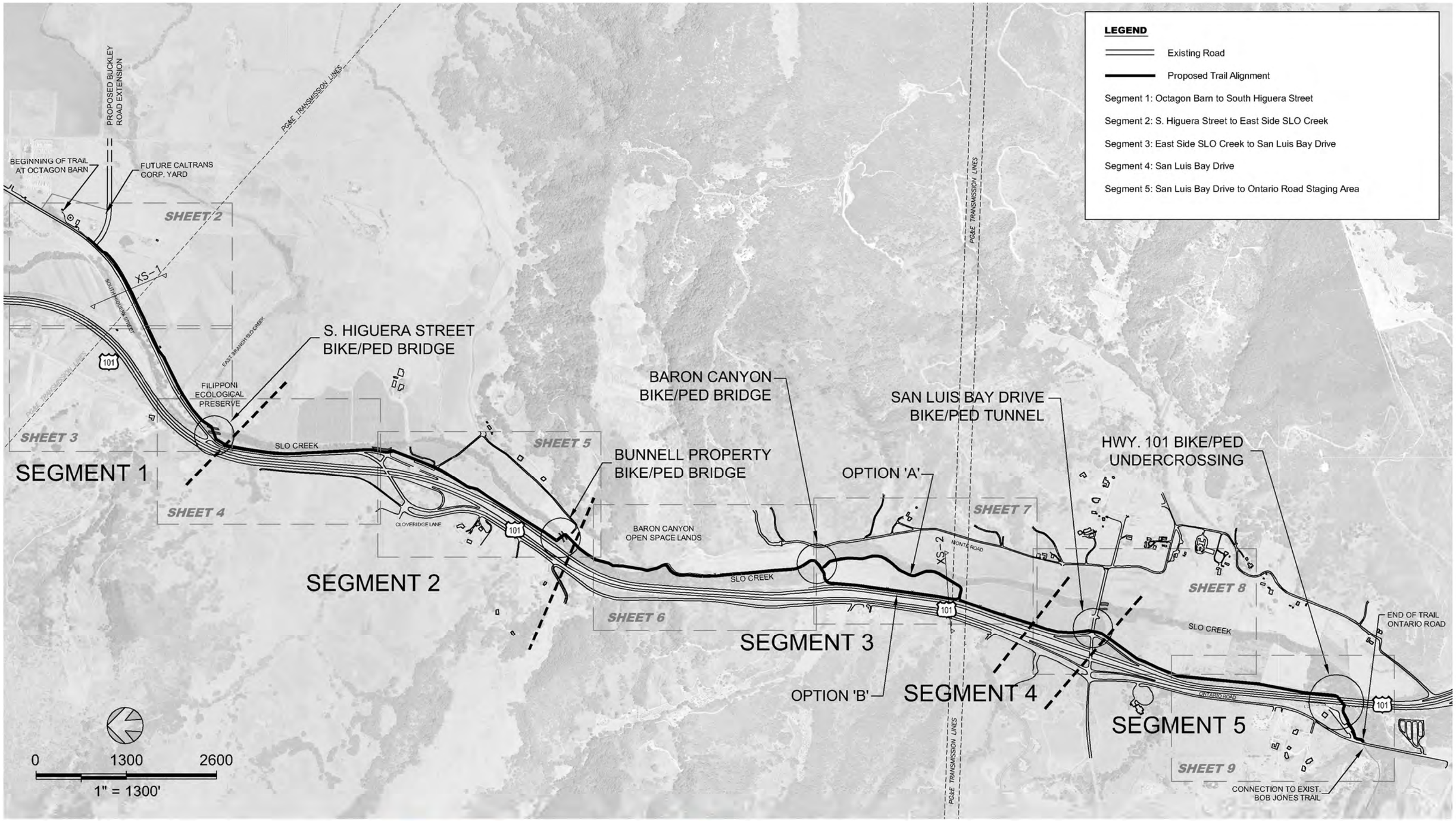
APPENDIX A: ALTERNATIVE - 6 PROJECT PLANS



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

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

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APPR'D	JP
DATE	07/24/14
PROJECT NUMBER	1300177

PRELIMINARY PLAN
CONFLICT AVOIDANCE
ALTERNATIVE

SHEET
1 of 12

FILE: P:\2013\1300177_BOB_JONES_2013\CAD\1300177_PREFERRED_ALIGNMENT_7-14-14.DWG

IF BAR DOES NOT EQUAL 1 INCH DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

MATCHLINE - SEE SOUTH HIGUERA ROADWAY WIDENING INSET AT RIGHT

BEGIN PATH

SIGN 5

OCTAGON BARN

PROPOSED BUCKLEY ROAD EXTENSION

SOUTH HIGUERA STREET

SEE INSET BELOW

TRAILHEAD

1A 4 5 6 9

500 LF PATH CLASS I PATH

180 LF 4'-6' RETAINING WALL

1A 10

(E) 72" BOX CULVERT

MORABITO
076-081-020

HAYASHI
076-081-018

3,100 LF CLASS I PATH 1A

PG&E TRANSMISSION LINE

Luis Obispo Creek

XS-1

ENVIRONMENTAL/MITIGATION ROW TO BE DETERMINED IN ENVIRONMENTAL REVIEW PROCESS

LOCATE TRAIL AWAY FROM PG&E TOWER FOOTING

5 SIGN

(E) 72" BOX CULVERT

MATCHLINE - SEE SHEET 3

0 200' 400'

1" = 200'

STORAGE

RESTROOMS & BIKE STORAGE

PARKING AREA, DECOMPOSED GRANITE OR SIMILAR PERMEABLE SURFACE, 65 SPACES FOR BOB JONES BIKE TRAIL

PARKING

EXPANDED PARKING AND BUCKLEY ROAD ACCESS (NIC)

(E) OCTAGON BARN

BARN COMMONS (NIC)

MEETING SPACE (NIC)

(E) MILKING PARLOR

ENTRY ROAD

LEGEND

(NIC) Not in Pathway Project

LEGEND

- Bicycle/Pedestrian Bridge
- Bridge Approach Ramp
- BR-A South Higuera Bridge
- BR-B Bunnell Property Bridge
- BR-C San Luis Bay Drive Bridge
- BR-D HWY 101 Overcrossing
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- Temporary Construction Access
- Traffic Barrier
- Limit of Construction Disturbance
- Split Rail Fence
- Security Fence
- T Post Fence (consistent with property owner negotiations)
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SOUTH HIGUERA ROADWAY WIDENING

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

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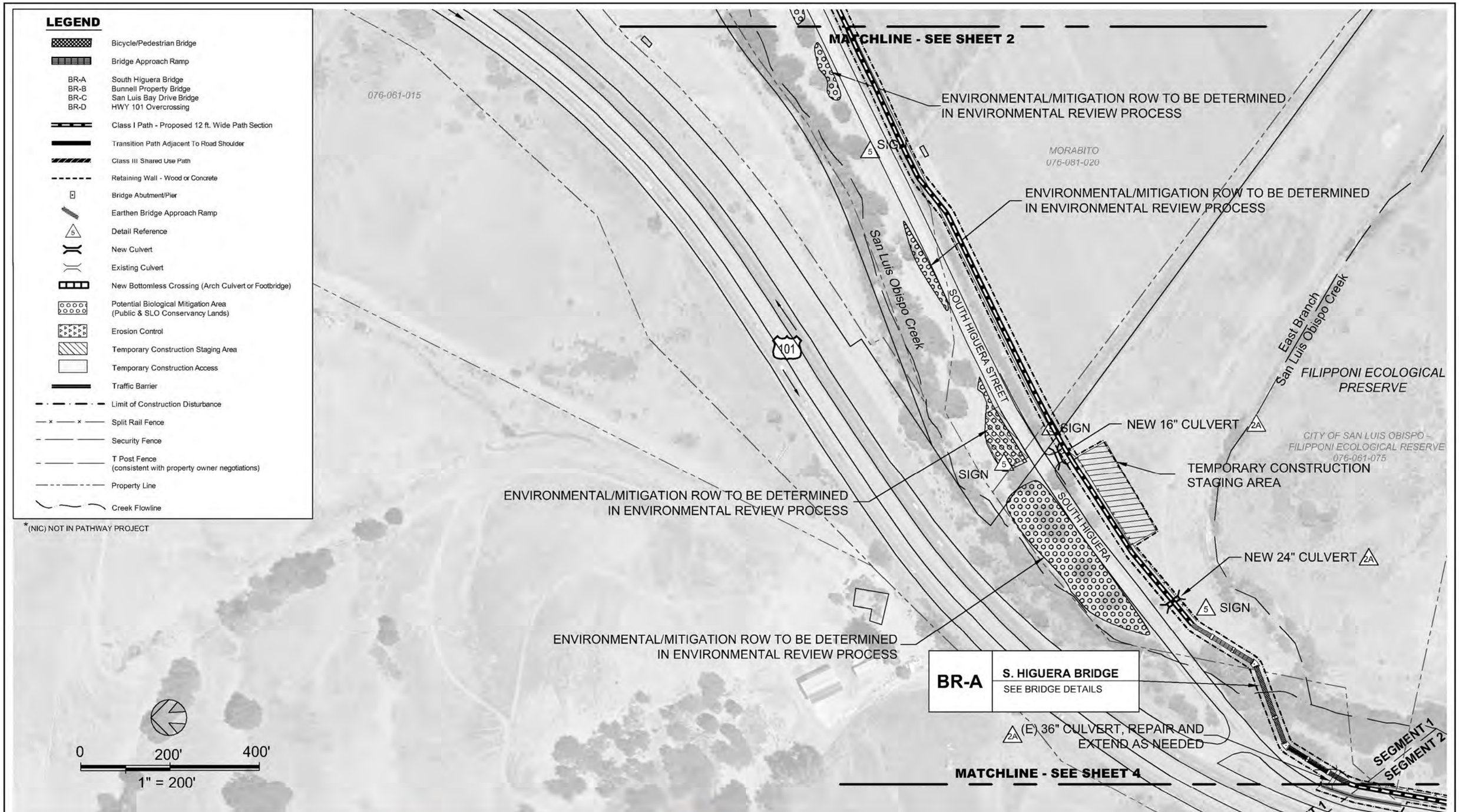
*(NIC) NOT IN PATHWAY PROJECT



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SHEET 3 of 12

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ENVIRONMENTAL/MITIGATION ROW TO BE DETERMINED IN ENVIRONMENTAL REVIEW PROCESS

SOUTH HIGUERA

NEW 24" CULVERT 2A

5 SIGN

101

BR-A | S. HIGUERA BRIDGE
SEE BRIDGE DETAILS

CITY OF SAN LUIS OBISPO - FILIPPONI ECOLOGICAL RESERVE

MAINO

MAINO

1B 500 LF PATH ADJACENT TO ROAD SHOULDER

(E) 30" CULVERT, REPAIR AS NEEDED (NIC)

2B REPLACE (E) 36" CULVERT WITH NEW BOTTOMLESS ARCH CULVERT, HOLLOW CORE CONCRETE FOOTBRIDGE, OR CLEAR SPAN TIMBER FRAME FOOTBRIDGE

(E) 30" CULVERT, REPAIR AS NEEDED (NIC)

2A (E) 36" CULVERT, REPAIR AND EXTEND AS NEEDED

SEGMENT 1 / SEGMENT 2

(E) 36" CULVERT, REPAIR AS NEEDED (NIC)

MATCHLINE - SEE SHEET 3

SIGN 5

SAN LUIS OBISPO CREEK

SIGN 5

SEGMENT 1 / SEGMENT 2

101

SOUTH HIGUERA STREET

TRANSITION TO CLASS III PATH

INSTALL NEW CONCRETE TRAFFIC BARRIER ±100 LF 8

PRIVATE ROAD

101

2,000 LF CLASS I PATH 1A

2,000 LF SPLIT RAIL FENCE (WIRE FENCE TO BE REMOVED) 4

MATCHLINE - SEE SHEET 5

0 200' 400'

1" = 200'

*(NIC) NOT IN PATHWAY PROJECT

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200 LF BY 3' HIGH RETAINING WALL 1B 11

500 LF PATH ADJACENT TO ROAD SHOULDER 1B 8

REPLACE (E) 36" CULVERT WITH NEW BOTTOMLESS ARCH CULVERT, HOLLOW CORE CONCRETE FOOTBRIDGE, OR CLEAR SPAN TIMBER FRAME FOOTBRIDGE 2B

SIGN 5

SIGN 5

SIGN 5

SIGN 5

CLOVERIDGE LANE

PRIVATE ROAD

CALTRANS R.O.W.

VENADO LANE

Davenport Creek

San Luis Obispo Creek

BUNNELL 076-121-030

TEMPORARY CONSTRUCTION ACCESS

RECONSTRUCT ±100 LF OF EXISTING TRAFFIC BARRIER 8

TEMPORARY CONSTRUCTION STAGING & FUTURE PERMANENT TRAIL HEAD PARALLEL PARKING (6 - 8 SPACES) 3 5 6 7 9

TEMPORARY CONSTRUCTION STAGING & FUTURE PERMANENT TRAIL HEAD PARALLEL PARKING (10 - 12 SPACES) 5 6 9

1,300 LF SPLIT RAIL FENCE 4

NEW 24" CULVERT 2A

(E) 16" CULVERT, REPAIR AS NEEDED (NIC)

NEW CROSS WALK

NORTHBOUND OFF RAMP

1C 1,300 LF SHARED USE PATH

101

PRIVATE ROAD

MATCHLINE - SEE SHEET 4

1,500 LF CLASS I PATH 1A

1,500 LF SPLIT RAIL FENCE 4

ONTARIO ROAD

076-121-014

076-121-020

076-121-021

076-121-025

ONTARIO ROAD

NEW 36" CULVERT 2A

SIGN 5

BUNNELL 076-121-030

SEGMENT 2

SEGMENT 3

SIGN 5

3,500 LF CLASS I PATH 1A

500 LF T-POST FENCE

MATCHLINE - SEE SHEET 6

BR-B	BUNNELL BRIDGE SEE BRIDGE DETAILS

0 200' 400'

1" = 200'

LEGEND

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*(NIC) NOT IN PATHWAY PROJECT

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

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MATCHLINE - SEE SHEET 5

BARON CANYON OPEN SPACE 076-243-024

BARON CANYON RANCH ROAD (PRIVATE)

(E) GATE

MONTE ROAD

2A

MATCHLINE - SEE SHEET 7

END OF T-POST FENCE AT BUNNELL PROPERTY LINE

3,000 LF CLASS I PATH 1A

NO FENCE EAST SIDE OF TRAIL

BARON CANYON OPEN SPACE

SIGN 5

3,500 LF CLASS I PATH 1A

2,200 LF SPLIT RAIL FENCE ADJACENT TO AG FIELD 4

SLO LAND CONSERVANCY 076-241-018

NEW 48" CULVERT 2A

100' LF OF 3' HIGH WOOD RETAINING WALL AS NEEDED 12

San Luis Obispo Creek

101

SLO LAND CONSERVANC 076-241-018

101

ONTARIO ROAD

ONTARIO ROAD

0 200' 400'

1" = 200'

LEGEND

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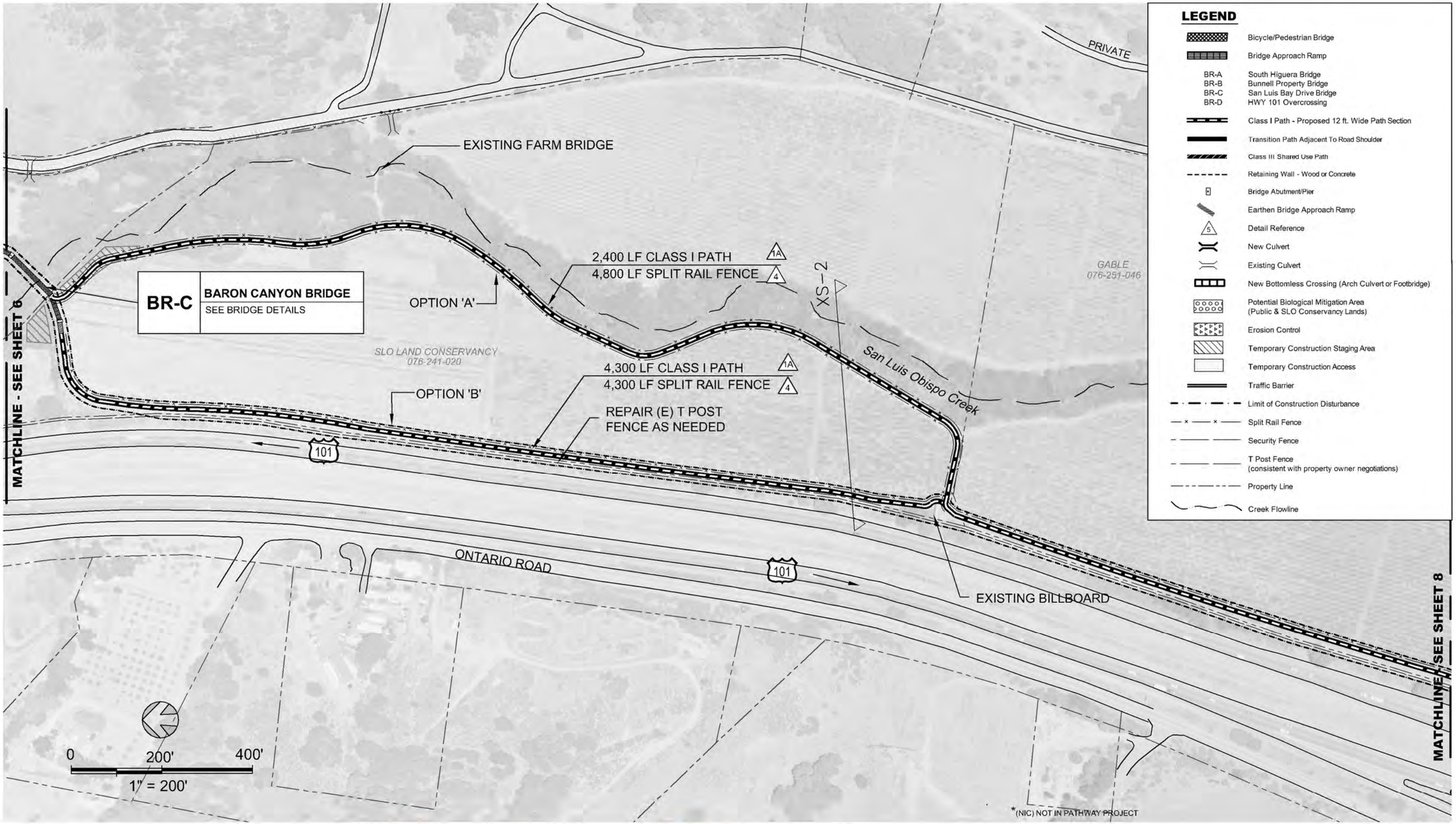

BOB JONES PATHWAY

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CONFLICT AVOIDANCE ALTERNATIVE

SHEET
7 of 12

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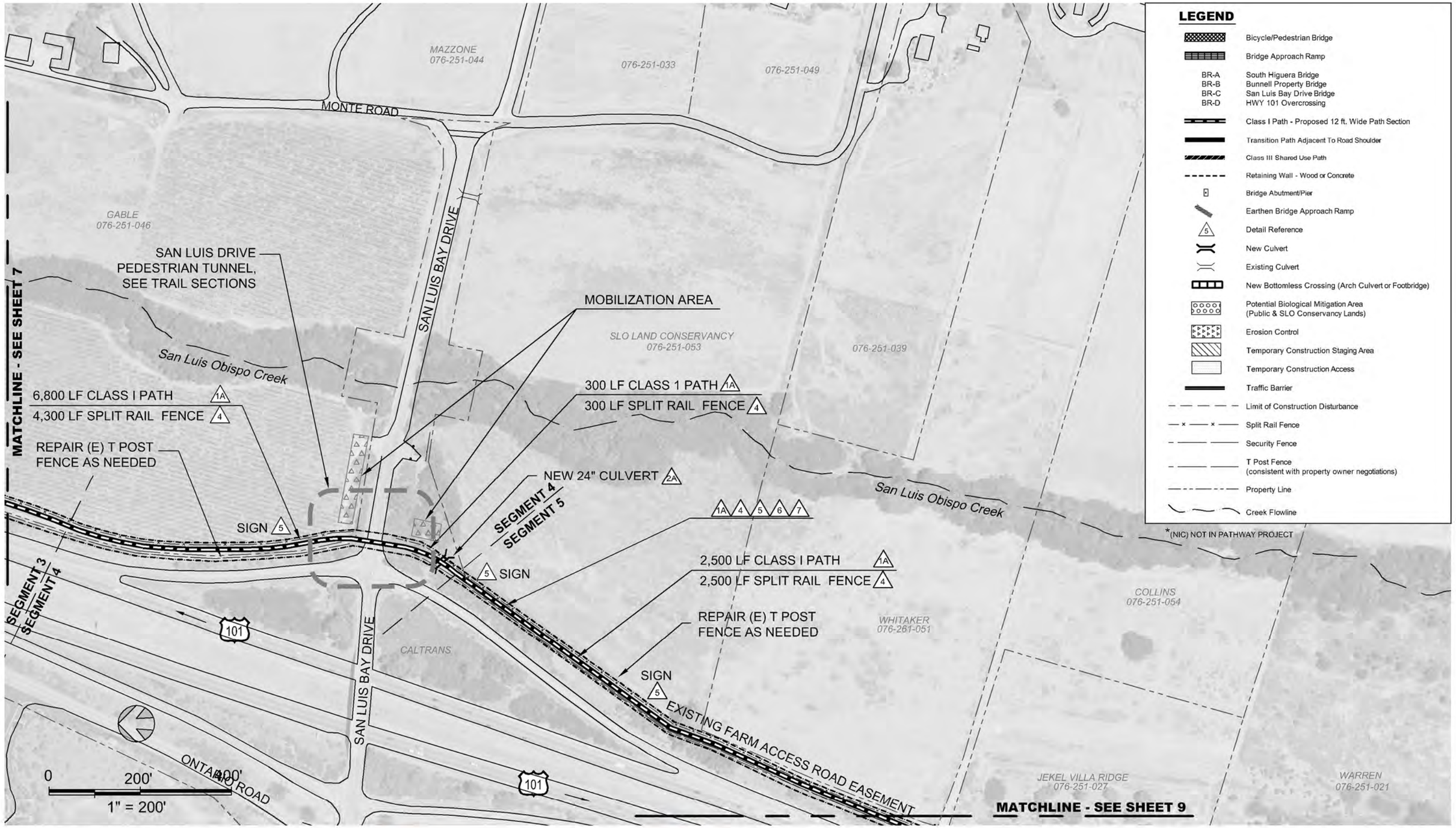

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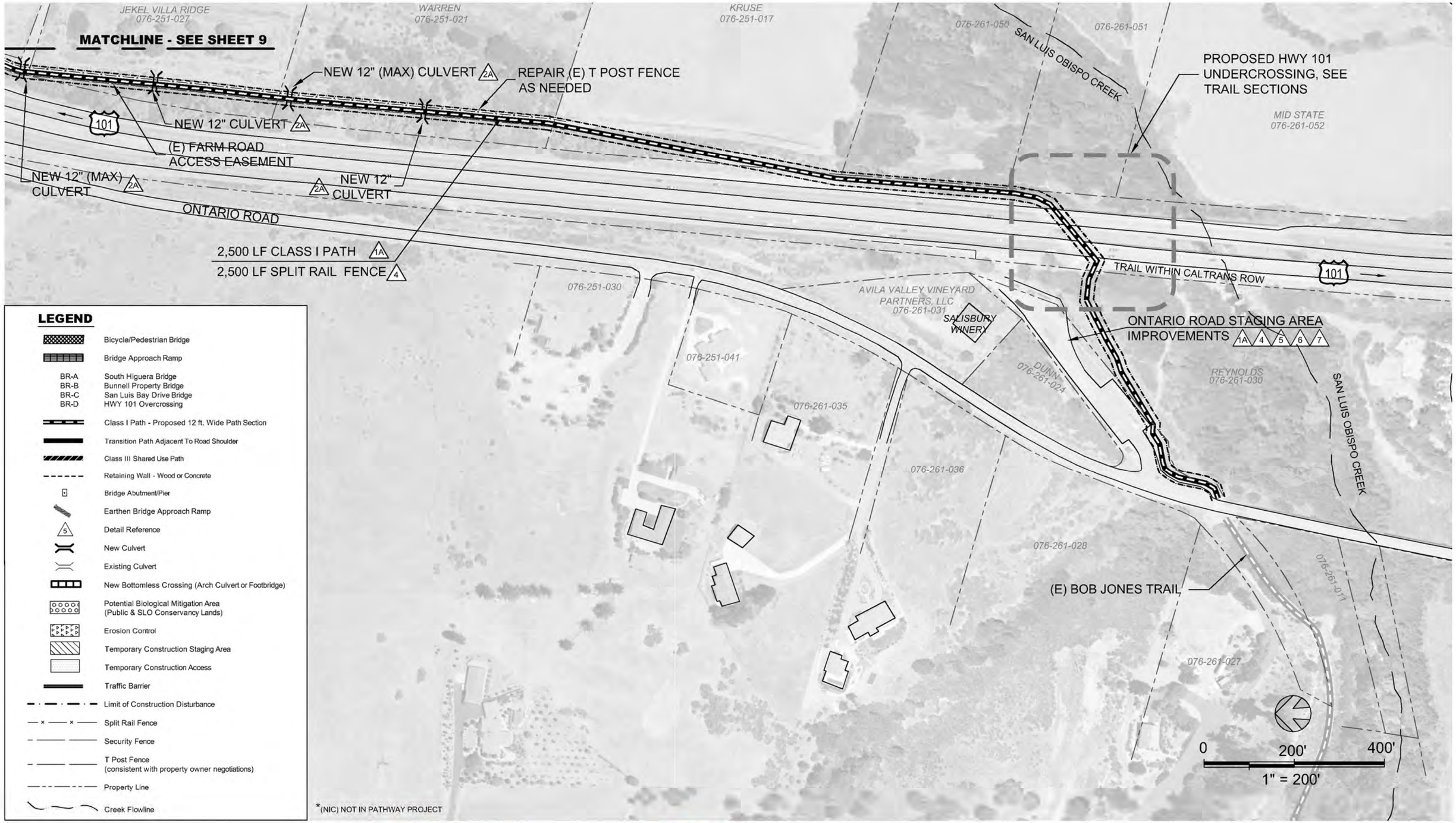

LEGEND

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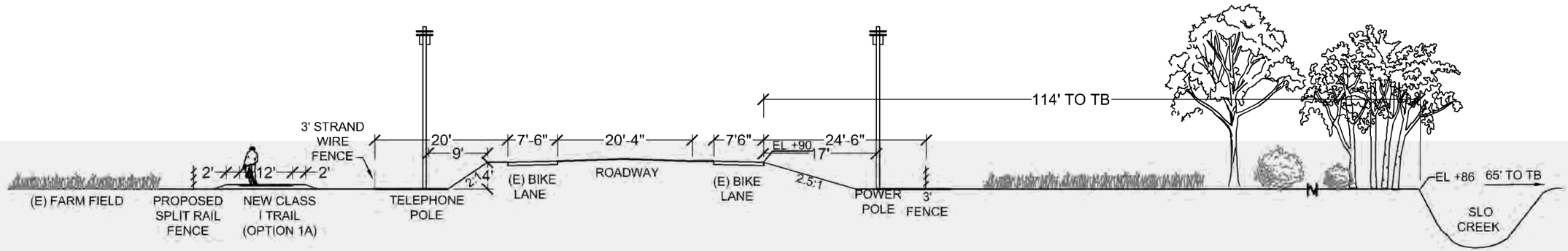
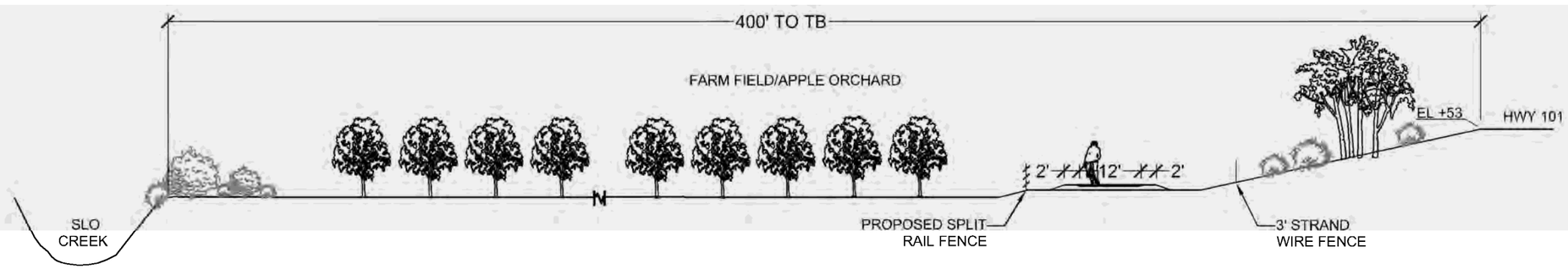


XS-1
SOUTH HIGUERA STREET AT FARM FIELD
(LOOKING SOUTH)



XS-2
ALONG HWY 101 NEAR DAVID CT
(LOOKING SOUTH)

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TRAIL CROSS SECTIONS
1 AND 2

SHEET
10 OF 12

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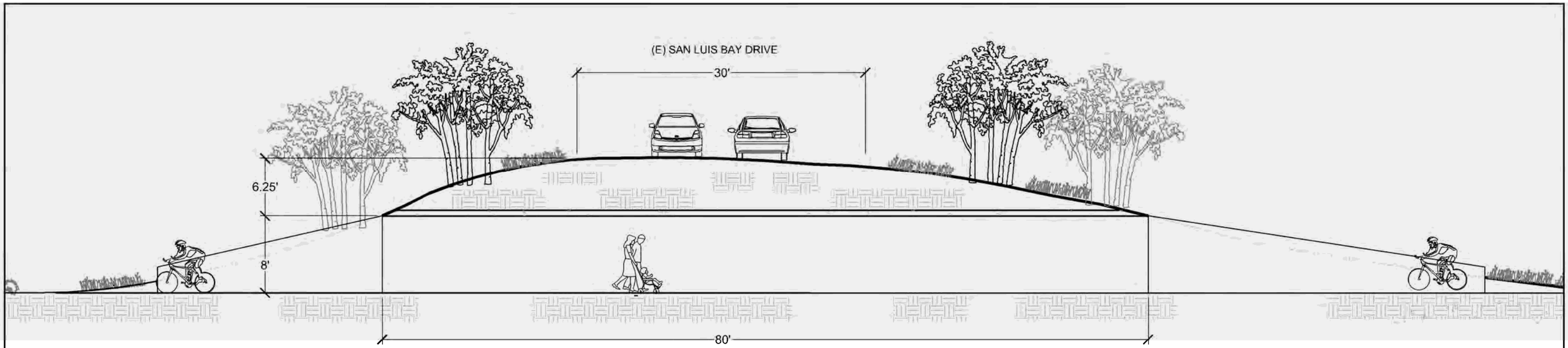
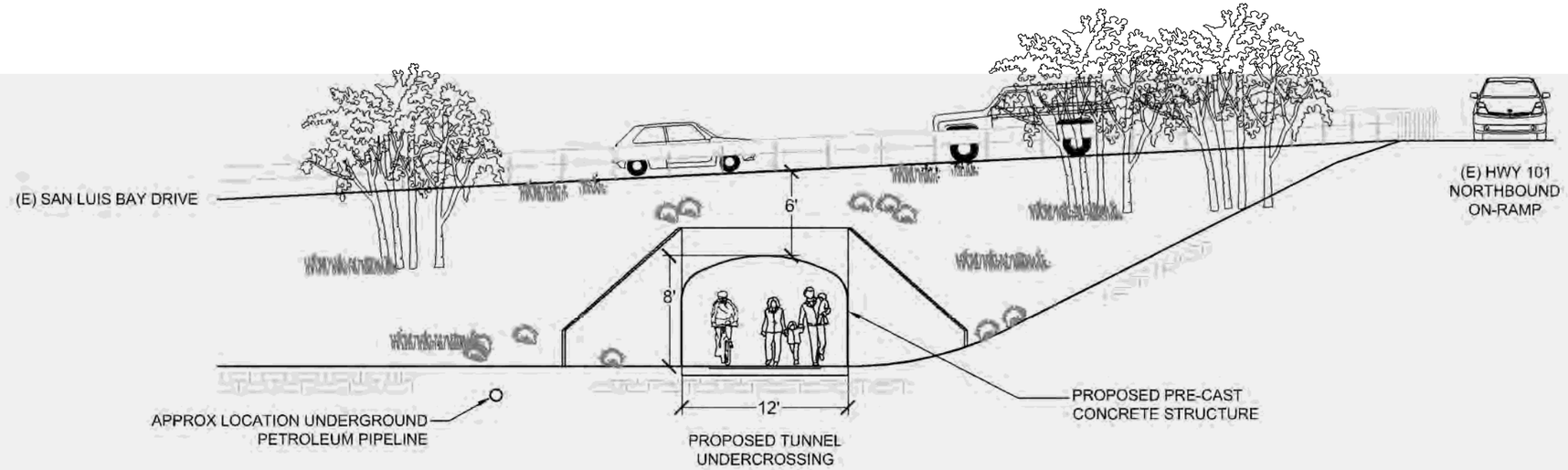


SAN LUIS BAY DRIVE TUNNEL
SECTION VIEW
(LOOKING EAST)



SAN LUIS BAY DRIVE TUNNEL
ELEVATION VIEW
(LOOKING SOUTH)

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TRAIL SECTIONS AT
SAN LUIS BAY DRIVE

SHEET
11 OF 12

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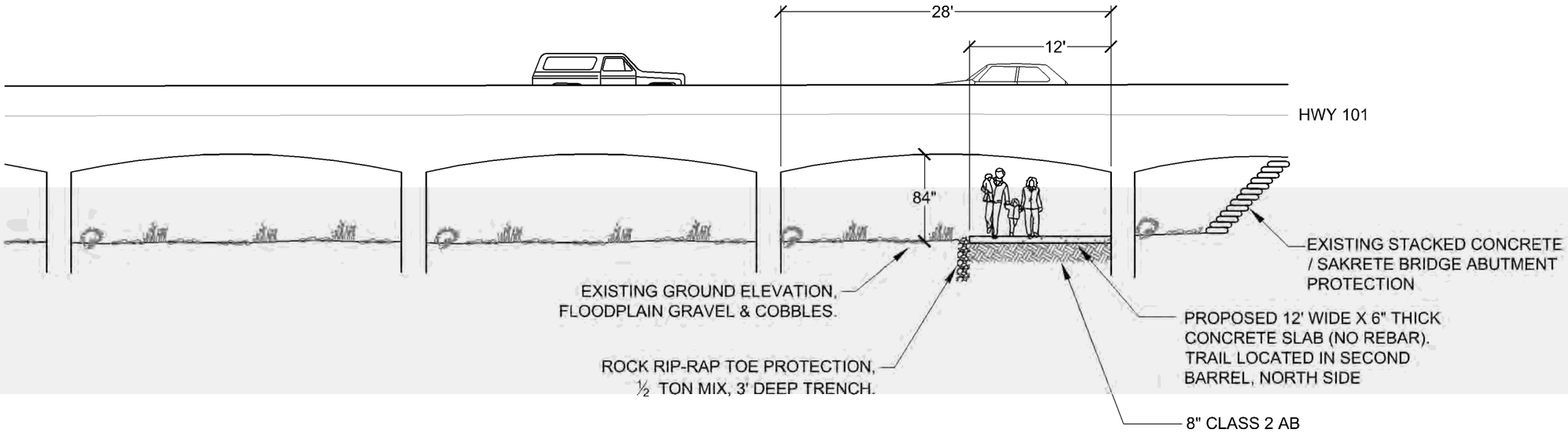
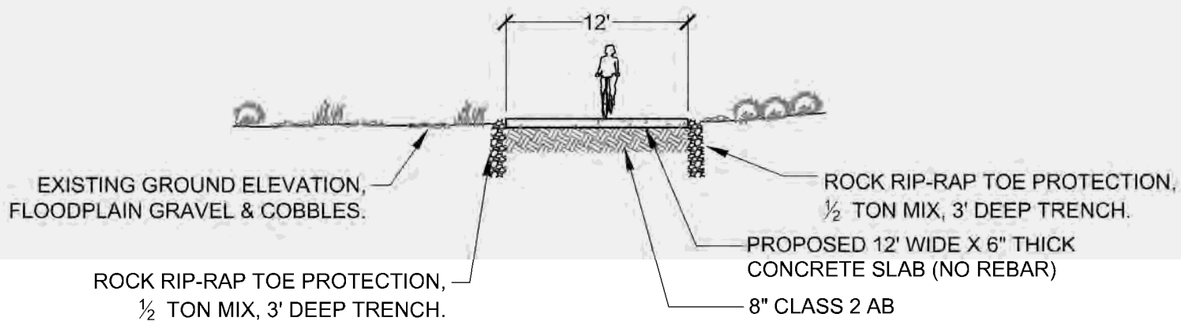


HWY 101 UNDERCROSSING
(LOOKING WEST)



HWY 101 UNDERCROSSING APPROACH AT
FLOODPLAIN
(LOOKING WEST)

NOTES:

1. TRAIL WILL BE SUBJECT TO SEASONAL CLOSURE AT SAN LUIS BAY DRIVE.
2. TRAIL WILL REQUIRE ANNUAL MAINTENANCE TO REMOVE SAND, GRAVEL , COBBLES FROM SURFACE.
3. UNDERPASS WITH LIMITED HEIGHT (7'). WILL REQUIRE BIKE RIDERS TO DISMOUNT AND WALK BIKES

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TRAIL SECTIONS
UNDER HWY 101 BRIDGE

SHEET
12 OF 12

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Appendix B: Biological Resources Assessment

SWCA®
ENVIRONMENTAL CONSULTANTS
Sound Science. Creative Solutions.®

Biological Resources Assessment for the Bob Jones Pathway Project Conflict Avoidance Alignment, Southern San Luis Obispo County, California

Prepared for:

PMC

Prepared by:

SWCA Environmental Consultants

August 2014

Biological Resources Assessment for the Bob Jones Pathway Project Conflict Avoidance Alignment in Southern San Luis Obispo County

Prepared for

PMC
60 Garden Court, Suite 230
Monterey, CA 93940
Attn: Tad Stearn
(831) 644-9174

Prepared by

Travis Belt, Senior Biologist

SWCA Environmental Consultants
1422 Monterey Street, C200
San Luis Obispo, California 93401
(805) 543-7095
www.swca.com

SWCA Project No. 28218

August 6, 2014

Reporting Biologist: Travis Belt, SWCA Environmental Consultants

"As a County-approved biologist, I hereby certify that this Biological Resources Assessment was prepared according to the Guidelines established by the County of San Luis Obispo Department of Planning and Building and that the statements furnished in the report and associated maps are true and correct to the best of my knowledge and belief; and I further certify that I was present throughout the site visit(s) associated with this report."

Signature	August 6, 2014 Date

EXECUTIVE SUMMARY/SYNOPSIS

SWCA Environmental Consultants (SWCA) has prepared this Biological Resources Assessment (BRA) at the request of PMC and County of San Luis Obispo General Services Agency. The purpose of this BRA is to document the biological resources in the Bob Jones Pathway Conflict Avoidance Alignment, identify impacts to natural resources that could occur from developing the proposed project, and recommend avoidance and mitigation measures. This BRA documents the natural resources on the entire Conflict Avoidance Alternative, which includes Segments 3 and 4 of the Bob Jones Pathway, located between Baron Canyon and the San Luis Bay Drive Bridge over U.S. Route 101 (US 101). The evaluation in this BRA is based on project plans as of July 2014 and provides quantified estimates of habitat impacts within the Area of Direct Impact (ADI), encompassed by the Biological Study Area (BSA).

The objective of the Conflict Avoidance Alignment is to: (a) reduce potential conflicts with day-to-day agricultural operations associated with active farms along the proposed pathway; (b) incorporate the highway undercrossing concept instead of the US 101 overcrossing; and (c) improve safety by eliminating key at-grade crossings. Two alternatives are included in this alignment—Alternative 6A and Alternative 6B. The primary difference between Alternatives 6A and 6B is a variation in the alignment (a stretch of approximately 2,000 feet) within a portion of Segment 3. Alternative 6A places the path closer to San Luis Obispo Creek (SLO Creek), while the Alternative 6B runs along US 101.

The Conflict Avoidance Alignment is largely situated in agricultural land and adjacent to the SLO Creek riparian corridor. One creek crossing is included in the alignment. Due to its situation, the Conflict Avoidance Alignment would largely impact ruderal habitats associated with agricultural roads; however, impacts to riparian habitat is expected. The anticipated impacts to U.S. Army Corps of Engineers (USACE), California Department of Fish and Wildlife (CDFW), and Regional Water Quality Control Board (RWQCB) jurisdictional areas associated with the riparian corridor are included below.

Jurisdictional Area*	Permanent**			Temporary**			TOTAL**		
	ft^2	m^2	ac	ft^2	m^2	ac	ft^2	m^2	ac
USACE Wetlands[1]	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
USACE Other Waters[2]	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Alternative 6A CDFW/RWQCB jurisdiction[3]	8,491.91	788.92	0.20	11,282.52	1,048.18	0.26	**19,774.43**	**1,837.10**	**0.46**
Alternative 6B CDFW/RWQCB jurisdiction[3]	11,138.05	1,034.76	0.26	15,732.11	1,461.56	0.36	**26,870.16**	**2,496.32**	**0.62**
Staging Areas CDFW/RWQCB jurisdiction[3]	0.00	0.00	0.00	8,461.18	786.07	0.19	8,461.18	786.07	0.19

* Impact area = jurisdictional areas within the ADI.
**ft^2 = square feet, m^2 = square meters, ac = acres
[1] Also includes RWQCB and CDFW jurisdictional areas below the ordinary high water mark (OHWM).
[2] Includes other non-wetland waters regulated by USACE, usually determined by limit of the OHWM.
[3] CDFW jurisdiction extends from the thalweg of the channel to the top of bank or outer extent of riparian vegetation, whichever is greater. May also include areas under USACE jurisdiction (below the OHWM) and RWQCB jurisdiction (above the OHWM).

In addition to being a USACE and CDFW jurisdictional feature, the main channel of SLO Creek occurs within the south-central California coast steelhead (*Oncorhynchus mykiss irideus*) critical habitat unit defined as Estero Bay Hydrologic Unit 3310 – (xii) San Luis Obispo Creek Hydrologic Sub-area 331024. Based on surveys within the project area and a review of the relevant literature, the section of SLO Creek that traverses the BSA contains the constituent elements of steelhead critical habitat. Although there will be impacts resulting from trimmed or removed willows, these effects would be minor and would not substantially affect the ability of steelhead to spawn, rear young, migrate, or feed in SLO Creek. There will be no permanent or temporary loss of service to steelhead because no in-stream work or fill will be required within SLO Creek.

The SLO Creek channel and riparian area provides suitable habitat for a variety of wildlife species including south-central California coast steelhead, foothill yellow-legged frog (*Rana boylii*), California red-legged frog (CRLF; *Rana draytonii*), Coast Range newt (*Taricha torosa torosa*), western pond turtle (*Emys marmorata*), silvery legless lizard (*Anniella pulchra pulchra*), two-striped garter snake (*Thamnophis hammondii*), and many bird species. Avoidance and mitigation measures are proposed to address potential impacts to these wildlife species. Formal consultation with the U.S. Fish and Wildlife Service (USFWS) for potential take of CRLF and the National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) for potential take of steelhead is warranted.

The only special-status plant species observed within the BSA was southern California black walnut (*Juglans californica* var. *californica*), a California Native Plant Society (CNPS) Rank 4.2 species that occurs at various locations along the SLO Creek riparian corridor. Southern California black walnut occurs on a CNPS watch list and is among the lowest degrees of sensitivity that CNPS considers. Southern California black walnut is fairly common along stream reaches in San Luis Obispo County, and many local specimens of this tree may be the result of plantings by humans. This BRA recommends that impacts to southern California black walnut be mitigated by replacing removed individuals on a 4:1 basis and planting two individuals for every one existing walnut trimmed.

Pre-construction authorizations will likely be required from the USACE, CDFW, and RWQCB. Pursuant to Section 7 of the Federal Endangered Species Act, consultation will be necessary with NOAA Fisheries for impacts to south-central California coast steelhead evolutionarily significant units and with USFWS for impacts to CRLF.

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1 INTRODUCTION

1.1 Purpose of Biological Resources Assessment

SWCA Environmental Consultants (SWCA) has prepared this Biological Resources Assessment (BRA) at the request of PMC and the County of San Luis Obispo (County) General Services Agency for the County's proposed Bob Jones Bike Pathway Conflict Avoidance Alignment (Conflict Avoidance Alignment, or Project). The purpose of this BRA is to document the biological resources along the Conflict Avoidance Alignment and identify impacts that could occur from any reasonably foreseeable development of the Project. This analysis is based on the conceptual plans provided by Questa Engineers (Questa 2014) and has taken into consideration biological resources, such as sensitive habitats and plant and animal species, which are known to occur within the vicinity of the Conflict Avoidance Alignment. For those instances where potential impacts to sensitive biological resources may occur, SWCA has proposed mitigation measures and best management practices (BMPs) with the objective of avoiding or minimizing the impacts.

SWCA understands that this BRA would be used by the project's planning and design team, the County Department of Planning and Building, and affected state or federal regulatory agencies during the environmental review process for the project. This BRA has been prepared in accordance with the County's *Standard Guidelines for Biological Resources Assessments* (County of San Luis Obispo 2009).

1.1.1 Project Location

The Bob Jones Pathway project is an approximately 4.4-mile (7.1-kilometer) route that would connect the existing bikeway along South Higuera Street from the San Luis Obispo Land Conservancy's Octagon Barn, then south and paralleling San Luis Obispo Creek (SLO Creek) to the Ontario Road Staging Area, near U.S. Route 101 (US 101) and Avila Bay Drive in San Luis Obispo County, California. This BRA focuses on Segments 3 and 4 of the Bob Jones Pathway, which are located between Baron Canyon and the San Luis Bay Drive Bridge over US 101 (refer to Figures 1 and 2).

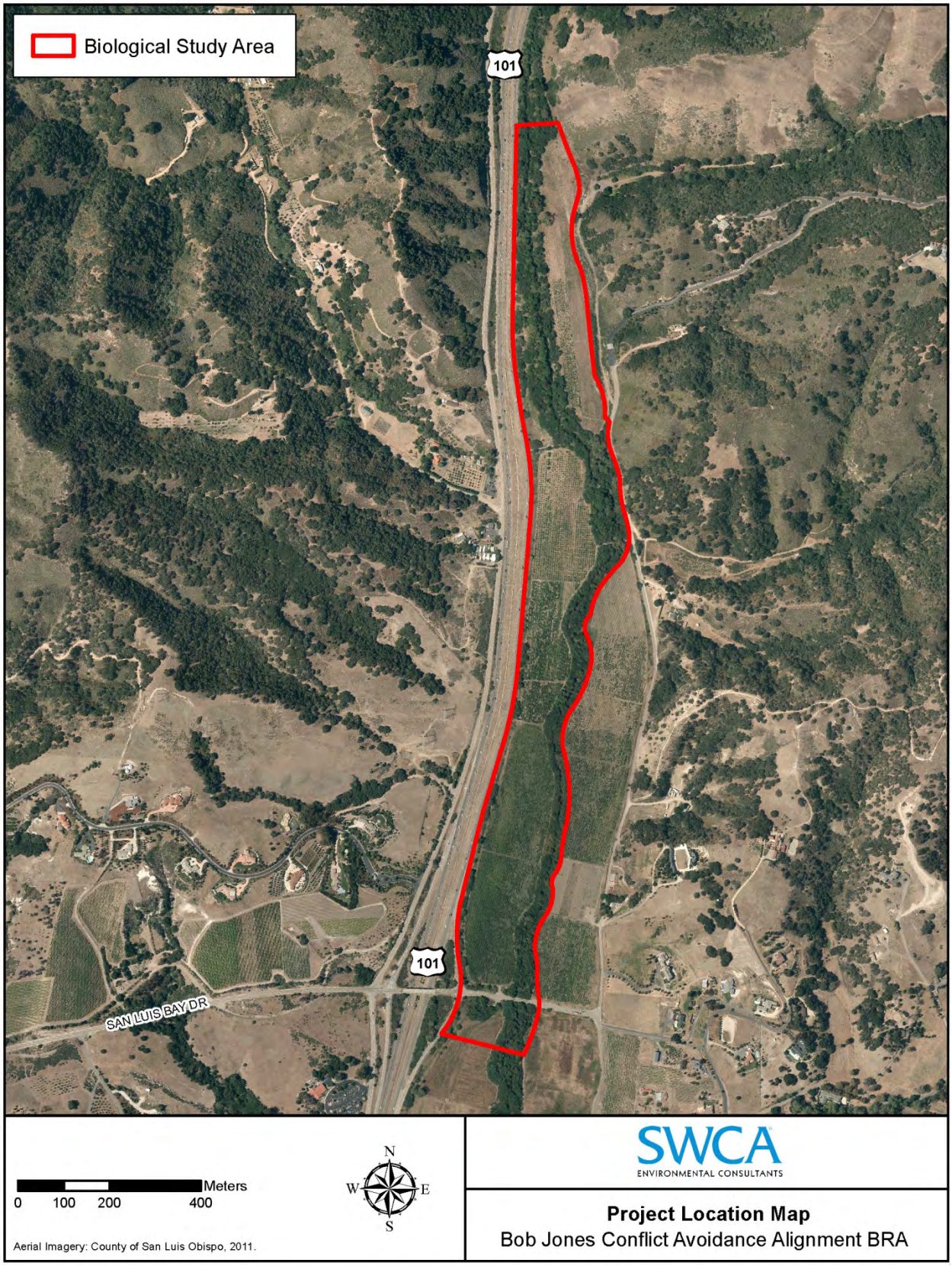
1.1.2 Project Background

The County prepared and circulated the Draft Environmental Impact Report (DEIR) for the Bob Jones Pathway project in 2013. The project description in the DEIR included the following elements:

- Development of a 4.4-mile mostly Class I pedestrian/bike path route that would connect an existing bikeway along South Higuera Street from the Land Conservancy of San Luis Obispo County's Octagon Barn south to the County's Ontario Road Staging Area.
- Construction of four bridges (three crossing SLO Creek and one crossing US 101 along the trail route.
- Construction of two at-grade crossings on South Higuera Street (one at the Octagon Barn parking lot staging area and one approximately 0.5 mile south of the Octagon Barn).
- Improved and expanded parking, primarily located at the Octagon Barn and the Ontario Road Staging Area, with lesser (trailhead) parking located at specified locations along the route.

Figure 1. Project Vicinity Map

Figure 2. Project Location Map



The DEIR detailed and reviewed the project in the following five segments:

- Segment 1: Octagon Barn to South Higuera Street Crossing
- Segment 2: South Higuera Street Crossing to Bunnell Crossing
- Segment 3: Bunnell Crossing to San Luis Bay Drive
- Segment 4: San Luis Bay Drive Crossing
- Segment 5: San Luis Bay Drive to Ontario Road Staging Area

The County received comments on the DEIR regarding certain portions of the proposed pathway being incompatible with on-going agricultural uses in the area. In coordination with the interested parties, the County identified the Conflict Avoidance Alignment, which includes two alternative alignments—Alternative 6A and Alternative 6B. The Conflict Avoidance Alignment is designed to address public concerns regarding the proposed bike path and agricultural activities. This BRA focuses on the biological resources along the Conflict Avoidance Alignment.

1.2 Conflict Avoidance Alignment (Alternatives 6A and 6B)

The Conflict Avoidance Alignment spans most of Segments 3 and 4 of the proposed Bob Jones Pathway, as described above. The objective of this alignment is to: (a) reduce potential conflicts with day-to-day agricultural operations associated with active farms along the alignment; (b) incorporate the highway undercrossing concept instead of the US 101 overcrossing; and (c) improve safety by eliminating key at-grade crossings. The primary difference between Alternatives 6A and 6B is a variation in the alignment (a stretch of approximately 2,000 feet) within a portion of Segment 3. Alternative 6A places the path closer to SLO Creek, while the Alternative 6B runs along US 101. The following provides brief discussions of the Conflict Avoidance Alignment in Segments 3 and 4.

1.2.1 Segment 3: Bunnell Crossing to San Luis Bay Drive

After crossing to the east side of SLO Creek at the Bunnell property, the Conflict Avoidance Alignment would follow the creek similar to the originally proposed alignment. At a location approximately 1,300 feet south of the creek crossing; however, the trail would continue along the east side of the creek's riparian edge instead of shifting to Monte Road.

At the approximate midpoint of Segment 3 in the Baron Canyon area, the trail would shift to the south, crossing SLO Creek approximately 4,200 feet south of the Bunnell Bridge. The proposed crossing would include a new bridge of a similar type as the other crossings along the proposed Bob Jones Pathway, although the span would be longer based on creek conditions in this area. The bridge across SLO Creek has been designed to span the creek, negating the need for fill in the creek and in-stream work. Immediately past this new crossing, Alternative 6A would continue along the west side of the creek between existing agricultural fields and riparian vegetation. There is a dirt farm road in this location. After following the creek for approximately 2,000 feet, the alignment would dip westward toward US 101 at the Gable property.

Instead of following the creek, Alternative 6B would dip westward immediately after the creek crossing, turning south and ultimately following a route parallel to US 101. The pathway would be located on San Luis Obispo Land Conservancy property immediately adjacent to California Department of Transportation (Caltrans) right of way.

Alternatives 6A and 6B reconnect near the highway. The alignment continues parallel to the highway until reaching San Luis Bay Drive in Segment 4 (refer to Appendix A, Plan Sheets).

1.2.2 Segment 4: San Luis Bay Drive Crossing

At San Luis Bay Drive, the pathway would cross over or under the roadway. If crossing at-grade, the pathway would hug the US 101 northbound on-ramp, then continue east, upslope, to a point approximately 200 feet east of the junction of San Luis Bay Drive and the highway ramps. After crossing at a controlled crossing point, the alignment would then ramp down again and connect to the original trail alignment.

To pass under San Luis Bay Drive, a new bike/pedestrian tunnel would be constructed under the roadway, which is elevated in this location. The tunnel would also connect to the original trail alignment to the south.

2 METHODOLOGY

2.1 Literature Review

Prior to conducting field surveys, SWCA conducted a literature review to gain insight on what species have known occurrences in the project vicinity. The review was initiated with a query of the most recent version of the California Department of Fish and Wildlife (CDFW) California Natural Diversity Database (CNDDB) to identify reported occurrences of sensitive resources within the Pismo Beach, Morro Bay South, Lopez Mountain, Arroyo Grande Northeast, Port San Luis, Oceano, and San Luis Obispo U.S. Geological Survey (USGS) 7.5-minute quadrangles.

In addition to the CNDDB query, SWCA queried the California Native Plant Society (CNPS) Electronic Inventory of Rare and Endangered Plants of California (2014) to gather additional information on rare plants that are known to occur in the area. SWCA also reviewed other biological reports prepared for the project, including: *Bob Jones Pathway – San Luis Obispo to Ontario Road Natural Environmental Study* (SWCA 2013a), *Bob Jones Pathway – San Luis Obispo to Ontario Road Biological Assessment* (SWCA 2013b), and *Bob Jones Pathway – San Luis Obispo to Ontario Road Wetland Assessment* (SWCA 2012).

2.2 Field Surveys

2.2.1 Plants and Wildlife

Following the literature review, SWCA conducted two field surveys in the BSA. For the purposes of this project, the BSA is defined as the area (land and water) that may be directly, indirectly, temporarily, or permanently impacted by construction and construction-related activities. Biological survey efforts focused on the vicinities of the proposed Conflict Avoidance Alignment, proposed creek crossing, access areas, and staging areas. Areas located outside of, but adjacent to the project site were included in field survey efforts to maximize the potential for observing special-status species with migratory behaviors or life histories. SWCA Biologists Travis Belt and Jackie Hancock conducted the surveys on April 24, April 26, and June 25, 2014. Surveys were timed to correspond with the appropriate flowering seasons for regional special-status plant species that have a potential to occur in the BSA. A floristic inventory of the BSA was compiled within the project site during these dates following the guidelines of CDFW (CDFW 2000) and USFWS (USFWS 1996). Plants were identified with dichotomous keys used as necessary (Hoover 1970; Baldwin et al. 2012). Presence or absence of special-status plant species in the project area was confirmed during the floristic surveys. General-level reconnaissance surveys for special-status wildlife coincided with the botanical surveys. Wildlife species were documented based on visual observation, auditory cues (i.e., calls and songs), and indirect signs (e.g., tracks, scat, skeletal remains, burrows, etc.). Protocol wildlife surveys were not conducted. A list of plants and wildlife observed within the BSA is included in Appendix B.

2.2.2 Jurisdictional Areas

SWCA conducted a wetland delineation of SLO Creek during the survey efforts. Wetland delineation efforts utilized the routine delineation methodology described in the U.S. Army Corps of Engineers (USACE) *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), and as supplemented in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Arid West Region (Version 2.0)* (USACE 2008b). Delineators also utilized *A Field Guide to the Identification of the Ordinary High Water Mark in the Arid West Region of the Western United States* (USACE 2008a). Habitat and plant species descriptions follow the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979), *Preliminary Description of Terrestrial Natural Communities of California* (Holland 1986), *The Jepson Manual* (Baldwin et al. 2012), and the *Arid West 2014 Regional Wetland Plant List* (USACE 2014). Soils data was obtained from the *Soil Survey for San Luis Obispo County, California, Coastal Part* (U.S. Department of Agriculture Soil Conservation Service [SCS] 1984). Specific references not listed above are cited in text.

Delineation of jurisdictional areas associated with the project study area were based on review of pertinent literature and a thorough on-site investigation conducted on September 25, 2014, by SWCA Senior Biologist Mr. Belt. Prior to beginning the field delineation, Mr. Belt reviewed the USGS quadrangle map for Pismo Beach, California, and recent aerial photographs of the project site to determine the locations of potential areas of USACE/state jurisdiction. These resources were also used as a reference to determine hydrologic connectivity to a navigable water body. A site examination was conducted to identify boundaries between upland and jurisdictional habitats, and ensure compliance with Arid West requirements. Representative sampling points in potentially jurisdictional areas were evaluated to investigate the presence of hydric soils, hydrophytic vegetation, and wetland hydrology indicators. Two sampling points were excavated in the project area to observe and record soil characteristics, vegetation types, and hydrologic features. Soil matrix colors were classified according to the Munsell Soil Color Charts (Munsell Color 2000). Hydrological conditions, including surface inundation, saturated soils, groundwater levels, and other hydrology indicators, were recorded at sample points. Jurisdictional features including tops of banks, ordinary high water marks (OWHMs), and adjacent or in-stream jurisdictional boundaries were mapped using a Trimble Geo XT Global Positioning System unit capable of 1-meter accuracy. Please refer to Appendix C for plot locations and Appendix D for Arid West Data Sheets.

3 RESULTS

3.1 Soils, Topography, and Elevation

The SCS has mapped Marimel sandy clay loam, occasionally flooded within the biological study area (BSA) (SCS 1984). This nearly level soil is considered very poorly drained. The soil has moderate erodibility and moderate shrink-swell characteristics, as well as having potential septic system constraints due to slow percolation, wetness/high groundwater, and flooding. Marimel sandy clay loam is found throughout most the proposed Conflict Avoidance Alignment, with exception to the SLO Creek channel. The creek channel supports riverwash soils. Riverwash soils occur in active stream channels and support a mix of water deposited sand, loamy sand, gravels, and cobbles.

The north-to-south oriented BSA roughly parallels SLO Creek and US 101. The elevation in the BSA is approximately 40 to 60 feet. SLO Creek is a perennial stream subject to flooding, and is the dominant hydrological feature within the BSA. The flood prone area of SLO Creek is currently managed for agriculture.

3.2 Habitat Types

The BSA is characterized by agricultural land situated with US 101 to the west and Monte Road to the east. The SLO Creek riparian corridor bisects the agricultural areas. Due to its situation, the Conflict Avoidance Alignment largely supports agricultural and ruderal habitats, with exception to the proposed bridge crossing over SLO Creek. The proposed bridge would be built in the creek riparian zone which is relatively intact and supports native habitat. The habitat conditions are discussed in more detail below. Maps of the habitats are provided in Appendix E and representative photos are included in Appendix F.

3.2.1 Riparian Habitat

Riparian communities occur adjacent to existing stream channels, along seasonally flooded arroyos, or along ponds or depressional areas located close to ground water. These communities are transitional between riverine and upland habitats. Along stream channels, riparian habitat may fall within USACE jurisdiction in areas below the OHWM and within CDFW jurisdiction toward the outer extent of riparian growth. The riparian habitat within the BSA includes a lower stratum of riparian scrub, an upper stratum of riparian forest, and riverine in the active channel. These habitats have been mapped together as "riparian habitat" Approximately 29.04 acres of riparian habitat were mapped within the BSA.

The riparian forest habitat within the BSA can be further classified as central coast arroyo willow riparian forest (Holland 1986). The BSA supports a diverse assemblage of tree species in the riparian forest, including southern California black walnut (*Juglans californica* var. *californica*), western sycamore (*Platanus racemosa*), cottonwood (*Populus* spp.), box elder (*Acer negundo* var. *californicum*), arroyo willow (*Salix lasiolepis*), and coast live oak (*Quercus agrifolia*).

Riparian scrub occurs below the riparian forest layer. The riparian scrub habitat within the BSA can be further classified as central coast riparian scrub (Holland 1986). This riparian scrub community is typically close to groundwater and usually vegetated by willows (*Salix* spp.) (Holland 1986). Dominant plant species for this habitat type within the BSA include arroyo willow, California blackberry (*Rubus ursinus*), giant reed (*Arundo donax*), creek clematis (*Clematis ligusticifolia*), poison hemlock (*Conium maculatum*), Cape ivy (*Delairea odorata*), and black mustard (*Brassica nigra*). Young coast live oak trees and coyote brush (*Baccharis pilularis*) are occasionally interspersed with the willows in the riparian scrub community.

Riverine habitat along the streambed of SLO Creek is seasonally variable and includes open water components (active, flowing channel), vegetated and unvegetated sandbars (riverwash, active floodplain), and seasonally emergent wetlands. The stream gradient is low, water velocities are slow, and floodplains are typically well developed. The stream reach in the BSA is channelized with steep banks, approximately 3 to 8 feet high. Substrate within this habitat type is variable and consists of silt, sand, gravel, and cobbles. Using the classification, SLO Creek can be described as Riverine, Upper Perennial, Unconsolidated Bottom, and Permanently Flooded (Cowardin et al. 1979).

Riparian areas provide habitat for a diverse assemblage of aquatic, semi-aquatic, and terrestrial wildlife species. Native fish known to occur in the SLO Creek watershed include steelhead trout (*Oncorhynchus mykiss*), speckled dace (*Rhinichthys osculus*), threespine stickleback (*Gasterosteus aculeatus*), prickly sculpin (*Cottus asper*), and Pacific lamprey (*Entosphenus tridentata*) (Tamagni 1995). Introduced fish species include goldfish (*Carassius auratus*), largemouth bass (*Micropterus salmoides*), green sunfish (*Lepomis cyanellus*), bluegill (*Lepomis macrochirus*), mosquitofish (*Gambusia affinis*), channel catfish (*Ictalurus punctatus*), brown bullhead (*Ameiurus nebulosus*), golden shiners (*Notemigonus crysoleucas*), and fathead minnows (*Pimephales promelas*) (Tamagni 1995).

A variety of amphibian and reptile species are expected to occur in association with riparian areas within the BSA including Pacific chorus frog (*Pseudacris regilla*) and western pond turtle (*Emys marmorata*). The non-native crayfish (*Procambarus* sp.), and bullfrog (*Rana catesbeiana*) are known to be numerous throughout the creek. Although there are no records from this stretch of SLO Creek, the federally threatened California red-legged frog (CRLF; *Rana draytonii*) could occur in the riverine habitats and adjacent uplands in the BSA. Riparian areas also provide important nesting, roosting, and foraging habitat for a variety of migratory songbirds and raptors.

3.2.2 Seasonal Wetlands

A small patch of poison hemlock, a ruderal wetland indicator species, occurs within the BSA adjacent to the floodplain of SLO Creek (refer to Appendix E). This area is inundated for only a portion of the year, but long enough to support the growth of hydrophytic ("water-tolerant") vegetation. This seasonal wetland is isolated from SLO Creek and provided little to no habitat values; therefore, it is not considered to be jurisdictional. Approximately 0.10 acre of seasonal wetlands was mapped within the BSA.

3.2.3 Agricultural

Agricultural fields occupy a large portion of the BSA (refer to Appendix E). These fields support apple orchard planted in rows, ruderal plants between the apple trees, and unimproved access roads. Agricultural fields may provide habitat for rodents, other small mammals, and foraging birds, but are unlikely to support sensitive species because they are subject to considerable disturbance. Avian species that occupy the riparian community likely frequent the agricultural areas to forage. Approximately 47.34 acres of agricultural land were mapped within the BSA.

3.2.4 Ruderal/Mixed Trees

The Conflict Avoidance Alignment (including Alternatives 6A and 6B) run along existing unimproved agricultural roads that border the SLO Creek riparian area and the US 101 northbound lanes. Due to the on-going agricultural roadside disturbances in the pathway alignments, the Area of Direct Impact (ADI) supports ruderal vegetation. Ruderal habitats often occur along roadsides and fence-lines, near developments, and in other areas experiencing severe ground surface disturbance. Plants found within this habitat are typically introduced Mediterranean species that exhibit clinging seeds, adhesive stems, and rough leaves that assist their invasion and colonization of disturbed lands. The ruderal vegetation in the BSA includes a ground layer of typical Mediterranean forbs. Mixed species shrub and canopy layers occur in the US 101 right-of-way. This area supports scattered trees and shrubs including southern California black walnut, California buckeye (*Aesculus californica*), coyote brush, acacia (*Acacia* sp.), and arroyo willow. These trees and shrubs are likely present due to roadside plantings and naturalization in the disturbed areas. The willows and walnuts are likely sustained by roadside runoff and do not appear to be dependent on the hydrologic processes of SLO Creek. The ruderal/mixed tree areas comprise 5.88 acres of the BSA.

In general, ruderal vegetation does not provide the habitat complexity necessary for diverse wildlife communities or rare plant species. Species expected to occur within the ruderal habitats at the project site include various rodents including mice, squirrels, and pocket gophers. These species, in turn, are preyed upon by foraging raptors, including American kestrel (*Falco sparverius*), red-tailed hawk (*Buteo jamaicensis*), and red-shouldered hawk (*Buteo lineatus*). Avian species that are capable of adapting to constant road noise may utilize the trees and shrubs along US 101 for nesting.

3.3 USACE and CDFW Jurisdictional Areas

Wetlands may be defined as those areas transitional between open water and upland habitats. Wetlands function to improve water quality, detain storm water runoff, recharge groundwater, and provide wildlife habitats. USACE jurisdictional wetlands were identified within the BSA along SLO Creek. USACE jurisdictional other waters (jurisdictional aquatic areas lacking wetland vegetation) were identified within the BSA along a culverted drainage ditch with OHWMs and connectivity to SLO Creek located near the western section of the BSA. CDFW jurisdictional areas were also identified and mapped along the SLO Creek riparian corridor and the aforementioned drainage ditch. CDFW jurisdictional areas were identified by the outer extent of riparian vegetation. Maps of the jurisdictional features are included in Appendix C and quantified in Table 1 below.

Table 1. USACE and CDFW Jurisdictional Area Totals

Jurisdictional Areas	ft^2	m^2	ac
Grand Totals (SLO Creek and Drainage Ditch)			
USACE Jurisdictional Wetlands (SLO Creek)	229,561	21,326	5.27
USACE Jurisdictional Other Waters	1,742	162	0.04
CDFW Jurisdictional Areas	1,264,973	117,519	29.04

3.4 Special-Status Species

The following describes those sensitive biotic resources that have been documented within the Pismo Beach USGS Quadrangle and the surrounding six quadrangles. Sensitive biotic resources include sensitive plant and/or animal species as described below.

3.4.1 Special-Status Plant Species

For the purposes of this section, special-status plant species are defined as the following:

- Plants listed or proposed for listing as threatened or endangered under the Federal Endangered Species Act (FESA) (50 Code of Federal Regulations [CFR] 17.12 for listed plants and various notices in the Federal Register for proposed species).
- Plants that are candidates for possible future listing as threatened or endangered under the FESA.
- Plants that meet the definitions of rare or endangered species under the California Environmental Quality Act (CEQA) (State CEQA Guidelines §15380).
- Plants considered by the CNPS to be “rare, threatened, or endangered” in California (Rank 1B and 2 in CNPS 2014).
- Plants listed by CNPS as plants about which we need more information and plants of limited distribution (Rank 3 and 4 in CNPS 2014).
- Plants listed or proposed for listing by the State of California as threatened or endangered under the California Endangered Species Act (CESA) (14 California Code of Regulations [CCR] 670.5).

- Plants listed under the California Native Plant Protection Act (California Fish and Game Code §1900 et seq.).
- Plants considered sensitive by other Federal agencies (i.e., U.S. Forest Service, Bureau of Land Management), state and local agencies, or jurisdictions.

Based on the literature review for this project, a total of 64 special-status plant species have been documented in the queried quadrangles (refer to Appendix G, Table G-1). Because the plant list presented in the table is regional, SWCA evaluated the listed species to identify which special-status plants have the potential to occur in the BSA. SWCA compared the known habitat requirements of those 64 species to the sites' existing conditions, elevation, and soils. Table G-1 provides a rationale for SWCA's determination on whether or not a species may occur in the BSA. The analysis determined that the site supports suitable conditions for the following plant species:

- marsh sandwort (*Arenaria paludicola*)
- San Luis Obispo sedge (*Carex obispoensis*)
- Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*)
- Coulter's goldfields (*Lasthenia glabrata* ssp. *coulteri*)
- Gambel's watercress (*Nasturtium gambelii*)
- San Bernardino aster (*Symphyotrichum defoliatum*)
- southern California black walnut (*Juglans californica* var. *californica*)

Southern California black walnut was the only special-status plant species observed in the BSA.

3.4.1.1 SOUTHERN CALIFORNIA BLACK WALNUT (*JUGLANS CALIFORNICA* VAR*. CALIFORNICA*)

Southern California black walnut is a tree in the walnut family (Juglandaceae) that is a California endemic. It occurs in chaparral, cismontane woodland, riparian, and coastal scrub (alluvial) habitats. The species flowers from March to May. There are two sub-species of the California walnut—the northern California black walnut (*J. californica hindsii*) and the southern California black walnut. The northern subspecies occurs mainly north of the San Francisco Bay area. The southern subspecies is widely cultivated in the Santa Lucia Mountains (Hickman 1993) and is the subspecies assumed to occur within the BSA. The CNPS considers this subspecies to have a limited distribution and is on a "watch list" (Rank 4.2). This species was observed to occur along the SLO Creek riparian corridor and the northbound US 101 right-of-way within the BSA.

3.4.2 Special-Status Animal Species

For the purposes of this section, special-status animal species are defined as the following:

- Animals listed or proposed for listing as threatened or endangered under the FESA (50 CFR 17.11 for listed animals and various notices in the Federal Register for proposed species).
- Animals that are candidates for possible future listing as threatened or endangered under the FESA.
- Animals that meet the definitions of rare or endangered species under CEQA (State CEQA Guidelines §15380).

- Animals listed or proposed for listing by the State of California as threatened and endangered under the CESA (14 CCR 670.5).
- Animal species of special concern to the CDFW (Remsen 1978 for birds; Williams 1986 for mammals).
- Animal species that are fully protected in California (California Fish and Game Code, §3511 [birds], §4700 [mammals], and §5050 [reptiles and amphibians]).

Based on a CNDDB query and a review of existing literature, a total of 28 sensitive wildlife species have been documented as occurring in the queried quadrangles (refer to Appendix G, Table G-2). Because this list of species is considered regional, an analysis of the range and habitat preferences of those animal species was conducted to identify which sensitive wildlife species have the potential to occur within the BSA. SWCA determined that the following special-status animal species and migratory birds have potential to occur in the BSA:

- south-central California coast steelhead (*Oncorhynchus mykiss irideus*)
- foothill yellow-legged frog (*Rana boylii*)
- California red-legged frog (*Rana draytonii*)
- Coast Range newt (*Taricha torosa torosa*)
- western pond turtle (*Emys marmorata*)
- Silvery legless lizard (*Anniella pulchra pulchra*)
- two-striped garter snake (*Thamnophis hammondii*)
- least Bell's vireo (*Vireo bellii pusillus*)
- Cooper's hawk (*Accipiter cooperii*)
- sharp-shinned hawk (*Accipiter striatus*)
- white-tailed kite (*Elanus leucurus*)
- southwestern willow glycatcher (*Empidonax traillii extimus*)
- western yellow-billed cuckoo (*Coccyzus americanus*)
- loggerhead shrike (*Lanius ludovicianus*)
- yellow warbler (*Dendroica petechia brewsteri*)
- yellow-breasted chat (*Icteria virens*)
- loggerheaded shrike (*Lanius ludovicianua)*
- merlin (*Falco columbarius*)
- purple martin (*Progne subis*)
- Class Aves
  Other migratory bird species (nesting)

Based on presence of suitable foraging, roosting, or nesting habitat, the site supports suitable conditions for the species listed above and nesting migratory birds. Although all of the species listed above have potential to occur on the site, only south-central California coast steelhead was observed during the surveys. South-central California coast steelhead is discussed in more detail below.

3.4.2.1 SOUTH-CENTRAL CALIFORNIA COAST STEELHEAD (*ONCORHYNCHUS MYKISS IRIDEUS*)

Steelhead are the anadromous form of rainbow trout. Steelhead historically ranged from Alaska southward to the California-Mexico border, though current data suggest that the Ventura River is

presently the southernmost drainage supporting substantial steelhead runs. Steelhead along the central and southern California coast represent the southernmost portion of the native steelhead range in North America, having ecologically and physiologically adapted to seasonally intermittent coastal California streams.

Optimal habitat for steelhead throughout its entire range on the Pacific coast can be characterized by clear, cool water with abundant instream cover (i.e., submerged branches, rocks, logs), well-vegetated stream margins, relatively stable water flow, and a 1:1 pool-to-riffle ratio (NOAA Fisheries 2005); however, steelhead are occasionally found in reaches of streams containing habitat that would be considered less than optimal. The reach of SLO Creek in the BSA supports good steelhead habitat. Four juvenile steelhead individuals were observed in the proposed bridge location during the June 25, 2014, survey.

4 REGULATORY OVERVIEW

4.1 Federal Policies and Regulations

4.1.1 Federal Endangered Species Act of 1973

The FESA provides legislation to protect federally listed plant and animal species. Impacts to listed species resulting from the implementation of a project would require the responsible agency or the applicant to formally consult with the USFWS or National Oceanic and Atmospheric Administration National Marine Fisheries Service (NOAA Fisheries) to determine the extent of impact to a particular species. If USFWS or NOAA Fisheries determine that impacts to a federally listed species would likely occur, alternatives and measures to avoid or reduce impacts must be identified. USFWS and NOAA Fisheries also regulate activities conducted in federal critical habitat, which are geographic units designated as areas that support primary habitat constituent elements for listed species.

4.1.2 Migratory Bird Treaty Act of 1918

The Migratory Bird Treaty Act (MBTA) protects all migratory birds, including their eggs, nests, and feathers. The MBTA was originally drafted to put an end to the commercial trade in bird feathers, popular in the latter part of the 1800s. The MBTA is enforced by the USFWS, and potential impacts to species protected under the MBTA are evaluated by the USFWS in consultation with other federal agencies.

4.2 State Policies and Regulations

4.2.1 California Endangered Species Act and Species of Concern

The CESA ensures legal protection for plants listed as rare or endangered, and wildlife species formally listed as endangered or threatened. The state also maintains a list of California Species of Special Concern (SSC). SSC status is assigned to species that have limited distribution, declining populations, diminishing habitat, or unusual scientific, recreational, or educational value. Under state law, the CDFW is empowered to review projects for their potential to impact special-status species and their habitats. Under CESA, CDFW reserves the right to request the replacement of lost habitat that is considered important to the continued existence of CESA protected species.

4.2.2 California Fish and Game Code

California Fish and Game Code §3511 includes provisions to protect Fully Protected (FP) species, such as: (1) prohibiting take or possession “at any time” of the species listed in the statute, with few exceptions; (2) stating that “no provision of this code or any other law shall be construed to authorize the issuance of permits or licenses to “take” the species; and (3) stating that no previously issued permits or

licenses for take of the species "shall have any force or effect" for authorizing take or possession. The CDFW is unable to authorize incidental take of "fully protected" species when activities are proposed in areas inhabited by those species. Sections 3503 and 3503.5 of the Fish and Game Code state that it is unlawful to take, possess, or destroy the nest or eggs of any bird, with occasional exceptions. In addition, §3513 states that it is unlawful to take or possess any migratory bird as designated in the MBTA or any part of such migratory birds except as provided by rules and regulations under provisions of the MBTA.

5 IMPACT ASSESSMENT AND MITIGATION

This impact assessment focuses on identifying potential impacts associated with implementation of the proposed project. The impact analysis is based on the site's existing conditions, regulatory setting, and conceptual site plans (refer to Appendix A). The section focuses on identifying potential biological constraints associated with implementation of the project. Impact calculations are based on the provided plans and are subject to refinement. The emphasis is on determining the potential effects of the project on special-status species, habitats, and jurisdictional areas within the BSA. Adverse impacts could occur if implementation of the project or future uses of the site would result in temporary or permanent modification to sensitive habitats or to habitats occupied by special-status species.

Permanent impact areas include the pathway pavement and shoulders, graded bridge approaches, bridge piers and footings. The bridge span(s) where riparian trees must be removed for construction and ongoing maintenance were determined to be permanently impacted as well. A 10-foot temporary impact buffer was applied to the trail and bridge right-of-way. Where potential impacts to sensitive resources have been identified, measures for avoiding, minimizing, or mitigating adverse effects to these resources are recommended. The following section has been formatted to meet the general guidelines set forth by the County (County of San Luis Obispo 2009).

The proposed project includes Alternatives 6A and 6B. Due to the site conditions and alternative designs, impacts to wildlife and plants associated with the two alternatives are essentially the same. Therefore, proposed mitigation for those impacts applies to both alternatives. Impacts to sensitive habitat and jurisdictional areas differ between the two alternatives. Therefore, Table 2 below provides a breakdown of the impacts by each alternative. Mitigation for impacts to sensitive habitats and jurisdictional areas are based on ratios. The same ratio applies to both alternatives.

5.1 Sufficiency of Biological Data

The biological surveys conducted in support of this BRA were sufficient to inventory the biological resources in the BSA. No additional field surveys or specialized investigation is needed to determine which resources may be impacted by the proposed project and the appropriate avoidance and mitigation measures. However, the impact calculations to habitat types are based on conceptual project designs that may be modified as the planning process continues. Upon refinement of the project plans, the area of direct affect may change, which would result in changes to habitat impact calculations.

5.2 Impacts

5.2.1 Project Effect on Unique or Special-Status Species or Their Habitats

5.2.1.1 SPECIAL-STATUS PLANT SPECIES

Sothern California black walnut was the only special-status plant species observed in the BSA. Southern California black walnut is California Rare Plant Rank 4.2 indicating that the species is uncommon and fairly endangered in California. Very few plants with the California Rare Plant Rank 4 meet the

definitions of §1901, Chapter 10 (Native Plant Protection Act) or §§2062 and 2067 (CESA) of the California Fish and Game Code. Typically, plants in the Rank 4 category are not eligible for state listing. Nevertheless, many of them are significant locally, and CNPS strongly recommends that California Rare Plant Rank 4 plants be evaluated for consideration during preparation of environmental documents relating to CEQA (CNPS 2013a).

It is expected that installation of the bridge crossing over SLO Creek and the under crossing of San Luis Bay Drive would require the removal or trimming of at least four southern California black walnut trees. Protection or mitigation for CNPS Rank 4 species is not required under CEQA; however, mitigation for the removal or other impacts to these tress is recommended (refer to mitigation measure BIO-1).

5.2.1.2 WILDLIFE

Suitable habitat conditions occur within the BSA for several special-status animal species. The special-status animal species in Appendix G, Table G-2, with potential for occurrence within the BSA have been addressed in this section, with some taxa combined as a group for conciseness because they will be subjected to similar potential project-related impacts. Taxa combined into one section will be protected by similar avoidance and mitigation measures.

South-Central California Coast Steelhead

All populations of steelhead occurring within the South-Central California Coast Evolutionarily Significant Units (ESU) Region, which is defined as that geographic region north of the Santa Maria River, northward to (and including) the Pajaro River (and its tributaries), were listed as federally threatened by NOAA Fisheries in August 1997. South-central California coast steelheads are also considered a SSC by CDFW. NOAA Fisheries lists habitat deterioration due to sedimentation and flooding related to land management practices, and potential genetic interaction with hatchery rainbow trout, as risk factors to steelhead within this ESU. The main channel of SLO Creek occurs within the south-central California coast steelhead critical habitat unit defined as Estero Bay Hydrologic Unit 3310 – (xii) San Luis Obispo Creek Hydrologic Sub-area 331024 (NOAA Fisheries 2005).

The BSA is within designated critical habitat for steelhead, and steelhead were observed in the proposed bridge location during the survey effort. The project may affect, but is not likely to adversely affect, south-central California coast steelhead. The proposed bridge design would negate the need to fill, dewater, or otherwise alter the active channel of the creek. Therefore, direct adverse effects on individual steelhead during construction are unlikely. Installation of the bridge would require vegetation removal on the creek banks. In addition, future uses of the bridge would increase the human presence in the area. Removal of the vegetation on the banks could result in indirect effects on steelhead habitat including loss of shade (localized warming of the water), loss of shelter habitat, loss of woody debris deposition in the creek, and increased sedimentation. These indirect effects may only be temporary, lasting until the vegetation in the area was replaced. Increased human presence in the area could result in an increase of trash in the creek, unauthorized fishing, or non-native species introductions. All of which would have an adverse effect on the habitat in the area. The presence of steelhead and their critical habitat in the BSA and work area warrants formal consultation with NOAA Fisheries prior to project implementation.

California Red-Legged Frog

The CRLF was formally listed by the USFWS as federally threatened in 1996, and is considered a SSC species by CDFW. Critical habitat has been designated for the subspecies, but not within the BSA. The subspecies historically ranged from Marin County southward to northern Baja California (Stebbins 1972, 2003). Monterey, San Luis Obispo, and Santa Barbara Counties support the largest remaining CRLF populations within California. The CRLF prefers aquatic habitats with little or no flow, the presence of surface water to at least early June, surface water depths to at least 2.3 feet, and the presence of fairly

sturdy underwater supports such as cattails. Riparian habitat degradation, urbanization, predation by bullfrogs, and historic market harvesting have all reportedly contributed to its population decline (USFWS 2002a).

A CRLF Site Assessment Report for the entire Bob Jones Pathway alignment including areas adjacent to the Conflict Avoidance Alignment was submitted to USFWS on April 2, 2007, in which SWCA biologists determined that suitable habitat for CRLF occurs within the BSA. No CRLFs were observed during the reconnaissance surveys of the BSA; however, on May 14, 2007, USFWS indicated that based on the information provided in the CRLF Site Assessment Report, protocol CRLF surveys would not be necessary and presence of CRLF in the project BSA could be inferred (Elvin 2007).

Direct impacts to CRLF adults and sub-adults could potentially include injury or mortality in adjacent uplands from construction equipment, construction debris, and worker foot traffic. Indirect effects of construction activities, including noise and vibration, may cause CRLFs to temporarily abandon habitat adjacent to work areas. This disturbance may increase the potential for predation and desiccation if CRLFs abandon shelter sites. The indirect effects of erosion and sedimentation could also impact CRLFs. The removal of any encountered exotic wildlife species from SLO Creek may produce a beneficial effect by reducing predation and competition pressures for CRLF.

The project may affect, and is likely to adversely affect, CRLF. Although no CRLFs were observed during reconnaissance surveys within the BSA, USFWS has indicated that CRLF presence within the BSA should be inferred. There would be a potential for take of CRLF during construction in upland dispersal habitat adjacent to SLO Creek and any necessary capture and relocation of CRLF. The proposed project will also create temporary and/or permanent impacts to vegetation along SLO Creek, which may offer shading and microhabitat temperature regulation in the channel; however, the loss of trees will be mitigated with replacement trees. The potential for take of CRLF is believed to be very low, as CRLF are believed to be uncommon along the SLO Creek corridor.

Foothill Yellow-Legged Frog, Coast Range Newt, Western Pond Turtle, Silvery Legless Lizard, and Two-Striped Garter Snake

Foothill yellow-legged frog is a SSC that ranges from northern Oregon into Baja California, Mexico. They occupy coastal California foothills in flowing streams and rivers with rocky substrate or sunny banks. This species has not been documented in SLO Creek but has been documented in tributaries to SLO Creek.

The Coast Range newt is considered a SSC by the CDFW. It is a moderate-sized, dark brown salamander with a bright yellow-orange to orange belly, and thick textured skin. Historically, Coast Range newts have been distributed in coastal drainages from central Mendocino County in the north Coast Ranges, south to Boulder Creek, San Diego County (Stebbins 2003). Coast Range newts occupy terrestrial habitats, but breed in ponds, reservoirs, and slow-moving streams. The riparian area in the BSA supports suitable habitat for Coast Range newts; however, this species was not observed during the reconnaissance surveys in the area.

The western pond turtle is considered a SSC species by the CDFW. This species historically has been present in most Pacific slope drainages between the Oregon and Mexican borders (Jennings and Hayes 1994). Pond turtles live where water persists year-round in ponds along foothill streams or in broad washes near the coast. The western pond turtle is mostly aquatic, leaving its aquatic site to reproduce, aestivate, and over-winter in nearby upland areas.

The silvery legless lizard is considered a SSC species by the CDFW. It is an elusive, fossorial (sub-surface), mostly coastally distributed lizard ranging from the San Francisco Bay area southward into

northern Mexico (Zeiner et al. 1990). Suitable habitat includes loose soils of coastal dune, valley foothill woodland, chaparral, and coastal scrub areas, where the species forages at the bases of vegetation and under leaf litter.

The two-striped garter snake is considered a SSC species by the CDFW. It is a medium-sized garter snake with a variable dorsal coloration of olive, brown, or brownish gray, with a single yellow-orange lateral stripe on each side of the body (Jennings and Hayes 1994). There is no dorsal stripe, and the ventral surface is pale cream-colored to salmon, becoming white toward the throat. The two-striped garter snake occurs mainly along Coast Range streams from Monterey Bay south to Baja California (Stebbins 2003; Stewart 2003). An extremely aquatic species, the two-striped garter snake uses water for both predation and escape from predators. Its habitat includes perennial and intermittent streams with rocky substrate bordered by dense vegetation (Jennings and Hayes 1994). These snakes may also overwinter in small mammal burrows (Rathbun et al. 1993).

Direct impacts to foothill yellow-legged frog, Coast Range newt, western pond turtle, silvery legless lizard, and two-striped garter snake could include injury or mortality in adjacent uplands from construction equipment, construction debris, and worker foot traffic. Indirect effects of construction activities, including noise and vibration, may cause these species to temporarily abandon habitat adjacent to work areas. This disturbance may increase the potential for predation and desiccation if individuals abandon shelter sites. The indirect effects of erosion and sedimentation could also impact the species'. The removal of any encountered exotic wildlife species from SLO Creek may produce a beneficial effect by reducing predation and competition pressures for these sensitive native species.

Cooper's Hawk, Sharp-shinned Hawk, White-tailed Kite, Western Yellow-billed Cuckoo, Loggerhead Shrike, Least Bell's vireo, Southwestern Willow Flycatcher, Purple Martin, Yellow Warbler, Yellow-breasted Chat, and Other Nesting Birds.

These bird species have been addressed as a group because they have similar habitat requirements, potential project-related impacts, and avoidance and minimization measures.

The Cooper's hawk is considered a SSC species by the CDFW. It is a fairly large accipiter hawk that ranges throughout the United States and is widely distributed throughout California. This species is a resident of San Luis Obispo County, nesting and foraging in and near deciduous riparian areas. The Cooper's hawk occupies forests and woodlands, especially near edges. It is rarely found in areas without dense tree stands or patchy woodland habitat. Nests are built in deciduous trees usually 20 to 50 feet above ground (Zeiner et al. 1990).

The sharp-shinned hawk is considered a SSC species by the CDFW. It is a small accipiter hawk with a grayish back and a squared-off, banded tail, in comparison to the more rounded off tail of the larger Cooper's hawk. This species formerly bred in small numbers throughout much of northern California and in very small numbers in all the mountain ranges of southern California as far south as the Cuyamaca Mountains, San Diego County. This species roosts in intermediate to high-canopy forest or riparian areas. Sharp-shinned hawks usually nest within 275 feet of water.

The white-tailed kite is a fully protected species by the California Fish and Game Code. It is a yearlong resident ranging throughout valley and coastal lowlands in California, and most commonly, near agricultural areas. Within San Luis Obispo County, this species is considered an uncommon resident. Nesting and roosting occurs in dense, broad-leafed deciduous groves of trees.

The western yellow-billed cuckoo is a federal candidate for listing and a state endangered species. It is a casual spring and fall transient in San Luis Obispo County (Edell 2004). Although its historic status within the county is unknown, it was likely a regular breeder in large cottonwood-willow riparian

woodlands. There are only eight San Luis Obispo County records for the species over the last 50 years, two of which pertain to nesting birds. The six recent non-breeding records are from Morro Bay (1961, 1989), Los Osos (1980), Carrizo Plain (1991), Oso Flaco Lake (1999), and San Simeon Creek (1999). The County's two nesting records involve a fledgling collected in San Luis Obispo in 1921 (San Bernardino County Museum) and an egg set taken in 1932 at "Mile's Station" in upper Avila Valley, which is incorrectly mapped by the CNDDB as a City of San Luis Obispo record (Edell 2004). There are no known recent nesting records in San Luis Obispo County and there are no known breeding locations outside of the currently known breeding locations, none of which occur in San Luis Obispo County (Edell 2004). The subspecies is not expected to nest within the BSA or otherwise be impacted by the proposed project.

The loggerhead shrike is considered a SSC species by the CDFW. It is a medium-sized passerine (perching) bird that ranges from southern Canada to southern Mexico and from the Gulf States west into California. This species prefers open habitats with scattered shrubs, trees, posts, fences, utility lines, or other perches. Nests are built on a stable branch in a densely foliaged shrub or tree, usually well concealed and 1.3 to 50 feet above ground.

The least Bell's vireo (LBV) is a federal and state endangered species. Critical habitat has been designated for the species, but not within the BSA. It is one of four recognized subspecies of Bell's vireo and is the western-most subspecies, breeding entirely within California and northern Baja California. Historically, the LBV was a common to locally abundant species in lowland riparian habitat, ranging from coastal southern California through the Sacramento and San Joaquin Valleys. By the time the species was federally listed in 1986, the LBV had been extirpated from most of its historic range. Populations were confined to eight counties south of Santa Barbara, with the majority of birds occurring in San Diego County. LBVs usually arrive in California during mid- to late-March. They build their nests in a variety of plants that provide concealment in the form of dense foliage. The species bred north of Santa Barbara County at the San Joaquin River National Wildlife Refuge in 2005 and 2006. In 1983, three territorial males were along a 6-mile stretch of the Salinas River in Monterey County and a singing male was identified in San Luis Obispo County near San Miguel a couple of years ago (Edell 2008); however, habitat is more important than the known distribution, and the riparian corridor of SLO Creek is not suitable for LBV and the subspecies is not expected to nest within the BSA or otherwise be impacted by the proposed project.

LBVs require riparian areas to breed and typically inhabit structurally diverse woodlands along watercourses. They occur in a number of riparian habitat types, including cottonwood-willow woodlands/forests, oak woodlands, and mule fat scrub. Several investigators have attempted to identify the habitat requirements of the LBV by comparing characteristics of occupied and unoccupied sites and have focused on two features that appear to be essential: 1) the presence of dense cover within 3-6 feet of the ground, where nests are typically placed; and 2) a dense, stratified canopy, which is needed for foraging (USFWS 1998). This type of stratified riparian habitat structure with dense cover near the ground does not occur along the SLO Creek riparian corridor within the BSA.

The southwestern willow flycatcher is a federal and state endangered species. The southwestern willow flycatcher breeding range includes southern California (from the Santa Ynez River south), Arizona, New Mexico, extreme southern portions of Nevada and Utah, extreme southwest Colorado, and western Texas. Records of probable breeding southwestern willow flycatchers in Mexico are rare and restricted to extreme northern Baja California and Sonora. The southwestern willow flycatcher breeds in dense riparian habitats along rivers, streams, or other wetlands. The vegetation can be dominated by dense growths of willows, mule fat (*Baccharis salicifolia*), or other shrubs and medium-sized trees. There may be an overstory of cottonwood (*Populus* sp.), tamarisk (*Tamarix* sp.), or other large trees, but this is not always present. In some areas, the flycatcher will nest in habitats dominated by tamarisk and Russian olive (*Elaeagnus angustifolia*). One of the most important characteristics of the habitat is the presence of

dense vegetation, usually throughout all vegetation layers present (USFWS 2002b). The species is not expected to nest within the BSA or otherwise be impacted by the proposed project.

The purple martin is considered a SSC species by the CDFW. It is a dark purple-black swallow. At one time, the species was a fairly common breeder in the Coast Range, but in the last 15 years there has been a dramatic decrease in southern California where it was once a common breeder in the mountains and in some lowland residential areas. The purple martin inhabits hardwood, hardwood-conifer, riparian, and coniferous habitats. It usually nests in old woodpecker cavities, but will occasionally nest in man-made structures.

The yellow warbler is considered a SSC species by the CDFW. Yellow warblers are migratory and are broadly distributed throughout North America, though their California distribution is largely restricted to northern and coastal areas and the Sierra Nevada foothills. Within San Luis Obispo County, this species is a fairly common summer transient of deciduous riparian habitats.

The yellow-breasted chat is considered a SSC species by the CDFW. It is a migratory species distributed throughout the United States, though it is noted as an uncommon summer resident of the coast and Sierra Nevada foothills of California. Preferred habitat for cover, foraging, and nesting consists of willow riparian thickets, with dense understory cover. In San Luis Obispo County, observations of yellow-breasted chat are limited to uncommon occurrences from May to mid-August, concurrent with their breeding period, which peaks in June.

The species described above are each protected by the MBTA and California Fish and Game Code §3503. In addition to these species, numerous other nesting bird species protected by these two regulatory laws have the potential to nest in habitats within the BSA. The removal of vegetation could directly impact bird nests and any eggs or young residing in nests. Indirect impacts could also result from noise and disturbance associated with construction, which could alter perching, foraging, and/or nesting behaviors. While temporary loss of vegetation supporting potential nesting habitat would result from trimming or removal, this would be mitigated by planting new trees and the establishment of habitat mitigation/restoration areas. The implementation of the avoidance and minimization measures such as appropriate timing of vegetation, pre-activity surveys, and exclusion zones will reduce the potential for adverse effects to nesting bird species.

5.2.2 Project Effect on Extent, Diversity, or Quality of Native or Other Important Vegetation

The Conflict Avoidance Alignment will affect the SLO Creek riparian area and associated trees. These effects are discussed in Section 5.2.3 below.

5.2.3 Project Effect on Wetland or Riparian Habitat

Wetlands are typically within USACE jurisdiction if they support wetland indicators for all three parameters (i.e., hydrophytic vegetation, hydric soils, and wetland hydrology) below the OHWM or in areas that are hydrologically connected to a drainage or aquatic site. Jurisdictional other waters typically occur below the OHWM of a drainage channel and lack one or more of the three wetland parameters. Riparian habitat may fall within USACE jurisdiction in areas below the OHWM along stream channels, and within CDFW jurisdiction toward the outer extent of riparian growth. Riparian habitat may also fall outside of the jurisdiction of these agencies if it occurs in isolated areas away from stream or other aquatic systems.

Riparian, wetland/riverine, and other waters habitats are present along SLO Creek and a connected drainage within the BSA. These jurisdictional areas were delineated within the BSA as potential USACE

jurisdictional wetlands, and a drainage ditch with connectivity to SLO Creek toward the northern section of the proposed project was delineated as potential other waters (refer to Appendix C). CDFW jurisdiction extends to the upper banks or outside edge of riparian vegetation for SLO Creek and the connected drainage. Seasonal wetlands mapped in the BSA did not exhibit all three necessary wetland parameters, were determined to be isolated, and, therefore, were not delineated as jurisdictional wetlands.

Potential impacts to jurisdictional wetlands, other waters, and riparian areas were determined by overlaying project plans with the jurisdictional delineation maps. All components of the proposed bridge, including the abutments and pilings, would avoid discharge of fill below the OHWMs of SLO Creek and the connected drainage. Riparian vegetation associated with the stream corridor under the jurisdiction of CDFW would be permanently impacted to accommodate the proposed bridge. Temporary impacts to streamside vegetation could result from temporary worker foot-traffic, hazardous material spills, and the indirect effects of increased erosion and sedimentation.

Principal features of the project that would impact riparian areas include the construction of the proposed bridge over San Luis Creek and the San Luis Bay Drive undercrossing would require the removal and trimming of riparian trees. Construction of the new trail alignment adjacent to sections of the riparian corridor may also require minimal trimming or removal of individual trees. Temporary impacts to riparian vegetation could result from unintentional limb injury from construction equipment. Indirect root zone impacts from construction equipment are also a concern, but not expected as cut and fill associated with grading will be less than 2 feet.

Estimated impacts to jurisdictional wetlands, other waters, and riparian areas resulting from the Conflict Avoidance Alignment are quantified in Table 2.

Table 2. Estimated Impacts to Jurisdictional Areas

Jurisdictional Area*	Permanent			Temporary			TOTAL		
	ft^2	m^2	ac	ft^2	m^2	ac	ft^2	m^2	ac
USACE Wetlands[1]	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
USACE Other Waters[2]	0.00	0.00	0.00	0.00	0.00	0.00	**0.00**	**0.00**	**0.00**
Alternative 6A CDFW/RWQCB jurisdiction[3]	8,491.91	788.92	0.20	11,282.52	1,048.18	0.26	**19,774.43**	**1,837.10**	**0.46**
Alternative 6B CDFW/RWQCB jurisdiction[3]	11,138.05	1,034.76	0.26	15,732.11	1,461.56	0.36	**26,870.16**	**2,496.32**	**0.62**
Staging Areas CDFW/RWQCB jurisdiction[3]	0.00	0.00	0.00	8,461.18	786.07	0.19	8,461.18	786.07	0.19

* Impact area = jurisdictional areas within the ADI.
[1] Also includes RWQCB and CDFW jurisdictional areas below the OHWM.
[2] Includes other non-wetland waters regulated by USACE, usually determined by limit of the OHWM.
[3] CDFW jurisdiction extends from the thalweg of the channel to the top of bank or outer extent of riparian vegetation, whichever is greater. May also include areas under USACE jurisdiction (below the OHWM) and RWQCB jurisdiction (above the OHWM).

5.2.4 Project Effect on Movement of Resident or Migratory Fish and Wildlife Species

The proposed project would include a permanent bridge over SLO Creek. The bridge would span the aquatic habitat in the creek; therefore, the bridge would not create a barrier to fish or other aquatic species movements. Installation of the bridge would also require the removal of trees and other vegetation in the immediate work area. The vegetation removal would have no direct or indirect effect on the movement of resident or migratory terrestrial wildlife species. No new permanent fences or other barriers to wildlife movements are included in the proposed project.

5.3 Avoidance and Mitigation Measures

5.3.1 Special-Status Plants

BIO-1 Avoid impacts to southern California black walnut trees to the extent practicable. If southern California black walnut trees cannot be avoided and must be removed or trimmed during construction, their loss shall be mitigated at a 4:1 restoration ratio for every walnut tree removed and a 2:1 ratio for every walnut tree trimmed or otherwise impacted but not removed. If more than 25 percent of a walnut tree must be trimmed, it shall be mitigated at a 4:1 restoration ratio.

BIO-2 Other special-status plant species were not observed during floristic surveys and are not expected to occur in the BSA; however, if any special-status plant species are observed in or near work areas during the monitoring of construction, the distribution of special-status plant species shall be mapped, marked off with exclusion zones, and avoided until the appropriate regulatory agencies (e.g., USFWS, CDFW, and Caltrans) are consulted for mitigation options. Should a federally listed plant species be found during monitoring or construction, Caltrans shall be notified so that it can initiate FESA Section 7 discussions with USFWS.

5.3.2 South-Central California Coast Steelhead

BIO-3 The County shall implement measures BIO-24 through BIO-39 to avoid or minimize adverse effects on aquatic habitats and aquatic species. In addition, prior to construction, a component including a description of south-central California coast steelhead, its ecology, its legal status, and the need for conservation of the species shall be integrated into a worker environmental training program. All construction personnel conducting in-stream work shall participate in the training program conducted by a qualified biologist.

5.3.3 California Red-Legged Frog

BIO-4 Only USFWS-approved biologists shall participate in activities associated with the capture, handling, and monitoring of CRLFs. Ground disturbance shall not begin until written approval is received from the USFWS that the biologist is qualified to conduct the work. The Caltrans would be the federal lead agency for the project. Therefore, Caltrans shall request approval of the biologist from USFWS.

BIO-5 A USFWS-approved biologist shall survey the project area no more than 48 hours before the onset of work activities. If any life stage of the CRLF is found and these individuals are likely to be killed or injured by work activities, the approved biologist shall be allowed sufficient time to move them from the site before work activities begin. The USFWS-approved biologist shall relocate the CRLFs the shortest distance possible to a location that contains suitable habitat and will not be affected by the activities associated with the project. The USFWS-approved biologist shall maintain detailed records of any individuals that are moved

(e.g., size, coloration, any distinguishing features, photographs [digital preferred]) to assist him or her in determining whether translocated animals are returning to the point of capture.

BIO-6 Before any activities begin on a project, a USFWS-approved biologist shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the CRLF and its habitat, the specific measures that are being implemented to conserve the CRLF for the current project, and the boundaries within which the project may be accomplished. Brochures, books, and briefings may be used in the training session, provided that a qualified person is on hand to answer any questions.

BIO-7 A USFWS-approved biologist shall be present at the work site until all CRLFs have been removed, workers have been instructed, and disturbance of the habitat has been completed. After this time, the state or local sponsoring agency shall designate a person to monitor on-site compliance with all minimization measures. The USFWS-approved biologist shall ensure that this monitor receives the training outlined in BIO-4 above and in the identification of CRLFs. If the monitor or the USFWS-approved biologist recommends that work be stopped because CRLFs would be affected to a degree that exceeds the levels anticipated by Caltrans and the USFWS during the review of the proposed action, they shall notify the resident engineer (the engineer that is directly overseeing and in command of construction activities) immediately. The resident engineer shall either resolve the situation by eliminating the effect immediately or require that all actions that are causing these effects be halted. If work is stopped, Caltrans and the USFWS shall be notified as soon as is reasonably possible.

BIO-8 During project activities, all trash that may attract predators shall be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas.

BIO-9 All refueling, maintenance and staging of equipment and vehicles shall occur at least 60 feet from the riparian habitat or water bodies and not in a location from where a spill would drain directly toward aquatic habitat. The monitor shall ensure contamination of habitat does not occur during such operations. Prior to the onset of work, Caltrans shall ensure that a plan is in place for prompt and effective response to any accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take shall a spill occur.

BIO-10 Project areas shall be revegetated with an assemblage of native riparian, wetland, and upland vegetation suitable for the area. Locally collected plant materials shall be used to the extent practicable. Invasive, exotic plants shall be controlled to the maximum extent practicable. This measure shall be implemented in all areas disturbed by activities associated with the project, unless the USFWS and Caltrans determine that it is not feasible or practical. (For example, an area disturbed by construction that would be used for future activities need not be revegetated.)

BIO-11 Habitat contours shall be returned to their original configuration at the end of the project activities. This measure shall be implemented in all areas disturbed by activities associated with the project, unless the USFWS and Caltrans determine that it is not feasible or modification of original contours would not benefit the CRLF.

BIO-12 The number of access routes, size of staging areas, and the total area of activity shall be limited to the minimum necessary to achieve the project. Environmentally Sensitive Areas shall be established to confine access routes and construction areas to the minimum area necessary to complete construction, and minimize the impact to CRLF habitat; this goal

includes locating access routes and construction areas outside of wetlands and riparian areas to the maximum extent practicable.

BIO-13 Caltrans will attempt to schedule work for times of the year when impacts to the CRLF would be minimal. For example, work that would affect large pools that may support breeding would be avoided, to the maximum degree practicable, during the breeding season (November through May). Isolated pools that are important to maintain CRLFs through the driest portions of the year would be avoided, to the maximum degree practicable, during the late summer and early fall. Habitat assessments, surveys, and technical assistance between Caltrans and the USFWS during project planning shall be used to assist in scheduling work activities to avoid sensitive habitats during key times of year.

BIO-14 To control sedimentation during and after project implementation, Caltrans shall implement BMPs outlined in any authorizations or permits, issued under the authorities of the Clean Water Act received for the project. If BMPs are ineffective, Caltrans shall attempt to attempt to remedy the situation immediately, in consultation with the USFWS.

BIO-15 If a work site is to be temporarily dewatered by pumping, intakes shall be completely screened with wire mesh not larger than 0.2 inch to prevent CRLFs from entering the pump system. Water shall be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. The methods and materials used in any dewatering shall be determined by Caltrans in consultation with the USFWS on a site-specific basis. Upon completion of construction activities, any diversions or barriers to flow shall be removed in a manner that would allow flow to resume with the least disturbance to the substrate. Alteration of the streambed shall be minimized to the maximum extent possible; any imported material shall be removed from the streambed upon completion of the project.

BIO-16 Unless approved by the USFWS, water shall not be impounded in a manner that may attract CRLFs.

BIO-17 A USFWS-approved biologist shall permanently remove any individuals of exotic species, such as bullfrogs, crayfish, and centrarchid fishes from the project area, to the maximum extent possible. The USFWS-approved biologist shall be responsible for ensuring his or her activities are in compliance with the California Fish and Game Code.

BIO-18 If Caltrans demonstrates that the disturbed areas have been restored to conditions that allow the site to function as habitat for CRLF, these areas will not be included in the amount of total habitat permanently disturbed.

BIO-19 The project site will be re-vegetated with an assemblage of native riparian, wetland, and upland vegetation suitable for the area. Locally collected plant materials will be used to the extent practicable. Invasive exotic plants will be controlled to the extent practicable. This measure will be implemented in all areas disturbed by activities associated with the project, unless the service and Caltrans determine that it is not feasible or practicable.

BIO-20 The Service approved biologist shall follow the fieldwork code of practice developed by the Declining Amphibian Task Force at all times.

BIO-21 Caltrans will not use herbicides as the primary method to control invasive, exotic plants. However, If Caltrans determines the use of herbicides is the only feasible method for controlling invasive plants at a specific project site; it will implement the following additional measures to protect CRLF.

a) Caltrans will not use herbicides during the breeding season for CRLF.

b) Caltrans will conduct surveys for CRLF immediately prior to the start of herbicide use, If found, CRLF will be relocated to suitable habitat far enough from the project area that no direct contact with herbicide would occur.

c) Giant reed and other invasive plants will be cut and hauled out by hand and painted with glyphosate-based products, such as Aquamaster or Rodeo.

d) Licensed and experienced Caltrans staff or a licensed and experienced contractor will use a hand held sprayer for foliar application of Aquamaster or Rodeo where large monoculture stands occur at a project site.

e) All precautions will be taken to ensure that no herbicide is applied to native vegetation.

f) Herbicide will not be applied on or near open water surfaces (no closer than 60 feet from open water).

g) Foliar applications of herbicide will not occur when wind speed is in excess of 3 miles per hour.

h) No herbicides will be applied within 24 hours of forecasted rain.

i) Application of all herbicides will be done by a qualified Caltrans staff or contractors to ensure that overspray is minimized, that all applications is made in accordance with the label recommendations, and with implementation of all required and reasonable safety measures. A safe dye will be added to the mixture to visually denote treated sites. Application of herbicides will be consistent with the U.S. Environmental Protection Agency County Bulletins.

j) All herbicides, fuels, lubricants, and equipment will be stored, poured, or refilled at least 60 feet from riparian habitat or water bodies in a location where a spill would not drain directly toward aquatic areas. Caltrans will ensure that contamination of aquatic habitat does not occur during such operations. Prior to the onset of work, Caltrans will ensure that a plant is in place for a prompt and effective response to accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

5.3.4 Foothill Yellow-Legged Frog, Coast Range Newt, Western Pond Turtle, Silvery Legless Lizard, and Two-Striped Garter Snake

BIO-22 Prior to construction, the applicant shall obtain a letter of permission from CDFW to relocate Foothill yellow-legged frog, Coast Range newts, western pond turtles, silvery legless lizards, two-striped garter snake, and other CSC species from work areas encountered during construction, as necessary. Qualified biologists shall conduct a pre-construction survey for these species in areas along and adjacent to the SLO Creek corridor where construction will occur. The qualified biologists shall capture and relocate any CSC species (if present) or other native species to suitable habitat outside of the area of impact. Observations of CSC species or other special-status species shall be documented on CNDDB forms and submitted to CDFW upon project completion.

5.3.5 Cooper's Hawk, Sharp-Shinned Hawk, White-Tailed Kite, Western Yellow-Billed Cuckoo, Loggerhead Shrike, Least Bell's Vireo, Southwestern Willow Flycatcher, Purple Martin, Yellow Warbler, Yellow-Breasted Chat, and Other Nesting Birds.

BIO-23

1. Prior to construction, the applicant shall schedule vegetation removal to occur outside of the nesting season (September 1 to February 14) if possible, to avoid birds that may be nesting within areas of disturbance during or just prior to construction.

2. Prior to construction, if construction activities are proposed to occur during the typical nesting season (February 15 to August 31) within 200 feet of potential nesting habitat, a nesting bird survey shall be conducted by qualified biologists in potential nesting habitat at least two weeks prior to construction to determine presence/absence of nesting birds within the project area. Work activities shall be avoided within 100 feet of active bird nests and 200 feet of active raptor nests until young birds have fledged and left the nest. Readily visible exclusion zones shall be established in areas where nests must be avoided. Caltrans shall be contacted if western yellow-billed cuckoo, LBV, or any other federally listed bird species are observed during surveys. USFWS and CDFW shall be contacted for additional guidance if nesting birds are observed within or near the boundaries of the project site. Nests, eggs, or young of birds covered by the MBTA and California Fish and Game Code would not be moved or disturbed until the end of the nesting season or until young fledge, whichever is later, nor would adult birds be killed, injured, or harassed at any time.

3. Vegetation removal in potential nesting habitats shall be monitored and documented by the biological monitor(s) regardless of time of year.

5.3.6 Wetland or Riparian Habitat

The project has the potential to impact jurisdictional aquatic and riparian areas within the BSA. A variety of avoidance and minimization measures are recommended for potential impacts to jurisdictional wetlands resulting from the project. In addition, compensatory mitigation is recommended for impacts that cannot be avoided. Onsite mitigation for impacts to wetlands is proposed at a 1:1 ratio for temporary impacts and at a 2:1 ratio for permanent impacts, unless otherwise directed by regulatory agencies. Off-site mitigation, if required, would be at a 3:1 replacement ratio. Temporary impacts to riparian vegetation would be mitigated at a 1:1 ratio and permanent impacts would be mitigated at a 2:1 ratio, unless otherwise directed by regulatory agencies. Mitigation is anticipated to be on-site and primarily in the form of restoration and enhancement. The County will prepare a Habitat Mitigation and Monitoring Plan (HMMP) that will detail such mitigation and be structured to be consistent with Caltrans approval standards and mitigation requirements from CDFW and RWQCB. The HMMP will be prepared when full construction plans are prepared, and will be finalized through the permit review process with regulatory agencies.

BIO-24 Prior to construction, the County will obtain a Section 1602 Streambed Alteration Agreement from CDFW, and coordinate with State Water Resources Control Board/RWQCB regarding the need for a Section 13263(a) General Waste Discharge Requirement permit for project-related impacts that will occur in areas under the jurisdiction of these regulatory agencies.

BIO-25 Prior to construction, the applicant will retain a qualified biological monitor(s) approved by all involved regulatory agencies to ensure compliance with avoidance and minimization measures within the project environmental documents. Monitoring will occur throughout the length of construction or as directed by the regulatory agencies. Full-time monitoring will

occur during vegetation removal, and erosion control installation. Monitoring may be reduced to part time once construction activities are underway and the potential for additional impacts are reduced.

BIO-26 Any construction activities across SLO Creek will take place between June 15 and October 31 in any given year, or as otherwise directed by the regulatory agencies, when the surface water is likely to be at seasonal minimum. Deviations from this work window will only be made with permission from the relevant regulatory agencies and Caltrans.

BIO-27 Prior to construction, the project site will be clearly flagged or fenced so that the contractor is aware of the limits of allowable site access and disturbance. Areas within the designated project site that do not require regular access will be clearly flagged as off-limit areas to avoid/discourage unnecessary damage to sensitive habitats or existing vegetation within the project site.

BIO-28 Prior to construction, an Erosion Control Plan and Stormwater Pollution Prevention Plan for the project will be prepared. Provisions of these plans shall be implemented during and after construction as necessary to avoid and minimize erosion and stormwater pollution in and near the work area.

BIO-29 Prior to construction, the County will prepare a Hazardous Materials (HAZMAT) Response Plan to allow for a prompt and effective response to any accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

BIO-30 Prior to construction, the County shall prepare a comprehensive final HMMP to mitigate impacts to vegetation and natural habitats. The final HMMP will include the specific mitigation sites along the vicinity of the SLO Creek riparian corridor, based on the specific mitigation acreage required by regulatory agencies during the permitting process. The HMMP will be consistent with federal and state regulatory requirements and will be amended with any regulatory permit conditions, as required. The County will implement the HMMP as necessary during construction and immediately following project completion.

BIO-31 Prior to construction, the County and their contractors will plan for minimizing the trimming and removal of trees to the extent feasible. To avoid the potential for unnecessary removal or trimming of trees, any trees to be removed shall be marked with colored flagging or other suitable material. Trees to be trimmed shall be similarly marked but with a different color to differentiate them from trees to be removed. Unmarked trees shall not be removed or trimmed. All trees marked for removal will be tallied and documented in order to calculate mitigation replacement requirements.

BIO-32 After construction, any loss of riparian trees shall be replaced at a minimum 3:1 replacement ratio, or as otherwise directed by regulatory agencies. Methods for riparian vegetation replacement shall be incorporated into the final HMMP.

BIO-33 During construction, erosion control measures will be implemented. Silt fencing, fiber rolls, and barriers (e.g., hay bales) will be installed between the project site and adjacent wetlands and other waters. No synthetic plastic mesh products shall be used in any erosion control materials. At a minimum, silt fencing will be checked and maintained on a daily basis throughout the construction period. The contractor will also apply adequate dust control techniques, such as site watering, during construction.

BIO-34 To control erosion during and after project implementation, the applicant will implement standard Caltrans BMPs.

BIO-35 During construction, the cleaning and refueling of equipment and vehicles will occur only within a designated staging area and at least 65 feet from wetlands, other waters, or other aquatic areas. This staging area will conform to BMPs applicable to attaining zero discharge of stormwater runoff. At a minimum, all equipment and vehicles will be checked and maintained on a daily basis to ensure proper operation and avoid potential leaks or spills.

BIO-36 During construction, all project-related hazardous materials spills within the project site will be cleaned up immediately. Spill prevention and cleanup materials will be on-site at all times during construction.

BIO-37 During construction, the biological monitor(s) will ensure that the spread or introduction of invasive exotic plant species will be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project site will be removed and properly disposed.

BIO-38 During construction, trash will be contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas. All vegetation removed from the construction site shall be taken to a certified landfill to prevent the spread of invasive species. If soil from weedy areas (such as areas with poison hemlock or other invasive exotic plant species) must be removed off-site, the top 6 inches containing the seed layer in areas with weedy species shall be disposed of at a certified landfill.

BIO-39 During construction, no pets will be allowed on the construction site

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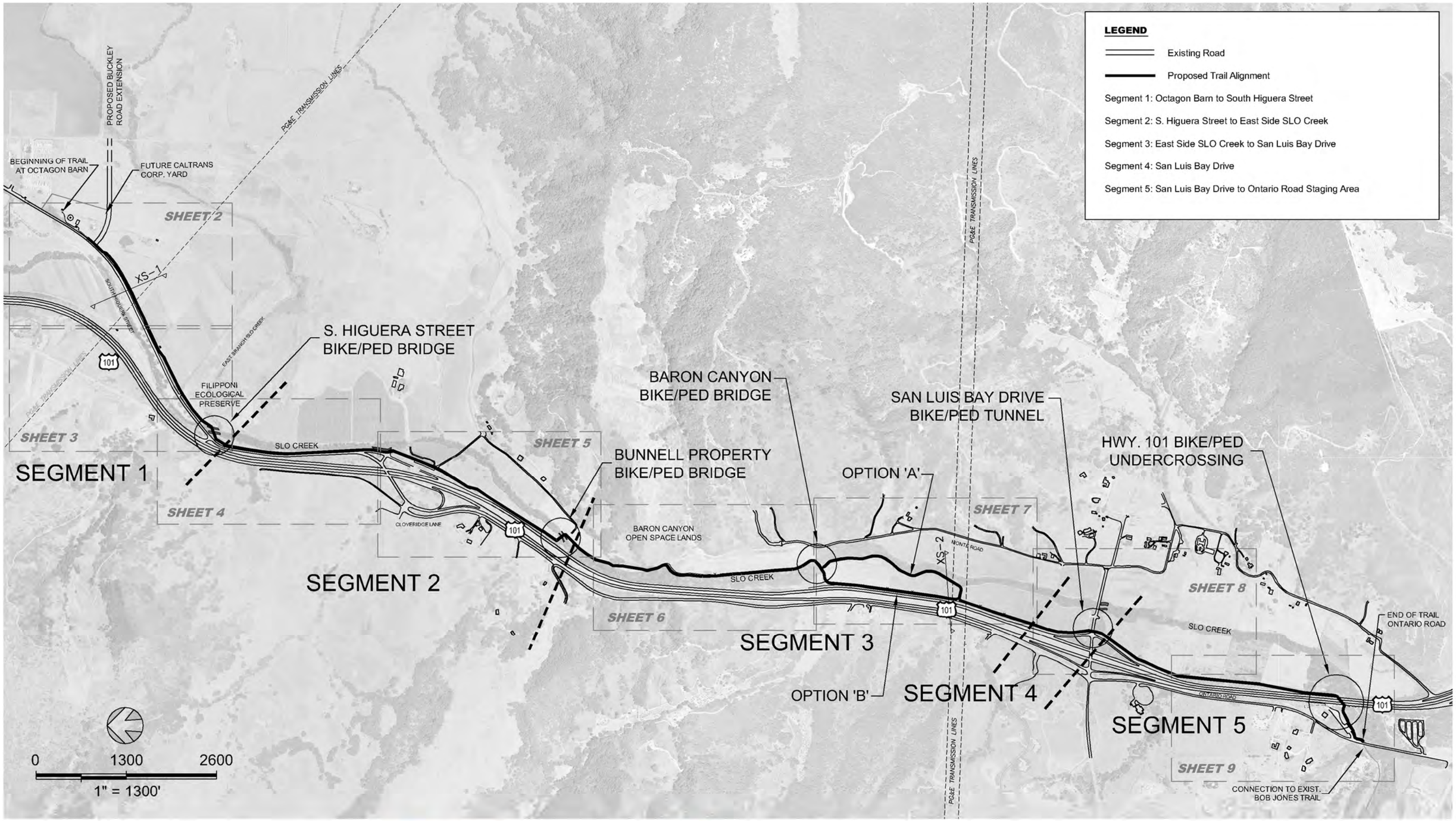
Appendix A.
Plan Sheets



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

QUESTA ENGINEERING CORP.

Civil
Environmental
& Water Resources

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DESIGN	MH/JM
DRAWN	OR
CHECKED	
APPR'D	JP
DATE	07/24/14
PROJECT NUMBER	1300177

PRELIMINARY PLAN
CONFLICT AVOIDANCE
ALTERNATIVE

SHEET
1 of 12

FILE: P:\2013\1300177_BOB_JONES_2013\CAD\1300177_PREFERRED_ALIGNMENT_7-14-14.DWG

IF BAR DOES NOT EQUAL 1 INCH DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

MATCHLINE - SEE SOUTH HIGUERA ROADWAY WIDENING INSET AT RIGHT

BEGIN PATH

SIGN 5

OCTAGON BARN

PROPOSED BUCKLEY ROAD EXTENSION

SOUTH HIGUERA STREET

SEE INSET BELOW

TRAILHEAD

1A 4 5 6 9

500 LF PATH CLASS I PATH

180 LF 4'-6' RETAINING WALL

1A 10

(E) 72" BOX CULVERT

MORABITO
076-081-020

HAYASHI
076-081-018

3,100 LF CLASS I PATH 1A

PG&E TRANSMISSION LINE

Luis Obispo Creek

XS-1

ENVIRONMENTAL/MITIGATION ROW TO BE DETERMINED IN ENVIRONMENTAL REVIEW PROCESS

LOCATE TRAIL AWAY FROM PG&E TOWER FOOTING

5 SIGN

(E) 72" BOX CULVERT

MATCHLINE - SEE SHEET 3

0 200' 400'

1" = 200'

STORAGE

RESTROOMS & BIKE STORAGE

PARKING AREA, DECOMPOSED GRANITE OR SIMILAR PERMEABLE SURFACE, 65 SPACES FOR BOB JONES BIKE TRAIL

PARKING

EXPANDED PARKING AND BUCKLEY ROAD ACCESS (NIC)

(E) OCTAGON BARN

BARN COMMONS (NIC)

MEETING SPACE (NIC)

(E) MILKING PARLOR

ENTRY ROAD

LEGEND

(NIC) Not in Pathway Project

LEGEND

- Bicycle/Pedestrian Bridge
- Bridge Approach Ramp
- BR-A South Higuera Bridge
- BR-B Bunnell Property Bridge
- BR-C San Luis Bay Drive Bridge
- BR-D HWY 101 Overcrossing
- Class I Path - Proposed 12 ft. Wide Path Section
- Transition Path Adjacent To Road Shoulder
- Class III Shared Use Path
- Retaining Wall - Wood or Concrete
- Bridge Abutment/Pier
- Earthen Bridge Approach Ramp
- Detail Reference
- New Culvert
- Existing Culvert
- New Bottomless Crossing (Arch Culvert or Footbridge)
- Potential Biological Mitigation Area (Public & SLO Conservancy Lands)
- Erosion Control
- Temporary Construction Staging Area
- Temporary Construction Access
- Traffic Barrier
- Limit of Construction Disturbance
- Split Rail Fence
- Security Fence
- T Post Fence (consistent with property owner negotiations)
- Property Line
- Creek Flowline

SOUTH HIGUERA ROADWAY WIDENING

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

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DESIGN	MH/JM
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PRELIMINARY PLAN

CONFLICT AVOIDANCE ALTERNATIVE

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IF BAR DOES NOT EQUAL 1 INCH DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

LEGEND

- Bicycle/Pedestrian Bridge
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- BR-B Bunnell Property Bridge
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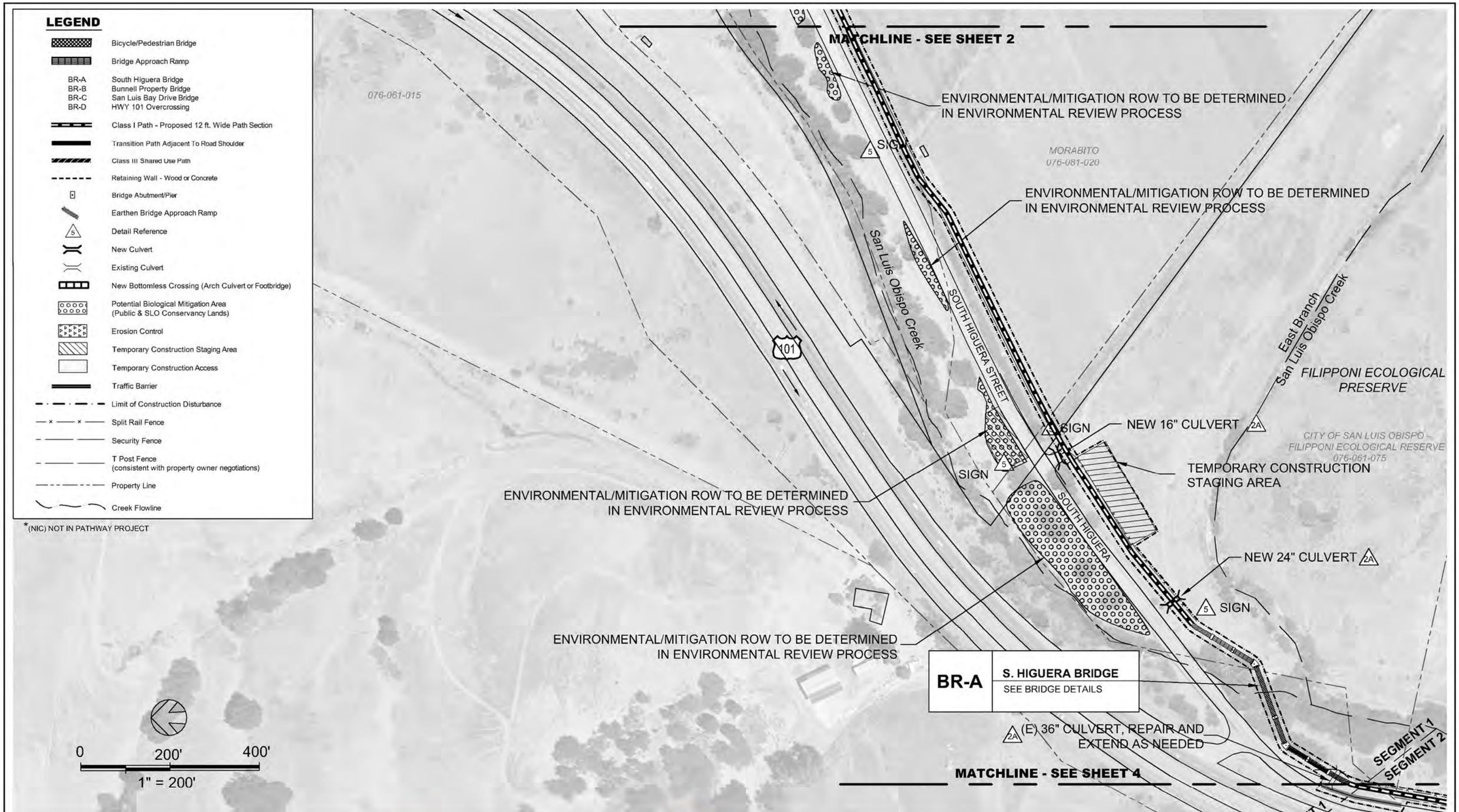
- Traffic Barrier
- Limit of Construction Disturbance
- Split Rail Fence
- Security Fence
- T Post Fence (consistent with property owner negotiations)
- Property Line
- Creek Flowline

*(NIC) NOT IN PATHWAY PROJECT



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

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PRELIMINARY PLAN

CONFLICT AVOIDANCE ALTERNATIVE

SHEET 3 of 12

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IF BAR DOES NOT EQUAL 1 INCH DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

ENVIRONMENTAL/MITIGATION ROW TO BE DETERMINED IN ENVIRONMENTAL REVIEW PROCESS

SOUTH HIGUERA

NEW 24" CULVERT 2A

5 SIGN

101

BR-A | S. HIGUERA BRIDGE
SEE BRIDGE DETAILS

CITY OF SAN LUIS OBISPO - FILIPPONI ECOLOGICAL RESERVE

MAINO

MAINO

1B 500 LF PATH ADJACENT TO ROAD SHOULDER

(E) 30" CULVERT, REPAIR AS NEEDED (NIC)

2B REPLACE (E) 36" CULVERT WITH NEW BOTTOMLESS ARCH CULVERT, HOLLOW CORE CONCRETE FOOTBRIDGE, OR CLEAR SPAN TIMBER FRAME FOOTBRIDGE

(E) 30" CULVERT, REPAIR AS NEEDED (NIC)

2A (E) 36" CULVERT, REPAIR AND EXTEND AS NEEDED

SEGMENT 1 / SEGMENT 2

(E) 36" CULVERT, REPAIR AS NEEDED (NIC)

MATCHLINE - SEE SHEET 3

SIGN 5

SAN LUIS OBISPO CREEK

SIGN 5

SEGMENT 1 / SEGMENT 2

101

SOUTH HIGUERA STREET

TRANSITION TO CLASS III PATH

INSTALL NEW CONCRETE TRAFFIC BARRIER ±100 LF 8

PRIVATE ROAD

101

2,000 LF CLASS I PATH 1A

2,000 LF SPLIT RAIL FENCE (WIRE FENCE TO BE REMOVED) 4

MATCHLINE - SEE SHEET 5

0 200' 400'

1" = 200'

*(NIC) NOT IN PATHWAY PROJECT

LEGEND

- Bicycle/Pedestrian Bridge
- Bridge Approach Ramp
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- BR-B Bunnell Property Bridge
- BR-C San Luis Bay Drive Bridge
- BR-D HWY 101 Overcrossing
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200 LF BY 3' HIGH RETAINING WALL 1B 11

500 LF PATH ADJACENT TO ROAD SHOULDER 1B 8

REPLACE (E) 36" CULVERT WITH NEW BOTTOMLESS ARCH CULVERT, HOLLOW CORE CONCRETE FOOTBRIDGE, OR CLEAR SPAN TIMBER FRAME FOOTBRIDGE 2B

SIGN 5

SIGN 5

SIGN 5

SIGN 5

CLOVERIDGE LANE

PRIVATE ROAD

CALTRANS R.O.W.

VENADO LANE

Davenport Creek

San Luis Obispo Creek

BUNNELL 076-121-030

TEMPORARY CONSTRUCTION ACCESS

RECONSTRUCT ±100 LF OF EXISTING TRAFFIC BARRIER 8

TEMPORARY CONSTRUCTION STAGING & FUTURE PERMANENT TRAIL HEAD PARALLEL PARKING (6 - 8 SPACES) 3 5 6 7 9

TEMPORARY CONSTRUCTION STAGING & FUTURE PERMANENT TRAIL HEAD PARALLEL PARKING (10 - 12 SPACES) 5 6 9

1,300 LF SPLIT RAIL FENCE 4

NEW 24" CULVERT 2A

(E) 16" CULVERT, REPAIR AS NEEDED (NIC)

NEW CROSS WALK

NORTHBOUND OFF RAMP

1C 1,300 LF SHARED USE PATH

101

PRIVATE ROAD

MATCHLINE - SEE SHEET 4

1,500 LF CLASS I PATH 1A

1,500 LF SPLIT RAIL FENCE 4

ONTARIO ROAD

076-121-014

076-121-020

076-121-021

076-121-025

ONTARIO ROAD

NEW 36" CULVERT 2A

SIGN 5

BUNNELL 076-121-030

SEGMENT 2

SEGMENT 3

SIGN 5

3,500 LF CLASS I PATH 1A

500 LF T-POST FENCE

MATCHLINE - SEE SHEET 6

BR-B	BUNNELL BRIDGE SEE BRIDGE DETAILS

0 200' 400'

1" = 200'

LEGEND

- Bicycle/Pedestrian Bridge
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- Property Line
- Creek Flowline

*(NIC) NOT IN PATHWAY PROJECT

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

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MATCHLINE - SEE SHEET 5

BARON CANYON OPEN SPACE 076-243-024

BARON CANYON RANCH ROAD (PRIVATE)

(E) GATE

MONTE ROAD

2A

MATCHLINE - SEE SHEET 7

END OF T-POST FENCE AT BUNNELL PROPERTY LINE

3,000 LF CLASS I PATH 1A

NO FENCE EAST SIDE OF TRAIL

BARON CANYON OPEN SPACE

SIGN 5

3,500 LF CLASS I PATH 1A

2,200 LF SPLIT RAIL FENCE ADJACENT TO AG FIELD 4

SLO LAND CONSERVANCY 076-241-018

NEW 48" CULVERT 2A

100' LF OF 3' HIGH WOOD RETAINING WALL AS NEEDED 12

San Luis Obispo Creek

101

SLO LAND CONSERVANC 076-241-018

101

ONTARIO ROAD

ONTARIO ROAD

0 200' 400'

1" = 200'

LEGEND

- Bicycle/Pedestrian Bridge
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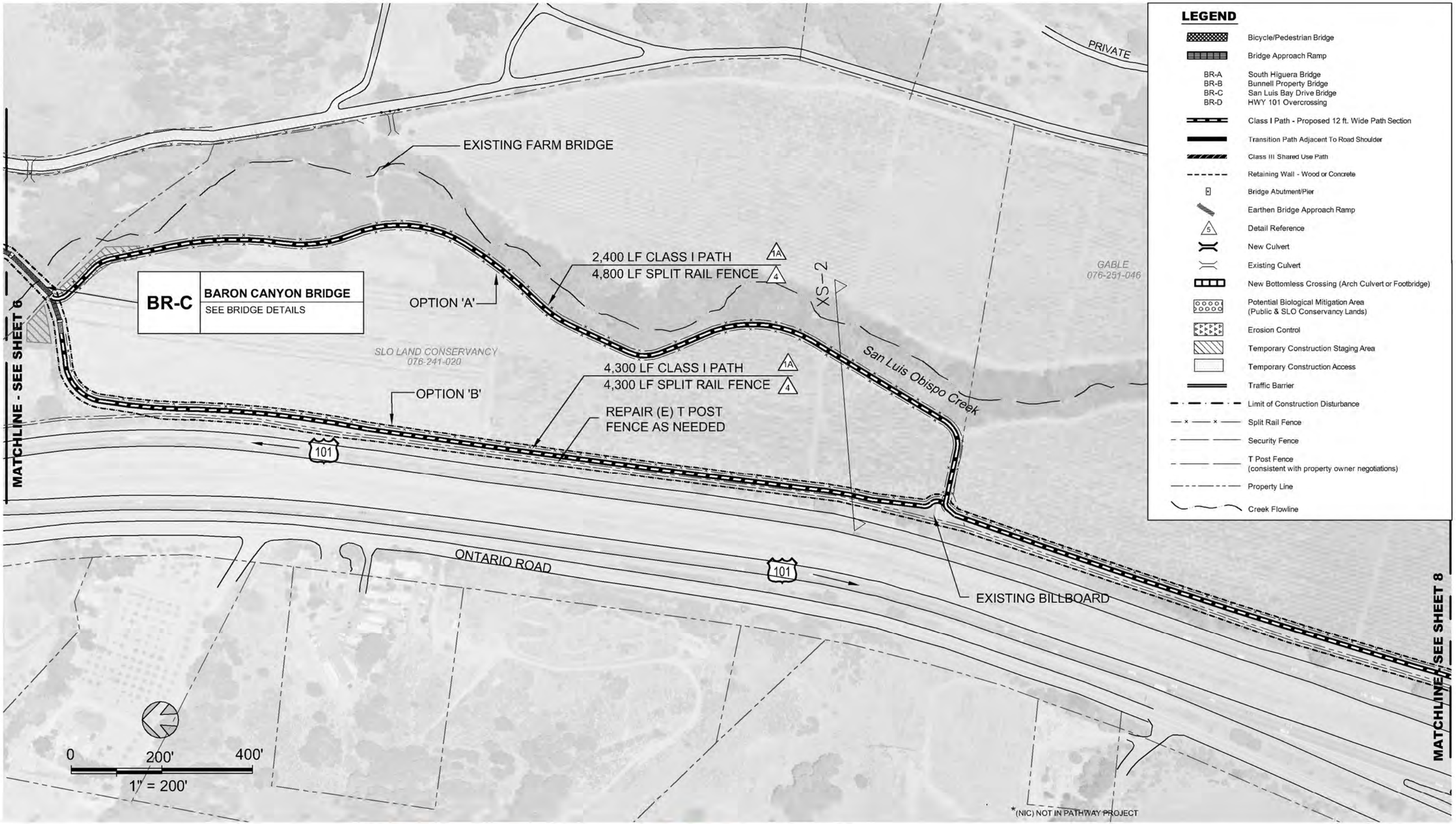

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

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PRELIMINARY PLAN
CONFLICT AVOIDANCE ALTERNATIVE

SHEET
7 of 12

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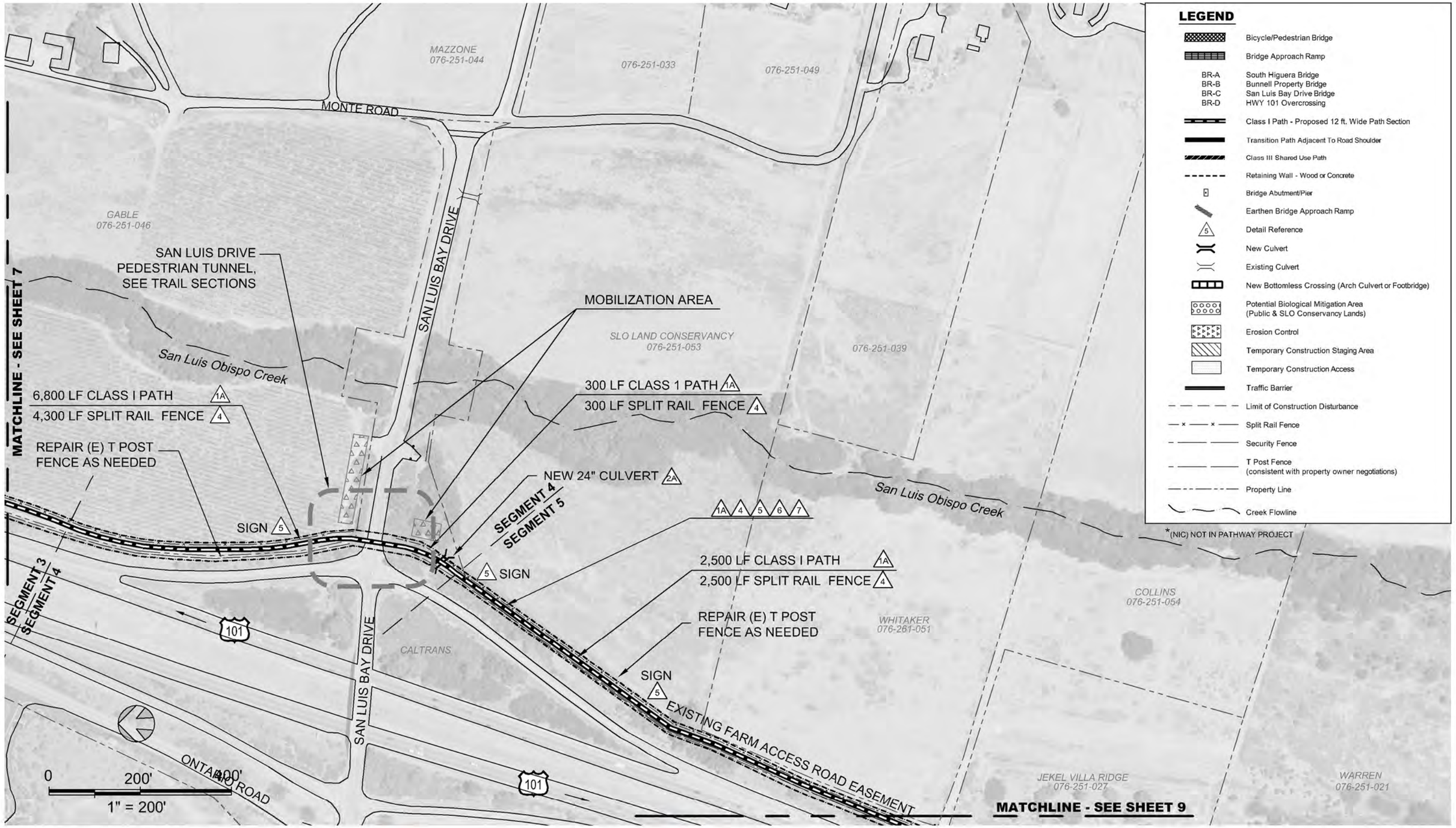

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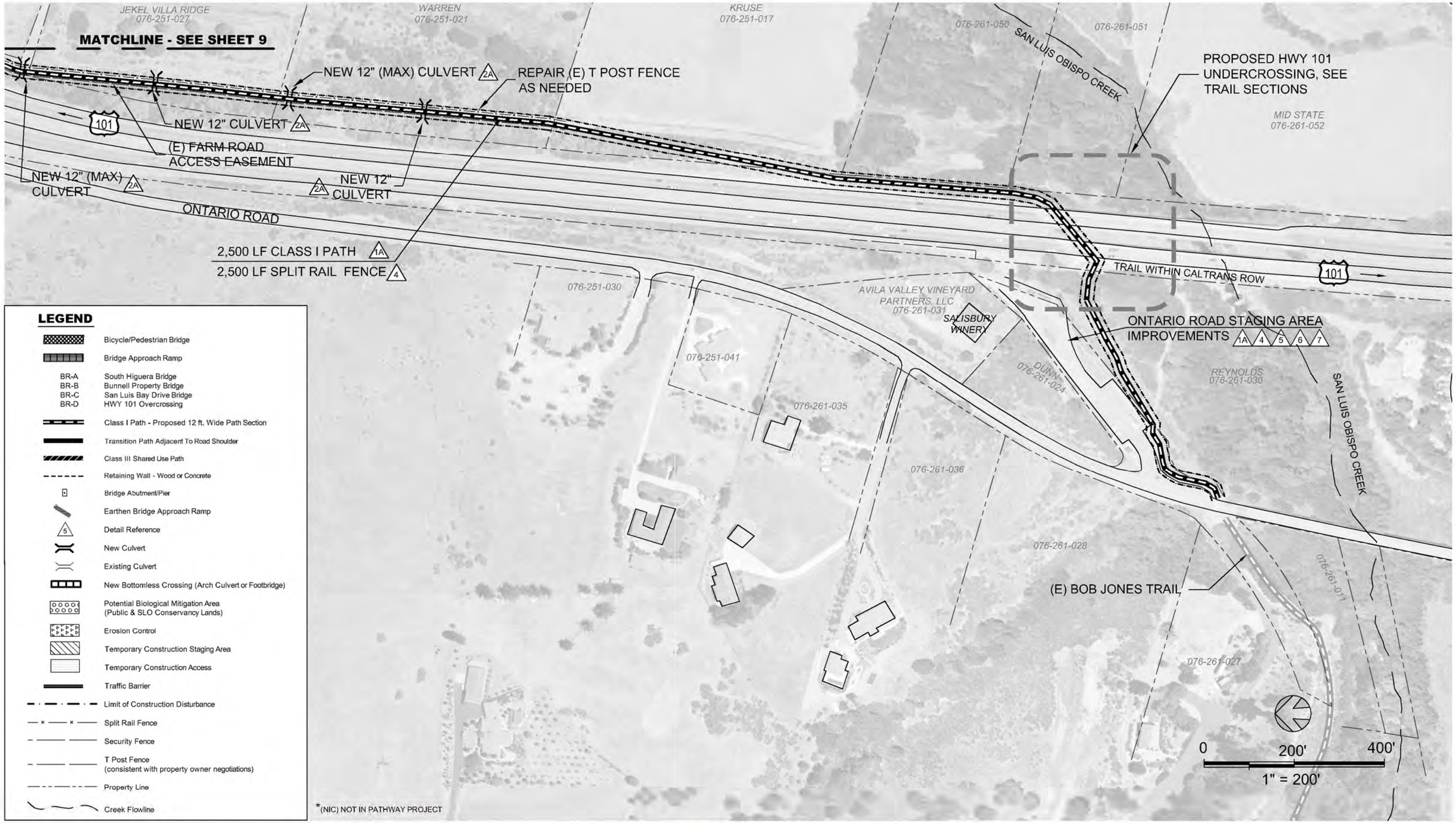

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PRELIMINARY PLAN
CONFLICT AVOIDANCE ALTERNATIVE

SHEET
9 of 12

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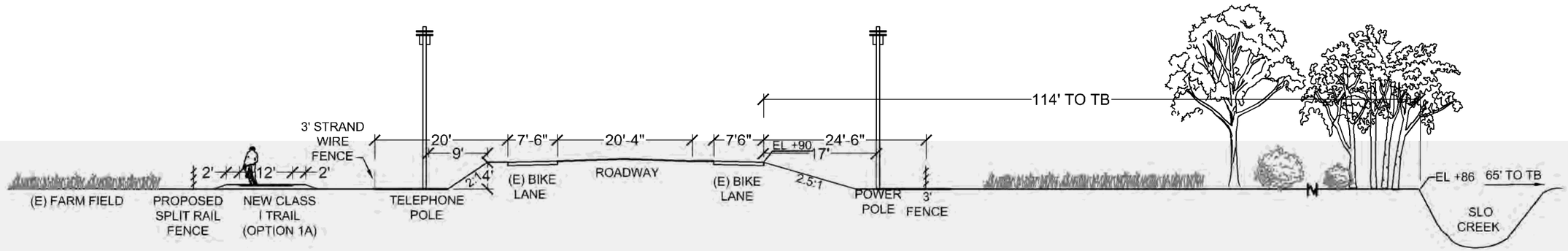
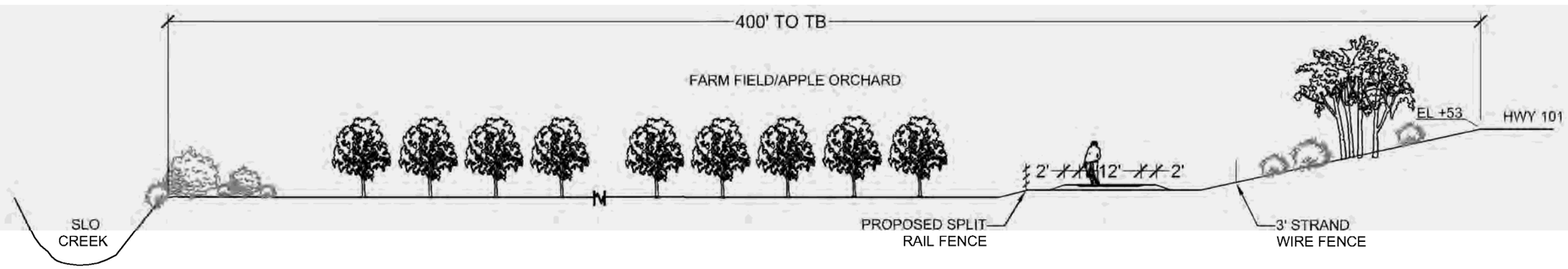


XS-1
SOUTH HIGUERA STREET AT FARM FIELD
(LOOKING SOUTH)



XS-2
ALONG HWY 101 NEAR DAVID CT
(LOOKING SOUTH)

BOB JONES PATHWAY
SAN LUIS OBISPO TO ONTARIO ROAD

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TRAIL CROSS SECTIONS
1 AND 2

SHEET
10 OF 12

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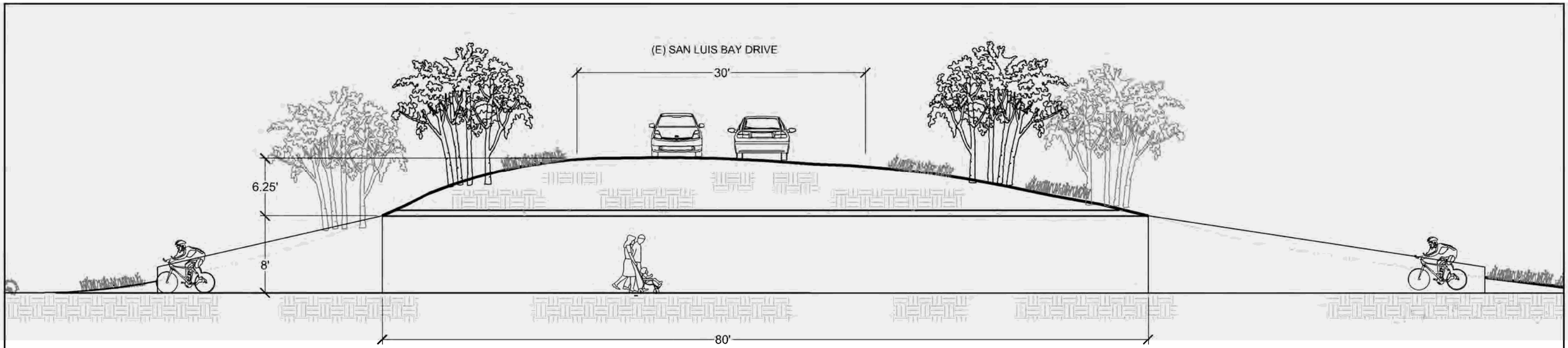
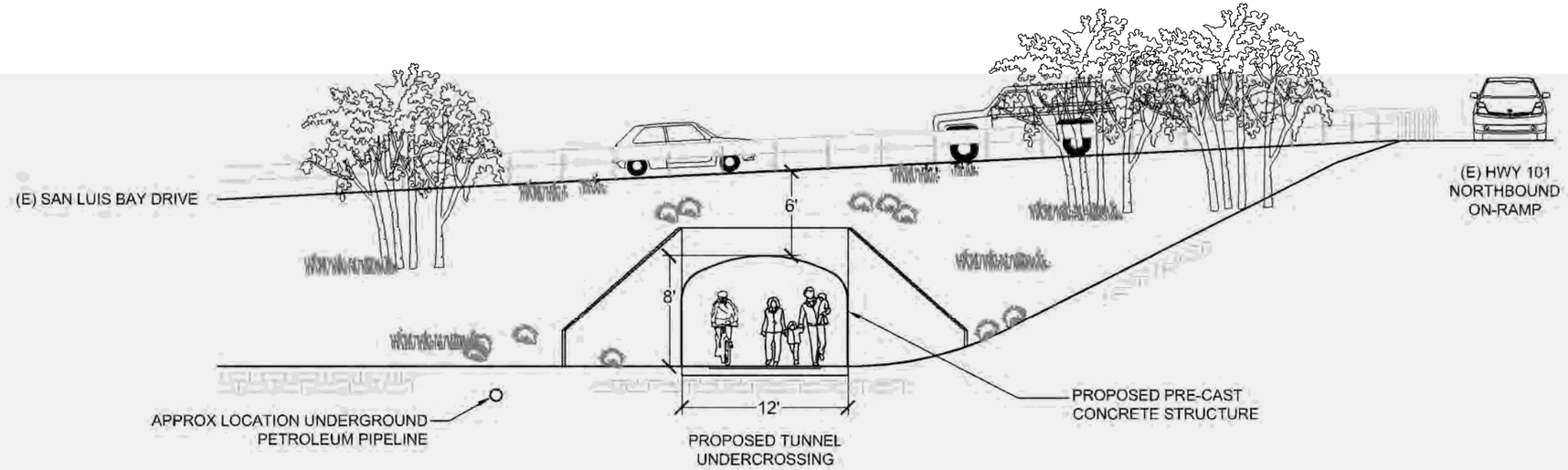


SAN LUIS BAY DRIVE TUNNEL
SECTION VIEW
(LOOKING EAST)



SAN LUIS BAY DRIVE TUNNEL
ELEVATION VIEW
(LOOKING SOUTH)

BOB JONES PATHWAY
SAN LUIS OBISPO TO ONTARIO ROAD

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TRAIL SECTIONS AT
SAN LUIS BAY DRIVE

SHEET
11 OF 12

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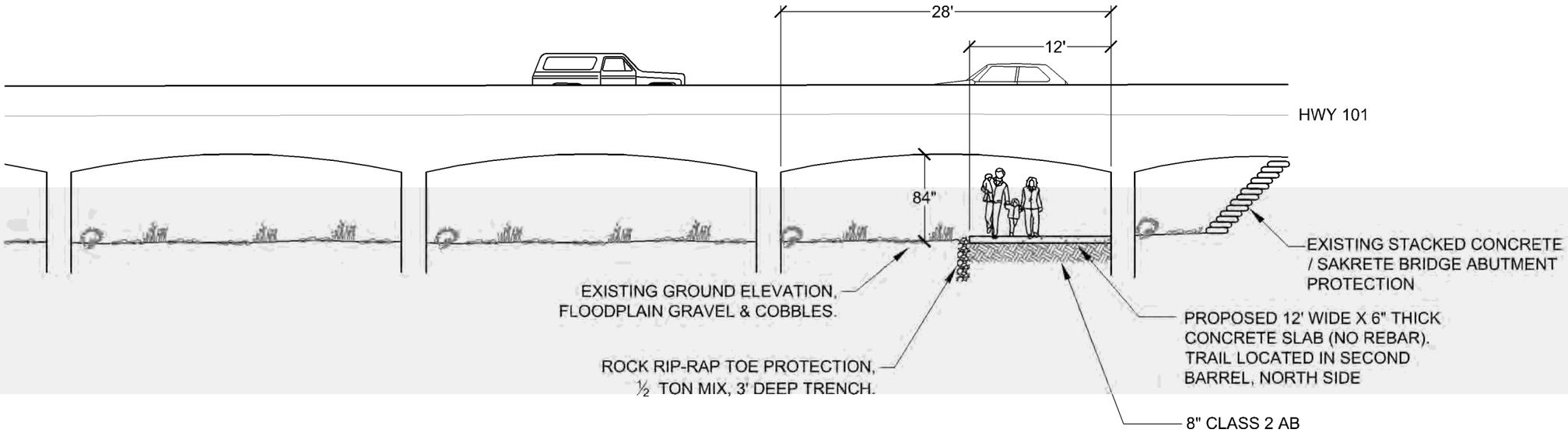
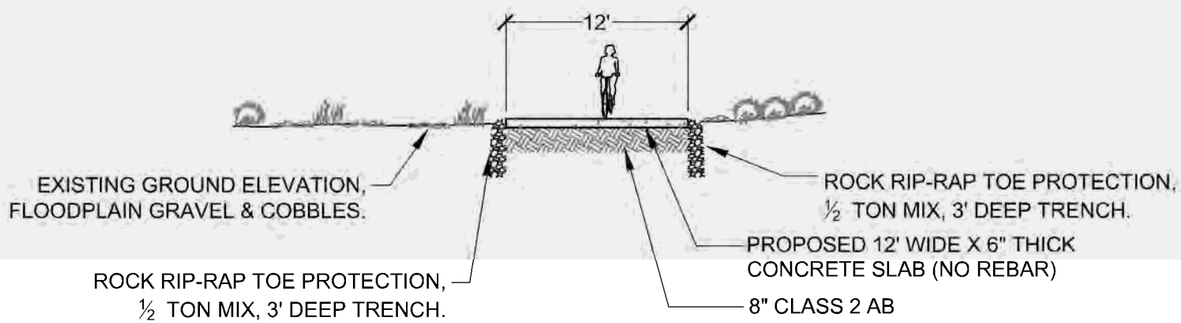


HWY 101 UNDERCROSSING
(LOOKING WEST)



HWY 101 UNDERCROSSING APPROACH AT
FLOODPLAIN
(LOOKING WEST)

NOTES:

1. TRAIL WILL BE SUBJECT TO SEASONAL CLOSURE AT SAN LUIS BAY DRIVE.
2. TRAIL WILL REQUIRE ANNUAL MAINTENANCE TO REMOVE SAND, GRAVEL , COBBLES FROM SURFACE.
3. UNDERPASS WITH LIMITED HEIGHT (7'). WILL REQUIRE BIKE RIDERS TO DISMOUNT AND WALK BIKES

BOB JONES PATHWAY
SAN LUIS OBISPO TO ONTARIO ROAD

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TRAIL SECTIONS
UNDER HWY 101 BRIDGE

SHEET
12 OF 12

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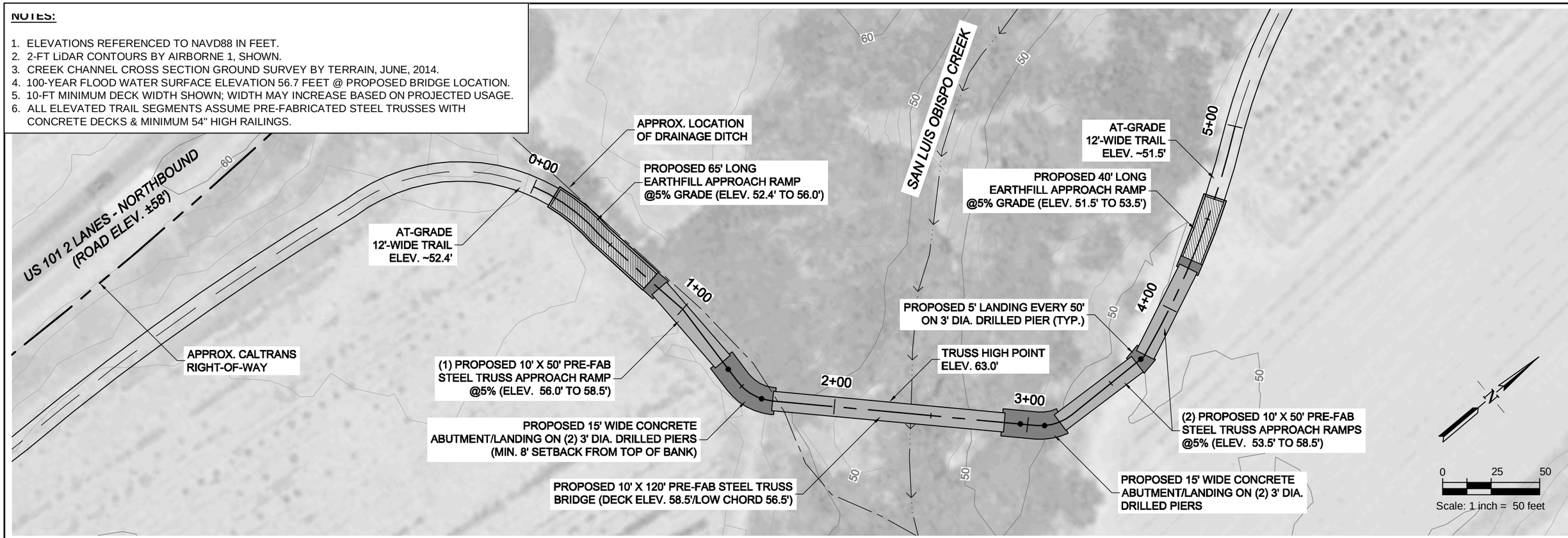
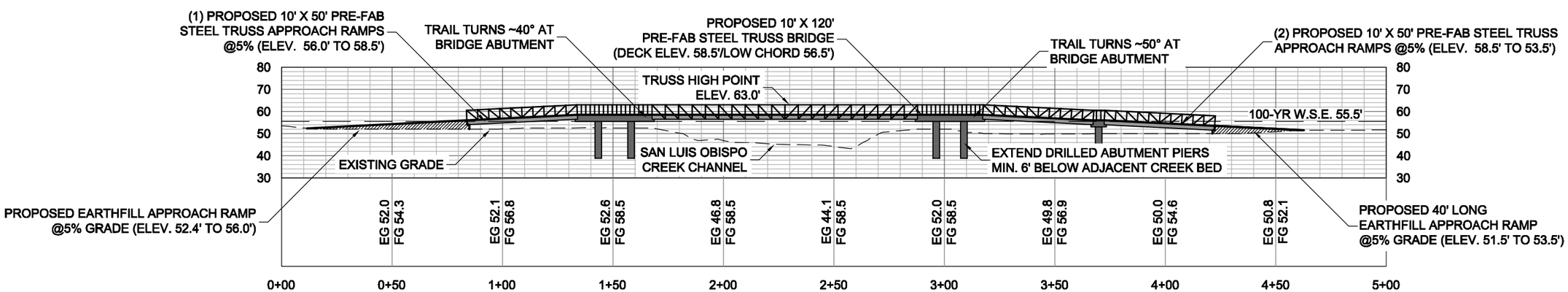
NOTES:

1. ELEVATIONS REFERENCED TO NAVD88 IN FEET.
2. 2-FT LiDAR CONTOURS BY AIRBORNE 1, SHOWN.
3. CREEK CHANNEL CROSS SECTION GROUND SURVEY BY TERRAIN, JUNE, 2014.
4. 100-YEAR FLOOD WATER SURFACE ELEVATION 56.7 FEET @ PROPOSED BRIDGE LOCATION.
5. 10-FT MINIMUM DECK WIDTH SHOWN; WIDTH MAY INCREASE BASED ON PROJECTED USAGE.
6. ALL ELEVATED TRAIL SEGMENTS ASSUME PRE-FABRICATED STEEL TRUSSES WITH CONCRETE DECKS & MINIMUM 54" HIGH RAILINGS.



CONCEPTUAL BRIDGE PLAN (OPTION A)

SCALE: 1" = 50'



CONCEPTUAL BRIDGE PROFILE (OPTION A)

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

BOB JONES PATHWAY
SAN LUIS OBISPO TO ONTARIO ROAD

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CONCEPTUAL SAN LUIS OBISPO CREEK CROSSING (OPTION A)
AT
BARON CANYON

SHEET
1 OF 2

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01/05/2012
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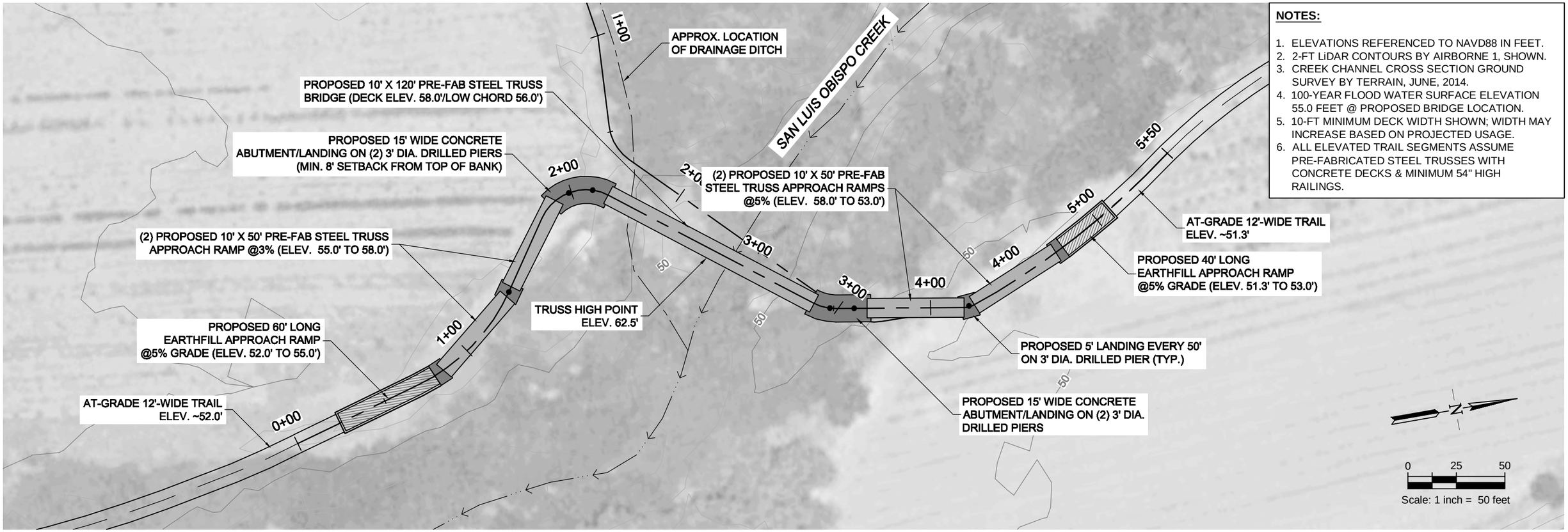

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2. 2-FT LiDAR CONTOURS BY AIRBORNE 1, SHOWN.
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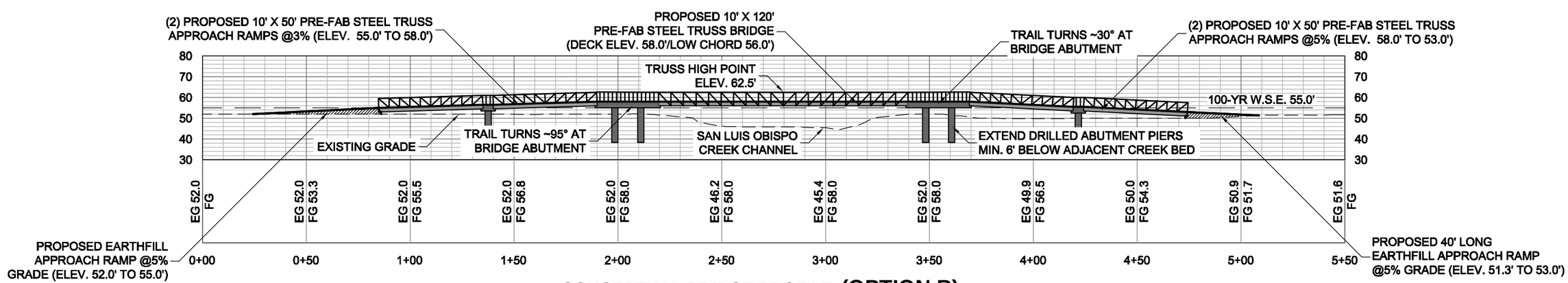
4. 100-YEAR FLOOD WATER SURFACE ELEVATION 55.0 FEET @ PROPOSED BRIDGE LOCATION.
5. 10-FT MINIMUM DECK WIDTH SHOWN; WIDTH MAY INCREASE BASED ON PROJECTED USAGE.
6. ALL ELEVATED TRAIL SEGMENTS ASSUME PRE-FABRICATED STEEL TRUSSES WITH CONCRETE DECKS & MINIMUM 54" HIGH RAILINGS.

CONCEPTUAL BRIDGE PLAN (OPTION B)

SCALE: 1" = 50'



CONCEPTUAL BRIDGE PROFILE (OPTION B)

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

BOB JONES PATHWAY
SAN LUIS OBISPO TO ONTARIO ROAD

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CONCEPTUAL SAN LUIS OBISPO CREEK CROSSING (OPTION B)
AT
BARON CANYON

SHEET
2 OF 2

IF BAR DOES NOT EQUAL 1 INCH DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

Appendix B.
Species List

Bob Jones Pathway Conflict Avoidance Alignment Plant List

Scientific Name	Common Name	Native	Species Status / Notes
Vascular Plants nomenclature follows " The Jepson Manual" and http://ucjeps.berkeley.edu/interchange.html			
PTERIDOPHYTES			
Equisetaceae	**Horsetail family**		
Equisetum arvense	common horsetail	Yes	
ANGIOSPERMS (DICOTS)			
Anacardiaceae	**Sumac family**		
Schinus molle	Peruvian pepper tree	No	Invasive weed
Toxicodendron diversilobum	poison oak	Yes	
Apiaceae	**Carrot family**		
Apium graveolens	wild celery	No	
Conium maculatum	poison hemlock	No	Invasive weed, FACW
Daucus pusillus	rattle snake weed	Yes	
Foeniculum vulgare	sweet fennel	No	Invasive weed, FACU
Oenanthe sarmentosa	water parsley	Yes	
Apocynaceae	**Dogbane family**		
Vinca major	greater periwinkle	No	Invasive weed
Araliaceae	**Ginseng family**		
Hedera helix	English ivy	No	Invasive weed
Asteraceae	**Sunflower family**		
Ambrosia psilostachya	western ragweed	Yes	
Anthemis arvensis	corn chamomile	No	
Artemisia californica	California sagebrush	Yes	
Artemisia dracunculus	tarragon	Yes	
Artemisia douglasiana	mugwort	Yes	
Baccharis pilularis var. *consanguinea*	coyote brush	Yes	
Carduus pycnocephalus	Italian thistle	No	Invasive weed
Centaurea melitensis	tocolote	No	
Centaurea solstitialis	yellow star-thistle	No	
Chamomilla sauveolens	pineapple weed	No	
Cirsium arvense	Canada thistle	No	
Cirsium vulgare	bull thistle	No	Invasive weed
Conyza canadensis	horseweed	Yes	
Delairea odorata	Cape Ivy	No	
Gnaphalium luteo-album	cudweed	No	
Lactuca serriola	prickly lettuce	No	

Scientific Name	Common Name	Native	Species Status / Notes
Picris echioides	bristly ox-tongue	No	
Senecio vulgaris	ragwort	No	
Silybum marianum	milk thistle	No	
Sonchus asper	prickly sow thistle	No	
Sonchus oleraceus	sow thistle	No	
Xanthium strumarium	cocklebur	Yes	
Brassicaceae	**Mustard family**		
Brassica nigra	black mustard	No	
Brassica rapa	Field mustard		
Capsella bursa-pastoris	Shepherd's purse	No	
Cardaria draba	heart-podded hoary cress	No	Invasive Weed
Raphanus sativa	wild radish	No	
Sisymbrium altissimum	tumble mustard	No	
Cactaceae	**Cactus family**		
Opuntia littoralis	prickly-pear cactus	No	
Chenopodiaceae	**Goosefoot family**		
Chenopodium album	pigweed	No	
Salsola tragus	Russian thistle	No	
Convolvulaceae	**Morning glory family**		
Convolvulus arvensis	bindweed	No	
Datiscaceae	**Datisca family**		
Datisca glomerata	durango root	Yes	
Dipsacaceae	**Teasel family**		
Dipsacus fullonum	wild teasel	No	Invasive Weed
Euphorbiaceae	**Spurge family**		
Euphorbia lathyris	caper spurge	No	
Euphorbia peplus	petty spurge	No	
Fabaceae	**Pea family**		
Lotus corniculatus	bird's foot trefoil	No	
Lupinus succulentis	succulent lupine	Yes	
Melilotus indica	sourclover	No	
Medicago polymorpha	bur clover	No	
Vicia sativa	spring vetch	No	
Fagaceae	**Oak family**		
Quercus agrifolia	coast live oak	Yes	
Geraniaceae	**Geranium family**		
Erodium cicutarium	red-stemmed filaree	No	

Scientific Name	Common Name	Native	Species Status / Notes
Erodium botrys	filaree	No	
Geranium sp.	Varietals	No	Ornamental variety
Hippocastanaceae	**Buckeye family**		
Aesculus californicus	California buckeye		
Hydrophylaceae	**Waterleaf family**		
Pholistoma auritum var. auritum	fiesta flower	Yes	
Juglandaceae	**Walnut family**		
Juglans californica var. *californica*	southern California black walnut		
Lauraceae	**Laurel family**		
Umbellaria californica	California bay	Yes	
Malvaceae	**Mallow family**		
Malva parviflora	cheeseweed	No	
Myrtaceae	**Myrtle family**		
Eucalyptus sp.	Eucalyptus	No	
Oxalidaceae	**Woodsorrel family**		
Oxalis pes-caprae	Bermuda buttercup	No	
Papaveraceae	**Poppy family**		
Fumaria parviflora	Fine-leaved fumitory	No	
Plantaginaceae	**Plantain family**		
Plantago lanceolata	English plantain	No	
Plantago coronopus	cut leaf plantain	No	
Plantanaceae	**Sycamore family**		
Platanus racemosa	western sycamore	Yes	
Polygonaceae	**Buckwheat family**		
Eriogonum fasciculatum	California buckwheat	Yes	
Primulaceae	**Primrose family**		
Anagalis arvensis	scarlet pimpernel	No	
Ranunculaceae	**Buttercup family**		
Clematis ligusticifolia	virgin's bower	Yes	
Rhamnaceae	**Buckthorn family**		
Frangula californica	coffeeberry	Yes	
Rhamnus ilicifolia	holly-leaf red berry	Yes	
Rosaceae	**Rose family**		
Rubus ursinus	California blackberry	Yes	
Salicaceae	**Willow family**		
Populus balsamifera ssp. *trichocarpa*	black cottonwood	Yes	
Salix lasiandra	red willow	Yes	

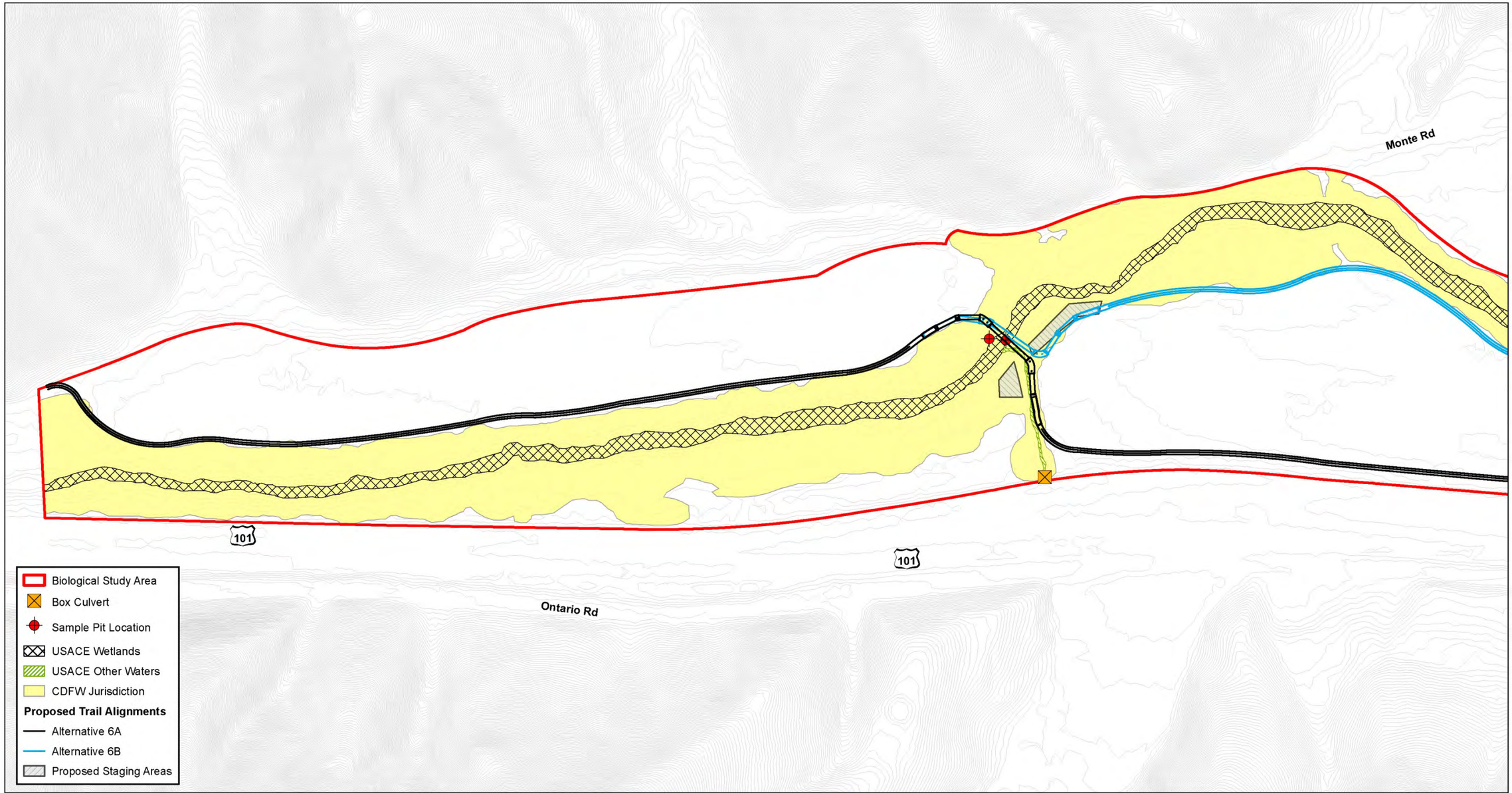
Scientific Name	Common Name	Native	Species Status / Notes
Salix lasiolepis	arroyo willow	Yes	
Urticaceae	**Nettle family**		
Urtica dioica	hoary nettle	Yes	
Urtica urens	dwarf nettle	No	
Verbenaceae	**Verbena family**		
Phyla nodiflora	Turkey tangle frogfruit		
ANGIOSPERMS (MONOCOTS)			
Cyperaceae	**Sedge family**		
Cyperus eragrostis	tall flat sedge	Yes	
Scirpus microcarpus	small fruited bulrush	Yes	
Liliaceae	**Lily family**		
Asphodelus fistulosus	onion weed	No	
Poaceae	**Grass family**		
Arundo donax	giant reed	No	
Avena barbata	slender wild oats	No	
Avena fatua	Wild oats	No	
Bromus diandrus	ripgut brome	No	
Bromus hordeaceus	soft chess brome	No	
Bromus madritensis ssp. *madritensis*	Spanish brome	No	
Bromus madritensis ssp. *rubens*	Red brome	No	
Bromus tectorum	Cheat grass	No	
Cynodon dactylon	Bermuda grass	No	
Hordeum murinum ssp. *leporinum*	foxtail	No	
Phalaris aquatica	harding grass	No	
Stipa miliaceae	smilo grass	No	

Bob Jones Pathway Conflict Avoidance Alignment Wildlife List

Scientific Name	Common Name	Notes
BIRDS		
Diurnal Raptors		
Cathartes aura	turkey vulture	
Buteo jamaicensis	red-tailed hawk	
Upland Game Birds		
Callipela californica	California quail	
Pigeons and Doves		
Zenaida macroura	mourning dove	
Streptopelia decaocto	Eurasian colored dove	
Hummingbirds		
Calypte anna	Anna's hummingbird	
Woodpeckers		
Colaptes auratus	northern red-shafted flicker	
Tyrant Flycatchers		
Sayornis nigricans	black phoebe	
Jays, Crows, and Allies		
Aphelocoma californica	western scrub jay	
Corvus brachyrhynchos	American crow	
Swallows		
Tachycineta bicolor	tree swallow	
Petrochelidon pyrrhonota	cliff swallow	
Chickadees, Nuthatches, and Allies		
Baeolophus inornatus	oak titmouse	
Psaltriparus minimus	bush tit	
Wrens		
Thryomanes bewickii	Bewick’s wren	
Kinglets, Old World Warblers, and Gnatcatchers		
Regulus calendula	ruby-crowned kinglet	
Thrushes		
Sailia mexicana	western bluebird	
Turdus migratorius	American robin	
Toxostoma redivivum	California thrasher	

Scientific Name	Common Name	Notes
Mimids		
Mimus polyglottos	northern mockingbird	
Emberizine Sparrows and Allies		
Pipilo crissalis	California towhee	
Junco hymalis	dark-eyed junco	
MAMMALS		
Canidae		
Canis latrans	coyote	Tracks and scat
Raccoons, Skunks, and Weasels		
Procyon lotor	common raccoon	Tracks
Lagomorphs		
Sylvilagus bachmanii	brush rabbit	
Rodents		
Spermophilus beecheyii	California ground squirrel	
REPTILES		
Sceloporus occidentalis	western fence lizard	
FISH		
Oncorhynchus mykiss	south-central California coast steelhead	FESA Endangered

Appendix C.
Jurisdictional Maps


Monte Rd
101
101
Ontario Rd
Biological Study Area
Box Culvert
Sample Pit Location
USACE Wetlands
USACE Other Waters
CDFW Jurisdiction
Proposed Trail Alignments
Alternative 6A
Alternative 6B
Proposed Staging Areas
0 150 300 600 Feet
N E S W
Source: County of San Luis Obispo, 2011.
SWCA
ENVIRONMENTAL CONSULTANTS
Jurisdictional Determination Map
Bob Jones Path Conflict Avoidance Alignment BRA
SHEET
1 OF 2

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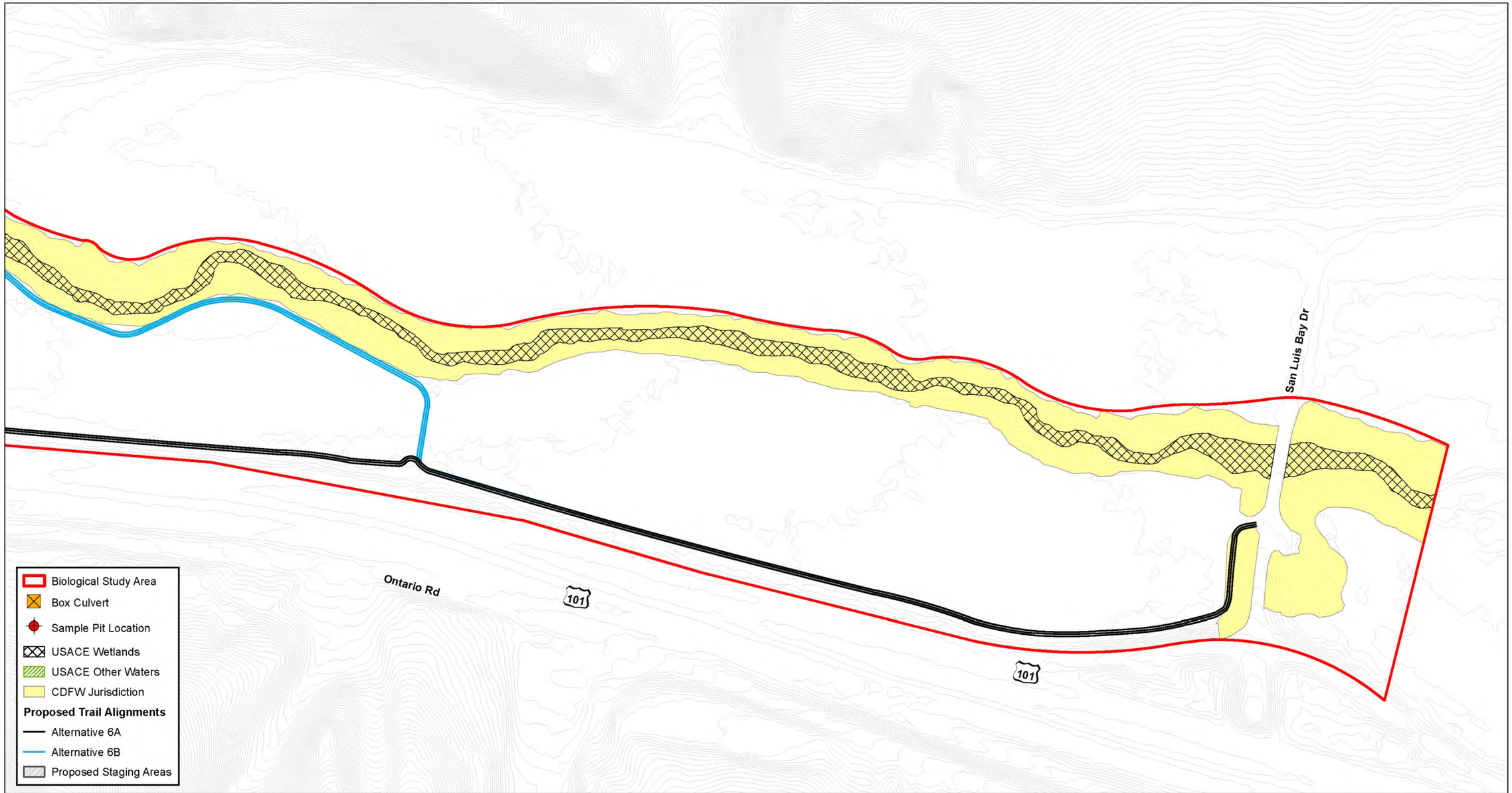

0 150 300 600 Feet

Source: County of San Luis Obispo, 2011.

SWCA ENVIRONMENTAL CONSULTANTS

Jurisdictional Determination Map
Bob Jones Path Conflict Avoidance Alignment BRA

SHEET
2 OF 2

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Appendix D.
Arid West Data Sheets

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bob Jones Pathway Farm Friendly Alignment City/County: San Luis Obispo/San Luis Obispo Sampling Date: June 25, 2014

Applicant/Owner: San Luis Obispo County General Services Agency State: Ca Sampling Point: 1

Investigator(s): Travis Belt Section, Township, Range: San Miguelito, T 31 S, R12 E

Landform (hillslope, terrace, etc.): Top of Creek Bank Local relief (concave, convex, none): none Slope (%): 1

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Marimel Sandy Clay Loam NWI classification: PFO/SSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No X
Hydric Soil Present?	Yes _____	No X	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

SLO area has been in severe drought for several years. Drought conditions has resulted in lower stream levels in the area. the subject stretch of San Luis Creek still has water in it, but water levels appear low based on the historic ordinary high water in the area.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasioleps	10	Yes	FACW
2.			
3.			
4.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 15')			
1. Clematis lingusticifolia	25	Yes	FAC
2. Delariea odorata	20	Yes	None
3. Brassica nigra	15	No	None
4. Arundo donax	10	No	FACW
5. Conium maculatum	10	No	FACW
6.			
7.			
8.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: 15')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 20 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes X No _____

Remarks:

This plot is located at the top of the eastern creek bank, which is approximately 8 vertical feet above the active channel. Vegetation is arroyo willow thicket with a weedy understory. Willow canopy is dense but few individuals are rooted in the plot. Clematis is climbing in canopy.

SOIL

Sampling Point: 1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-14	10yr3/2	100					sand	very dry, minimal roots, some gravels
14-22	10yr2/1	100					sandyloam	very dry, no features

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes ___ No X

Remarks:

Soil on surface is a sand with few gravels but no cobbles. Loamy sand starts at approximately 14" but does not show any sign of redox features.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 6"

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water is present in active channel approximately four horizontal feet from the soil test pit. Soil test pit is dry.

WETLAND DETERMINATION DATA FORM – Arid West Region

Project/Site: Bob Jones Pathway Farm Friendly Alignment City/County: San Luis Obispo/San Luis Obispo Sampling Date: June 25, 2014

Applicant/Owner: San Luis Obispo County General Services Agency State: Ca Sampling Point: 2

Investigator(s): Travis Belt Section, Township, Range: San Miguelito, T 31 S, R12 E

Landform (hillslope, terrace, etc.): creek channel Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): C Lat: _____ Long: _____ Datum: _____

Soil Map Unit Name: Riverwash NWI classification: R2UUB

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No X (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes X No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No _____	**Is the Sampled Area within a Wetland?** **Yes X** **No _____**
Hydric Soil Present?	Yes X	No _____	
Wetland Hydrology Present?	Yes X	No _____	

Remarks:

SLO area has been in severe drought for several years. Drought conditions has resulted in lower stream levels in the area. The subject stretch of San Luis Obispo Creek still has water in it, but water levels appear low based on the historic ordinary high water marks in the area.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 15')	Absolute % Cover	Dominant Species?	Indicator Status
1. Salix lasioleps	15	Yes	FACW
2. Juglans californica	5	Yes	FAC
3.			
4.			
	5 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1.			
2.			
3.			
4.			
5.			
	0 = Total Cover		
Herb Stratum (Plot size: 15')			
1. Urtica dioica	35	Yes	FAC
2. Rubus ursinus	15	Yes	FAC
3. Conium maculatum	15	Yes	FACW
4. Arundo donax	10	No	FACW
5.			
6.			
7.			
8.			
	75 = Total Cover		
Woody Vine Stratum (Plot size: 15')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 25 % Cover of Biotic Crust 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 5 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100 (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species _____	x 1 = _____
FACW species _____	x 2 = _____
FAC species _____	x 3 = _____
FACU species _____	x 4 = _____
UPL species _____	x 5 = _____
Column Totals: _____ (A)	_____ (B)

Prevalence Index = B/A = _____

Hydrophytic Vegetation Indicators:

X Dominance Test is >50%

___ Prevalence Index is ≤3.0[1]

___ Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes X** **No _____**

Remarks:

This plot is located on a vegetated sand/gravel bar approximately four horizontal feet up from the OHWM. Vegetation is arroyo willow thicket with a understory of stinging nettle. Willow canopy is dense but few individuals are rooted in the plot. One California walnut is present in plot. active stream channel lacks significant vegetation.

SOIL

Sampling Point: 2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox %	Type[1]	Loc[2]	Texture	Remarks
0-2	10yr2/1	100					silt	moist with gravels
2-16							sand/grave	Riverwash gravels, sand, silt
16-22							sand/grave	Saturated riverwash

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR C**)
- ___ 1 cm Muck (A9) (**LRR D**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ Vernal Pools (F9)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR C**)
- ___ 2 cm Muck (A10) (**LRR B**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: None

Depth (inches): ___

Hydric Soil Present? Yes X No ___

Remarks:

Surface is a fine silt with few gravels. Remaining portions of pit is riverwash with a variety of sands, gravels, and silt. Riverwash is a hydric soil in this location under criteria 4.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- X Surface Water (A1)
- ___ High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1) (**Nonriverine**)
- ___ Sediment Deposits (B2) (**Nonriverine**)
- ___ Drift Deposits (B3) (**Nonriverine**)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Biotic Crust (B12)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres along Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water Marks (B1) (**Riverine**)
- ___ Sediment Deposits (B2) (**Riverine**)
- ___ Drift Deposits (B3) (**Riverine**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 6"

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 16"

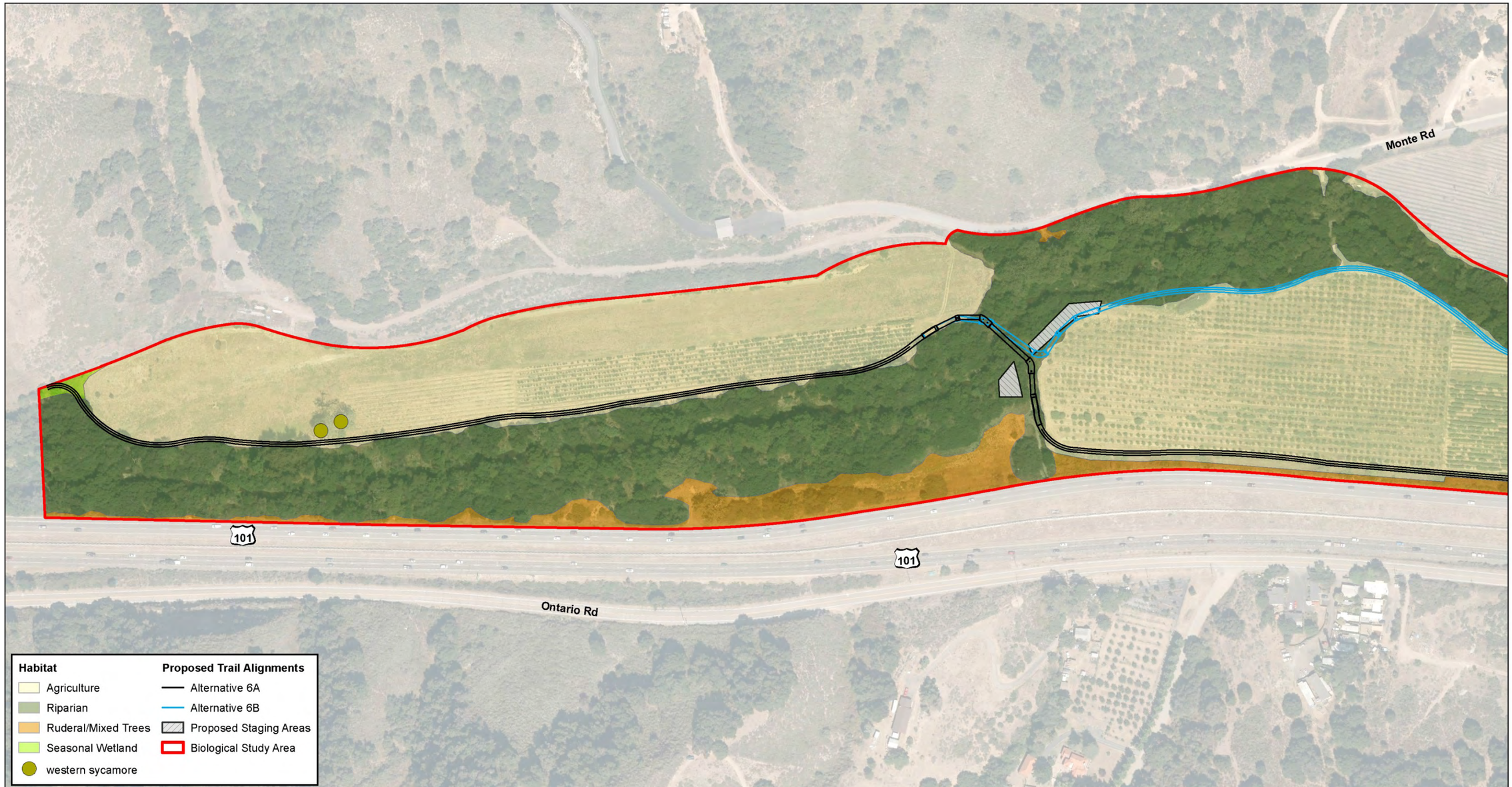
Wetland Hydrology Present? Yes X No ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Surface water is present in active channel approximately four horizontal feet from the soil test pit. Soil test pit is saturated at 16".

Appendix E.
Habitat Maps



Source: County of San Luis Obispo, 2011.

SWCA ENVIRONMENTAL CONSULTANTS

Habitat Map
Bob Jones Path Conflict Avoidance Alignment BRA

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1 OF 2

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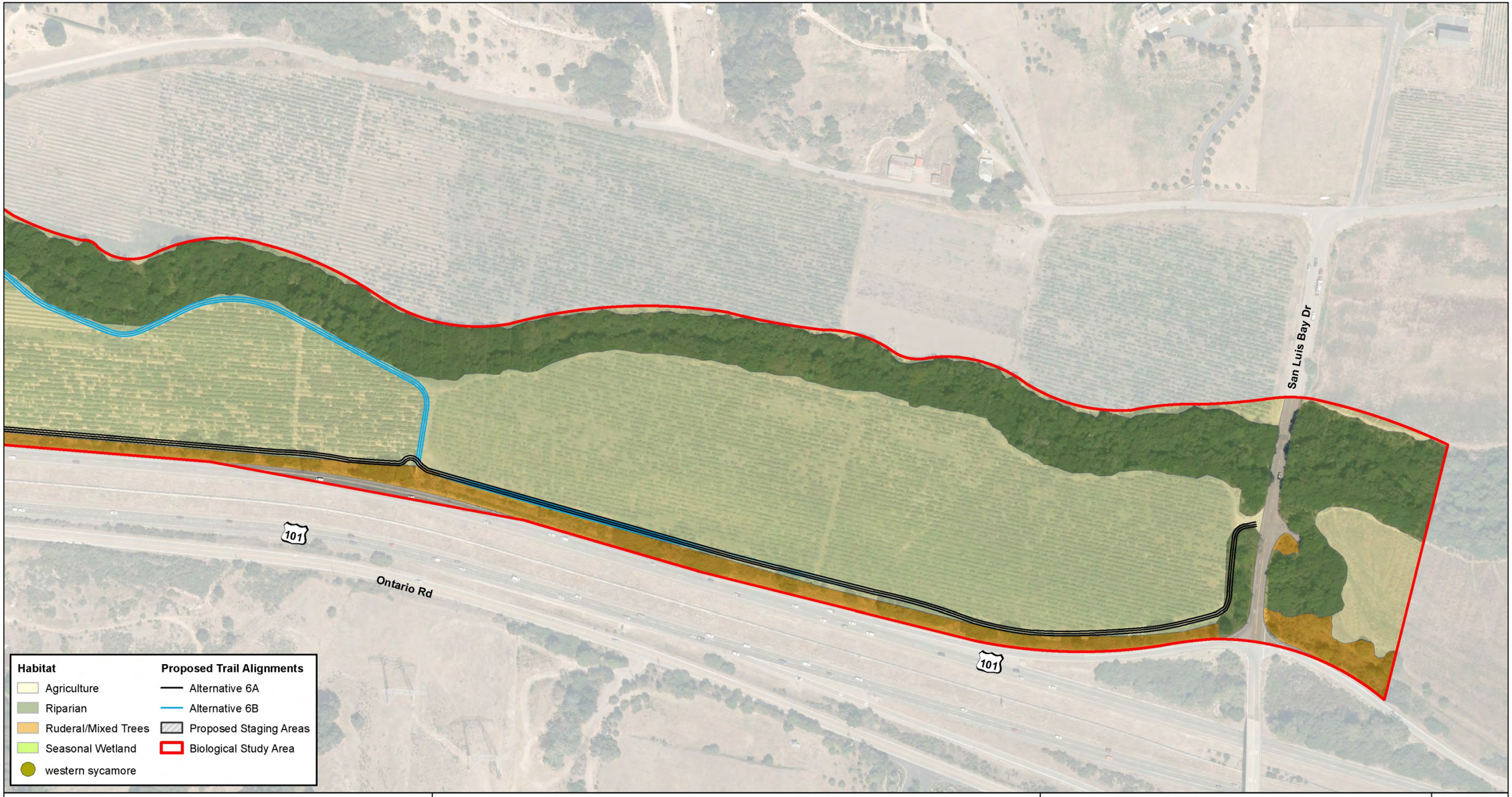

0 150 300 600 Feet

Source: County of San Luis Obispo, 2011.

SWCA ENVIRONMENTAL CONSULTANTS

Habitat Map

Bob Jones Path Conflict Avoidance Alignment BRA

SHEET 2 OF 2

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Appendix F.
Photo Documentation

PHOTO 1:

Representative view of the riparian canopy edge and agricultural areas located in the Conflict Avoidance Alignment.

Photo taken on June 25, 2014.

PHOTO 2:

View of the SLO Creek channel looking downstream from the approximate proposed bridge location.

Photo taken on June 25, 2014.

PHOTO 3:

View of the SLO Creek channel looking upstream from the approximate proposed bridge location.

Photo taken on June 25, 2014.

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PHOTO 4:

View looking downstream at the tributary drainage to SLO Creek.

Photo taken on June 25, 2014.

PHOTO 5:

View of riparian canopy edge located at the approximate location of the San Luis Bay Drive undercrossing.

Photo taken on June 25, 2014.

PHOTO 6:

View of the riparian canopy and existing agricultural road in the approximate location of the southern end of the San Luis Bay Drive undercrossing.

Photo taken on June 25, 2014.

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Appendix G.
Special-Status Species Tables

Table G-1. Special-status Plant Species Investigated for Potential Occurrence

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
Hoover's bent grass *Agrostis hooveri*	Sandy sites in chaparral, cismontane woodland, valley and foothill grassland. 60-600 meters	April-July	--/--/1B.2	**Suitable Conditions Absent:** Sandy soils on the site are managed for agriculture resulting in compacted soils and a lack of native vegetation. The agricultural conditions are not conducive to rare plant species. Hoover's bent grass was not observed during surveys conducted in the appropriate season.
Arroyo de la Cruz manzanita *Arctostaphylos cruzensis*	Broadleaf upland forest, coastal scrub, closed cone coniferous forest, chaparral and grassland. On sandy soils. 60-310 meters	December-March	--/--/1B.2	**Suitable Conditions Absent:** Sandy soils on the site are managed for agriculture resulting in compacted soils and a lack of native vegetation. The agricultural conditions are not conducive to rare plant species. The BSA does not support the appropriate habitat associations. The BSA is at a lower elevation than this species documented range. No Arctostaphylos species were observed in the BSA.
Santa Lucia manzanita *Arctostaphylos luciana*	Evergreen shrub; occurs on Chaparral with shale outcrops. 350-850 meters	February-March	--/--/1B.2	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range. The BSA does not contain shale soil. No Arctostaphylos species were observed in the BSA.
Morro manzanita *Arctostaphylos morroensis*	Chaparral, cismontane woodland, coastal scrub, on stabilized coastal dunes. 5-205 meters	December-March	FT/--/1B.1	**Suitable Conditions Absent:** The BSA is south of this species range and does not support stabilized dunes. No Arctostaphylos species were observed in the study area.

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
Oso Manzanita *Arctostaphylos osoensis*	Evergreen shrub; occurs in chaparral and cismontane woodland associated with dacite porphyry (purple/red igneous volcanic rock) on buttes. 300-500 meters	February-March	--/--/1B.2	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range and does not contain dacite soils or the appropriate community. No Arctostaphylos species were observed in the study area.
Pecho manzanita *Arctostaphylos pechoensis*	Closed coniferous forest, chaparral, and coastal scrub on siliceous shale. 125-850 meters	November to March	--/--/1B.2	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range. The BSA does not contain siliceous shale. No Arctostaphylos species were observed in the study area.
Santa Margarita manzanita *Arctostaphylos pilosula*	Evergreen shrub; occurs in closed coniferous forest, chaparral, and cismontane woodland on shale soils. 170-1100 meters	December - March	--/--/1B.2	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range and does not contain shale soils or the appropriated community. No Arctostaphylos species were observed in the study area.
sand mesa manzanita *Arctostaphylos rudis*	Evergreen shrub; occurs in maritime chaparral and coastal scrub with sandy soils. 25-322 meters	November-February	--/--/1B.2	**Suitable Conditions Absent:** Sandy soils on the site are managed for agriculture resulting in compacted soils and a lack of native vegetation. The agricultural conditions are not conducive to rare plant species. No Arctostaphylos species were observed in the study area.
dacite manzanita *Arctostaphylos tomentosa ssp. daciticola*	Evergreen shrub occurs in chaparral and cismontane woodland associated with dacite porphyry (purple/red igneous volcanic rock) on buttes. 100-300 meters	March	--/--/1B.1	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range and does not contain dacite soils or the appropriate community. No Arctostaphylos species were observed in the BSA.

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
marsh sandwort ***Arenaria paludicola***	**Marshes and swamps. Grows through dense mats of *Typha*, *Juncus*, *Scirpus*, etc. in freshwater marsh. 10-170 meters**	**May-August**	**FE/SE/1B.1**	**Suitable Conditions Present: Shallow water portions of San Luis Obispo Creek provide suitable habitat. Marsh sandwort was not observed during surveys conducted in the appropriate season.**
Mile's milk vetch *Astragalus didymocarpus* var. *milesianus*	Annual herb; Occurs in coastal scrub on clay soils. 20-90 meters	March-June	--/--/1B.2	**Suitable Conditions Absent:** Sandy clay soils on the site are managed for agriculture resulting in compacted soils and a lack of native vegetation. The agricultural conditions are not conducive to rare plant species. Species not observed during survey conducted in the appropriate period.
Coulter's saltbush *Atriplex coulteri*	Coastal bluff scrub, coastal dunes, coastal scrub, valley and foothill grassland/alkaline or clay; elev. 3-460 meters.	March-October	--/--/1B.2	**Suitable Conditions Absent:** Sandy clay soils in the BSA are managed for agriculture resulting in compacted soils and a lack of native vegetation. The agricultural conditions are not conducive to rare plant species. Species not observed during survey conducted in the appropriate period.
San Joaquin spearscale *Atriplex joaquiniana*	Shrub occurs in chenopod scrub, meadows, seeps, playas, and valley and foothill grassland. Often in alkaline soils. 1-835 meters	April-October	--/--/1B.2	**Suitable Conditions Absent:** The BSA does not contain wet alkali soils or the appropriate habitat. Species not observed during surveys conducted in the appropriate season.
San Luis mariposa-lily *Calochortus obispoensis*	Chaparral, coastal scrub, valley and foothill grassland. Often in serpentine grassland. 75-665 meters	May-July	--/--/1B.2	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range. No serpentine soils are present. Species not observed during surveys conducted in the appropriate season.

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
San Luis Obispo mariposa lily *Calochortus simulans*	Chaparral, cismontane woodlands, lower montane coniferous forest, valley and foothill grassland; often in sandy, granitic, or serpentine soils. 395-1100 Meters	April-May	--/--/1B.3	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range. Granitic or serpentine soils do not occur in the BSA. Species not observed during surveys conducted in the appropriate season.
Cambria morning-glory *Calystegia subacaulis* ssp. *episcopalis*	Grassland and rocky areas associated with chaparral and cismontane woodland. 60-500 meters	April-May	--/--/4.2	**Suitable Conditions Absent:** Soils in the BSA are appropriate for the species but are managed for agriculture. The agricultural conditions are not conducive to rare plant species. Appropriate habitat does not occur in the BSA. Species not observed during survey conducted in the appropriate period.
Hardham's evening-primrose *Camissoniopsis hardhamiae*	An annual herb that is typically found in sandy, decomposed carbonate soils. Especially in disturbed or burned areas among chaparral and cismontane woodland. 140 - 945 meters	March-May	-- / -- / 1B.2	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range. Appropriate soils and habitat do not occur in the BSA. Species not observed during surveys conducted in the appropriate season.
San Luis Obispo sedge ***Carex obispoensis***	**Closed cone coniferous forests, chaparral, coastal prairie, coastal scrub, and valley and foothill grassland. Usually adjacent to seeps, springs, stream sides or other water source with sand, clay or serpentine. 5-790 meters**	**April-June**	**--/--/1B.2**	**Suitable Conditions Present: Riparian corridor at the proposed creek crossing provides suitable habitat for this species. CNDDB does not document any occurrences in San Luis Obispo Creek. Species not observed during surveys conducted in the appropriate season.**

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
San Luis Obispo owls clover *Castilleja densiflora* ssp. *obispoensis*	Valley and foothill grassland. 10-215 meters	April	--/--/1B.2	**Suitable Conditions Absent:** Soils in the upland portions of the BSA are appropriate for the species but are managed for agriculture. The agricultural conditions are not conducive to rare plant species. Appropriate habitat does not occur in the BSA. Species not observed during survey conducted in the appropriate period.
Congdon's tarplant *Centromadia parryi* ssp. *congdonii*	**Depressional areas within valley and foothill grassland. Often occupies disturbed areas. 1-230 meters**	**June-November**	**--/--/1B.2**	**Suitable Conditions Present: Species not observed during surveys conducted in the appropriate season.**
Coastal goosefoot *Chenopodium littoreum*	annual herb that occurs on coastal dunes.10 - 30 meters	April - August	--/--/1B.2	**Suitable Conditions Absent:** The BSA does not contain any coastal dune habitat. Species not observed during survey conducted in the appropriate period.
dwarf soaproot *Chlorogalum pomeridianum* var. *minus*	Chaparral habitats with serpentine soils. 305-1000 meters	May-August	--/--/1B.2	**Suitable Conditions Absent:** The BSA does not contain serpentine soils and is located at a lower elevation than the species documented range. Species not observed during surveys conducted in the appropriate season.
salt marsh bird's-beak *Chloropyron maritimus ssp. maritimus*	Annual herb; occurs in marshes and swamps on coastal dunes. 0-30 meters	May-October	FE/SE/1B.2	**Suitable Conditions Absent:** The BSA does not contain any marsh or swamp habitats or coastal dune substrates. Species not observed during survey conducted in the appropriate period.
Brewer's spineflower *Chorizanthe breweri*	Chaparral, cismontane woodland, coastal scrub, closed-cone coniferous forest; rocky or gravelly serpentine sites; usually in barren areas. 45-800 meters	May -August	--/--/1B.3	**Suitable Conditions Absent:** Soils on site are not suitable for this species. Species not observed during surveys conducted in the appropriate season.

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
straight-awned spineflower *Chorizanthe rectispina*	Chaparral, cismontane woodland, coastal scrub. Often on granite in chaparral. 355-1035 meters	April-July	--/--/1B.3	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range. Soils on site are not conducive to this species. Species not observed during surveys conducted in the appropriate season.
San Luis Obispo fountain thistle *Cirsium fontinale* var. *obispoense*	Chaparral, cismontane woodlands; serpentine seeps or bogs. 35-380 meters	February-July	FE/SE/1B.2	**Suitable Conditions Absent:** The BSA does not contain serpentine soils. No documented occurrences of SLO fountain thistle in San Luis Obispo Creek. Species not observed during surveys conducted in the appropriate season.
Cuesta Ridge thistle *Cirsium occidentale* var. *lucianum*	A perennial herb that occurs in openings among chaparral with rocky substrates and serpentinite. Often found on steep rocky slopes and road cuts. 500-750 meters	April - June	-- / -- /1B.2	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range. Soils on site are not conducive to this species. Species not observed during surveys conducted in the appropriate season.
la graciosa thistle *Cirsium loncholepis*	Coastal dunes, brackish marsh, riparian scrub. Sandy wet areas .5-185 meters.	May-August	FE/ST/1B.1	**Suitable Conditions Absent:** The BSA does not contain any dune or brackish marsh habitat. Riparian corridor in the BSA does not contain sandy soils. Species not observed during survey conducted in the appropriate period.
surf thistle *Cirsium rhothophilum*	Coastal dunes, coastal bluff scrub. Open areas in central dune scrub; usually in coastal dunes. 3-60 meters	April-June	--/ST/1B.2	**Suitable Conditions Absent:** The BSA does not contain any dune habitat. Species not observed during survey conducted in the appropriate period.
California saw-grass *Cladium californicum*	Rhizomatous herb. Occurs in meadows and seeps, and marshes and swamps (alkaline or freshwater). 60-600 meters	June-September	--/--/2B.2	**Suitable Conditions Absent:** BSA does not contain meadows, seeps, marshes, or swamps. Species not observed. Impacts to this species are not expected

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
Pismo clarkia *Clarkia speciosa* ssp. *immaculata*	Sandy soils, openings in chaparral, cismontane woodland, valley and foothill grassland. On ancient sand dunes not far from the coast. 25-185 meters.	May-July	FE/SR/1B.1	**Suitable Conditions Absent:** The BSA does not contain requisite sandy soils. Species not observed. Impacts to this species are not expected.
dune larkspur *Delphinium parryi ssp. blochmaniae*	Perennial herb. Occurs in maritime chaparral and coastal dunes with sandy or rocky soils. 0-200 meters	April-May	--/--/1B.2	**Suitable Conditions Absent:** The BSA does not support maritime chaparral or appropriate soil conditions. Species not observed during surveys conducted in the appropriate season.
Eastwood's larkspur *Delphinium parryi* ssp. *Eastwoodiae*	A perennial herb that occurs in coastal areas with serpentinite soil. Often associated with openings in chaparral and valley and foothill grassland. 75-500 meters	February-March	--/--/1B.2	**Suitable Conditions Absent:** The BSA is at a lower elevation than this species documented range. Soils on site are not conducive to this species.
beach spectaclepod *Dithyrea maritima*	Coastal dunes, coastal scrub. Sea shores, on sand dunes, and sandy places near the shore. 3-50 meters	March-May	--/ST/1B.1	**Suitable Conditions Absent:** The BSA does not contain any dune habitat and is not near the shore. Species not observed during survey conducted in the appropriate period.
Betty's dudleya *Dudleya abramsii* ssp. *bettinae*	Coastal scrub, valley and foothill grassland, chaparral; rocky barren serpentine exposures. 20-180 meters	May-July	--/--/1B.2	**Suitable Conditions Absent:** BSA does not contain serpentine outcrops. Species not observed during surveys conducted in the appropriate season.
mouse-gray dudleya *Dudleya abramsii* ssp. *murina*	Serpentine outcrops in chaparral, cismontane woodland. 90 - 300 meters.	May-June	--/--/1B.3	**Suitable Conditions Absent:** BSA does not contain serpentine outcrops and is at a lower elevation than the species documented range. Species not observed during surveys conducted in the appropriate season.
Blochman's dudleya *Dudleya blochmaniae* ssp. *blochmaniae*	Coastal scrub, chaparral, and valley and foothill grassland habitats on rocky outcrops in clay or serpentine soils. 5-450 meters.	April-June	--/--/1B.1	**Suitable Conditions Absent:** BSA does not contain rocky outcrops. Species not observed during surveys conducted in the appropriate season.

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
Blochman's leafy daisy *Erigeron blochmaniae*	Perennial rhizomatous herb. Occurs in coastal dunes and coastal scrub on sandy soils. 3-45 meters.	July-August	--/--/1B.2	**Suitable Conditions Absent:** The BSA does not contain coastal dunes or coastal scrub habitat, or requisite sandy soil. Species not observed during surveys conducted in the appropriate season.
Indian knob mountainbalm *Eriodictyon altissimum*	Evergreen shrub. Occurs in maritime chaparral, cismontane woodland, and coastal scrub with sandstone substrates. 80-270 meters	March-June	FE/SE/1B.1	**Suitable Conditions Absent:** The BSA does not contain sandstone substrates and is located at a lower elevation than this species documented range. Species was not observed during surveys conducted in the appropriate season.
Hoover's button-celery *Eryngium aristulatum* var. *hooveri*	Vernal pools in alkaline depressions near the coast. 5-45 meters.	July	--/--/1B.1	**Suitable Conditions Absent:** The BSA does not contain any vernal pools. Species not observed during surveys conducted in the appropriate season.
San Benito fritillary *Fritillaria viridea*	Chaparral on serpentine slopes; elev. 200-1525 meters.	March-May	--/--/1B.2	**Suitable Conditions Absent:** BSA does not contain serpentine slopes and is at a lower elevation than the species documented range. Species not observed during surveys conducted in the appropriate season.
mesa horkelia *Horkelia cuneata* ssp. *puberula*	Perennial herb that occurs in chaparral, cismontane woodlands, coastal scrub; in sandy or gravelly sites. 70-810 meters	February-September	--/--/1B.1	**Suitable Conditions Absent:** Appropriate habitat and soil conditions do not occur in the BSA. Species was not observed during surveys conducted in the appropriate flowering season.
Kellogg's horkelia *Horkelia cuneata ssp. sericea*	Perennial herb. Occurs in closed-cone coniferous forest, maritime chaparral, and coastal scrub with sandy or gravelly openings. 10-200 meters.	April-September	--/--/1B.1	**Suitable Conditions Absent:** Appropriate habitat and soil conditions do not occur in the BSA. Species was not observed during surveys conducted in the appropriate flowering season.

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
Coulter's goldfields ***Lasthenia glabrata ssp. coulteri***	**Annual herb occurs in freshwater wetlands coastal salt marshes, wetland-riparian habitat, alkali sink, playas, vernal-pools, and swamps. 1-1220 meters**	**February-June**	**--/--/1B.1**	**Suitable Conditions Present: The riparian corridor of San Luis Obispo Creek in the BSA supports marginal habitat for this species. Species not observed during surveys conducted in the appropriate season.**
Jones's layia *Layia jonesii*	Chaparral and valley and foothill grassland on clay or serpentine outcrops. 5-400 meters.	March-May	--/--/1B.2	**Suitable Conditions Absent:** Sandy clay soils on the site are managed for agriculture resulting in compacted soils and a lack of native vegetation. The agricultural conditions are not conducive to rare plant species. Species not observed during surveys conducted in the appropriate season.
San Luis Obispo County lupine *Lupinus ludovicianus*	Chaparral, cismontane woodland. Open areas in sandy soils of the Santa Margarita formation. 50-525 meters	April-July	--/--/1B.2	**Suitable Conditions Absent:** Appropriate habitat and soil conditions do not occur in the BSA. Species was not observed during surveys conducted in the appropriate flowering season.
Nipomo Mesa Lupine *Lupinus nipomensis*	Annual herb. Occurs in coastal dunes. 10-50 meters	December-May	FE/SE/1B.1	**Suitable Conditions Absent:** The BSA does not contain coastal dunes or coastal scrub habitat, or requisite sandy soil. Species not observed during surveys conducted in the appropriate season.
Palmer's monardella *Monardella palmeri*	Chaparral and cismontane woodland on serpentine slopes. 200-800 meters.	June-August	--/--/1B.2	**Suitable Conditions Absent:** BSA is located at a lower elevation than the species documented range and does not support the appropriate communities or substrate. Species not observed during surveys conducted in the appropriate season.

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
southern curly-leaved monardella *Monardella sinuata ssp. sinuata*	Annual herb that occurs in sandy soil among openings in chaparral, cismontae woodland, and coastal scrub on coastal dunes. 0-300 meters	April-September	--/--/1B.2	**Suitable Conditions Absent:** The BSA does not contain coastal dunes, coastal scrub habitat, or requisite sandy soil. Species not observed during surveys conducted in the appropriate season.
crisp monardella *Monardella undulata* ssp. *crispa*	A perennial and rhizomatous herb that occurs in coastal dunes among coast scrub and maritime chaparral. 10-120 meters	April-August	--/--/1B.2	**Suitable Conditions Absent:** The BSA does not contain coastal dunes, coastal scrub habitat, or requisite sandy soil. Species not observed during surveys conducted in the appropriate season
San Luis Obispo monardella *Monardella undulata* ssp. *undulata*	Perennial and rhizomatous herb that occurs in coastal dunes among coast scrub and maritime chaparral.on sandy substrates.10-200 meters	May-September	--/--/1B.2	**Suitable Conditions Absent:** The BSA does not contain coastal dunes, coastal scrub habitat, or requisite sandy soil. Species not observed during surveys conducted in the appropriate season
woodland woollythreads *Monolopia gracilens*	An annual herb associated with serpentine soil. Often found in openings within broadleafed upland forest, chaparral, cismontane woodland, north coast coniferous forest, and valley and foothill grassland. 100 - 1200 meters	February - July	--/--/1B.2	**Suitable Conditions Absent:** The site does not support appropriate habitat or soil types and is at a lower elevation than this species range. Species was not observed during survey conducted in the appropriate season.
Gambel's watercress ***Nasturtium gambelii***	**Rhizomatous herb; occurs in marshes and swamps (freshwater or brackish). 5-330 meters**	**April-October**	**FE/ST/1B.1**	**Suitable Conditions Present: The shallow water habitat of San Luis Obispo Creek in the BSA is suitable for this species. Species not observed during surveys conducted in the appropriate season.**
coast woolly-heads *Nemacaulis denudate var. denudata*	Annual herb that occurs on coastal dunes. 0-100 meters	April – September	--/--/1B.2	**Suitable Conditions Absent:** The BSA is not contain coastal dunes or requisite sandy soil. Species not observed during surveys conducted in the appropriate season

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
short-lobed broomrape *Orobanche parishii* ssp. *brachyloba*	Parasitic perennial herb; occurs in coastal bluff scrub, coastal dunes and coastal scrub in sandy soil. 3-305 meters	April-October	--/--/4.2	**Suitable Conditions Absent:** The BSA does not contain coastal dunes, coastal scrub habitat, or requisite sandy soil. Species not observed during surveys conducted in the appropriate season
hooked popcorn-flower *Plagiobothrys uncinatus*	Annual herb occurs in chaparral, cismontane woodland, and valley and foothill grassland with sandy soils. 300-760 meters	April-May	--/--/1B.2	**Suitable Conditions Absent:** BSA is located at a lower elevation than the species documented range and does not support the appropriate communities. Species not observed during surveys conducted in the appropriate season.
Diablo Canyon blue grass *Poa diaboli*	Rhizomatous herb occurs in closed-cone coniferous forest, chaparral, cismontane woodland, and coastal scrub with shale substrates. 120-400 meters	March-April	--/--/1B.2	**Suitable Conditions Absent:** BSA is located at a lower elevation than the species documented range and does not support shale substrates or appropriate habitats. Species not observed during surveys conducted in the appropriate season.
adobe sanicle *Sanicula maritima*	Moist seeps within coastal prairie, chaparral, meadows, and valley and foothill grassland habitats in clay or serpentine soils. 30-240 meters	February-May	--/SR/1B.1	**Suitable Conditions Absent:** Appropriate habitat and soil conditions do not occur in the BSA. Species was not observed during surveys conducted in the appropriate flowering season.
black-flowered figwort *Scrophularia atrata*	Closed-cone coniferous forest, chaparral, coastal dunes, coastal scrub, riparian scrub. Around swales and in sand dunes. Sand, diatomaceous shale and soils derived from other parent material. 10-250 meters	March-April	--/--/1B.2	**Suitable Conditions Absent:** Appropriate habitat and soil conditions do not occur in the BSA. Species was not observed during surveys conducted in the appropriate flowering season.
rayless (chaparral) ragwort *Senecio aphanactis*	Chaparral, cismontane woodlands; coastal scrub/alkaline. 15-800 meters	January-April	--/--/2B.2	**Suitable Conditions Absent:** Appropriate habitat and soil conditions do not occur in the BSA. Species was not observed during surveys conducted in the appropriate flowering season.

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
Cuesta pass checkerbloom *Sidalcea hickmanii ssp. anomala*	Closed-cone coniferous forest with rocky serpentine slopes. 600-800 meters.	May-June	--/SR/1B.2	**Suitable Conditions Absent:** The BSA does not contain closed-cone coniferous forest or serpentine slopes. Elevation of the BSA is lower than the documented range for this species. Species not observed.
most beautiful jewel-flower *Streptanthus albidus* ssp. *peramoenus*	Chaparral, cismontane woodlands, valley and foothill grasslands on serpentine soil. 110-1000 meters	April-June	--/--/1B.2	**Suitable Conditions Absent:** Appropriate habitat and soil conditions do not occur in the BSA. The BSA is located at a lower elevation than the species documented range. Species was not observed during surveys conducted in the appropriate flowering season.
California seablite *Suaeda californica*	Low growing evergreen shrub occurs in coastal salt marshes and swamps. 0-15 meters	July-October	FE/--/1B.1	**Suitable Conditions Absent:** The BSA does not support requisite coastal salt marsh habitat.
San Bernardino aster *Symphyotrichum defoliatum*	**Rhizomatous herb. Occurs in cismontane woodland, coastal scrub, and foothill grassland near ditches and springs. 2-2,040 meters**	**July-November**	**--/--/1B.2**	**Suitable Conditions Present: The riparian corridor of San Luis Obispo Creek in the BSA supports moderate habitat for this species. CNDDB reports one documented occurrence in Arroyo Grande. The reliability of this occurrence is questionable. SLO County is likely north of species range. Species not observed during surveys conducted in the appropriate season.**
saline clover *Trifolium hydrophilum*	Annual herb that occurs in marshes and swamps, valley and foothill grassland (mesic, alkaline), and vernal pools. 0-300 meters.	April-June	--/--/1B.2	**Suitable Conditions Absent:** Appropriate habitat and soil conditions do not occur in the BSA. Species was not observed during surveys conducted in the appropriate flowering season.

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
caper fruited tropidocarpum *Tropidocarpum capparideum*	Valley and foothill grassland habitats on alkaline hills 1-455 meters	March-April	--/--/1B.1	**Suitable Conditions Absent:** Appropriate habitat and soil conditions do not occur in the BSA. Species was not observed during surveys conducted in the appropriate flowering season.
Natural Communities of Concern				
central dune scrub	A back dune plant community characterized by low growing, drought tolerant shrubs that develop considerable cover. Diagnostic species include *Ericameria ericoides* and *Lupinus chamissonis*.			Site is not located on the coast and does not support any dune habitats.
central foredunes	A foredune plant community characterized by scattered low growing perennial plants including *Abronia* sp. *Ambrosia* sp. and *Cackile* sp. Usually occurring in areas exposed to tidal action.			Site is not located on the coast and does not support any dune habitats.
central maritime chaparral	A variable scrub community of moderate to high cover dominated by various *Arctostaphylos* sp. Found on well drained sandy soils in areas subject to summer fog.			Site does not contain sandy well drained soils and does not support central maritime chaparral.
coastal Brackish Marsh	Marsh habitat dominated by perennial, emergent, herbaceous monocots such a Scirpus sp. Salinity varies but is brackish from freshwater input. Usually located at interior edges of coastal bays and estuaries or in coastal lagoons.			Brackish water habitat is not present in the BSA.
coastal and valley freshwater marsh	A wetland community that is found in areas of permanently or prolonged freshwater saturation without significant current or flow. Vegetation is dominated by perennial emergent monocots including cattails and rushes.			Site does not support coastal and valley freshwater marsh.
northern Coastal Salt Marsh	Marsh habitat supporting herbaceous, suffrutescent, salt tolerant hydrophytes often active in summer and dormant in winter. Characteristic species include Jaumea carnosa, Limonium californicum, and Frankenia salina. Developed around Humboldt Bay, Tomales Bay, San Francisco Bay, Elkhorn Slough, and Morro Bay.			Brackish and salt water habitats are not present in the BSA.
northern interior cypress forest	An open serotinous forest that is often found on dry, rocky soils. Often associated with serpentine soils. Vegetation consists of dense to sparse stands of *Cupressus* species.			Site does not support northern interior cypress forest.

Species Name	Habitat and Distribution	Flower Season	Legal Status Federal/ State/CNPS	Rationale for Expecting Presence or Absence
serpentine bunchgrass	An open grassland community that is dominated by perennial bunch grasses. Typically, total cover is low but native species' dominate the composition. Associated species include *Nassela cernua*, *N. lepida*, *N. pulchra*, and *Melica californica*. Always occurring on serpentine substrates.			Site does not support northern interior serpentine bunchgrass.
valley needlegrass grassland	Grassland reaching up to 2 feet tall and dominated by *Nassella* sp, which is a native tussock forming grass. Annual grasses occur between the perennials, often exceeding the bunch grasses in cover. Usually occurs on fine-textured soils that are wet in the winter and very dry in the summer.			Site does not support northern interior valley needlegrass grassland.
General references: CDFG 2008, Hickman (ed.) 1993, Munz 1974, CNDDB 2009				

Status Codes
--= No status

Federal:
FE = Federal Endangered
FT=Federal Threatened

State:
SE=State Endangered
ST= State Threatened
SR= State Rare

California Native Plant Society (CNPS):
Rank 1B = rare, threatened, or endangered in California and elsewhere.
Rank 2 = rare, threatened, or endangered in California, but more common elsewhere.
Rank 3 = plants that about which more information is needed.
Rank 4 = a watch list plants of limited distribution.

Threat Code:
.1 = Seriously endangered I California (over 80% of occurrences threatened / high degree and immediacy of threat)
.2 = Fairly endangered in California (20-80% occurrences threatened)
.3 = Not very endangered I California (<20% of occurrences threatened or no current threats known)

Table G-2. Special-status Wildlife Species Investigated for Potential Occurrence

Species Name	Habitat and Distribution	Legal Status Federal/State/CDFW	Rationale for Expecting Presence or Absence
Gastropods			
Morro shoulderband snail *Helminthoglypta walkeriana*	The Morro shoulderband snail (MSS) is restricted to Baywood fine sand in coastal dune and coastal sage scrub communities near Morro Bay. MSS often occurs under shrubs that exhibit dense, low growth and have ample contact with the ground. Mock heather, seaside golden yarrow, deerweed, sand almond, and ice plant include some species the MSS utilize.	FE/--/--	**Suitable Conditions Absent:** Soils within the project alignment consist of clay and will not support MSS. The BSA is located south of the known MSS range.
Insects			
Monarch butterfly *Danaus plexippus*	Occurs along the coast from northern Mendocino to Baja California, Mexico. Winter roosts in wind protected tree groves (eucalyptus, Monterey pine and cypress), with nectar and water sources nearby.	--/SA/--	**Suitable Conditions Absent:** Project study area not contain eucalyptus, Monterey pine and cypress trees suitable for winter roosting. Species not observed during surveys.
Morro Bay blue butterfly *Plebejus icarioides moroensis*	Locally common from March to July, this species flies only along the immediate coast of San Luis Obispo and western Santa Barbara counties. Feeds on Lupinus chamissonis. This variety is restricted to the dunes at Vandenberg Air Force Base, Pismo/Guadalupe dune system and the dunes of Morro Bay.	--/SA/--	**Suitable Conditions Present**: The BSA does not support coastal scrub habitat or requisite dune lupine. Species not observed during surveys.
Branchiopods			
Vernal pool fairy shrimp *Branchinecta lynchi*	Occur in vernal pool habitats including depressions in sandstone, to small swale, earth slump, or basalt-flow depressions with a grassy or, occasionally, muddy bottom in grassland.	FT/-- /--	**Suitable Conditions Absent**: Site does not support vernal pools.
Fish			
Tidewater goby *Eucyclogobius newberryi*	Occurs in brackish shallow lagoons and lower stream reaches where water is fairly still, but not stagnant.	FE/--/CSC	**Suitable Conditions Absent:** Freshwater habitat of San Luis Obispo Creek is not suitable for tidewater goby.

Species Name	Habitat and Distribution	Legal Status Federal/State/CDFW	Rationale for Expecting Presence or Absence
Central California coast steelhead DPS ***Oncorhynchus mykiss irideus***	**Clear, cool water with abundant in-stream cover, well-vegetated stream margins, relatively stable water flow, and a 1:1 pool-to-riffle ratio.**	**FT, PCH /-- /CSC**	**Suitable Conditions Present: San Luis Obispo Creek is designated Critical Habitat for steelhead and is known to support the species. The proposed crossing over San Luis Obispo Creek warrants formal consultation with NOAA Fisheries.**
Amphibians			
foothill yellow-legged frog ***Rana boylii***	**The foothill yellow-legged frog ranges from northern Oregon into Baja California, Mexico. They occupy coastal California foothills in flowing streams and rivers with rocky substrate or sunny banks.**	**--/--/CSC**	**Suitable Conditions Present: The riparian corridor of San Luis Obispo Creek supports moderate habitat for this species. CNDDB does not document any occurrences in or near the BSA. Species not observed during surveys in the BSA.**
California red-legged frog ***Rana draytonii***	**Aquatic habitats with little or no flow and surface water depths to at least 2.3 feet. Presence of fairly sturdy underwater supports such as cattails.**	**FT /-- /CSC**	**Suitable Conditions Present: The riparian corridor of San Luis Obispo Creek supports habitat for this species. CNDDB reports several occurrences in tributaries to San Luis Obispo Creek. Species not observed during surveys in the BSA.**
Coast range newt ***Taricha torosa torosa***	**Breed in ponds, reservoirs, and slow-moving streams. Frequents terrestrial habitats such as oak woodlands.**	**--/--/CSC**	**Suitable Conditions Present: The riparian corridor of San Luis Obispo Creek supports habitat for this species. CNDDB reports several occurrences in tributaries to San Luis Obispo Creek. Species not observed during surveys in the BSA.**
Reptiles			
silvery legless lizard ***Anniella pulchra pulchra***	**Sandy or loose loamy soils with high moisture content under sparse vegetation.**	**--/--/CSC**	**Suitable Conditions Present: Suitable habitat occurs in riparian habitat in the BSA where loose sandy soils and surface duff are prominent. Species not observed during surveys in the BSA.**

Species Name	Habitat and Distribution	Legal Status Federal/State/CDFW	Rationale for Expecting Presence or Absence
black legless lizard *Anniella pulchra nigra*	Sandy or loose loamy soils with high moisture content under sparse vegetation.	--/--/CSC	**Suitable Conditions Absent**: Soil type and agricultural practices in BSA does not provide suitable habitat for legless lizards. Species not observed during surveys in the BSA.
western pond turtle *Emys marmorata*	**Quiet waters of ponds, lakes, streams, and marshes. Typically in the deepest parts with an abundance of basking sites.**	**--/--/CSC**	**Suitable Conditions Present: The riparian corridor of San Luis Obispo Creek supports habitat for this species. CNDDB reports several occurrences in San Luis Obispo Creek and its tributaries. Species not observed during surveys in the BSA.**
Coast horned lizard *Phrynosoma coronatum (blainvillii* population)	Frequents a wide variety of habitats, commonly occurring in lowlands along sandy washes, coastal sage scrub and chaparral in arid and semi-arid climate conditions. Species prefers friable, rocky or shallow sandy soils.	--/--/CSC	**Suitable Conditions Absent:** Appropriate habitat and soil conditions do not occur in the BSA. Species was not observed during surveys.
two-striped garter snake (*Thamnophis hammondii*)	**Coastal California from Salinas to Baja California, from sea level to 7,000 ft; highly aquatic; found in or near permanent freshwater, often along riparian streams with rocky beds and riparian growth.**	**--/--/CSC**	**Suitable Conditions Present: The riparian corridor of SLO Creek in the BSA supports suitable habitat for the species. Species not observed during surveys in the BSA.**
Birds			
Cooper's hawk *Accipiter cooperii*	**Deciduous riparian woodland habitat throughout California. Cooper's hawks nest in deciduous, mixed-deciduous, and evergreen forests, as well as in suburban and urban environments. Cooper's hawks tend to nest in more open areas that have older and larger trees.**	**MBTA/--/WL**	**Suitable Conditions Present: The riparian corridor of San Luis Obispo Creek supports habitat for this species. Species not observed during surveys conducted in the appropriate season.**
sharp-shinned hawk *Accipiter striatus*	**A short distance migrant that nests in mixed forests and wooded areas. Prefers tall trees for nest building. Prey base includes small birds and mammals.**	**MBTA/--/WL**	**Suitable Conditions Present: The riparian corridor of San Luis Obispo Creek supports winter habitat for this species. Nesting activity not expected in the area. Species not observed during surveys in the BSA.**

Species Name	Habitat and Distribution	Legal Status Federal/State/CDFW	Rationale for Expecting Presence or Absence
tricolored blackbird *Agelaius tricolor*	(Nesting colony); requires open water, protected nesting substrate such as cattails or tall rushes, and foraging area with insect prey.	MBTA/--/CSC	Suitable Conditions Absent: Portion of San Luis Obispo Creek in the BSA provides open water habitat; however, lacks suitable nesting substrate. Species not observed during surveys in the BSA.
burrowing owl *Athene cunicularia*	Open, dry grasslands, deserts and scrublands. Subterranean nester, dependent upon burrowing mammals.	MBTA/-- /CSC	**Suitable Conditions Absent:** Available open habitat in the BSA is managed for agriculture resulting in compacted soils and a lack of burrow sites. The agricultural conditions are not conducive to this species. Species not observed during surveys in the BSA.
ferruginous hawk *Buteo regalis*	(Wintering) open grasslands, sagebrush flats, desert scrub, low foothills, and fringes of pinyon-juniper habitats; eats lagomorphs, ground squirrels, and mice.	MBTA/--/WL	**Suitable Conditions Absent:** Appropriate habitat conditions do not occur in the BSA. Species was not observed.
western snowy plover *Charadrius alexandrinus nivosus*	Occurs on sandy beaches, salt pond levees, and shores of large alkali lakes. Needs sandy, gravelly or friable soils for nesting.	MBTA, FT/ --/CSC	**Suitable Conditions Absent:** The site does not include any sandy dune or gravely habitat suitable for snowy plover nesting. Species not observed during surveys in the BSA.
western yellow-billed cuckoo ***Coccyzus americanus***	**Forests to open riparian woodlands with thick under story.**	**FC, MBTA/SE/ --**	**Suitable Conditions Present: The riparian corridor of San Luis Creek supports habitat for this species. CNDDB reports one occurrence in SLO in a 1932 egg set collection (CNDDB, 2014). Five non-nesting occurrences have been documented in SLO County from 1980 to 1999 (SLO Coast Birding 2014). Currently, there are no known recent nesting records in San Luis Obispo County. It is unlikely that yellow billed cuckoo would be found nesting in San Luis Obispo Creek. Species not observed during surveys in the BSA.**

Species Name	Habitat and Distribution	Legal Status Federal/State/CDFW	Rationale for Expecting Presence or Absence
white-tailed kite ***Elanus leucurus***	**Open grasslands, meadows, or marshlands for foraging close to isolated trees for nesting and perching.**	**MBTA/--/FP**	**Suitable Conditions Present: Agricultural areas in the BSA may provide suitable foraging habitat for white-tailed kite. The riparian corridor may provide suitable nesting habitat. Species not observed during surveys in the BSA.**
southwestern willow flycatcher ***Empidonax traillii extimus***	**Breeds in relatively dense riparian tree and shrub communities associated with rivers, swamps, wetlands, lakes, and reservoirs.**	**MBTA, FE/--/--**	**Suitable Conditions Present: Suitable riparian habitat occurs within the BSA along SLO Creek. Closest recent nesting was in 2010 in Kern County near Lake Isabella. Species was not observed during surveys. Nesting individuals are not expected to occur in the BSA.**
California horned lark *Eremophila alpestris actia*	Occurs in short grass prairies, coastal plains, fallow grain fields and alkali flats. Found in coastal regions from Sonoma to San Diego county, and west to the San Joaquin Valley. .	MBTA/--/WL	**Suitable Conditions Absent:** Grassland habitat does not occur in the BSA. Species was not observed.
merlin ***Falco columbarius***	**(Wintering) Nests in trees associated with open forests adjacent with open areas. Preys on small birds**	**MBTA/--/WL**	**Suitable Conditions Present: The riparian corridor of San Luis Obispo Creek supports winter habitat for this species. Merlin is not expected to nest in the BSA. Species not observed during surveys in the BSA.**
Prairie falcon *Falco mexicanus*	Occurs in dry, open terrain that is level or hilly and breeds on cliffs.	MBTA/--/WL	**Suitable Conditions Absent**: Agricultural areas in BSA may support foraging habitat; however, The BSA does not support suitable nesting habitat. Species not observed during surveys in the BSA.
California black rail *Laterallus jamaicensis coturnniculus*	Shore birds known to frequent tidal salt marshes. Utilize densely vegetated mud flats and high tide line in salt water marsh systems.	--/ST/FP	**Suitable Conditions Absent:** The BSA does not contain tidal salt marshes or densely vegetated mudflats. Species not observed during the surveys.

Species Name	Habitat and Distribution	Legal Status Federal/State/CDFW	Rationale for Expecting Presence or Absence
loggerheaded shrike ***Lanius ludovicianua***	**A predatory passerine that frequents open areas with scattered shrubs. Commonly observed foraging in grassland, desert scrubs, and waste places. Builds nests in isolated trees or shrubs in the vicinity of foraging areas.**	**-- / -- / CSC**	**Suitable Conditions Present: Agricultural areas in the BSA provides suitable foraging habitat. The riparian corridor of San Luis Obispo Creek provides nesting habitat. Species not observed during surveys in the BSA.**
least Bell's vireo ***Vireo bellii pusillus***	**Summer resident of southern California in low riparian areas near water or river bottoms. Nests placed along margins of bushes or on twigs usually Salix, Baccharis, and mesquite.**	**FE, MBTA/SE/--**	**Suitable Conditions Present: The riparian habitat occurs within the BSA is marginal for this species. Least Bell's vireo is not expected to occur within the BSA. Species was not observed during surveys.**
purple martin ***Progne subis***	**Occupies valley foothill and montane hardwood forests, conifer forests, and riparian habitats. May nest in old woodpecker cavities or in human-made structures such as bridges and culverts. Feeds on insects.**	**--/--/CSC**	**Suitable Conditions Present: San Luis Obispo Creek riparian corridor may provide suitable nesting habitat. Pre-disturbance nesting bird surveys are proposed to avoid impacts to nesting birds. Species not observed during the surveys.**
yellow warbler ***Dendroica petechia brewsteri***	**Riparian plant associations; prefers willows, cottonwoods, aspens, sycamores, and alders for nesting and foraging; also nests in montane shrubbery in open conifer forests**	**MBTA/--/CSC**	**Suitable Conditions Present: Suitable nesting habitat occurs within the riparian zone of the BSA. Species was not observed during surveys.**
yellow-breasted chat ***Icteria virens***	**Summer resident of riparian thickets of willow and other vegetation near watercourses; nests in low, dense riparian habitats, consisting of willows, blackberry, and wild grape; forage and nest within 10 feet of the ground.**	**MBTA/--/CSC**	**Suitable Conditions Present: Suitable nesting habitat occurs within the riparian zone of the BSA. Species was not observed during surveys.**
California clapper rail *Rallus longirostris obsoletus*	Occurs within salt and brackish marshes dominated by pickleweed and Pacific cordgrass. Currently, this species is restricted to marsh areas within the vicinity of San Francisco Bay. The last Califronia clapper rail to be sighted in Morro Bay was documented in 1939.	FE/SE/FP	**Suitable Conditions Absent:** The BSA does not contain tidal salt marshes or densely vegetated mudflats. Species not observed during the surveys.

Species Name	Habitat and Distribution	Legal Status Federal/State/CDFW	Rationale for Expecting Presence or Absence
California least tern *Sterna antillarum brownie*	Largely a coastal species that feed on fish and nest on sandy dunes or beaches. Once a common species in California; currently nesting colonies are isolated to Southern California and scattered Bay Area beaches.	FE/SE/FP	**Suitable Conditions Absent:** The BSA does not contain suitable nesting habitat. Species not observed. Impacts to this species are not expected.
Class Aves Other migratory bird species (nesting)	Annual grasslands, coastal scrub, chaparral, and oak woodlands may provide nesting habitat.	MBTA/--/--	**Suitable Conditions Present:** Potential nesting habitat occurs throughout the site. Pre-disturbance nesting bird surveys are proposed to avoid impacts to nesting birds.
Mammals			
Pallid bat *Antrozous pallidus*	Prefers rocky outcrops, cliffs, and crevices with access to open habitats for foraging. Day roosts are in caves, crevices, mines, and occasionally in hollow trees and buildings. Night roosts may be in more open sites, such as porches and buildings.	--/--/CSC	**Suitable Conditions Absent**: The BSA does not support rocky outcrops or crevices for roosting.
Townsends big-eared bat *Corynorhinus townsendii*	Occurs in a wide variety of habitats; most common in mesic (wet) sites. May use trees for day and night roosts; however, requires caves, mines, rock faces, bridges or buildings for maternity roosts. Maternity roosts are in relatively warm sites.	--/C/CSC	**Suitable Conditions Absent:** The riparian corridor of San Luis Creek supports trees that are available for day and night roosts. However, maternity roost sites are not expected in the BSA.
Morro Bay kangaroo rat *Dipodomys heermanni morroensis*	Typically occurs in habitats associated with stabilized dunes and coastal dune scrub communities with dominant vegetation including mock heather, buck brush, and deer weed.	SE/FE/FP	**Suitable Conditions Absent:** The BSA is approximately 11.0 miles south of this species historic range and does not contain the appropriate habitat associates. Species not observed during surveys.
Western mastiff bat *Eumops perotis*	Found in many open, semi-arid to arid habitats, including conifer and deciduous woodlands, coastal scrub, grasslands, chaparral, etc.; roosts in crevices in cliff faces, high buildings, trees, and tunnels.	--/--/CSC	**Suitable Conditions Absent:** Appropriate habitat conditions do not occur in the BSA. Species was not observed during surveys.
San Diego desert woodrat *Neotoma lepida intermedia*	Ranges from Baja California northward to northern San Luis Obispo County. Typically occurs in woodlands and coastal scrub habitats. Desert woodrats build nests within cracks and rock crevices, or in clumps of cactus.	--/--/CSC	**Suitable Conditions Absent:** The project study area does not support woodland communities with significant rock crevices. Species not observed during surveys.

Species Name	Habitat and Distribution	Legal Status Federal/State/CDFW	Rationale for Expecting Presence or Absence
big free-tailed bat *Nyctinomops macrotis*	Rare vagrant in California, probable resident in Texas, New Mexico, and southern Arizona. Probably does not breed in California. Prefers rugged, rocky canyons but will roost on buildings or in caves and trees.	--/--/CSC	**Suitable Conditions Present**: The project area does not contain suitable rock cliffs; however, the trees in San Luis Obispo Creek provides marginal roosting habitat. Considering the species rarity in California, impacts to this species are not expected.
American badger *Taxidea taxus*	Occurs in open stages of shrub, forest, and herbaceous habitats; needs uncultivated ground with friable soils.	--/--/CSC	**Suitable Conditions Absent:** Due to on-going agricultural activities and heavily compacted soils in the BSA, this species is not expected to occur in or near the project area.

General references: Unless otherwise noted all habitat and distribution data provided by California Natural Diversity Database

Status Codes
--= No status

Federal:
FE = Federal Endangered
FT= Federal Threatened
FC= Federal Candidate
CH= Federal Critical Habitat
PCH= Proposed Federal Critical Habitat
MBTA= Protected by Federal Migratory Bird Treaty Act

State:
SE= State Endangered
ST= State Threatened
C= Candidate for Listing
California Department of Fish and Wildlife:
CSC= California Special Concern Species
FP= Fully Protected Species
SA= Not formally listed but included in CDFG “Special Animal” List.
WL=Watch List

APPENDIX C: HYDRAULIC STUDY

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

Revised October 10, 2014

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

Prepared for:

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Revised October 10, 2014

Questa Project No. 1300177

Signature	10/10/14 Date
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Signature	10/10/14 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.

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APPENDIX A: Preliminary Trail Plan Sheets 1 through 12 and Bridge Plan Sheets 1 through 13

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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 14 to 16 feet wide and located at or slightly above adjacent grade. The pathway would consist of 10 to 12 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. A Conflict Avoidance Alternative was developed as a part of the FEIR that includes alternative trail alignments, and an alternative to Bridge #3. The alternative to bridge #3 would be located near Baron Canyon, and an analysis of its hydraulic impactys on flooding was included in this updated LHS. In addition, as an alternative to the original concept examined in the DEIR of a Highway 101 overcrossing south of San Luis Bay Drive, a seasonal, at channel grade, undercrossing of the Highway 101 Bridge was developed and evaluated. The undercrossing would be located south of San Luis Bay Drive and north of the Ontario Road staging area.

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, including 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). Changes to the original trail proposed, including a) a new trail alignment, b) a new bridge crossing of SLO Creek near Baron Canyon, c) a bicycle/pedestrian undercrossing of San Luis Bay Drive (instead of the trail along Monte Road and the San Luis Bay Drive Bridge Crossing), and d) a seasonal undercrossing of the existing Highway 101 Bridge (instead of an overcrossing), were made as part of the development of a Conflict Avoidance Alternate for the FEIR. The alternative bridge near Baron Canyon would increase water surface elevations locally by about 0.5 feet, but flooding of Highway 101 in this area would not occur. Water-surface elevations at the proposed Highway 101 at-grade undercrossing 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 14 to 16 feet wide and located at or slightly above adjacent grade. The pathway would consist of 10 to 12 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 **12** and **Bridge Plan Sheets 1** through **13** 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.

Baron Canyon Bridge

The Highway 101 Bicycle/Pedestrian 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 at either end with an earthfill % percent approach ramps that differ in lengths, at 42 and 61 feet. These approach ramps would be supported by vertical concrete retaining walls. The western approach is shorter and perpendicular to flood flows, where as the eastern abutment is parallel to the flow direction. The over crossing structure will consist of 5 steel truss bridge segments. There will be 4, 50” segments and one 120 foot long segment. Each of the bridge segments will be supported by a single 36” diameter concrete pier. The 4 50 foot segments slope up to the 120 long segment that spans the active channel. The bottom of the bridge or low chord is approximately 6 feet above the adjacent floodplain.

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

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. As noted earlier, a new trail on the east side of SLO Creek (including an option near the Creek and near Highway 101), instead of the original concept plan trail alignment near Monte Road, were developed as part of a Conflict Avoidance Alternative, to be evaluated in the FEIR. This alternative included a new bridge crossing of SLO Creek near Baron Canyon (instead of the San Luis Bay Drive Bridge Crossing), a pedestrian tunnel undercrossing of San Luis Bay Drive near the northbound Highway 101 onramp, and an at-grade seasonal undercrossing of Highway 101 near the Ontario Road staging area, replacing the original concept Highway 101 overcrossing. 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 four bicycle/pedestrian bridges, one highway overcrossing, and one undercrossing discussed and evaluated in this report: The Baron Canyon Bridge would be constructed instead of the San Luis Bay Drive Bridge, and the Highway 101 undercrossing would be constructed instead of the Overcrossing in the Conflict Avoidance Alternative.

- South Higuera Street Bicycle/Pedestrian Bridge
- Bunnell Bicycle/Pedestrian Bridge
- San Luis Bay Drive Bicycle/Pedestrian Bridge
- Baron Canyon Bicycle/Pedestrian Bridge (Conflict Avoidance Alternative)
- Highway 101 Bicycle/Pedestrian Overcrossing
- Highway 101 Bicycle/Pedestrian Undercrossing (Conflict Avoidance Alternative)

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
Baron Canyon Bridge	54.64	55.01	55.02	55.47	52	53
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

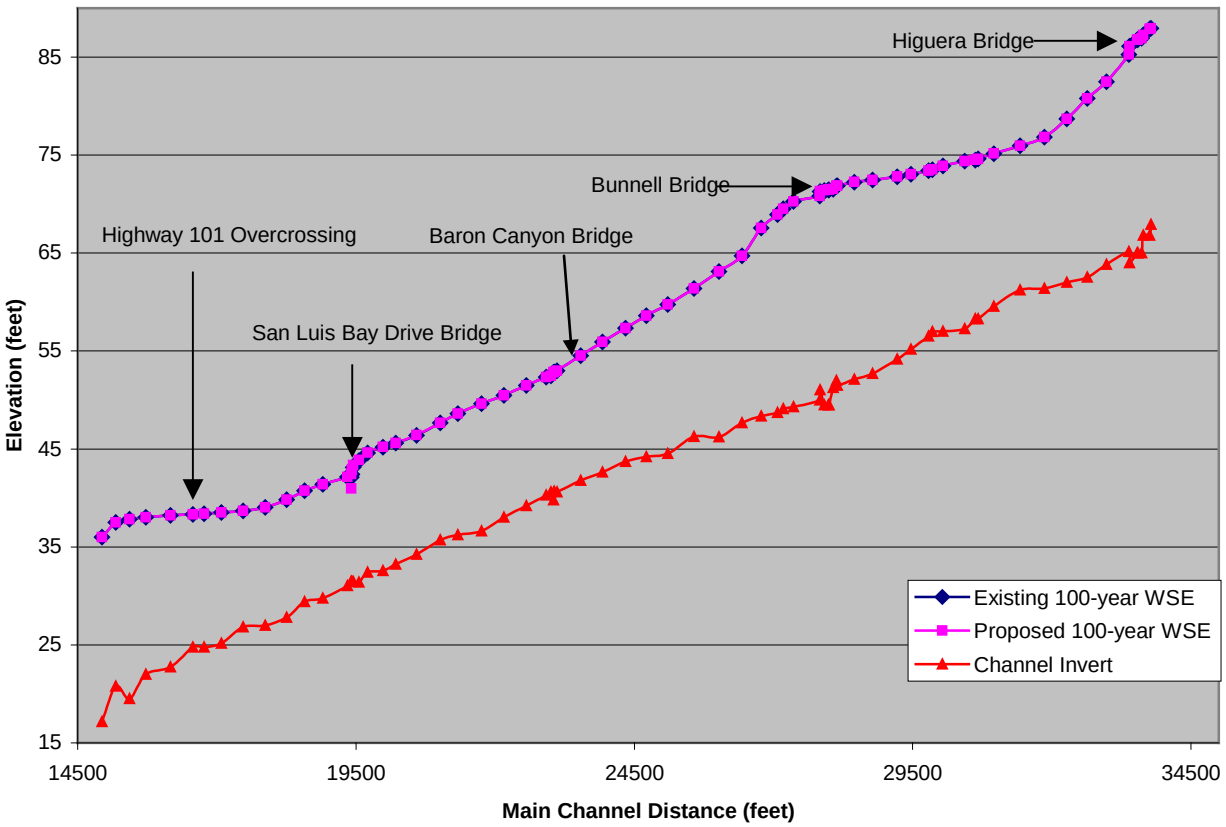
[1] Personal communication, Mike Britton, SLO County Department of Public Works

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.

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**.

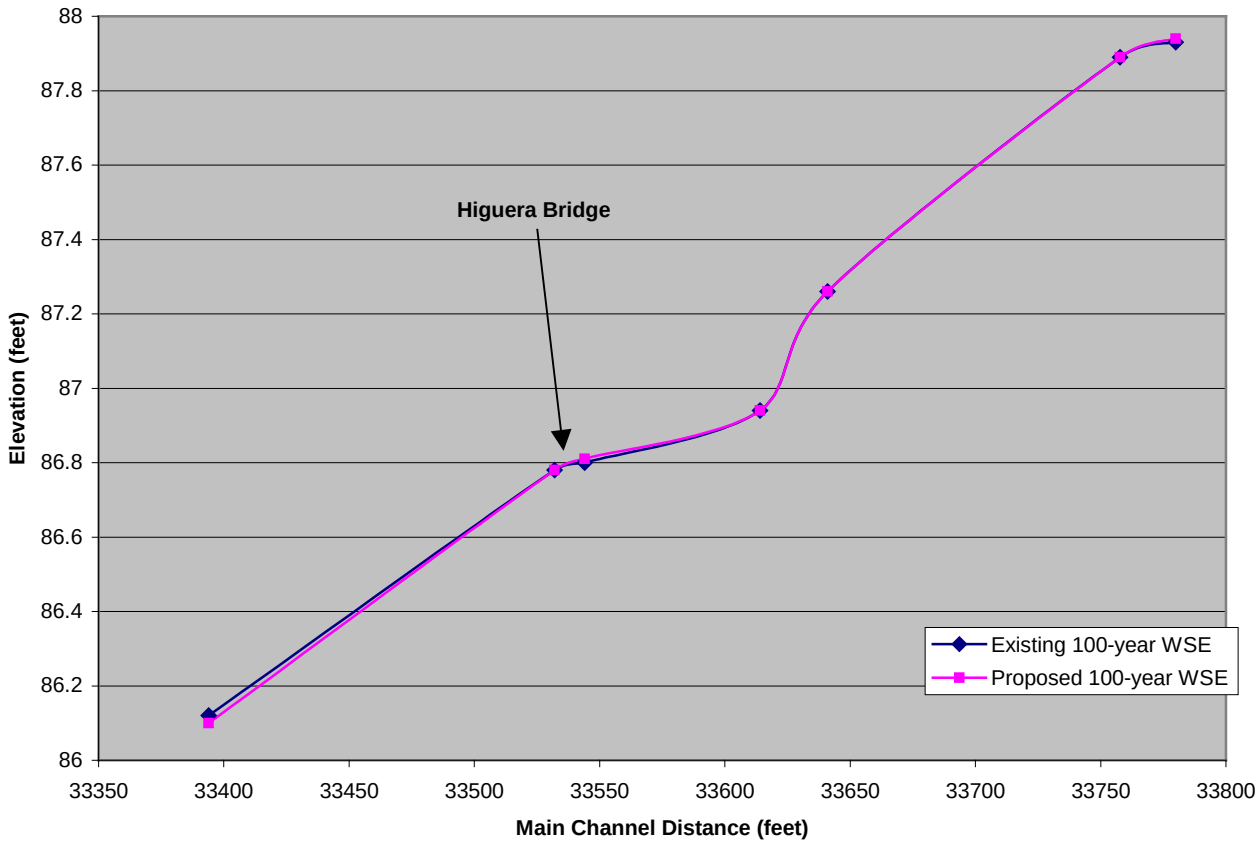
Figure 2. Existing and Proposed Conditions Flow Profiles



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.

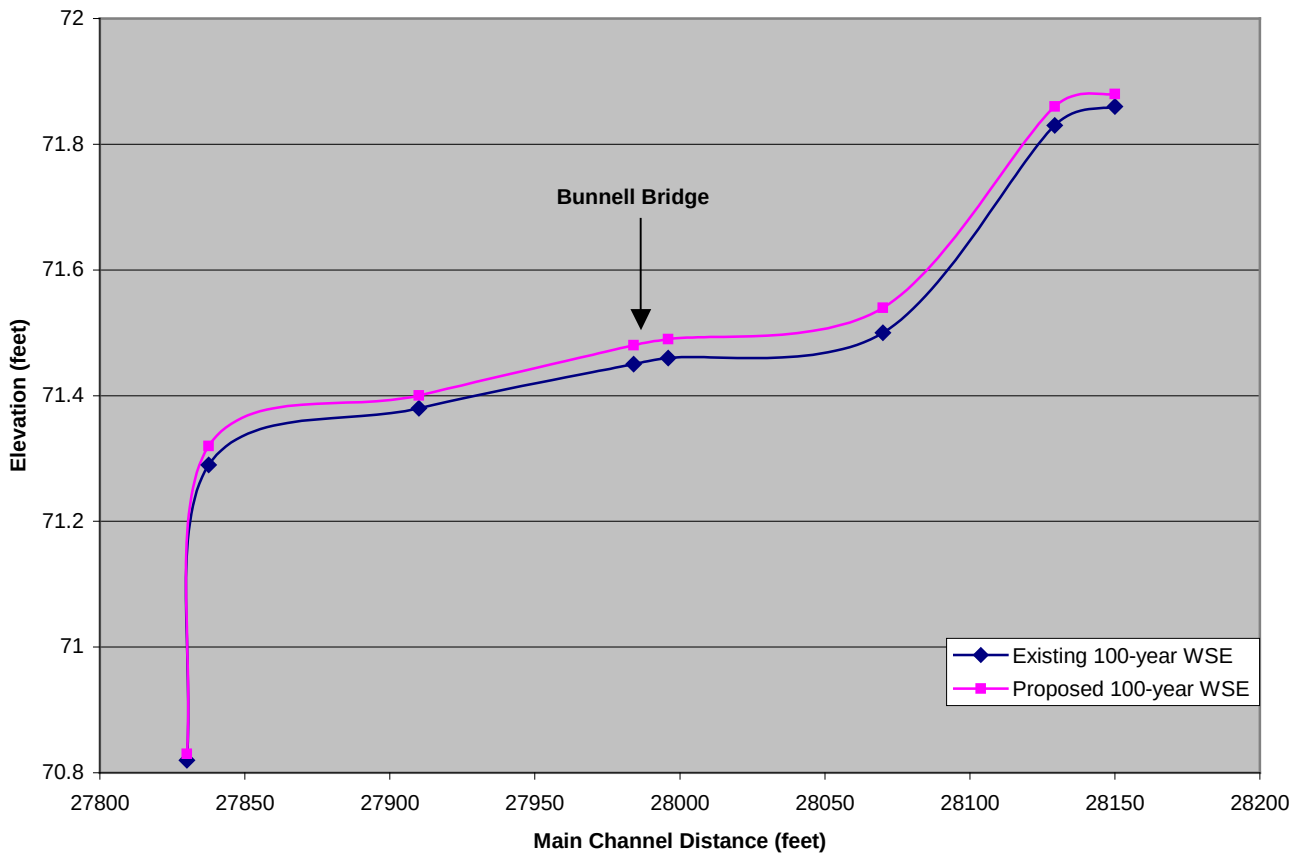
The 100-year water-surface elevation under existing conditions is 71.46 feet. Water-surface elevations here are approximately 1 to 2 feet above the top of banks for the 2-year flood event. The flow profile is shown on **Figure 2** (preceding).

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



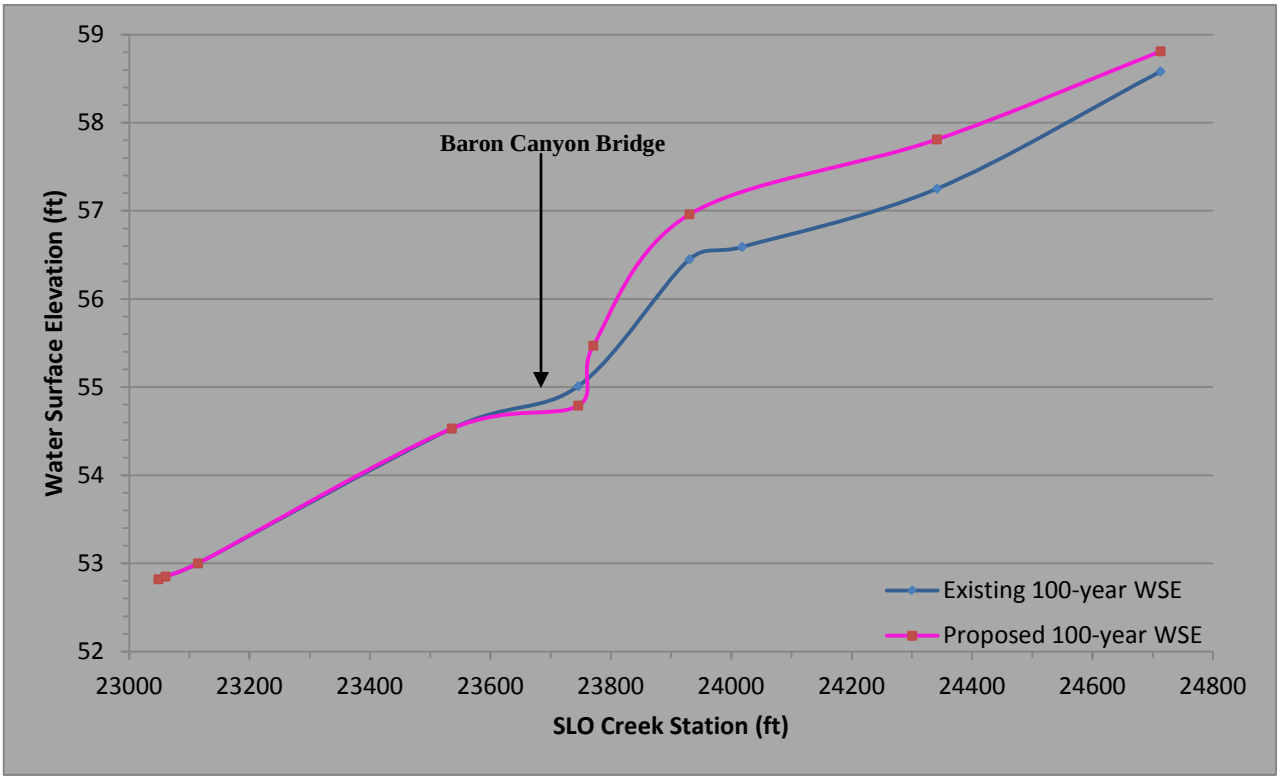
Baron Canyon Bridge (Conflict Avoidance Alternative)

The Baron Canyon Bridge would be constructed instead of the San Luis Bay Bridge (see next section) as part of the FEIR Conflict Avoidance Alternative. The Baron Canyon Bridge was modeled according to the conceptual bridge design (**Appendix A, Sheet 3**). The bridge would be 280 feet long and 10 feet wide, with proposed high chord and low chord elevations of 58.5 feet and 56.5 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 Baron Canyon Bridge is 55.01 feet. Under proposed conditions the water-surface elevation increases to 55.47 feet. The maximum increase in water-surface elevation at this site occurs upstream of the proposed bridge, where it

is 0.51 feet higher than under existing conditions. The proposed bridge would have 1.52 feet of freeboard. It should be noted that this bridge has two filled approach ramps that extend in line and perpendicular to the flood flows. The bridge was modeled with one cross section that represents the bridge openings as if you were looking directly downstream, perpendicular to flow. In actuality only the main span of 120 feet is perpendicular to flow and the other sections are oblique or in line with flood flows (the bridge piers are not arranged in a line, but are off-set). This is a conservative modeling approach and understates the amount of bridge opening area and likely overestimates impacts immediately upstream of the bridge because of this. The flow profile for proposed conditions is shown in **Figure 2c**. The potential 100-year flooding impacts of this bridge are greater than those of the other pedestrian bridges evaluated. However, this bridge is in a rural/agricultural area and no existing structures would be impacted. Construction of the bridge would not cause flooding of Highway 101. However, flooding depths on Monte Road, which currently does flood, would increase by several inches.

Figure 2c. Proposed Conditions Flow Profile at Baron Canyon 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.

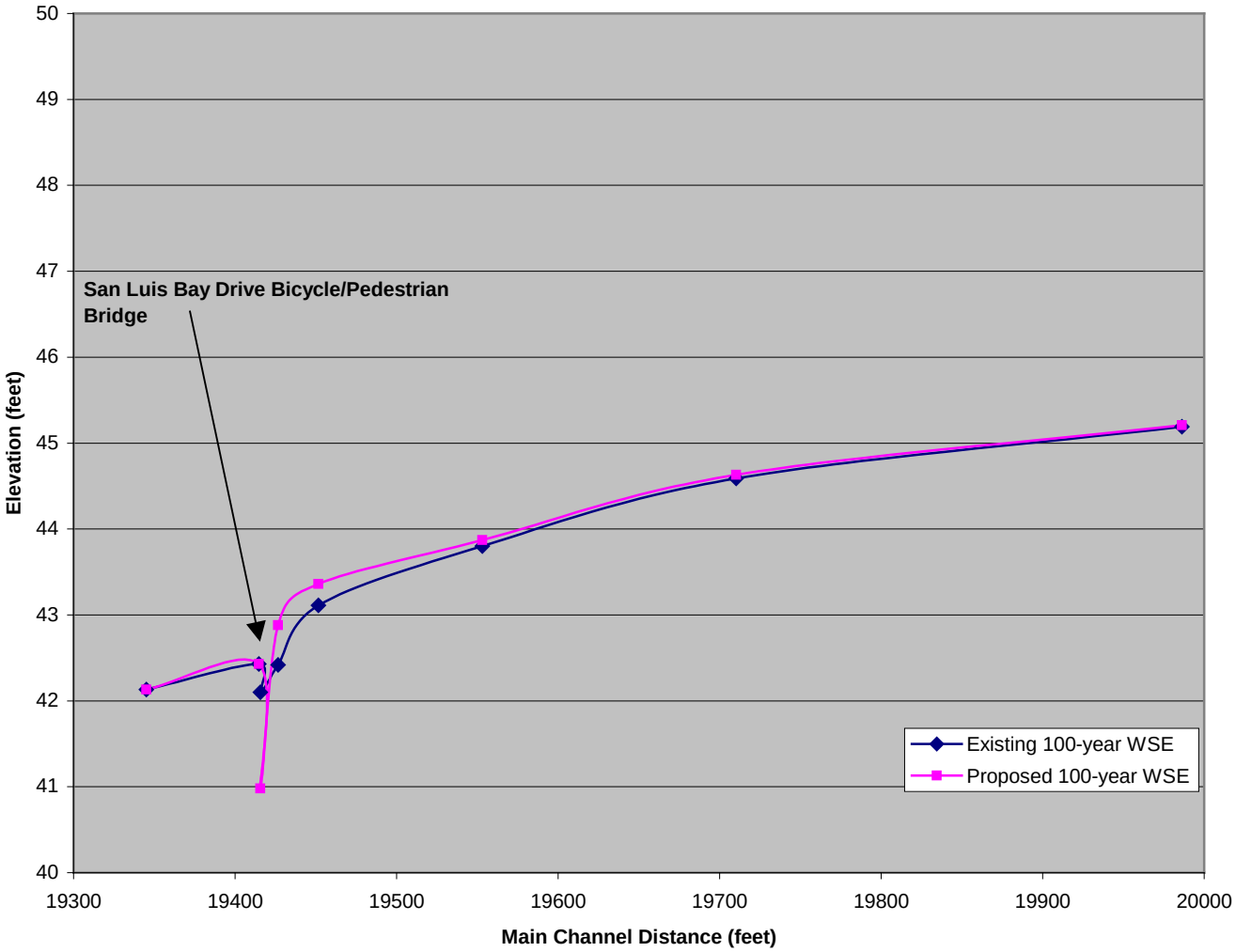
The 100-year water-surface elevation at the San Luis Bay Drive Bridge under existing conditions is 43.80 feet. Water-surface elevations are approximately 2 to 3 feet over the top of banks during the 2-year flood event. The flow profile is shown on **Figure 2** (below).

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

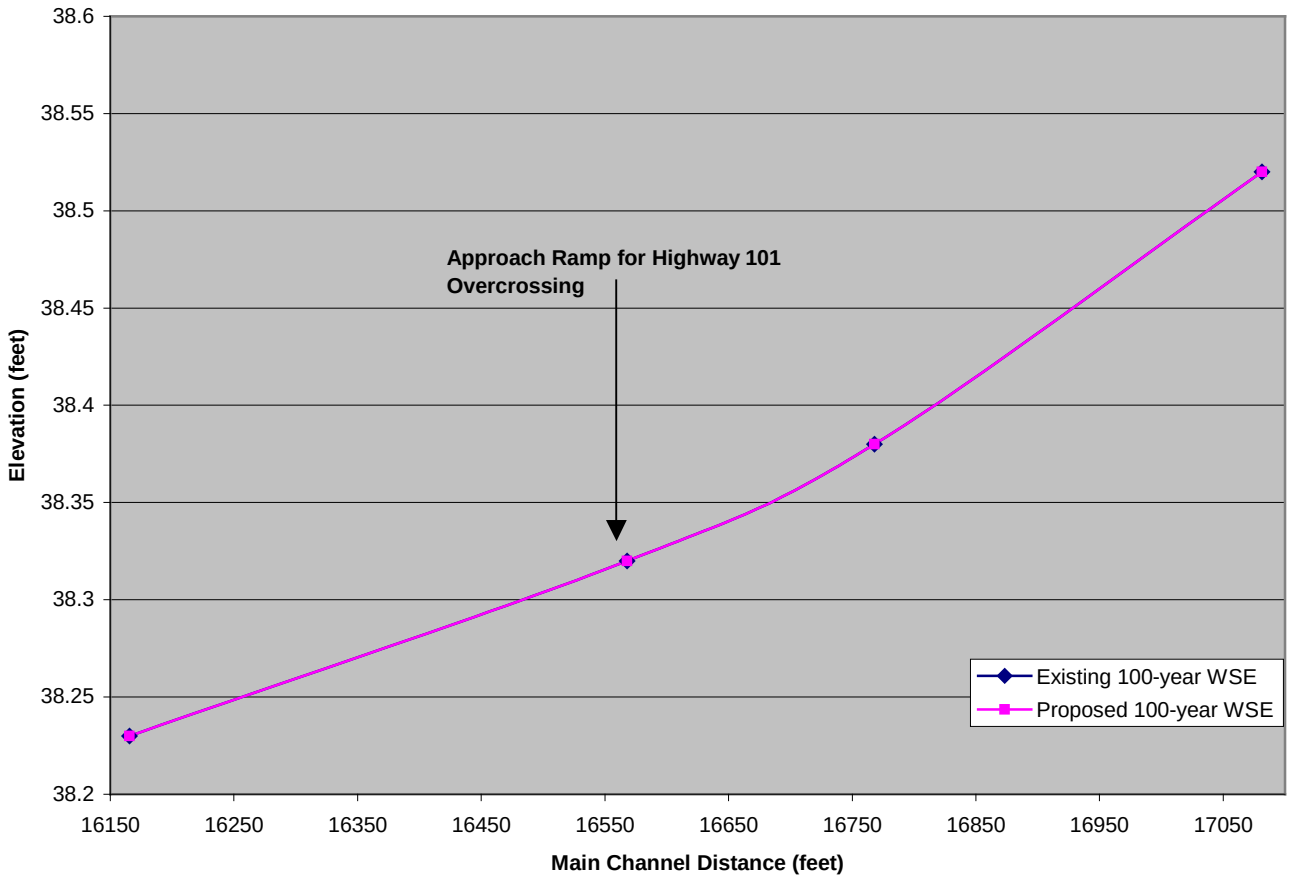
SLO Creek, near the proposed highway overcrossing, has a channel top width of approximately 150 feet. The channel bottom is approximately 75 feet wide and has a channel invert elevation of 24.77 feet. The channel is approximately 8 feet deep. The floodplain is over 1,100 feet wide at this location. Highway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



Highway 101 Undercrossing (Conflict Avoidance Alternative)

A seasonal at-channel-grade undercrossing of the existing Highway 101 bridge crossing of SLO Creek downstream of San Luis Bay Drive is also proposed as a FEIR Conflict Avoidance Alternative.

This undercrossing would be located near the outer edge of the active SLO Creek channel floodplain (in the second bridge barrels on the north side of the bridges) near the Ontario Road staging area. As such, it would be subject to flooding every normal year.

The undercrossing structure would consist of an at grade 12-foot-wide, 6-inch-thick unreinforced concrete slab in 12-foot-long sections abutting the existing concrete structure along the north side of the bridge. It would be constructed at the existing channel grade and therefore would not add to any fill into the existing channel or floodplain. The concrete slab would be placed on an aggregate base section. A 3-foot-deep (minimum) trench backfilled with ½-ton grouted rock would be placed on one or both sides of the

concrete slab to minimize scour and undermining of the structure. Even so, there is a chance that unusually high flood flows could scour, undermine and dislodge the concrete pads, requiring their reposition, or demolition and replacement. Because of this, the conceptual design is to use semi-reinforced concrete (steel mesh reinforcement; no rebar) to facilitate demolition and replacement, when needed.

Because the maximum height of the undercrossing at the edge of the 12-foot-wide trail section is less than 8 feet, signage will need to be placed on the approaches to the undercrossing advising trail users to dismount and walk their bicycles.

In addition, since the undercrossing is located within the active floodplain of SLO Creek, it will need to be closed for weeks at a time during periods of creek high flow. Each year, the operators of the trail will need to clear the concrete pad pathway of debris and sediment and make any required repairs.

Since the concrete pad pathway is located at channel grade and adds no net fill into the channel or floodplain, there will be no hydraulic or increased flooding impacts caused by the undercrossing. Although we reviewed available channel hydraulic information at this location supplied by Caltrans, and discussed the proposed structure with their hydraulic engineer, no new hydraulic analysis was considered to be necessary. This issue was discussed with Caltrans representative, Lynn Wickham, on June 15, 2014 and was followed up by email conformation that "If the project doesn't reduce waterway or increase roughness, I (i.e. Caltrans) wouldn't require a hydraulic analysis."

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

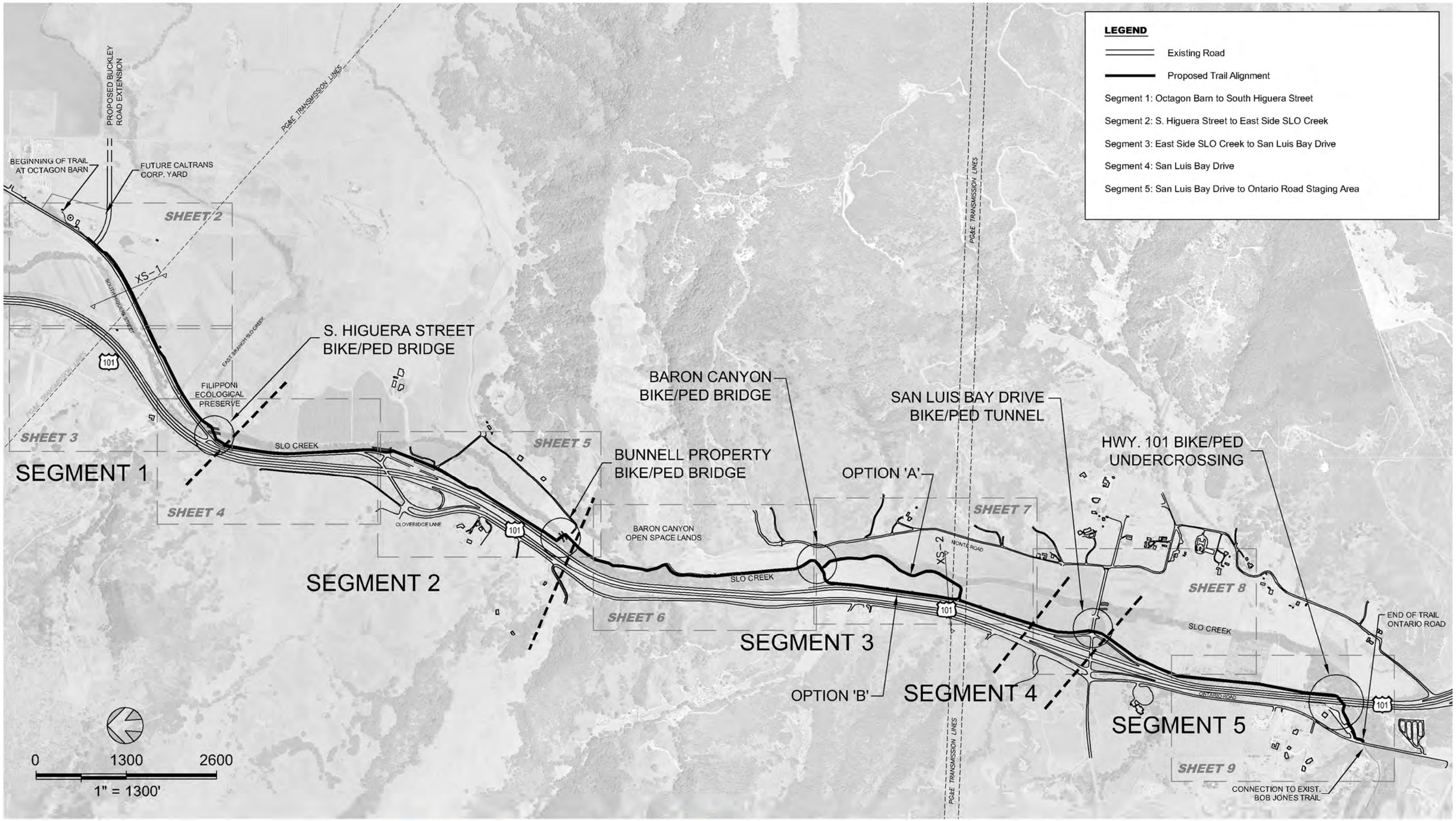
No habitable structures will be constructed as part of the project and therefore no structures will be put at risk. Some damage to paved trail sections may occur during significant flood events. The plan includes the installation of farm fencing, gates and signage allowing the County to close the trail 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 12
and
Bridge Plan Sheets 1 through 13



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

QUESTA ENGINEERING CORP.

Civil
Environmental
& Water Resources

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questa@questaec.com
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PRELIMINARY PLAN
CONFLICT AVOIDANCE
ALTERNATIVE

SHEET
1 of 12

FILE: P:\2013\1300177_BOB_JONES_2013\CAD\1300177_PREFERRED_ALIGNMENT_7-14-14.DWG

IF BAR DOES NOT EQUAL 1 INCH DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

MATCHLINE - SEE SOUTH HIGUERA ROADWAY WIDENING INSET AT RIGHT

BEGIN PATH

SIGN 5

OCTAGON BARN

PROPOSED BUCKLEY ROAD EXTENSION

SOUTH HIGUERA STREET

SEE INSET BELOW

TRAILHEAD

1A 4 5 6 9

500 LF PATH CLASS I PATH

180 LF 4'-6' RETAINING WALL

1A 10

(E) 72" BOX CULVERT

MORABITO
076-081-020

HAYASHI
076-081-018

3,100 LF CLASS I PATH 1A

PG&E TRANSMISSION LINE

Luis Obispo Creek

XS-1

ENVIRONMENTAL/MITIGATION ROW TO BE DETERMINED IN ENVIRONMENTAL REVIEW PROCESS

LOCATE TRAIL AWAY FROM PG&E TOWER FOOTING

5 SIGN

(E) 72" BOX CULVERT

MATCHLINE - SEE SHEET 3

0 200' 400'

1" = 200'

STORAGE

RESTROOMS & BIKE STORAGE

PARKING AREA, DECOMPOSED GRANITE OR SIMILAR PERMEABLE SURFACE, 65 SPACES FOR BOB JONES BIKE TRAIL

PARKING

EXPANDED PARKING AND BUCKLEY ROAD ACCESS (NIC)

(E) OCTAGON BARN

BARN COMMONS (NIC)

MEETING SPACE (NIC)

(E) MILKING PARLOR

ENTRY ROAD

LEGEND

(NIC) Not in Pathway Project

LEGEND

- Bicycle/Pedestrian Bridge
- Bridge Approach Ramp
- BR-A South Higuera Bridge
- BR-B Bunnell Property Bridge
- BR-C San Luis Bay Drive Bridge
- BR-D HWY 101 Overcrossing
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- Temporary Construction Access
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- Limit of Construction Disturbance
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- Security Fence
- T Post Fence (consistent with property owner negotiations)
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SOUTH HIGUERA ROADWAY WIDENING

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

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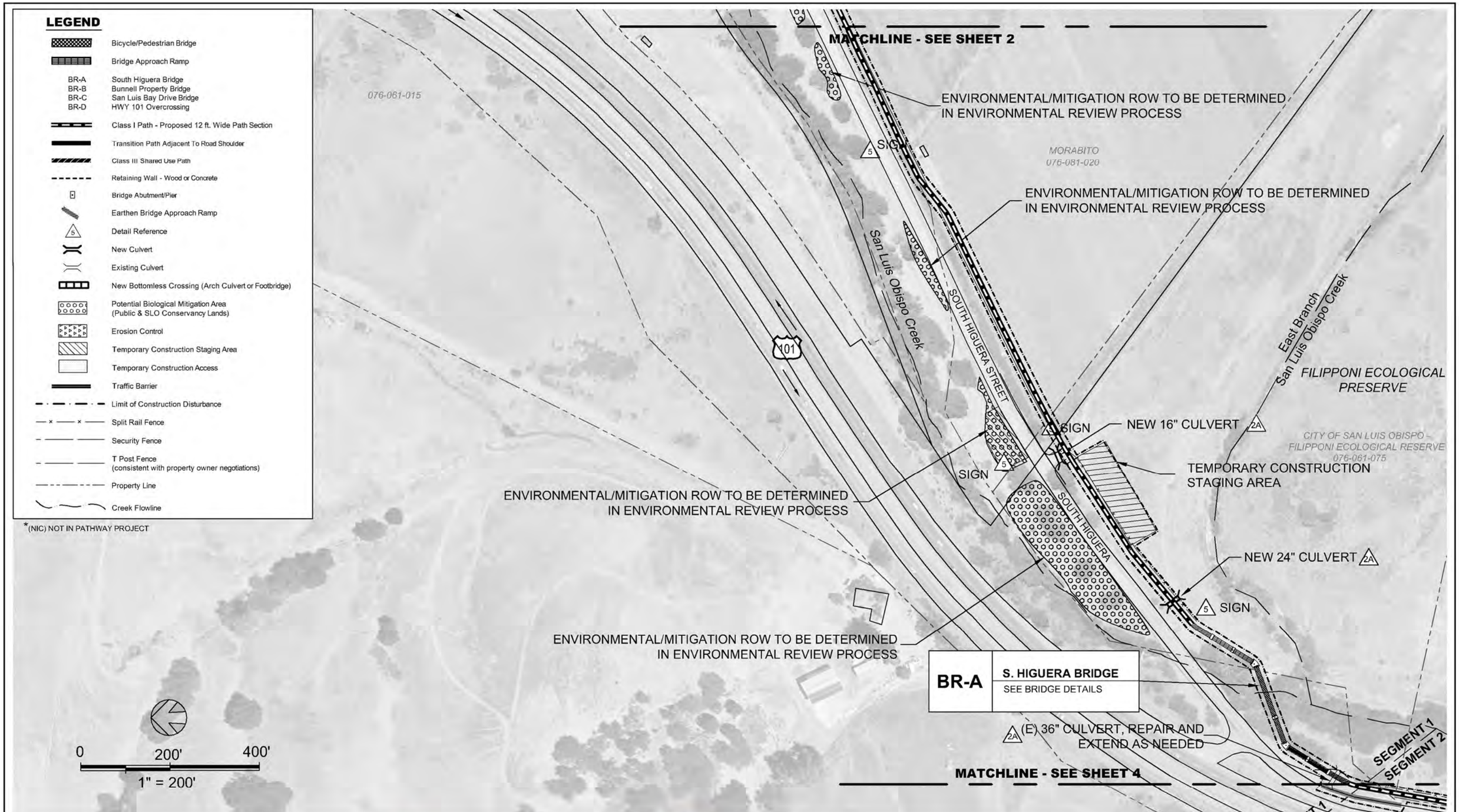

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SHEET 3 of 12

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ENVIRONMENTAL/MITIGATION ROW TO BE DETERMINED IN ENVIRONMENTAL REVIEW PROCESS

SOUTH HIGUERA

NEW 24" CULVERT 2A

5 SIGN

101

BR-A | S. HIGUERA BRIDGE
SEE BRIDGE DETAILS

CITY OF SAN LUIS OBISPO - FILIPPONI ECOLOGICAL RESERVE

MAINO

MAINO

1B 500 LF PATH ADJACENT TO ROAD SHOULDER

(E) 30" CULVERT, REPAIR AS NEEDED (NIC)

2B REPLACE (E) 36" CULVERT WITH NEW BOTTOMLESS ARCH CULVERT, HOLLOW CORE CONCRETE FOOTBRIDGE, OR CLEAR SPAN TIMBER FRAME FOOTBRIDGE

(E) 30" CULVERT, REPAIR AS NEEDED (NIC)

2A (E) 36" CULVERT, REPAIR AND EXTEND AS NEEDED

SEGMENT 1 / SEGMENT 2

(E) 36" CULVERT, REPAIR AS NEEDED (NIC)

MATCHLINE - SEE SHEET 3

SIGN 5

SAN LUIS OBISPO CREEK

SIGN 5

SEGMENT 1 / SEGMENT 2

101

SOUTH HIGUERA STREET

TRANSITION TO CLASS III PATH

INSTALL NEW CONCRETE TRAFFIC BARRIER ±100 LF 8

PRIVATE ROAD

101

2,000 LF CLASS I PATH 1A

2,000 LF SPLIT RAIL FENCE (WIRE FENCE TO BE REMOVED) 4

MATCHLINE - SEE SHEET 5

0 200' 400'

1" = 200'

*(NIC) NOT IN PATHWAY PROJECT

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200 LF BY 3' HIGH RETAINING WALL 1B 11

500 LF PATH ADJACENT TO ROAD SHOULDER 1B 8

REPLACE (E) 36" CULVERT WITH NEW BOTTOMLESS ARCH CULVERT, HOLLOW CORE CONCRETE FOOTBRIDGE, OR CLEAR SPAN TIMBER FRAME FOOTBRIDGE 2B

SIGN 5

SIGN 5

SIGN 5

SIGN 5

CLOVERIDGE LANE

PRIVATE ROAD

CALTRANS R.O.W.

VENADO LANE

Davenport Creek

San Luis Obispo Creek

BUNNELL 076-121-030

TEMPORARY CONSTRUCTION ACCESS

RECONSTRUCT ±100 LF OF EXISTING TRAFFIC BARRIER 8

TEMPORARY CONSTRUCTION STAGING & FUTURE PERMANENT TRAIL HEAD PARALLEL PARKING (6 - 8 SPACES) 3 5 6 7 9

TEMPORARY CONSTRUCTION STAGING & FUTURE PERMANENT TRAIL HEAD PARALLEL PARKING (10 - 12 SPACES) 5 6 9

1,300 LF SPLIT RAIL FENCE 4

NEW 24" CULVERT 2A

(E) 16" CULVERT, REPAIR AS NEEDED (NIC)

NEW CROSS WALK

NORTHBOUND OFF RAMP

1C 1,300 LF SHARED USE PATH

101

PRIVATE ROAD

MATCHLINE - SEE SHEET 4

1,500 LF CLASS I PATH 1A

1,500 LF SPLIT RAIL FENCE 4

ONTARIO ROAD

076-121-014

076-121-020

076-121-021

076-121-025

ONTARIO ROAD

NEW 36" CULVERT 2A

SIGN 5

BUNNELL 076-121-030

SEGMENT 2

SEGMENT 3

SIGN 5

3,500 LF CLASS I PATH 1A

500 LF T-POST FENCE

MATCHLINE - SEE SHEET 6

BR-B	BUNNELL BRIDGE SEE BRIDGE DETAILS

0 200' 400'

1" = 200'

LEGEND

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*(NIC) NOT IN PATHWAY PROJECT

BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

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MATCHLINE - SEE SHEET 5

BARON CANYON OPEN SPACE 076-243-024

BARON CANYON RANCH ROAD (PRIVATE)

(E) GATE

MONTE ROAD

2A

MATCHLINE - SEE SHEET 7

END OF T-POST FENCE AT BUNNELL PROPERTY LINE

3,000 LF CLASS I PATH 1A

NO FENCE EAST SIDE OF TRAIL

BARON CANYON OPEN SPACE

SIGN 5

3,500 LF CLASS I PATH 1A

2,200 LF SPLIT RAIL FENCE ADJACENT TO AG FIELD 4

SLO LAND CONSERVANCY 076-241-018

NEW 48" CULVERT 2A

100' LF OF 3' HIGH WOOD RETAINING WALL AS NEEDED 12

San Luis Obispo Creek

101

SLO LAND CONSERVANC 076-241-018

101

ONTARIO ROAD

ONTARIO ROAD

0 200' 400'

1" = 200'

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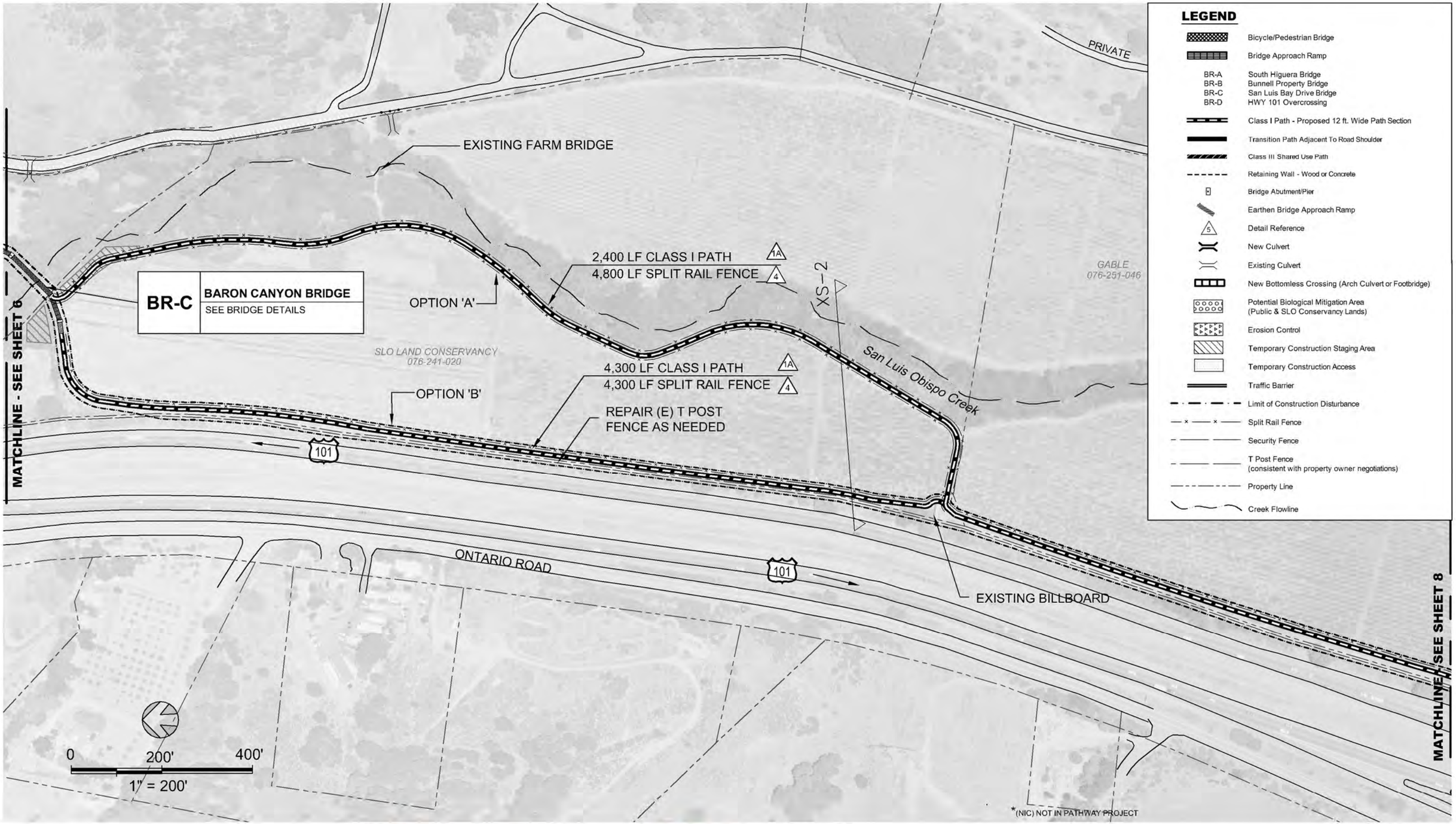

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CONFLICT AVOIDANCE ALTERNATIVE

SHEET
7 of 12

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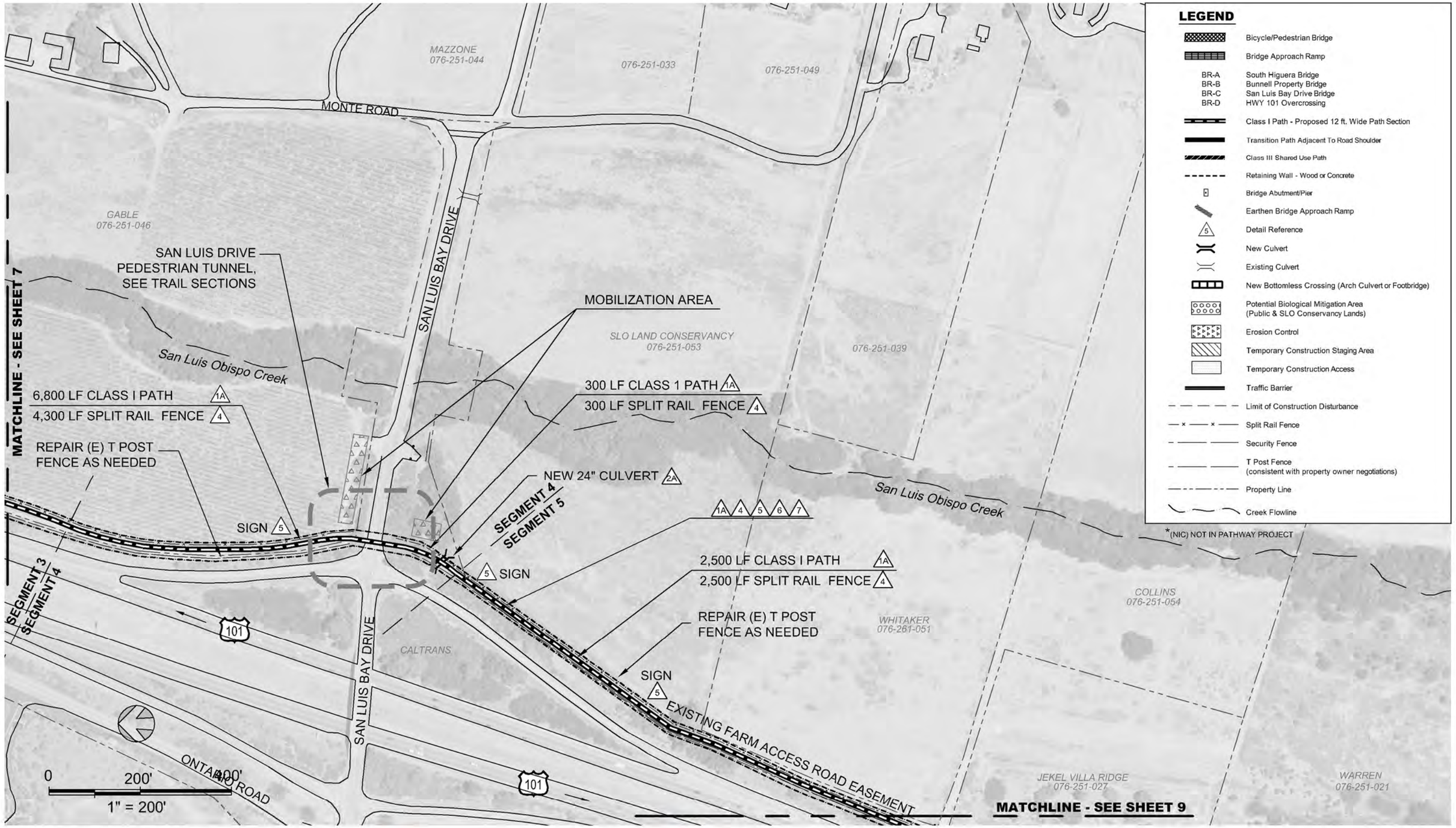

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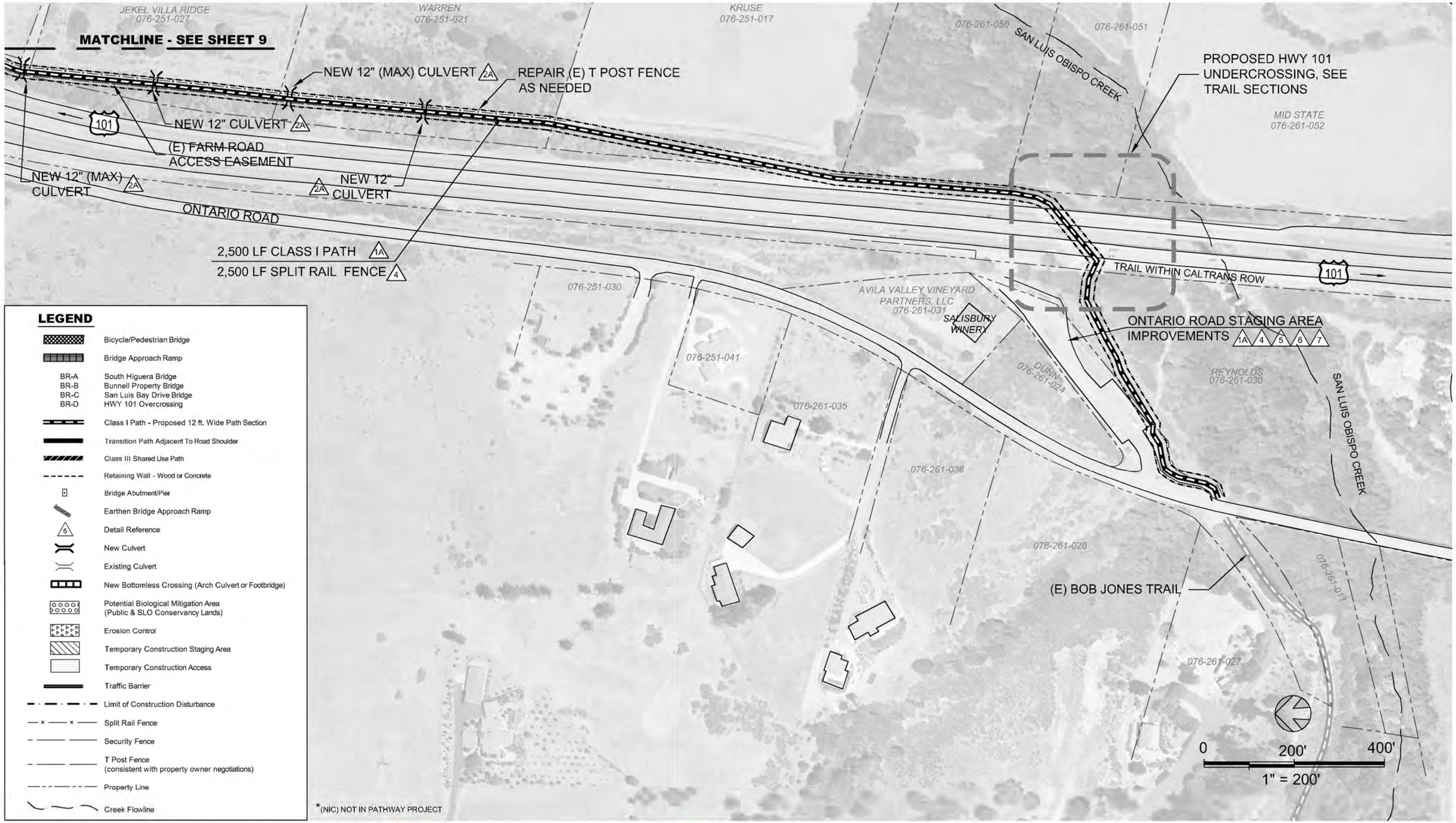

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9 of 12

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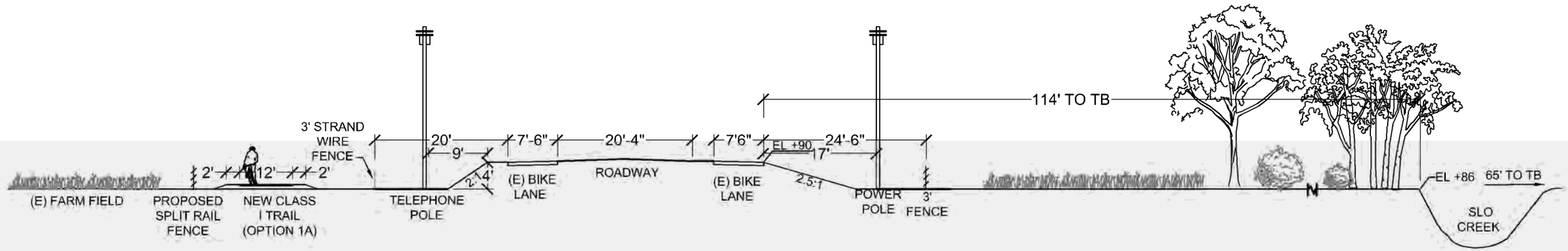
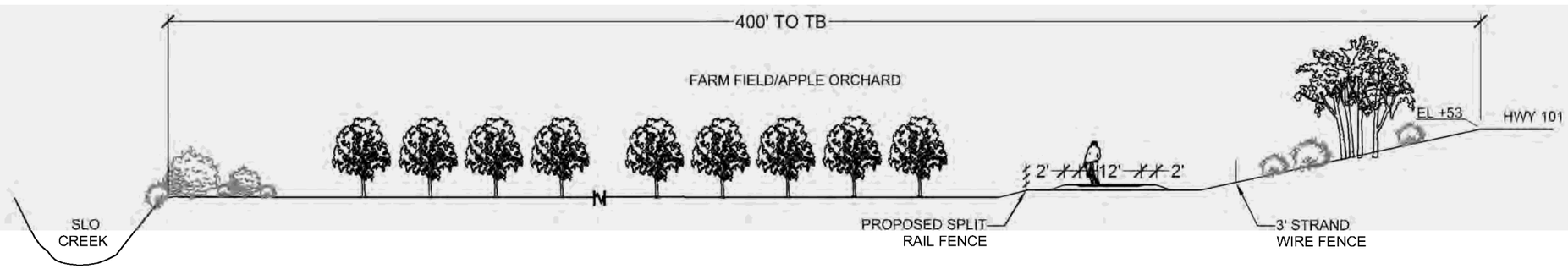


XS-1
SOUTH HIGUERA STREET AT FARM FIELD
(LOOKING SOUTH)



XS-2
ALONG HWY 101 NEAR DAVID CT
(LOOKING SOUTH)

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TRAIL CROSS SECTIONS
1 AND 2

SHEET
10 OF 12

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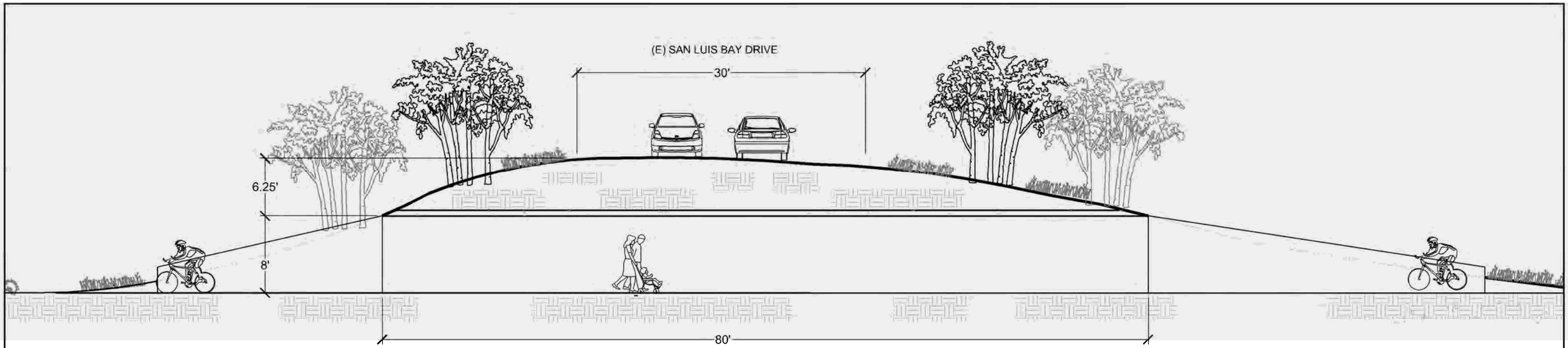
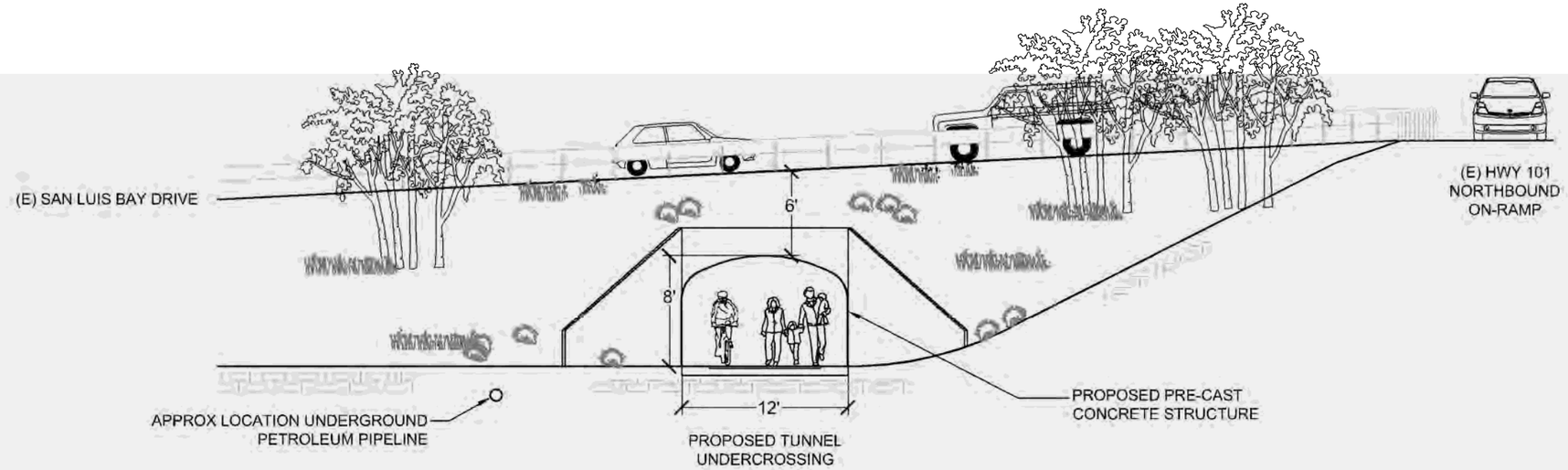


SAN LUIS BAY DRIVE TUNNEL
SECTION VIEW
(LOOKING EAST)



SAN LUIS BAY DRIVE TUNNEL
ELEVATION VIEW
(LOOKING SOUTH)

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TRAIL SECTIONS AT
SAN LUIS BAY DRIVE

SHEET
11 OF 12

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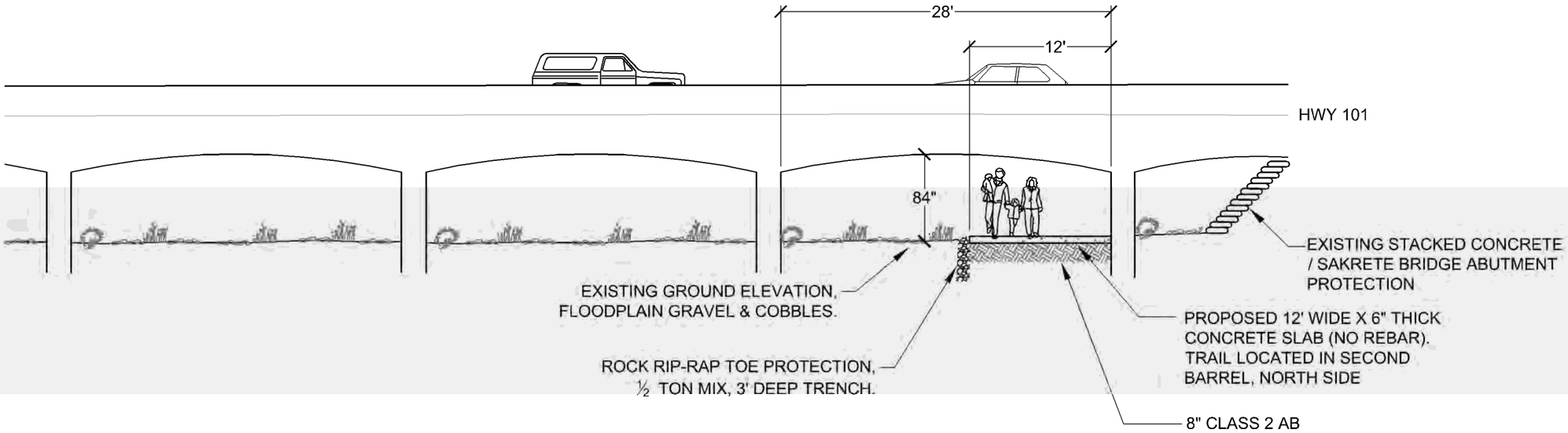
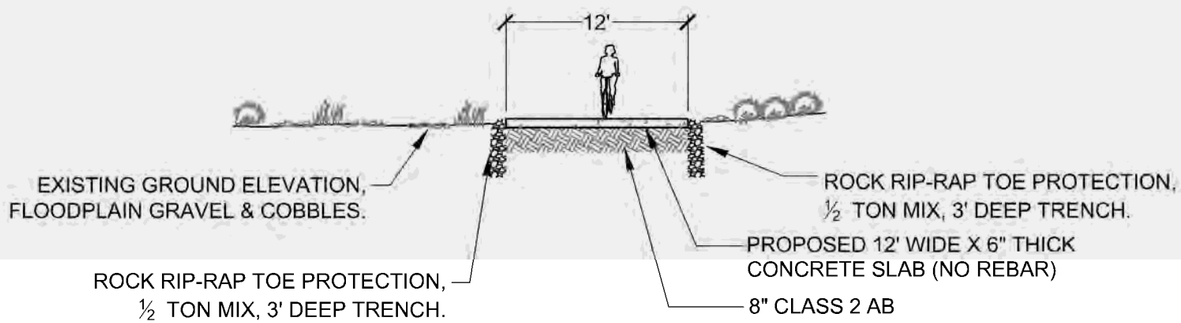


HWY 101 UNDERCROSSING
(LOOKING WEST)



HWY 101 UNDERCROSSING APPROACH AT
FLOODPLAIN
(LOOKING WEST)

NOTES:

1. TRAIL WILL BE SUBJECT TO SEASONAL CLOSURE AT SAN LUIS BAY DRIVE.
2. TRAIL WILL REQUIRE ANNUAL MAINTENANCE TO REMOVE SAND, GRAVEL , COBBLES FROM SURFACE.
3. UNDERPASS WITH LIMITED HEIGHT (7'). WILL REQUIRE BIKE RIDERS TO DISMOUNT AND WALK BIKES

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TRAIL SECTIONS
UNDER HWY 101 BRIDGE

SHEET
12 OF 12

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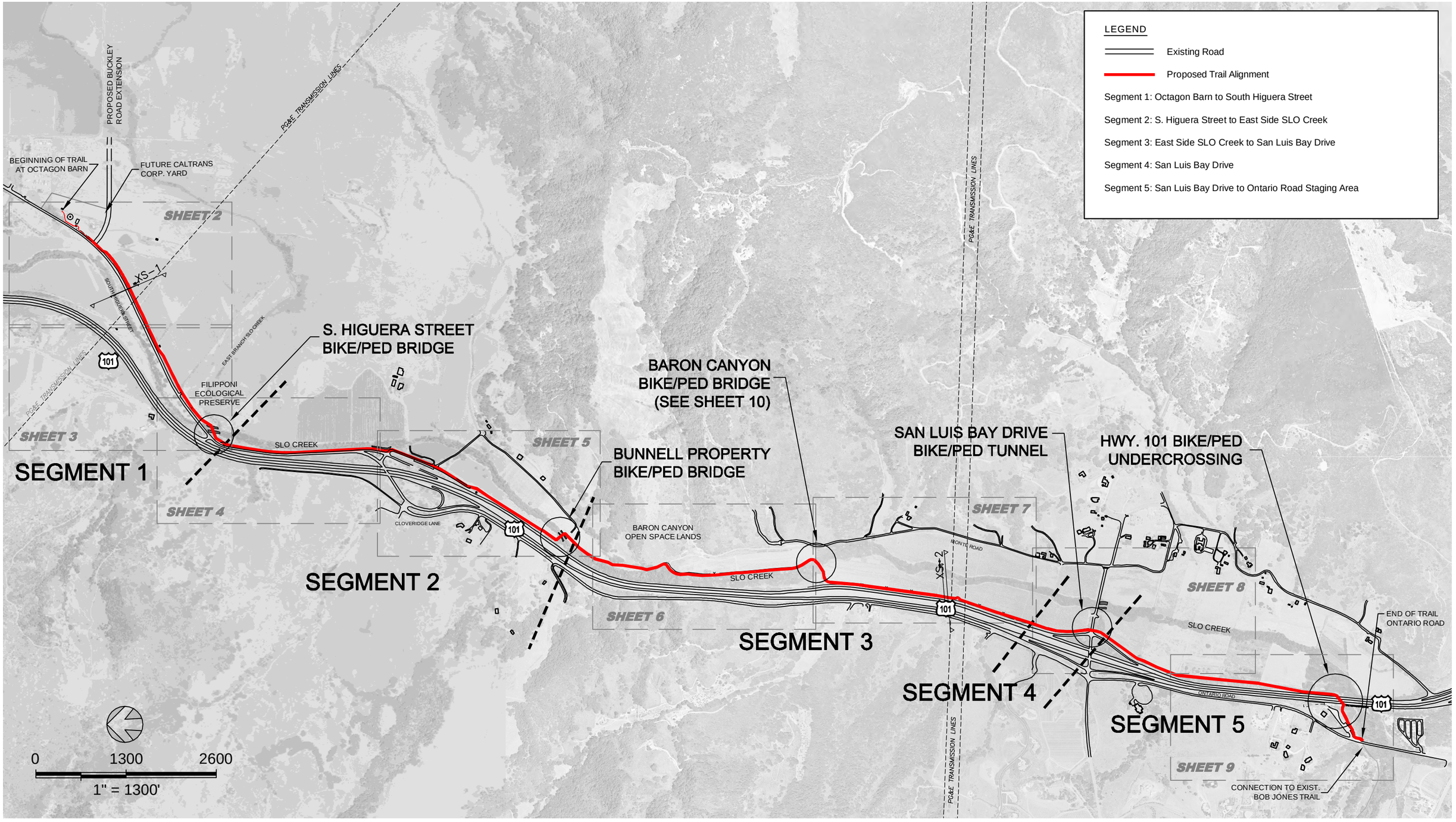
IF BAR DOES NOT EQUAL 1 INCH DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY



BOB JONES PATHWAY

SAN LUIS OBISPO TO ONTARIO ROAD

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PRELIMINARY PLAN
"EIR ALTERNATIVE"

SHEET
1 of 13

FILE: P:\2013\1300177_BOB_JONES_2013\CAD\1300177_PREFERRED_ALIGNMENT_7-14-14.DWG

IF BAR DOES NOT EQUAL 1 INCH DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

MATCHLINE - SEE SOUTH HIGUERA ROADWAY WIDENING INSET AT RIGHT

BEGIN PATH

SIGN 5

OCTAGON BARN

PROPOSED BUCKLEY ROAD EXTENSION

SOUTH HIGUERA STREET

SEE INSET BELOW

TRAILHEAD

1A 4 5 6 9

500 LF PATH CLASS I PATH

180 LF 4'-6' RETAINING WALL

1A 10

(E) 72" BOX CULVERT

HAYASHI
076-081-018

MORABITO
076-081-020

PG&E TRANSMISSION LINE

3,100 LF CLASS I PATH 1A

STORAGE

RESTROOMS & BIKE STORAGE

PARKING AREA, DECOMPOSED GRANITE OR SIMILAR PERMEABLE SURFACE, 65 SPACES FOR BOB JONES BIKE TRAIL

EXPANDED PARKING AND BUCKLEY ROAD ACCESS (NIC)

PARKING

Luis Obispo Creek

XS-1

ENVIRONMENTAL/MITIGATION ROW TO BE DETERMINED IN ENVIRONMENTAL REVIEW PROCESS

LOCATE TRAIL AWAY FROM PG&E TOWER FOOTING

5 SIGN

(E) OCTAGON BARN

BARN COMMONS (NIC)

MEETING SPACE (NIC)

(E) MILKING PARLOR

ENTRY ROAD

LEGEND

(NIC) Not in Pathway Project

(E) 72" BOX CULVERT

MATCHLINE - SEE SHEET 3

MATCHLINE - SEE SHEET 2

LEGEND

- Bicycle/Pedestrian Bridge
- Bridge Approach Ramp
- BR-A South Higuera Bridge
- BR-B Bunnell Property Bridge
- BR-C San Luis Bay Drive Bridge
- BR-D HWY 101 Overcrossing
- Class I Path - Proposed 12 ft. Wide Path Section
- Transition Path Adjacent To Road Shoulder
- Class III Shared Use Path
- Retaining Wall - Wood or Concrete
- Bridge Abutment/Pier
- Earthen Bridge Approach Ramp
- Detail Reference
- New Culvert
- Existing Culvert
- New Bottomless Crossing (Arch Culvert or Footbridge)
- Potential Biological Mitigation Area (Public & SLO Conservancy Lands)
- Erosion Control
- Temporary Construction Staging Area
- Temporary Construction Access
- Traffic Barrier
- Limit of Construction Disturbance
- Split Rail Fence
- Security Fence
- T Post Fence (consistent with property owner negotiations)
- Property Line
- Creek Flowline

076-071-017

MATCHLINE - SEE SOUTH HIGUERA ROADWAY WIDENING

0 200' 400'

1" = 200'

BOB JONES PATHWAY

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PRELIMINARY PLAN
"EIR ALTERNATIVE"

SHEET

2 of 13

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IF BAR DOES NOT EQUAL 1 INCH DRAWING IS NOT TO SCALE – ADJUST ACCORDINGLY

LEGEND

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- BR-A South Higuera Bridge
- BR-B Bunnell Property Bridge
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- BR-D HWY 101 Overcrossing
- Class I Path - Proposed 12 ft. Wide Path Section
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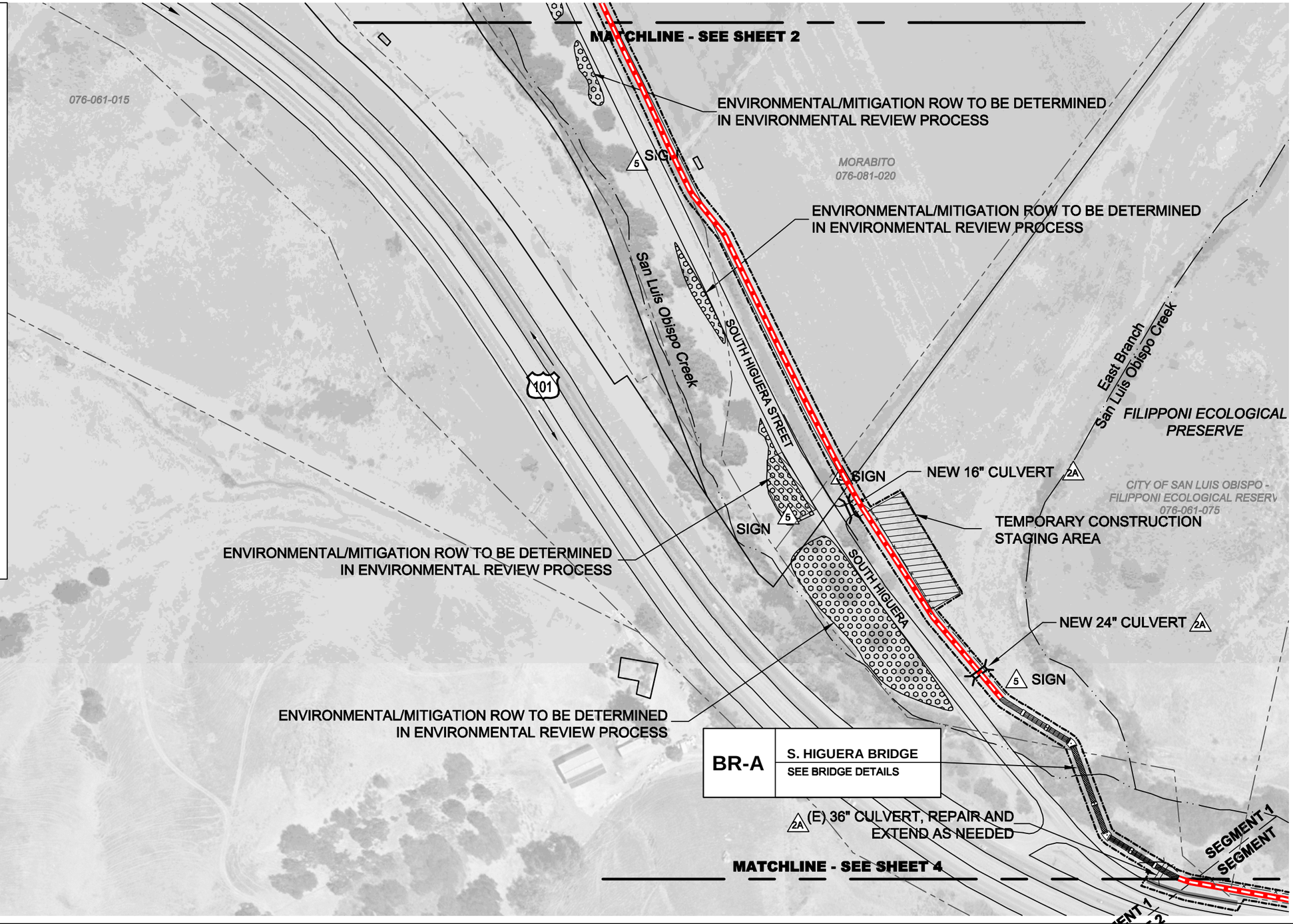
- Creek Flowline

*(NIC) NOT IN PATHWAY PROJECT



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PRELIMINARY PLAN
"EIR ALTERNATIVE"

SHEET
3 of 13

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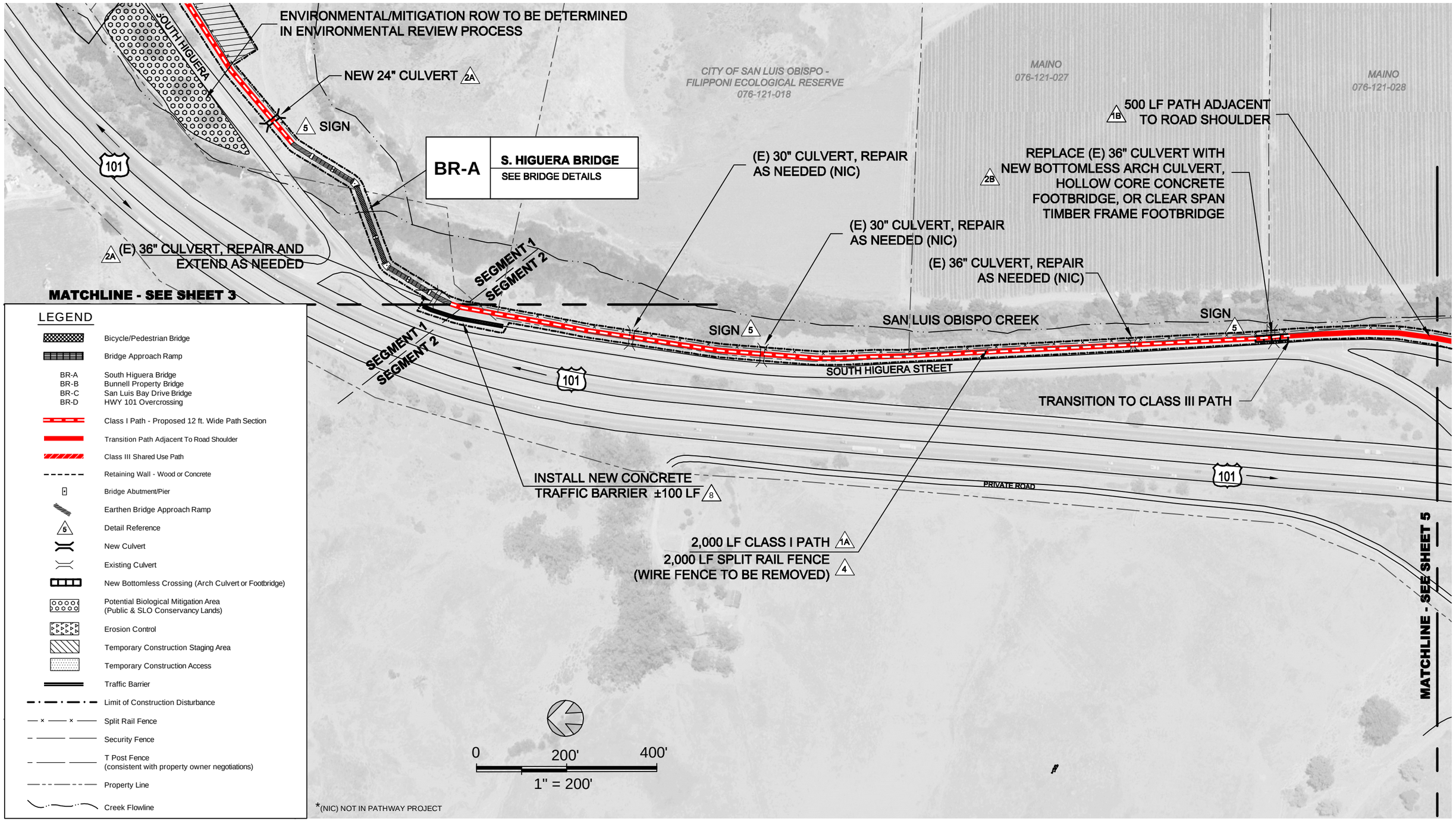

LEGEND

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PRELIMINARY PLAN "EIR ALTERNATIVE"

SHEET 4 of 13

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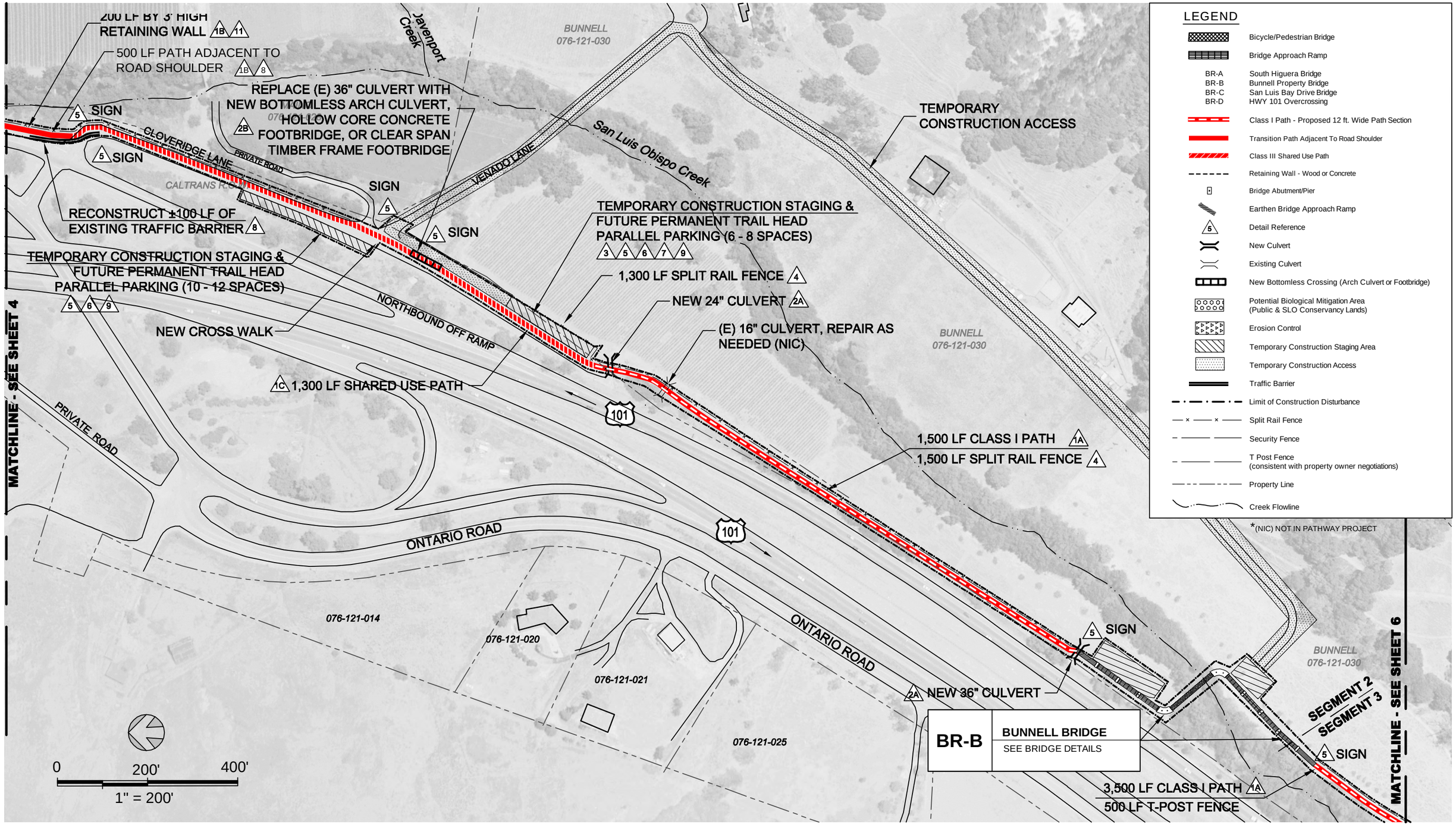

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PRELIMINARY PLAN
"EIR ALTERNATIVE"

SHEET
5 of 13

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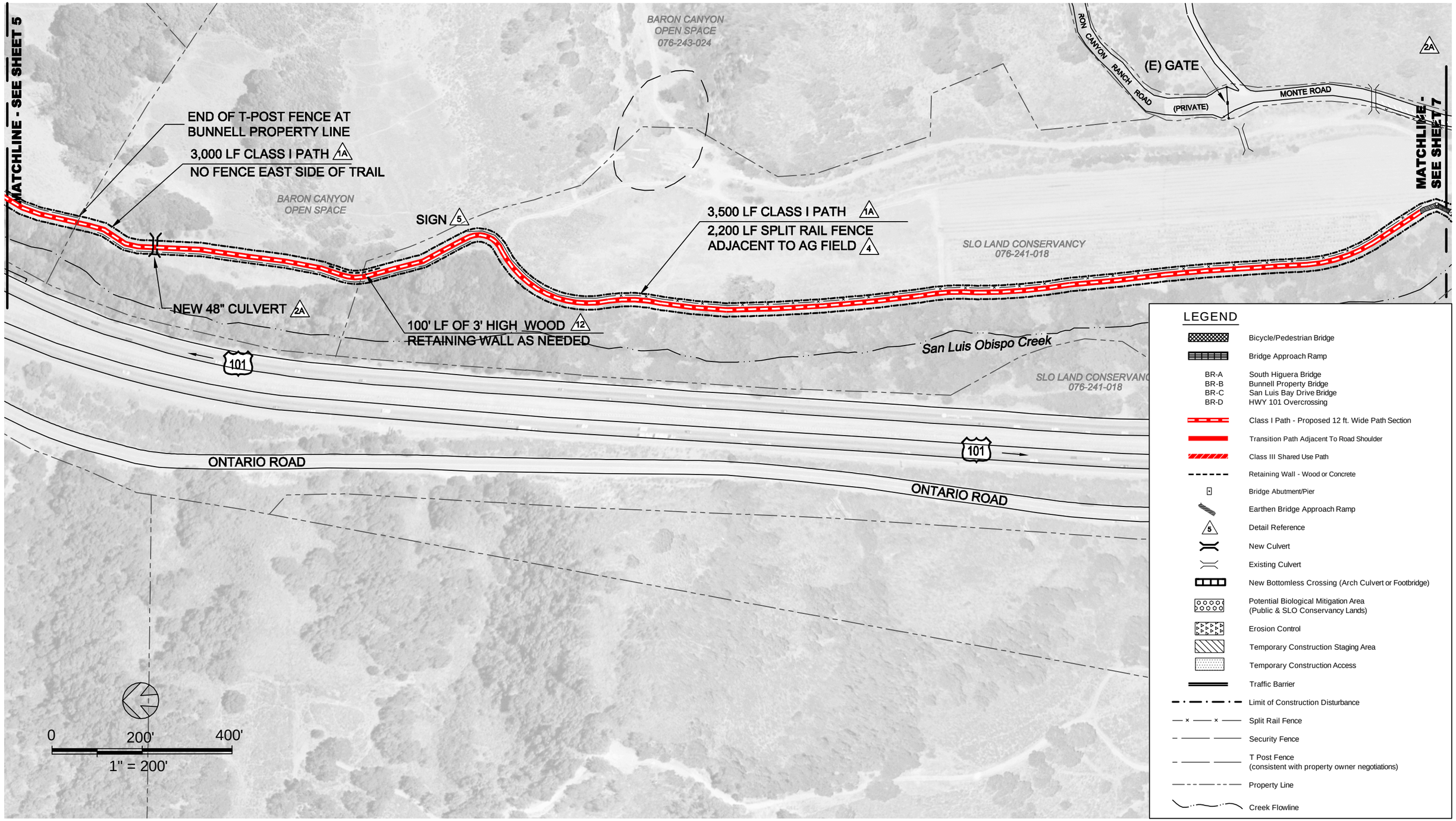

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PRELIMINARY PLAN
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6 of 13

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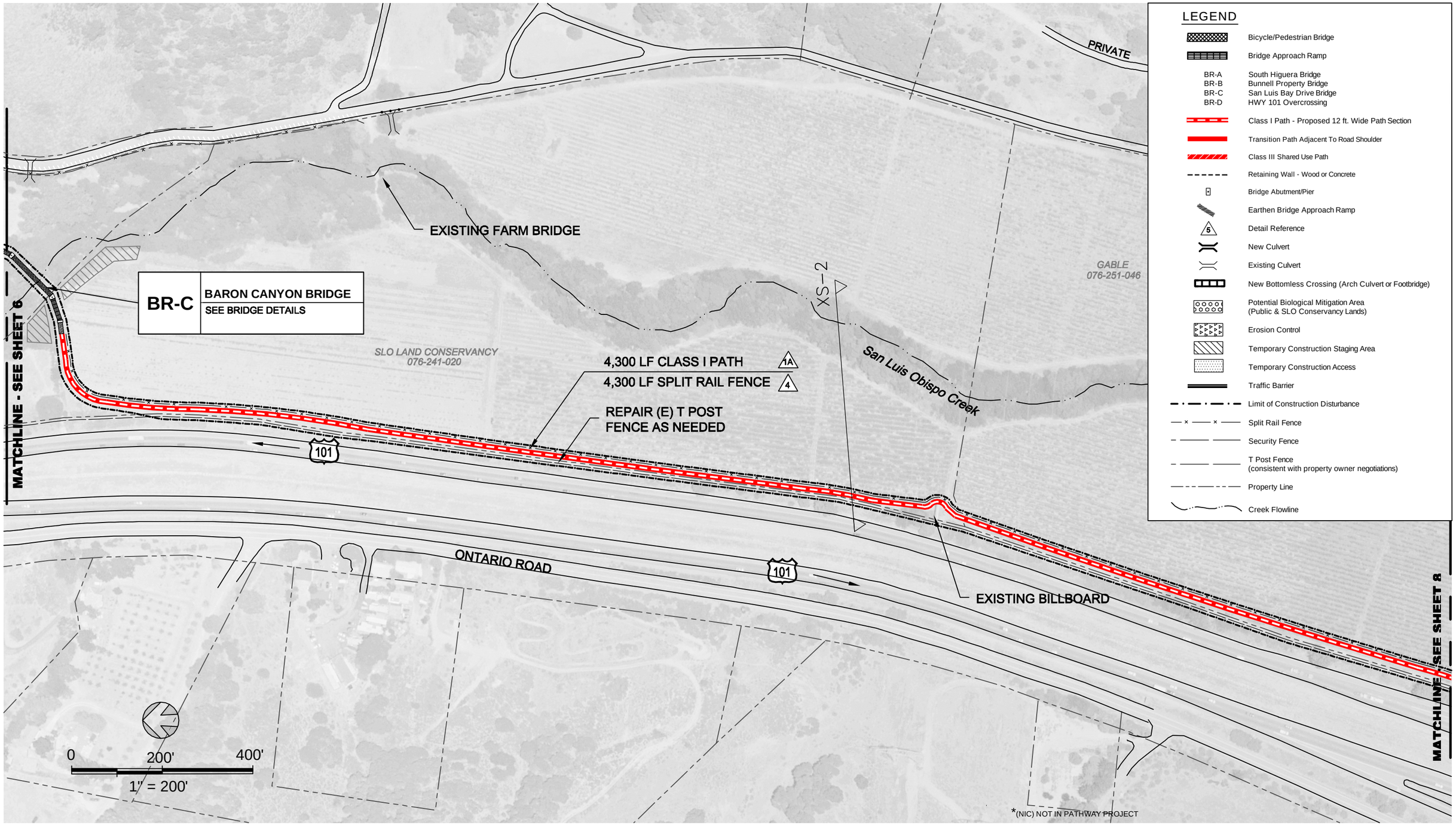

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APPR'D	JP
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PROJECT NUMBER	250083

FARM FRIENDLY ALTERNATIVE

SHEET

7 OF 13

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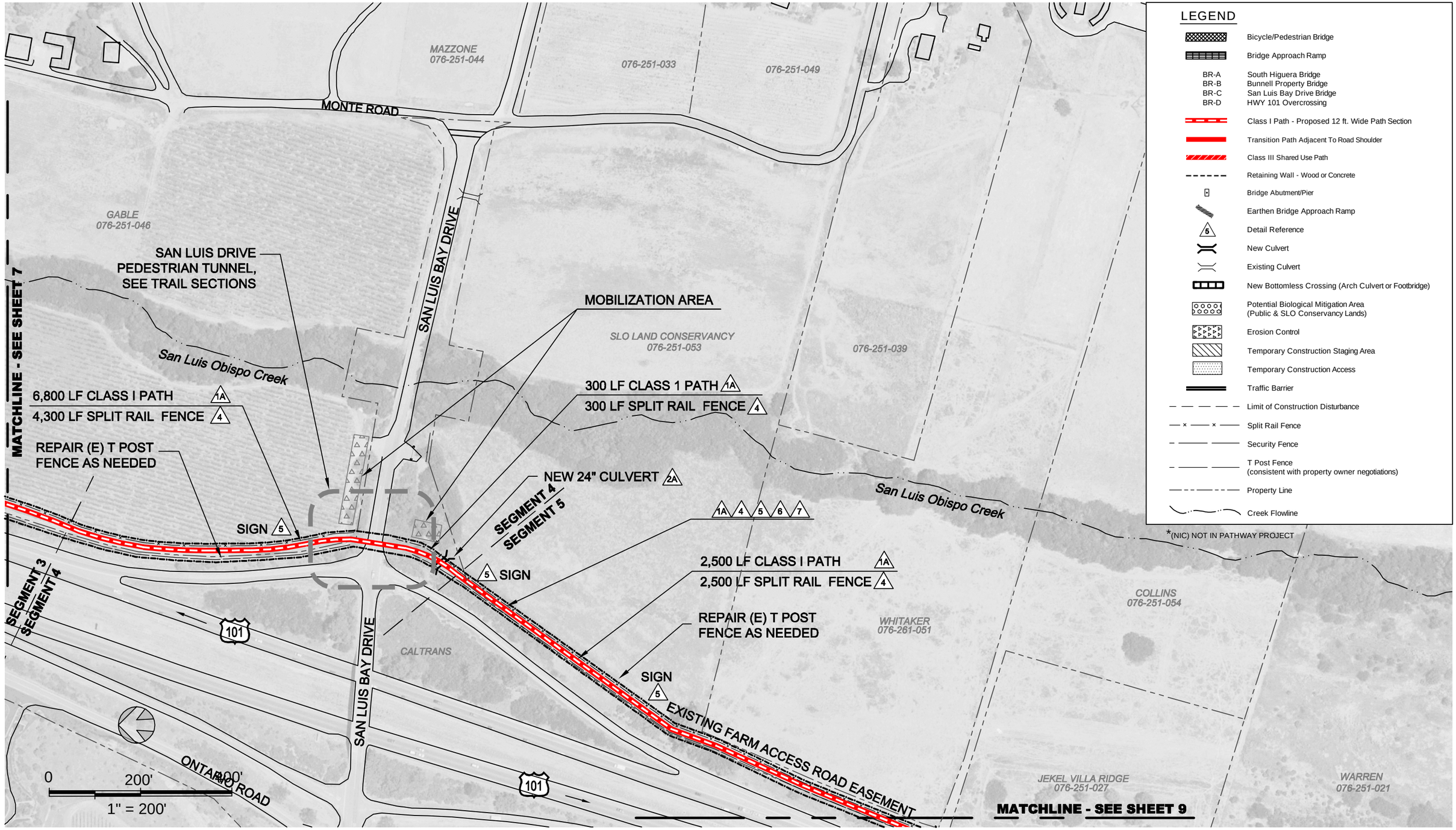

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PRELIMINARY PLAN
"EIR ALTERNATIVE"

SHEET
8 of 13

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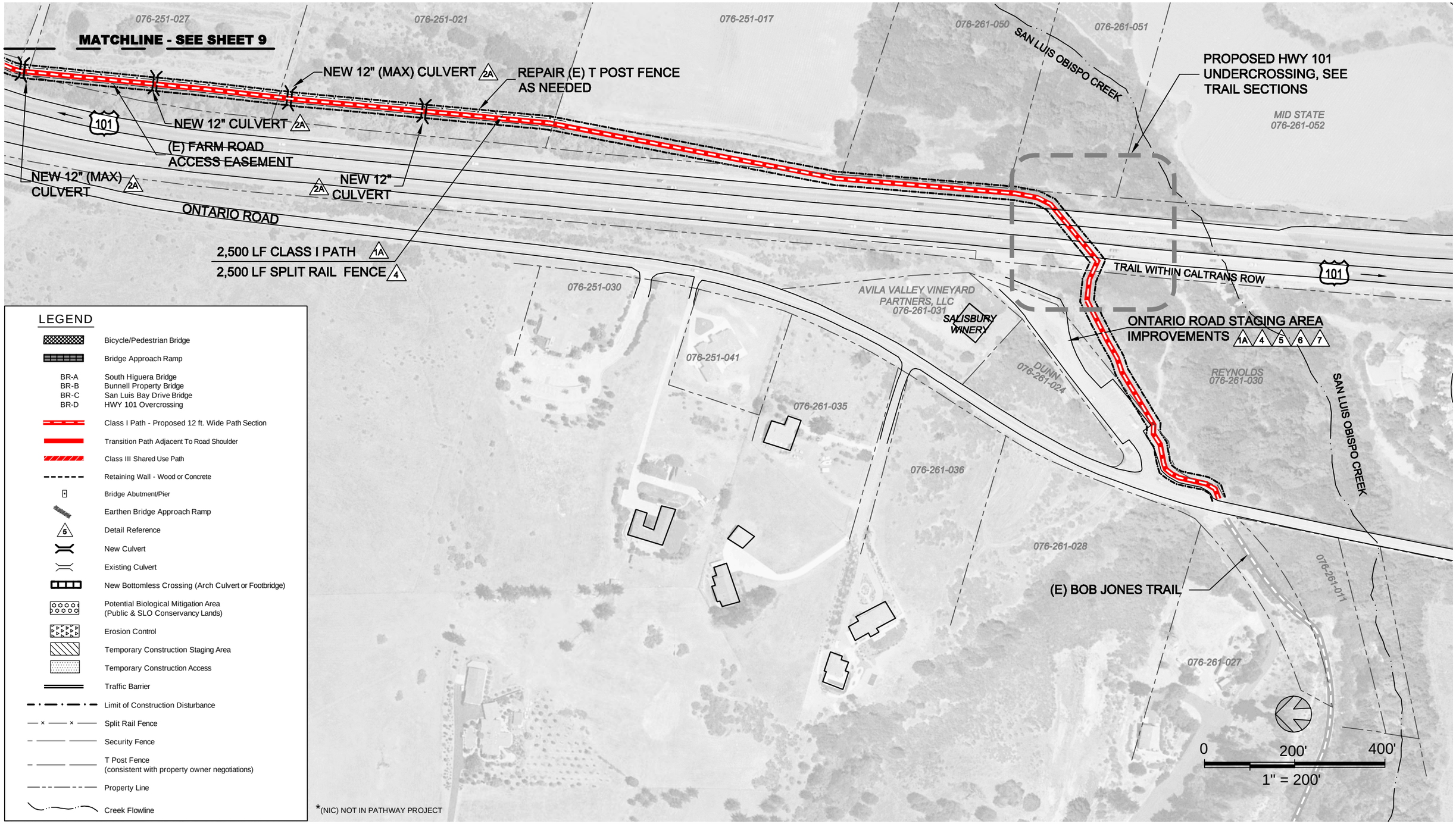

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PRELIMINARY PLAN
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SHEET
9 OF 13

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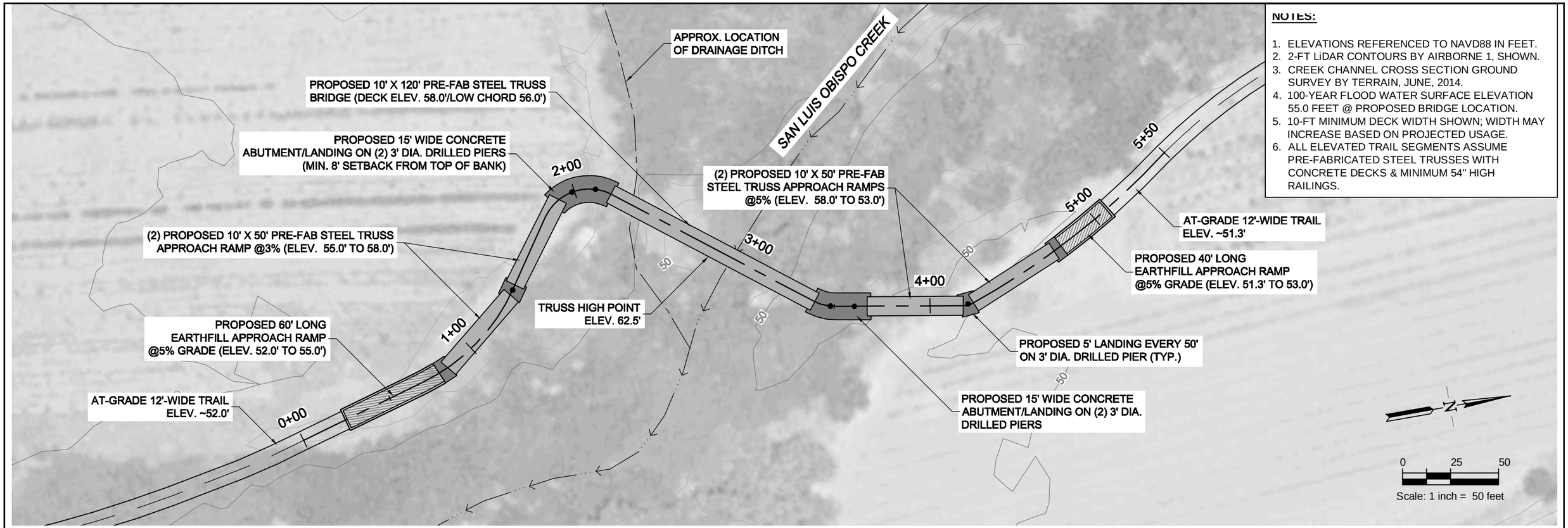
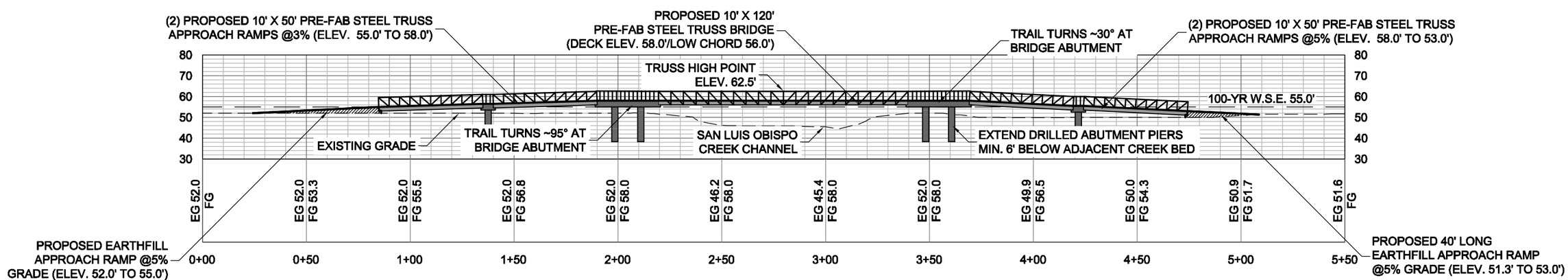


NOTES:

1. ELEVATIONS REFERENCED TO NAVD88 IN FEET.
2. 2-FT LiDAR CONTOURS BY AIRBORNE 1, SHOWN.
3. CREEK CHANNEL CROSS SECTION GROUND SURVEY BY TERRAIN, JUNE, 2014.
4. 100-YEAR FLOOD WATER SURFACE ELEVATION 55.0 FEET @ PROPOSED BRIDGE LOCATION.
5. 10-FT MINIMUM DECK WIDTH SHOWN; WIDTH MAY INCREASE BASED ON PROJECTED USAGE.
6. 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

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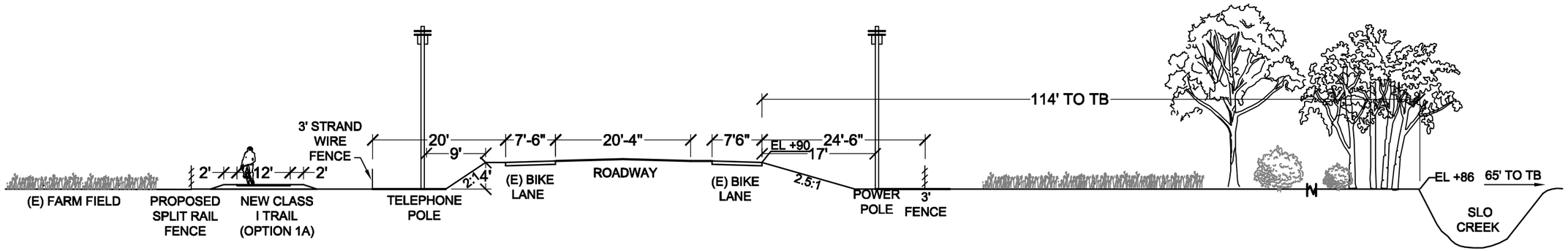
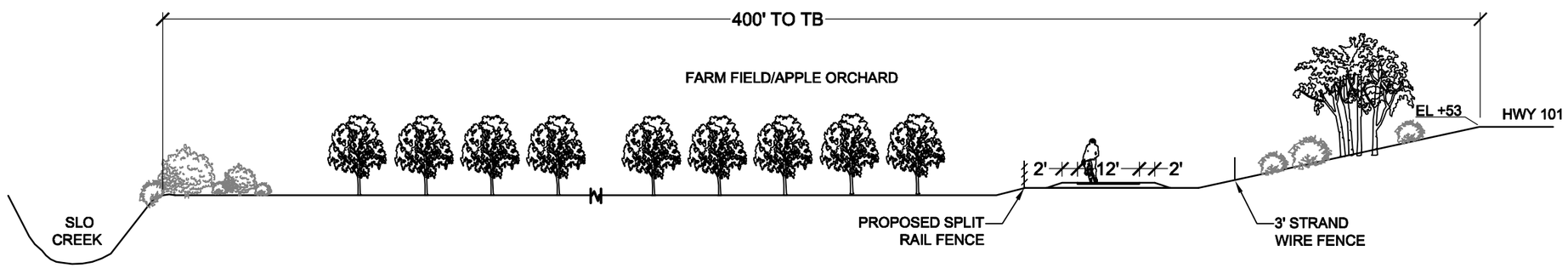
PRELIMINARY PLAN
"EIR ALTERNATIVE"

SHEET
10 of 13



XS-1
SOUTH HIGUERA STREET AT FARM FIELD
(LOOKING SOUTH)



XS-2
ALONG HWY 101 NEAR DAVID CT
(LOOKING SOUTH)

BOB JONES PATHWAY
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TRAIL CROSS SECTIONS 1 AND 2

SHEET
11 OF 13

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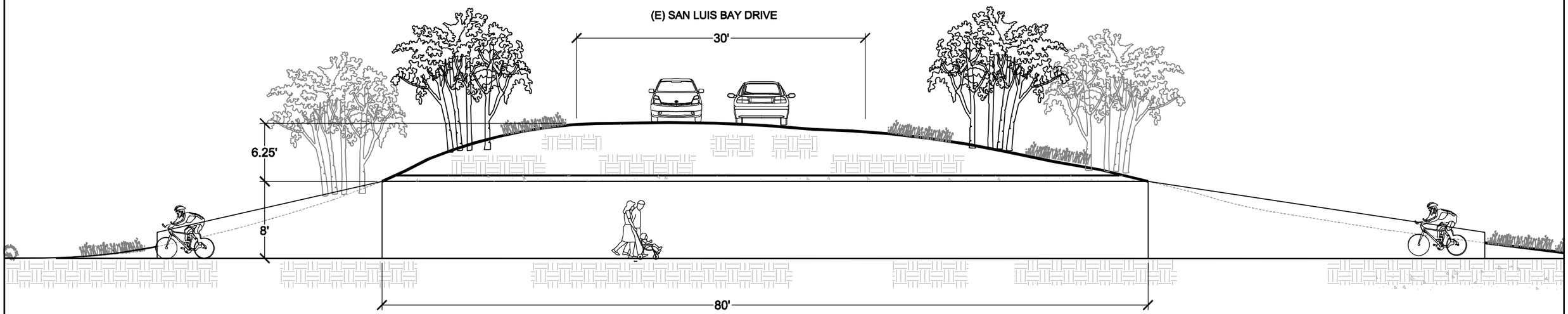
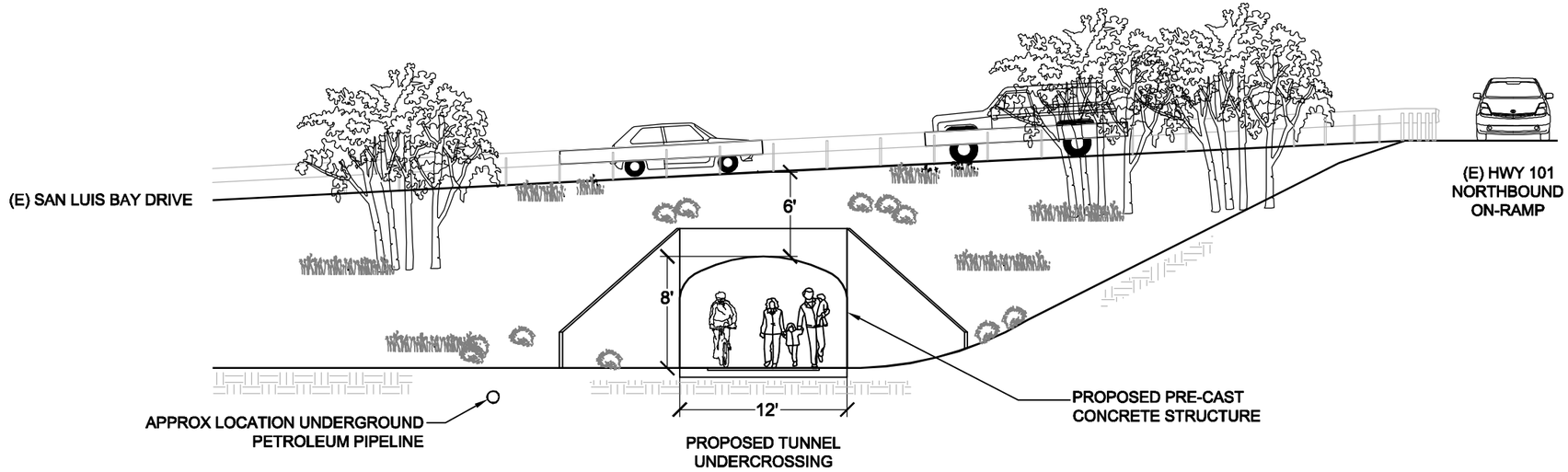


SAN LUIS BAY DRIVE TUNNEL
SECTION VIEW
(LOOKING EAST)



SAN LUIS BAY DRIVE TUNNEL
ELEVATION VIEW
(LOOKING SOUTH)

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TRAIL SECTIONS AT
SAN LUIS BAY DRIVE

SHEET
12 OF 13

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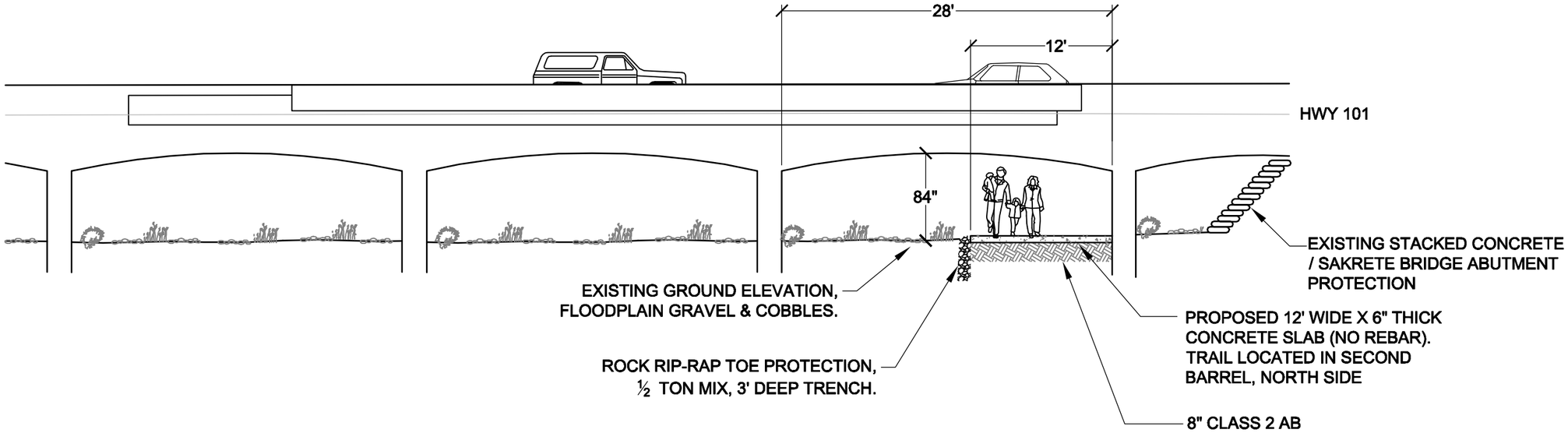
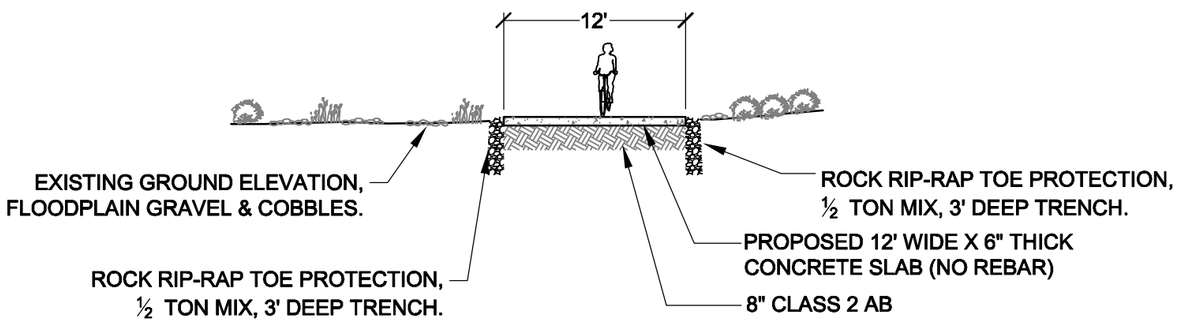


HWY 101 UNDERCROSSING
(LOOKING WEST)



HWY 101 UNDERCROSSING APPROACH AT
FLOODPLAIN
(LOOKING WEST)

NOTES:

1. TRAIL WILL BE SUBJECT TO SEASONAL CLOSURE AT SAN LUIS BAY DRIVE.
2. TRAIL WILL REQUIRE ANNUAL MAINTENANCE TO REMOVE SAND, GRAVEL , COBBLES FROM SURFACE.
3. UNDERPASS WITH LIMITED HEIGHT (7'). WILL REQUIRE BIKE RIDERS TO DISMOUNT AND WALK BIKES

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TRAIL SECTIONS
UNDER HWY 101 BRIDGE

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APPENDIX B

Hydraulic Analysis

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

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

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

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

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

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

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

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

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

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

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

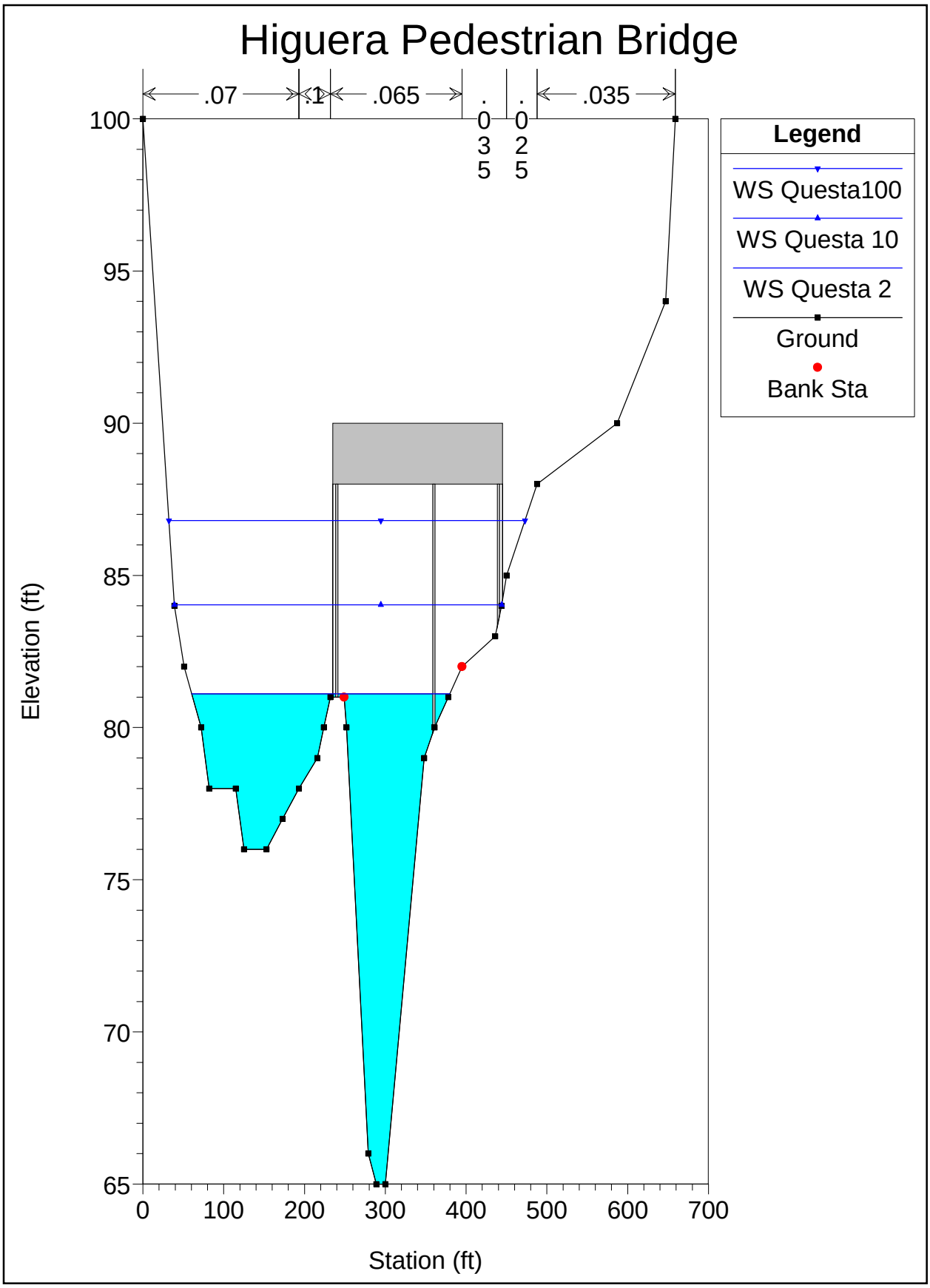
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Below Prefumo	22155.85	Questa100	21047.54	38.03	50.46		50.83	0.002398	3.87	4795.12	955.75	0.25
Below Prefumo	21757.07	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

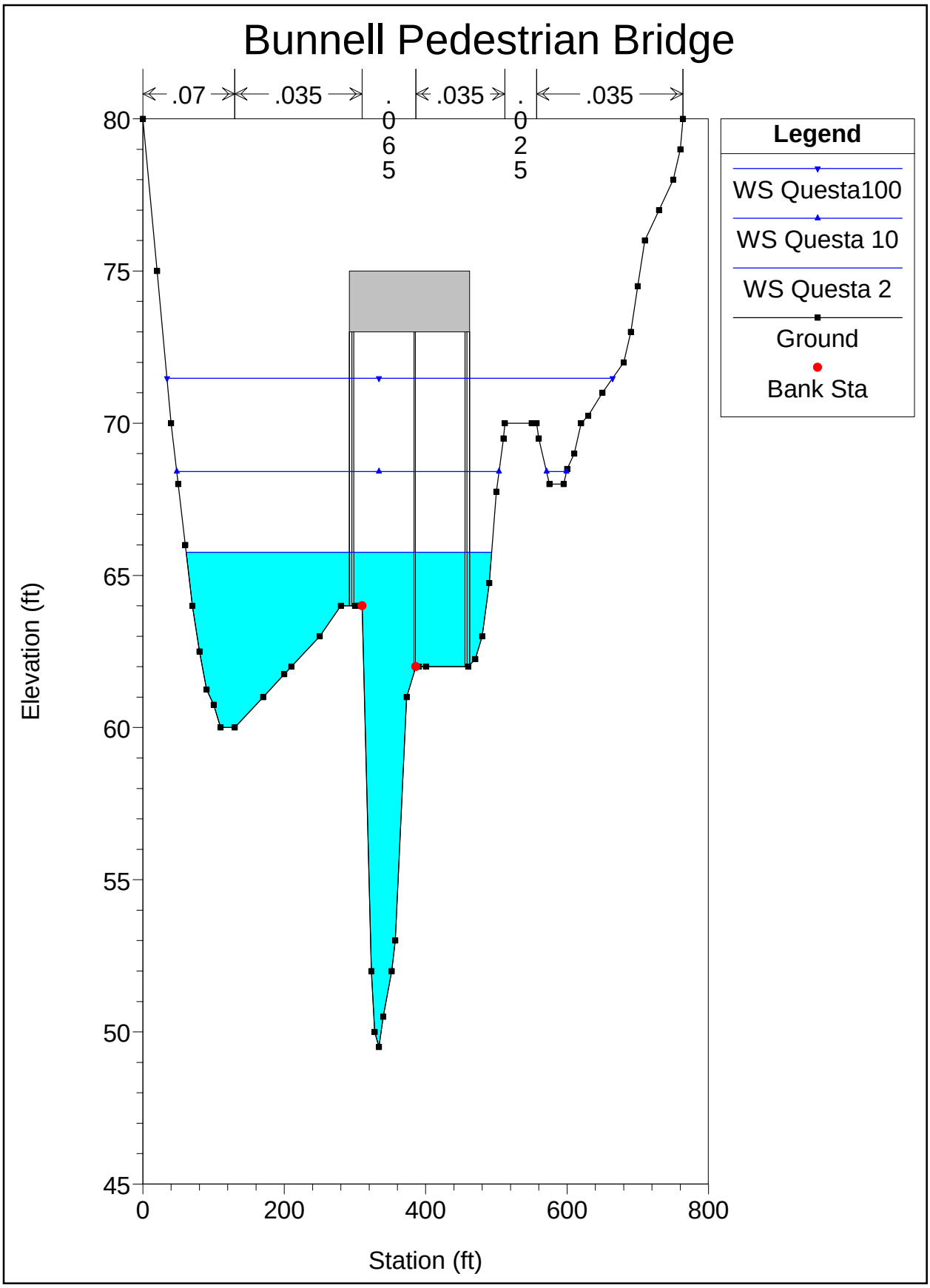
HEC-RAS Plan: Pro_Total_V2 River: SLO Creek Reach: Below Prefumo (Continued)

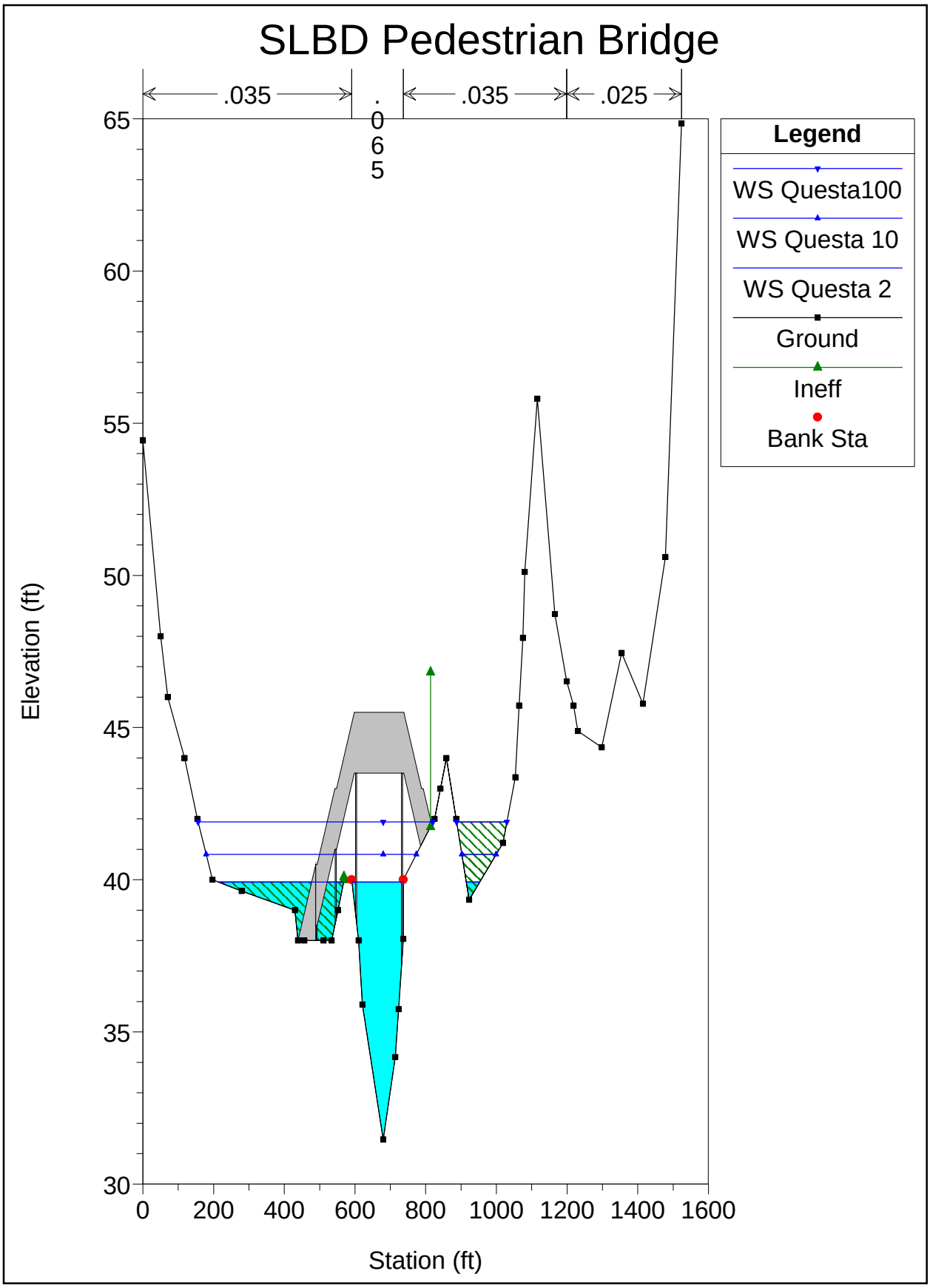
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Below Prefumo	19345.01	Questa 10	11936.36	31.04	41.03	39.83	41.40	0.003806	4.47	2459.96	993.67	0.33
Below Prefumo	19345.01	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									

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

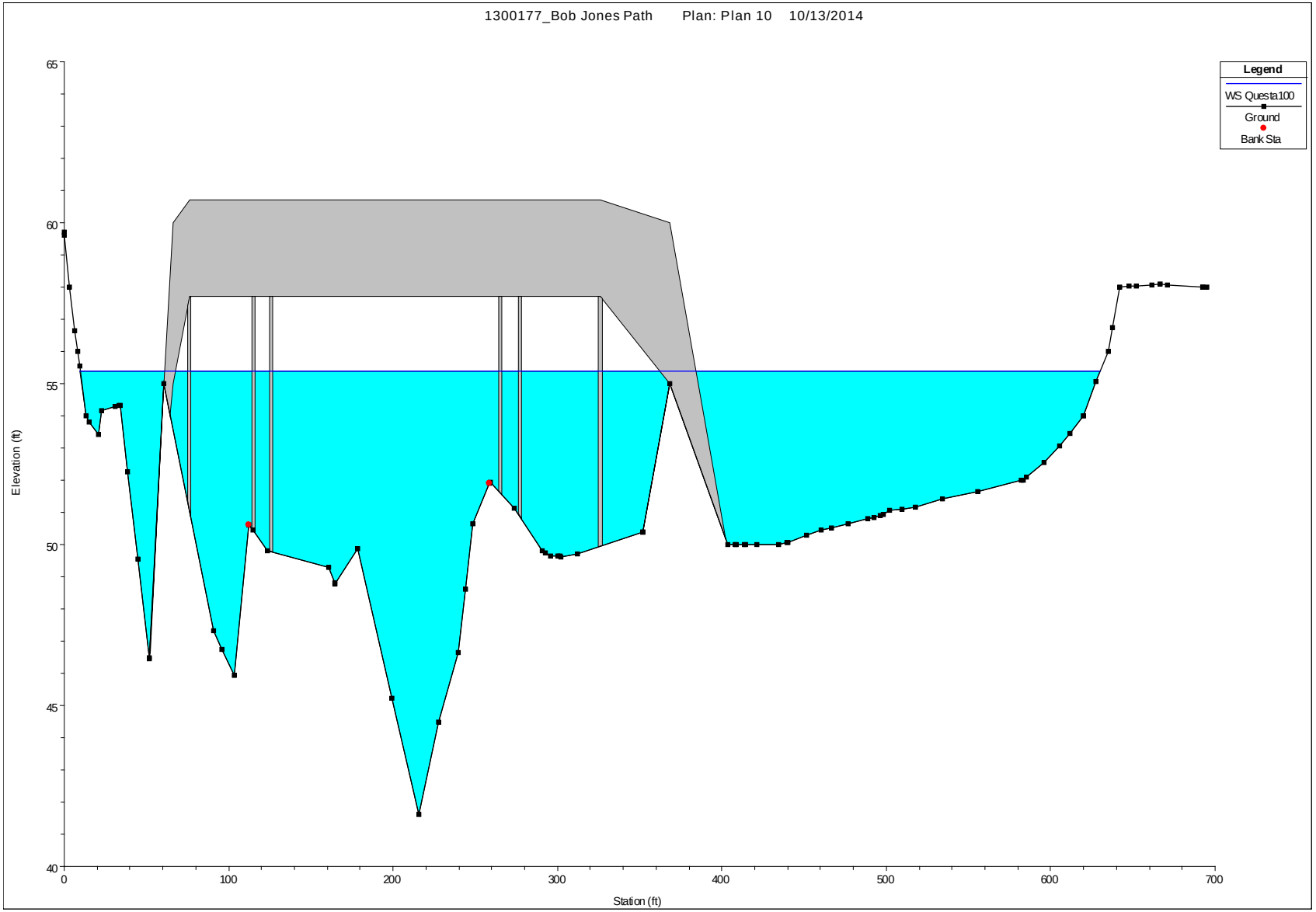
Reach	River Sta	Profile	Q Total	Min Ch El	W.S. Elev	Crit W.S.	E.G. Elev	E.G. Slope	Vel Chnl	Flow Area	Top Width	Froude # Chl
			(cfs)	(ft)	(ft)	(ft)	(ft)	(ft/ft)	(ft/s)	(sq ft)	(ft)	
Below Prefumo	14937.93	Questa 2	6568.53	17.16	32.20	26.67	32.38	0.001455	3.88	2339.06	900.08	0.22
Below Prefumo	14937.93	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

Baron Canyon Bridge



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 or alternate underpass, will not affect evacuation routes in the area. The bridge construction and underpass 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. The alternative to the San Luis Bay Drive pedestrian bridge, the bridge near Baron Canyon, would cause an approximately 0.5-foot rise in water surface elevations, but no buildings would be flooded, and Highway 101 would not be flooded during the 100-year event in the area of the bridge.

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, or an alternative Hwy 101 undercrossing. This undercrossing may be seasonally closed and would require annual maintenance to remove sediment. 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 alternative.

Signature – Hydraulic Engineer _____ Date 10/10/14
(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 10/10/14
(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:

_____ _____
Signature – Local Agency Project Engineer Date

APPROVED BY:

_____ _____
Signature - Caltrans Environmental Branch Chief Date

_____ _____
Signature – District Local Assistance Engineer Date

APPENDIX D: ARCHAEOLOGICAL SURVEY REPORT

Archaeological Survey Report for the Bob Jones Pathway San Luis Obispo to Ontario Road EIR Alternative 6 Project, San Luis Obispo County, California

By:
Deborah Jones, Principal Investigator

June 2014 DRAFT

USGS Topographic Quadrangle:
Pismo Beach 7.5-minute

Township and Range:
T31S, R12E

Project Size:
1.2 linear miles
1.7 acres

Submitted to:
Tad Stearns, Principal
Pacific Municipal Consultants
60 Garden Court, Suite 230
Monterey, CA 93940

FAR WESTERN ANTHROPOLOGICAL RESEARCH GROUP, INC.
2727 Del Rio Place, Suite A, Davis, California, 95618
http://www.farwestern.com 530-756-3941

Archaeological Survey Report for the Bob Jones Pathway San Luis Obispo to Ontario Road EIR Alternative 6 Project, San Luis Obispo County, California

By:
Deborah Jones, Principal Investigator

June 2014 DRAFT

Submitted to:
Tad Stearn, Principal
Pacific Municipal Consultants
60 Garden Court, Suite 230
Monterey, CA 93940

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SUMMARY OF FINDINGS

The Bob Jones Pathway San Luis Obispo to Ontario Road Environmental Impact Report (EIR) Alternative 6 Project is being undertaken by the County of San Luis Obispo (County) General Services Agency—Parks. The proposed alternative addresses issues that emerged during review of the Draft EIR (County of San Luis Obispo 2013) and is designed to alleviate potential conflicts with day-to-day agricultural operations, incorporate a highway undercrossing, and improve public safety by eliminating at-grade crossings. The study is being completed under provisions of the California Environmental Quality Act.

Prior work conducted for the Bob Jones Pathway Project by Far Western Anthropological Research Group, Inc., (Far Western) is documented in a Historic Properties Survey Report (Jones 2013). The document presents study findings for the proposed approximately five-mile-long bike and pedestrian pathway extending along Highway 101 south from South Higuera Street to the Ontario Road parking area. Under contract to the County, Pacific Municipal Consultants contacted Far Western to conduct an archaeological survey for those portions of Alternative 6 (A and B) that extend onto lands located outside the original project Area of Potential Effects (APE).

The current archaeological supplemental study reported herein covers 1.2 linear miles of a narrow 60-foot-wide corridor and a 1.7-acre area of land, and relies upon the baseline studies (i.e., records searches, Native American Commission contacts, Native American contacts, and background research) conducted for the larger project APE prepared by Far Western (Jones 2013). Prior studies found that no cultural resources were recorded within the previously surveyed portions of the alternative corridor. For the current study, a pedestrian field investigation of the unsurveyed 1.2-mile-long linear alternative route and 1.7-acre rectangular survey area was conducted on June 17, 2014, by a Far Western archaeologist. No cultural resources were found during the field survey. Of note, impacts to cultural resources should be avoided whenever possible. If buried cultural materials are encountered during construction, work should stop in that area until a qualified archaeologist can evaluate the nature and significance of the find. Additional survey will be required if the project changes to include areas not previously surveyed.

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INTRODUCTION

The Bob Jones Pathway Project will provide a pedestrian and bike trail linking the cities of San Luis Obispo and Avila Beach, California (Figures 1 and 2). The County of San Luis Obispo (County) General Services Agency—Parks is proposing an alternative route to that identified in the Draft Bob Jones Pathway San Luis Obispo to Ontario Road Environmental Impact Report (EIR; County of San Luis Obispo 2013). Alternative 6 consists of an approximately 60-foot-wide trail corridor that extends from the Octagon Barn along South Higuera Street southward to the San Luis Obispo Drive-Ontario Road staging area. The Alternative consists of 6A, which provides a route along San Luis Obispo Creek, and 6B, an approximately 2,000-foot variation that travels along Highway 101.

Far Western Anthropological Research Group, Inc., (Far Western) was contacted by Pacific Municipal Consultants (PMC) to complete an archaeological study of the previously unsurveyed portions of the proposed Alternative 6 (A and B) project area (Figure 2). The linear survey area extends 1.2 miles, either bordering Highway 101 or following the San Luis Obispo Creek channel. A small rectangular segment of survey area (1.7 acres) is located at the southernmost end of the project area and consists of an under-bridge crossing to allow access beneath the highway (Figure 3). Project studies for cultural resources were completed under provisions of the California Environmental Quality Act (CEQA). Principal State regulations relating to preserving historic and archaeological properties are Public Resources Code Section 5020 et seq., CEQA Sections 21083.2 and 21084.1, and CEQA Guidelines Section 15064.5.

The project was directed by Far Western Principal Investigator Deborah Jones, M.A. in Anthropology (emphasis in Archaeology), a Registered Professional Archaeologist with more than 30 years of experience in California Archaeology. Assistance with field survey was provided by Far Western Archaeological Monitor/Crew Chief Kacey Hadick, B.S. in Anthropology-Geography, with four years of field experience. Project management and report editing was provided by Far Western Principal Investigator, Patricia Mikkelsen, M.A. in Cultural Resources Management, a Registered Professional Archaeologist with more than 30 years of experience in California Archaeology.

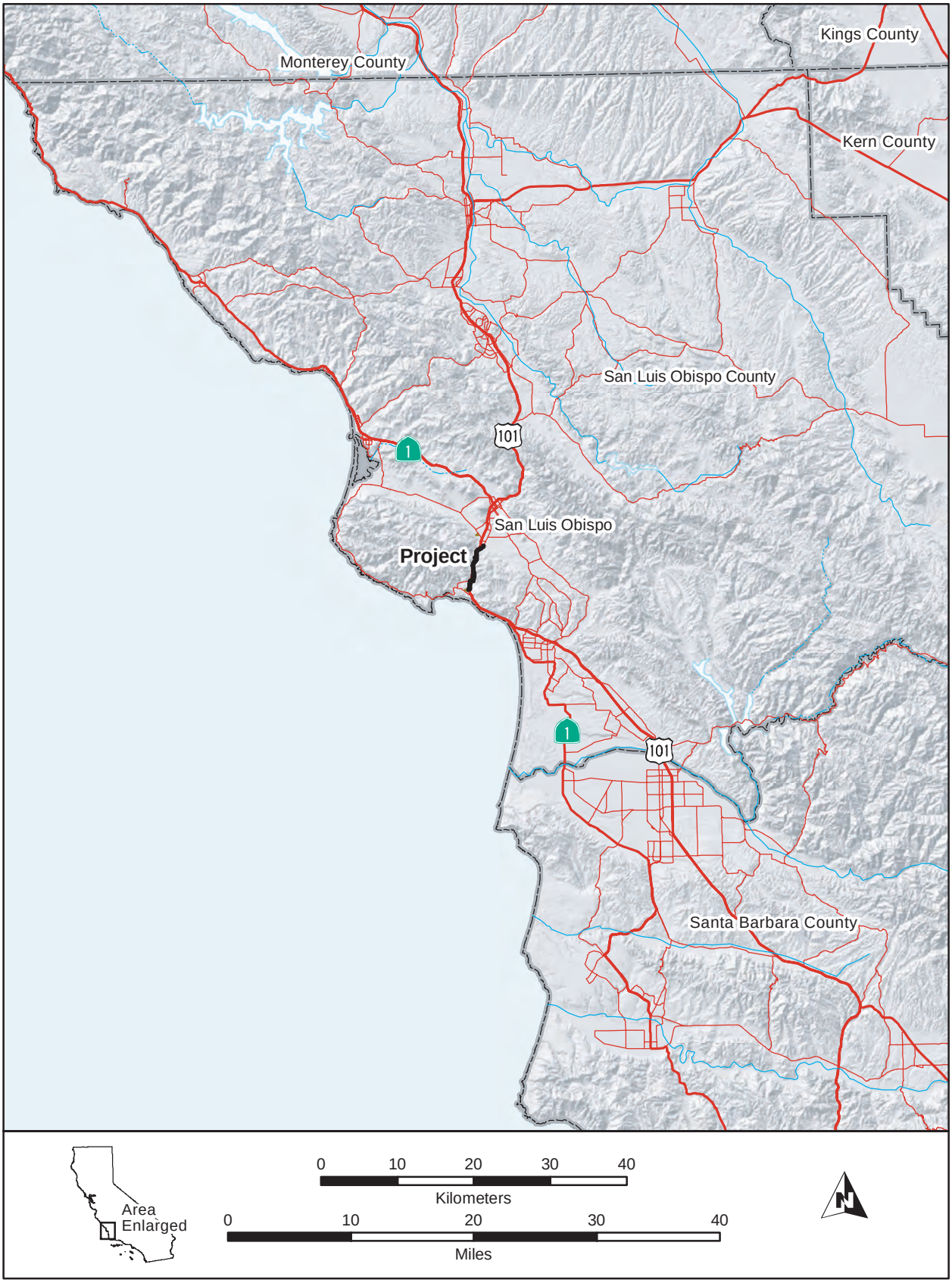

Figure 1. Project Vicinity.

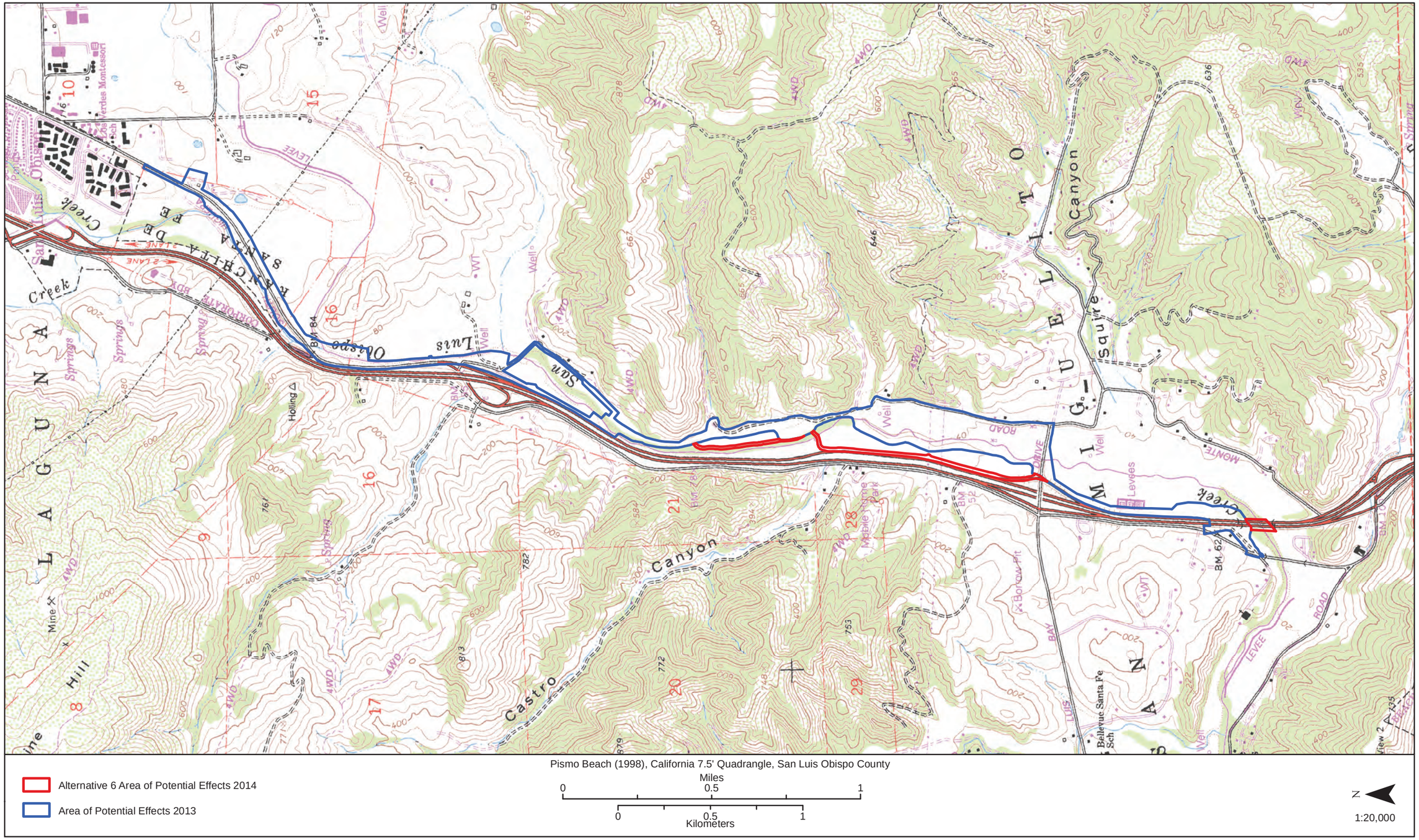

Figure 2. Project Location.

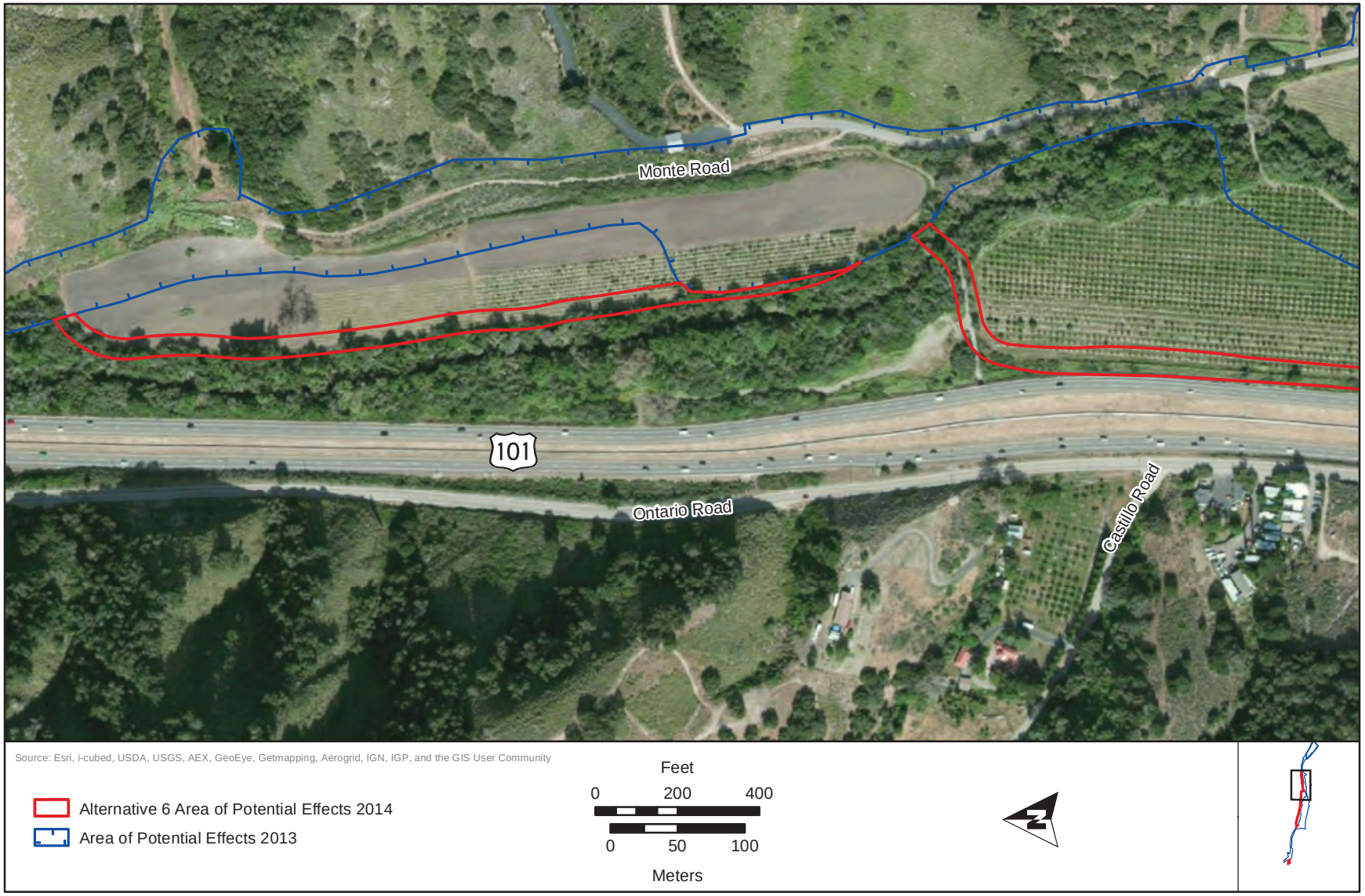

Figure 3. Area of Potential Effects (Map 1 of 3).

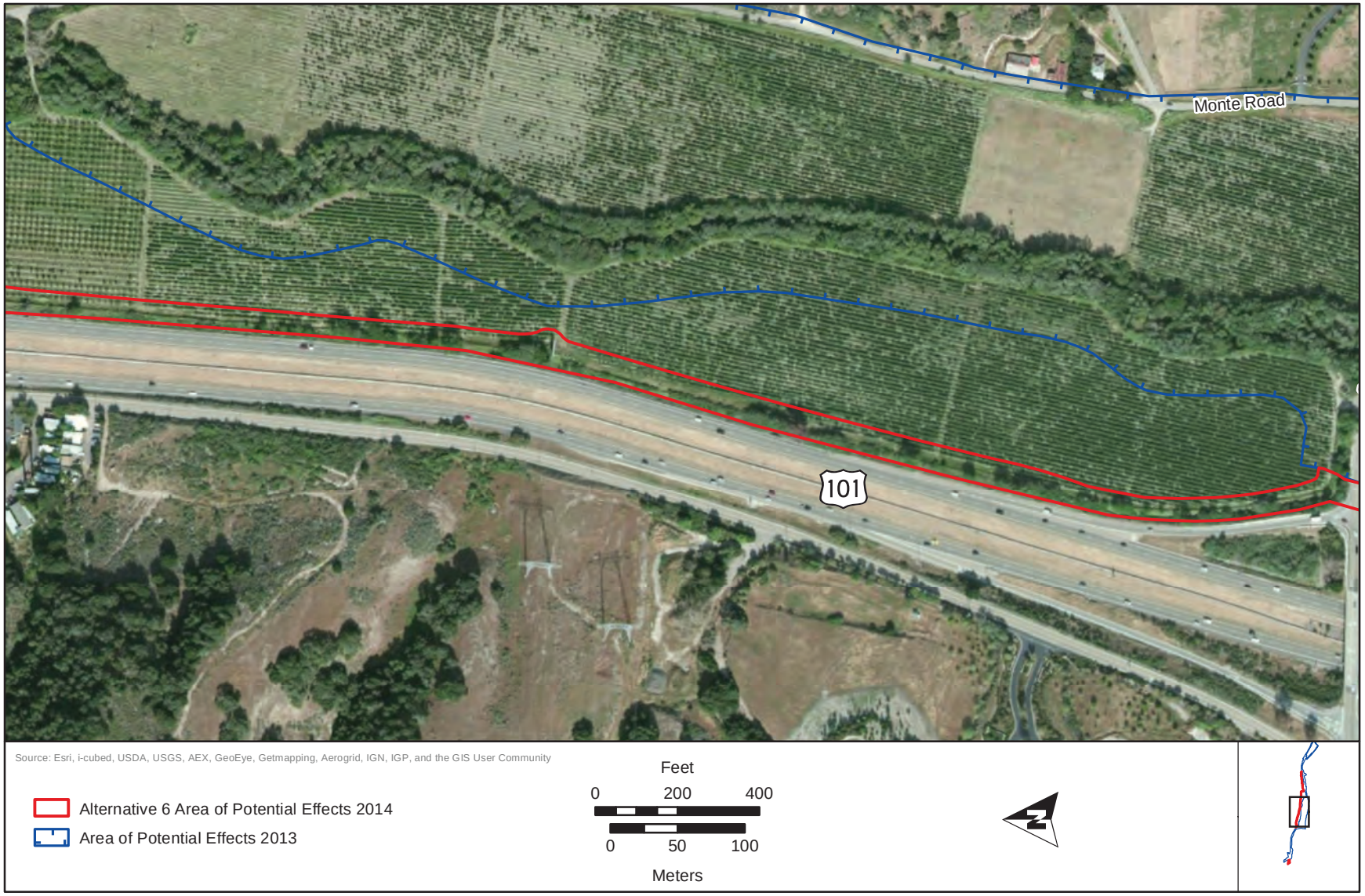

Figure 3. Area of Potential Effects (Map 2 of 3).

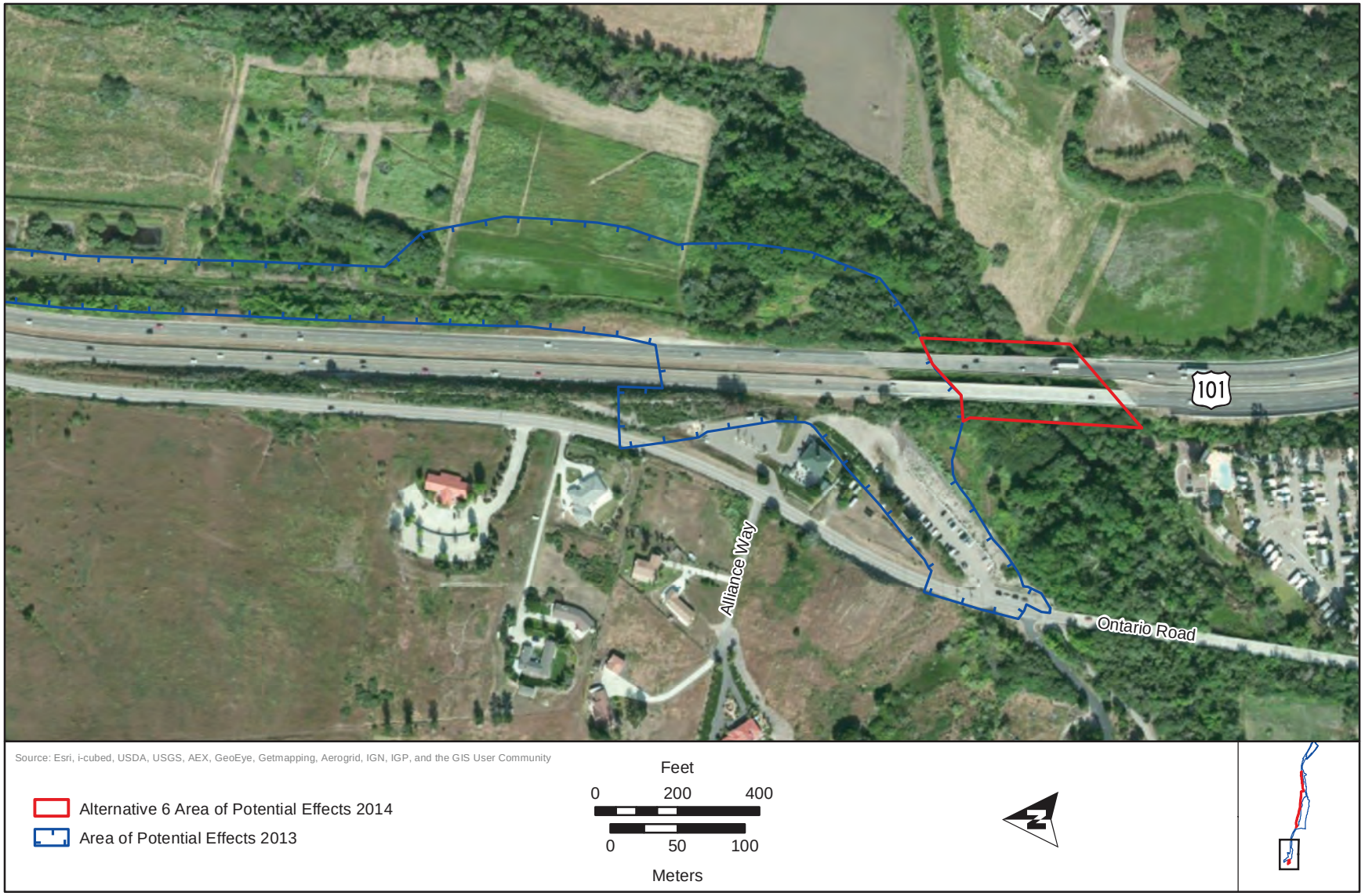

Figure 3. Area of Potential Effects (Map 3 of 3).

ALTERNATIVE PROJECT DESCRIPTION

The Bob Jones Pathway San Luis Obispo to Ontario Road EIR Alternative 6 Project description has been supplied by PMC. This description presents both the alternative project alignment, which crosses lands already surveyed during investigations reported in the Draft Bob Jones Historic Property Survey Report (Jones 2013), and the current Alternative 6 survey Area of Potential Effects (APE). The former APE consisted of a five-mile study area (see Figure 2, Area of Potential Effects 2013), while the current study area is restricted to a 60-foot-wide, 1.2-mile linear route and a small, 1.7-acre area of land at the southern end of the Bob Jones Pathway APE (see Figures 2 and 3).

ALTERNATIVE 6 – FARMING OPERATIONS AND CONFLICT AVOIDANCE

The objectives of this alternative (referred to within this narrative as 6A and 6B) are to: (1) reduce potential conflicts with day-to-day agricultural operations associated with active farms along the alignment; (2) incorporate the highway undercrossing concept instead of the highway overcrossing; and (3) improve safety by eliminating key at-grade crossings. The primary difference between alternatives 6A and 6B is a variation in the alignment of some 2,000 feet in a segment that travels northward from San Luis Bay Drive. Alternative 6A (subsumed within the previously surveyed APE) places the path closer to San Luis Obispo Creek, while 6B closely parallels Highway 101 and is within the current survey APE.

A segment-by-segment description of the alternative is provided below to allow for a meaningful comparison with the original project analyzed in the Draft EIR.

<u>Segment 1: Octagon Barn to South Higuera Street Crossing</u>. Under Alternative 6, Segment 1 would be aligned similar to the Draft EIR Alternative 3. Segment 1 extends between the Octagon Barn and the South Higuera Street crossing of San Luis Obispo Creek, and would be aligned so that the pathway would not cross South Higuera Street twice, but instead would continue to run along the south/east side of the roadway. This alignment would avoid safety concerns associated with the dual road crossings, while providing function and access.

<u>Segment 2: South Higuera Street Crossing to Bunnell Crossing</u>. This segment remains unchanged from the project as proposed within the Draft EIR.

<u>Segment 3: Bunnell Crossing to San Luis Bay Drive</u>. After crossing to the east side of San Luis Obispo Creek at the Bunnell property, the path alignment would follow the creek similar to the original alignment. At a location approximately 1,300 feet south of the crossing, however, the trail would continue along the east side of the creek along the riparian edge instead of shifting to Monte Road.

At the approximate midpoint of Segment 3, in the Baron Canyon area, the trail would shift to the south, crossing San Luis Obispo Creek approximately 4,200 feet south of the Bunnell Bridge. This bridge would be of a similar type as the other crossings along the proposed alignment, although the span would be longer based on creek conditions in this area. Immediately past this new crossing, Alternative 6A would continue along the west side of the creek between existing agricultural fields and riparian vegetation. There is a dirt farm road at this location. After following the creek for approximately 2,000 feet, the alignment would dip westward toward Highway 101 at the Gable property.

Instead of following the creek, Alternative 6B would dip westward immediately after the creek crossing, turning south and ultimately following a route parallel to Highway 101. The pathway would be located on Land Conservancy of San Luis Obispo County property immediately adjacent to Caltrans right-of-way.

Alternative 6A and 6B reconnect near the freeway. The alignment continues parallel to the freeway until reaching San Luis Bay Drive in Segment 4.

Segment 4: San Luis Bay Drive Crossing. At San Luis Bay Drive, the pathway would cross over or under the roadway. If crossing at grade, the pathway would hug the Highway 101 northbound on-ramp, then continue east, upslope, to a point approximately 200 feet east of the junction of San Luis Bay Drive and the freeway ramps. After crossing at a controlled crossing point, the alignment would then ramp down again and connect to the original trail alignment.

To pass under San Luis Bay Drive, a new bike/pedestrian tunnel would be constructed under the roadway, which is elevated in this location. The tunnel would also connect to the original trail alignment to the south.

Segment 5: San Luis Bay Drive to Ontario Road Staging Area. This segment of Alternative 6 would be similar to Alternative 4. Alternative 6 would align Segment 5 between San Luis Bay Drive and the Ontario Road Staging Area to cross Highway 101 under an existing bridge instead of constructing a new overcrossing structure and associated ramps. Within Segment 5, the pathway would extend south along a farm road within a Caltrans easement that is adjacent to the east side of the freeway. At Highway 101 (Bridge No. 49-0014R/L) at San Luis Obispo Creek, the pathway would go under the roadway and connect to the existing Ontario Road Staging Area.

SOURCES CONSULTED

RECORDS AND PREFIELD SEARCH

A records search and subsequent update were completed for the Bob Jones Pathway San Luis Obispo to Ontario Road Project. The searches were conducted by staff of the Central Coast Information Center (CCIC), University of California, Santa Barbara, in 2001 and 2005. An additional update was not conducted for the current smaller Alternative 6 survey areas as no new development has occurred on the subject properties. The CCIC search included a review of cultural resources records and reports within a quarter-mile radius of the five-mile-long APE. Primary reference materials consulted included the USGS 7.5-minute Pismo Beach quadrangle maps (showing previously recorded sites, isolates, and survey areas), site records, report files, and the *Directory of Properties in the Historical Property Data Files*. The latter includes smaller inventories such as the National Register of Historic Places, California Register of Historical Resources, California Points of Historical Interest, California and Historical Landmarks, and California State and Local Bridge Surveys.

The records search identified 30 cultural resources surveys and 12 archaeological sites (CA-SLO-522, -981, -1002H, -1556H, -1557H, -1558H, -1609H, -1612H, -1614H, -1365, -1731, and -2194) within the project vicinity. Current review of the records search data and results of the prior archaeological survey reports (Jones 2009, 2011; Jones and McKenzie 2006), and Historic Property Survey Report conducted for the Bob Jones Pathway San Luis Obispo to Ontario Road Project (Jones 2013), revealed that no previously recorded archaeological sites occur within or immediately adjacent to the Alternative 6 project survey areas. Of note, a single historic-period site (CA-SLO-2592H) was recorded by Far Western (Jones 2008) in the Monte Road-Baron Canyon area. This resource is located outside and some 300 feet north of the Alternative 6 route.

NATIVE AMERICAN HERITAGE COMMISSION

The Native American Heritage Commission was notified of the proposed Bob Jones Pathway Project in a letter from Far Western dated July 10, 2006. A records search of the Sacred Lands Inventory File and a list of local Native American contacts were requested in the letter. The Commission responded, in a letter dated August 6, 2006, that no Native American sacred sites were located in the immediate area, including the current Alternative 6 survey APE. In addition, the Commission supplied a list of Native American individuals/organizations that may have knowledge of the local cultural resources. As documented in the Historic Properties Survey Report (Jones 2013:7-8), contact with all listed parties was attempted. Reponses included concerns about the general sensitivity of the area, potential use of Chumash monitors, and a request that if any native vegetation needed to be removed, it would be appreciated if it was donated to the local Chumash; these materials could potentially be used for making baskets or re-creating structures.

BACKGROUND

The environmental setting, including recent modifications to the project area and the ethnographic affiliation of Native Americans inhabiting lands within the San Luis Obispo vicinity, is discussed below.

PHYSICAL ENVIRONMENT

The linear alternative project routes extend along the San Luis Obispo Creek drainage, which is set in a relatively narrow, north-south-oriented valley between the Pismo Beach area and the city of San Luis Obispo. Elevation ranges from 40 feet (12 meters) above mean sea level (amsl) along the relatively flat creek embankments and terraces, to a height of 400-600 feet (120-200 meters) amsl on the surrounding hill slopes. The dominant landform in the area is the Santa Lucia Range; these low coastal mountains are composed of highly eroded, metamorphosed marine sediments. Included are chert-rich outcrops of the Franciscan Complex and Monterey Formation (Hall 1973; Hansen et al. 1994). The more prominent Franciscan mélange contains outcrops of chert in various hues of red, white, and green, while Monterey chert occurs in linear or banded formation. The latter rock is generally buff to white; however the bedded cherts are highly variable, with colors ranging from white to tan, to dark brown and black. Both materials were used extensively by prehistoric populations for tool manufacture.

Soils mapped within the project area consist predominantly of Marimel Series sediments which form on alluvial fans, floodplains and narrow valleys (US Department of Agriculture 1980). These sandy-clay deposits found along San Luis Obispo Creek are poorly drained, possess a high water table, and are subject to flooding. Additional soil types found on alluvial fans and plains, and mapped along this watercourse, are: Riverwash, which occurs in the active stream channel; Salinas silty, clay loam; and Still, gravely, clay loam. Surrounding hill slopes are characterized by Chamise shaly loam, Pismo Tierra, and Gaviota fine, sandy loam. There is a potential for pockets of buried soil in creek-valley alluvial settings; however, frequent flooding of the creekside settings may have influenced prehistoric settlement on more elevated landforms surrounding the watercourse.

Vegetation in the vicinity consists of grasses and chaparral on the open hill slopes, interspersed with oak woodland infiltrating the moist drainages, and dense riparian vegetation along the San Luis Obispo Creek channel. On the uplands and along the drainages occur chamise (*Adenostoma fasciculatum*), scrub oak (*Quercus agrifolia*), white thorn (*Ceonothus leucondermis*), wild lilac (*C. tomentosus*), California laurel (*Umbellularia californica*), and buckeye (*Aesculus californica*). The riparian corridor includes alder (*Alnus* spp.), sycamore (*Plantanus racemosa*), willow (*Salix* spp.), and various grasses and ferns (Cooper 1967; Küchler 1988; Mooney 1988).

Climate within the area is classified as Mediterranean, with cool, wet winters and warm, dry summers. Temperature variations in the project vicinity are tempered by proximity to coastal marine air. The mean maximum summer temperature is 26 °C (78 °F) with an occasional extreme maximum of 38 °C (100 °F) possible. Mean minimum winter temperature is 6 °C (42 °F) with a possible extreme low of -1 °C (30 °F). Most rain falls during the winter months of December, January, February, and March, while little or no precipitation occurs during the months of May through September. Average annual precipitation for coastal San Luis Obispo County is 55 centimeters (21.5 inches), although geography produces some local variation (Beck and Haase 1977; Major 1988).

Regional fauna include various species of birds, mammals, reptiles, and amphibians. Common mammal species consist of cottontail rabbit (*Sylvilagus audubonii*), raccoon (*Procyon lotor*), striped skunk (*Mephitis mephitis*), and deer (*Odocoileus hemionus*). In the past, black bear (*Ursus americanus*) and grizzly bear (*Ursus arctos*) also occupied the area. In addition, San Luis Obispo Creek provided habitat for a variety of fish species, most notably steelhead trout (*Oncorhynchus mykiss*), which used the watercourse seasonally for spawning.

RECENT MODIFICATION

Historic-period modifications to the immediate project vicinity consist primarily of highway construction with Highway 101 bordering the alternative to the west. Lesser access roads occur to the east, with most of the route cutting across fenced farmlands.

ETHNOGRAPHIC AFFILIATION

The project vicinity was inhabited by speakers of the Obispeño language of the Chumash language family. Disagreement exists regarding the location of the Chumash and neighboring Salinan language boundary at the time of Spanish settlement. Kroeber (1925) and most others placed the boundary just north of Morro Bay on the coast, reaching inland to the east, then southeast along the Santa Lucia Range, and east again to the central Carrizo Plain. Gibson (1983), on the other hand, argued that the boundary was farther north, reaching from Ragged Point inland in an east-southeast direction to the Mission San Miguel vicinity and on to the northern edge of the Carrizo Plain. This disparity, illustrated by Milliken (2000:12), leaves a wide swath of ambiguous ethnographic landscape across northern San Luis Obispo County.

The following is a summary of ethnographic information on contact-period Obispeño Chumash material culture, socio-political organization, and regional marriage networks. These data were derived from contact-period accounts and records and, as such, cannot be strictly applied to cultures inhabiting the area throughout the prehistoric past. They do, however, provide a comparative framework for interpretation of earlier lifeways and population distributions.

The Obispeño Chumash practiced a hunter-gatherer-fisher economy and used stone, bone, and shell implements to hunt game animals and capture fish and birds, along with basketry items (rarely preserved) to gather various vegetal resources. Males generally hunted, while females collected and processed vegetal resources (i.e., seeds, nuts, roots, and bulbs) and prepared foods for consumption. Houses were small and either grass-thatched or earth-covered, with larger structures used as dance or sweat lodges. Tule balsa canoes, constructed from bundled reeds, were used in estuary and embayment settings found at Pismo Beach, Avila Beach, and Morro Bay.

Socio-political organization within the Obispeño Chumash language group was organized at the village level. Village headmen had the authority to resolve internal disputes, redistribute wealth, and engage in warfare, and they received status privileges such as the acquisition of multiple wives, and tributes of food and various goods. Warfare was not uncommon, and the "big man's" physical prowess and leadership determined the outcome in conflicts commonly involving the theft of women and resources, and threats of magical poisoning.

Marriage networks were far-ranging, extending to 50 kilometers (31 miles) in distance (Milliken 2000). Mission records have recorded inter-marriages of individuals from such present-day areas as San Luis Obispo, Paso Robles, Cambria, Avila, Morro Bay, and Santa Margarita. These marriages created an interaction sphere between interior and coastal regions and provided a means of exchanging resources from these varied zones.

In 1772, the Mission San Luis Obispo was established. Manned by "Fr. Jose Cavaller, five soldiers, and two Lower California Mission Indians" (Milliken and Johnson 2002), the location was referred to as *Tixlini*. This reference appears in the confirmation register, entered by Father Serra (founder of the mission), and likely reflects a native place name rather than an inhabited village location (Engelhardt 1933:35). Conversion of the local native population was slow over the first few years, probably due to the abundance of wild food resources (seeds and berries, game animals, and fish) which allowed the small, mobile groups to remain independent. Three factors—the impacts of European diseases, diminishing local resources, and an increase in the area's non-native population—forced the resistant natives to turn to the Mission San Luis Obispo for food, clothing, and shelter. That the natives grudgingly relinquished their traditional lifeway is reflected in the pulses in conversions and baptisms recorded for the mission from the late 1770s until the 1830s. Termination of the Mexican government's mission land holdings in 1836 found the Mission Indians in search of jobs as laborers for various ranchos.

FIELD METHODS

A 1.2-linear-mile pedestrian survey of the previously unsurveyed Alternative 6 APE was conducted on June 17, 2014, by Far Western Archaeological Crew Chief Kacey Hadick. The survey also covered a rectangular 1.7-acre portion of land at the southern end of the Bob Jones Pathway APE near the Ontario Road staging area (see Figure 3). As the project survey area extended across lands owned by the Land Conservancy of San Luis Obispo County and a private property owner, phone contact was made with the responsible parties identified by the County to notify them of the survey and to gain approval for access, which was obtained.

Survey methods consisted of 20-meter-wide survey transects along the linear route and over portions of the 1.7-acre study area. Access was gained to the agricultural survey properties at San Luis Obispo Drive, with the surveyor walking northward along the Highway 101 corridor to the San Luis Obispo Creek crossing. This portion of the survey area contains a dirt frontage road that follows the highway alignment, and is bordered to the west by a fence and construction fill embankment, with orchards located to the east. Ground surface visibility was generally good along the dirt roadway, fence, and embankment, with low visibility within the orchard which was overgrown with thick grasses. As the creek crossing in the northern portion of the survey area was flowing with water and thick with vegetation, access to the remainder of the Conservancy property was made at Monte Road. This survey segment follows the east side of the creek and runs along the edge of an orchard and an uncultivated field (Figure 4). Surface visibility was hindered by surface vegetation, with the surveyor inspecting any open areas of ground.

Located at the southern end of the Bob Jones Pathway Project, the 1.7-acre survey area encompassed the bridge over San Luis Obispo Creek at Highway 101 (Figure 5). In general, the vicinity is overgrown with vegetation, including poison oak, fennel, and nettles. The surveyor transected portions of the survey area along and within the creek channel, inspecting any open areas beneath and surrounding the bridge structure.

STUDY FINDINGS AND CONCLUSIONS

No cultural materials were identified within the 1.2-linear-mile survey route or the 1.7-acre rectangular APE for the Bob Jones Pathway San Luis Obispo to Ontario Road EIR Alternative 6 Project. Of note, additional survey should be conducted if any revised project plans extend the boundaries of proposed impacts beyond the current archaeological APE. If previously unidentified cultural materials are unearthed during construction, work should be halted in that area until a qualified archaeologist can assess the significance of the find.

Figure 4. Land Conservancy Property, looking North.

Figure 5. View of Highway 101 Bridge within Southern Survey Area, looking East.

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