Appendix T6: Hydrology

Location Hydraulic Study

Bob Jones City to Sea Bicycle/Pedestrian Pathway Project

San Luis Obispo Creek

County of San Luis Obispo, California

Prepared for

County of San Luis Obispo Parks Department

By

Questa Engineering Corporation

January 12, 2009

LOCATION HYDRAULIC STUDY
BOB JONES CITY TO SEA BICYCLE/PEDESTRIAN PATHWAY PROJECT
SAN LUIS OBISPO CREEK
COUNTY OF SAN LUIS OBISPO, CALIFORNIA

Prepared for:

Jan Di Leo, Parks Planner
San Luis Obispo County
Department of General Services
1087 Santa Rosa Street
San Luis Obispo, CA 93408

Prepared by:

Questa Engineering Corporation
1220 Brickyard Cove Road, Suite 206
Point Richmond, California 94801
Tel: (510) 236-6114
Fax: (510) 236-2423
www.questaec.com

January 12, 2009

Questa Project No. 250083

Signature	1-12-2009 Date
Jeffrey H. Peters Name	Principal Title
Signature	1-12-2009 Date
Sydney A. Temple, P.E. Name	Principal/Project Engineer Title

CERTIFICATION

This document was prepared under the direction and supervision of a qualified Professional Engineer.

TABLE OF CONTENTS

EXECUTIVE SUMMARY 1
PROPOSED ACTION DESCRIPTION 3
SOUTH HIGUERA STREET BICYCLE/PEDESTRIAN BRIDGE 3
BUNNELL BICYCLE/PEDESTRIAN BRIDGE 3
SAN LUIS BAY DRIVE BICYCLE/PEDESTRIAN BRIDGE 4
HIGHWAY 101 BICYCLE/PEDESTRIAN OVERCROSSING 4
HYDROLOGY & HYDRAULICS 5
EXISTING FLOODPLAIN 5
HYDROLOGY INFORMATION 5
HYDRAULIC ANALYSIS 6
SOUTH HIGUERA STREET BICYCLE/PEDESTRIAN BRIDGE 8
BUNNELL BICYCLE/PEDESTRIAN BRIDGE 10
SAN LUIS BAY DRIVE BICYCLE/PEDESTRIAN BRIDGE 11
HIGHWAY 101 OVERCROSSING 13
LONGITUDINAL FLOODPLAIN ENCROACHMENT OF PATHWAY 14
FLOOD RISK AND FLOOD DAMAGE 15
CONCLUSIONS 15

FIGURES

Figure 1a FEMA Flood Insurance Rate Map
Figure 1b San Luis Obispo 100-Year Floodplain
Figure 2 Existing and Proposed Conditions Flow Profiles
Figure 2a Existing and Proposed Conditions Flow Profiles at Higuera Street Bicycle/Pedestrian Bridge
Figure 2b Existing and Proposed Conditions Flow Profiles at Bunnell Bicycle/Pedestrian Bridge
Figure 2c Existing and Proposed Conditions Flow Profiles at San Luis Bay Drive Bicycle/Pedestrian Bridge
Figure 2d Existing and Proposed Conditions Flow Profiles at Highway 101 Bicycle/Pedestrian Overcrossing

APPENDIX A: Preliminary Trail Plan Sheets 1 through 9 and Bridge Plan Sheets 1 through 5

APPENDIX B: Hydraulic Analysis

APPENDIX C: Location Hydraulic Study Requirements Questionnaire and Forms

EXECUTIVE SUMMARY

The Bob Jones City to Sea Bicycle/Pedestrian Pathway Project is located in San Luis Obispo (SLO) County, just south of the City of SLO, and proposes to construct approximately 4.5 miles of predominantly Class I bicycle and pedestrian pathway between the Octagon Barn near the southern SLO City limits, and the existing Ontario Road staging area. The proposed pathway roughly parallels Highway 101 and SLO Creek, and in many areas is within 100 feet of the creek. The pathway itself would be 12 feet wide and located at or slightly above adjacent grade. The pathway would consist of 8 feet of asphalt concrete (ac) paving, with two 2-foot-wide gravel shoulders. In most areas, the 12-foot-wide, paved pathway would be elevated at most 6 inches above adjacent grade with a 2% cross slope.

The project would include bicycle/pedestrian bridge crossings of SLO Creek in three (3) locations and a Highway 101 bicycle/pedestrian overcrossing. The bridges and portions of their approach ramps would consist of pre-fabricated steel truss structures, designed to support light (e.g., pickup truck) maintenance vehicles. The bridges would be located: (1) near the existing South Higuera crossing of SLO Creek, 2) on the Bunnell property, southeast of the Clover Ridge Avenue on-/off-ramp, and 3) just south of the existing San Luis Bay Drive crossing of SLO Creek. The Highway 101 overcrossing would be located at the Ontario Road staging area, just south of San Luis Bay Drive.

Existing and proposed conditions focused on the proposed pedestrian bridges were modeled using HEC-RAS, a one-dimensional hydraulic model capable of calculating water surface elevations and flood profiles for steady, gradually varied flow. Although the less than 0.5-foot-high (maximum) trail section represents a longitudinal encroachment in the floodplain, sensitivity testing of a slightly elevated cross section using the HEC-RAS model in several locations had no discernible effect on the hydraulic model's predicted floodwater surface elevations. Under existing conditions, flooding over the tops of banks occurs along much of SLO Creek at flows greater than or equal to the 10-year event. The 1985 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) indicates that nearly all of San Luis Bay Drive from the Highway 101 off-ramp to Monte Road, portions of Highway 101 immediately upstream and downstream of the Clover Ridge on-/off-ramp, and virtually all of South Higuera Street are within the 100-year floodplain. No regulatory floodway has been designated along SLO Creek. Because of their location within the 100-year floodplain, all of the three proposed bicycle/pedestrian crossings of SLO Creek are elevated on piers spanning the creek from 5 to 10 feet above the adjacent floodplain elevation. Long, elevated approach ramps would be used to access the bridges. The clear-span bridges are elevated a minimum of 1 foot above the predicted 100-year flood water-surface elevation. The ramps transition from floodplain elevation to bridge elevation at a 5% grade, and as such, the lower portions of the ramps are located below the calculated 100-year flood water-surface elevation.

Existing conditions and proposed conditions (including the project's elevated clear-span bridges and approach ramps) were modeled using an updated HEC-RAS model originally prepared for the County as part of the SLO Creek Waterway Management Plan (SLO WMP) by Questa Engineering Corporation in 2003. Both of the SLO WMP hydrology and hydraulic models were peer reviewed and found to be satisfactory for use by the Los Angeles District Office of the US Army Corps of Engineers. New field-surveyed cross sections were added to this model at the proposed bridge locations, and the bridge and ramp structures were represented in the model under proposed project conditions. Under proposed conditions, water-surface elevations rose from as little as 0.01 feet at Higuera Bridge to as much as 0.07 feet at San Luis Bay Drive Bridge (SLO County uses a 0.1-foot flood elevation rise as the standard for determining significance). Water-surface elevations at the proposed Highway 101 overcrossing did not change.

The proposed Bob Jones City to Sea Bicycle/Pedestrian Pathway Project was determined to have a minimal longitudinal encroachment on the floodplain, with no significant impacts on the flood-carrying capacity of SLO Creek. No significant impacts on local flooding due to construction of the proposed bicycle/pedestrian bridges are predicted. Placement of rock slope protection on the banks under the proposed bridge structures, and in a zone from 50 to 75 feet upstream and downstream of the bridges, was determined in the project's Natural Environment Study (NES) to have an impact on jurisdictional wetlands and Waters of the United States, as well as on the habitat of two federally listed threatened species, California red-legged frog and South-Central California Coast Steelhead. The NES includes recommendations on avoiding and minimizing temporary impacts during construction, as well as recommendations for streamside habitat enhancement for mitigating permanent impacts.

PROPOSED ACTION DESCRIPTION

The Bob Jones City to Sea Bicycle/Pedestrian Pathway Project is located in San Luis Obispo (SLO) County, just south of the City of SLO, and proposes to construct approximately 4.5 miles of predominantly Class I bicycle and pedestrian pathway between the Octagon Barn near the southern SLO City limits, and the existing Ontario Road staging area. The proposed pathway roughly parallels Highway 101 and SLO Creek, and in many areas is within 100 feet of the creek. The pathway itself would be 12 feet wide and located at or slightly above adjacent grade. The pathway would consist of 8 feet of asphalt concrete (ac) paving, with two 2-foot-wide gravel shoulders. In most areas, the pathway would be elevated at most 6 inches above adjacent grade with a 2% cross slope. The project would include bicycle/pedestrian bridge crossings of SLO Creek in three (3) locations and a Highway 101 bicycle/pedestrian overcrossing (see **Preliminary Plan Sheets 1** through **9** and **Bridge Plan Sheets 1** through **5** in **Appendix A**). The project would also include placing willow-planted rock riprap from the scour line up to the 10-year flood elevation (from toe to top of bank in all three instances at the proposed bridge locations), approximately 50 to 75 feet upstream and downstream of each proposed bridge location. In order to compensate for the slightly increased friction caused by the willow-planted rock riprap, vegetative thinning of the dense willows would be conducted in proximity to the proposed bridges.

Following are general descriptions of the proposed bridges, focused primarily on the elements of each structure that could potentially impact water-surface elevations and represent encroachments within the SLO Creek floodplain.

South Higuera Street Bicycle/Pedestrian Bridge

The proposed South Higuera Street Bicycle/Pedestrian Bridge would span SLO Creek with a 10-foot wide by 120-foot long pre-fabricated steel truss bridge structure. The bridge would have an approximately 2-foot thick deck with the low chord elevation at 88.0 feet. The bridge would be supported on the east side by two (2) 36-inch diameter concrete abutment piers. Two (2) 50-foot long by 10-foot wide inclined approach ramps and a 50-foot long earthfill approach ramp would bring the trail up to the 90-foot elevation on the east side of SLO Creek. The approach ramps would also be pre-fabricated steel truss structures. On the west side of the creek the bridge would be supported by two (2) 36-inch diameter concrete piers, which would also connect the bridge to an 80-foot long inclined approach ramp (5% grade). The inclined approach ramp would connect to another 80-foot long inclined approach ramp at a 36-inch diameter concrete pier. The second inclined approach ramp would be aligned towards the south and parallel to the predominant creek flow direction. The structure would descend to grade at the 82.5-foot elevation via a 50-foot long earthfill ramp.

Bunnell Bicycle/Pedestrian Bridge

The Bunnell Bicycle/Pedestrian Bridge would span SLO Creek with one 10-foot wide by 80-foot long prefabricated steel truss bridge. The bridge would have an approximately 2-foot thick deck with a low chord elevation of 72.5 feet. Two (2) 36-inch diameter concrete piers located on the top of bank would support the bridge on the west side of SLO Creek. The piers would also support the connecting 65-foot long elevated trail segment, which would run west over the floodplain to connect with the inclined approach ramps. There would be four (4) 50-foot long inclined approach ramps that descend down to floodplain elevation 65 feet at a 5% grade. A 50-foot long earthfill approach ramp would bring the trail back down to grade at an elevation of 62.5 feet. On the east side of the bridge a concrete abutment pier would connect the bridge to four (4) 50-feet long inclined, approach ramps, which would descend at a 5% grade. The trail would descend to grade at an elevation of 62.5 feet via a 50-foot long, earthfill approach ramp.

San Luis Bay Drive Bicycle/Pedestrian Bridge

The entire proposed San Luis Bay Drive Bicycle/Pedestrian Bridge structure would lie in the floodplain of SLO Creek. The bridge would run parallel to and at least 25 feet downstream from the outer (southern) edge of the San Luis Bay Drive Bridge. The proposed structure would begin at grade (elev. 38 feet) on the east side of SLO Creek with a 50-foot long earthfill approach ramp at a 5% grade. Two (2) 50-foot long by 10-foot wide inclined truss segments would climb to an elevation of 45.5 feet at a 5% grade. Two (2) 36-inch diameter concrete piers (positioned near the top of bank on each side of the creek) would support the 120-foot long steel truss bridge. The bridge would have an approximately 2-foot thick dock with a low chord elevation of 43.5 feet. On the west side of the creek, the approach ramp structure would descend down to existing floodplain grade via a 50-foot long by 10-foot wide inclined steel truss segment and a 30-foot long earthfill approach ramp at a maximum 5% grade.

Highway 101 Bicycle/Pedestrian Overcrossing

The Highway 101 Bicycle/Pedestrian Overcrossing structure would consist of an elevated ramp constructed east of and parallel to the highway on the SLO Creek floodplain. The overcrossing structure would begin at grade with a 50-foot long, inclined earthfill approach ramp with vertical concrete retaining walls. Nine (9) inclined, 50-foot long by 10-foot wide approach ramp segments, supported by eight (8) 36-inch diameter concrete piers, would bring the structure up to an elevation of 55 feet, approximately 25 feet above floodplain elevation. The west abutment of the overcrossing would be located on County and Caltrans property just north of the Salisbury Winery, with the trail descending at a 6% grade to the east end of the existing Ontario Road staging area. Only the east earthfill approach ramp, the first two (2) inclined approach ramp segments, and the support piers would be exposed to over-bank flood flows and potentially have an impact on water-surface elevations in the immediate vicinity.

HYDROLOGY & HYDRAULICS

The proposed construction project involves installing three pre-fabricated steel truss bridges, along with pier-supported elevated approach ramps over SLO Creek, and building one highway overcrossing. The proposed bridge/approach ramp construction will involve drilling pier holes for new reinforced, poured-in-place concrete abutments and piers outside of the existing low-flow channel, and constructing short lengths of compacted earthfill approach ramps with vertical concrete retaining walls at the end of the bridge approach ramps, where they will join the at-grade trail. All of the abutment and support piers and portions of the approach ramps would be within the 100-year flood elevation; however, most of the structures, including all of the bridge structures crossing the creeks, will be elevated a minimum of 1 foot above the estimated 100-year flood elevation. In addition to the piers, local rock slope protection is included in a zone 50 to 75 feet upstream and downstream from each creek crossing bridge structure. The piers and abutments for the clear-span bridge structures would be located at top of bank, rather than within the active flow line of the channel. Because portions of the bridge approach ramps are within the 100-year floodplain, use of breakaway handrails are proposed. The lower portions of the approach ramps therefore represent longitudinal floodplain encroachment, along with any portions of the trail that are elevated slightly above (± 0.5 feet) adjacent grade.

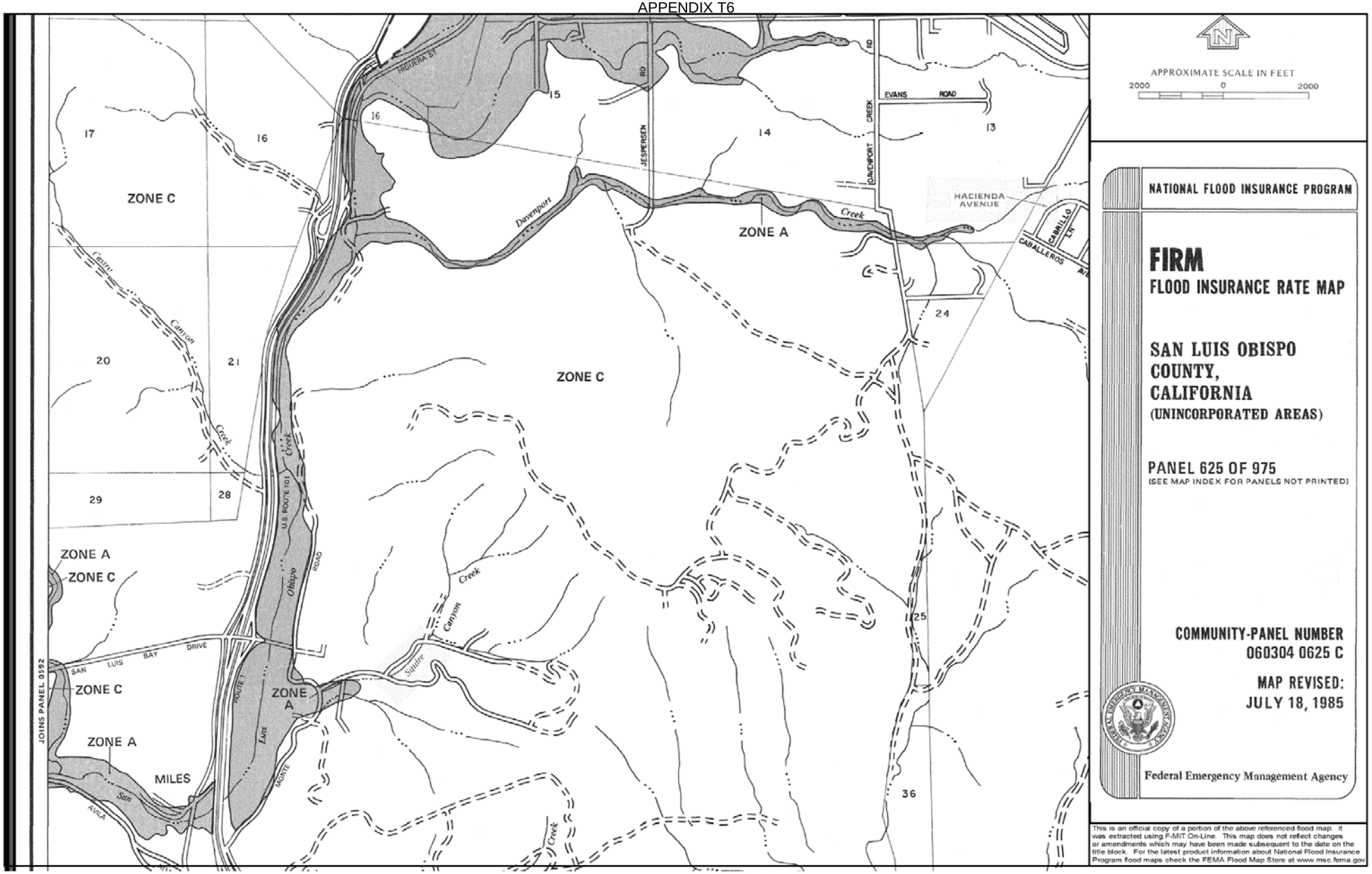
Unless carefully designed, encroachment on floodplains and channels with elevated trail grades, ramps, and bridge structures can reduce the flood-carrying capacity of the channel, increasing the flood heights of streams, causing backwater effects, and potentially increasing flood hazards in areas beyond the bridge itself. This is an important issue, as the bicycle/pedestrian bridges could potentially increase the frequency, depth, and duration of flooding on already flood-prone County roads, as well as portions of Highway 101. Furthermore, bridges, abutments, and approach ramps built below predicted flood water-surface elevations are prone to damage and potential failure.

Existing Floodplain

The 100-year floodplain elevation is shown on the 1985 Federal Emergency Management Agency (FEMA) Flood Insurance Rate Map (FIRM) for the floodplain along SLO Creek. This is an approximate study (Zone A) and no base flood elevations are provided. The FIRM indicates that San Luis Bay Drive, from the western edge of the Highway 101 on ramp to Monte Road, portions of Highway 101 immediately upstream and downstream of the Clover Ridge on-/off-ramp, and all of South Higuera Street, including the South Higuera Street Bridge, are within the 100-year floodplain. All of the proposed bicycle/pedestrian bridges, as well as the eastern abutment and landing of the proposed Highway 101 Bicycle/Pedestrian Overcrossing, would be located within the FEMA 100-year floodplain. However, no FEMA-defined floodway has been designated along SLO Creek. **Figure 1a** shows the FEMA-designated 100-year floodplain, or base flood map, for the area. **Figure 1b** shows the floodplain based on the more detailed hydrology/hydraulic analysis completed for the San Luis Obispo Creek Waterway Management Plan (SLO WMP), a 2003 floodplain management plan written by Questa Engineering for the City and County of SLO. Under existing conditions, portions of the trail project area experience over-bank flooding at flows greater than the 10-year flood event.

Hydrology Information

This location study evaluated the hydraulics of the proposed bridge sites under the 2-, 10-, 25-, 50-, and 100-year recurrent flow conditions of **6,745 cfs, 13,278 cfs, 18,116 cfs, 21,295 cfs, and 24,226 cfs**, respectively. The flows were obtained from the SLO WMP (Questa, 2003). The hydrologic analysis completed as part of the SLO WMP included rainfall runoff simulation modeling for various rainfall and flood return intervals constructed using the US Army Corps of Engineers HEC-HMS model. Rainfall

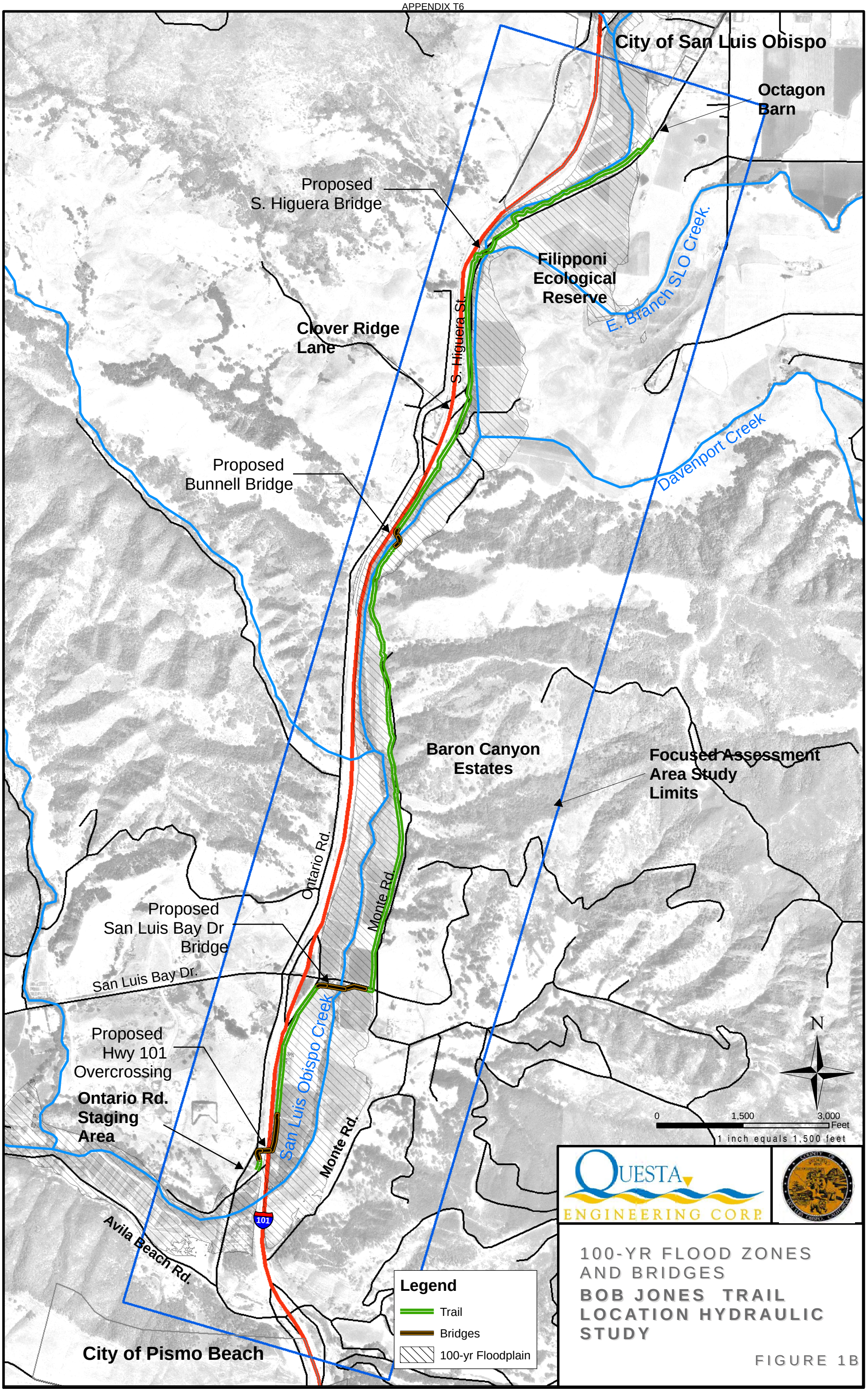


DATE:	12/28/2007
PROJECT:	Bob Jones City to Sea Pedestrian/Bike Path Project
PROJECT NO.:	250083
DRAWN:	n/a
APPROVED:	n/a

QUESTA ENGINEERING CORP.
Civil Environmental & Water Resources
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com

FEMA FLOOD INSURANCE RATE MAP

FIGURE
1a



Project No. 250083; Design: J.P.; Drawn: W.S.; Checked: J.P.; Approved: J.P.

Source: Questa 2003. San Luis Obispo Waterway Management Plan.

information for the model was collected from various rain gages in the watershed and from a Nexrain radar rainfall simulation for select storm events, and calibrated using surveyed flood height information. This hydrology model (and hydraulic model) were subsequently peer reviewed and accepted by the Los Angeles District office of the US Army Corps of Engineers.

Hydraulic Analysis

The 2003 SLO WMP also included the completion of a detailed HEC-GEORAS hydraulic analysis. Topographic information for channel hydraulics and floodplain characterization was obtained from a Digital Terrain Model (DTM) prepared using airborne laser (LiDAR) data collected specifically for the project. The LiDAR information was supplemented by select field surveys (mainly in dense vegetation areas) and by surveying select bridges and other structures. The LiDAR information included field quality control (QC) verifications and was found to meet FEMA standards for floodplain mapping. This was the base model used for this hydraulic analysis.

Hydraulic analysis consisted of modeling the flow regime through the channel reach as characterized using both field surveyed cross sections and cross sections cut from the LiDAR-produced DTM. The field data were imported into HEC-RAS (Hydrologic Engineering Center River Analysis System version 3.1.3, 2005) hydraulic modeling software developed by the US Army Corps of Engineers. The hydraulic model predicts flow velocity, water surface elevations, and water depths, among other hydraulic parameters. New field surveyed and LiDAR cut cross sections and proposed bridge structures were added into the existing hydraulic model to better represent existing conditions and evaluate proposed bridge water-surface elevation impacts.

Modeling Methods

- **1D Hydraulic Model.** HEC-RAS is a one-dimensional hydraulic model capable of calculating water surface profiles for steady, gradually varied flow. The basic computational procedure is based on the solution of the one-dimensional energy equation. Energy losses are evaluated by friction (Manning's *n* coefficient) and contraction/expansion (coefficient multiplied by the change in velocity head). The model is therefore capable of evaluating backwater effects caused by channel constrictions such as undersized culverts. This hydraulic analysis was performed with the assumption that flow in SLO Creek is uniform, steady, open-channel flow. A mixed regime steady flow analysis was computed, where flow can be either sub- or super-critical.
- **Cross Section Geometry.** A total of 86 cross sections were used for the HEC-RAS analysis of the three proposed bridges and overcrossing project. The cross sections were obtained from the 2001 LiDAR survey, supplemented by field surveys of select bridge locations as part of the present project. These cross sections were approximately equally spaced, throughout most of the 3.57-mile reach of SLO Creek between South Higuera (on the north) and the proposed Highway 101 Overcrossing structure on the south. Cross sections were spaced closer together in the vicinity of the bridges to more accurately account for the potential expansion and contractions. Any time additional cross sections were added to the model, they were added to both the base model (existing conditions) and the proposed conditions model, thereby isolating the change between the models to the presence of bridge structures only.
- **Roughness.** Roughness coefficients were assigned to left overbank, channel, and right overbank sections of each cross section. Different roughness coefficient (Manning's "n") values reflect different surface "roughness" qualities. **Table 1** shows typical Manning's "n" values used throughout the model.

Table 1. Typical Manning's Roughness Values	
Land Use	Roughness Value
Overbank Areas	
Typical Built up Areas	0.07-0.15
Fields	0.035
Orchard	0.06
Riparian Scrub/Forest	0.09-0.1
Suburban Areas	0.06
Open Streets	0.025
Upland Woodland/Chaparral	0.07
Downtown SLO Commercial Buildings *	1.0-2.0
Stream Channels	
SLO Creek Below City Limits	0.06-0.07

* Downtown commercial buildings were coded with extremely high Roughness to effectively block all flow from being conveyed through them. Overbank flow in those areas was allowed to travel down individual streets, which were coded with a roughness of 0.025.

- **Steady Flow Analysis.** A steady flow analysis requires the input of user-defined profiles specifying peak flow data and model boundary conditions.

  In a modeled flow regime, boundary conditions are necessary at the upstream and downstream ends of the river system. This analysis used a "Normal Depth" boundary condition at the upstream boundary, requiring an energy slope to be used in calculating normal depth (Manning's equation) at each cross section for each profile. Since the energy slope was unknown, the average slope of the channel bottom was used. A known water surface elevation was used as the downstream boundary condition. The downstream boundary condition for the model was taken as the highest recorded tide at Port San Luis.

Hydraulic model runs for both the existing and proposed conditions were completed. The modeled cross sections and summary output tables for these runs are attached as **Appendix B** to this study.

Existing Conditions

The modeled reach of SLO Creek, from the South Higuera Street crossing to the Highway 101 crossing, is approximately 3.6 miles in length and lies just southwest of the SLO City limits. The modeled reach of the creek flows primarily through agricultural lands. Several portions were straightened during the construction of Highway 101 in the 1930s and 1950s. The riparian corridor is fairly narrow throughout most of the reach, and is densely lined with vegetation, primarily shrubby and tree-forming willows. The creek descends roughly 50 feet over the course of the modeled reach.

Flooding above top of bank occurs along much of the reach at flows greater than or equal to the 10-year event. The FEMA FIRM indicates that San Luis Bay Drive to Monte Road, portions of Highway 101 immediately upstream and downstream of the Clover Ridge on/off ramp, and nearly all of South Higuera Street are within the 100-year floodplain.

Proposed Conditions

The Bob Jones City to Sea Bicycle/Pedestrian Pathway Project proposes to build three (3) bicycle/pedestrian bridges, which will cross SLO Creek, and one (1) highway overcrossing, which will have an approach ramp in the floodplain. Each structure and the associated changes to water surface elevations will be discussed separately in the following sections.

Freeboard is defined as the distance between the 100-year flow water-surface elevation and the low chord (bottom of structure) elevation at the upstream or downstream side of the bridge, whichever is greater. The freeboard at the upstream face of the bridge is the most important because this is where debris has the greatest potential to contact the bridge. The County of SLO[1] has indicated they will require that all the proposed bicycle/pedestrian bridges over the active or defined portion of the stream channel have at least one (1.0) foot of freeboard, and that there be less than a 0.1-foot rise in water surface elevation resultant from bridge construction, as predicted by detailed hydraulic analysis and including consideration of the approach ramps, piers, and abutments. The County will also require that all bridge abutments, piers, and embankment slopes in the vicinity of the bridges be adequately protected from scour and bank erosion.

Existing versus Proposed Conditions Modeling

There are three bicycle/pedestrian bridges and one highway overcrossing discussed and evaluated in this report:

- South Higuera Street Bicycle/Pedestrian Bridge
- Bunnell Bicycle/Pedestrian Bridge
- San Luis Bay Drive Bicycle/Pedestrian Bridge
- Highway 101 Bicycle/Pedestrian Overcrossing

Existing hydraulic conditions and proposed conditions with the bridges/overcrossing hydraulically modeled are summarized in **Table 2** and discussed in the following paragraphs.

Table 2. Summary of Bridge Project Impacts

	Existing Conditions WSE		Proposed Conditions WSE		Top of Bank Elevation	
Bridge	50-year (feet)	100-year (feet)	50-year (feet)	100-year (feet)	Left Bank (ft)	Right Bank (ft)
South Higuera Street	86.15	86.80	86.16	86.81	81	82
Bunnell	70.74	71.46	70.77	71.49	64	62
San Luis Bay Drive	43.51	43.80	43.57	43.87	39	39
Hwy 101	37.39	38.32	37.39	38.32	33	32

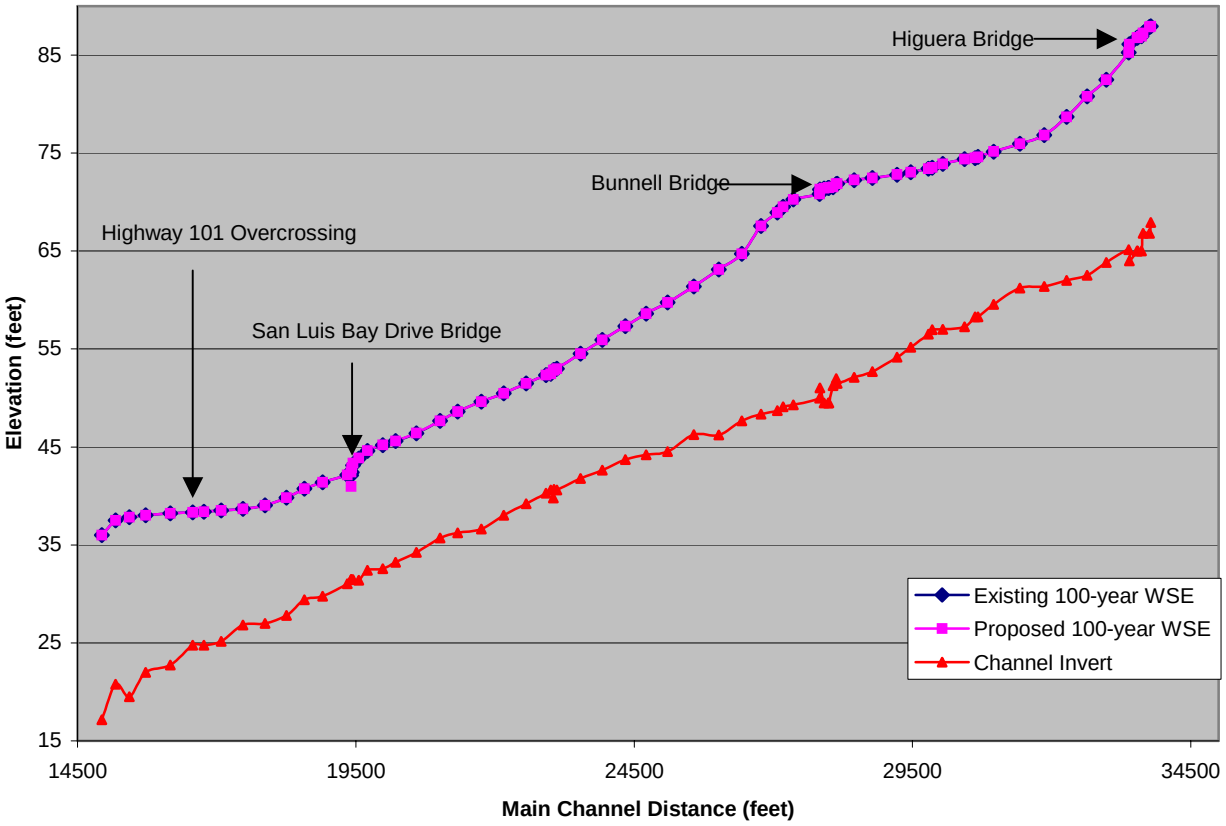
South Higuera Street Bicycle/Pedestrian Bridge

The proposed bicycle/pedestrian bridge at this location would be located roughly parallel to and about 150 feet downstream of the existing SLO County South Higuera Street Bridge. SLO Creek, at the proposed bridge location, has a channel top width of approximately 145 feet. The channel bottom is approximately 30 feet wide, with a channel invert elevation of 65 feet. The channel is approximately 16 feet deep.

[1] Personal communication, Mike Britton, SLO County Department of Public Works

The 100-year water-surface elevation under existing conditions is 86.8 feet. Water-surface elevations here are approximately 2 feet above the top of banks for the 10-year flood event, and over 4 feet above top of bank for the 100-year flood event. The flow profile is shown in **Figure 2**.

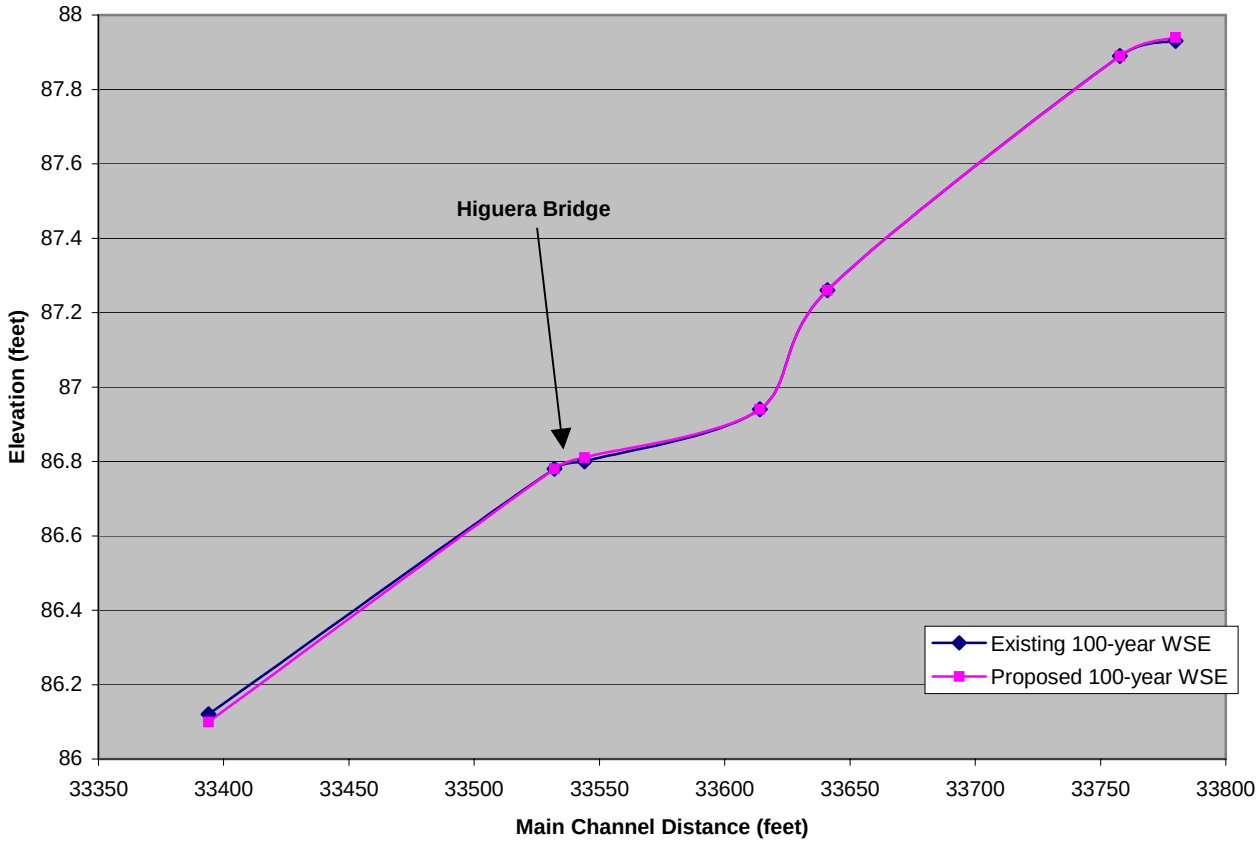
Figure 2. Existing and Proposed Conditions Flow Profiles



The proposed South Higuera Street Bicycle/Pedestrian Bridge was modeled based on the conceptual bridge design as shown in **Appendix A, Sheet 2**. The proposed bicycle/pedestrian bridge would be 120-feet long and 10-feet wide over the channel, and the high chord and low chord elevations would be at elevations of 90.0 feet and 88.0 feet, respectively (See the **Proposed Action Description** for a full description of the bridge and associated structures).

The construction of the proposed bridge will have negligible impacts on the water-surface elevations at the site. The 100-year water-surface elevation under existing conditions is 86.80 feet and the water-surface elevation under proposed conditions is 86.81 feet, representing a rise of only 0.01 feet as a result of the new structure. As shown by the overlap between existing and proposed conditions on the profile, water surface elevation increases were in all cases less than 0.1 feet, and typically below 0.04 feet. The proposed bridge would have 1.2 feet of freeboard during the 100-year event. The flow profile for proposed conditions is shown in **Figure 2** and **2a.**

Figure 2a. Proposed Conditions Flow Profile at Higuera Street Bicycle/Pedestrian Bridge



Bunnell Bicycle/Pedestrian Bridge

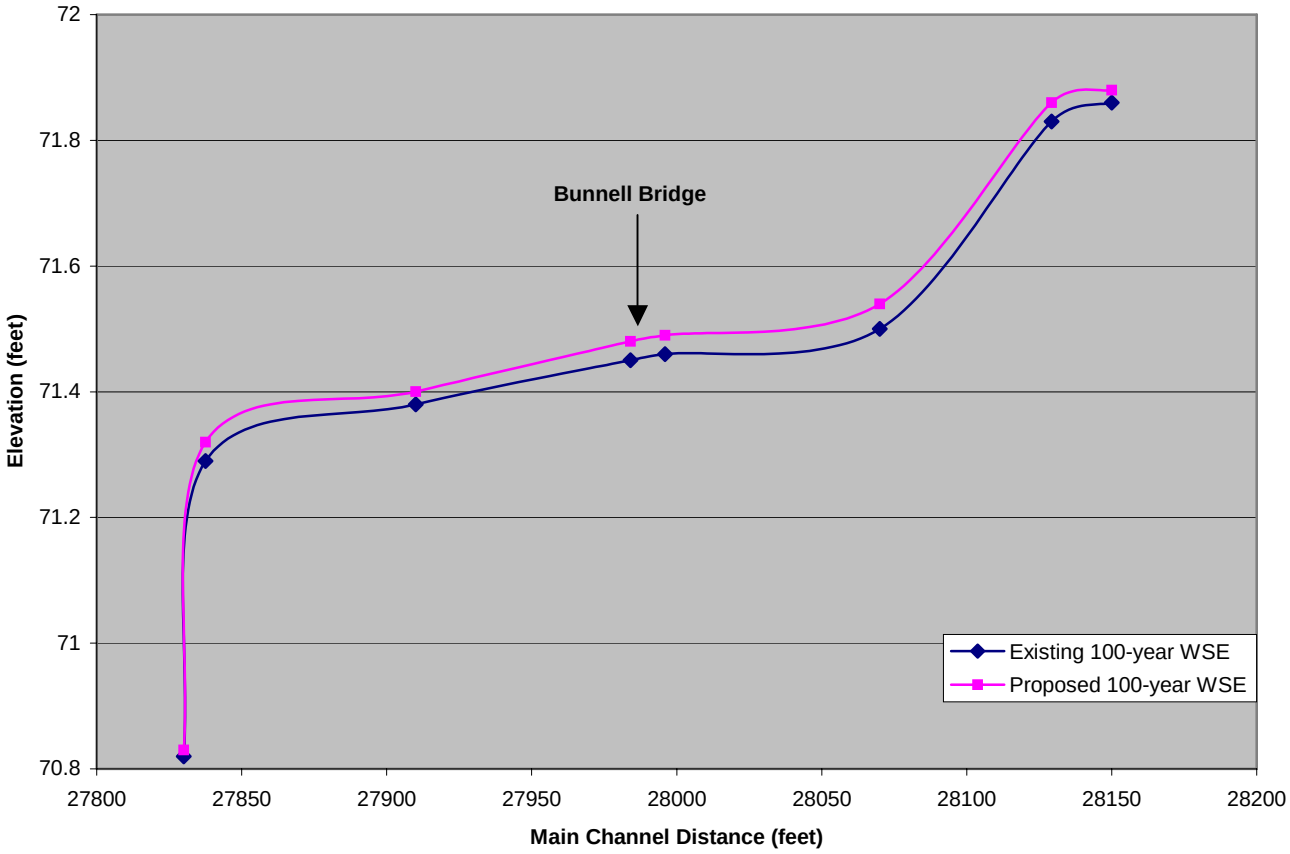
SLO Creek, at the proposed Bunnell Bridge location, has a channel top width of approximately 76 feet. The channel bottom is approximately 29 feet wide with a channel invert elevation of 49.5 feet. The channel is approximately 12.5 feet deep.

The 100-year water-surface elevation under existing conditions is 71.46 feet. Water-surface elevations here are approximately 1 to 2 feet above the top of banks for the 2-year flood event. The flow profile is shown on **Figure 2** (preceding).

The Bunnell Bridge was modeled according to the conceptual bridge design (**Appendix A, Sheet 3**). The bridge would be 80 feet long and 10 feet wide, with proposed high chord and low chord elevations of 72.5 feet and 70.5 feet, respectively (See the **Proposed Action Description** for a full description of the bridge and associated structures).

Under existing conditions, the water-surface elevation just upstream of the proposed Bunnell Bridge is 71.46 feet. Under proposed conditions the water-surface elevation increases to 71.49 feet. The maximum increase in water-surface elevation at this site occurs 80 feet upstream of the proposed bridge, where it is 0.04 feet higher than under existing conditions. The proposed bridge would have 1.52 feet of freeboard. The flow profile for proposed conditions is shown in **Figure 2** and **2b**.

Figure 2b. Proposed Conditions Flow Profile at Bunnell Bicycle/Pedestrian Bridge



San Luis Bay Drive Bicycle/Pedestrian Bridge

The proposed bicycle/pedestrian bridge at this location would be located roughly parallel to and about 35 to 50 feet downstream of the existing SLO County San Luis Bay Drive Bridge. SLO Creek, at the proposed San Luis By Drive bridge location, has a channel top width of approximately 146 feet. The channel bottom is approximately 100 feet wide, with a channel invert elevation of 31.46 feet. The channel is approximately 8.5 feet deep.

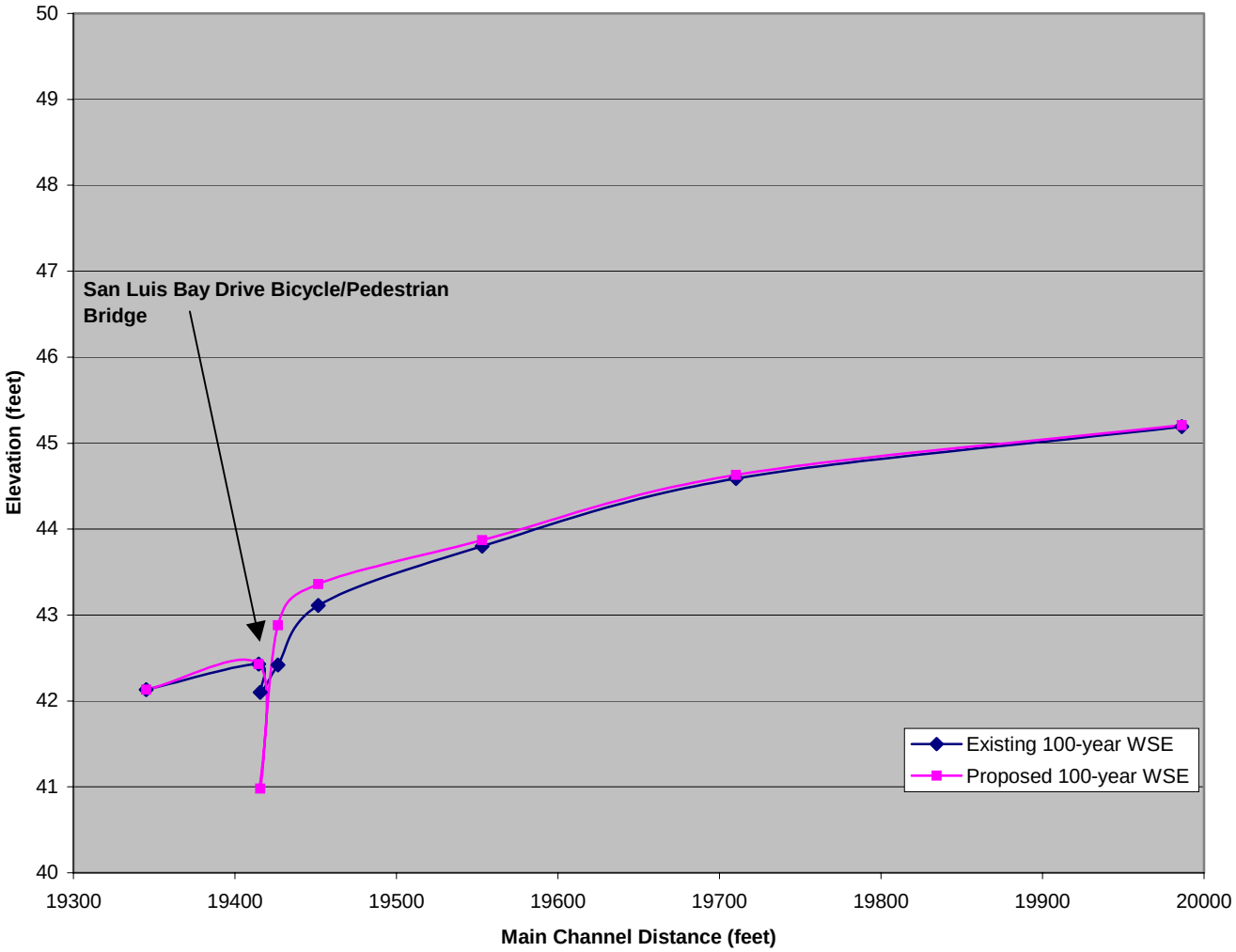
The 100-year water-surface elevation at the San Luis Bay Drive Bridge under existing conditions is 43.80 feet. Water-surface elevations are approximately 2 to 3 feet over the top of banks during the 2-year flood event. The flow profile is shown on **Figure 2** (above).

The San Luis Bay Drive Bridge was modeled according to the conceptual bridge design (**Appendix A, Sheet 4**). The bridge is 120 feet long and 10 feet wide, with high chord and low chord elevations of 45.5 feet and 43.5 feet, respectively (See the **Proposed Action Description** for a full description of the bridge and associated structures).

The proposed San Luis Bay Drive Bicycle/Pedestrian Bridge is proposed to be built just downstream (minimum 25 feet) from the existing San Luis Bay Drive Bridge, and therefore may increase flooding on the roadway at San Luis Bay Drive. Under existing conditions, the 100-year water-surface elevation at San Luis Bay Drive is 43.8 feet. The roadway surface has an elevation of 41 to 42 feet. Under proposed conditions, the water-surface elevation would rise slightly to 43.87 feet. This is considered to be a relatively minimal and insignificant increase in water-surface elevation. The effect of the bridge on water-surface elevations is relatively localized as the increase in water-surface elevations decreases to less than 0.04 feet within 285 feet upstream of the bicycle/pedestrian bridge. The bridge will maintain a freeboard of 1.6 feet during the 100-year event. The flow profile for proposed conditions is shown in **Figures 2** and **2c.**

As shown in **Figure 2c**, the HEC-RAS model predicts that a hydraulic jump will occur just downstream of the San Luis Bay Drive Bridge during the 50- and 100-year flood event under both existing and proposed conditions. This appears as a sharp drop followed by an abrupt rise in water-surface elevation on **Figure 2c.** The hydraulic jump occurs as water over-tops San Luis Bay Drive and flow becomes super-critical. The placement of the San Luis Bay Drive Bicycle/Pedestrian Bridge just downstream of the San Luis Bay Drive Bridge and the associated increase in constriction to flow causes a larger hydraulic jump than would occur without the bicycle/pedestrian bridge. A small standing wave will most likely form just below the bicycle/pedestrian bridge, but the impact would be minimal. Due to increased flow velocities in the vicinity of the bicycle/pedestrian bridge, additional armoring may be required to protect the pier and abutments from scour. Scour protection would be determined during final engineering design of the bridges, but as noted earlier, the preliminary engineering plans include approximately 50 linear feet of willow-planted rock riprap toe protection, upstream and downstream of the proposed bridge crossings.

Figure 2c. Proposed Conditions Flow Profile at San Luis Bay Drive Bicycle/Pedestrian Bridge



Highway 101 Overcrossing

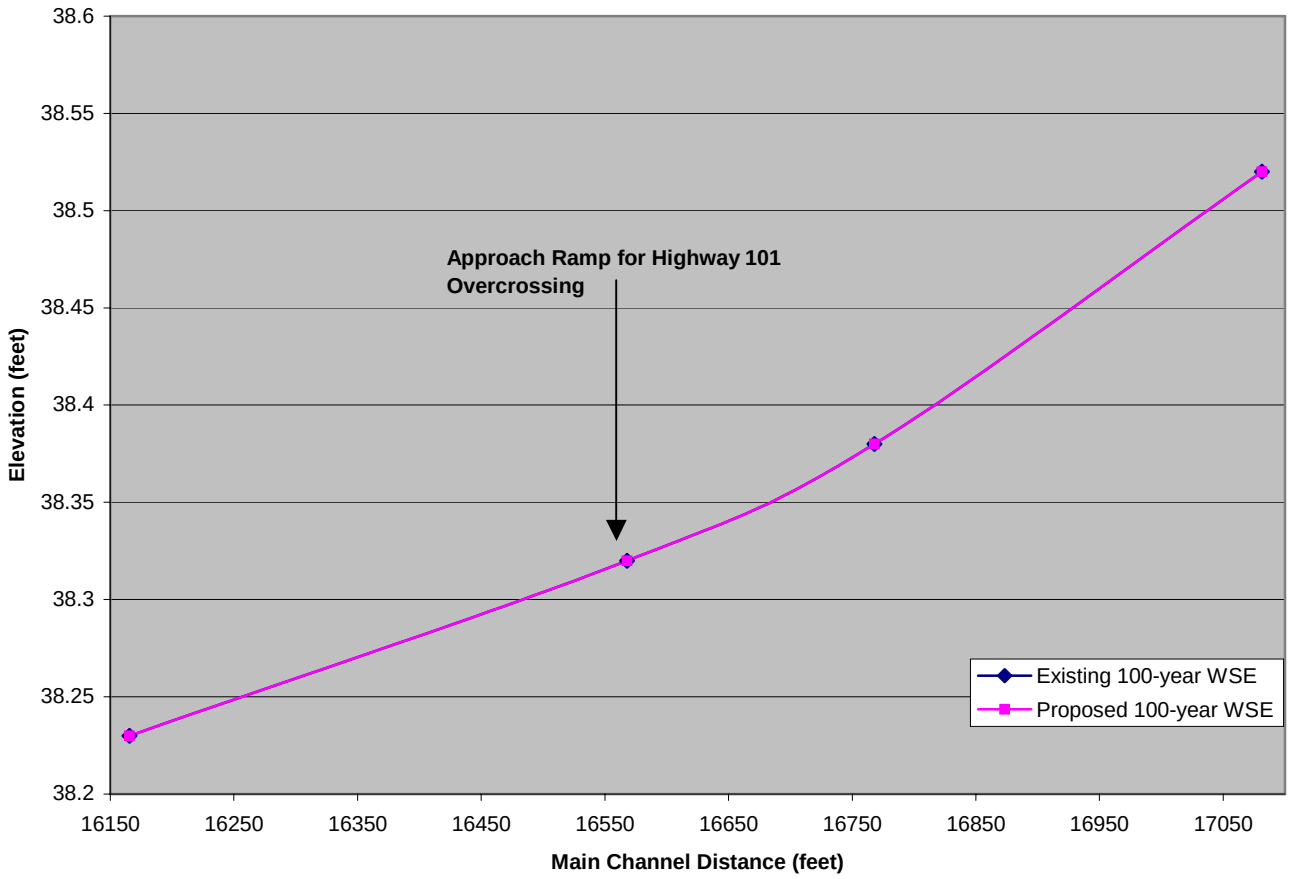
SLO Creek, near the proposed highway overcrossing, has a channel top width of approximately 150 feet. The channel bottom is approximately 75 feet wide and has a channel invert elevation of 24.77 feet. The channel is approximately 8 feet deep. The floodplain is over 1,100 feet wide at this location. Highway 101 lies at approximately 40 feet in elevation here.

Water-surface elevations in this vicinity are approximately 2 feet above the top of banks for 2-year flood events. The 100-year water-surface elevation under existing conditions is 38.38 feet. The flow profile is shown in **Figure 2**.

The Highway 101 Overcrossing was modeled according to the conceptual design (**Appendix A, Sheet 5**). See the **Proposed Action Description** for a full description of the bridge and associated structures.

The proposed earthfill approach ramp and inclined approach ramp segments, although lying on the floodplain, have no detectable or significant impact on water-surface elevations in this area. Water-surface elevations here remain virtually the same after proposed construction of the overcrossing structure. The flow profile for proposed conditions is shown in **Figure 2** and **2d**.

Figure 2d. Proposed Conditions Flow Profile at Highway 101 Bicycle/Pedestrian Overcrossing



Longitudinal Floodplain Encroachment of Pathway

Approximately 5,162 cubic yards of fill (representing a maximum of 4 inches of Class 2 aggregate base and 2 inches of asphalt concrete trail surfacing) will be imported into and placed in the San Luis Obispo Creek floodplain across the 12-foot-wide, 23,230-foot-long pathway, potentially displacing a similar amount (5,162 cubic yards or about 3.2 acre feet) of floodwater storage capacity. The SLO Creek floodplain between the Octagon Barn on South Higuera Street and the Highway 101 overcrossing at Ontario Road is approximately 497 acres in size and holds an estimated 20,000 acre-feet of floodwater at an average 4-foot, 100-year flood depth. The potential loss of 3.2 acre-feet of storage is well below 0.01% of existing floodplain storage. We believe this represents an insignificant reduction in floodplain volume.

However, fill placement for the slight trail elevation, which is needed in several areas for drainage improvement, does constitute some minor degree of longitudinal floodplain encroachment. As indicated earlier, sensitivity testing of a slightly raised trail section (most of the trail will be at or just above

adjacent grade) using the results of the HEC-RAS modeling indicates a loss of overbank cross section flow area of less than 0.5%. All of this flow path reduction occurs in the floodplain and not within the floodway or portions of the cross section that provide the bulk of the flow conveyance. Therefore, the effect of this loss in floodplain cross-sectional area is too small to be discernible in the hydraulic modeling.

Flood Risk and Flood Damage

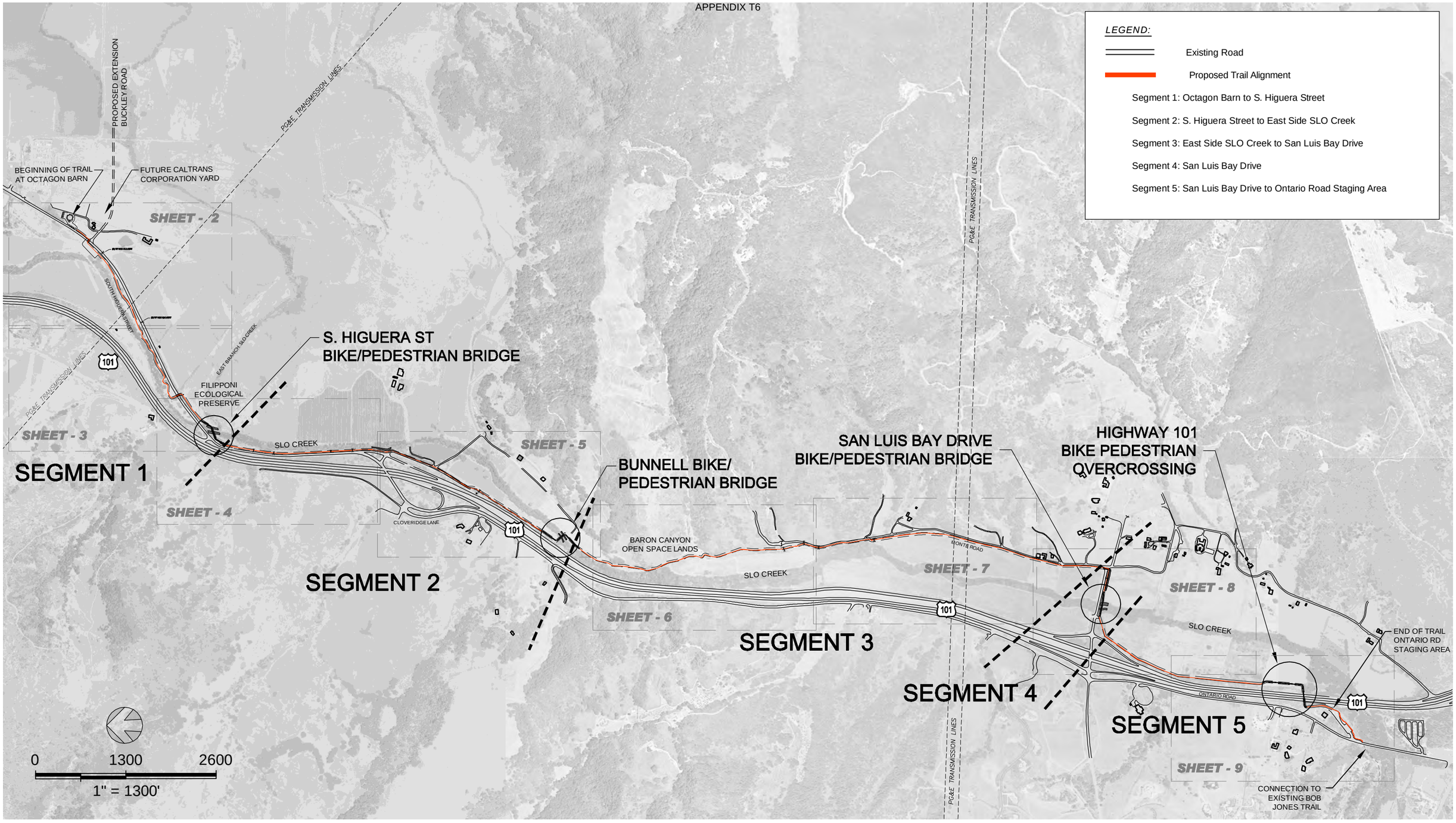
No habitable structures will be constructed as part of the project and therefore no structures will be put at risk. Some damage to paved trail sections may occur during significant flood events. The plan includes the installation of farm fencing, gates and signage allowing the County to close the trail as needed during forecast flood events in order to provide public safety.

CONCLUSIONS

The proposed Bob Jones City to Sea Bicycle/Pedestrian Pathway Project was determined to have a minimal longitudinal encroachment with no significant impacts on the flood-carrying capacity of SLO Creek. No significant impacts on local flooding, local bank erosion, or on hydrologic-related floodplain functions and values are predicted to occur due to construction of the proposed bicycle/pedestrian pathway and bridge(s). However, the rock slope protection proposed for bridge abutments was found, in the Natural Environment Study (NES) prepared for the County by the Morro Group (December 2008), to have adverse impacts on riparian habitat functions and values, including impacts on habitat for two federally protected endangered species, California red-legged frog and South-Central California Coast Steelhead. The NES includes recommendations on avoiding and minimizing temporary impacts during construction, as well as recommendations for streamside habitat enhancement for mitigating permanent impacts.

APPENDIX A

Preliminary Trail Plan Sheets 1 through 9
and
Bridge Plan Sheets 1 through 5



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

DESIGN	MH
DRAWN	BJV
CHECKED	JP
APPR'D	JP
DATE	11/23/08
PROJECT NUMBER	250083

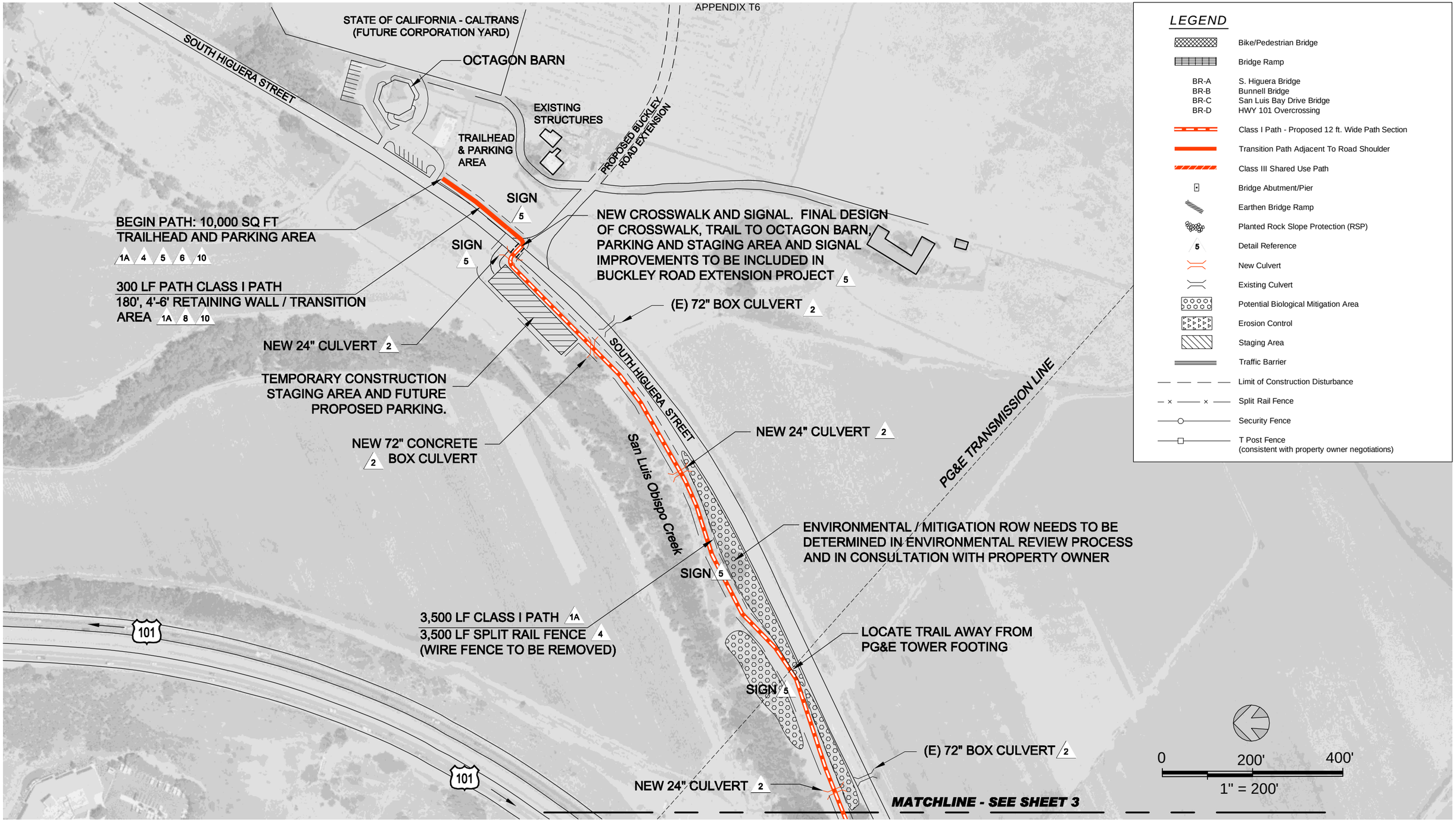
QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

PRELIMINARY PLAN

SHEET

1 of 9

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

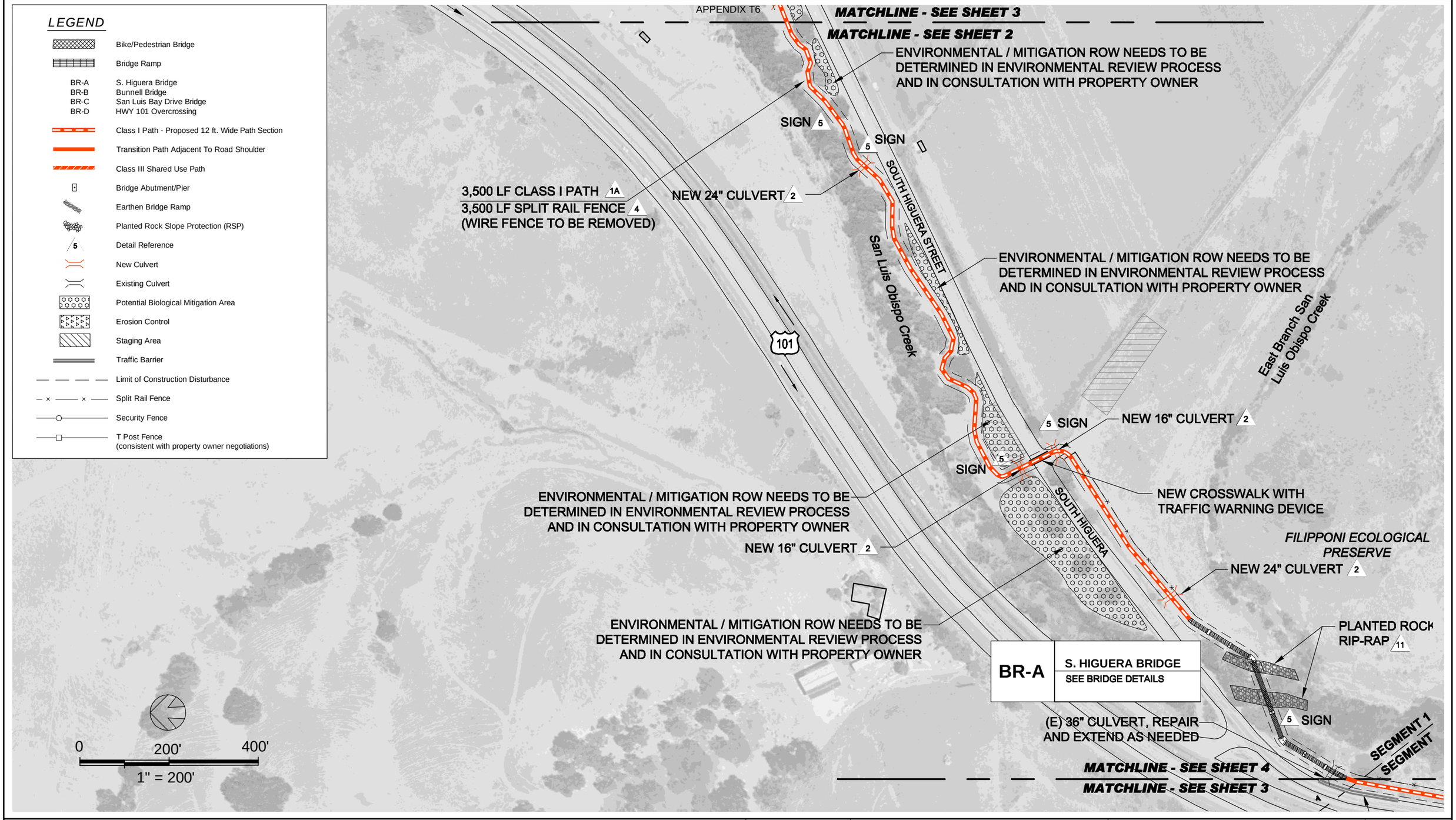
DESIGN	MH
DRAWN	BJV
CHECKED	JP
APPR'D	JP
DATE	11/23/08
PROJECT NUMBER	250083

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

PRELIMINARY PLAN

SHEET

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

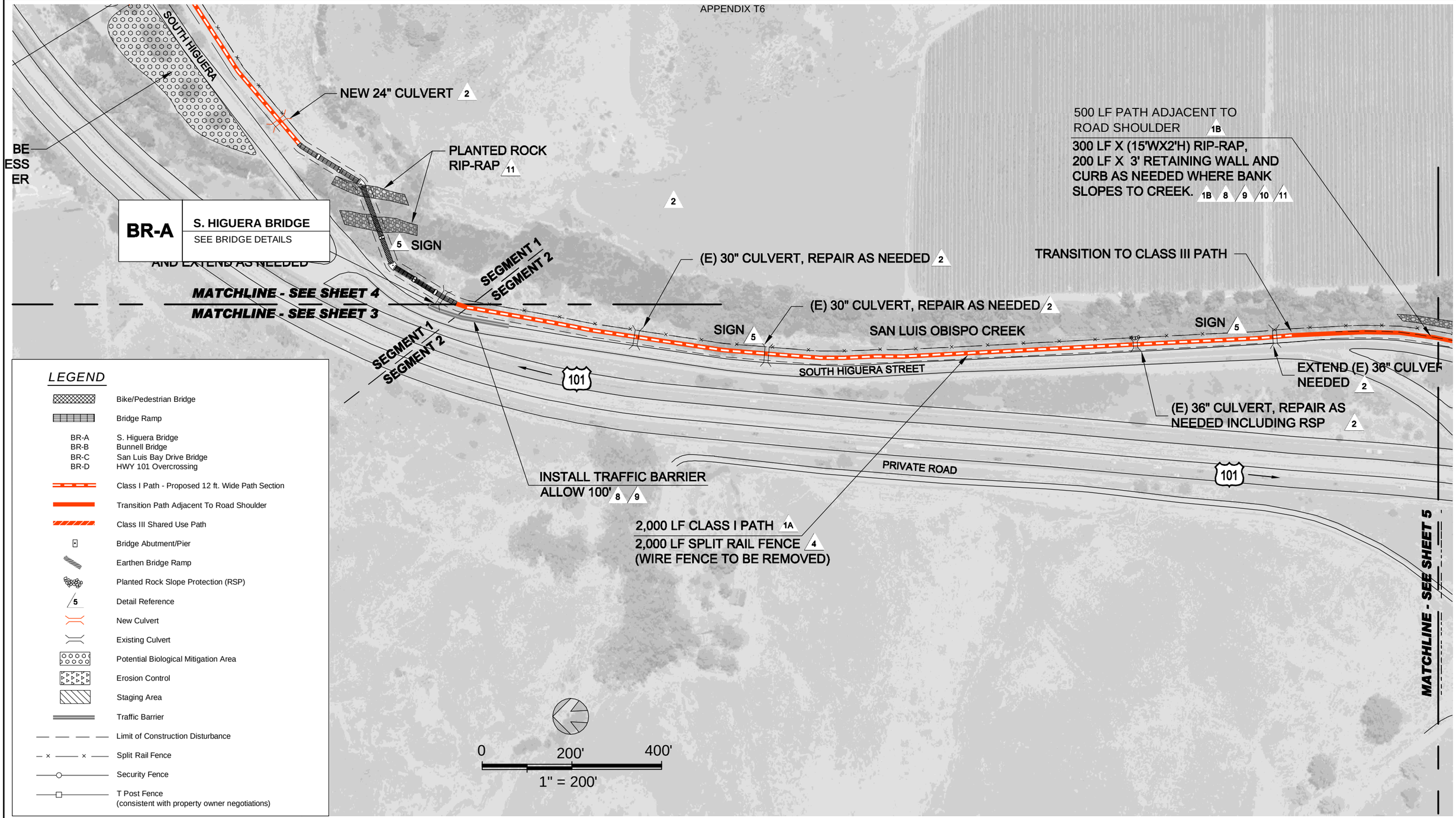
DESIGN	MH
DRAWN	BJV
CHECKED	JP
APPR'D	JP
DATE	11/23/08
PROJECT NUMBER	250083

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com

PRELIMINARY PLAN

SHEET
3 OF 9

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

DESIGN	MH
DRAWN	BJV
CHECKED	JP
APPR'D	JP
DATE	11/23/08
PROJECT NUMBER	250083

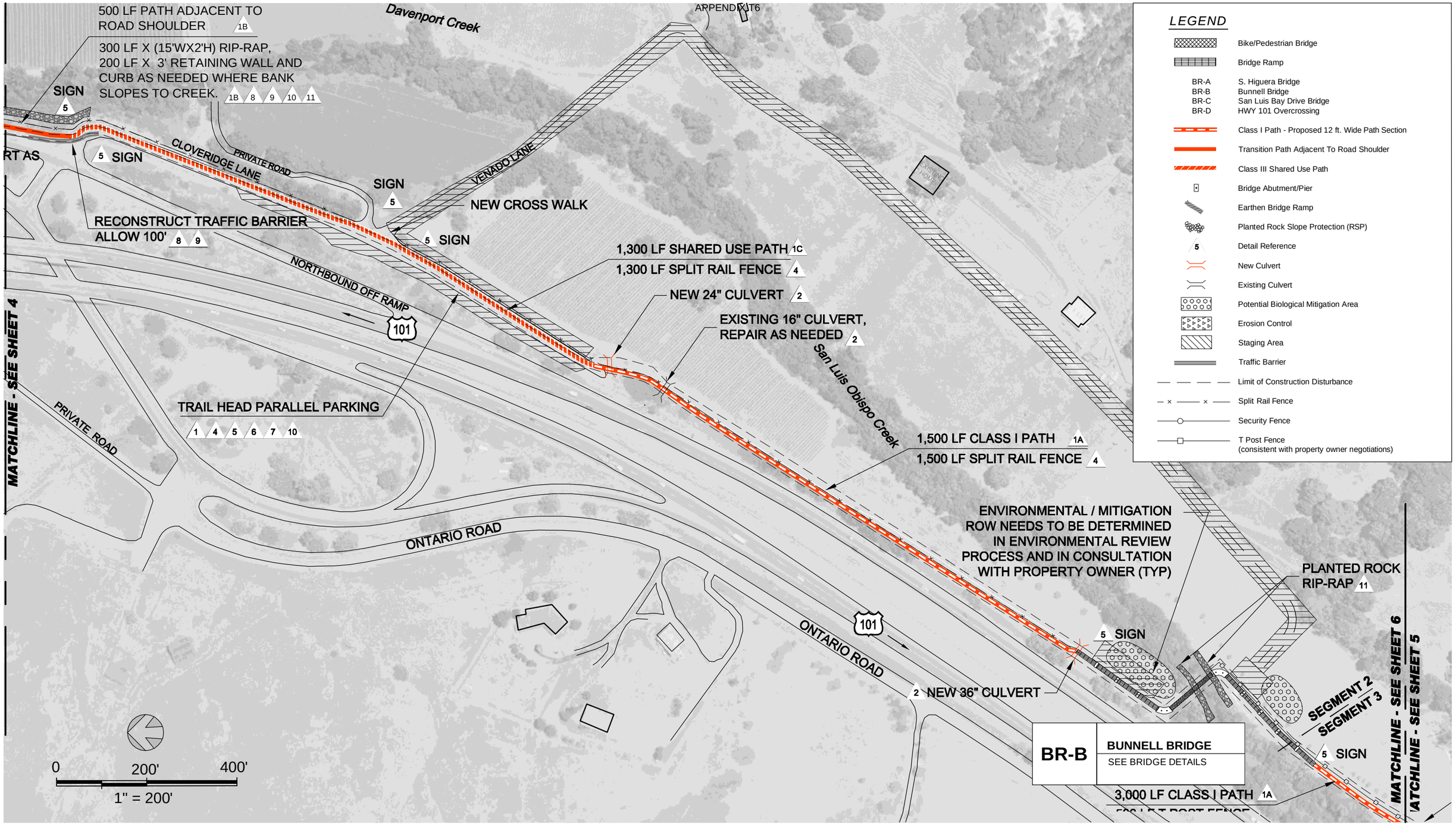
QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

PRELIMINARY PLAN

SHEET

4 OF 9

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

DESIGN	MH
DRAWN	BJV
CHECKED	JP
APPR'D	JP
DATE	11/23/08
PROJECT NUMBER	250083

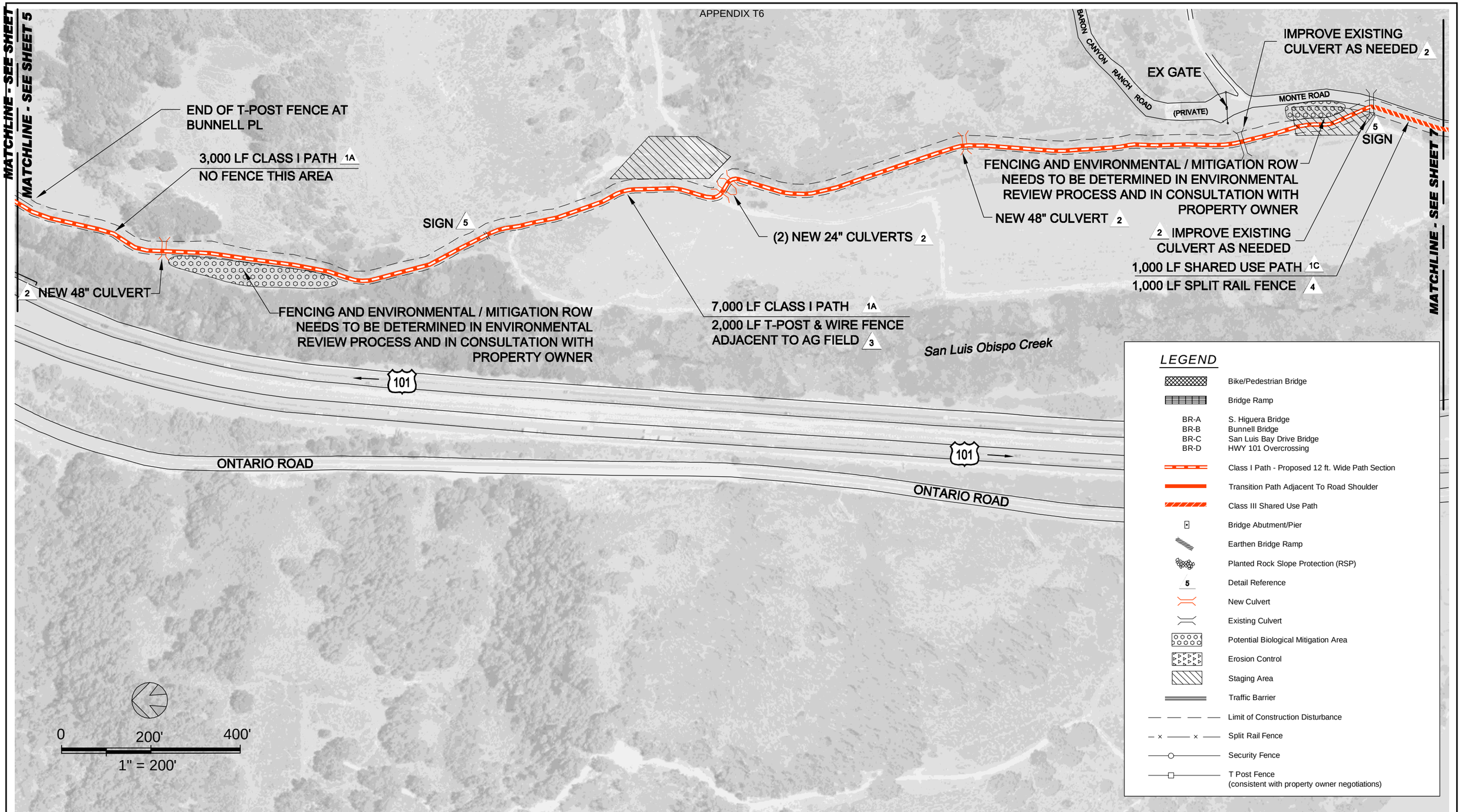
QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

PRELIMINARY PLAN

SHEET

5 OF 9

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

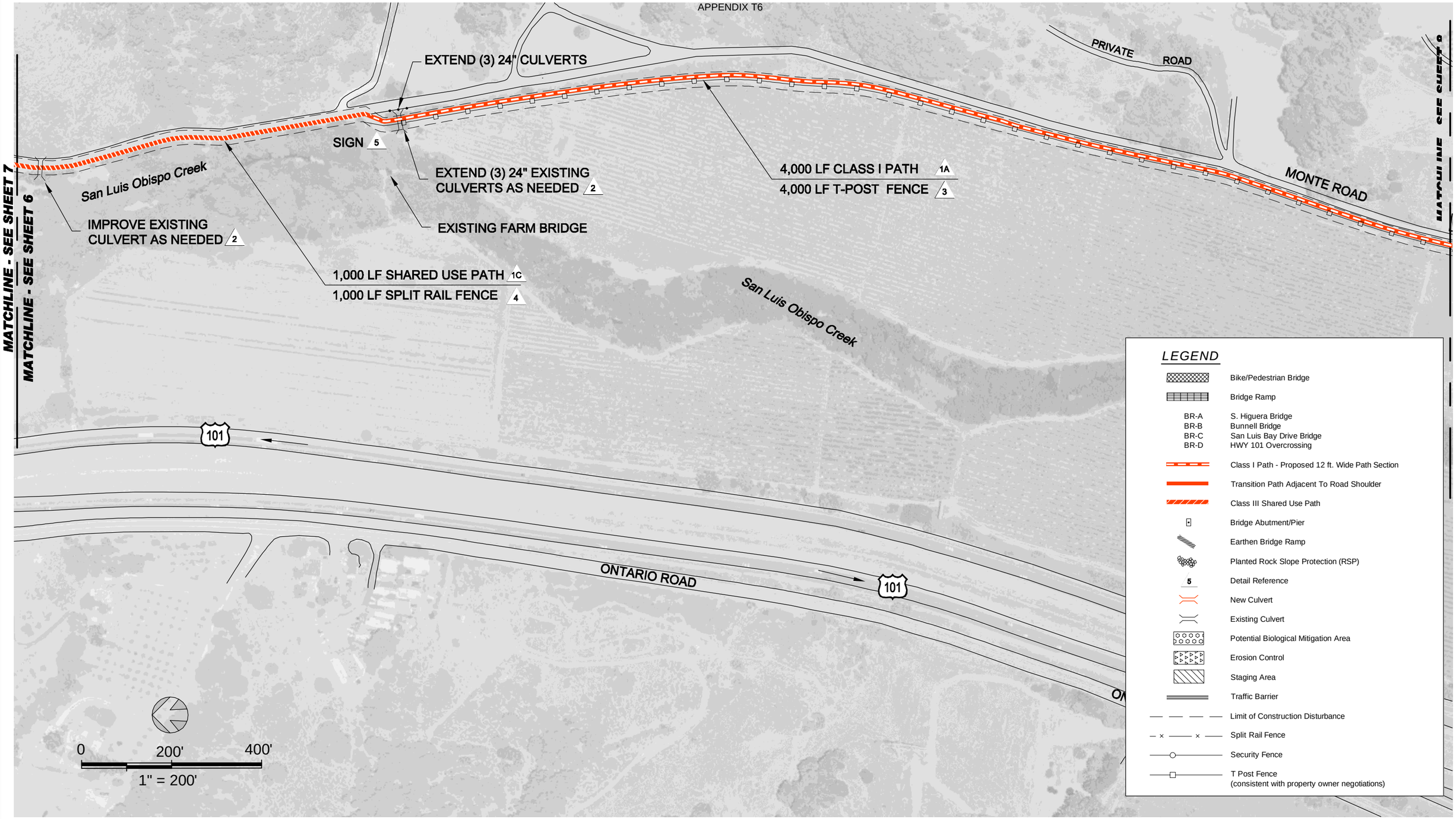
DESIGN	MH
DRAWN	BJV
CHECKED	JP
APPR'D	JP
DATE	11/23/08
PROJECT NUMBER	250083

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

PRELIMINARY PLAN

SHEET 6 OF 9

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

DESIGN	MH
DRAWN	BJV
CHECKED	JP
APPR'D	JP
DATE	11/23/08
PROJECT NUMBER	250083

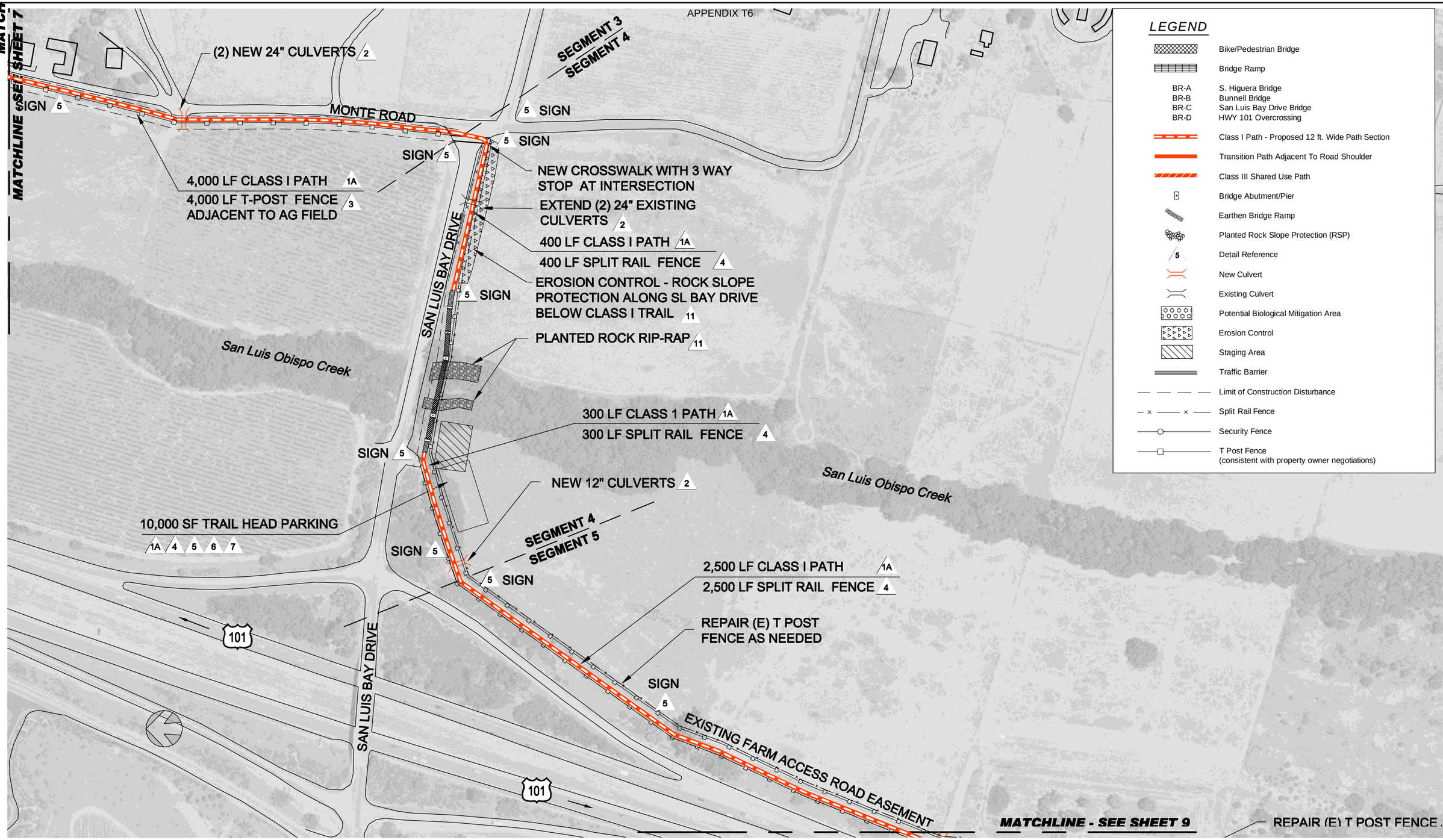
QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

PRELIMINARY PLAN

SHEET

7 OF 9

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

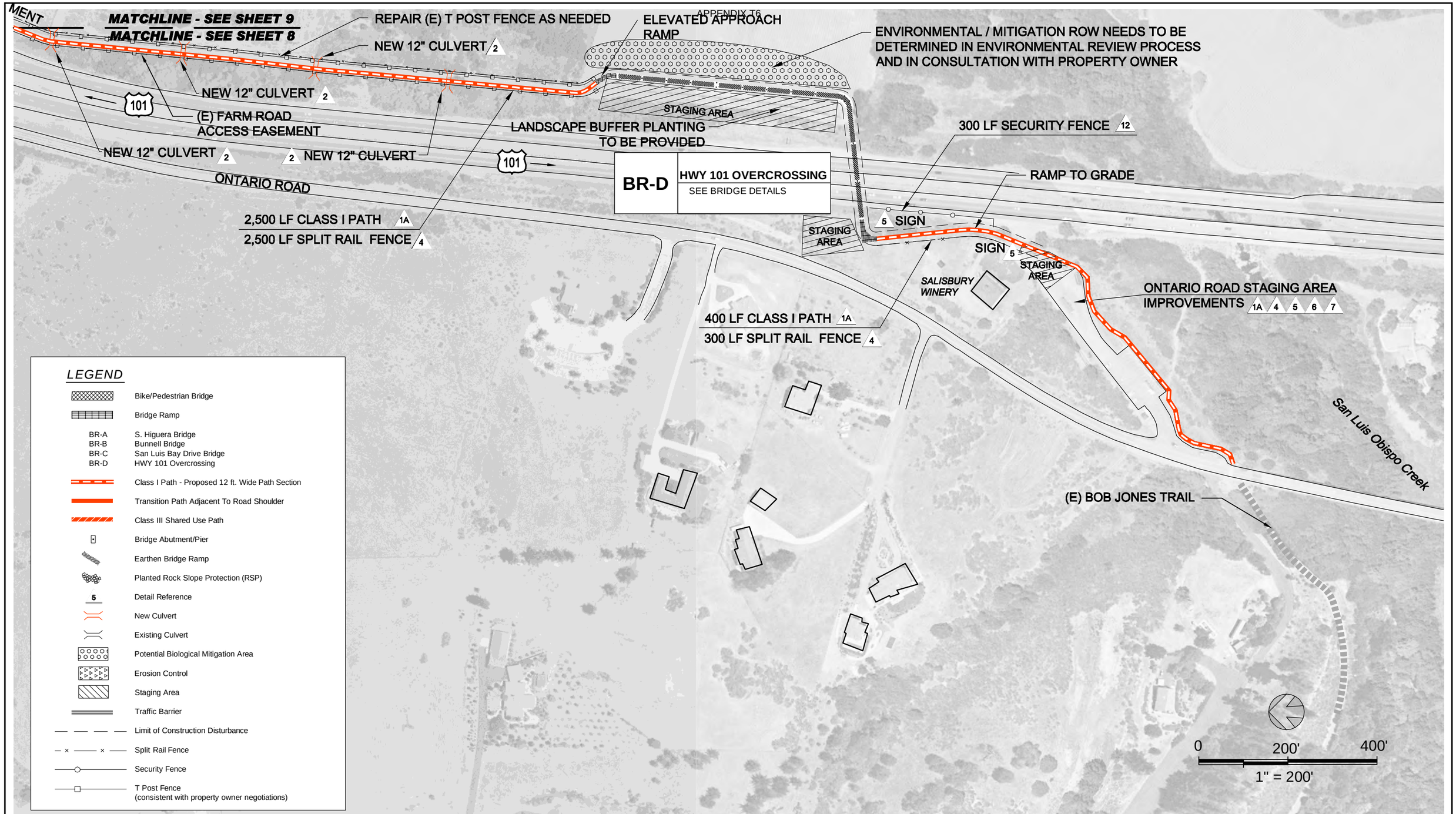
DESIGN	MH
DRAWN	BJV
CHECKED	JP
APPR'D	JP
DATE	08/28/08
PROJECT NUMBER	250083

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

PRELIMINARY PLAN

SHEET
8 OF 9

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

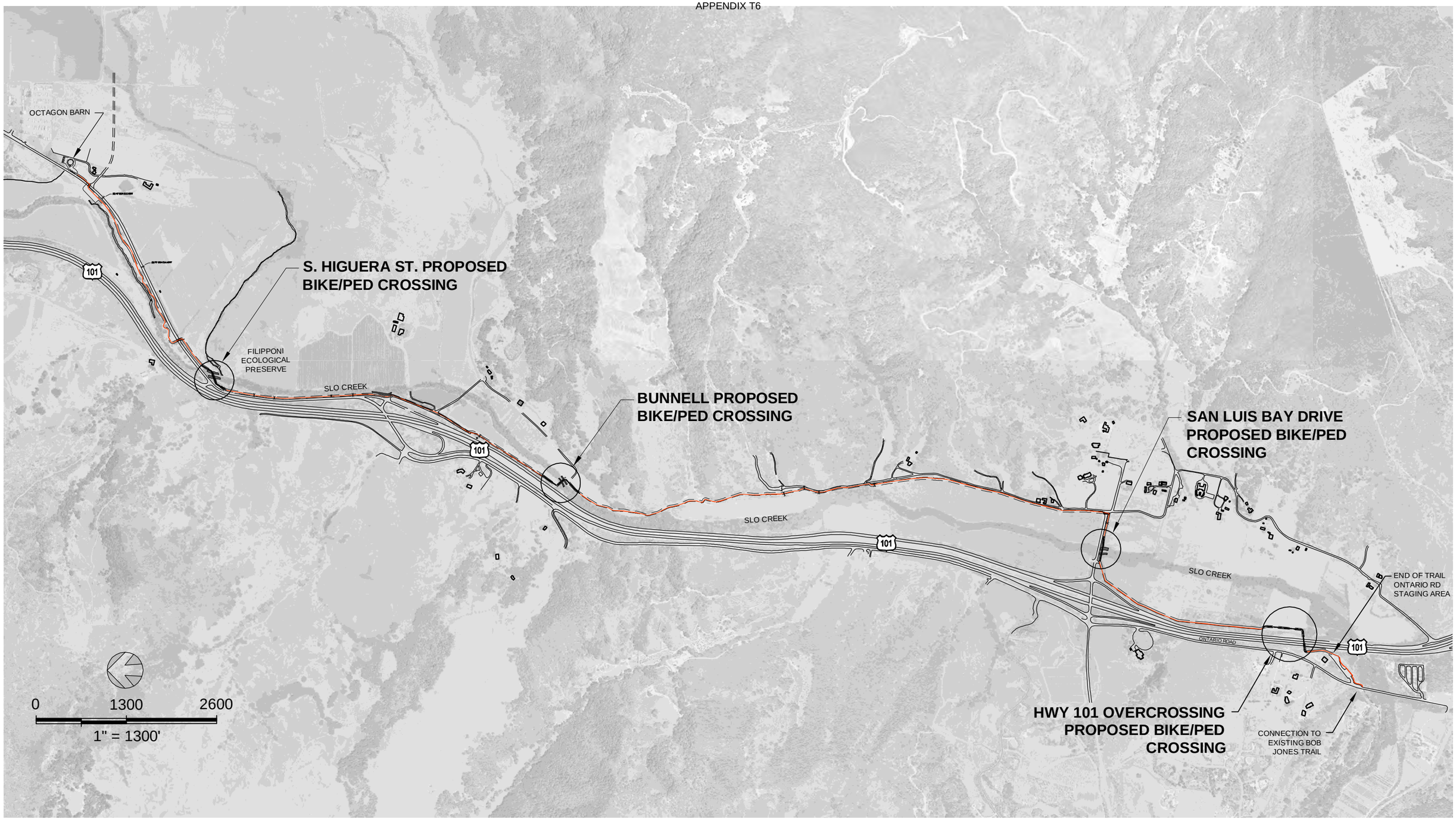
DESIGN	MH
DRAWN	BJV
CHECKED	JP
APPR'D	JP
DATE	11/23/08
PROJECT NUMBER	250083

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

PRELIMINARY PLAN

SHEET
9 OF 9

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

DESIGN	JCM
DRAWN	BJV
CHECKED	JP
APPR'D	JCM
DATE	08/28/08
PROJECT NUMBER	250083

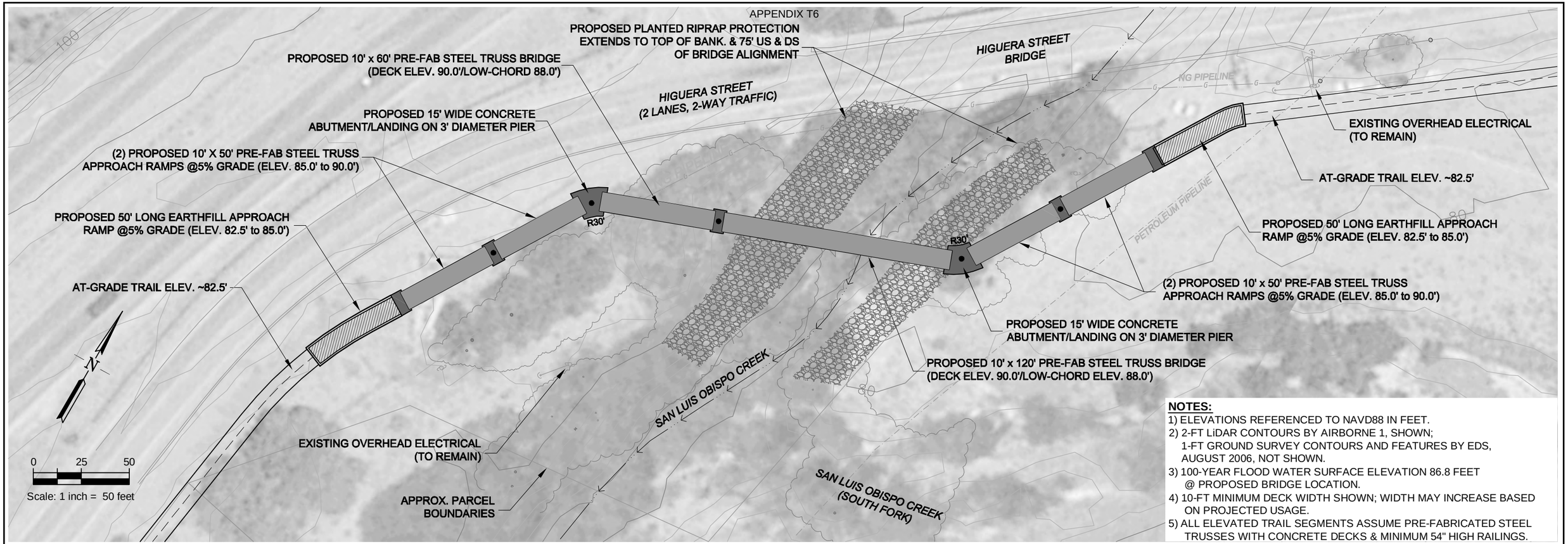
QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

PROPOSED BICYCLE / PEDESTRIAN CROSSINGS

SHEET

1 OF 5

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

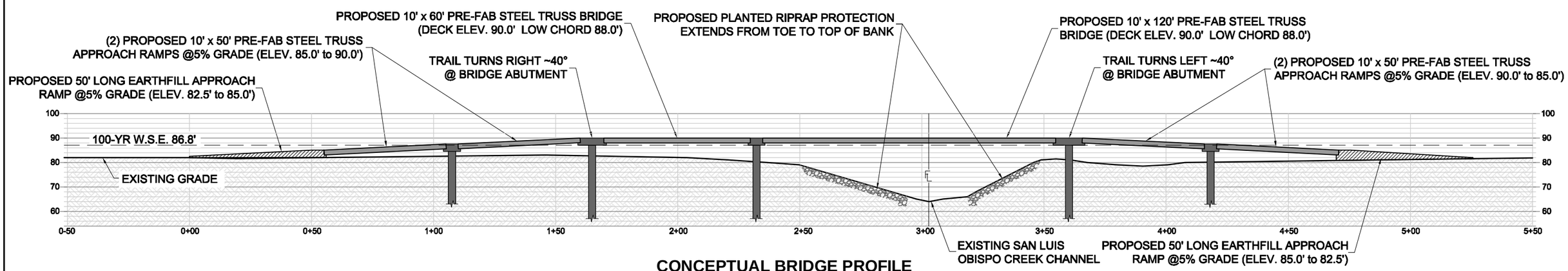


NOTES:

1) ELEVATIONS REFERENCED TO NAVD88 IN FEET.
2) 2-FT LiDAR CONTOURS BY AIRBORNE 1, SHOWN; 1-FT GROUND SURVEY CONTOURS AND FEATURES BY EDS, AUGUST 2006, NOT SHOWN.
3) 100-YEAR FLOOD WATER SURFACE ELEVATION 86.8 FEET @ PROPOSED BRIDGE LOCATION.
4) 10-FT MINIMUM DECK WIDTH SHOWN; WIDTH MAY INCREASE BASED ON PROJECTED USAGE.
5) ALL ELEVATED TRAIL SEGMENTS ASSUME PRE-FABRICATED STEEL TRUSSES WITH CONCRETE DECKS & MINIMUM 54" HIGH RAILINGS.

CONCEPTUAL BRIDGE PLAN

SCALE: 1" = 50'



CONCEPTUAL BRIDGE PROFILE

SCALE (HORIZ./VERT.): 1" = 40'

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

DESIGN	JCM
DRAWN	MCL
CHECKED	JP
APPR'D	JCM
DATE	12/27/07
PROJECT NUMBER	250083

QUESTA ENGINEERING CORP.
Civil Environmental & Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

CONCEPTUAL SAN LUIS OBISPO CREEK CROSSING

AT

HIGUERA STREET

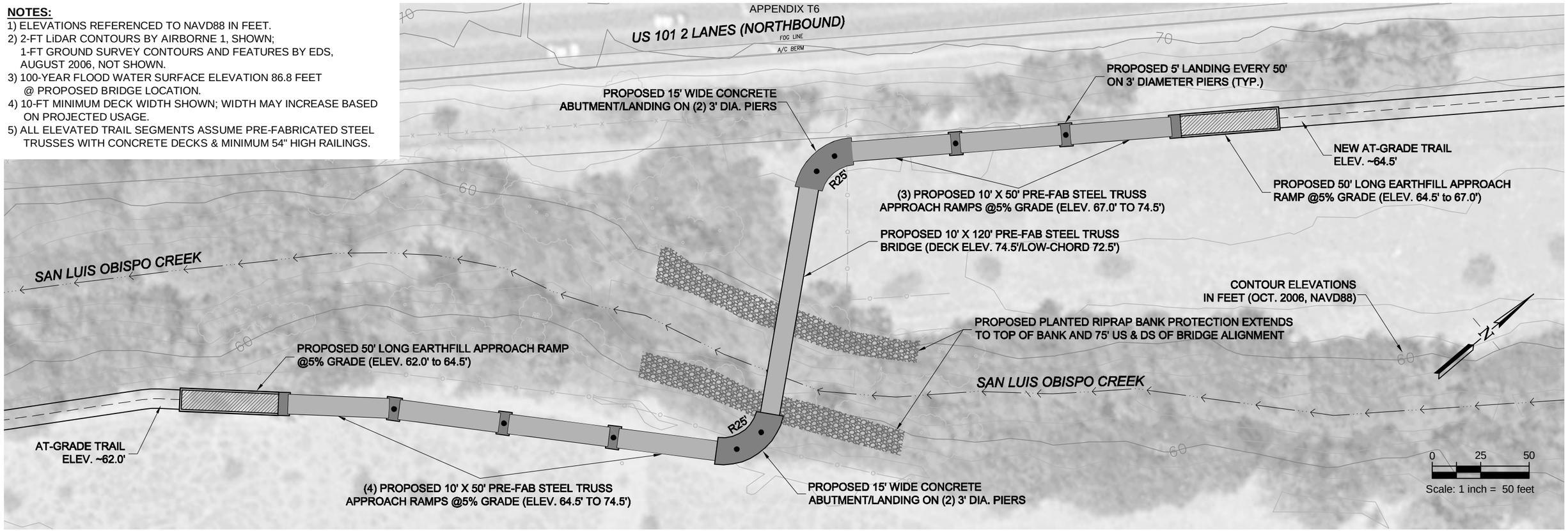
SHEET

2 OF 5

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

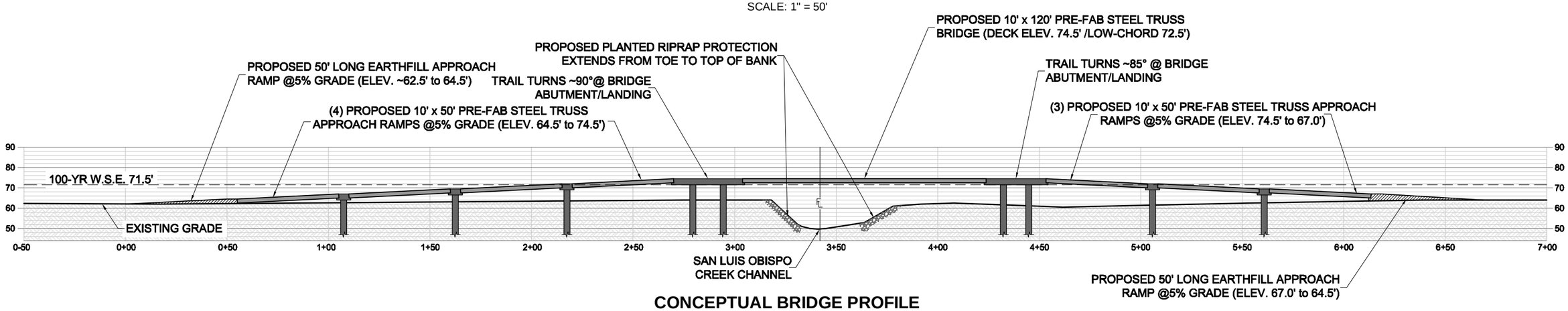
NOTES:

1) ELEVATIONS REFERENCED TO NAVD88 IN FEET.
2) 2-FT LiDAR CONTOURS BY AIRBORNE 1, SHOWN; 1-FT GROUND SURVEY CONTOURS AND FEATURES BY EDS, AUGUST 2006, NOT SHOWN.
3) 100-YEAR FLOOD WATER SURFACE ELEVATION 86.8 FEET @ PROPOSED BRIDGE LOCATION.
4) 10-FT MINIMUM DECK WIDTH SHOWN; WIDTH MAY INCREASE BASED ON PROJECTED USAGE.
5) ALL ELEVATED TRAIL SEGMENTS ASSUME PRE-FABRICATED STEEL TRUSSES WITH CONCRETE DECKS & MINIMUM 54" HIGH RAILINGS.



CONCEPTUAL BRIDGE PLAN

SCALE: 1" = 50'



CONCEPTUAL BRIDGE PROFILE

SCALE (HORIZ./VERT.): 1" = 50'

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

DESIGN	JCM
DRAWN	MCL
CHECKED	JP
APPR'D	JCM
DATE	12/27/07
PROJECT NUMBER	250083

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

CONCEPTUAL SAN LUIS OBISPO CREEK CROSSING

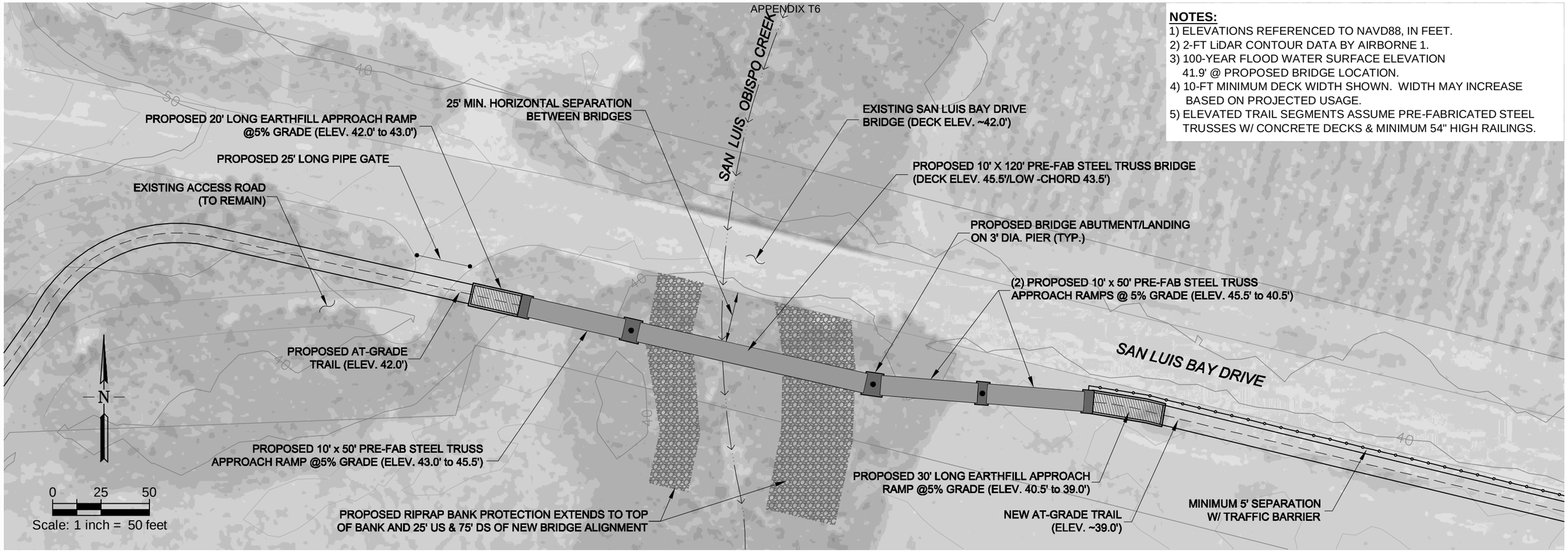
AT

BUNNELL PROPERTY

SHEET

3 OF 5

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

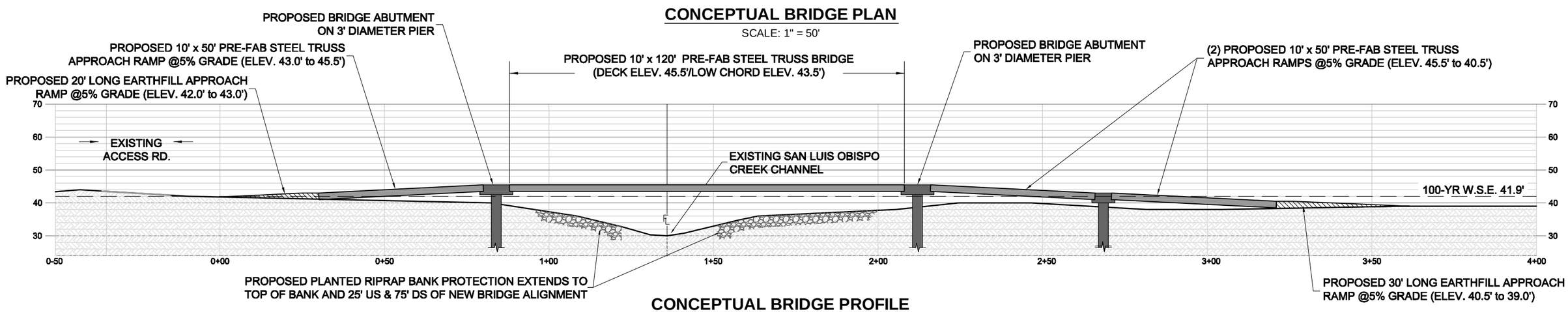


NOTES:

1) ELEVATIONS REFERENCED TO NAVD88, IN FEET.
2) 2-FT LiDAR CONTOUR DATA BY AIRBORNE 1.
3) 100-YEAR FLOOD WATER SURFACE ELEVATION 41.9' @ PROPOSED BRIDGE LOCATION.
4) 10-FT MINIMUM DECK WIDTH SHOWN. WIDTH MAY INCREASE BASED ON PROJECTED USAGE.
5) ELEVATED TRAIL SEGMENTS ASSUME PRE-FABRICATED STEEL TRUSSES W/ CONCRETE DECKS & MINIMUM 54" HIGH RAILINGS.

CONCEPTUAL BRIDGE PLAN

SCALE: 1" = 50'



CONCEPTUAL BRIDGE PROFILE

SCALE (HORIZ./VERT.): 1" = 30'

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

DESIGN	JCM
DRAWN	MCL
CHECKED	JP
APPR'D	JCM
DATE	12/27/07
PROJECT NUMBER	250083

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

CONCEPTUAL SAN LUIS OBISPO CREEK CROSSING

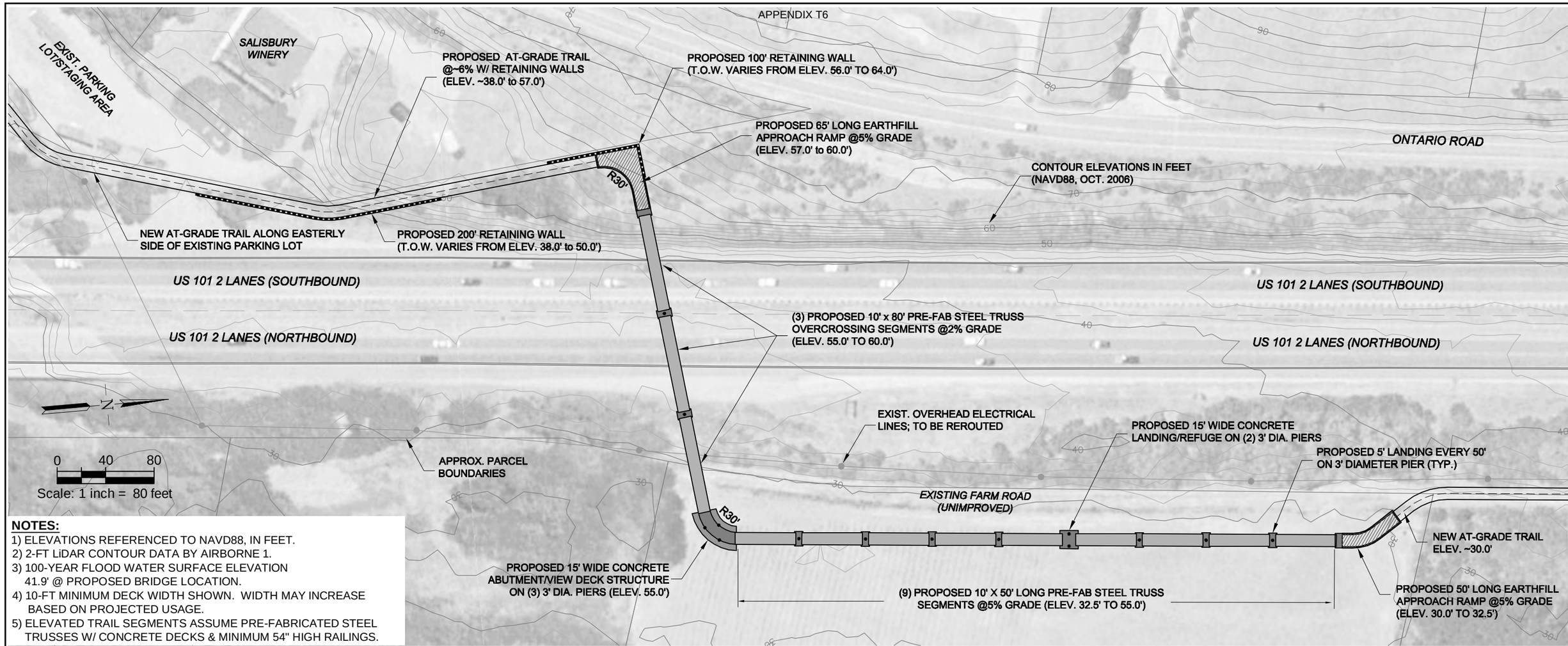
AT

SAN LUIS BAY DRIVE

SHEET

4 OF 5

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

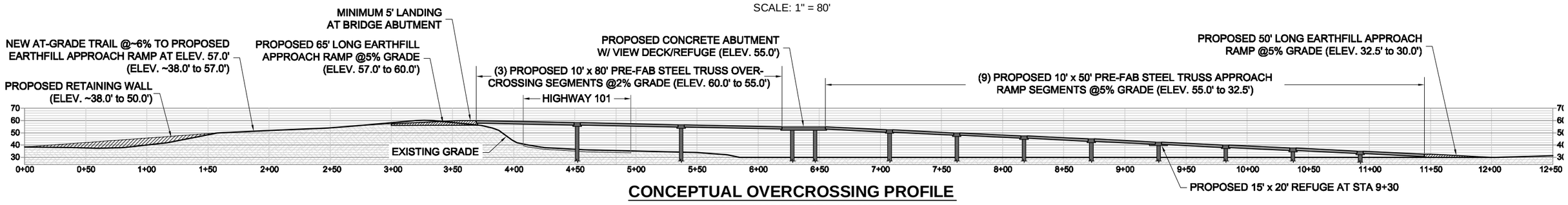


NOTES:

1) ELEVATIONS REFERENCED TO NAVD88, IN FEET.
2) 2-FT LiDAR CONTOUR DATA BY AIRBORNE 1.
3) 100-YEAR FLOOD WATER SURFACE ELEVATION 41.9' @ PROPOSED BRIDGE LOCATION.
4) 10-FT MINIMUM DECK WIDTH SHOWN. WIDTH MAY INCREASE BASED ON PROJECTED USAGE.
5) ELEVATED TRAIL SEGMENTS ASSUME PRE-FABRICATED STEEL TRUSSES W/ CONCRETE DECKS & MINIMUM 54" HIGH RAILINGS.

CONCEPTUAL OVERCROSSING PLAN

SCALE: 1" = 80'



CONCEPTUAL OVERCROSSING PROFILE

SCALE (HORIZ./VERT.): 1" = 80'

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

MORRO GROUP, INC.
Environmental Services

DESIGN	JCM
DRAWN	MCL
CHECKED	JP
APPR'D	JCM
DATE	12/27/07
PROJECT NUMBER	250083

QUESTA ENGINEERING CORP.
Civil
Environmental
& Water Resources
(510) 236-6114
FAX (510) 236-2423
questa@questaec.com
P.O. Box 70356 1220 Brickyard Cove Road Point Richmond, CA 94807

CONCEPTUAL HIGHWAY 101 OVERCROSSING

SHEET

5 OF 5

IF BAR DOES NOT MEASURE 1" DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

APPENDIX B

Hydraulic Analysis

Appendix B - Hydraulic Analysis: Existing Conditions

HEC-RAS Plan: Total_Base River: SLO Creek Reach: Below Prefumo

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)	
Below Prefumo	33779.96	Questa 2	5120.63	67.91	83.87	76.99	84.30	0.003349	5.25	974.91	114.49	0.32
Below Prefumo	33779.96	Questa 10	9323.07	67.91	86.04	79.91	86.19	0.001207	3.41	3067.79	389.16	0.19
Below Prefumo	33779.96	Questa 25	12077.62	67.91	86.46	81.57	86.68	0.001793	4.09	3239.30	435.69	0.24
Below Prefumo	33779.96	Questa 50	14055.24	67.91	87.26	82.72	87.50	0.001795	4.30	3606.76	465.43	0.24
Below Prefumo	33779.96	Questa100	15679.71	67.91	87.93	83.68	88.19	0.001753	4.44	3920.18	471.66	0.24
Below Prefumo	33757.76	Questa 2	5120.63	66.80	83.80	76.45	84.22	0.003206	5.19	986.24	114.04	0.31
Below Prefumo	33757.76	Questa 10	9323.07	66.80	86.01	79.58	86.16	0.001190	3.42	3076.08	386.23	0.19
Below Prefumo	33757.76	Questa 25	12077.62	66.80	86.41	81.31	86.63	0.001781	4.11	3239.23	433.31	0.24
Below Prefumo	33757.76	Questa 50	14055.24	66.80	87.22	82.38	87.46	0.001789	4.32	3605.14	464.87	0.24
Below Prefumo	33757.76	Questa100	15679.71	66.80	87.89	83.43	88.14	0.001748	4.46	3918.76	471.24	0.24
Below Prefumo	33698.72		Bridge									
Below Prefumo	33641	Questa 2	5120.63	66.80	81.47	76.16	81.93	0.003972	5.44	941.53	303.79	0.35
Below Prefumo	33641	Questa 10	9323.07	66.80	84.21	78.73	85.01	0.005095	7.14	1305.59	336.62	0.41
Below Prefumo	33641	Questa 25	12077.62	66.80	85.86	80.39	86.07	0.001590	3.96	3324.50	371.82	0.23
Below Prefumo	33641	Questa 50	14055.24	66.80	86.61	81.24	86.85	0.001668	4.27	3612.86	399.63	0.24
Below Prefumo	33641	Questa100	15679.71	66.80	87.26	81.87	87.52	0.001683	4.47	3876.18	413.72	0.24
Below Prefumo	33614	Questa 2	5120.63	65.00	81.29		81.41	0.001104	3.16	1983.82	339.57	0.19
Below Prefumo	33614	Questa 10	9323.07	65.00	84.18		84.36	0.001155	3.83	3010.74	371.64	0.20
Below Prefumo	33614	Questa 25	12077.62	65.00	85.56		85.77	0.001213	4.23	3540.19	398.79	0.21
Below Prefumo	33614	Questa 50	14055.24	65.00	86.29		86.53	0.001299	4.54	3838.29	410.51	0.22
Below Prefumo	33614	Questa100	15679.71	65.00	86.94		87.19	0.001327	4.73	4104.17	417.10	0.22
Below Prefumo	33544	Questa 2	5120.63	65.00	81.11		81.31	0.001977	3.89	1580.74	319.48	0.25
Below Prefumo	33544	Questa 10	9323.07	65.00	84.03		84.25	0.001730	4.27	2654.79	405.27	0.24
Below Prefumo	33544	Questa 25	12077.62	65.00	85.42		85.67	0.001623	4.51	3225.87	419.77	0.24
Below Prefumo	33544	Questa 50	14055.24	65.00	86.15		86.43	0.001660	4.76	3537.74	430.85	0.24
Below Prefumo	33544	Questa100	15679.71	65.00	86.80		87.09	0.001635	4.89	3818.96	440.59	0.24
Below Prefumo	33532	Questa 2	5120.63	65.00	81.08		81.28	0.001998	3.91	1572.30	318.76	0.25
Below Prefumo	33532	Questa 10	9323.07	65.00	84.01		84.23	0.001747	4.28	2645.51	405.07	0.24
Below Prefumo	33532	Questa 25	12077.62	65.00	85.40		85.65	0.001637	4.53	3216.88	419.45	0.24
Below Prefumo	33532	Questa 50	14055.24	65.00	86.13		86.41	0.001674	4.77	3528.26	430.51	0.24
Below Prefumo	33532	Questa100	15679.71	65.00	86.78		87.07	0.001647	4.90	3809.42	440.27	0.24
Below Prefumo	33394	Questa 2	5120.63	64.00	80.67		80.95	0.002709	4.30	1190.45	165.64	0.28
Below Prefumo	33394	Questa 10	9323.07	64.00	83.48		83.92	0.002719	5.35	1803.08	251.10	0.30
Below Prefumo	33394	Questa 25	12077.62	64.00	84.83		85.34	0.002689	5.79	2151.20	263.24	0.30
Below Prefumo	33394	Questa 50	14055.24	64.00	85.50		86.08	0.002852	6.20	2330.24	272.52	0.31
Below Prefumo	33394	Questa100	15679.71	64.00	86.12		86.74	0.002855	6.41	2501.29	281.95	0.32
Below Prefumo	33382.72	Questa 2	5826.92	65.13	80.46		80.90	0.003275	5.39	1129.77	142.62	0.32
Below Prefumo	33382.72	Questa 10	10912.23	65.13	82.99		83.83	0.005347	7.50	1550.70	224.71	0.42
Below Prefumo	33382.72	Questa 25	14549.64	65.13	84.14		85.23	0.006115	8.63	1843.18	262.06	0.46
Below Prefumo	33382.72	Questa 50	16809.78	65.13	84.75		85.96	0.006489	9.21	2002.23	267.29	0.48
Below Prefumo	33382.72	Questa100	18999.29	65.13	85.27		86.62	0.006818	9.72	2144.91	276.75	0.49
Below Prefumo	32983.12	Questa 2	5826.92	63.85	79.03		79.53	0.003555	5.71	1056.12	219.85	0.33
Below Prefumo	32983.12	Questa 10	10912.23	63.85	80.72		81.60	0.005825	7.92	1599.87	372.81	0.43
Below Prefumo	32983.12	Questa 25	14549.64	63.85	81.60		82.65	0.006771	8.89	1935.67	386.84	0.47
Below Prefumo	32983.12	Questa 50	16809.78	63.85	82.06		83.22	0.007186	9.41	2118.63	404.67	0.49
Below Prefumo	32983.12	Questa100	18999.29	63.85	82.48		83.73	0.007525	9.86	2288.80	418.94	0.50
Below Prefumo	32638.86	Questa 2	5826.92	62.53	78.11		78.46	0.002607	5.08	1355.92	427.84	0.29
Below Prefumo	32638.86	Questa 10	10912.23	62.53	79.42		79.97	0.003746	6.60	1939.64	481.21	0.35
Below Prefumo	32638.86	Questa 25	14549.64	62.53	80.10		80.80	0.004322	7.38	2272.96	497.47	0.38
Below Prefumo	32638.86	Questa 50	16809.78	62.53	80.47		81.25	0.004630	7.80	2459.19	516.00	0.40
Below Prefumo	32638.86	Questa100	18999.29	62.53	80.79		81.67	0.004898	8.17	2631.13	533.91	0.41
Below Prefumo	32266.82	Questa 2	5826.92	62.01	76.76	72.40	77.18	0.004647	5.85	1310.12	698.15	0.36
Below Prefumo	32266.82	Questa 10	10912.23	62.01	77.70	77.16	78.21	0.005890	6.65	1976.62	720.92	0.42
Below Prefumo	32266.82	Questa 25	14549.64	62.01	78.20	77.55	78.82	0.006318	7.09	2339.00	727.56	0.44
Below Prefumo	32266.82	Questa 50	16809.78	62.01	78.47	77.73	79.16	0.006537	7.35	2536.42	730.12	0.44
Below Prefumo	32266.82	Questa100	18999.29	62.01	78.71	77.82	79.48	0.006707	7.58	2717.34	732.45	0.45
Below Prefumo	31868.76	Questa 2	5826.92	61.39	74.52	71.77	75.05	0.006182	6.63	1223.54	871.13	0.41
Below Prefumo	31868.76	Questa 10	10912.23	61.39	75.55		76.00	0.005198	6.49	2128.40	885.63	0.39
Below Prefumo	31868.76	Questa 25	14549.64	61.39	76.15		76.63	0.004684	6.36	2661.38	891.32	0.37
Below Prefumo	31868.76	Questa 50	16809.78	61.39	76.50		77.01	0.004383	6.27	2978.71	894.58	0.36
Below Prefumo	31868.76	Questa100	18999.29	61.39	76.85		77.37	0.004087	6.16	3286.34	897.78	0.35
Below Prefumo	31428.59	Questa 2	5826.92	61.22	73.30		73.48	0.002073	4.18	1924.98	973.30	0.25
Below Prefumo	31428.59	Questa 10	10912.23	61.22	74.38		74.59	0.001994	4.37	2979.13	985.99	0.25
Below Prefumo	31428.59	Questa 25	14549.64	61.22	75.10		75.34	0.001816	4.23	3695.55	997.07	0.24
Below Prefumo	31428.59	Questa 50	16809.78	61.22	75.54		75.79	0.001700	4.14	4133.26	1003.25	0.23
Below Prefumo	31428.59	Questa100	18999.29	61.22	75.96		76.23	0.001584	4.03	4561.19	1009.39	0.23

Appendix B - Hydraulic Analysis: Existing Conditions

HEC-RAS Plan: Total_Base River: SLO Creek Reach: Below Prefumo (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)	
Below Prefumo	30961.47	Questa 2	5826.92	59.55	72.69		72.78	0.000962	2.69	2369.37	767.34	0.17
Below Prefumo	30961.47	Questa 10	10912.23	59.55	73.51		73.71	0.001585	3.66	3001.55	780.24	0.22
Below Prefumo	30961.47	Questa 25	14549.64	59.55	74.22		74.48	0.001647	3.76	3563.20	796.73	0.23
Below Prefumo	30961.47	Questa 50	16809.78	59.55	74.68		74.97	0.001593	3.79	3935.97	804.91	0.23
Below Prefumo	30961.47	Questa100	18999.29	59.55	75.15		75.46	0.001515	3.80	4311.75	813.86	0.22
Below Prefumo	30676.26	Questa 2	5826.92	58.27	72.33	70.80	72.44	0.002236	3.48	2392.15	843.65	0.24
Below Prefumo	30676.26	Questa 10	10912.23	58.27	72.81	71.47	73.07	0.004956	5.35	2803.48	859.69	0.36
Below Prefumo	30676.26	Questa 25	14549.64	58.27	73.55	71.83	73.85	0.004676	5.58	3442.75	866.68	0.36
Below Prefumo	30676.26	Questa 50	16809.78	58.27	74.08	72.10	74.38	0.004212	5.55	3900.77	871.65	0.35
Below Prefumo	30676.26	Questa100	18999.29	58.27	74.60	72.31	74.91	0.003779	5.49	4360.63	877.62	0.33
Below Prefumo	30635.2		Bridge									
Below Prefumo	30623.00	Questa 2	5826.92	58.27	72.18	70.53	72.28	0.001443	2.91	2267.90	888.15	0.21
Below Prefumo	30623.00	Questa 10	10912.23	58.27	72.73	71.27	72.98	0.002885	4.32	2771.23	919.95	0.29
Below Prefumo	30623.00	Questa 25	14549.64	58.27	73.45	71.62	73.74	0.002713	4.46	3442.34	936.12	0.29
Below Prefumo	30623.00	Questa 50	16809.78	58.27	73.98	71.82	74.27	0.002420	4.40	3933.46	945.07	0.28
Below Prefumo	30623.00	Questa100	18999.29	58.27	74.50	72.06	74.80	0.002144	4.32	4433.29	954.60	0.26
Below Prefumo	30438.21	Questa 2	5826.92	57.28	72.08	67.79	72.13	0.000410	1.80	3399.91	1147.49	0.11
Below Prefumo	30438.21	Questa 10	10912.23	57.28	72.52	70.44	72.65	0.000945	2.82	3905.23	1153.33	0.17
Below Prefumo	30438.21	Questa 25	14549.64	57.28	73.27	70.76	73.42	0.000904	2.92	4767.59	1163.21	0.17
Below Prefumo	30438.21	Questa 50	16809.78	57.28	73.82	70.93	73.98	0.000809	2.87	5411.38	1170.46	0.16
Below Prefumo	30438.21	Questa100	18999.29	57.28	74.37	71.09	74.54	0.000720	2.81	6059.95	1177.72	0.15
Below Prefumo	30042.53	Questa 2	6321.33	57.02	71.91	67.02	71.96	0.000327	1.65	3691.74	927.62	0.10
Below Prefumo	30042.53	Questa 10	11936.36	57.02	71.99	69.52	72.16	0.001093	3.03	3769.19	928.70	0.18
Below Prefumo	30042.53	Questa 25	16068.17	57.02	72.70	69.86	72.92	0.001193	3.34	4427.05	937.81	0.19
Below Prefumo	30042.53	Questa 50	18540.20	57.02	73.29	70.14	73.52	0.001086	3.32	4989.07	945.56	0.19
Below Prefumo	30042.53	Questa100	21047.54	57.02	73.88	70.42	74.12	0.000998	3.31	5547.92	953.21	0.18
Below Prefumo	29852.94	Questa 2	6321.33	56.99	71.82	67.01	71.89	0.000457	1.76	3210.62	780.26	0.12
Below Prefumo	29852.94	Questa 10	11936.36	56.99	71.64	70.60	71.90	0.001870	3.51	3068.11	774.77	0.23
Below Prefumo	29852.94	Questa 25	16068.17	56.99	72.28	71.00	72.63	0.002110	3.95	3569.28	787.35	0.25
Below Prefumo	29852.94	Questa 50	18540.20	56.99	72.91	71.00	73.26	0.001855	3.90	4066.69	796.31	0.24
Below Prefumo	29852.94	Questa100	21047.54	56.99	73.52	71.00	73.89	0.001662	3.87	4556.71	804.49	0.23
Below Prefumo	29815.2		Bridge									
Below Prefumo	29786.44	Questa 2	6321.33	56.53	69.34	66.42	69.65	0.003968	4.70	1440.71	660.36	0.34
Below Prefumo	29786.44	Questa 10	11936.36	56.53	71.01	68.82	71.46	0.003872	5.24	2217.86	742.83	0.34
Below Prefumo	29786.44	Questa 25	16068.17	56.53	72.10	69.62	72.36	0.001451	3.35	4051.24	775.24	0.21
Below Prefumo	29786.44	Questa 50	18540.20	56.53	72.77	69.95	73.03	0.001305	3.36	4567.73	783.70	0.20
Below Prefumo	29786.44	Questa100	21047.54	56.53	73.40	70.29	73.68	0.001199	3.37	5066.95	791.61	0.20
Below Prefumo	29470.07	Questa 2	6321.33	55.18	68.46	65.04	68.67	0.002310	3.67	1790.79	625.50	0.26
Below Prefumo	29470.07	Questa 10	11936.36	55.18	70.38	67.84	70.63	0.001593	3.65	3077.52	694.43	0.23
Below Prefumo	29470.07	Questa 25	16068.17	55.18	71.67	68.51	71.93	0.001270	3.60	3985.36	711.59	0.21
Below Prefumo	29470.07	Questa 50	18540.20	55.18	72.38	68.75	72.65	0.001156	3.60	4487.41	718.02	0.20
Below Prefumo	29470.07	Questa100	21047.54	55.18	73.04	69.05	73.32	0.001078	3.63	4963.37	724.35	0.19
Below Prefumo	29220.55	Questa 2	6321.33	54.17	67.76		68.04	0.002474	4.66	1636.15	654.03	0.29
Below Prefumo	29220.55	Questa 10	11936.36	54.17	69.98		70.21	0.001619	4.38	3171.59	726.88	0.24
Below Prefumo	29220.55	Questa 25	16068.17	54.17	71.37		71.60	0.001287	4.23	4198.84	750.66	0.22
Below Prefumo	29220.55	Questa 50	18540.20	54.17	72.10		72.34	0.001178	4.21	4756.37	763.50	0.21
Below Prefumo	29220.55	Questa100	21047.54	54.17	72.79		73.03	0.001105	4.22	5282.75	776.03	0.20
Below Prefumo	28780.70	Questa 2	6321.33	52.69	67.11		67.26	0.001317	3.43	2107.47	594.91	0.20
Below Prefumo	28780.70	Questa 10	11936.36	52.69	69.49		69.66	0.001003	3.51	3649.01	707.97	0.19
Below Prefumo	28780.70	Questa 25	16068.17	52.69	70.97		71.14	0.000852	3.52	4753.01	805.49	0.17
Below Prefumo	28780.70	Questa 50	18540.20	52.69	71.74		71.92	0.000798	3.54	5405.16	887.78	0.17
Below Prefumo	28780.70	Questa100	21047.54	52.69	72.45		72.63	0.000755	3.57	6044.97	914.42	0.17
Below Prefumo	28455.06	Questa 2	6321.33	52.10	66.73		66.86	0.001180	3.15	2244.03	600.32	0.19
Below Prefumo	28455.06	Questa 10	11936.36	52.10	69.21		69.37	0.000846	3.16	3798.41	645.50	0.17
Below Prefumo	28455.06	Questa 25	16068.17	52.10	70.72		70.89	0.000743	3.23	4811.72	716.27	0.16
Below Prefumo	28455.06	Questa 50	18540.20	52.10	71.50		71.68	0.000708	3.29	5415.19	837.85	0.16
Below Prefumo	28455.06	Questa100	21047.54	52.10	72.22		72.41	0.000688	3.35	6019.81	845.80	0.16
Below Prefumo	28150	Questa 2	6321.33	51.50	66.31		66.46	0.001129	3.59	2108.21	460.86	0.19
Below Prefumo	28150	Questa 10	11936.36	51.50	68.85		69.05	0.001002	3.90	3297.06	478.52	0.19
Below Prefumo	28150	Questa 25	16068.17	51.50	70.36		70.60	0.000950	4.09	4069.62	598.87	0.19
Below Prefumo	28150	Questa 50	18540.20	51.50	71.15		71.41	0.000919	4.16	4543.97	610.35	0.19
Below Prefumo	28150	Questa100	21047.54	51.50	71.86		72.14	0.000898	4.24	4982.59	620.79	0.19
Below Prefumo	28129.27	Questa 2	6321.33	51.97	66.29	63.53	66.44	0.001349	3.25	2050.42	450.83	0.20
Below Prefumo	28129.27	Questa 10	11936.36	51.97	68.81	64.72	69.03	0.001114	3.55	3216.97	483.28	0.19

Appendix B - Hydraulic Analysis: Existing Conditions

HEC-RAS Plan: Total_Base River: SLO Creek Reach: Below Prefumo (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)	
Below Prefumo	28129.27	Questa 25	16068.17	51.97	70.33	65.27	70.58	0.001033	3.74	4011.42	555.19	0.19
Below Prefumo	28129.27	Questa 50	18540.20	51.97	71.12	65.57	71.38	0.001021	3.88	4460.75	594.51	0.19
Below Prefumo	28129.27	Questa100	21047.54	51.97	71.83	65.88	72.12	0.001001	3.99	4902.71	626.64	0.19
Below Prefumo	28070	Questa 2	6321.33	51.25	65.80		65.99	0.001765	3.70	1856.55	446.69	0.23
Below Prefumo	28070	Questa 10	11936.36	51.25	68.45		68.68	0.001245	3.76	3071.03	470.87	0.20
Below Prefumo	28070	Questa 25	16068.17	51.25	69.98		70.27	0.001126	3.91	3803.01	480.90	0.20
Below Prefumo	28070	Questa 50	18540.20	51.25	70.78		71.08	0.001071	3.97	4278.78	604.34	0.19
Below Prefumo	28070	Questa100	21047.54	51.25	71.50		71.82	0.001030	4.04	4719.92	616.33	0.19
Below Prefumo	27996	Questa 2	6321.33	49.50	65.73		65.88	0.001065	3.37	2073.75	431.89	0.18
Below Prefumo	27996	Questa 10	11936.36	49.50	68.39		68.60	0.000893	3.58	3262.26	483.35	0.17
Below Prefumo	27996	Questa 25	16068.17	49.50	69.94		70.18	0.000843	3.75	4053.78	533.46	0.17
Below Prefumo	27996	Questa 50	18540.20	49.50	70.74		71.00	0.000819	3.83	4524.08	605.91	0.17
Below Prefumo	27996	Questa100	21047.54	49.50	71.46		71.74	0.000804	3.91	4971.66	629.67	0.17
Below Prefumo	27984	Questa 2	6321.33	49.50	65.71		65.86	0.001074	3.38	2067.82	431.78	0.18
Below Prefumo	27984	Questa 10	11936.36	49.50	68.38		68.59	0.000898	3.59	3256.71	483.00	0.17
Below Prefumo	27984	Questa 25	16068.17	49.50	69.93		70.17	0.000847	3.76	4047.99	533.19	0.17
Below Prefumo	27984	Questa 50	18540.20	49.50	70.73		70.99	0.000823	3.84	4517.65	605.58	0.17
Below Prefumo	27984	Questa100	21047.54	49.50	71.45		71.73	0.000807	3.92	4965.10	629.32	0.17
Below Prefumo	27910	Questa 2	6321.33	49.50	65.64		65.79	0.000954	3.53	2117.61	422.94	0.18
Below Prefumo	27910	Questa 10	11936.36	49.50	68.31		68.52	0.000850	3.80	3277.69	442.31	0.17
Below Prefumo	27910	Questa 25	16068.17	49.50	69.85		70.11	0.000830	4.02	3966.47	452.07	0.18
Below Prefumo	27910	Questa 50	18540.20	49.50	70.65		70.93	0.000819	4.12	4406.79	582.92	0.18
Below Prefumo	27910	Questa100	21047.54	49.50	71.38		71.67	0.000807	4.20	4837.45	607.78	0.18
Below Prefumo	27837.52	Questa 2	6321.33	51.02	65.52	61.94	65.69	0.001782	3.72	1984.16	422.99	0.23
Below Prefumo	27837.52	Questa 10	11936.36	51.02	68.21	63.92	68.44	0.001434	4.05	3148.13	442.55	0.22
Below Prefumo	27837.52	Questa 25	16068.17	51.02	69.77	64.66	70.03	0.001348	4.31	3895.66	521.99	0.22
Below Prefumo	27837.52	Questa 50	18540.20	51.02	70.57	65.02	70.85	0.001298	4.41	4333.66	572.16	0.22
Below Prefumo	27837.52	Questa100	21047.54	51.02	71.29	65.36	71.60	0.001256	4.51	4756.41	598.33	0.21
Below Prefumo	27830	Questa 2	6321.33	50.00	64.97		65.11	0.000928	3.30	2136.91	405.98	0.18
Below Prefumo	27830	Questa 10	11936.36	50.00	67.74		67.95	0.000829	3.64	3287.21	423.95	0.17
Below Prefumo	27830	Questa 25	16068.17	50.00	69.30		69.56	0.000829	3.91	3964.21	447.34	0.18
Below Prefumo	27830	Questa 50	18540.20	50.00	70.09		70.38	0.000840	4.07	4333.22	558.68	0.18
Below Prefumo	27830	Questa100	21047.54	50.00	70.82		71.14	0.000841	4.20	4746.21	579.54	0.18
Below Prefumo	27357.37	Questa 2	6321.33	49.31	64.29	59.01	64.49	0.002229	3.91	1832.85	375.99	0.26
Below Prefumo	27357.37	Questa 10	11936.36	49.31	67.17	62.89	67.43	0.001748	4.28	2947.16	404.72	0.24
Below Prefumo	27357.37	Questa 25	16068.17	49.31	68.74	63.52	69.05	0.001666	4.62	3632.81	472.28	0.24
Below Prefumo	27357.37	Questa 50	18540.20	49.31	69.54	63.89	69.88	0.001637	4.79	4026.19	501.64	0.24
Below Prefumo	27357.37	Questa100	21047.54	49.31	70.27	64.25	70.63	0.001614	4.94	4396.48	514.49	0.24
Below Prefumo	27178.08	Questa 2	6321.33	49.11	63.78		64.08	0.002302	4.87	1584.32	230.41	0.26
Below Prefumo	27178.08	Questa 10	11936.36	49.11	66.51		67.00	0.003010	6.44	2261.66	286.67	0.30
Below Prefumo	27178.08	Questa 25	16068.17	49.11	68.02		68.62	0.003253	7.17	2754.21	367.31	0.32
Below Prefumo	27178.08	Questa 50	18540.20	49.11	68.81		69.45	0.003274	7.44	3051.17	386.04	0.33
Below Prefumo	27178.08	Questa100	21047.54	49.11	69.52		70.20	0.003281	7.67	3334.76	403.60	0.33
Below Prefumo	27074.70	Questa 2	6321.33	48.72	63.44		63.80	0.002952	4.77	1313.20	215.02	0.30
Below Prefumo	27074.70	Questa 10	11936.36	48.72	66.01		66.65	0.003514	5.69	1906.75	272.59	0.33
Below Prefumo	27074.70	Questa 25	16068.17	48.72	67.45		68.25	0.003550	6.28	2334.97	340.45	0.34
Below Prefumo	27074.70	Questa 50	18540.20	48.72	68.22		69.08	0.003485	6.52	2610.70	371.81	0.34
Below Prefumo	27074.70	Questa100	21047.54	48.72	68.93		69.83	0.003394	6.71	2881.58	389.05	0.34
Below Prefumo	26778.09	Questa 2	6321.33	48.36	62.43		62.88	0.003432	5.25	1171.27	211.87	0.32
Below Prefumo	26778.09	Questa 10	11936.36	48.36	64.78		65.58	0.003967	6.19	1716.23	257.72	0.35
Below Prefumo	26778.09	Questa 25	16068.17	48.36	66.13		67.15	0.004056	6.83	2084.45	291.62	0.36
Below Prefumo	26778.09	Questa 50	18540.20	48.36	66.85		67.99	0.004046	7.13	2321.47	346.10	0.37
Below Prefumo	26778.09	Questa100	21047.54	48.36	67.57		68.77	0.003944	7.32	2574.34	363.52	0.37
Below Prefumo	26431.63	Questa 2	6321.33	47.67	60.89		61.47	0.004945	5.25	1068.61	215.76	0.37
Below Prefumo	26431.63	Questa 10	11936.36	47.67	62.74		63.88	0.006165	6.71	1483.18	228.87	0.43
Below Prefumo	26431.63	Questa 25	16068.17	47.67	63.76		65.33	0.006928	7.62	1719.78	236.45	0.46
Below Prefumo	26431.63	Questa 50	18540.20	47.67	64.27		66.10	0.007363	8.17	1841.07	242.56	0.48
Below Prefumo	26431.63	Questa100	21047.54	47.67	64.72		66.84	0.007816	8.71	1952.51	248.83	0.50
Below Prefumo	26023.24	Questa 2	6321.33	46.23	59.12		59.42	0.004660	4.63	1474.54	369.18	0.34
Below Prefumo	26023.24	Questa 10	11936.36	46.23	60.98		61.44	0.004864	5.36	2197.90	404.34	0.35
Below Prefumo	26023.24	Questa 25	16068.17	46.23	62.04		62.62	0.005040	5.91	2637.11	428.10	0.37
Below Prefumo	26023.24	Questa 50	18540.20	46.23	62.60		63.24	0.005116	6.18	2878.67	439.60	0.37
Below Prefumo	26023.24	Questa100	21047.54	46.23	63.12		63.83	0.005173	6.42	3111.04	449.25	0.38
Below Prefumo	25570.72	Questa 2	6321.33	46.26	57.69		57.93	0.002396	3.42	1629.80	413.44	0.24
Below Prefumo	25570.72	Questa 10	11936.36	46.26	59.42		59.84	0.002650	4.13	2388.02	445.25	0.26
Below Prefumo	25570.72	Questa 25	16068.17	46.26	60.39		60.93	0.002851	4.60	2819.70	452.05	0.28

Appendix B - Hydraulic Analysis: Existing Conditions

HEC-RAS Plan: Total_Base River: SLO Creek Reach: Below Prefumo (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)	
Below Prefumo	25570.72	Questa 50	18540.20	46.26	60.90		61.51	0.002934	4.83	3060.68	471.97	0.29
Below Prefumo	25570.72	Questa100	21047.54	46.26	61.39		62.08	0.003002	5.03	3292.30	474.79	0.29
Below Prefumo	25099.23	Questa 2	6321.33	44.52	56.42	54.40	56.71	0.003000	3.06	1560.16	456.59	0.26
Below Prefumo	25099.23	Questa 10	11936.36	44.52	57.96	55.43	58.48	0.003342	3.46	2299.58	502.13	0.28
Below Prefumo	25099.23	Questa 25	16068.17	44.52	58.84	56.27	59.50	0.003441	3.90	2741.04	505.04	0.29
Below Prefumo	25099.23	Questa 50	18540.20	44.52	59.30	56.82	60.05	0.003513	4.14	2977.27	506.91	0.29
Below Prefumo	25099.23	Questa100	21047.54	44.52	59.74	57.20	60.58	0.003595	4.36	3201.37	510.12	0.30
Below Prefumo	24712.76	Questa 2	6321.33	44.19	55.32		55.58	0.002759	2.49	1718.42	542.54	0.24
Below Prefumo	24712.76	Questa 10	11936.36	44.19	56.86		57.29	0.002691	2.99	2597.31	583.31	0.25
Below Prefumo	24712.76	Questa 25	16068.17	44.19	57.72		58.27	0.002763	3.34	3105.21	599.00	0.26
Below Prefumo	24712.76	Questa 50	18540.20	44.19	58.18		58.79	0.002820	3.54	3378.22	609.14	0.26
Below Prefumo	24712.76	Questa100	21047.54	44.19	58.61		59.29	0.002865	3.73	3642.19	618.10	0.27
Below Prefumo	24341.33	Questa 2	6321.33	43.70	54.23		54.50	0.003181	2.87	1640.97	517.61	0.26
Below Prefumo	24341.33	Questa 10	11936.36	43.70	55.70		56.18	0.003411	3.26	2453.99	583.04	0.28
Below Prefumo	24341.33	Questa 25	16068.17	43.70	56.50		57.12	0.003582	3.64	2927.21	599.84	0.29
Below Prefumo	24341.33	Questa 50	18540.20	43.70	56.93		57.61	0.003652	3.89	3182.01	602.43	0.30
Below Prefumo	24341.33	Questa100	21047.54	43.70	57.33		58.09	0.003716	4.12	3425.87	604.91	0.30
Below Prefumo	23930.51	Questa 2	6321.33	42.62	52.94		53.26	0.003590	3.30	1533.98	507.84	0.28
Below Prefumo	23930.51	Questa 10	11936.36	42.62	54.31		54.83	0.003988	3.99	2290.90	596.35	0.31
Below Prefumo	23930.51	Questa 25	16068.17	42.62	55.10		55.73	0.003969	4.36	2768.41	617.35	0.31
Below Prefumo	23930.51	Questa 50	18540.20	42.62	55.52		56.21	0.003968	4.56	3030.18	628.31	0.32
Below Prefumo	23930.51	Questa100	21047.54	42.62	55.92		56.67	0.003974	4.75	3280.02	631.04	0.32
Below Prefumo	23535.79	Questa 2	6321.33	41.77	51.74		51.92	0.003349	3.32	1887.18	606.08	0.28
Below Prefumo	23535.79	Questa 10	11936.36	41.77	53.02		53.37	0.003599	4.06	2676.42	623.27	0.30
Below Prefumo	23535.79	Questa 25	16068.17	41.77	53.76		54.24	0.003807	4.53	3142.65	639.53	0.31
Below Prefumo	23535.79	Questa 50	18540.20	41.77	54.15		54.71	0.003904	4.77	3396.36	647.31	0.32
Below Prefumo	23535.79	Questa100	21047.54	41.77	54.53		55.16	0.003984	4.99	3640.06	652.80	0.33
Below Prefumo	23114.16	Questa 2	6321.33	40.62	50.12		50.40	0.004893	3.77	1515.25	601.74	0.33
Below Prefumo	23114.16	Questa 10	11936.36	40.62	51.55		51.98	0.003941	3.78	2421.88	659.78	0.30
Below Prefumo	23114.16	Questa 25	16068.17	40.62	52.26		52.81	0.003996	4.11	2893.86	677.60	0.31
Below Prefumo	23114.16	Questa 50	18540.20	40.62	52.64		53.26	0.004011	4.30	3153.55	687.31	0.31
Below Prefumo	23114.16	Questa100	21047.54	40.62	53.00		53.70	0.004012	4.48	3407.96	700.49	0.32
Below Prefumo	23060.20	Questa 2	6321.33	40.68	49.87		50.13	0.004499	3.36	1571.91	630.37	0.31
Below Prefumo	23060.20	Questa 10	11936.36	40.68	51.38		51.76	0.003171	3.45	2571.13	687.31	0.27
Below Prefumo	23060.20	Questa 25	16068.17	40.68	52.09		52.59	0.003241	3.81	3064.37	704.85	0.28
Below Prefumo	23060.20	Questa 50	18540.20	40.68	52.48		53.04	0.003272	4.01	3339.53	722.56	0.29
Below Prefumo	23060.20	Questa100	21047.54	40.68	52.85		53.47	0.003291	4.18	3610.67	738.11	0.29
Below Prefumo	23048.56	Questa 2	6321.33	39.80	49.80	48.70	50.08	0.005518	3.68	1522.06	660.76	0.26
Below Prefumo	23048.56	Questa 10	11936.36	39.80	51.35	49.56	51.72	0.003662	3.47	2579.84	693.75	0.22
Below Prefumo	23048.56	Questa 25	16068.17	39.80	52.06	50.05	52.55	0.003744	3.71	3076.91	707.86	0.22
Below Prefumo	23048.56	Questa 50	18540.20	39.80	52.44	50.40	53.00	0.003776	3.84	3353.26	724.27	0.23
Below Prefumo	23048.56	Questa100	21047.54	39.80	52.82	50.67	53.43	0.003793	3.95	3625.24	739.07	0.23
Below Prefumo	23045.28		Bridge									
Below Prefumo	23003.51	Questa 2	6321.33	40.62	49.84		50.04	0.003071	3.02	1779.43	663.04	0.26
Below Prefumo	23003.51	Questa 10	11936.36	40.62	51.04		51.41	0.003156	3.62	2591.67	687.78	0.28
Below Prefumo	23003.51	Questa 25	16068.17	40.62	51.73		52.22	0.003270	4.00	3073.77	697.53	0.29
Below Prefumo	23003.51	Questa 50	18540.20	40.62	52.11		52.66	0.003328	4.20	3336.99	702.30	0.29
Below Prefumo	23003.51	Questa100	21047.54	40.62	52.47		53.09	0.003376	4.39	3591.91	715.17	0.30
Below Prefumo	22913.53	Questa 2	6321.33	40.29	49.66		49.84	0.002433	3.05	1910.76	701.21	0.24
Below Prefumo	22913.53	Questa 10	11936.36	40.29	50.88		51.20	0.002571	3.63	2782.84	738.54	0.26
Below Prefumo	22913.53	Questa 25	16068.17	40.29	51.58		52.00	0.002675	3.98	3306.62	753.97	0.27
Below Prefumo	22913.53	Questa 50	18540.20	40.29	51.96		52.43	0.002721	4.16	3595.01	760.13	0.27
Below Prefumo	22913.53	Questa100	21047.54	40.29	52.33		52.86	0.002757	4.33	3873.88	764.90	0.28
Below Prefumo	22562.02	Questa 2	6321.33	39.21	48.85		49.06	0.002942	3.40	1909.80	768.01	0.26
Below Prefumo	22562.02	Questa 10	11936.36	39.21	50.04		50.38	0.003130	3.93	2879.23	842.22	0.28
Below Prefumo	22562.02	Questa 25	16068.17	39.21	50.74		51.17	0.003154	4.24	3476.82	853.25	0.28
Below Prefumo	22562.02	Questa 50	18540.20	39.21	51.13		51.60	0.003165	4.40	3804.14	857.26	0.29
Below Prefumo	22562.02	Questa100	21047.54	39.21	51.49		52.01	0.003175	4.56	4118.27	861.10	0.29
Below Prefumo	22155.85	Questa 2	6321.33	38.03	47.76		47.91	0.002467	2.95	2240.48	928.66	0.24
Below Prefumo	22155.85	Questa 10	11936.36	38.03	48.98		49.22	0.002397	3.33	3385.56	945.51	0.24
Below Prefumo	22155.85	Questa 25	16068.17	38.03	49.70		50.00	0.002389	3.59	4069.07	950.60	0.25
Below Prefumo	22155.85	Questa 50	18540.20	38.03	50.09		50.43	0.002392	3.74	4440.38	953.21	0.25
Below Prefumo	22155.85	Questa100	21047.54	38.03	50.46		50.83	0.002398	3.87	4794.81	955.75	0.25
Below Prefumo	21757.07	Questa 2	6321.33	36.61	46.96		47.09	0.002143	3.04	2374.79	918.59	0.23
Below Prefumo	21757.07	Questa 10	11936.36	36.61	48.17		48.39	0.002256	3.56	3496.04	929.72	0.24

Appendix B - Hydraulic Analysis: Existing Conditions

HEC-RAS Plan: Total_Base River: SLO Creek Reach: Below Prefumo (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)	
Below Prefumo	21757.07	Questa 25	16068.17	36.61	48.88		49.16	0.002340	3.87	4156.52	936.21	0.25
Below Prefumo	21757.07	Questa 50	18540.20	36.61	49.26		49.58	0.002383	4.04	4515.04	940.77	0.25
Below Prefumo	21757.07	Questa100	21047.54	36.61	49.62		49.98	0.002423	4.20	4857.69	945.89	0.26
Below Prefumo	21330.46	Questa 2	6321.33	36.22	46.09		46.22	0.002009	3.46	2422.62	939.01	0.23
Below Prefumo	21330.46	Questa 10	11936.36	36.22	47.22		47.43	0.002320	4.11	3497.81	960.02	0.26
Below Prefumo	21330.46	Questa 25	16068.17	36.22	47.89		48.16	0.002460	4.46	4140.99	969.72	0.27
Below Prefumo	21330.46	Questa 50	18540.20	36.22	48.25		48.55	0.002517	4.64	4493.54	971.68	0.27
Below Prefumo	21330.46	Questa100	21047.54	36.22	48.60		48.93	0.002566	4.80	4830.13	973.55	0.28
Below Prefumo	21016.06	Questa 2	6321.33	35.70	45.26		45.43	0.003507	4.01	2046.51	966.90	0.31
Below Prefumo	21016.06	Questa 10	11936.36	35.70	46.33		46.59	0.003427	4.26	3093.15	989.44	0.31
Below Prefumo	21016.06	Questa 25	16068.17	35.70	46.97		47.29	0.003376	4.48	3731.08	998.21	0.31
Below Prefumo	21016.06	Questa 50	18540.20	35.70	47.33		47.68	0.003332	4.61	4087.14	1002.19	0.31
Below Prefumo	21016.06	Questa100	21047.54	35.70	47.67		48.06	0.003300	4.75	4428.16	1005.98	0.31
Below Prefumo	20585.48	Questa 2	6321.33	34.25	43.92		44.08	0.002864	3.82	2094.11	953.63	0.29
Below Prefumo	20585.48	Questa 10	11936.36	34.25	45.01		45.26	0.002839	4.28	3140.60	964.87	0.29
Below Prefumo	20585.48	Questa 25	16068.17	34.25	45.68		46.00	0.002787	4.52	3792.75	972.49	0.29
Below Prefumo	20585.48	Questa 50	18540.20	34.25	46.05		46.40	0.002767	4.66	4149.19	976.63	0.30
Below Prefumo	20585.48	Questa100	21047.54	34.25	46.40		46.78	0.002751	4.78	4491.88	980.67	0.30
Below Prefumo	20214.24	Questa 2	6321.33	33.24	42.99	42.02	43.13	0.002207	3.15	2134.57	961.14	0.25
Below Prefumo	20214.24	Questa 10	11936.36	33.24	44.15	42.53	44.36	0.001989	3.42	3258.58	981.90	0.24
Below Prefumo	20214.24	Questa 25	16068.17	33.24	44.86	42.86	45.12	0.001899	3.59	3960.56	993.62	0.24
Below Prefumo	20214.24	Questa 50	18540.20	33.24	45.24	43.06	45.53	0.001868	3.69	4339.86	998.09	0.24
Below Prefumo	20214.24	Questa100	21047.54	33.24	45.60	43.24	45.92	0.001847	3.79	4701.90	1002.34	0.24
Below Prefumo	19986.28	Questa 2	6321.33	32.58	42.55		42.67	0.001961	2.99	2487.66	990.80	0.23
Below Prefumo	19986.28	Questa 10	11936.36	32.58	43.73		43.92	0.002016	3.46	3656.98	1000.17	0.24
Below Prefumo	19986.28	Questa 25	16068.17	32.58	44.44		44.69	0.002022	3.73	4377.32	1005.45	0.25
Below Prefumo	19986.28	Questa 50	18540.20	32.58	44.82		45.10	0.002040	3.88	4760.83	1008.28	0.25
Below Prefumo	19986.28	Questa100	21047.54	32.58	45.19		45.49	0.002061	4.02	5124.61	1011.05	0.26
Below Prefumo	19710.33	Questa 2	6321.33	32.42	42.04		42.16	0.001925	2.95	2444.31	924.56	0.23
Below Prefumo	19710.33	Questa 10	11936.36	32.42	43.15		43.36	0.002193	3.62	3498.39	960.18	0.26
Below Prefumo	19710.33	Questa 25	16068.17	32.42	43.86		44.13	0.002223	3.93	4193.72	990.55	0.27
Below Prefumo	19710.33	Questa 50	18540.20	32.42	44.24		44.54	0.002251	4.10	4564.96	997.98	0.27
Below Prefumo	19710.33	Questa100	21047.54	32.42	44.59		44.92	0.002281	4.26	4917.57	1004.99	0.27
Below Prefumo	19553.09	Questa 2	6321.33	31.40	41.68	39.93	41.84	0.002017	3.41	2055.33	909.44	0.24
Below Prefumo	19553.09	Questa 10	11936.36	31.40	42.59	40.92	42.94	0.003239	4.75	2663.03	926.93	0.32
Below Prefumo	19553.09	Questa 25	16068.17	31.40	43.20	41.41	43.67	0.003732	5.39	3075.58	937.24	0.34
Below Prefumo	19553.09	Questa 50	18540.20	31.40	43.51	41.68	44.05	0.004030	5.75	3286.27	942.33	0.36
Below Prefumo	19553.09	Questa100	21047.54	31.40	43.80	41.94	44.42	0.004324	6.10	3481.90	947.03	0.37
Below Prefumo	19496.32		Bridge									
Below Prefumo	19451.64	Questa 2	6321.33	31.46	40.67	38.49	40.84	0.001921	3.35	1925.81	735.77	0.24
Below Prefumo	19451.64	Questa 10	11936.36	31.46	41.80	40.09	42.12	0.002453	4.24	2669.99	830.98	0.28
Below Prefumo	19451.64	Questa 25	16068.17	31.46	42.44	40.30	42.87	0.002731	4.75	3103.44	878.28	0.30
Below Prefumo	19451.64	Questa 50	18540.20	31.46	42.78	40.62	43.28	0.002881	5.02	3334.12	896.88	0.31
Below Prefumo	19451.64	Questa100	21047.54	31.46	43.11	40.92	43.67	0.003012	5.27	3555.93	922.20	0.32
Below Prefumo	19426.64	Questa 2	6321.33	31.46	40.27	38.45	40.70	0.006524	5.70	1266.53	618.23	0.43
Below Prefumo	19426.64	Questa 10	11936.36	31.46	41.28	40.58	41.93	0.007643	6.90	1859.65	746.92	0.48
Below Prefumo	19426.64	Questa 25	16068.17	31.46	41.84	41.09	42.67	0.008143	7.53	2220.35	800.73	0.50
Below Prefumo	19426.64	Questa 50	18540.20	31.46	42.13	41.37	43.07	0.008364	7.84	2415.20	824.95	0.51
Below Prefumo	19426.64	Questa100	21047.54	31.46	42.42	41.64	43.45	0.008520	8.11	2603.41	843.40	0.52
Below Prefumo	19415.64	Questa 2	6321.33	31.46	40.10	38.45	40.61	0.008060	6.20	1172.41	596.00	0.47
Below Prefumo	19415.64	Questa 10	11936.36	31.46	41.06	40.58	41.83	0.009558	7.54	1724.62	720.62	0.53
Below Prefumo	19415.64	Questa 25	16068.17	31.46	41.57	41.09	42.55	0.010460	8.31	2043.13	774.66	0.56
Below Prefumo	19415.64	Questa 50	18540.20	31.46	41.84	41.37	42.94	0.010851	8.69	2219.70	800.64	0.58
Below Prefumo	19415.64	Questa100	21047.54	31.46	42.10	41.64	43.32	0.011118	9.01	2391.29	822.60	0.59
Below Prefumo	19414.64	Questa 2	6321.33	31.46	40.30	38.49	40.52	0.002800	3.87	1692.01	661.68	0.29
Below Prefumo	19414.64	Questa 10	11936.36	31.46	41.30	40.09	41.71	0.003764	5.01	2337.44	799.74	0.34
Below Prefumo	19414.64	Questa 25	16068.17	31.46	41.85	40.30	42.41	0.004254	5.62	2706.43	833.83	0.37
Below Prefumo	19414.64	Questa 50	18540.20	31.46	42.15	40.62	42.80	0.004514	5.95	2903.04	856.95	0.38
Below Prefumo	19414.64	Questa100	21047.54	31.46	42.43	40.92	43.16	0.004747	6.25	3091.25	877.35	0.40
Below Prefumo	19345.01	Questa 2	6321.33	31.04	40.07	39.18	40.28	0.003188	3.89	1736.42	899.10	0.30
Below Prefumo	19345.01	Questa 10	11936.36	31.04	41.03	39.83	41.40	0.003806	4.47	2459.96	993.67	0.33
Below Prefumo	19345.01	Questa 25	16068.17	31.04	41.57	40.21	42.06	0.004113	4.93	2873.14	1002.01	0.35
Below Prefumo	19345.01	Questa 50	18540.20	31.04	41.85	40.43	42.42	0.004264	5.18	3094.60	1004.52	0.36
Below Prefumo	19345.01	Questa100	21047.54	31.04	42.13	40.66	42.77	0.004391	5.40	3307.60	1006.94	0.36
Below Prefumo	18905.78	Questa 2	6321.33	29.76	39.33		39.42	0.001382	2.63	2712.89	1257.05	0.20

Appendix B - Hydraulic Analysis: Existing Conditions

HEC-RAS Plan: Total_Base River: SLO Creek Reach: Below Prefumo (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)	
Below Prefumo	18905.78	Questa 10	11936.36	29.76	40.24		40.39	0.001582	3.11	3865.62	1282.31	0.22
Below Prefumo	18905.78	Questa 25	16068.17	29.76	40.78		40.97	0.001663	3.37	4557.96	1288.99	0.23
Below Prefumo	18905.78	Questa 50	18540.20	29.76	41.08		41.30	0.001688	3.49	4945.13	1292.18	0.23
Below Prefumo	18905.78	Questa100	21047.54	29.76	41.38		41.62	0.001691	3.59	5333.26	1295.37	0.23
Below Prefumo	18574.44	Questa 2	6321.33	29.40	38.73		38.85	0.002530	3.18	2244.44	1302.22	0.26
Below Prefumo	18574.44	Questa 10	11936.36	29.40	39.61		39.80	0.002365	3.35	3403.70	1323.95	0.26
Below Prefumo	18574.44	Questa 25	16068.17	29.40	40.13		40.37	0.002309	3.52	4104.72	1333.84	0.26
Below Prefumo	18574.44	Questa 50	18540.20	29.40	40.44		40.70	0.002247	3.59	4511.14	1338.35	0.26
Below Prefumo	18574.44	Questa100	21047.54	29.40	40.75		41.04	0.002146	3.63	4934.41	1341.25	0.25
Below Prefumo	18253.37	Questa 2	6321.33	27.79	37.63		37.82	0.003323	4.37	1863.00	1085.68	0.32
Below Prefumo	18253.37	Questa 10	11936.36	27.79	38.55		38.82	0.003106	4.67	2918.00	1181.69	0.32
Below Prefumo	18253.37	Questa 25	16068.17	27.79	39.11		39.42	0.002942	4.80	3579.78	1222.10	0.32
Below Prefumo	18253.37	Questa 50	18540.20	27.79	39.44		39.78	0.002862	4.88	3989.70	1257.26	0.31
Below Prefumo	18253.37	Questa100	21047.54	27.79	39.84		40.18	0.002545	4.76	4504.29	1295.05	0.30
Below Prefumo	17870.03	Questa 2	6321.33	27.00	36.32		36.52	0.003622	3.99	1799.70	956.63	0.32
Below Prefumo	17870.03	Questa 10	11936.36	27.00	37.35		37.62	0.003285	4.32	2896.69	1142.32	0.31
Below Prefumo	17870.03	Questa 25	16068.17	27.00	38.04		38.34	0.002818	4.30	3709.63	1212.81	0.29
Below Prefumo	17870.03	Questa 50	18540.20	27.00	38.40		38.73	0.002713	4.37	4175.39	1321.00	0.29
Below Prefumo	17870.03	Questa100	21047.54	27.00	39.05		39.33	0.001954	3.93	5030.51	1360.63	0.25
Below Prefumo	17472.89	Questa 2	6321.33	26.84	35.20		35.35	0.002351	3.31	2090.15	1160.16	0.25
Below Prefumo	17472.89	Questa 10	11936.36	26.84	36.60		36.76	0.001428	3.02	3861.03	1383.41	0.21
Below Prefumo	17472.89	Questa 25	16068.17	26.84	37.45		37.62	0.001135	2.91	5080.55	1464.71	0.19
Below Prefumo	17472.89	Questa 50	18540.20	26.84	37.85		38.03	0.001090	2.96	5679.10	1522.01	0.18
Below Prefumo	17472.89	Questa100	21047.54	26.84	38.68		38.84	0.000747	2.62	6966.52	1565.00	0.16
Below Prefumo	17081.37	Questa 2	6321.33	25.16	34.83		34.89	0.000591	1.74	3447.38	1314.05	0.13
Below Prefumo	17081.37	Questa 10	11936.36	25.16	36.35		36.42	0.000479	1.78	5503.30	1385.72	0.12
Below Prefumo	17081.37	Questa 25	16068.17	25.16	37.23		37.33	0.000449	1.87	6741.60	1403.71	0.12
Below Prefumo	17081.37	Questa 50	18540.20	25.16	37.63		37.74	0.000460	1.96	7304.69	1409.88	0.12
Below Prefumo	17081.37	Questa100	21047.54	25.16	38.52		38.62	0.000354	1.84	8567.06	1427.83	0.11
Below Prefumo	16768	Questa 2	6321.33	24.77	34.71		34.74	0.000207	1.14	4442.55	1074.22	0.08
Below Prefumo	16768	Questa 10	11936.36	24.77	36.20		36.26	0.000267	1.49	6077.33	1111.22	0.09
Below Prefumo	16768	Questa 25	16068.17	24.77	37.08		37.16	0.000299	1.69	7060.68	1130.84	0.10
Below Prefumo	16768	Questa 50	18540.20	24.77	37.46		37.56	0.000328	1.82	7500.59	1140.07	0.11
Below Prefumo	16768	Questa100	21047.54	24.77	38.38		38.48	0.000277	1.79	8557.00	1167.88	0.10
Below Prefumo	16568	Questa 2	6321.33	24.77	34.66		34.70	0.000214	1.15	4396.54	1072.19	0.08
Below Prefumo	16568	Questa 10	11936.36	24.77	36.14		36.21	0.000276	1.50	6015.38	1109.93	0.10
Below Prefumo	16568	Questa 25	16068.17	24.77	37.01		37.10	0.000308	1.71	6990.02	1129.35	0.10
Below Prefumo	16568	Questa 50	18540.20	24.77	37.39		37.50	0.000339	1.84	7422.13	1138.43	0.11
Below Prefumo	16568	Questa100	21047.54	24.77	38.32		38.42	0.000284	1.80	8489.76	1161.09	0.10
Below Prefumo	16165.55	Questa 2	6533.21	22.74	34.60		34.63	0.000168	1.23	4889.59	1124.94	0.08
Below Prefumo	16165.55	Questa 10	12466.08	22.74	36.06		36.11	0.000237	1.63	6585.21	1192.07	0.09
Below Prefumo	16165.55	Questa 25	16880.41	22.74	36.91		36.99	0.000273	1.85	7617.18	1210.86	0.10
Below Prefumo	16165.55	Questa 50	19352.44	22.74	37.29		37.38	0.000298	1.98	8070.13	1218.50	0.11
Below Prefumo	16165.55	Questa100	22036.35	22.74	38.23		38.32	0.000251	1.93	9234.14	1250.50	0.10
Below Prefumo	15724.39	Questa 2	6533.21	21.98	34.50		34.54	0.000314	1.44	4673.98	1005.31	0.10
Below Prefumo	15724.39	Questa 10	12466.08	21.98	35.89		35.99	0.000490	2.04	6110.59	1075.72	0.12
Below Prefumo	15724.39	Questa 25	16880.41	21.98	36.71		36.84	0.000583	2.37	6999.60	1088.02	0.14
Below Prefumo	15724.39	Questa 50	19352.44	21.98	37.06		37.21	0.000660	2.58	7381.38	1104.65	0.15
Below Prefumo	15724.39	Questa100	22036.35	21.98	38.04		38.19	0.000573	2.56	8498.57	1186.17	0.14
Below Prefumo	15429.64	Questa 2	6533.21	19.52	34.38	30.07	34.43	0.000294	1.80	4601.31	1084.74	0.10
Below Prefumo	15429.64	Questa 10	12466.08	19.52	35.73	30.84	35.81	0.000456	2.43	6625.17	1234.64	0.13
Below Prefumo	15429.64	Questa 25	16880.41	19.52	36.51	31.30	36.63	0.000589	2.89	7393.54	1268.70	0.14
Below Prefumo	15429.64	Questa 50	19352.44	19.52	36.82	31.54	36.97	0.000677	3.15	7707.84	1278.98	0.16
Below Prefumo	15429.64	Questa100	22036.35	19.52	37.82	31.78	37.98	0.000590	3.09	8714.62	1338.53	0.15
Below Prefumo	15186.16	Questa 2	6533.21	20.77	34.22	28.68	34.29	0.000459	2.19	3320.26	1189.53	0.12
Below Prefumo	15186.16	Questa 10	12466.08	20.77	35.34	29.78	35.56	0.001068	3.58	3813.09	1226.37	0.19
Below Prefumo	15186.16	Questa 25	16880.41	20.77	35.94	30.56	36.28	0.001582	4.51	4071.86	1262.88	0.23
Below Prefumo	15186.16	Questa 50	19352.44	20.77	36.48	30.92	36.68	0.001010	3.71	6461.46	1277.35	0.19
Below Prefumo	15186.16	Questa100	22036.35	20.77	37.51	31.30	37.71	0.000922	3.74	7223.67	1304.55	0.18
Below Prefumo	15055.2		Bridge									
Below Prefumo	14937.93	Questa 2	6568.53	17.16	32.20	26.67	32.38	0.001455	3.88	2339.06	900.08	0.22
Below Prefumo	14937.93	Questa 10	12607.34	17.16	33.67	29.02	34.10	0.002903	6.02	3070.55	985.02	0.32
Below Prefumo	14937.93	Questa 25	17127.61	17.16	34.57	30.35	35.16	0.003746	7.20	3548.05	1053.33	0.37
Below Prefumo	14937.93	Questa 50	19599.64	17.16	35.40	31.16	35.99	0.003547	7.32	4004.82	1078.36	0.36
Below Prefumo	14937.93	Questa100	22318.87	17.16	36.01	31.78	36.65	0.003676	7.69	4342.98	1083.30	0.37

Appendix B - Hydraulic Analysis: Proposed Conditions

HEC-RAS Plan: Pro_Total_V2 River: SLO Creek Reach: Below Prefumo

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)	
Below Prefumo	33779.96	Questa 2	5120.63	67.91	83.87	76.99	84.30	0.003349	5.25	974.91	114.49	0.32
Below Prefumo	33779.96	Questa 10	9323.07	67.91	86.04	79.91	86.19	0.001205	3.41	3069.01	389.47	0.19
Below Prefumo	33779.96	Questa 25	12077.62	67.91	86.46	81.57	86.68	0.001790	4.08	3242.41	436.40	0.24
Below Prefumo	33779.96	Questa 50	14055.24	67.91	87.27	82.72	87.51	0.001791	4.30	3609.55	465.49	0.24
Below Prefumo	33779.96	Questa100	15679.71	67.91	87.94	83.68	88.19	0.001750	4.43	3922.24	471.70	0.24
Below Prefumo	33757.76	Questa 2	5120.63	66.80	83.80	76.45	84.22	0.003206	5.19	986.24	114.04	0.31
Below Prefumo	33757.76	Questa 10	9323.07	66.80	86.01	79.58	86.16	0.001188	3.42	3077.31	386.54	0.19
Below Prefumo	33757.76	Questa 25	12077.62	66.80	86.42	81.31	86.64	0.001777	4.11	3242.35	433.64	0.24
Below Prefumo	33757.76	Questa 50	14055.24	66.80	87.22	82.38	87.46	0.001785	4.32	3607.98	464.96	0.24
Below Prefumo	33757.76	Questa100	15679.71	66.80	87.89	83.43	88.15	0.001745	4.46	3920.85	471.28	0.24
Below Prefumo	33698.72		Bridge									
Below Prefumo	33641	Questa 2	5120.63	66.80	81.47	76.16	81.93	0.003969	5.44	941.75	303.81	0.35
Below Prefumo	33641	Questa 10	9323.07	66.80	84.22	78.73	85.01	0.005088	7.14	1306.20	336.64	0.41
Below Prefumo	33641	Questa 25	12077.62	66.80	85.87	80.39	86.08	0.001585	3.96	3327.64	372.01	0.23
Below Prefumo	33641	Questa 50	14055.24	66.80	86.62	81.24	86.86	0.001664	4.26	3615.80	399.97	0.24
Below Prefumo	33641	Questa100	15679.71	66.80	87.26	81.87	87.53	0.001680	4.46	3878.40	413.82	0.24
Below Prefumo	33614	Questa 2	5120.63	65.00	81.29		81.41	0.001113	3.18	1941.99	313.83	0.19
Below Prefumo	33614	Questa 10	9323.07	65.00	84.18		84.36	0.001171	3.85	2920.12	357.49	0.20
Below Prefumo	33614	Questa 25	12077.62	65.00	85.56		85.77	0.001234	4.26	3438.68	398.74	0.21
Below Prefumo	33614	Questa 50	14055.24	65.00	86.29		86.54	0.001307	4.55	3737.67	410.51	0.22
Below Prefumo	33614	Questa100	15679.71	65.00	86.94		87.20	0.001322	4.72	4004.24	417.11	0.22
Below Prefumo	33544	Questa 2	5120.63	65.00	81.11	73.90	81.31	0.001977	3.89	1580.79	319.49	0.25
Below Prefumo	33544	Questa 10	9323.07	65.00	84.03	77.42	84.26	0.001728	4.27	2655.50	405.28	0.24
Below Prefumo	33544	Questa 25	12077.62	65.00	85.43	79.41	85.67	0.001619	4.51	3228.30	419.86	0.24
Below Prefumo	33544	Questa 50	14055.24	65.00	86.16	80.12	86.43	0.001655	4.75	3541.13	430.96	0.24
Below Prefumo	33544	Questa100	15679.71	65.00	86.81	80.59	87.10	0.001630	4.88	3822.86	440.73	0.24
Below Prefumo	33543		Bridge									
Below Prefumo	33532	Questa 2	5120.63	65.00	81.08		81.28	0.001998	3.91	1572.30	318.76	0.25
Below Prefumo	33532	Questa 10	9323.07	65.00	84.01		84.23	0.001747	4.28	2645.76	405.08	0.24
Below Prefumo	33532	Questa 25	12077.62	65.00	85.40		85.65	0.001634	4.52	3218.59	419.51	0.24
Below Prefumo	33532	Questa 50	14055.24	65.00	86.14		86.41	0.001670	4.77	3530.63	430.60	0.24
Below Prefumo	33532	Questa100	15679.71	65.00	86.78		87.07	0.001644	4.90	3812.11	440.36	0.24
Below Prefumo	33394	Questa 2	5120.63	64.00	80.67		80.95	0.002709	4.30	1190.45	165.64	0.28
Below Prefumo	33394	Questa 10	9323.07	64.00	83.48		83.92	0.002731	5.36	1791.77	238.50	0.30
Below Prefumo	33394	Questa 25	12077.62	64.00	84.82		85.33	0.002762	5.86	2118.07	249.11	0.31
Below Prefumo	33394	Questa 50	14055.24	64.00	85.48		86.08	0.002957	6.30	2293.06	272.18	0.32
Below Prefumo	33394	Questa100	15679.71	64.00	86.10		86.74	0.002966	6.53	2463.89	281.70	0.32
Below Prefumo	33382.72	Questa 2	5826.92	65.13	80.46		80.90	0.003275	5.39	1129.77	142.62	0.32
Below Prefumo	33382.72	Questa 10	10912.23	65.13	82.99		83.83	0.005347	7.50	1550.70	224.71	0.42
Below Prefumo	33382.72	Questa 25	14549.64	65.13	84.14		85.23	0.006115	8.63	1843.18	262.06	0.46
Below Prefumo	33382.72	Questa 50	16809.78	65.13	84.75		85.96	0.006489	9.21	2002.23	267.29	0.48
Below Prefumo	33382.72	Questa100	18999.29	65.13	85.27		86.62	0.006818	9.72	2144.91	276.75	0.49
Below Prefumo	32983.12	Questa 2	5826.92	63.85	79.03		79.53	0.003555	5.71	1056.12	219.85	0.33
Below Prefumo	32983.12	Questa 10	10912.23	63.85	80.72		81.60	0.005825	7.92	1599.87	372.81	0.43
Below Prefumo	32983.12	Questa 25	14549.64	63.85	81.60		82.65	0.006771	8.89	1935.67	386.84	0.47
Below Prefumo	32983.12	Questa 50	16809.78	63.85	82.06		83.22	0.007186	9.41	2118.63	404.67	0.49
Below Prefumo	32983.12	Questa100	18999.29	63.85	82.48		83.73	0.007525	9.86	2288.80	418.94	0.50
Below Prefumo	32638.86	Questa 2	5826.92	62.53	78.11		78.46	0.002607	5.08	1355.92	427.84	0.29
Below Prefumo	32638.86	Questa 10	10912.23	62.53	79.42		79.97	0.003746	6.60	1939.64	481.21	0.35
Below Prefumo	32638.86	Questa 25	14549.64	62.53	80.10		80.80	0.004322	7.38	2272.97	497.47	0.38
Below Prefumo	32638.86	Questa 50	16809.78	62.53	80.47		81.25	0.004630	7.80	2459.21	516.00	0.40
Below Prefumo	32638.86	Questa100	18999.29	62.53	80.79		81.67	0.004898	8.17	2631.14	533.92	0.41
Below Prefumo	32266.82	Questa 2	5826.92	62.01	76.76	72.40	77.18	0.004647	5.85	1310.12	698.15	0.36
Below Prefumo	32266.82	Questa 10	10912.23	62.01	77.70	77.26	78.21	0.005890	6.65	1976.62	720.92	0.42
Below Prefumo	32266.82	Questa 25	14549.64	62.01	78.20	77.55	78.82	0.006319	7.09	2338.92	727.56	0.44
Below Prefumo	32266.82	Questa 50	16809.78	62.01	78.47	77.73	79.16	0.006538	7.35	2536.28	730.11	0.44
Below Prefumo	32266.82	Questa100	18999.29	62.01	78.71	77.91	79.48	0.006708	7.58	2717.17	732.45	0.45
Below Prefumo	31868.76	Questa 2	5826.92	61.39	74.52	71.75	75.05	0.006182	6.63	1223.54	871.13	0.41
Below Prefumo	31868.76	Questa 10	10912.23	61.39	75.55		76.00	0.005198	6.49	2128.38	885.63	0.39
Below Prefumo	31868.76	Questa 25	14549.64	61.39	76.15		76.63	0.004682	6.36	2661.64	891.32	0.37
Below Prefumo	31868.76	Questa 50	16809.78	61.39	76.51		77.01	0.004380	6.27	2979.40	894.59	0.36
Below Prefumo	31868.76	Questa100	18999.29	61.39	76.85		77.37	0.004082	6.16	3287.62	897.79	0.35
Below Prefumo	31428.59	Questa 2	5826.92	61.22	73.30		73.48	0.002073	4.18	1924.98	973.30	0.25
Below Prefumo	31428.59	Questa 10	10912.23	61.22	74.38		74.59	0.001995	4.37	2978.48	985.98	0.25
Below Prefumo	31428.59	Questa 25	14549.64	61.22	75.10		75.34	0.001814	4.23	3696.89	997.09	0.24

Appendix B - Hydraulic Analysis: Proposed Conditions

HEC-RAS Plan: Pro_Total_V2 River: SLO Creek Reach: Below Prefumo (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)	
Below Prefumo	31428.59	Questa 50	16809.78	61.22	75.54		75.80	0.001696	4.13	4135.78	1003.29	0.23
Below Prefumo	31428.59	Questa100	18999.29	61.22	75.97		76.24	0.001580	4.03	4564.84	1009.45	0.23
Below Prefumo	30961.47	Questa 2	5826.92	59.55	72.69		72.78	0.000962	2.69	2369.37	767.34	0.17
Below Prefumo	30961.47	Questa 10	10912.23	59.55	73.50		73.71	0.001587	3.66	3000.31	780.22	0.22
Below Prefumo	30961.47	Questa 25	14549.64	59.55	74.22		74.48	0.001644	3.75	3565.49	796.79	0.23
Below Prefumo	30961.47	Questa 50	16809.78	59.55	74.69		74.98	0.001588	3.78	3939.86	805.08	0.23
Below Prefumo	30961.47	Questa100	18999.29	59.55	75.16		75.46	0.001509	3.80	4316.99	813.97	0.22
Below Prefumo	30676.26	Questa 2	5826.92	58.27	72.33	70.80	72.44	0.002236	3.48	2392.15	843.65	0.24
Below Prefumo	30676.26	Questa 10	10912.23	58.27	72.80	71.47	73.07	0.004971	5.36	2800.63	859.66	0.36
Below Prefumo	30676.26	Questa 25	14549.64	58.27	73.55	71.83	73.85	0.004657	5.57	3447.29	866.73	0.36
Below Prefumo	30676.26	Questa 50	16809.78	58.27	74.08	72.10	74.39	0.004189	5.54	3907.62	871.72	0.35
Below Prefumo	30676.26	Questa100	18999.29	58.27	74.61	72.31	74.92	0.003755	5.48	4369.11	877.73	0.33
Below Prefumo	30635.2		Bridge									
Below Prefumo	30623.00	Questa 2	5826.92	58.27	72.18	70.53	72.28	0.001443	2.91	2267.90	888.15	0.21
Below Prefumo	30623.00	Questa 10	10912.23	58.27	72.73	71.27	72.98	0.002880	4.32	2772.91	919.99	0.29
Below Prefumo	30623.00	Questa 25	14549.64	58.27	73.46	71.62	73.74	0.002704	4.46	3446.44	936.19	0.29
Below Prefumo	30623.00	Questa 50	16809.78	58.27	73.98	71.82	74.27	0.002409	4.39	3939.80	945.20	0.28
Below Prefumo	30623.00	Questa100	18999.29	58.27	74.51	72.06	74.80	0.002132	4.31	4441.31	954.75	0.26
Below Prefumo	30438.21	Questa 2	5826.92	57.28	72.08	67.79	72.13	0.000410	1.80	3399.91	1147.49	0.11
Below Prefumo	30438.21	Questa 10	10912.23	57.28	72.53	70.44	72.65	0.000943	2.82	3907.89	1153.37	0.17
Below Prefumo	30438.21	Questa 25	14549.64	57.28	73.27	70.76	73.43	0.000900	2.92	4773.69	1163.28	0.17
Below Prefumo	30438.21	Questa 50	16809.78	57.28	73.83	70.93	73.99	0.000804	2.87	5420.36	1170.56	0.16
Below Prefumo	30438.21	Questa100	18999.29	57.28	74.38	71.09	74.54	0.000716	2.81	6070.94	1177.84	0.15
Below Prefumo	30042.53	Questa 2	6321.33	57.02	71.91	67.02	71.96	0.000327	1.65	3691.74	927.62	0.10
Below Prefumo	30042.53	Questa 10	11936.36	57.02	72.00	69.52	72.16	0.001090	3.03	3772.57	928.75	0.18
Below Prefumo	30042.53	Questa 25	16068.17	57.02	72.70	69.86	72.92	0.001187	3.33	4434.52	937.92	0.19
Below Prefumo	30042.53	Questa 50	18540.20	57.02	73.30	70.14	73.53	0.001079	3.32	4999.22	945.70	0.19
Below Prefumo	30042.53	Questa100	21047.54	57.02	73.89	70.42	74.13	0.000991	3.30	5559.66	953.37	0.18
Below Prefumo	29852.94	Questa 2	6321.33	56.99	71.82	67.01	71.89	0.000457	1.76	3210.62	780.26	0.12
Below Prefumo	29852.94	Questa 10	11936.36	56.99	71.64	70.60	71.90	0.001863	3.50	3071.85	774.92	0.23
Below Prefumo	29852.94	Questa 25	16068.17	56.99	72.29	71.00	72.64	0.002094	3.94	3577.71	787.50	0.25
Below Prefumo	29852.94	Questa 50	18540.20	56.99	72.92	71.00	73.28	0.001839	3.88	4077.54	796.50	0.24
Below Prefumo	29852.94	Questa100	21047.54	56.99	73.53	71.00	73.90	0.001648	3.85	4568.83	804.64	0.23
Below Prefumo	29815.2		Bridge									
Below Prefumo	29786.44	Questa 2	6321.33	56.53	69.34	66.42	69.65	0.003964	4.70	1441.32	660.42	0.34
Below Prefumo	29786.44	Questa 10	11936.36	56.53	71.01	68.82	71.46	0.003852	5.23	2221.54	742.99	0.34
Below Prefumo	29786.44	Questa 25	16068.17	56.53	72.12	69.62	72.37	0.001440	3.34	4061.22	775.40	0.21
Below Prefumo	29786.44	Questa 50	18540.20	56.53	72.78	69.95	73.05	0.001294	3.35	4579.81	783.90	0.20
Below Prefumo	29786.44	Questa100	21047.54	56.53	73.42	70.29	73.70	0.001189	3.36	5079.98	791.80	0.20
Below Prefumo	29470.07	Questa 2	6321.33	55.18	68.46	65.04	68.68	0.002300	3.66	1793.54	625.67	0.26
Below Prefumo	29470.07	Questa 10	11936.36	55.18	70.40	67.84	70.64	0.001578	3.64	3086.93	694.65	0.22
Below Prefumo	29470.07	Questa 25	16068.17	55.18	71.69	68.51	71.95	0.001258	3.58	3997.45	711.74	0.21
Below Prefumo	29470.07	Questa 50	18540.20	55.18	72.40	68.75	72.67	0.001144	3.59	4501.24	718.20	0.20
Below Prefumo	29470.07	Questa100	21047.54	55.18	73.06	69.05	73.34	0.001068	3.61	4977.72	724.61	0.19
Below Prefumo	29220.55	Questa 2	6321.33	54.17	67.77		68.05	0.002453	4.65	1642.83	654.29	0.29
Below Prefumo	29220.55	Questa 10	11936.36	54.17	69.99		70.22	0.001599	4.36	3185.03	727.25	0.24
Below Prefumo	29220.55	Questa 25	16068.17	54.17	71.39		71.61	0.001273	4.22	4214.25	751.01	0.22
Below Prefumo	29220.55	Questa 50	18540.20	54.17	72.12		72.36	0.001165	4.20	4773.49	763.91	0.21
Below Prefumo	29220.55	Questa100	21047.54	54.17	72.81		73.05	0.001094	4.21	5300.21	776.45	0.20
Below Prefumo	28780.70	Questa 2	6321.33	52.69	67.13		67.27	0.001298	3.41	2118.64	595.55	0.20
Below Prefumo	28780.70	Questa 10	11936.36	52.69	69.52		69.68	0.000990	3.49	3666.72	708.95	0.18
Below Prefumo	28780.70	Questa 25	16068.17	52.69	70.99		71.17	0.000842	3.50	4773.51	807.68	0.17
Below Prefumo	28780.70	Questa 50	18540.20	52.69	71.76		71.94	0.000788	3.53	5429.09	888.79	0.17
Below Prefumo	28780.70	Questa100	21047.54	52.69	72.47		72.66	0.000746	3.55	6069.13	915.41	0.17
Below Prefumo	28455.06	Questa 2	6321.33	52.10	66.76		66.88	0.001156	3.12	2259.49	600.93	0.19
Below Prefumo	28455.06	Questa 10	11936.36	52.10	69.24		69.39	0.000833	3.14	3817.19	645.84	0.17
Below Prefumo	28455.06	Questa 25	16068.17	52.10	70.75		70.92	0.000734	3.22	4832.11	718.73	0.16
Below Prefumo	28455.06	Questa 50	18540.20	52.10	71.53		71.71	0.000700	3.27	5440.22	839.16	0.16
Below Prefumo	28455.06	Questa100	21047.54	52.10	72.25		72.44	0.000679	3.34	6044.38	846.04	0.16
Below Prefumo	28150	Questa 2	6321.33	51.50	66.33		66.49	0.001149	3.63	2084.57	446.99	0.20
Below Prefumo	28150	Questa 10	11936.36	51.50	68.87		69.08	0.001037	3.97	3271.74	478.66	0.19
Below Prefumo	28150	Questa 25	16068.17	51.50	70.38		70.63	0.000981	4.15	4047.37	599.18	0.19
Below Prefumo	28150	Questa 50	18540.20	51.50	71.17		71.43	0.000946	4.22	4523.22	610.70	0.19
Below Prefumo	28150	Questa100	21047.54	51.50	71.88		72.16	0.000923	4.30	4962.03	621.13	0.19

Appendix B - Hydraulic Analysis: Proposed Conditions

HEC-RAS Plan: Pro_Total_V2 River: SLO Creek Reach: Below Prefumo (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)	
Below Prefumo	28129.27	Questa 2	6321.33	51.97	66.31	63.53	66.46	0.001327	3.23	2061.05	451.04	0.20
Below Prefumo	28129.27	Questa 10	11936.36	51.97	68.84	64.72	69.05	0.001100	3.53	3229.38	486.57	0.19
Below Prefumo	28129.27	Questa 25	16068.17	51.97	70.36	65.27	70.61	0.001022	3.73	4025.65	556.28	0.19
Below Prefumo	28129.27	Questa 50	18540.20	51.97	71.14	65.57	71.41	0.001011	3.87	4477.16	596.67	0.19
Below Prefumo	28129.27	Questa100	21047.54	51.97	71.86	65.88	72.14	0.000990	3.98	4919.71	627.11	0.19
Below Prefumo	28070	Questa 2	6321.33	51.25	65.84		66.02	0.001718	3.66	1872.09	447.08	0.23
Below Prefumo	28070	Questa 10	11936.36	51.25	68.48		68.71	0.001226	3.73	3085.58	471.09	0.20
Below Prefumo	28070	Questa 25	16068.17	51.25	70.01		70.29	0.001112	3.89	3818.91	593.20	0.20
Below Prefumo	28070	Questa 50	18540.20	51.25	70.81		71.11	0.001057	3.95	4298.00	604.80	0.19
Below Prefumo	28070	Questa100	21047.54	51.25	71.54		71.85	0.001017	4.02	4739.11	616.88	0.19
Below Prefumo	27996	Questa 2	6321.33	49.50	65.76	62.25	65.91	0.001039	3.33	2089.62	432.20	0.18
Below Prefumo	27996	Questa 10	11936.36	49.50	68.42	63.76	68.63	0.000880	3.56	3277.68	484.33	0.17
Below Prefumo	27996	Questa 25	16068.17	49.50	69.97	64.66	70.21	0.000833	3.73	4070.01	534.22	0.17
Below Prefumo	27996	Questa 50	18540.20	49.50	70.77	64.99	71.03	0.000809	3.81	4543.71	606.90	0.17
Below Prefumo	27996	Questa100	21047.54	49.50	71.49	65.31	71.77	0.000794	3.89	4991.63	630.75	0.17
Below Prefumo	27990		Bridge									
Below Prefumo	27984	Questa 2	6321.33	49.50	65.75		65.90	0.001050	3.35	2083.08	432.07	0.18
Below Prefumo	27984	Questa 10	11936.36	49.50	68.40		68.61	0.000887	3.57	3270.19	483.86	0.17
Below Prefumo	27984	Questa 25	16068.17	49.50	69.95		70.20	0.000839	3.74	4061.24	533.81	0.17
Below Prefumo	27984	Questa 50	18540.20	49.50	70.75		71.01	0.000815	3.82	4533.42	606.38	0.17
Below Prefumo	27984	Questa100	21047.54	49.50	71.48		71.75	0.000800	3.90	4980.60	630.16	0.17
Below Prefumo	27910	Questa 2	6321.33	49.50	65.68		65.82	0.000933	3.50	2133.35	423.46	0.18
Below Prefumo	27910	Questa 10	11936.36	49.50	68.34		68.55	0.000839	3.78	3290.35	442.50	0.17
Below Prefumo	27910	Questa 25	16068.17	49.50	69.88		70.13	0.000823	4.00	3977.92	452.23	0.17
Below Prefumo	27910	Questa 50	18540.20	49.50	70.68		70.95	0.000810	4.10	4422.42	583.61	0.17
Below Prefumo	27910	Questa100	21047.54	49.50	71.40		71.69	0.000799	4.19	4852.85	608.85	0.17
Below Prefumo	27837.52	Questa 2	6321.33	51.02	65.56	61.94	65.73	0.001734	3.69	2001.13	423.29	0.23
Below Prefumo	27837.52	Questa 10	11936.36	51.02	68.24	63.92	68.47	0.001415	4.03	3161.41	442.87	0.22
Below Prefumo	27837.52	Questa 25	16068.17	51.02	69.79	64.66	70.06	0.001333	4.29	3909.65	523.06	0.22
Below Prefumo	27837.52	Questa 50	18540.20	51.02	70.59	65.02	70.88	0.001284	4.40	4349.43	572.82	0.22
Below Prefumo	27837.52	Questa100	21047.54	51.02	71.32	65.36	71.62	0.001244	4.49	4772.00	601.56	0.21
Below Prefumo	27830	Questa 2	6321.33	50.00	64.99		65.13	0.000989	3.41	2105.63	406.09	0.18
Below Prefumo	27830	Questa 10	11936.36	50.00	67.76		67.97	0.000876	3.74	3253.96	424.04	0.18
Below Prefumo	27830	Questa 25	16068.17	50.00	69.31		69.58	0.000873	4.01	3930.63	447.53	0.18
Below Prefumo	27830	Questa 50	18540.20	50.00	70.10		70.40	0.000882	4.17	4300.65	559.00	0.18
Below Prefumo	27830	Questa100	21047.54	50.00	70.83		71.15	0.000880	4.30	4713.67	579.85	0.19
Below Prefumo	27357.37	Questa 2	6321.33	49.31	64.29	59.01	64.49	0.002229	3.91	1832.85	375.99	0.26
Below Prefumo	27357.37	Questa 10	11936.36	49.31	67.17	62.89	67.43	0.001748	4.28	2947.16	404.72	0.24
Below Prefumo	27357.37	Questa 25	16068.17	49.31	68.74	63.52	69.05	0.001666	4.62	3632.81	472.28	0.24
Below Prefumo	27357.37	Questa 50	18540.20	49.31	69.54	63.89	69.88	0.001637	4.79	4026.19	501.64	0.24
Below Prefumo	27357.37	Questa100	21047.54	49.31	70.27	64.25	70.63	0.001614	4.94	4396.48	514.49	0.24
Below Prefumo	27178.08	Questa 2	6321.33	49.11	63.78		64.08	0.002302	4.87	1584.32	230.41	0.26
Below Prefumo	27178.08	Questa 10	11936.36	49.11	66.51		67.00	0.003010	6.44	2261.66	286.67	0.30
Below Prefumo	27178.08	Questa 25	16068.17	49.11	68.02		68.62	0.003253	7.17	2754.21	367.31	0.32
Below Prefumo	27178.08	Questa 50	18540.20	49.11	68.81		69.45	0.003274	7.44	3051.17	386.04	0.33
Below Prefumo	27178.08	Questa100	21047.54	49.11	69.52		70.20	0.003281	7.67	3334.76	403.60	0.33
Below Prefumo	27074.70	Questa 2	6321.33	48.72	63.44		63.80	0.002952	4.77	1313.20	215.02	0.30
Below Prefumo	27074.70	Questa 10	11936.36	48.72	66.01		66.65	0.003514	5.69	1906.75	272.59	0.33
Below Prefumo	27074.70	Questa 25	16068.17	48.72	67.45		68.25	0.003550	6.28	2334.97	340.45	0.34
Below Prefumo	27074.70	Questa 50	18540.20	48.72	68.22		69.08	0.003485	6.52	2610.70	371.81	0.34
Below Prefumo	27074.70	Questa100	21047.54	48.72	68.93		69.83	0.003394	6.71	2881.58	389.05	0.34
Below Prefumo	26778.09	Questa 2	6321.33	48.36	62.43		62.88	0.003432	5.25	1171.27	211.87	0.32
Below Prefumo	26778.09	Questa 10	11936.36	48.36	64.78		65.58	0.003967	6.19	1716.23	257.72	0.35
Below Prefumo	26778.09	Questa 25	16068.17	48.36	66.13		67.15	0.004056	6.83	2084.45	291.62	0.36
Below Prefumo	26778.09	Questa 50	18540.20	48.36	66.85		67.99	0.004046	7.13	2321.47	346.10	0.37
Below Prefumo	26778.09	Questa100	21047.54	48.36	67.57		68.77	0.003944	7.32	2574.34	363.52	0.37
Below Prefumo	26431.63	Questa 2	6321.33	47.67	60.89		61.47	0.004945	5.25	1068.61	215.76	0.37
Below Prefumo	26431.63	Questa 10	11936.36	47.67	62.74		63.88	0.006165	6.71	1483.18	228.87	0.43
Below Prefumo	26431.63	Questa 25	16068.17	47.67	63.76		65.33	0.006928	7.62	1719.78	236.45	0.46
Below Prefumo	26431.63	Questa 50	18540.20	47.67	64.27		66.10	0.007363	8.17	1841.07	242.56	0.48
Below Prefumo	26431.63	Questa100	21047.54	47.67	64.72		66.84	0.007816	8.71	1952.51	248.83	0.50
Below Prefumo	26023.24	Questa 2	6321.33	46.23	59.12		59.42	0.004660	4.63	1474.54	369.18	0.34
Below Prefumo	26023.24	Questa 10	11936.36	46.23	60.98		61.44	0.004864	5.36	2197.90	404.34	0.35
Below Prefumo	26023.24	Questa 25	16068.17	46.23	62.04		62.62	0.005040	5.91	2637.11	428.10	0.37
Below Prefumo	26023.24	Questa 50	18540.20	46.23	62.60		63.24	0.005116	6.18	2878.67	439.60	0.37
Below Prefumo	26023.24	Questa100	21047.54	46.23	63.12		63.83	0.005173	6.42	3111.04	449.25	0.38

Appendix B - Hydraulic Analysis: Proposed Conditions

HEC-RAS Plan: Pro_Total_V2 River: SLO Creek Reach: Below Prefumo (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)	
Below Prefumo	25570.72	Questa 2	6321.33	46.26	57.69		57.93	0.002396	3.42	1629.80	413.44	0.24
Below Prefumo	25570.72	Questa 10	11936.36	46.26	59.42		59.84	0.002650	4.13	2388.02	445.25	0.26
Below Prefumo	25570.72	Questa 25	16068.17	46.26	60.39		60.93	0.002851	4.60	2819.70	452.05	0.28
Below Prefumo	25570.72	Questa 50	18540.20	46.26	60.90		61.51	0.002934	4.83	3060.68	471.97	0.29
Below Prefumo	25570.72	Questa100	21047.54	46.26	61.39		62.08	0.003002	5.03	3292.30	474.79	0.29
Below Prefumo	25099.23	Questa 2	6321.33	44.52	56.42	54.40	56.71	0.003000	3.06	1560.16	456.59	0.26
Below Prefumo	25099.23	Questa 10	11936.36	44.52	57.96	55.43	58.48	0.003342	3.46	2299.58	502.13	0.28
Below Prefumo	25099.23	Questa 25	16068.17	44.52	58.84	56.27	59.50	0.003441	3.90	2741.04	505.04	0.29
Below Prefumo	25099.23	Questa 50	18540.20	44.52	59.30	56.82	60.05	0.003513	4.14	2977.27	506.91	0.29
Below Prefumo	25099.23	Questa100	21047.54	44.52	59.74	57.20	60.58	0.003595	4.36	3201.37	510.12	0.30
Below Prefumo	24712.76	Questa 2	6321.33	44.19	55.32		55.58	0.002759	2.49	1718.42	542.54	0.24
Below Prefumo	24712.76	Questa 10	11936.36	44.19	56.86		57.29	0.002691	2.99	2597.31	583.31	0.25
Below Prefumo	24712.76	Questa 25	16068.17	44.19	57.72		58.27	0.002763	3.34	3105.21	599.00	0.26
Below Prefumo	24712.76	Questa 50	18540.20	44.19	58.18		58.79	0.002820	3.54	3378.22	609.14	0.26
Below Prefumo	24712.76	Questa100	21047.54	44.19	58.61		59.29	0.002865	3.73	3642.19	618.10	0.27
Below Prefumo	24341.33	Questa 2	6321.33	43.70	54.23		54.50	0.003181	2.87	1640.97	517.61	0.26
Below Prefumo	24341.33	Questa 10	11936.36	43.70	55.70		56.18	0.003411	3.26	2453.99	583.04	0.28
Below Prefumo	24341.33	Questa 25	16068.17	43.70	56.50		57.12	0.003582	3.64	2927.21	599.84	0.29
Below Prefumo	24341.33	Questa 50	18540.20	43.70	56.93		57.61	0.003652	3.89	3182.01	602.43	0.30
Below Prefumo	24341.33	Questa100	21047.54	43.70	57.33		58.09	0.003716	4.12	3425.87	604.91	0.30
Below Prefumo	23930.51	Questa 2	6321.33	42.62	52.94		53.26	0.003590	3.30	1533.98	507.84	0.28
Below Prefumo	23930.51	Questa 10	11936.36	42.62	54.31		54.83	0.003988	3.99	2290.90	596.35	0.31
Below Prefumo	23930.51	Questa 25	16068.17	42.62	55.10		55.73	0.003969	4.36	2768.41	617.35	0.31
Below Prefumo	23930.51	Questa 50	18540.20	42.62	55.52		56.21	0.003968	4.56	3030.18	628.31	0.32
Below Prefumo	23930.51	Questa100	21047.54	42.62	55.92		56.67	0.003974	4.75	3280.02	631.04	0.32
Below Prefumo	23535.79	Questa 2	6321.33	41.77	51.74		51.92	0.003349	3.32	1887.18	606.08	0.28
Below Prefumo	23535.79	Questa 10	11936.36	41.77	53.02		53.37	0.003599	4.06	2676.42	623.27	0.30
Below Prefumo	23535.79	Questa 25	16068.17	41.77	53.76		54.24	0.003807	4.53	3142.65	639.53	0.31
Below Prefumo	23535.79	Questa 50	18540.20	41.77	54.15		54.71	0.003904	4.77	3396.36	647.31	0.32
Below Prefumo	23535.79	Questa100	21047.54	41.77	54.53		55.16	0.003984	4.99	3640.06	652.80	0.33
Below Prefumo	23114.16	Questa 2	6321.33	40.62	50.12		50.40	0.004893	3.77	1515.25	601.74	0.33
Below Prefumo	23114.16	Questa 10	11936.36	40.62	51.55		51.98	0.003941	3.78	2421.89	659.78	0.30
Below Prefumo	23114.16	Questa 25	16068.17	40.62	52.26		52.81	0.003996	4.11	2893.86	677.60	0.31
Below Prefumo	23114.16	Questa 50	18540.20	40.62	52.64		53.26	0.004011	4.30	3153.56	687.31	0.31
Below Prefumo	23114.16	Questa100	21047.54	40.62	53.00		53.70	0.004012	4.48	3407.98	700.49	0.32
Below Prefumo	23060.20	Questa 2	6321.33	40.68	49.87		50.13	0.004499	3.36	1571.91	630.37	0.31
Below Prefumo	23060.20	Questa 10	11936.36	40.68	51.38		51.76	0.003171	3.45	2571.13	687.31	0.27
Below Prefumo	23060.20	Questa 25	16068.17	40.68	52.09		52.59	0.003241	3.81	3064.37	704.85	0.28
Below Prefumo	23060.20	Questa 50	18540.20	40.68	52.48		53.04	0.003272	4.01	3339.54	722.56	0.29
Below Prefumo	23060.20	Questa100	21047.54	40.68	52.85		53.47	0.003291	4.18	3610.70	738.11	0.29
Below Prefumo	23048.56	Questa 2	6321.33	39.80	49.80	48.70	50.08	0.005518	3.68	1522.06	660.76	0.26
Below Prefumo	23048.56	Questa 10	11936.36	39.80	51.35	49.56	51.72	0.003662	3.47	2579.85	693.75	0.22
Below Prefumo	23048.56	Questa 25	16068.17	39.80	52.06	50.05	52.55	0.003744	3.71	3076.91	707.86	0.22
Below Prefumo	23048.56	Questa 50	18540.20	39.80	52.44	50.40	53.00	0.003776	3.84	3353.27	724.27	0.23
Below Prefumo	23048.56	Questa100	21047.54	39.80	52.82	50.67	53.43	0.003793	3.95	3625.27	739.07	0.23
Below Prefumo	23045.28		Bridge									
Below Prefumo	23003.51	Questa 2	6321.33	40.62	49.84		50.04	0.003071	3.02	1779.43	663.04	0.26
Below Prefumo	23003.51	Questa 10	11936.36	40.62	51.04		51.41	0.003156	3.62	2591.67	687.78	0.28
Below Prefumo	23003.51	Questa 25	16068.17	40.62	51.73		52.22	0.003270	4.00	3073.78	697.54	0.29
Below Prefumo	23003.51	Questa 50	18540.20	40.62	52.11		52.66	0.003328	4.20	3337.01	702.30	0.29
Below Prefumo	23003.51	Questa100	21047.54	40.62	52.47		53.09	0.003376	4.39	3591.95	715.17	0.30
Below Prefumo	22913.53	Questa 2	6321.33	40.29	49.66		49.84	0.002433	3.05	1910.76	701.21	0.24
Below Prefumo	22913.53	Questa 10	11936.36	40.29	50.88		51.20	0.002571	3.63	2782.84	738.54	0.26
Below Prefumo	22913.53	Questa 25	16068.17	40.29	51.58		52.00	0.002675	3.98	3306.63	753.97	0.27
Below Prefumo	22913.53	Questa 50	18540.20	40.29	51.96		52.43	0.002721	4.16	3595.04	760.13	0.27
Below Prefumo	22913.53	Questa100	21047.54	40.29	52.33		52.86	0.002757	4.33	3873.94	764.90	0.28
Below Prefumo	22562.02	Questa 2	6321.33	39.21	48.85		49.06	0.002942	3.40	1909.80	768.01	0.26
Below Prefumo	22562.02	Questa 10	11936.36	39.21	50.04		50.38	0.003130	3.93	2879.24	842.22	0.28
Below Prefumo	22562.02	Questa 25	16068.17	39.21	50.74		51.17	0.003154	4.24	3476.85	853.25	0.28
Below Prefumo	22562.02	Questa 50	18540.20	39.21	51.13		51.60	0.003165	4.40	3804.21	857.27	0.29
Below Prefumo	22562.02	Questa100	21047.54	39.21	51.49		52.01	0.003175	4.56	4118.39	861.10	0.29
Below Prefumo	22155.85	Questa 2	6321.33	38.03	47.76		47.91	0.002467	2.95	2240.48	928.66	0.24
Below Prefumo	22155.85	Questa 10	11936.36	38.03	48.98		49.22	0.002397	3.33	3385.58	945.51	0.24
Below Prefumo	22155.85	Questa 25	16068.17	38.03	49.70		50.00	0.002389	3.59	4069.18	950.60	0.25
Below Prefumo	22155.85	Questa 50	18540.20	38.03	50.09		50.43	0.002392	3.74	4440.56	953.21	0.25

Appendix B - Hydraulic Analysis: Proposed Conditions

HEC-RAS Plan: Pro_Total_V2 River: SLO Creek Reach: Below Prefumo (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)	
Below Prefumo	22155.85	Questa100	21047.54	38.03	50.46		50.83	0.002398	3.87	4795.12	955.75	0.25
Below Prefumo	21757.07	Questa 2	6321.33	36.61	46.96		47.09	0.002143	3.04	2374.79	918.59	0.23
Below Prefumo	21757.07	Questa 10	11936.36	36.61	48.17		48.39	0.002256	3.56	3496.09	929.72	0.24
Below Prefumo	21757.07	Questa 25	16068.17	36.61	48.88		49.16	0.002340	3.87	4156.73	936.22	0.25
Below Prefumo	21757.07	Questa 50	18540.20	36.61	49.26		49.58	0.002382	4.04	4515.39	940.78	0.25
Below Prefumo	21757.07	Questa100	21047.54	36.61	49.63		49.98	0.002422	4.20	4858.26	945.89	0.26
Below Prefumo	21330.46	Questa 2	6321.33	36.22	46.09		46.22	0.002009	3.46	2422.62	939.01	0.23
Below Prefumo	21330.46	Questa 10	11936.36	36.22	47.22		47.43	0.002320	4.11	3497.96	960.03	0.26
Below Prefumo	21330.46	Questa 25	16068.17	36.22	47.89		48.16	0.002459	4.46	4141.50	969.72	0.27
Below Prefumo	21330.46	Questa 50	18540.20	36.22	48.25		48.55	0.002515	4.64	4494.36	971.69	0.27
Below Prefumo	21330.46	Questa100	21047.54	36.22	48.60		48.94	0.002564	4.80	4831.41	973.56	0.28
Below Prefumo	21016.06	Questa 2	6321.33	35.70	45.26		45.43	0.003507	4.01	2046.51	966.90	0.31
Below Prefumo	21016.06	Questa 10	11936.36	35.70	46.33		46.59	0.003425	4.25	3093.63	989.45	0.31
Below Prefumo	21016.06	Questa 25	16068.17	35.70	46.97		47.29	0.003372	4.48	3732.26	998.22	0.31
Below Prefumo	21016.06	Questa 50	18540.20	35.70	47.33		47.69	0.003327	4.61	4089.02	1002.21	0.31
Below Prefumo	21016.06	Questa100	21047.54	35.70	47.67		48.06	0.003293	4.74	4431.01	1006.01	0.31
Below Prefumo	20585.48	Questa 2	6321.33	34.25	43.92		44.08	0.002864	3.82	2094.09	953.63	0.29
Below Prefumo	20585.48	Questa 10	11936.36	34.25	45.01		45.26	0.002829	4.28	3143.95	964.91	0.29
Below Prefumo	20585.48	Questa 25	16068.17	34.25	45.69		46.00	0.002774	4.52	3798.32	972.56	0.29
Below Prefumo	20585.48	Questa 50	18540.20	34.25	46.05		46.40	0.002752	4.65	4156.01	976.70	0.30
Below Prefumo	20585.48	Questa100	21047.54	34.25	46.41		46.79	0.002733	4.77	4500.92	980.78	0.30
Below Prefumo	20214.24	Questa 2	6321.33	33.24	42.99	42.02	43.13	0.002207	3.15	2134.34	961.13	0.25
Below Prefumo	20214.24	Questa 10	11936.36	33.24	44.16	42.53	44.37	0.001969	3.41	3268.66	982.07	0.24
Below Prefumo	20214.24	Questa 25	16068.17	33.24	44.87	42.86	45.13	0.001878	3.58	3973.79	993.78	0.24
Below Prefumo	20214.24	Questa 50	18540.20	33.24	45.26	43.06	45.54	0.001847	3.68	4354.66	998.27	0.24
Below Prefumo	20214.24	Questa100	21047.54	33.24	45.62	43.24	45.93	0.001824	3.77	4720.16	1002.56	0.24
Below Prefumo	19986.28	Questa 2	6321.33	32.58	42.55		42.67	0.001962	2.99	2487.21	990.79	0.23
Below Prefumo	19986.28	Questa 10	11936.36	32.58	43.74		43.93	0.001987	3.44	3672.74	1000.29	0.24
Below Prefumo	19986.28	Questa 25	16068.17	32.58	44.46		44.70	0.001993	3.71	4396.34	1005.59	0.25
Below Prefumo	19986.28	Questa 50	18540.20	32.58	44.85		45.12	0.002011	3.86	4781.49	1008.43	0.25
Below Prefumo	19986.28	Questa100	21047.54	32.58	45.21		45.51	0.002028	4.00	5149.49	1011.24	0.25
Below Prefumo	19710.33	Questa 2	6321.33	32.42	42.03		42.15	0.001927	2.96	2443.46	924.54	0.23
Below Prefumo	19710.33	Questa 10	11936.36	32.42	43.18		43.39	0.002140	3.58	3525.30	961.19	0.26
Below Prefumo	19710.33	Questa 25	16068.17	32.42	43.89		44.16	0.002171	3.89	4224.85	991.18	0.26
Below Prefumo	19710.33	Questa 50	18540.20	32.42	44.27		44.57	0.002199	4.06	4597.92	998.64	0.27
Below Prefumo	19710.33	Questa100	21047.54	32.42	44.63		44.96	0.002224	4.22	4956.53	1005.76	0.27
Below Prefumo	19553.09	Questa 2	6321.33	31.40	41.67	39.93	41.84	0.002020	3.42	2054.42	909.41	0.24
Below Prefumo	19553.09	Questa 10	11936.36	31.40	42.64	40.92	42.98	0.003126	4.69	2693.52	927.70	0.31
Below Prefumo	19553.09	Questa 25	16068.17	31.40	43.26	41.41	43.71	0.003601	5.32	3110.55	938.09	0.34
Below Prefumo	19553.09	Questa 50	18540.20	31.40	43.57	41.68	44.10	0.003887	5.67	3323.83	943.23	0.35
Below Prefumo	19553.09	Questa100	21047.54	31.40	43.87	41.94	44.47	0.004151	6.01	3527.00	948.10	0.37
Below Prefumo	19496.32		Bridge									
Below Prefumo	19451.64	Questa 2	6321.33	31.46	41.16	38.49	41.28	0.001203	2.79	2242.75	789.46	0.19
Below Prefumo	19451.64	Questa 10	11936.36	31.46	41.93	40.09	42.23	0.002207	4.08	2758.19	838.80	0.27
Below Prefumo	19451.64	Questa 25	16068.17	31.46	42.61	40.30	43.01	0.002429	4.54	3217.76	886.95	0.28
Below Prefumo	19451.64	Questa 50	18540.20	31.46	42.99	40.62	43.45	0.002522	4.77	3473.77	912.17	0.29
Below Prefumo	19451.64	Questa100	21047.54	31.46	43.36	40.92	43.87	0.002579	4.97	3730.25	927.00	0.30
Below Prefumo	19426.64	Questa 2	6321.33	31.46	40.01	38.45	41.08	0.014787	8.30	761.73	584.05	0.64
Below Prefumo	19426.64	Questa 10	11936.36	31.46	41.51	40.58	42.07	0.006067	6.29	2009.43	769.63	0.43
Below Prefumo	19426.64	Questa 25	16068.17	31.46	42.15	41.09	42.85	0.006175	6.75	2428.48	826.26	0.44
Below Prefumo	19426.64	Questa 50	18540.20	31.46	42.52	41.37	43.28	0.006111	6.93	2669.23	849.81	0.44
Below Prefumo	19426.64	Questa100	21047.54	31.46	42.88	41.64	43.70	0.005942	7.05	2917.29	873.85	0.44
Below Prefumo	19425.64		Bridge									
Below Prefumo	19415.64	Questa 2	6321.33	31.46	40.10	38.45	40.61	0.008060	6.20	1172.41	596.00	0.47
Below Prefumo	19415.64	Questa 10	11936.36	31.46	41.06	40.58	41.83	0.009558	7.54	1724.62	720.62	0.53
Below Prefumo	19415.64	Questa 25	16068.17	31.46	40.52	41.09	42.69	0.031231	12.84	1408.64	650.97	0.95
Below Prefumo	19415.64	Questa 50	18540.20	31.46	40.76	41.37	43.11	0.031805	13.31	1545.68	681.69	0.96
Below Prefumo	19415.64	Questa100	21047.54	31.46	40.98	41.64	43.52	0.032217	13.73	1678.09	710.61	0.97
Below Prefumo	19414.64	Questa 2	6321.33	31.46	40.30	38.49	40.52	0.002800	3.87	1692.01	661.68	0.29
Below Prefumo	19414.64	Questa 10	11936.36	31.46	41.30	40.09	41.71	0.003764	5.01	2337.44	799.74	0.34
Below Prefumo	19414.64	Questa 25	16068.17	31.46	41.85	40.30	42.41	0.004254	5.62	2706.43	833.83	0.37
Below Prefumo	19414.64	Questa 50	18540.20	31.46	42.15	40.62	42.80	0.004514	5.95	2903.04	856.95	0.38
Below Prefumo	19414.64	Questa100	21047.54	31.46	42.43	40.92	43.16	0.004747	6.25	3091.25	877.35	0.40
Below Prefumo	19345.01	Questa 2	6321.33	31.04	40.07	39.18	40.28	0.003188	3.89	1736.42	899.10	0.30

Appendix B - Hydraulic Analysis: Proposed Conditions

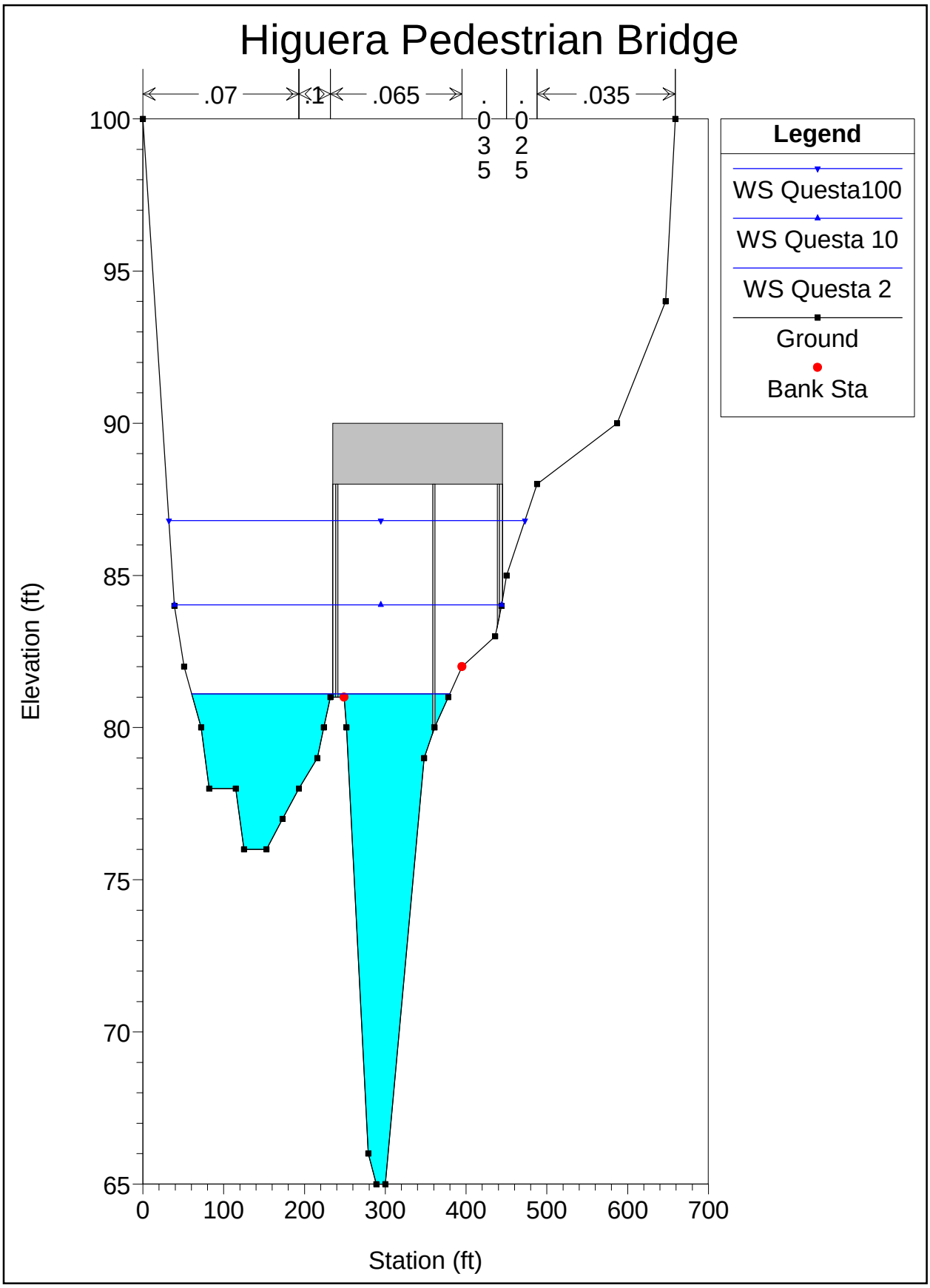
HEC-RAS Plan: Pro_Total_V2 River: SLO Creek Reach: Below Prefumo (Continued)

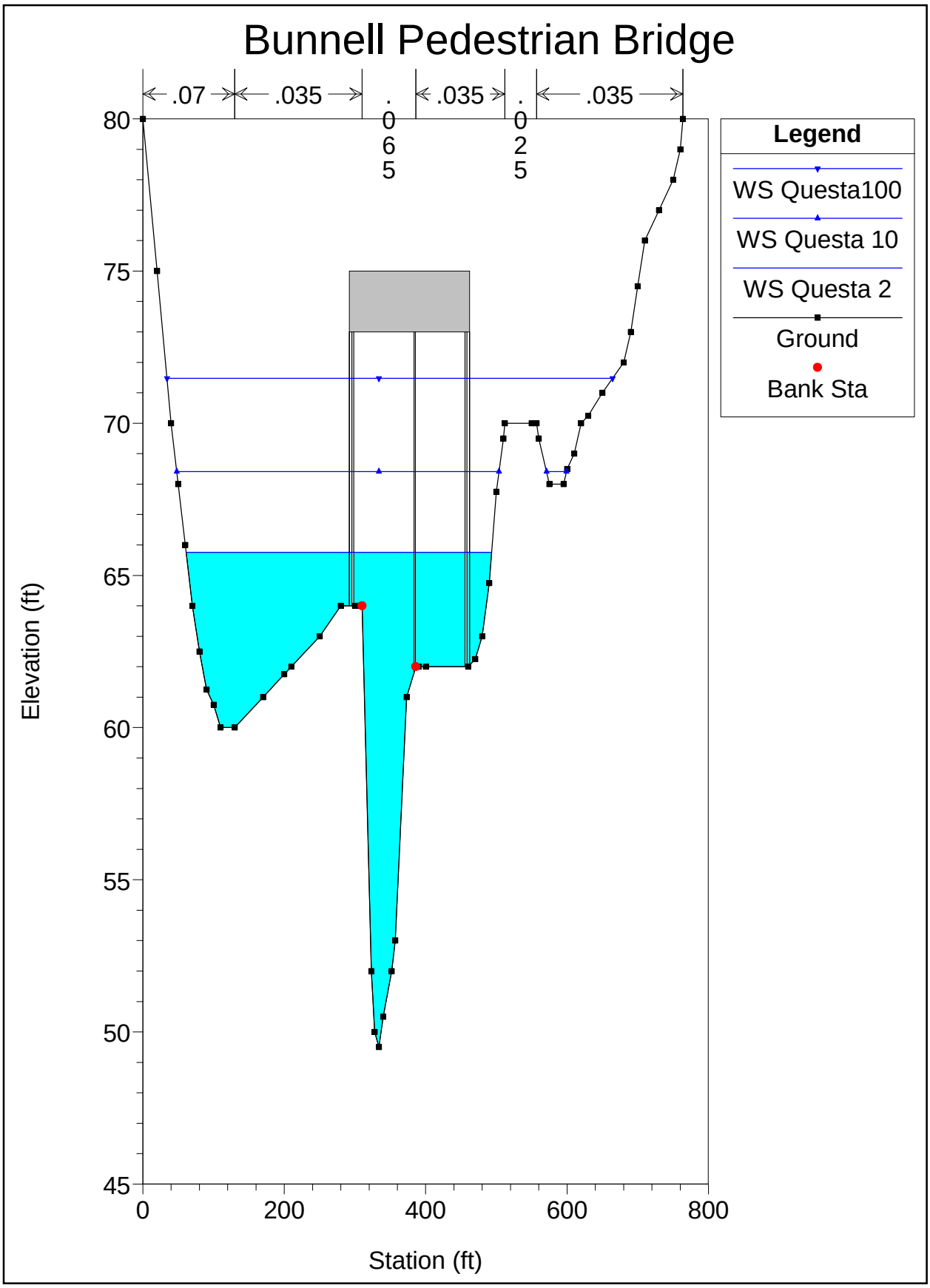
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Below Prefumo	19345.01	Questa 10	11936.36	31.04	41.03	39.83	41.40	0.003806	4.47	2459.96	993.67	0.33
Below Prefumo	19345.01	Questa 25	16068.17	31.04	41.57	40.21	42.06	0.004113	4.93	2873.14	1002.01	0.35
Below Prefumo	19345.01	Questa 50	18540.20	31.04	41.85	40.43	42.42	0.004264	5.18	3094.60	1004.52	0.36
Below Prefumo	19345.01	Questa100	21047.54	31.04	42.13	40.66	42.77	0.004391	5.40	3307.60	1006.94	0.36
Below Prefumo	18905.78	Questa 2	6321.33	29.76	39.33		39.42	0.001382	2.63	2712.89	1257.05	0.20
Below Prefumo	18905.78	Questa 10	11936.36	29.76	40.24		40.39	0.001582	3.11	3865.62	1282.31	0.22
Below Prefumo	18905.78	Questa 25	16068.17	29.76	40.78		40.97	0.001663	3.37	4557.96	1288.99	0.23
Below Prefumo	18905.78	Questa 50	18540.20	29.76	41.08		41.30	0.001688	3.49	4945.13	1292.18	0.23
Below Prefumo	18905.78	Questa100	21047.54	29.76	41.38		41.62	0.001690	3.59	5333.26	1295.37	0.23
Below Prefumo	18574.44	Questa 2	6321.33	29.40	38.73		38.85	0.002530	3.18	2244.44	1302.22	0.26
Below Prefumo	18574.44	Questa 10	11936.36	29.40	39.61		39.80	0.002365	3.35	3403.70	1323.95	0.26
Below Prefumo	18574.44	Questa 25	16068.17	29.40	40.13		40.37	0.002309	3.52	4104.71	1333.84	0.26
Below Prefumo	18574.44	Questa 50	18540.20	29.40	40.44		40.70	0.002247	3.59	4511.14	1338.35	0.26
Below Prefumo	18574.44	Questa100	21047.54	29.40	40.75		41.04	0.002146	3.63	4934.42	1341.25	0.25
Below Prefumo	18253.37	Questa 2	6321.33	27.79	37.63		37.82	0.003322	4.37	1863.01	1085.68	0.32
Below Prefumo	18253.37	Questa 10	11936.36	27.79	38.55		38.82	0.003106	4.67	2918.00	1181.69	0.32
Below Prefumo	18253.37	Questa 25	16068.17	27.79	39.11		39.42	0.002943	4.80	3579.71	1222.09	0.32
Below Prefumo	18253.37	Questa 50	18540.20	27.79	39.44		39.78	0.002862	4.88	3989.67	1257.25	0.31
Below Prefumo	18253.37	Questa100	21047.54	27.79	39.84		40.18	0.002545	4.76	4504.32	1295.05	0.30
Below Prefumo	17870.03	Questa 2	6321.33	27.00	36.32		36.52	0.003621	3.99	1799.77	956.64	0.32
Below Prefumo	17870.03	Questa 10	11936.36	27.00	37.35		37.62	0.003286	4.32	2896.41	1142.30	0.31
Below Prefumo	17870.03	Questa 25	16068.17	27.00	38.04		38.34	0.002819	4.30	3709.36	1212.80	0.29
Below Prefumo	17870.03	Questa 50	18540.20	27.00	38.40		38.73	0.002713	4.37	4175.29	1321.00	0.29
Below Prefumo	17870.03	Questa100	21047.54	27.00	39.05		39.33	0.001954	3.93	5030.63	1360.64	0.25
Below Prefumo	17472.89	Questa 2	6321.33	26.84	35.20		35.35	0.002354	3.31	2089.20	1160.03	0.25
Below Prefumo	17472.89	Questa 10	11936.36	26.84	36.60		36.76	0.001429	3.02	3859.91	1383.37	0.21
Below Prefumo	17472.89	Questa 25	16068.17	26.84	37.45		37.62	0.001135	2.91	5079.92	1464.63	0.19
Below Prefumo	17472.89	Questa 50	18540.20	26.84	37.85		38.03	0.001090	2.96	5678.87	1522.00	0.18
Below Prefumo	17472.89	Questa100	21047.54	26.84	38.68		38.84	0.000747	2.62	6966.72	1565.00	0.16
Below Prefumo	17081.37	Questa 2	6321.33	25.16	34.83		34.89	0.000592	1.74	3445.49	1313.95	0.13
Below Prefumo	17081.37	Questa 10	11936.36	25.16	36.34		36.42	0.000480	1.78	5501.85	1385.70	0.12
Below Prefumo	17081.37	Questa 25	16068.17	25.16	37.23		37.33	0.000449	1.87	6740.88	1403.70	0.12
Below Prefumo	17081.37	Questa 50	18540.20	25.16	37.63		37.74	0.000460	1.96	7304.43	1409.87	0.12
Below Prefumo	17081.37	Questa100	21047.54	25.16	38.52		38.62	0.000354	1.84	8567.26	1427.83	0.11
Below Prefumo	16768	Questa 2	6321.33	24.77	34.71		34.74	0.000204	1.13	4469.69	1078.28	0.08
Below Prefumo	16768	Questa 10	11936.36	24.77	36.20		36.26	0.000263	1.48	6108.77	1112.27	0.09
Below Prefumo	16768	Questa 25	16068.17	24.77	37.08		37.16	0.000294	1.68	7093.03	1130.87	0.10
Below Prefumo	16768	Questa 50	18540.20	24.77	37.46		37.56	0.000323	1.81	7533.39	1140.12	0.11
Below Prefumo	16768	Questa100	21047.54	24.77	38.38		38.48	0.000273	1.78	8589.95	1168.08	0.10
Below Prefumo	16568	Questa 2	6321.33	24.77	34.66	31.01	34.70	0.000226	1.18	4287.83	1055.90	0.08
Below Prefumo	16568	Questa 10	11936.36	24.77	36.14	31.92	36.21	0.000292	1.55	5863.91	1097.05	0.10
Below Prefumo	16568	Questa 25	16068.17	24.77	37.01	32.35	37.10	0.000326	1.76	6812.23	1118.42	0.11
Below Prefumo	16568	Questa 50	18540.20	24.77	37.39	32.58	37.50	0.000358	1.89	7232.11	1128.23	0.11
Below Prefumo	16568	Questa100	21047.54	24.77	38.32	32.74	38.42	0.000300	1.85	8271.93	1151.13	0.10
Below Prefumo	16165.55	Questa 2	6533.21	22.74	34.60		34.63	0.000168	1.23	4889.59	1124.94	0.08
Below Prefumo	16165.55	Questa 10	12466.08	22.74	36.06		36.11	0.000237	1.63	6585.21	1192.07	0.09
Below Prefumo	16165.55	Questa 25	16880.41	22.74	36.91		36.99	0.000273	1.85	7617.18	1210.86	0.10
Below Prefumo	16165.55	Questa 50	19352.44	22.74	37.29		37.38	0.000298	1.98	8070.13	1218.50	0.11
Below Prefumo	16165.55	Questa100	22036.35	22.74	38.23		38.32	0.000251	1.93	9234.14	1250.50	0.10
Below Prefumo	15724.39	Questa 2	6533.21	21.98	34.50		34.54	0.000314	1.44	4673.98	1005.31	0.10
Below Prefumo	15724.39	Questa 10	12466.08	21.98	35.89		35.99	0.000490	2.04	6110.59	1075.72	0.12
Below Prefumo	15724.39	Questa 25	16880.41	21.98	36.71		36.84	0.000583	2.37	6999.60	1088.02	0.14
Below Prefumo	15724.39	Questa 50	19352.44	21.98	37.06		37.21	0.000660	2.58	7381.38	1104.65	0.15
Below Prefumo	15724.39	Questa100	22036.35	21.98	38.04		38.19	0.000573	2.56	8498.57	1186.17	0.14
Below Prefumo	15429.64	Questa 2	6533.21	19.52	34.38	30.07	34.43	0.000294	1.80	4601.31	1084.74	0.10
Below Prefumo	15429.64	Questa 10	12466.08	19.52	35.73	30.84	35.81	0.000456	2.43	6625.17	1234.64	0.13
Below Prefumo	15429.64	Questa 25	16880.41	19.52	36.51	31.30	36.63	0.000589	2.89	7393.54	1268.70	0.14
Below Prefumo	15429.64	Questa 50	19352.44	19.52	36.82	31.54	36.97	0.000677	3.15	7707.84	1278.98	0.16
Below Prefumo	15429.64	Questa100	22036.35	19.52	37.82	31.78	37.98	0.000590	3.09	8714.62	1338.53	0.15
Below Prefumo	15186.16	Questa 2	6533.21	20.77	34.22	28.68	34.29	0.000459	2.19	3320.26	1189.53	0.12
Below Prefumo	15186.16	Questa 10	12466.08	20.77	35.34	29.78	35.56	0.001068	3.58	3813.09	1226.37	0.19
Below Prefumo	15186.16	Questa 25	16880.41	20.77	35.94	30.56	36.28	0.001582	4.51	4071.86	1262.88	0.23
Below Prefumo	15186.16	Questa 50	19352.44	20.77	36.48	30.92	36.68	0.001010	3.71	6461.46	1277.35	0.19
Below Prefumo	15186.16	Questa100	22036.35	20.77	37.51	31.30	37.71	0.000922	3.74	7223.67	1304.55	0.18
Below Prefumo	15055.2		Bridge									

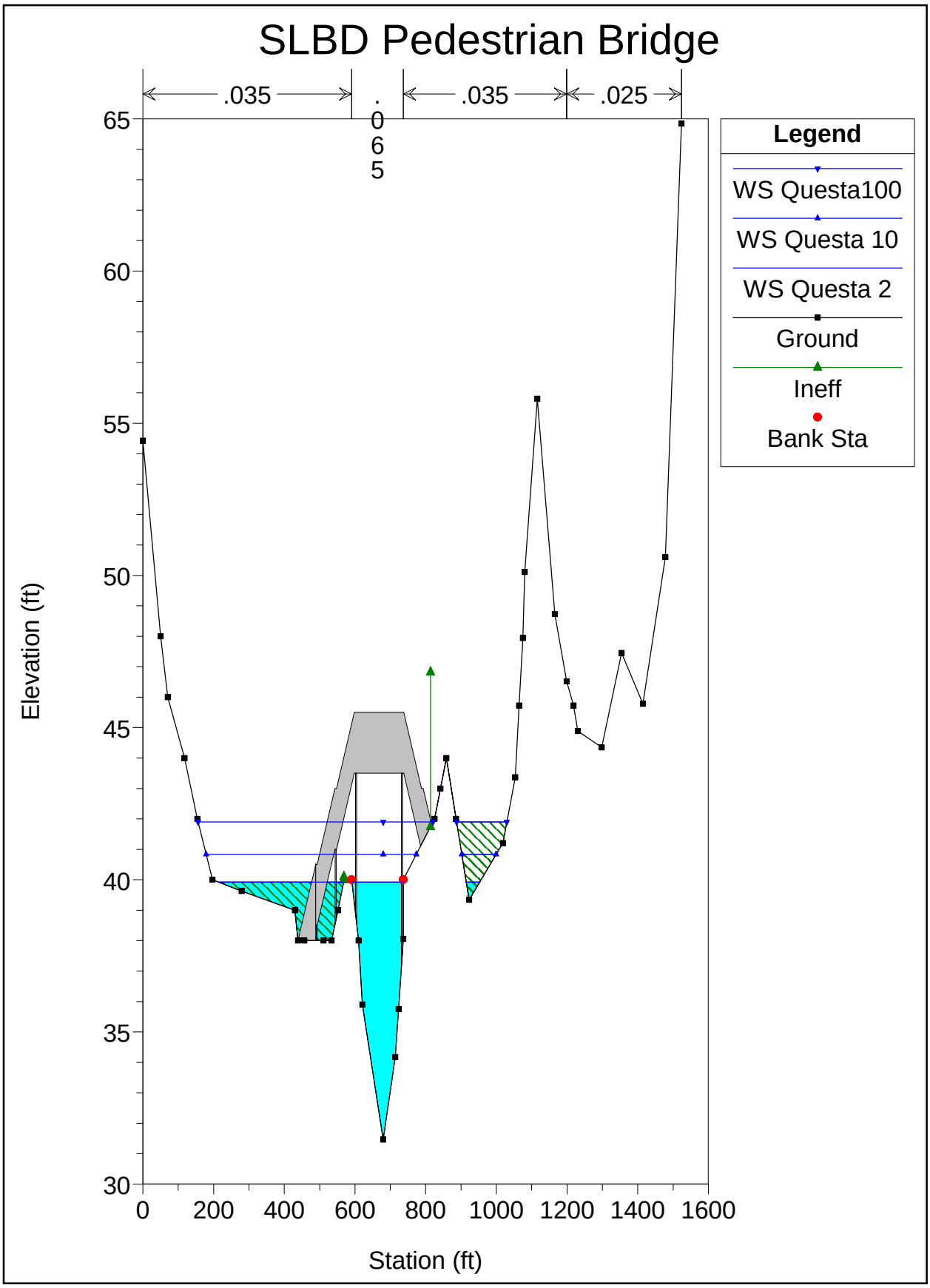
Appendix B - Hydraulic Analysis: Proposed Conditions

HEC-RAS Plan: Pro_Total_V2 River: SLO Creek Reach: Below Prefumo (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)	
Below Prefumo	14937.93	Questa 2	6568.53	17.16	32.20	26.67	32.38	0.001455	3.88	2339.06	900.08	0.22
Below Prefumo	14937.93	Questa 10	12607.34	17.16	33.67	29.02	34.10	0.002903	6.02	3070.55	985.02	0.32
Below Prefumo	14937.93	Questa 25	17127.61	17.16	34.57	30.35	35.16	0.003746	7.20	3548.05	1053.33	0.37
Below Prefumo	14937.93	Questa 50	19599.64	17.16	35.40	31.16	35.99	0.003547	7.32	4004.82	1078.36	0.36
Below Prefumo	14937.93	Questa100	22318.87	17.16	36.01	31.78	36.65	0.003676	7.69	4342.98	1083.30	0.37


Higuera Pedestrian Bridge
.07
.1
.065
.035
.035
.025
Legend
WS Questa100
WS Questa 10
WS Questa 2
Ground
Bank Sta
Elevation (ft)
Station (ft)
100
95
90
85
80
75
70
65
0
100
200
300
400
500
600
700


Bunnell Pedestrian Bridge
.07
.035
.065
.035
.025
.035
Legend
WS Questa100
WS Questa 10
WS Questa 2
Ground
Bank Sta
Elevation (ft)
Station (ft)
80
75
70
65
60
55
50
45
0
200
400
600
800


SLBD Pedestrian Bridge
.035
.065
.035
.025
Legend
WS Questa100
WS Questa 10
WS Questa 2
Ground
Ineff
Bank Sta
Elevation (ft)
Station (ft)
65
60
55
50
45
40
35
30
0
200
400
600
800
1000
1200
1400
1600

APPENDIX C

Location Hydraulic Study Requirements Questionnaire and Forms

APPENDIX C
LOCATION HYDRAULIC STUDY REQUIREMENTS

Bob Jones Pathway, San Luis Obispo to Ontario Road

This section provides the information required for Location Hydraulic Study, according to 23 CFR 650A, Section 650.111.

a) Base Flood Map.

The 100-year floodplain for the Bob Jones project is shown in **Figure 1a**.

b) Evaluation and discussion of the practicability of alternatives to any longitudinal encroachments.

The purpose of the project is to construct approximately four-and-one-half (4.5) miles of trail between the Octagon Barn near the SLO City limits, and the existing Ontario Road staging area south of San Luis Bay Drive. Based on detailed constraints analysis and preliminary engineering design, there are no feasible alternatives that do not have creek crossings. Longitudinal encroachment cannot be avoided, as the pedestrian approaches to the bridges, which are generally located parallel to or longitudinal to creek flow, need to ramp up from trail grade to 7 to 9 feet above the 10-foot floodplain elevation to achieve a bridge with a low cord elevation of at least 1 foot above the predicted 100-year flood under surface. In addition, the pathway, which is generally parallel to and near SLO Creek, may be elevated in places up to 0.5 feet above adjacent grade, and therefore also constitutes a minor longitudinal encroachment.

Location studies must include discussion of the following items, commensurate with the significance of the risk or environmental impact, for all alternatives containing encroachments and for those actions which would support base floodplain development:

a. The risks associated with implementation of the action,
b. The impacts on natural and beneficial floodplain values,
c. The support of probable incompatible floodplain development,
d. The measures to minimize floodplain impacts associated with the action, and
e. The measures to restore and preserve the natural and beneficial floodplain values impacted by the action.

a. The proposed action would not pose any significant risks or have significant impacts on (hydrologic/hydraulic) floodplain values in the SLO area. The project could potentially have impacts on natural floodplain functions and values, including localized impacts on riparian habitat as further explained in item (b) below.
b. The project could potentially have impacts on natural or beneficial floodplain values. The draft project Natural Environment Study (NES), Biological Assessment (BA) and Wetlands Assessment (WA) have determined that some components of the project, in particular creek bank rock slope protection associated with bridge abutment protection, will have localized impacts on riparian habitat and potential impacts on special status species. These documents also outline construction Best Management Practices (BMPs) to avoid and minimize impacts, and contain guidelines and criteria for habitat restoration and enhancement as mitigation.

c. The proposed project will not support incompatible floodplain development. This is a recreational trail and the bridges have not been designed to accommodate truck traffic or emergency vehicles.
d. Measures proposed as part of the project to minimize floodplain impacts, include implementation of construction Best Management Practices (BMPs) , such as development and implementation of erosion control, stormwater management plans, and live water or creek flow water management during construction of bridge abutments and placement of rock slope protection, management of dense willows in the vicinity of proposed bridges to reduce roughness, and live willow staking of any placed rock riprap. Pre-construction biological surveys to identify and relocate special status species from construction work areas (under proper regulatory permit approval), placement of construction barriers and exclosure fencing to keep sensitive species out of work areas, and having a biological monitor present during certain phases of the work are included in the avoidance and minimization measures for temporary or construction-related impacts. Riparian restoration and enhancement is also proposed to mitigate for more long lasting or permanent impacts on sensitive riparian habitat.
e. Restoration and protection measures for floodplain functions and values were summarized in item (d). above. Especially important is the development and implementation of a good Stormwater Pollution Prevention Plan (SWPPP) and Creek Protection Plan that shows the location of all work areas and staging areas, and the placement of temporary barriers to protect trees, riparian habitat and wetland areas, the installation of temporary erosion control measures such as use of silt fencing and straw rolls, as well as permanent erosion control, including the use of erosion control blankets and fiber rolls, hydro-seeding and mulching, and planting using native woody plants.

c) Location studies must include evaluation and discussion of the practicability of alternatives to any significant encroachments or any support of incompatible floodplain development.

No significant (negative) encroachment or incompatible floodplain development is proposed as part of the Bob Jones Pathway San Luis Obispo to Ontario Road project, that cannot be minimized and reduced in significance, or that cannot be adequately mitigated. This is based on the following criteria for determination of significance: 1) significant potential for interruption or termination of a transportation facility, which is needed for emergency vehicles or provides a community's only evacuation route, 2) a significant risk to life or property, or 3) a significant adverse impact on natural and beneficial floodplain values. Construction of the pathway, including three bridges and one highway overpass, will not affect evacuation routes in the area. The bridge construction would not pose a significant risk to life or property, as the trail will be closed during times of flood hazard. The proposed project has been carefully designed (and hydraulically modeled) to create less than a 0.1-foot rise in flood water-surface elevations.

Some potentially significant adverse impacts on natural and beneficial floodplain values could occur as a result of the project, but avoidance and minimization measures have been developed for temporary construction related impacts, and habitat restoration and enhancement along the creek is proposed for mitigation of permanent impacts on riparian and special status species habitat. A close look at project alignment alternatives did not indicate any environmentally superior alternatives that would avoid creek crossings and consequent localized habitat impacts, and that also met project goals and objectives.

d) Proposed action is consistent with existing watershed and floodplain management programs and to obtain current information on development and proposed actions in the affected watershed.

The proposed project is consistent with the County of SLO Floodplain Management Ordinance and the SLO Creek Waterway Management Plan (Questa, 2003) adopted by both the City of SLO City Council, and the SLO County Board of Supervisors.

LOCATION HYDRAULIC STUDY FORM

Dist. 5 Co. San Luis Obispo Rte. 101 P.M./K.P.
Fed. Proj. Number 05-5979 Bridge No. n/a
Floodplain Description:
Proposed bridges within 100-year (+10-year) floodplain of San Luis Obispo Creek. Floodplain very active in places with scour/deposition
1. Description of Proposal (include any physical barriers i.e. concrete barriers, soundwalls, etc. and design elements to minimize floodplain impacts)

Construction of 4.5 miles of 12'-wide, paved bicycle/pedestrian pathway at or less than 0.5 feet above adjacent grade; installation of three pre-engineered steel truss bicycle/pedestrian bridges and approach ramps over San Luis Obispo Creek and one new concrete girder or pre-engineered steel structure over Hwy 101 at Ontario Road. Bridges are associated with new Class I trail paralleling Hwy 101 and San Luis Obispo Creek.

2. ADT: Current n/a Projected n/a (bicycle/pedestrian project)

3. Hydraulic Data: Base Flood Q_{100}= 24,226 cfs
WSE_{100}= 38.3 to 86.2' The flood of record, if greater than Q_{100}: (<Q100)
Q= 18,116 cfs WSE= _____
Overtopping flood Q=_____ m^3 / s WSE= 32' - 82' (depending on location)
Are NFIP maps and studies available? YES X NO_____

4. Is the highway location alternative within a regulatory floodway?
YES_____ NO X

5. Attach map with flood limits outlined showing all buildings or other improvements within the base floodplain. (See attached report)

Potential Q_{100} backwater damages:

A. Residences? NO X YES_____
B. Other Bldgs? NO X YES_____
C. Crops? NO X YES_____
D. Natural and beneficial floodplain values? NO X YES_____

6. Type of Traffic:

A. Emergency supply or evacuation route? NO X YES_____
B. Emergency vehicle access? NO_____ YES X
C. Practicable detour available? NO_____ YES X
D. School bus or mail route? NO X YES _____

7. Estimated duration of traffic interruption for 100-year event hours: 0 increase (current conditions < 24 hrs.)

8. Estimated value of Q_{100} flood damages (if any) – moderate risk level.

A.	Roadway	$ 0
B	Property	$ 0
	Total	$ 0

9. Assessment of Level of Risk Low X
Moderate ____
High ____

For High Risk projects, during design phase, additional Design Study Risk Analysis may be necessary to determine design alternatives.

Signature – Hydraulic Engineer _____ Date 1-08-09
(Item numbers 3,4,5,7,9)

Is there any longitudinal encroachment, significant encroachment, or any support of incompatible floodplain development? NO ____ YES X

If yes, provide evaluation and discussion of practicability of alternatives in accordance with 23 CFR 650.113

Minor longitudinal encroachment, but no adverse flood impacts. Pedestrian pathway/recreational trail project does not support additional floodplain development. No feasible alternatives that meet project goals for a Class I (separated) pathway were identified.

Information developed to comply with the Federal requirement for the Location Hydraulic Study shall be retained in the project files.

Signature – Project Engineer _____ Date 1-8-09
(Item numbers 1,2,6,8)

SUMMARY FLOODPLAIN ENCROACHMENT REPORT

Dist. 5 Co. San Luis Obispo Rte. 101 P.M./K.P. _____
Federal Project No.: 05-5949 Bridge No. n/a
Limits: Proposed pathway is parallel to Highway 101 and San Luis Obispo Creek, from ¼ mile south of Los Osos Valley Rd. to ½ mile south of San Luis Bay Drive

Floodplain Description: Proposed bridges within 100-year (+10-year) floodplain of San Luis Obispo Creek. Floodplain very active in places with scour/deposition

		No	Yes
1.	Is the proposed action a longitudinal encroachment of the base floodplain? *(Hydraulic analysis indicates no significant hydraulic impacts from the minor floodplain fill for trail and bridge construction)*	___	_X_
2.	Are the risks associated with the implementation of the proposed action significant?	_X_	___
3.	Will the proposed action support probable incompatible floodplain development?	_X_	___
4.	Are there any significant impacts on natural and beneficial floodplain values? *(Local riparian habitat impacts from rock slope protection at bridges)*	_X_	___
5.	Routine construction procedures are required to minimize impacts on the floodplain. Are there any special mitigation measures necessary to minimize impacts or restore and preserve natural and beneficial floodplain values? If yes, explain. *(Implement biological construction BMPs and habitat mitigation per NES, local willow/vegetation management)*	___	_X_
6.	Does the proposed action constitute a significant floodplain encroachment as defined in 23 CFR, Section 650.105(q).	_X_	___
7.	Are Location Hydraulic Studies that document the above answers on file? If not explain. *(Detailed HEC-RAS analysis has been completed)*	___	_X_

PREPARED BY:

_____ 1-09-09
Signature – Local Agency Project Engineer Date

APPROVED BY:

_____ _____
Signature - Caltrans Environmental Branch Chief Date

_____ _____
Signature – District Local Assistance Engineer Date