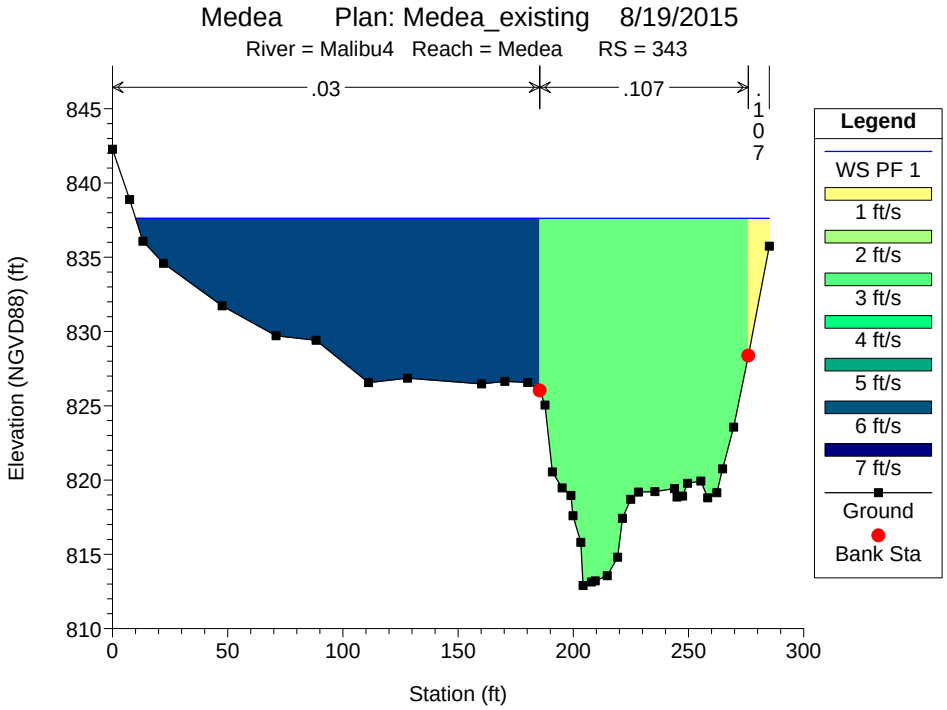

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 1026 wingwalls end/grouted riprap on banks and in channel
.03
.03
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
26 ft/s
28 ft/s
30 ft/s
32 ft/s
34 ft/s
36 ft/s
38 ft/s
Ground
Ineff
Bank Sta

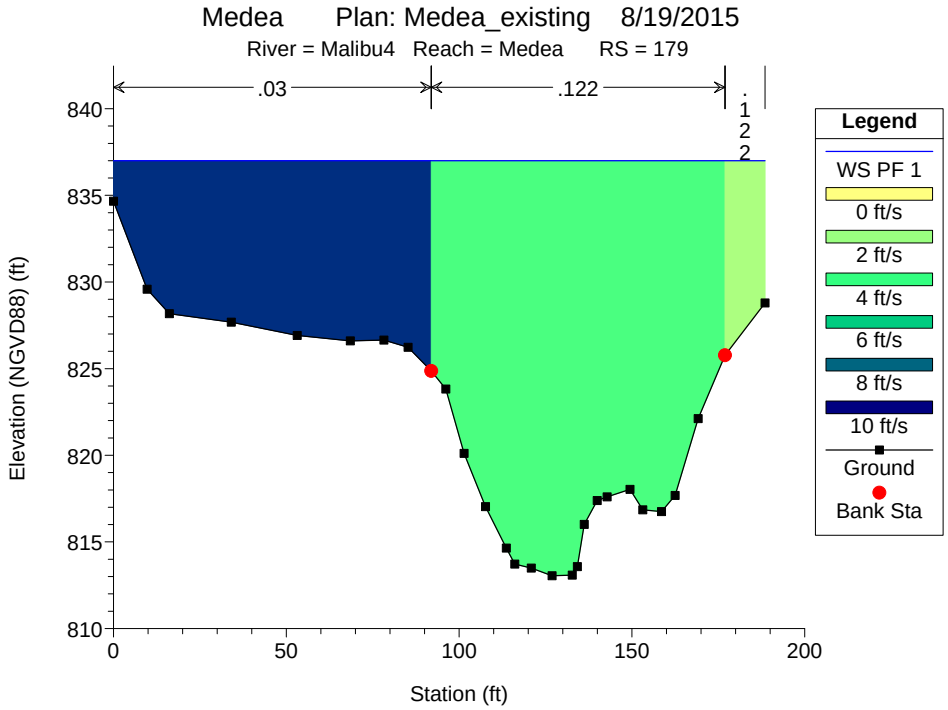

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 910 grouted riprap on left bank
.03
.03
.062
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
7.5 ft/s
8.0 ft/s
8.5 ft/s
9.0 ft/s
9.5 ft/s
Ground
Ineff
Bank Sta

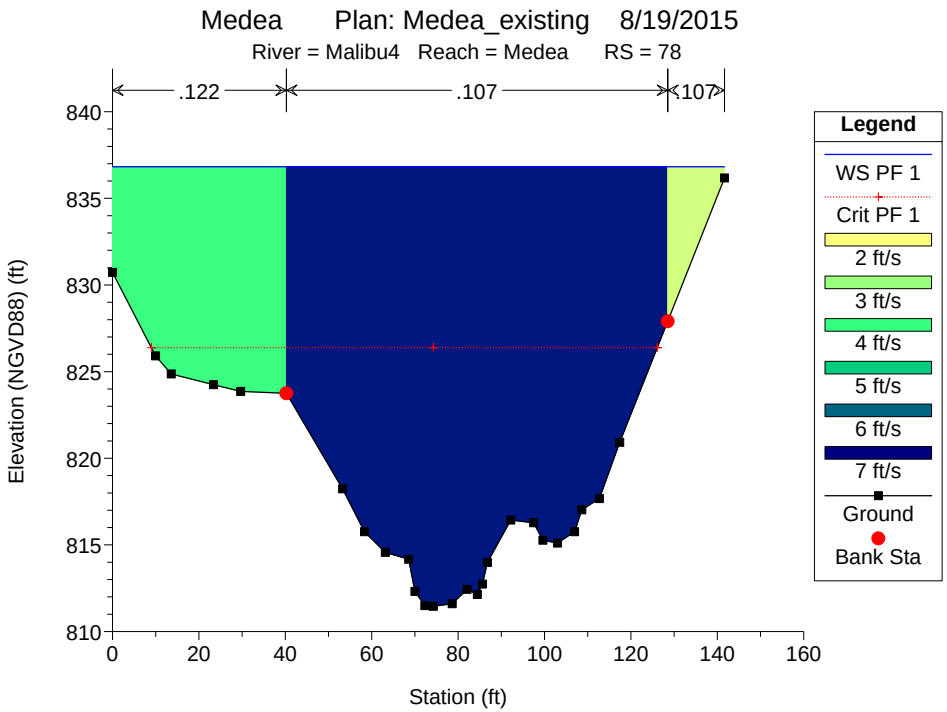

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 876
.03
.107
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
Ground
Ineff
Bank Sta


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

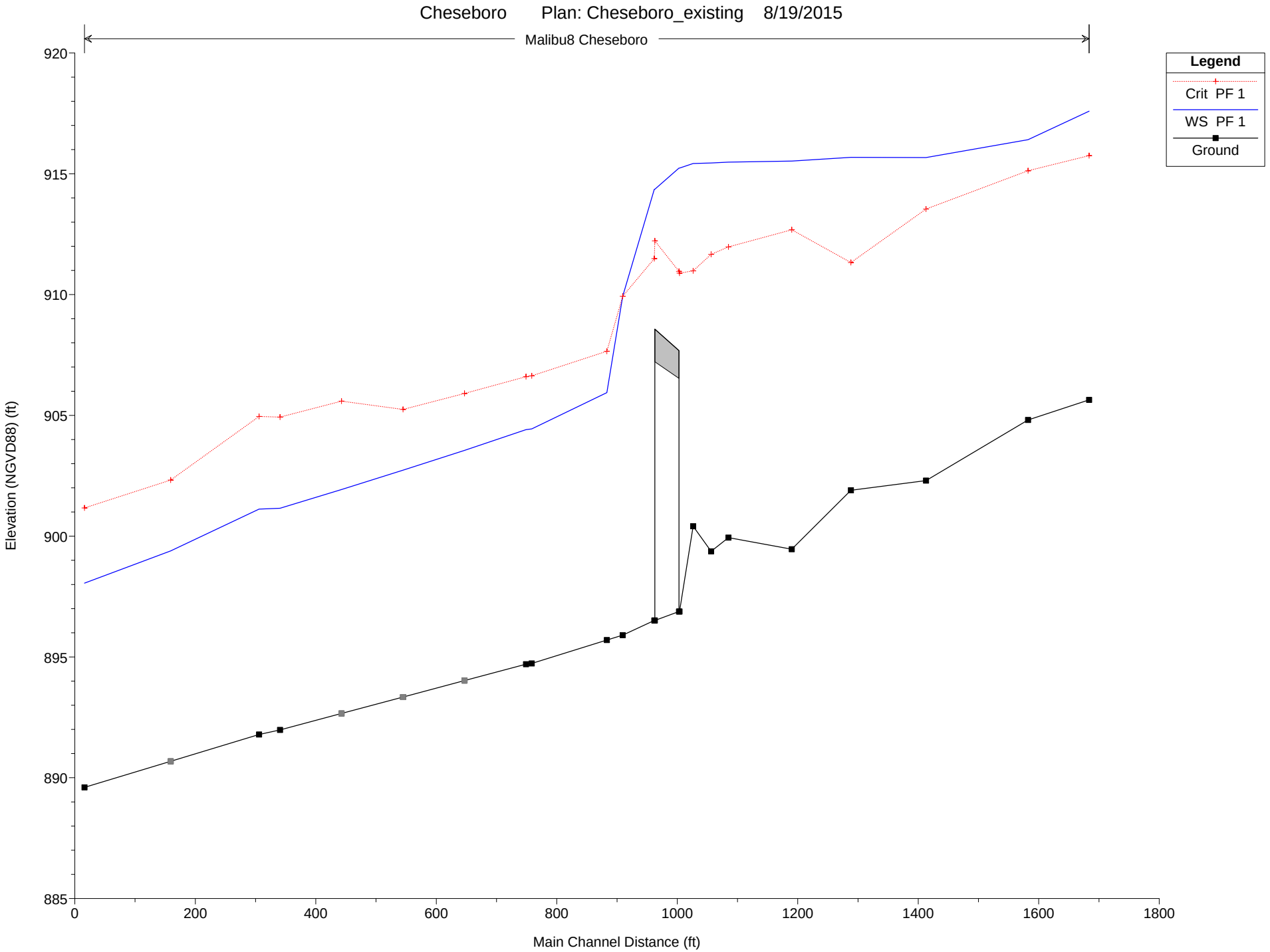

Medea Plan: Medea_existing 8/19/2015
River = Malibu4 Reach = Medea RS = 343
.03
.107
.107
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
1 ft/s
2 ft/s
3 ft/s
4 ft/s
5 ft/s
6 ft/s
7 ft/s
Ground
Bank Sta


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

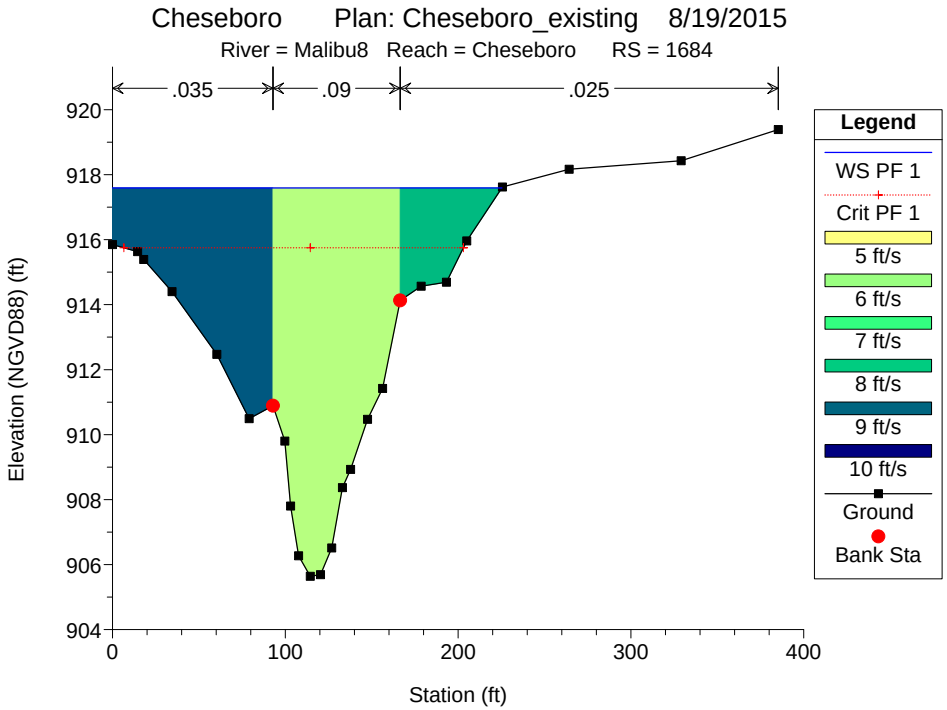
CHESEBORO CREEK MAIN CHANNEL INLET

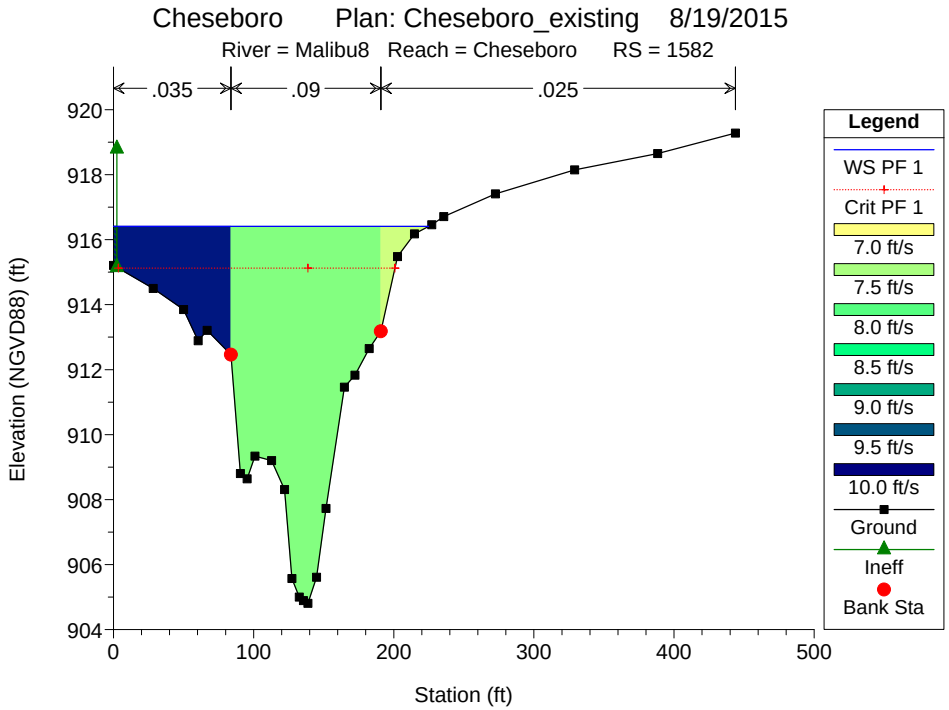

1684
1582
1413
1190
1085
1026
1004
962
758
646.75*
544.5*
442.25*
340
159
16

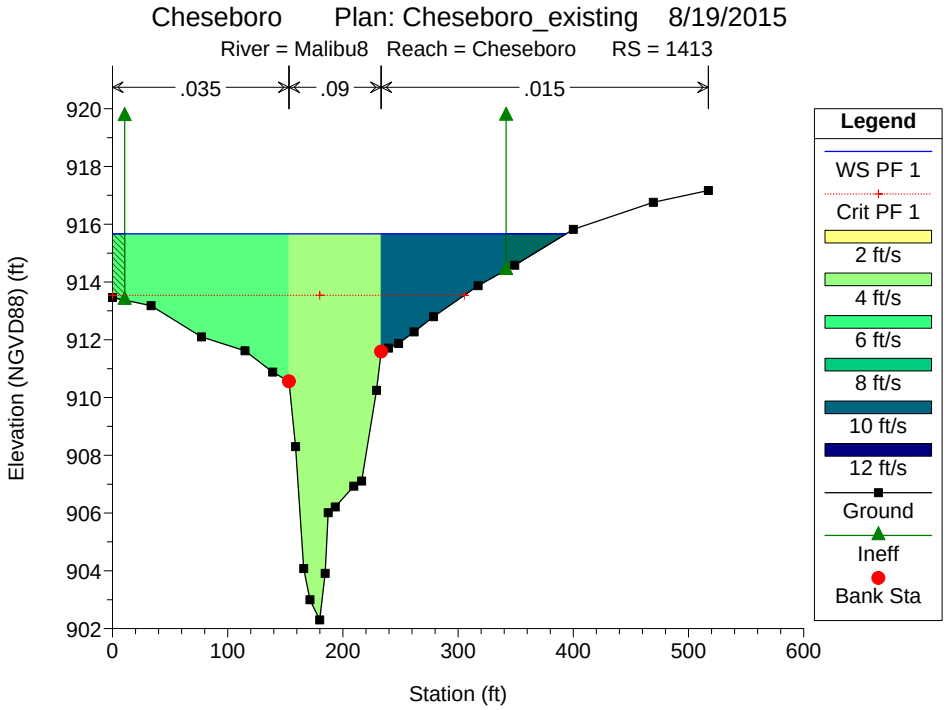

Cheseboro Plan: Cheseboro_existing 8/19/2015
Malibu8 Cheseboro
Legend
Crit PF 1
WS PF 1
Ground
Elevation (NGVD88) (ft)
Main Channel Distance (ft)
920
915
910
905
900
895
890
885
0
200
400
600
800
1000
1200
1400
1600
1800

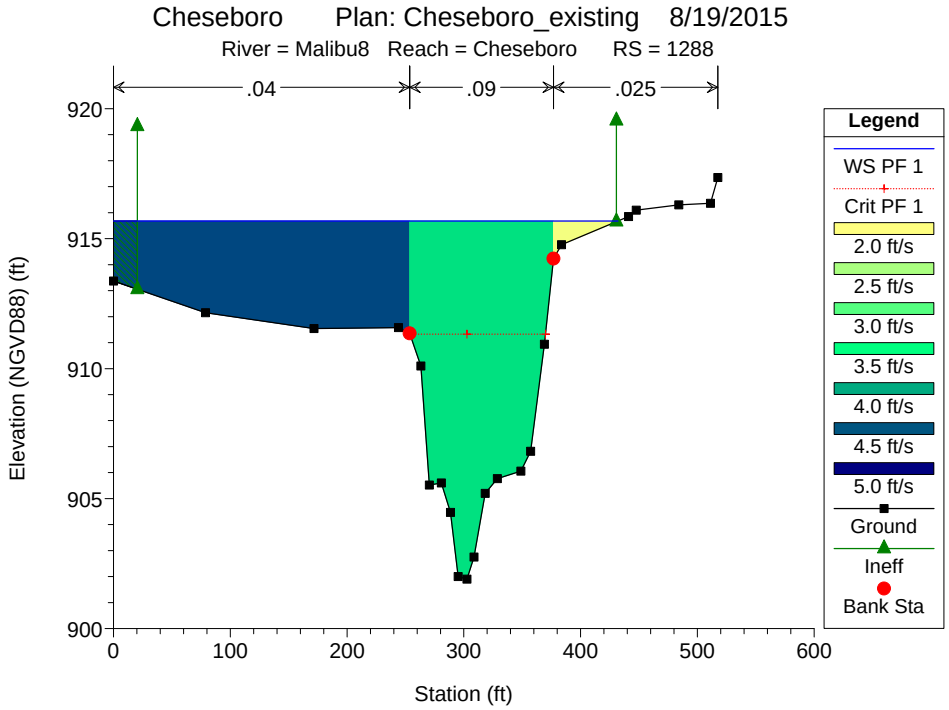
HEC-RAS Plan: Cheseboro_exist River: Malibu8 Reach: Cheseboro Profile: PF 1

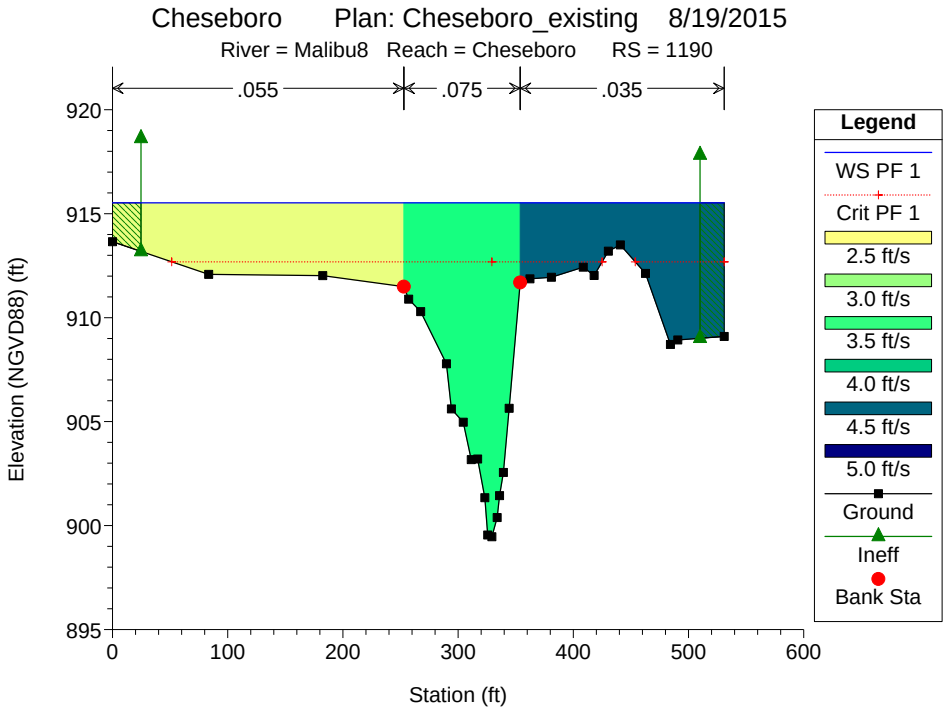
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Cheseboro	1684	PF 1	8310.00	905.64	917.59	915.75	918.51	0.006893	5.71	1163.08	225.34	0.34
Cheseboro	1582	PF 1	8310.00	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

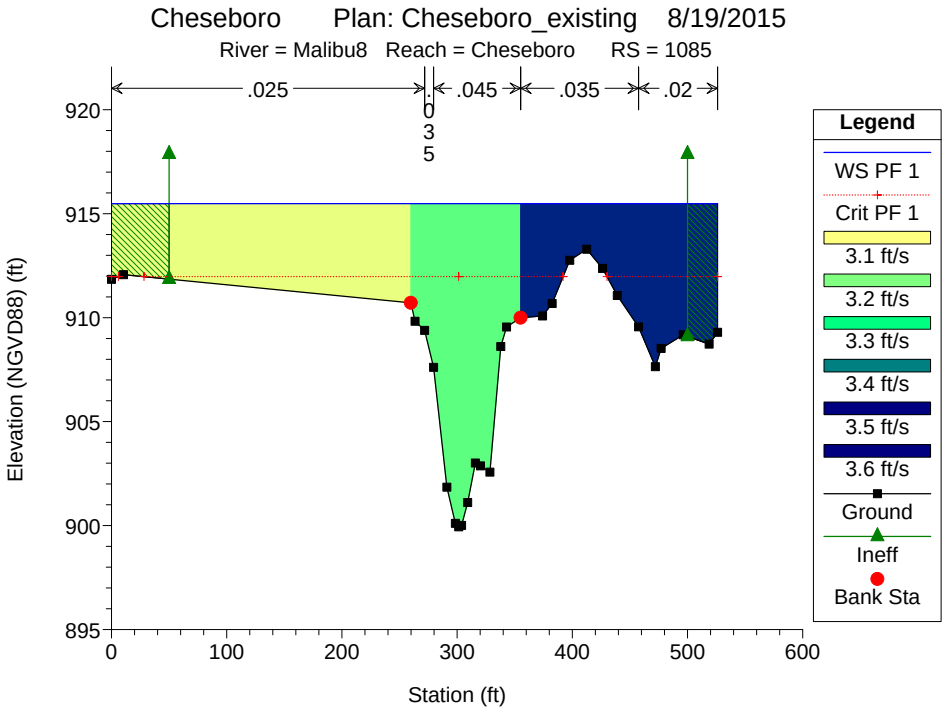

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1684
.035
.09
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Bank Sta

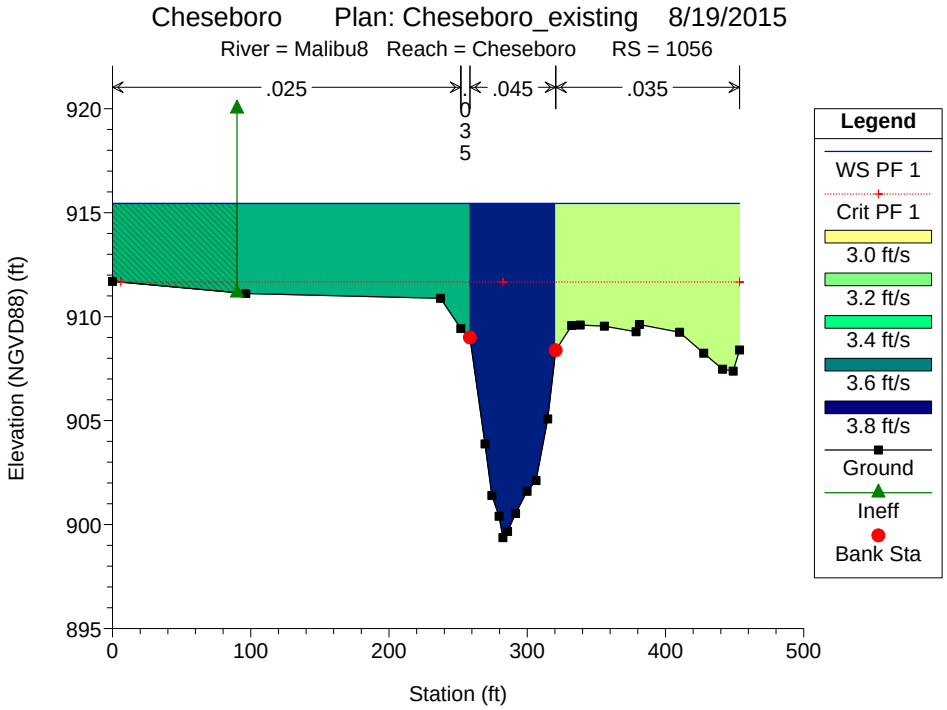

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1582
.035
.09
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
7.0 ft/s
7.5 ft/s
8.0 ft/s
8.5 ft/s
9.0 ft/s
9.5 ft/s
10.0 ft/s
Ground
Ineff
Bank Sta

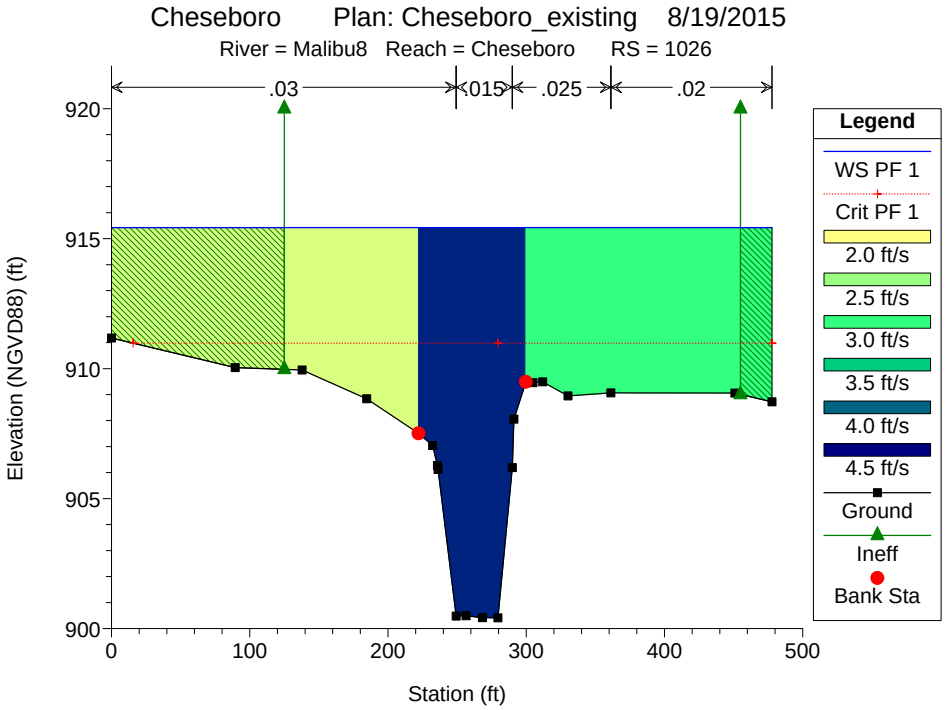

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1413
.035
.09
.015
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2 ft/s
4 ft/s
6 ft/s
8 ft/s
10 ft/s
12 ft/s
Ground
Ineff
Bank Sta

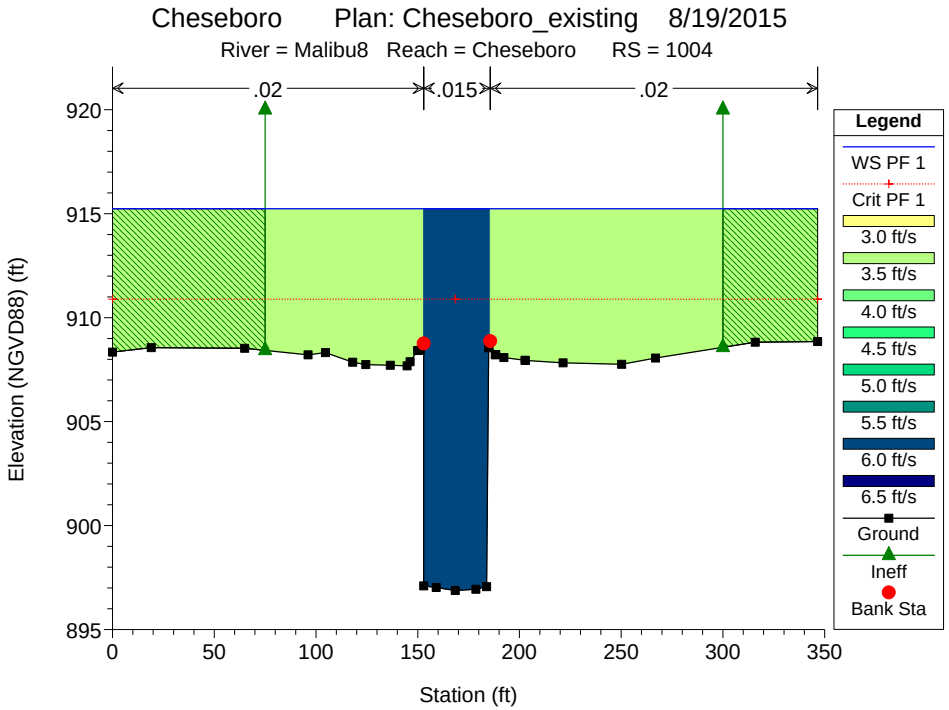

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1288
.04
.09
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
Ground
Ineff
Bank Sta

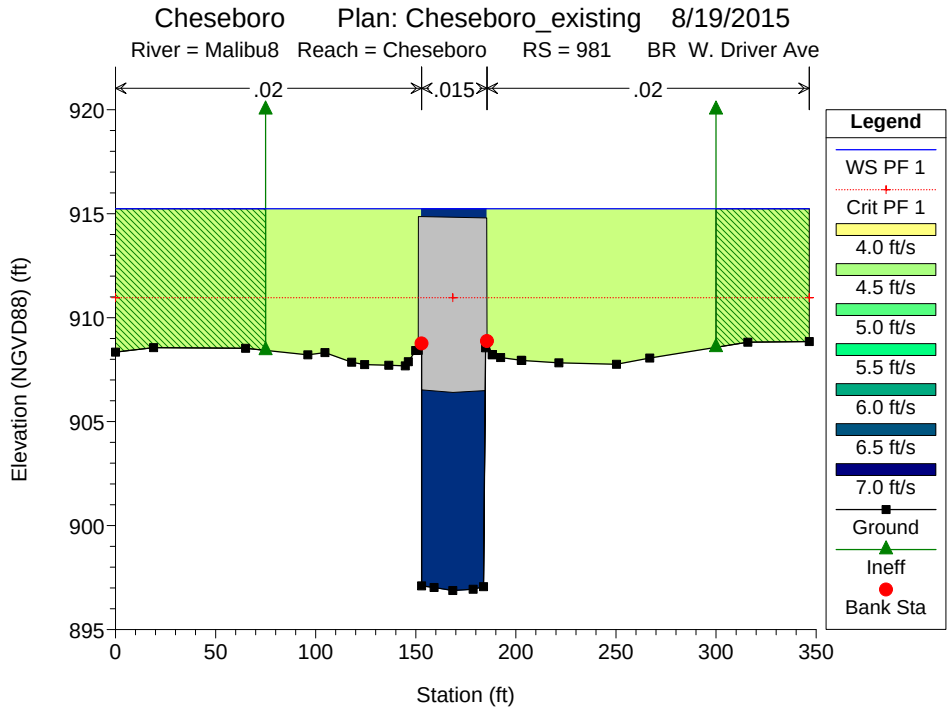

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1190
.055
.075
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2.5 ft/s
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
Ground
Ineff
Bank Sta

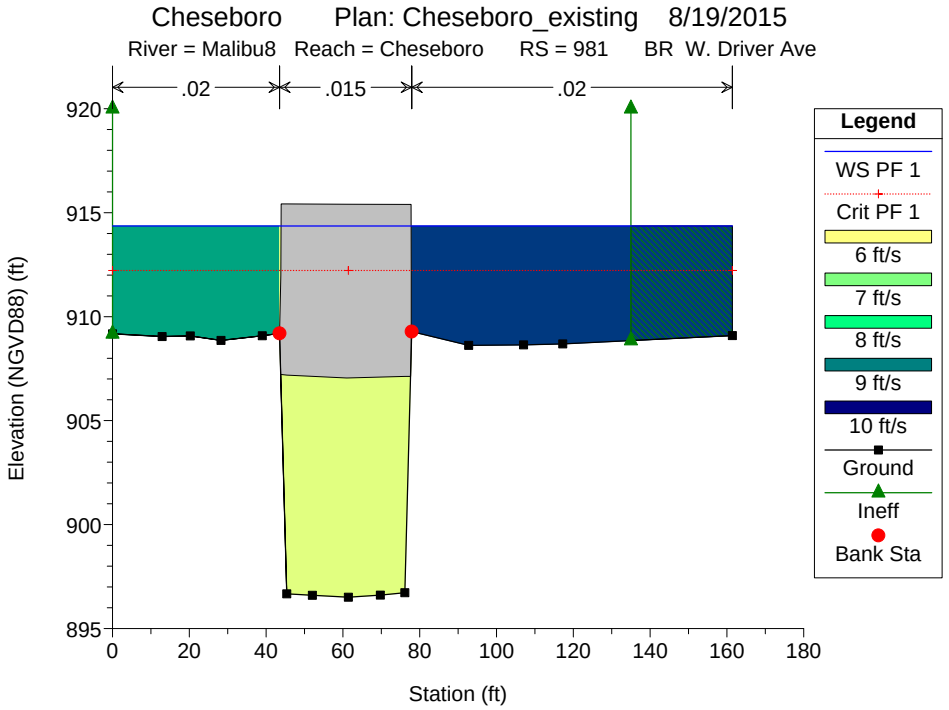

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1085
.025
.045
.035
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
3.1 ft/s
3.2 ft/s
3.3 ft/s
3.4 ft/s
3.5 ft/s
3.6 ft/s
Ground
Ineff
Bank Sta

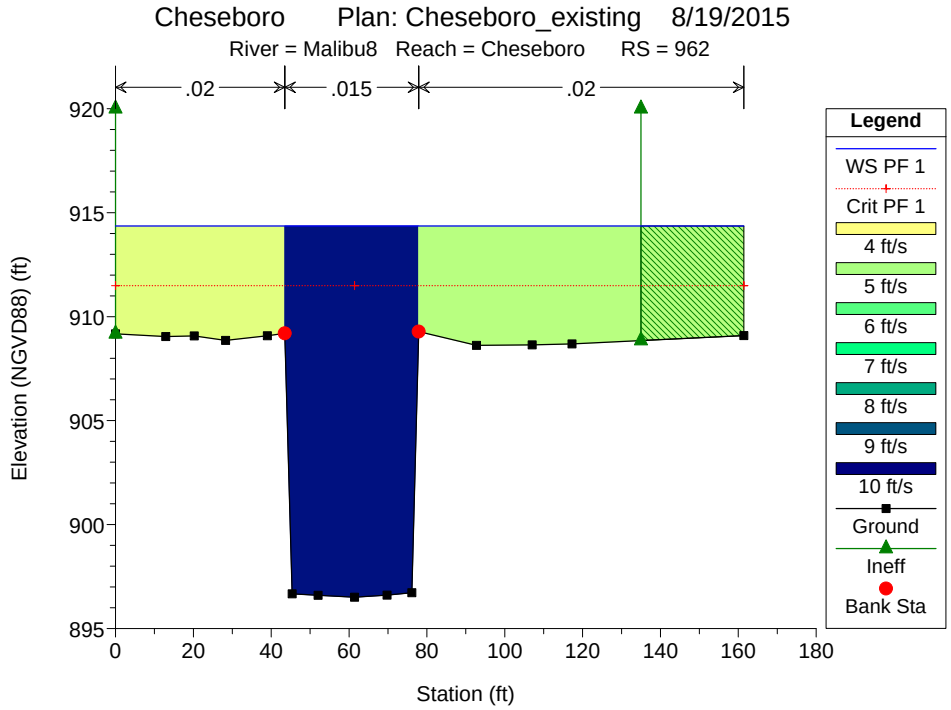

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1056
.025
.045
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
3.0 ft/s
3.2 ft/s
3.4 ft/s
3.6 ft/s
3.8 ft/s
Ground
Ineff
Bank Sta

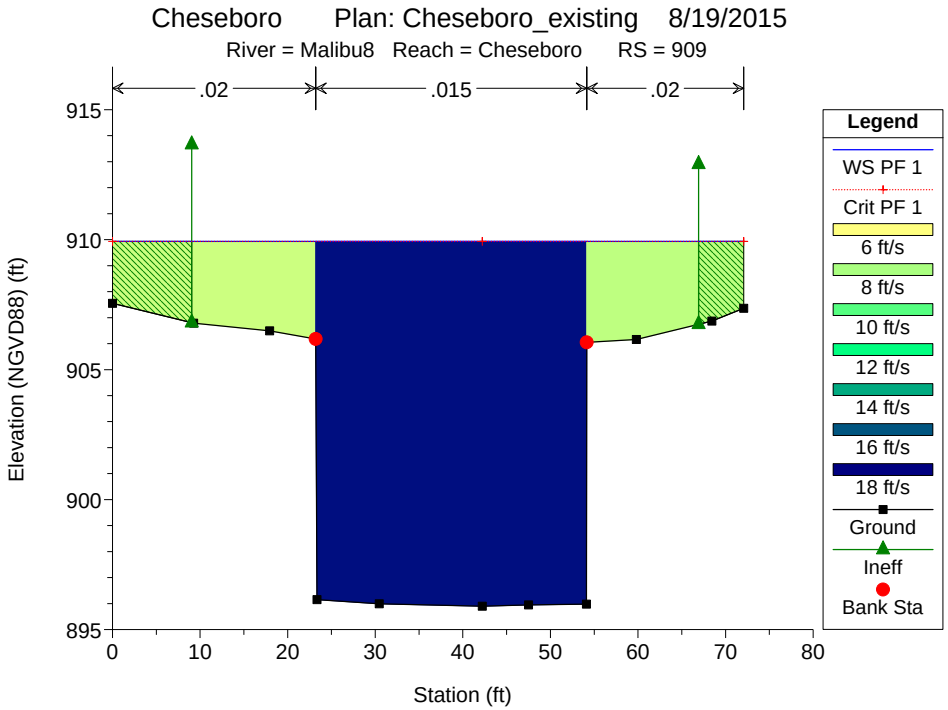

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1026
.03
.025
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
2.0 ft/s
2.5 ft/s
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
Ground
Ineff
Bank Sta

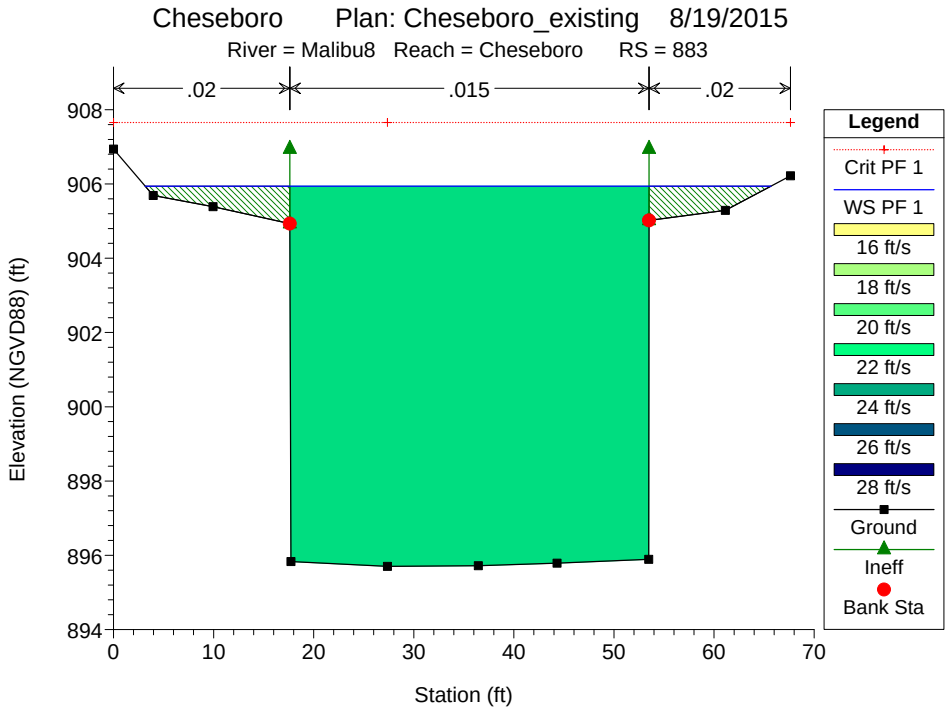

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 1004
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
3.0 ft/s
3.5 ft/s
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
Ground
Ineff
Bank Sta

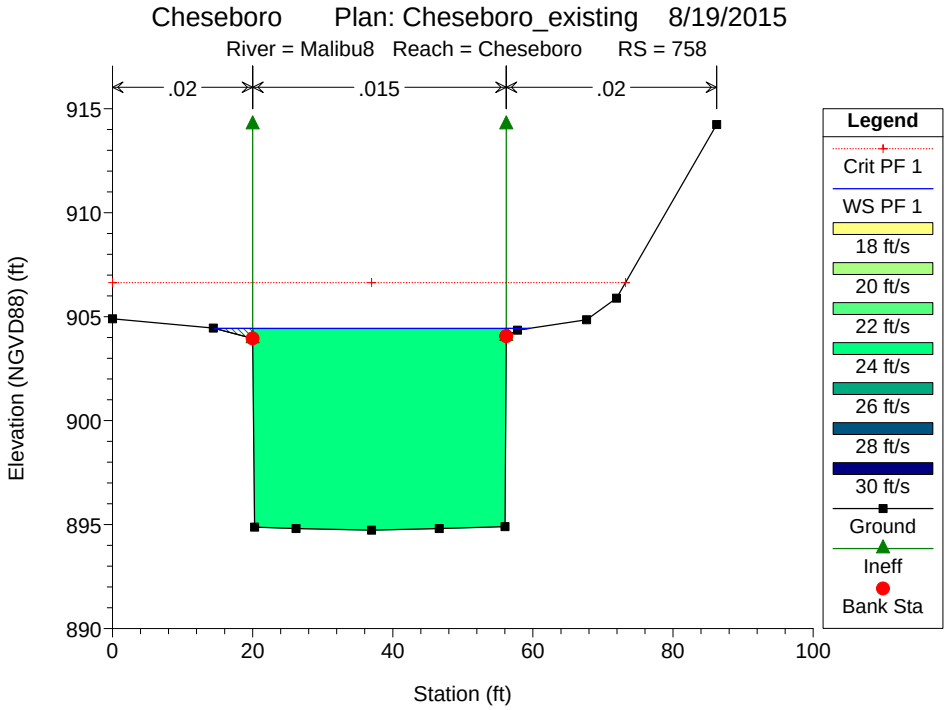

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 981 BR W. Driver Ave
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
7.0 ft/s
Ground
Ineff
Bank Sta

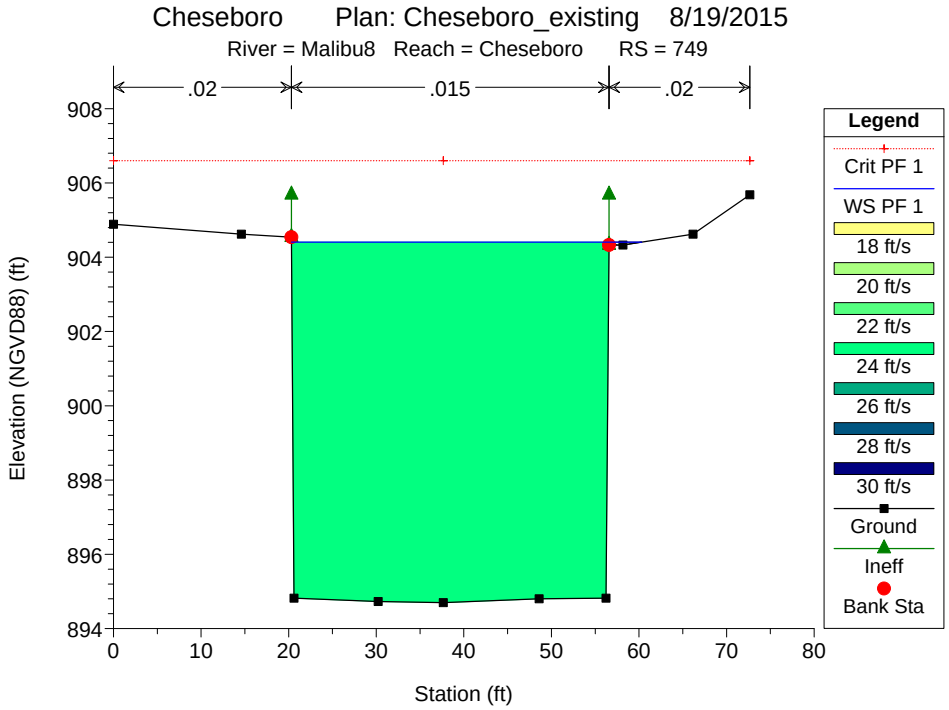

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 981 BR W. Driver Ave
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Ineff
Bank Sta

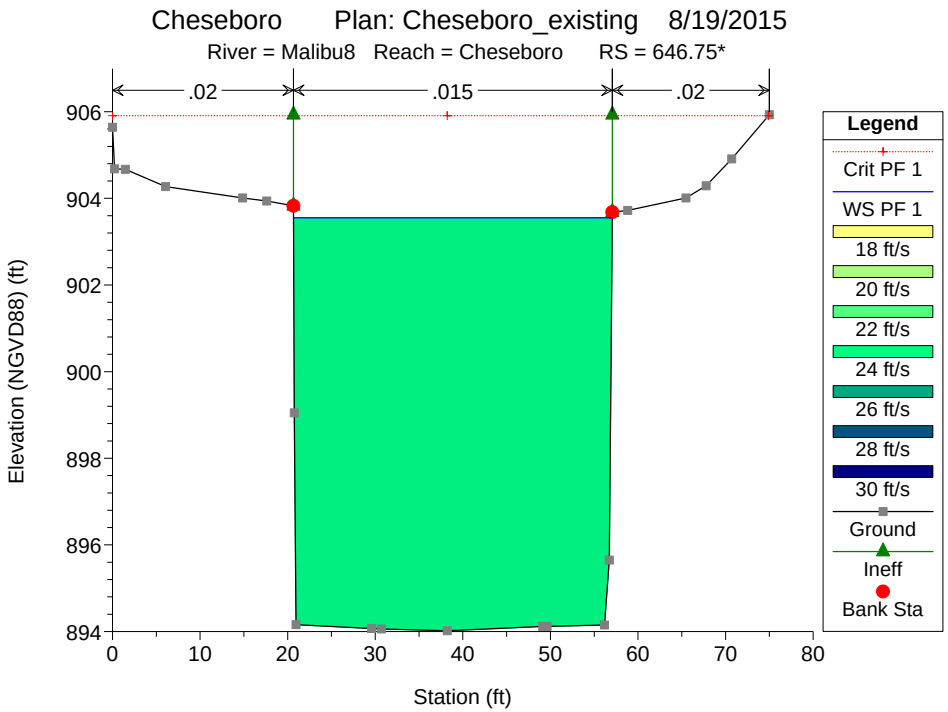

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 962
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4 ft/s
5 ft/s
6 ft/s
7 ft/s
8 ft/s
9 ft/s
10 ft/s
Ground
Ineff
Bank Sta

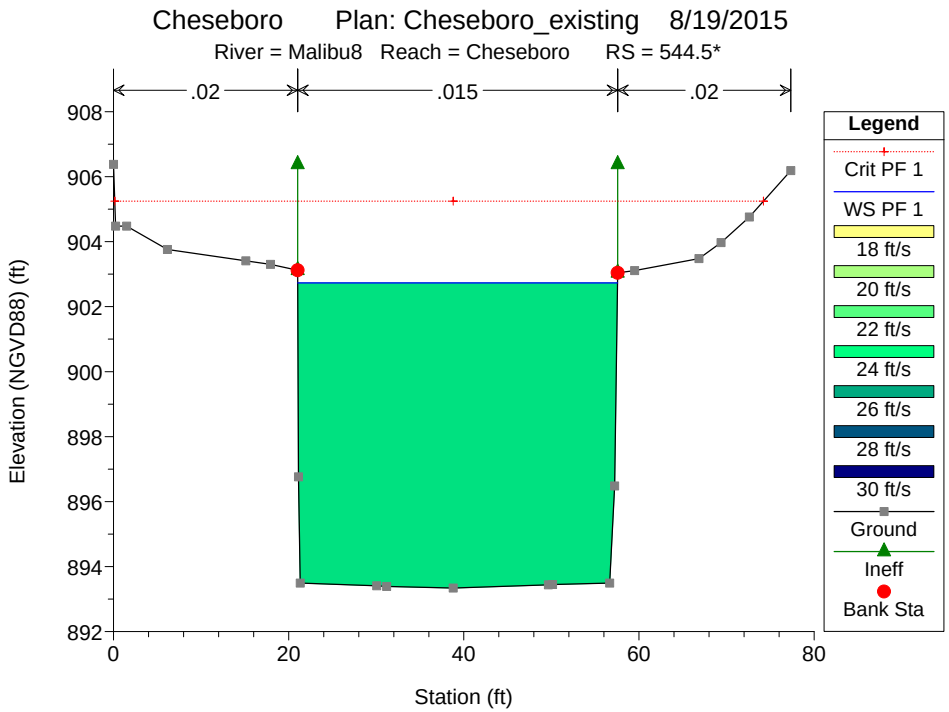

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 909
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
6 ft/s
8 ft/s
10 ft/s
12 ft/s
14 ft/s
16 ft/s
18 ft/s
Ground
Ineff
Bank Sta

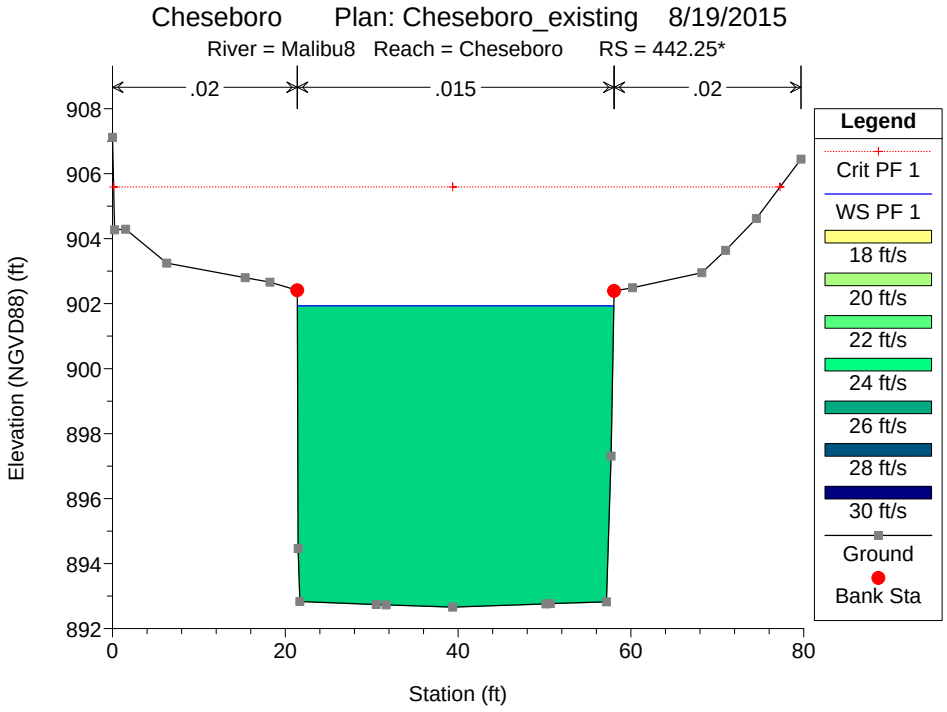

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 883
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
Ground
Ineff
Bank Sta

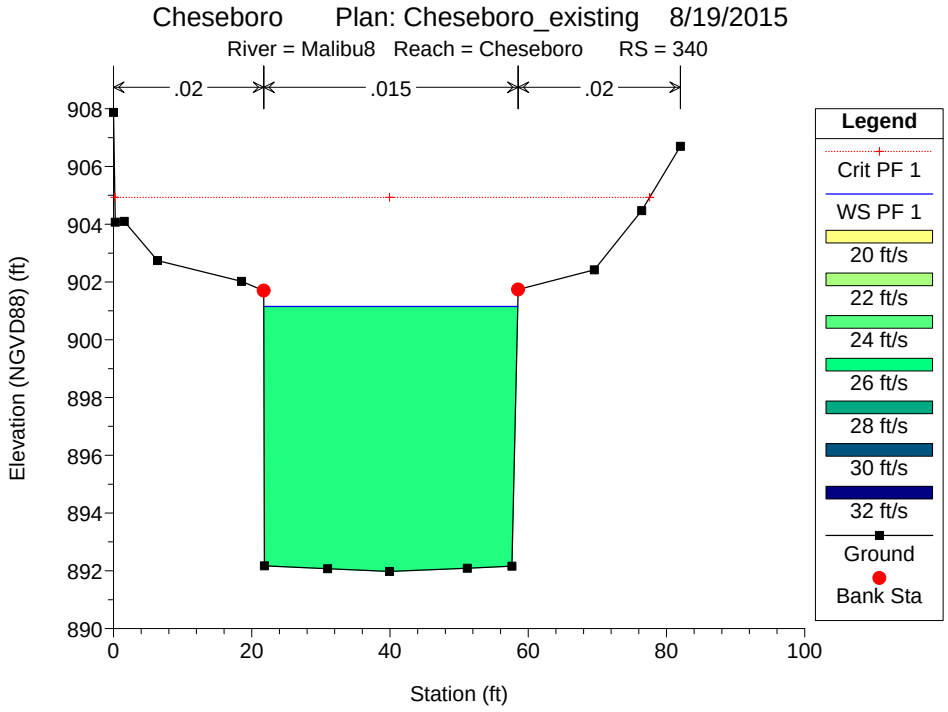

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 758
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Ineff
Bank Sta

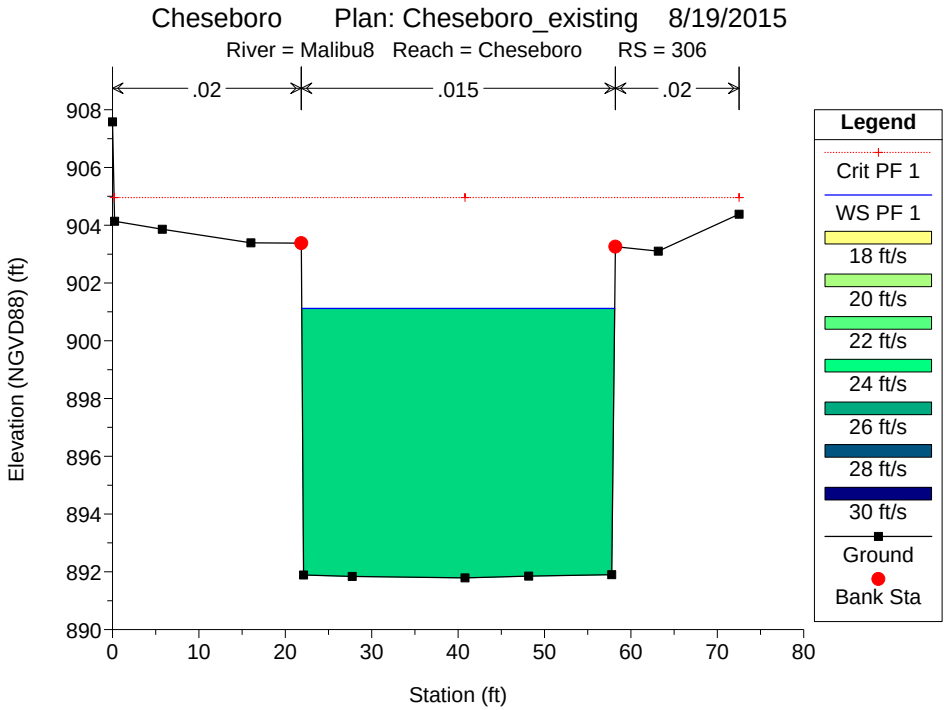

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 749
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Ineff
Bank Sta

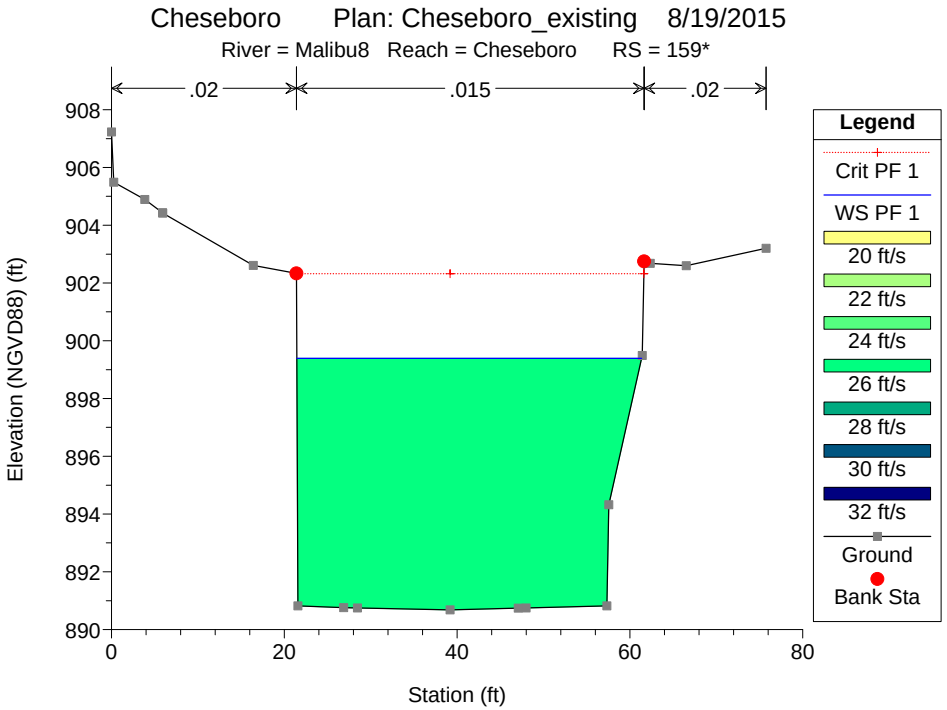

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 646.75*
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Ineff
Bank Sta

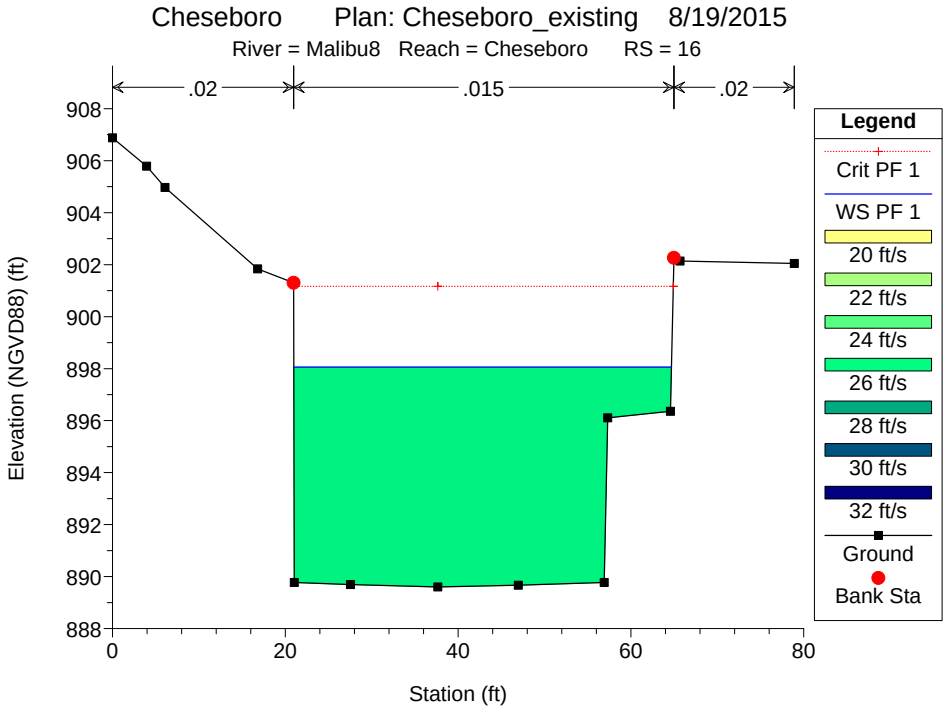

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 544.5*
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Ineff
Bank Sta


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

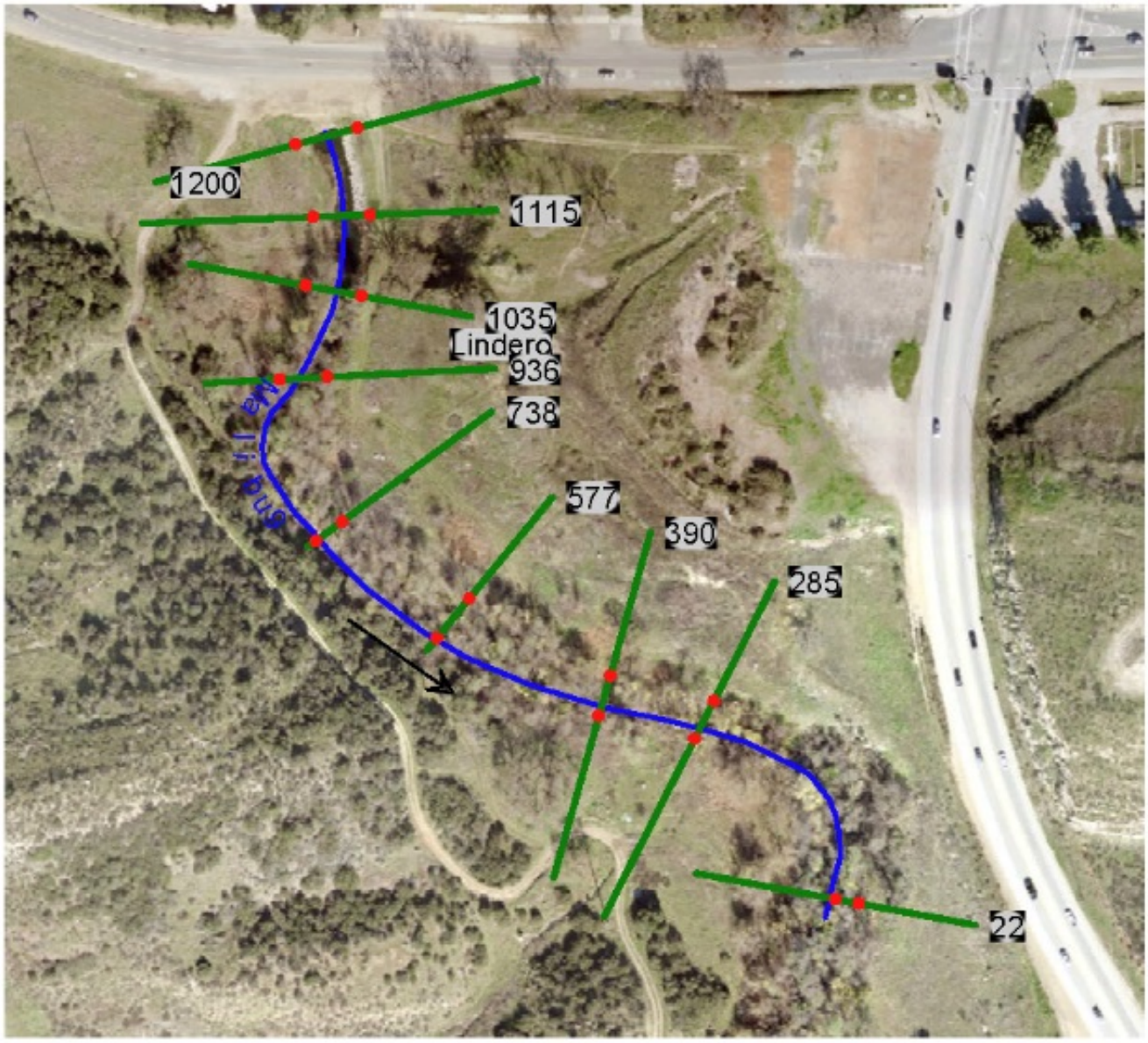

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 340
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
32 ft/s
Ground
Bank Sta

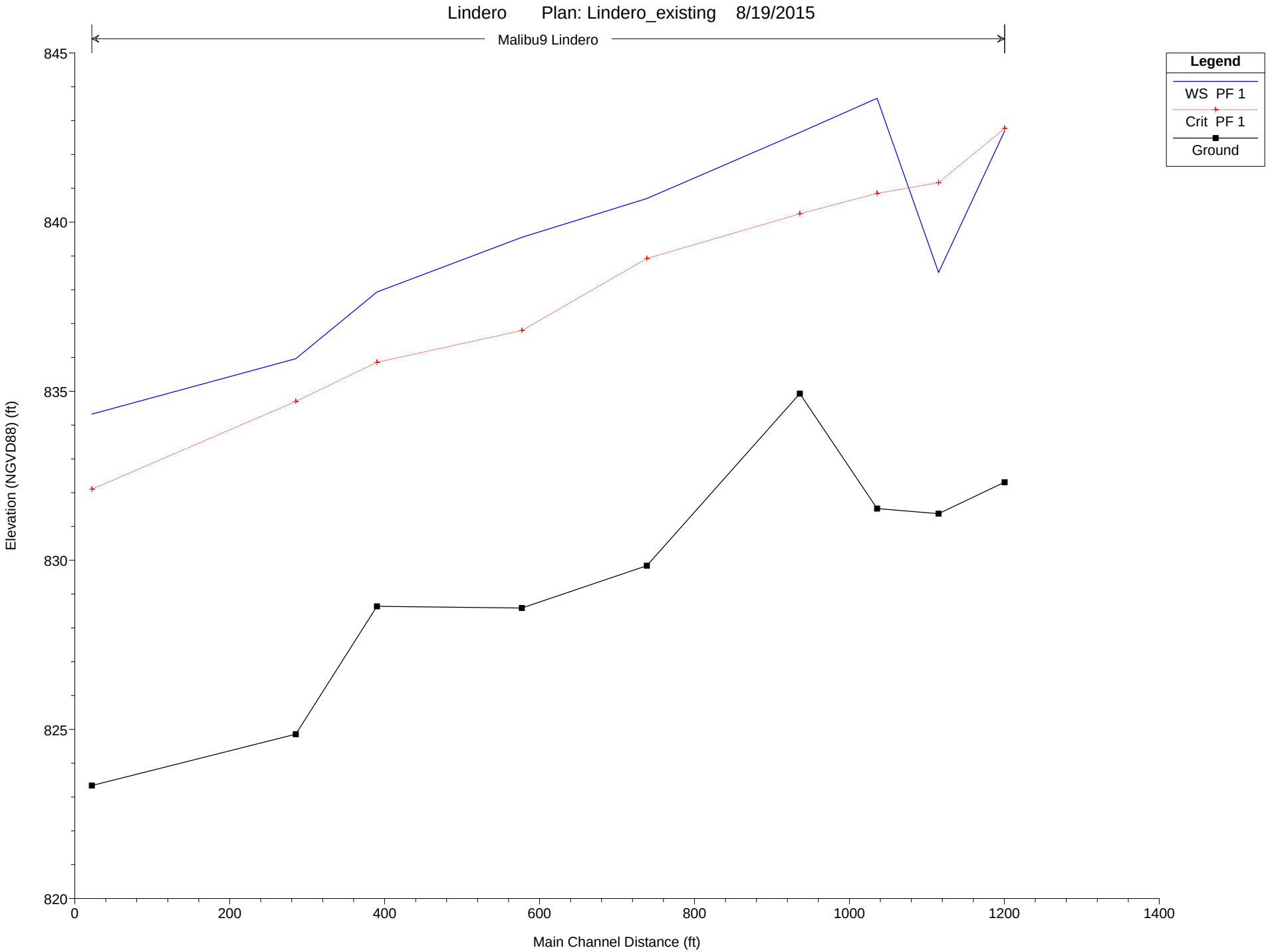

Cheseboro Plan: Cheseboro_existing 8/19/2015
River = Malibu8 Reach = Cheseboro RS = 306
.02
.015
.02
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
30 ft/s
Ground
Bank Sta


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

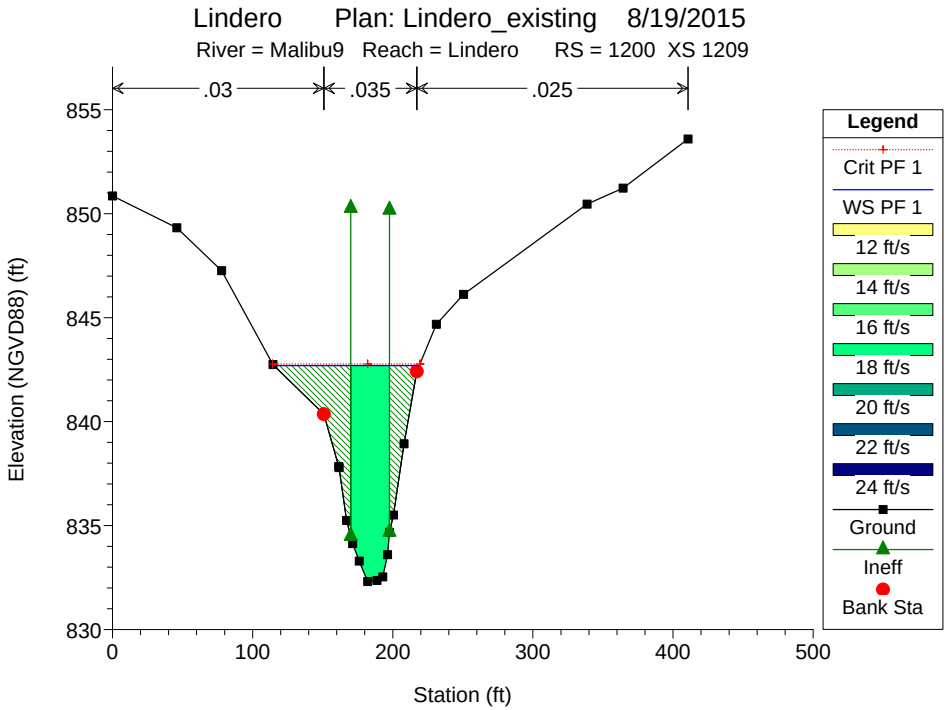
LINDERO CREEK MAIN CHANNEL OUTLET

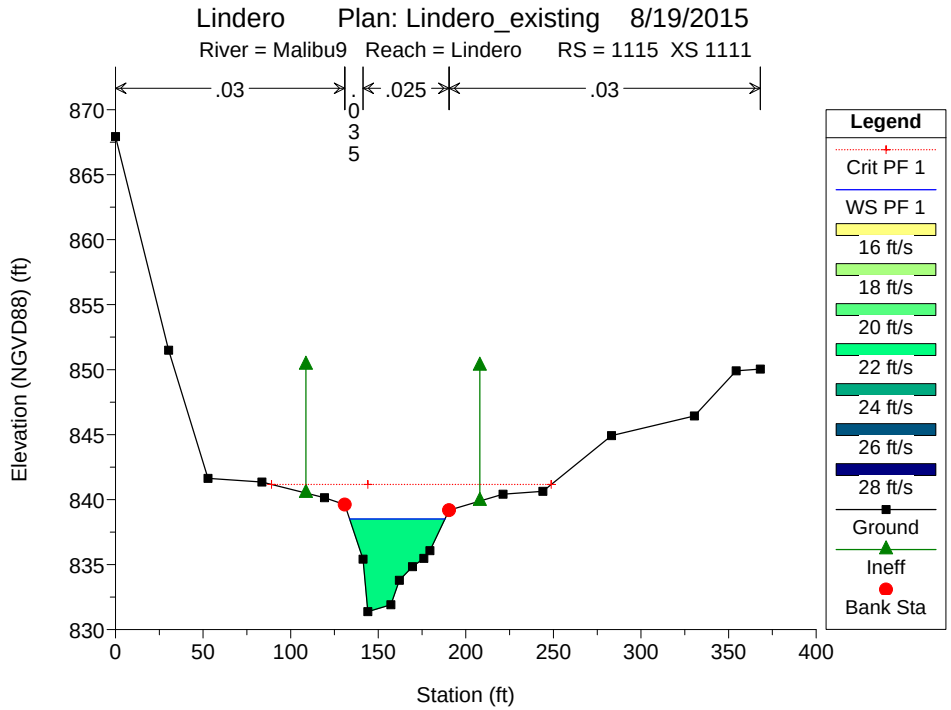

1200
1115
1035
Lindero
936
738
577
390
285
22
Main

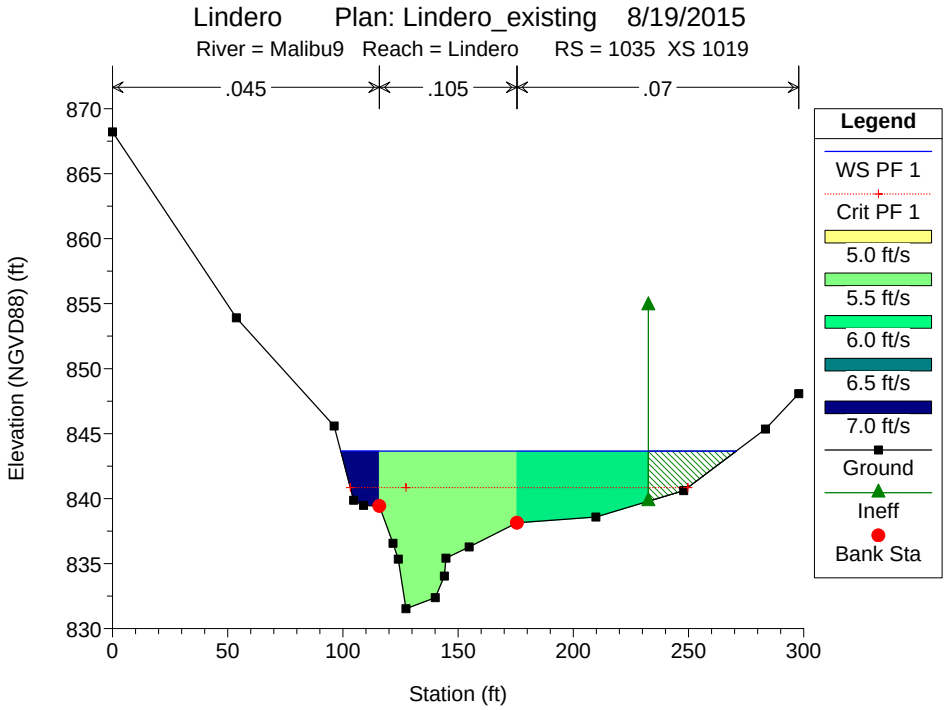

Lindero Plan: Lindero_existing 8/19/2015
Malibu9 Lindero
Legend
WS PF 1
Crit PF 1
Ground
Elevation (NGVD88) (ft)
845
840
835
830
825
820
0
200
400
600
800
1000
1200
1400
Main Channel Distance (ft)

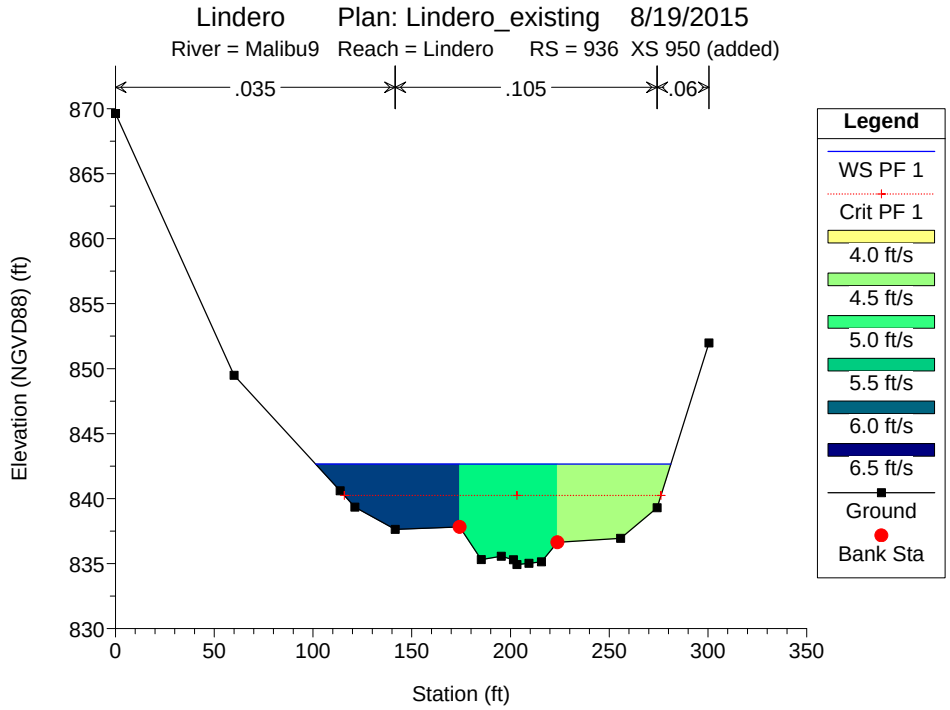
HEC-RAS Plan: Lindero_exist River: Malibu9 Reach: Lindero Profile: PF 1

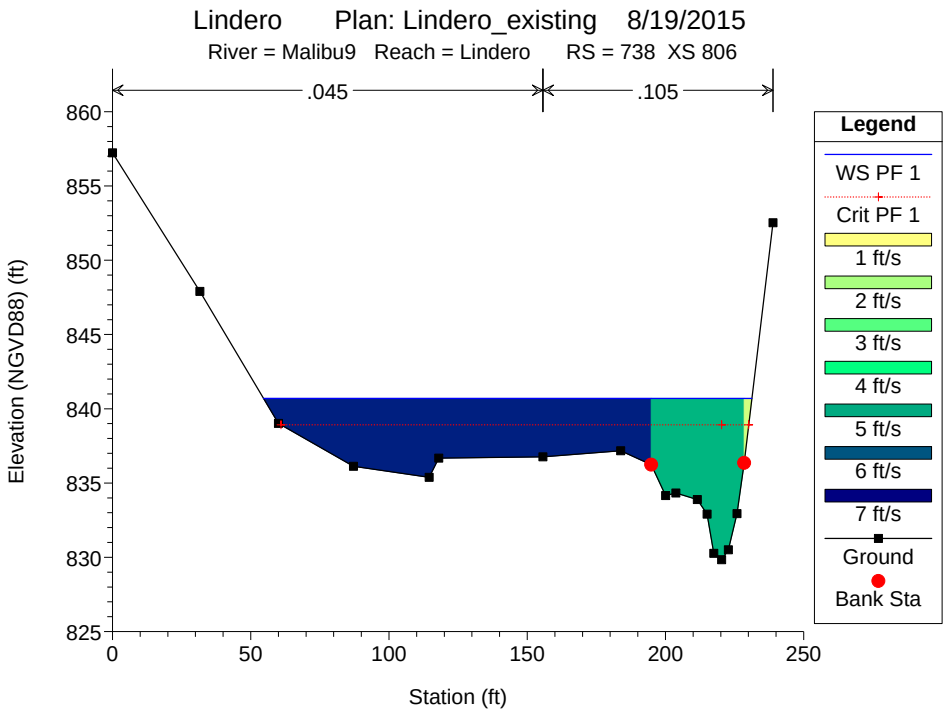
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Lindero	1200	PF 1	4810.00	832.31	842.70	842.77	847.66	0.008850	17.88	269.05	103.81	1.01
Lindero	1115	PF 1	4810.00	831.38	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

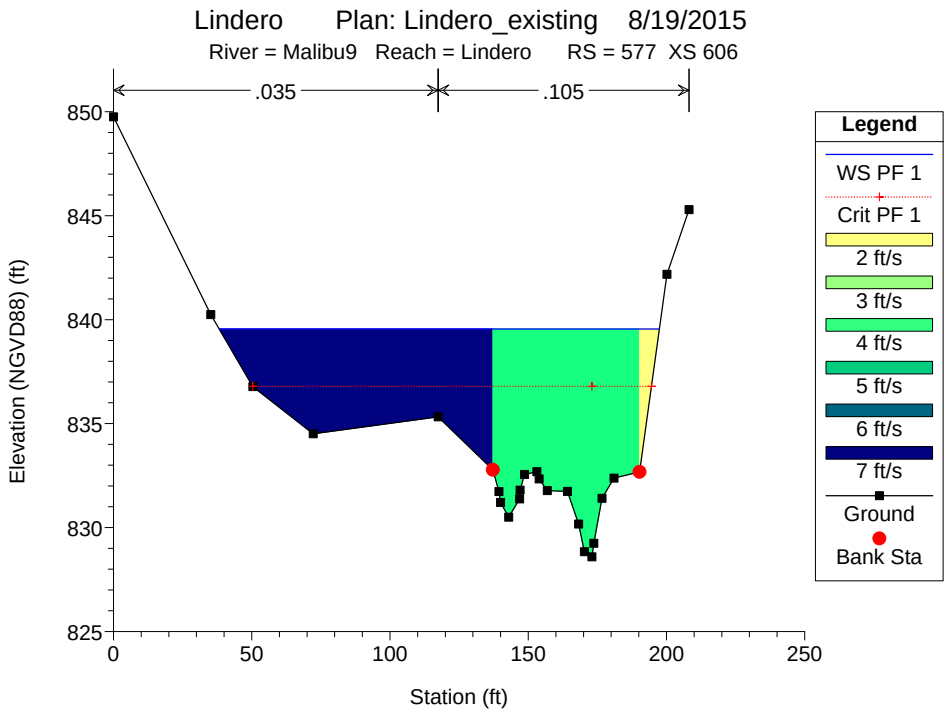

Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 1200 XS 1209
.03
.035
.025
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
12 ft/s
14 ft/s
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
Ground
Ineff
Bank Sta

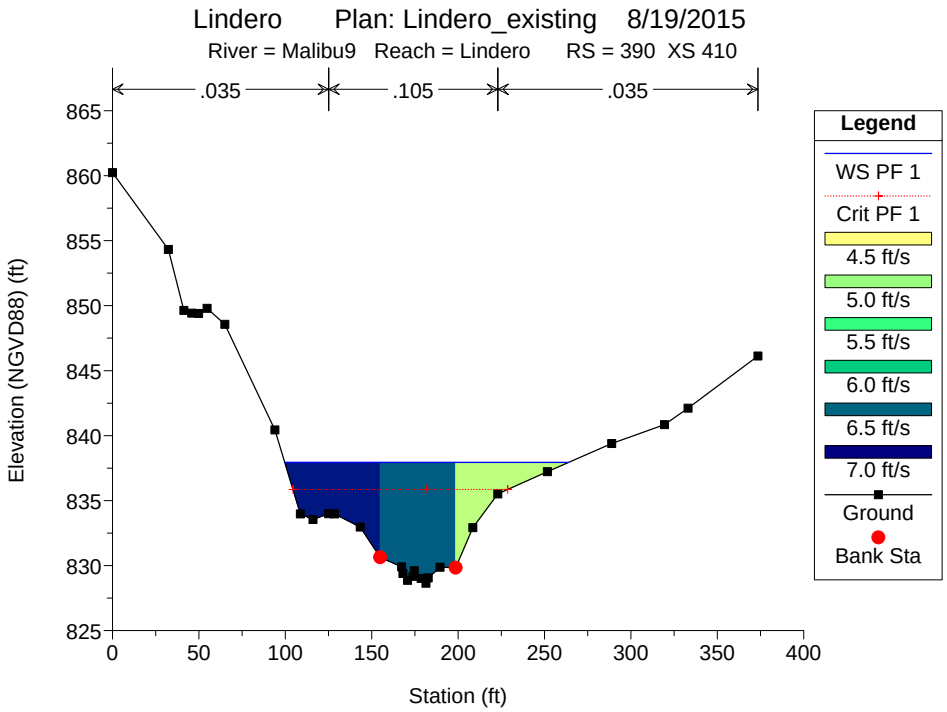

Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 1115 XS 1111
.03
.025
.03
Elevation (NGVD88) (ft)
Station (ft)
Legend
Crit PF 1
WS PF 1
16 ft/s
18 ft/s
20 ft/s
22 ft/s
24 ft/s
26 ft/s
28 ft/s
Ground
Ineff
Bank Sta

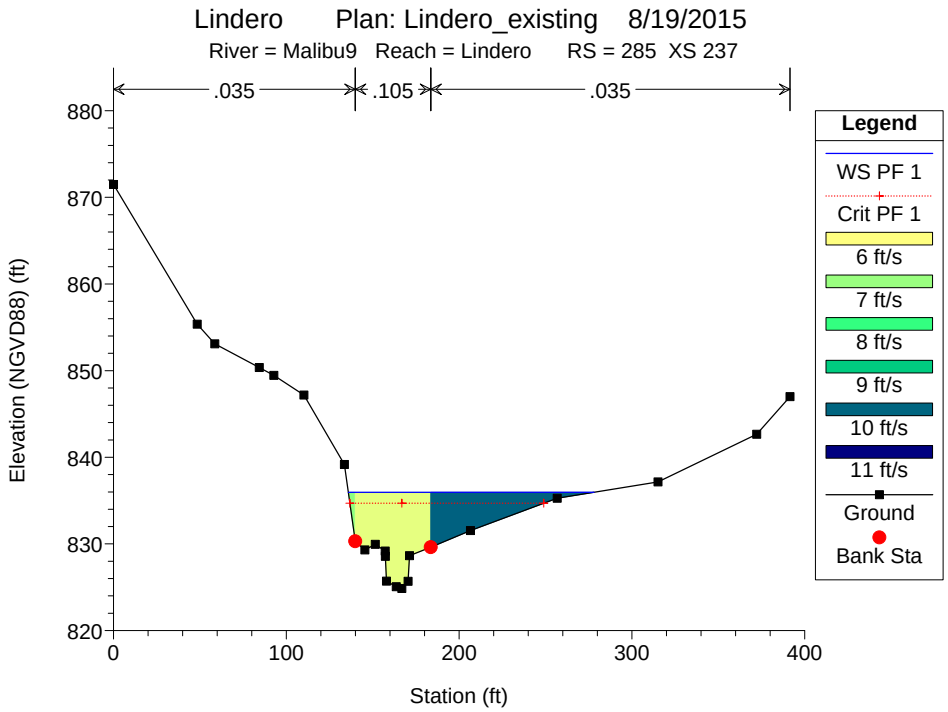

Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 1035 XS 1019
.045
.105
.07
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
7.0 ft/s
Ground
Ineff
Bank Sta

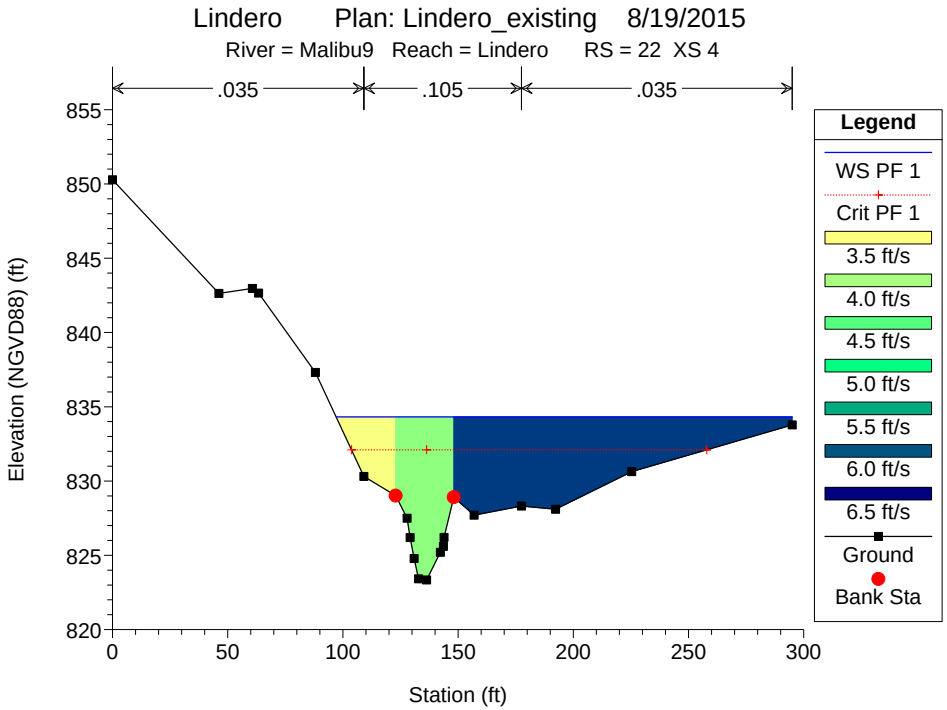

Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 936 XS 950 (added)
.035
.105
.06
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
4.0 ft/s
4.5 ft/s
5.0 ft/s
5.5 ft/s
6.0 ft/s
6.5 ft/s
Ground
Bank Sta


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


Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 577 XS 606
.035
.105
Elevation (NGVD88) (ft)
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


Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 390 XS 410
.035
.105
.035
Elevation (NGVD88) (ft)
Station (ft)
Legend
WS PF 1
Crit PF 1
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
Bank Sta


Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 285 XS 237
.035
.105
.035
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
11 ft/s
Ground
Bank Sta


Lindero Plan: Lindero_existing 8/19/2015
River = Malibu9 Reach = Lindero RS = 22 XS 4
.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