ADDENDUM SHEET

Date: July 26, 2011

Project: Los Osos Valley Road/U.S. 101 Interchange Improvements Project
EA: 05-0H7300
Location: 05-SLO-101 (PM 25.5/26.3)

Los Osos Valley Road/U.S. 101 Interchange Improvements Project 05-SLO-101 (PM 25.5/26.3)

The following corrections are made to the ***Water Quality Assessment Report*** *for the Los Osos Valley Road/US 101 Interchange, City of San Luis Obispo, California* (May 2008).

Changes resulting from the project description are reflected below. The complete updated project description is attached.

The Water Quality Assessment Report is revised by reference to the attached updated project description as follows:

- The removal of the two new culverts under Route 101,
- The removal of the Prefumo Creek channel work between the southbound off-ramp and the mainline of Route 101,
- Sediment removal is no longer a component of the project, and
- The addition of Rock Slope Protection around the Los Osos Valley Road bridge piers.

Section/Page	Change From	Change To
Figure 2 (Alternative 3) and Figure 3 (Alternative 6)	Locations of the proposed 7' Prefumo Creek culvert under US 101.	All indications of the proposed 7' Prefumo Creek culvert under US 101 were eliminated see attached Figures 2 and 3.
Page 36, Minimization Measure WQ-4: Design and Implement…	The following paragraph: "Minimization Measure WQ-4: Design and Implement Detention Basin between the mainline US 101 and the northbound offramp or within northbound loop onramp. A detention basin will be constructed in between the mainline US 101 and the northbound offramp or within the interior of the Northbound loop onramp. Stormwater from the eastern portion of the overcrossing and from the reconstructed onramp would then be transported to the basin before ultimately draining into San Luis Obispo Creek. This treatment will allow pollutants to settle in the basin due to throttling of the discharge rate of stormwater flows."	By reference to this Addendum sheet the paragraph listed is deleted.

Page 36, Minimization Measure WQ-6: Permanent Treatment BMP's	The following paragraph: "Minimization Measure WQ-6: Permanent Treatment BMP's Appropriate permanent treatment BMP's will be implemented during final design. Proposed BMP's may include Infiltration or Detention devices, Media filters and Multi-Chambered Treatment Trains. "	By reference to this Addendum sheet the paragraph listed is now: "Minimization Treatment BMP's Appropriate permanent treatment BMP's will be implemented during final design. Proposed BMP's may include Bio-filtration BMP's, Infiltration devices, Media filters and Multi-Chambered Treatment Trains."
Page 26	WQ-4 through WQ-6	By reference to this Addendum sheet WQ-5 is now referenced as WQ-4 and WQ-6 is now referenced as WQ-5.

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District 05

PROJECT DESCRIPTION

Build Alternatives

Two build alternatives (Alternative 3 and Alternative 6) have been identified to satisfy the purpose and need for the project. Alternative 3 has been identified by the City of San Luis Obispo as the locally preferred alternative. Alternative 3 and Alternative 6 are described below.

Common Design Features of the Build Alternatives

This project is intended to accommodate current and future travel demands. Calle Joaquin Road south of LOVR has been realigned so that the existing "T" intersection of LOVR and Calle Joaquin Road north of LOVR has been converted to a four-way intersection. The Calle Joaquin Road realignment was developed and completed by the Costco Wholesale Corporation as a condition of approval and mitigation measure for traffic impacts.

The project limits extend along LOVR between Auto Park Way to the west and South Higuera Street to the east covering a distance of 0.52 mile and along US 101 for about 2,500 feet south and 4,300 feet north of the LOVR overcrossing.

Under both build alternatives, the San Luis Obispo Creek arch culvert would be changed. Built in 1986, the existing three-barrel structural steel-plate arch culvert is a large structure, carrying LOVR over San Luis Obispo Creek. This project would widen and raise the roadway. These roadway changes require lengthening the culvert with a new structural steel arch (matching what exists) and increasing the loading on the existing culvert that would remain. To determine the feasibility of this increased loading, a structural analysis was conducted. The analysis showed that the existing culvert can easily carry the additional loading, making this a viable option.

Included in the project, along both sides of all project-related local streets, are sidewalks with grades and curb ramps at intersections, in compliance with Americans with Disabilities Act requirements. To help non-motorized transportation (such as pedestrians and bicyclists) cross the intersections, the project would limit use of free-slip ramps, include single-lane ramps, and review the southwest corner of the US 101 northbound off-ramp/LOVR to determine if a widened area is needed to create a bigger "landing" area.

A portion of the proposed Bob Jones City-to-Sea Bike Trail passes through the project. This project would provide bikeway access to connect to LOVR at the northbound on- and off-ramp intersection. Project design would not preclude connection of the Prefumo Creek trail extension to the future Bob Jones City-to-Sea Bike Trail (including possible extension of the trail under or over LOVR). Each build alternative would provide 6.5-foot Class II bike lanes throughout the project on both sides of LOVR. These lanes would connect to the existing 6-foot sidewalks in front of the Los Verdes Parks I and II developments. Sidewalks on both sides of the San Luis Obispo Creek bridge would be widened to accommodate Class I trails. Safety device placement, striping, and signage of the Class I trail would be completed once the location and alignment of the Bob Jones City-to-Sea Bike Trail is determined south of the interchange. Any at-grade crossings of the LOVR by the Bob Jones City-to-Sea Bike Trail would use appropriate and safe design guidelines for visibility and signal operations. Bicycle detector loops would be placed at all intersections that have traffic signals. Project design would remain consistent with the Bob Jones City-to-Sea Bike Trail Project Master Plan and the City of San Luis Obispo Bicycle Transportation Plan.

Both alternatives would:

1. Widen LOVR to four lanes from South Higuera Street to 600 feet west of Calle Joaquin to meet the existing four-lane section west of Calle Joaquin.
2. Extend the existing San Luis Obispo Creek culvert crossing to accommodate widened LOVR
3. Construct retaining walls to avoid Prefumo Creek and business impacts at LOVR and the US 101 southbound ramps.
4. Construct sidewalks and Class II bike lanes along both sides of LOVR.
5. Change the existing signals at the LOVR and US 101 ramp intersections.
6. Widen and rebuild the US 101 northbound off-ramp and build a retaining wall to avoid creek impacts.
7. Change the landscaping and sidewalks along LOVR at Los Verdes.
8. Change the striping, medians, and lane widths along LOVR at Los Verdes.
9. Restripe South Higuera Street to optimize the capacity of the South Higuera Street/LOVR intersection, given the widening of LOVR.
10. Include pedestrian crossing controls at all intersections that have traffic signals unless determined unsafe or detrimental to traffic conditions.
11. Further widen San Luis Obispo Creek bridge to accommodate a future Class I trail on either shoulder of the structure.
12. Use concrete paving at off-ramp ends.
13. Use street print (stamped/imprinted asphalt or concrete) through crosswalks for increased visibility.
14. Use rubberized asphalt concrete, as a project feature, on LOVR in front of the Los Verdes Parks I and II.
15. Restripe LOVR from two to four lanes in front of the Los Verdes Parks I and II driveways to assist with access.
16. Plant native landscaping within the intersections and ramps where appropriate.

Unique Features of Build Alternatives

Alternative 3—Minimum Build

Alternative 3 is the minimum build alternative for this project and is the locally preferred alternative. This alternative would widen LOVR between the recently constructed Calle Joaquin intersection with LOVR west of US-101 and the Los Verdes Park community east of US-101 to 4 lanes, construct a new two lane structure adjacent the existing LOVR Overcrossing, and widening San Luis Obispo Creek culvert crossing.

The actual work to be performed under the project includes:

1. Widen LOVR to four lanes from South Higuera Street to the existing four-lane section west of Calle Joaquin.

2. Extend the existing San Luis Obispo Creek culvert crossing to accommodate widened LOVR.

3. Construct retaining walls to avoid Prefumo Creek and business impacts at LOVR and the US 101 southbound ramps.

4. Construct sidewalks and Class II bike lanes along both sides of LOVR.

5. Change the existing signals at the LOVR and US 101 ramp intersections.

6. Widen and rebuild the US 101 northbound off-ramp and build a retaining wall to avoid creek impacts.

7. Change the landscaping and sidewalks along LOVR at Los Verdes.

8. Change the striping, medians, and lane widths along LOVR at Los Verdes.

9. Restripe South Higuera Street to optimize the capacity of the South Higuera Street/LOVR intersection, given the widening of LOVR.

10. Pavement section for ramps and LOVR will be 0.2' rubberized asphalt concrete over 0.3' hot mix asphalt over 1.67' aggregate based on the Life Cycle Pavement Cost Analysis findings. Concrete paving will be used at both off-ramp ends.

11. Use street print through crosswalks for increased visibility.

12. Use open-grade or rubberized asphalt on LOVR in front of the Los Verdes Parks I and II.

13. Plant native landscaping within the intersections and ramps where appropriate.

14. Construct retaining walls to avoid San Luis Obispo Creek impacts.

15. Construct a separate US 101 overcrossing to carry the two eastbound lanes with a split profile.

16. Raise the intersection of LOVR at the US 101 southbound ramps.

17. Construct new street lighting along LOVR.

18. Raise headwalls on Prefumo Creek box culvert under the southbound off-ramp to accommodate ramp raising and widening.

19. Widen the US 101 southbound off-ramp and construct retaining walls.

20. Change the storm drain system along LOVR to accommodate widening and profile changes.

21. Construct a standard acceleration lane from the southbound on-ramp.

Changes to Work to be Performed Resulting from Value Analysis and Public Comment

22. Include pedestrian crossing controls at all signalized intersections unless specific movements are determined unsafe or detrimental to traffic conditions.

23. Further widen San Luis Obispo Creek Bridge to accommodate a future Class I trail on either shoulder of the structure.

24. Restripe LOVR from two to four lanes in front of the Los Verdes Parks I and II driveways to assist with access.

25. Construct a right-turn lane from eastbound LOVR to northbound US-101 on-ramp.

26. Use concrete paving at off ramp termini.

27. Use imprinted AC for crosswalks for increased visibility, outside limits of state right-of-way.

28. Place bicycle detector loops at signalized intersections.

Alternative 6—Moderate Build, Near Full Standard

This alternative proposes to widen Los Osos Valley Road between Calle Joaquin west and the Los Verdes communities east of US 101 (see Figures 1.3-3 and 1.3-4). The existing LOVR overcrossing would be replaced to improve the profile, vertical clearance, and space required for the southbound hook off-ramp.

In addition, the existing northbound loop on-ramp to US 101 would be reconstructed, and the northbound off-ramp would be widened. A new northbound diagonal on-ramp to US 101 may be added in the northeast quadrant of the interchange as a phased improvement. An auxiliary lane would be added to northbound US 101 from the end of the northbound loop on-ramp to 1,000 feet beyond the end of the northbound diagonal on-ramp. The northbound diagonal on-ramp would be supported by retaining walls and an additional bridge over Prefumo Creek. The existing southbound on- and off-ramps from US 101 would be removed. South of LOVR, new/relocated southbound on- and off-ramps from US 101 would be constructed in a hook ramp configuration. Calle Joaquin south of LOVR is being realigned to accommodate the realigned southbound US 101 ramps and to create a four-way intersection with Calle Joaquin north LOVR.

The actual work to be performed under the project includes:

1. Widen LOVR to 4 lanes from South Higuera St. to 600 feet north of Calle Joaquin

2. Extend or reconstruct existing San Luis Obispo Creek Culvert Crossing to accommodate widened LOVR

3. Replace the LOVR US-101 Overcrossing

4. Relocate and reconstruct the southbound US-101 ramps

5. Reconstruct northbound US-101 loop on-ramp

6. Construct northbound US-101 slip on-ramp and merge lane to US-101

7. Construct northbound US-101 on-ramp bridge & retaining walls at Prefumo Creek

8. Construct signalized intersection of US-101 southbound ramps and Calle Joaquin

9. Construct sidewalks and combined bike lane/shoulder along LOVR
10. Construct new street lighting along LOVR and Calle Joaquin
11. Modify existing signals at LOVR/US-101 northbound off-ramp intersection
12. Abolish existing southbound US-101 ramps and Perfumo Creek Box Culvert
13. Widen US-101 northbound off-ramp and construct retaining wall
14. Extend the Perfumo Creek box culvert under US-101 for new southbound off ramp
15. Construct storm drain systems for LOVR and reconstruct ramps
16. Modify landscaping and sidewalks along LOVR at Los Verdes
17. Restripe South Higuera Street

No-Build Alternative

Environmental review must consider the effects of not implementing the proposed project. The No-Build Alternative provides a baseline for comparing the impacts of all alternatives.

Effects of the No-Build Alternative include deteriorating level of service, impacts to air quality, and continuing safety conditions. Unless operational improvements are made, future planned development and general regional growth will increase traffic volumes to a degree that all intersections in the vicinity of the LOVR/US 101 interchange would operate with severe congestion during both the morning and afternoon peak hours. This would result in congestion on US 101 from backups at the off-ramp intersections. This congestion would affect both local traffic on LOVR and regional traffic on US 101. Decreasing operational efficiency may negatively affect air quality and would likely affect existing safety

CALLE JOAQUIN

EXISTING RC BOX CULVERT

DITCH

CONSTRUCTION LIMITS

NEW CULVERT

RET WALL

WIDEN BRIDGE

TEMPORARY CREEK ACCESS EASEMENT

Potential Staging Area

NEW CULVERT

EXISTING RC BOX CULVERT

EXISTING TRIPLE BARREL ARCH BRIDGE

San Luis Obispo Creek

EXISTING RC BOX CULVERT

CALLE JOAQUIN CONSTRUCTION IN PROGRESS

RET WALL

NEW CULVERT

RAISE PROFILE

RET WALL

CONSTRUCTION LIMITS

RET WALLS

EXISTING RC BOX CULVERT

LOS OSOS VALLEY ROAD

AUTO PARK WAY

Prefumo Creek

CALLE JOAQUIN

Potential Staging Area

US-101

S. HIGUERA STREET

LEGEND

- CONSTRUCTION LIMITS (ESA FENCING)
- PROPOSED DRAINAGE IMPROVEMENTS
- EXISTING FLOWS & FEATURES
- STUDY AREA
- EXISTING RIGHT OF WAY
- PROPOSED RIGHT OF WAY
- CUT / FILL
- RETAINING WALL

FIGURE 2

325 0 325 650

Feet

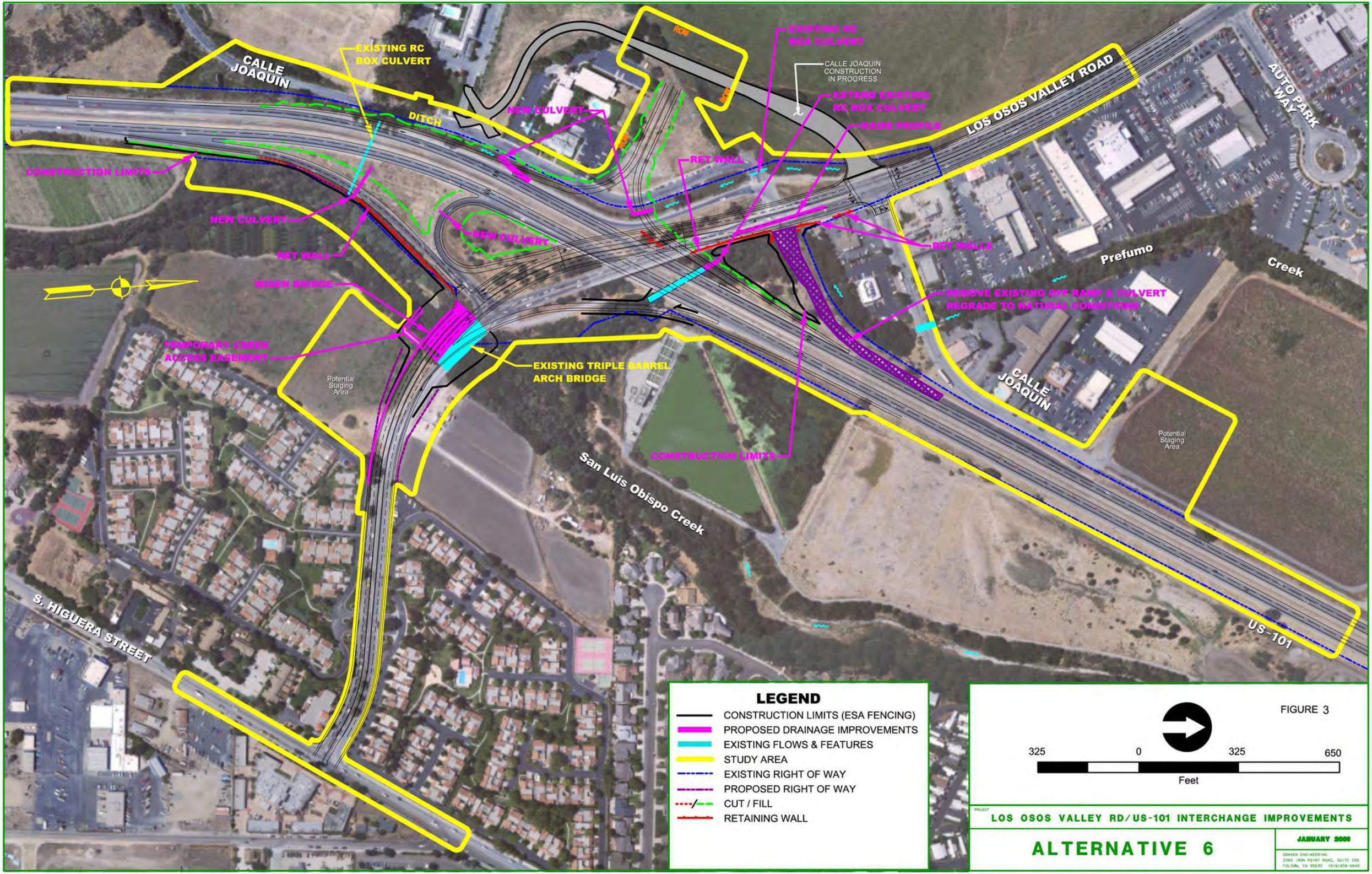
PROJECT

LOS OSOS VALLEY RD/US-101 INTERCHANGE IMPROVEMENTS

ALTERNATIVE 3

JANUARY 2008

DOKKEN ENGINEERING
2365 IRON POINT ROAD, SUITE 200
FOLSOM, CA 95630 (916)858-0642


CALLE JOAQUIN
EXISTING RC BOX CULVERT
DITCH
NEW CULVERT
CONSTRUCTION LIMITS
NEW CULVERT
RET WALL
NEW CULVERT
WIDEN BRIDGE
TEMPORARY CREEK ACCESS EASEMENT
Potential Staging Area
EXISTING TRIPLE BARREL ARCH BRIDGE
San Luis Obispo Creek
CONSTRUCTION LIMITS
S. HIGUERA STREET
EXISTING RC BOX CULVERT
CALLE JOAQUIN CONSTRUCTION IN PROGRESS
EXTEND EXISTING RC BOX CULVERT
RAISE PROFILE
RET WALL
RET WALLS
REMOVE EXISTING OFF RAMP & CULVERT REGRADE TO NATURAL CONDITIONS
LOS OSOS VALLEY ROAD
AUTO PARK WAY
Prefumo
Creek
CALLE JOAQUIN
Potential Staging Area
US-101
LEGEND
CONSTRUCTION LIMITS (ESA FENCING)
PROPOSED DRAINAGE IMPROVEMENTS
EXISTING FLOWS & FEATURES
STUDY AREA
EXISTING RIGHT OF WAY
PROPOSED RIGHT OF WAY
CUT / FILL
RETAINING WALL
FIGURE 3
325 0 325 650
Feet
PROJECT
LOS OSOS VALLEY RD/US-101 INTERCHANGE IMPROVEMENTS
ALTERNATIVE 6
JANUARY 2006
DOKKEN ENGINEERING
2365 IRON POINT ROAD, SUITE 200
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WATER QUALITY ASSESSMENT REPORT

Los Osos Valley Road/ US 101 Interchange Improvement Project

San Luis Obispo County, California
05-SLO-101-PM 25.5-26.3
EA# 0H7300

Prepared for:

State of California
Department of Transportation, District 5
50 Higuera Street
San Luis Obispo, California 93401

and

City of San Luis Obispo
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March 2008

TABLE OF CONTENTS

1.0 INTRODUCTION 1
1.1 PROJECT PURPOSE AND NEED 1
1.2 PROJECT DESCRIPTION 1
1.3 APPROACH TO WATER QUALITY ASSESSMENT 6
2.0 AFFECTED ENVIRONMENT 8
2.1 SURFACE WATER RESOURCES 8
2.2 GROUNDWATER RESOURCES 8
2.3 TOPOGRAPHY 8
2.4 SOILS/EROSION POTENTIAL 11
2.5 CLIMATE AND PRECIPITATION 11
2.6 POPULATION AND LAND USE 12
2.7 EXISTING WATER QUALITY 12
2.8 POLLUTANTS OF CONCERN 13
2.9 REGULATORY SETTING 15
2.10 BENEFICIAL USES 18
2.11 WATER QUALITY OBJECTIVES 20
3.0 ENVIRONMENTAL CONSEQUENCES 27
3.1 IMPACT ASSESSMENT METHODOLOGY 27
3.2 POTENTIAL IMPACTS TO WATER QUALITY 27
4.0 AVOIDANCE, MINIMIZATION, and/or MITIGATION MEASURES 30
5.0 REFERENCES 36

LIST OF FIGURES AND TABLES

FIGURES

Figure 1: Project Location 2
Figure 2: Alternative 3 5
Figure 3: Alternative 6 7
Figure 4: Watershed Location Map 9
Figure 5: Watershed and Major Sub-Basins 10

TABLES

Table 1: Existing Water Quality in San Luis Obispo Creek at LOVR 12-13
Table 2: Proposed 2006 303 (d) List of Water Quality Limited Segments 16
Table 3: Objectives for Inland Surface Waters 21-25
Table 4: Objectives for Groundwater 25-26
Table 5: Construction BMPs 28

EXECUTIVE SUMMARY

The proposed project would improve the Los Osos Valley Road/US 101 Interchange by widening the overcrossing, Los Osos Valley Road, and reconfiguring ramps. Two build alternatives are proposed with slightly different impacts but both would require work in and adjacent to several streams (San Luis Obispo Creek and Prefumo Creek).

Adverse impacts to water quality could result from both construction activity and post-construction impacts with either alternative. Existing interchange conditions create 8.8 acres of impervious area within the state right of way. The project is anticipated to disturb 16.0 acres of state right of way for Alternative 3 and 19.2 acres of state right of way for Alternative 6. The Alternative 3 improvements would produce an additional 1.0 acre of impervious within state right of way. Alternative 6 would produce a larger footprint and would add 2.0 acres of impervious within state right of way.

Anticipated increase in pollutant loading would occur temporarily during the construction phase of the project. Temporary Minimization Measures WQ-1 (Erosion-Control Measures), WQ-2 (Measures to Control Turbidity), and WQ-3 (Spill Prevention and Control) and BIO-5 (Prevent Erosion in Wetlands and Drainages), BIO-18 (Water Quality Measures), BIO-23 (Minimize Loss of Steelhead Spawning and Rearing Habitat), and BIO-24 (Avoid Substantial Increases in Water Temperature) would ensure that construction does not cause adverse impacts to water quality.

Also, because the project consists of a permanent increase in impervious surfaces under either alternative, there remains potential for a permanent increase in runoff and pollutant loading without implementation of construction, design, and treatment BMPs. Additional minimization measures WQ-4 (Design and Implement Detention Basin), WQ-5 (Use Local Standards When Feasible) and WQ-6 (Permanent Treatment BMPs) would prevent adverse water quality impacts from post-construction operation of the interchange.

1.0 INTRODUCTION

The California Department of Transportation (Caltrans) proposes to improve the Los Osos Valley Road/US 101 Interchange located in the City of San Luis Obispo. The project is located in the City of San Luis Obispo, at the edge of the Los Osos Valley, against the Irish Hills (Figure 1). The purpose of this report is to evaluate impacts of this project on potentially affected water resources and their beneficial uses. This report is intended to evaluate the existing surface and groundwater resources and the potential effects of the project on these water resources.

1.1 PROJECT PURPOSE AND NEED

The purpose of this project is to improve traffic operations and safety on Los Osos Valley Road and the Los Osos Valley Road/US 101 Interchange. The acceptable Level of Service for the proposed project is cusp of C/D at the year 2035. Project alternatives provide additional traveled lanes on Los Osos Valley Road over Route 101 and through the ramp intersections. Alternatives include improvements to the existing non-standard on- and off-ramps to better serve the needs of local and regional traffic (including bicycle and pedestrian traffic). The project is to be designed such that it will not preclude the planned ultimate widening of Route 101 or future interchange improvements.

The project is needed to respond to projected increases in regional and local traffic demand on the state and local roadway systems at the Los Osos Valley Road/US 101 Interchange. The study area's lack of alternative routes and presence of non-standard existing roadway geometrics combine with increased traffic to escalate congestion and reduce traffic safety for vehicle, bicycle and pedestrian travel.

The traffic demand on the Los Osos Valley Road corridor will increase as the area continues to develop. New commercial uses are proposed for development on Los Osos Valley Road west of the interchange at Route 101. A Home Depot and Costco stores have recently opened for business west of the interchange. Two new hotels have been proposed for development on Calle Joaquin (south). The traffic from these developments as well as other potential new development in the area will increase volumes at the Los Osos Valley Road/Route 101 interchange and the current interchange design will not be adequate to serve the increased traffic demand.

1.2 PROJECT DESCRIPTION

Two viable build alternatives (Alternative 3 and Alternative 6) for the proposed improvements have been identified by the Project Development Team that satisfy the purpose and need for this project. Alternative 3 is the locally preferred alternative. The estimated construction cost of these alternatives ranges from $21.7 million to $29.4 million. The major difference between the alternatives relates to the

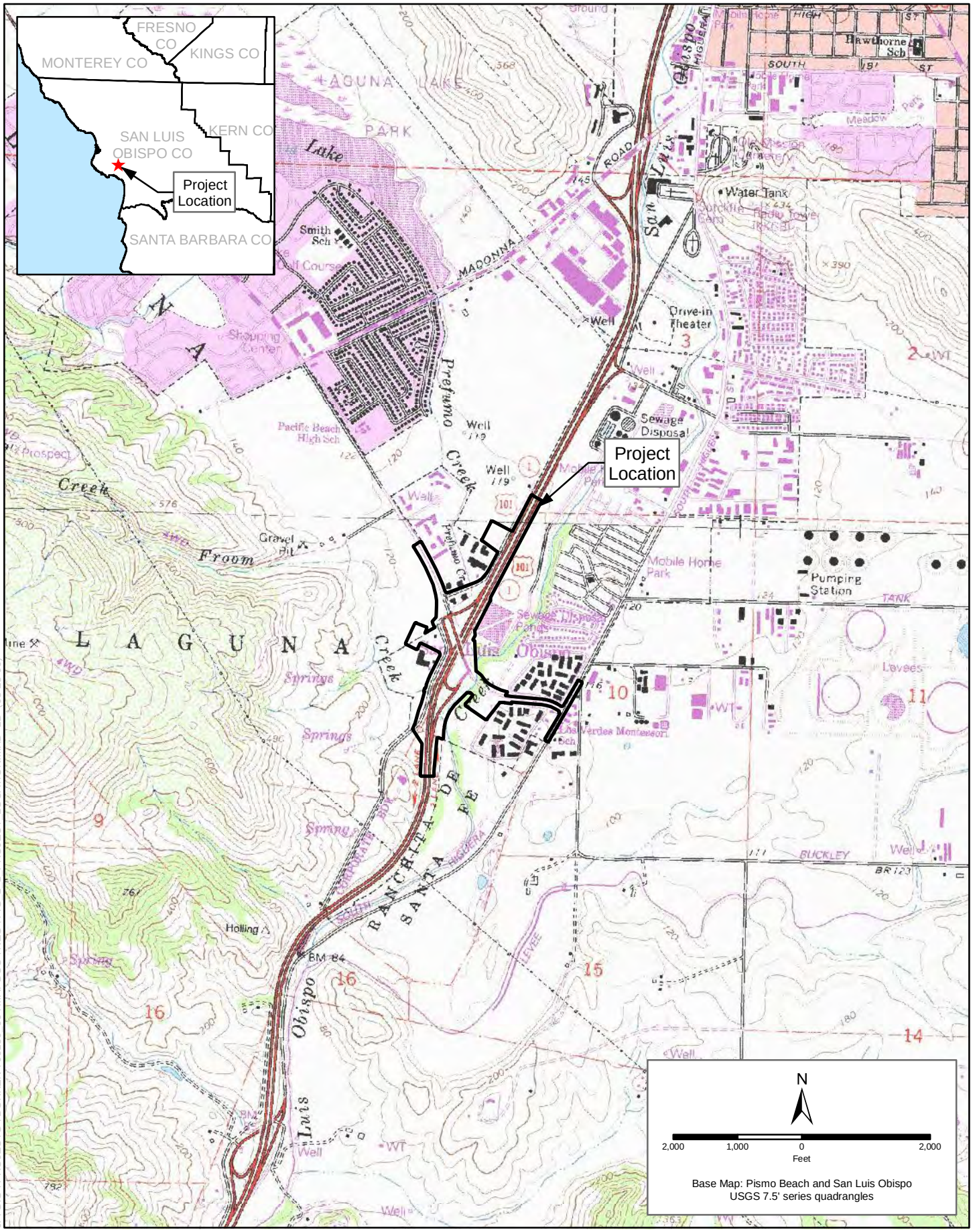

Figure 1
Project Location

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overcrossing. Alternative 3 would widen the overcrossing by constructing a separate overcrossing for eastbound lanes while Alternative 6 would replace it. Other important differences include type and location of the southbound on/off ramps and the configuration of the northbound on/off ramp intersection with Los Osos Valley Road. Alternative 3 and Alternative 6 are described below

Common Design Features of the Build Alternatives

This project is intended to accommodate current and future travel demands. Calle Joaquin Road south of Los Osos Valley Road is being realigned such that the existing "T" intersection of Los Osos Valley Road and Calle Joaquin Road north of Los Osos Valley Road will be converted to a four-legged intersection. The Calle Joaquin Road realignment is currently being developed by the Costco Wholesale Corporation as a condition of approval and mitigation measure for traffic impacts and is scheduled for completion prior to initiation of interchange improvements.

The project limits extend along Los Osos Valley Road between Auto Park Way to the west and South Higuera Street to the east and along US 101 for approximately 762 meters (2,500 feet) south and 1,500 meters (4,300 feet) north of the Los Osos Valley Road overcrossing, covering a distance of 0.84 km (0.52 miles).

Under both build alternatives, the San Luis Obispo Creek Arch Culvert will be modified. The existing three-barrel structural steel plate arch culvert is a large and modern (1986) structure, carrying Los Osos Valley Road over San Luis Obispo Creek. This project would widen and raise the roadway. These roadway revisions require lengthening the culvert with a new structural steel arch (matching the existing), as well as increasing the loading on the existing culvert that is to remain. To determine the feasibility of this increased loading, a structural analysis was conducted. The analysis showed that the existing culvert can easily carry the additional loading placed on it making this a viable option.

Non-motorized and Pedestrian Facilities

It is proposed to provide Class II bike lanes throughout the project on both sides of Los Osos Valley Road as described for each alternative. Sidewalks with grades and curb ramps at intersections that satisfy Americans with Disabilities Act requirements are included in the project along both sides of all local streets involved. A portion of the Bob Jones City-to-Sea bikeway passes through the project. The project will be constructed to provide bikeway access to connect to Los Osos Valley Road at the northbound on/off-ramp intersection.

Access Areas

Access to the construction site would occur along existing paved roadways and would be limited to the designated permanent and temporary impact areas for Alternatives 3 and 6. Two staging areas have been proposed and were included in each study area.

Traffic Management

Significant traffic delays are not anticipated due to the construction staging. The majority of construction can be accomplished using conventional traffic controls. Freeway traffic will be maintained with two lanes of traffic in each direction continuing through the falsework for the overcrossing widening. Falsework erection and removal will be performed at low traffic volume work periods. Median crossovers will be used temporarily to maintain northbound flow. Southbound flow will be detoured onto the existing southbound off ramp, through the intersection of Los Osos Valley Road, and back onto the freeway via the existing southbound on-ramp. Such activities will be restricted to periods when a single lane in each direction will be sufficient, which is likely at night.

Widening and reconstruction of the ramps will require some short duration ramp closures. For the northbound off- and southbound on-ramp closures, traffic will be detoured to the Higuera / US 101 interchange. Shorter closures will be scheduled for the northbound on- and southbound off-ramp closures, which will require traffic to use ramps at Prado Road and Madonna Road.

Staging

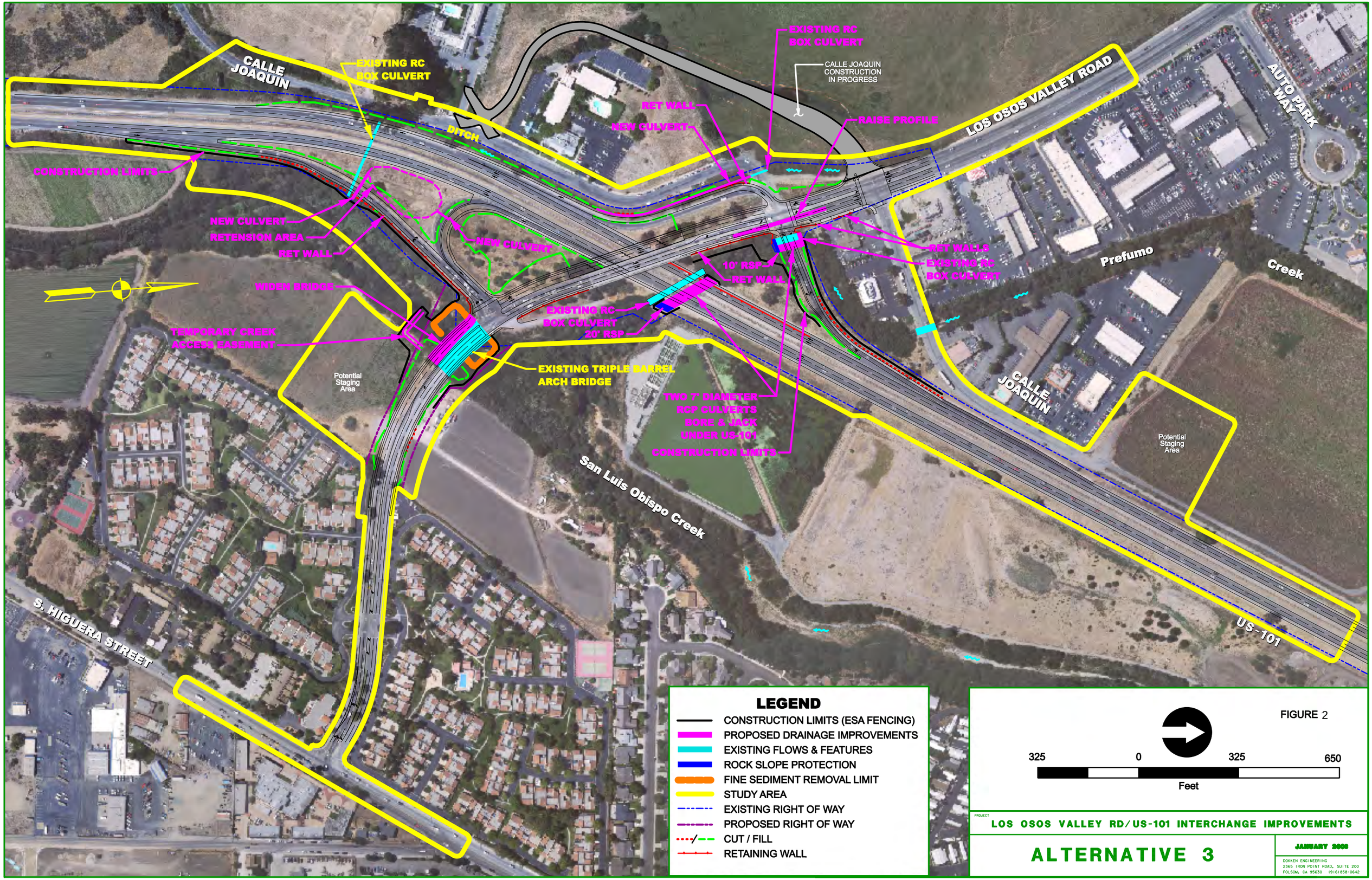
The concept for traffic handling during construction entails constructing the new bridge embankment and eastbound Los Osos Valley Road lanes while traffic continues to operate on the existing roadway and with the existing signals. Work would be conducted in four stages.

- **Stage 1:**
  Construct eastbound Los Osos Valley Road widening
  Construct US 101 overcrossing for eastbound lanes
  Widen San Luis Obispo Creek Bridge

- **Stage 2:**
  Reconstruct northbound on- and off-ramps
  Reconstruct southern ½ of northbound ramp intersection to new grade
  Shift traffic on overcrossing and San Luis Obispo Creek Bridge to south side
  Remove falsework over US 101

- **Stage 3:**
  Reconstruct southbound on- and off-ramps
  Reconstruct southern ½ of southbound ramp intersection to new grade
  Shift traffic to south side of southbound ramp intersection
  Construct improvements to north side of San Luis Obispo Creek Bridge

- **Stage 4:**
  Reconstruct northern ½ of southbound ramp intersection
  Complete final project paving and striping


CALLE JOAQUIN
EXISTING RC BOX CULVERT
DITCH
CONSTRUCTION LIMITS
NEW CULVERT
RETENSION AREA
RET WALL
NEW CULVERT
WIDEN BRIDGE
TEMPORARY CREEK ACCESS EASEMENT
Potential Staging Area
EXISTING TRIPLE BARREL ARCH BRIDGE
EXISTING RC BOX CULVERT
20' RSP
10' RSP
RET WALL
TWO 7' DIAMETER RCP CULVERTS BORE & JACK UNDER US-101
CONSTRUCTION LIMITS
San Luis Obispo Creek
S. HIGUERA STREET
RET WALL
NEW CULVERT
EXISTING RC BOX CULVERT
CALLE JOAQUIN CONSTRUCTION IN PROGRESS
RAISE PROFILE
LOS OSOS VALLEY ROAD
AUTO PARK WAY
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Prefumo
Creek
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LEGEND
CONSTRUCTION LIMITS (ESA FENCING)
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EXISTING FLOWS & FEATURES
ROCK SLOPE PROTECTION
FINE SEDIMENT REMOVAL LIMIT
STUDY AREA
EXISTING RIGHT OF WAY
PROPOSED RIGHT OF WAY
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FIGURE 2
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PROJECT
LOS OSOS VALLEY RD/US-101 INTERCHANGE IMPROVEMENTS
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Unique Features of Build Alternatives

Alternative 3-Minimum Build

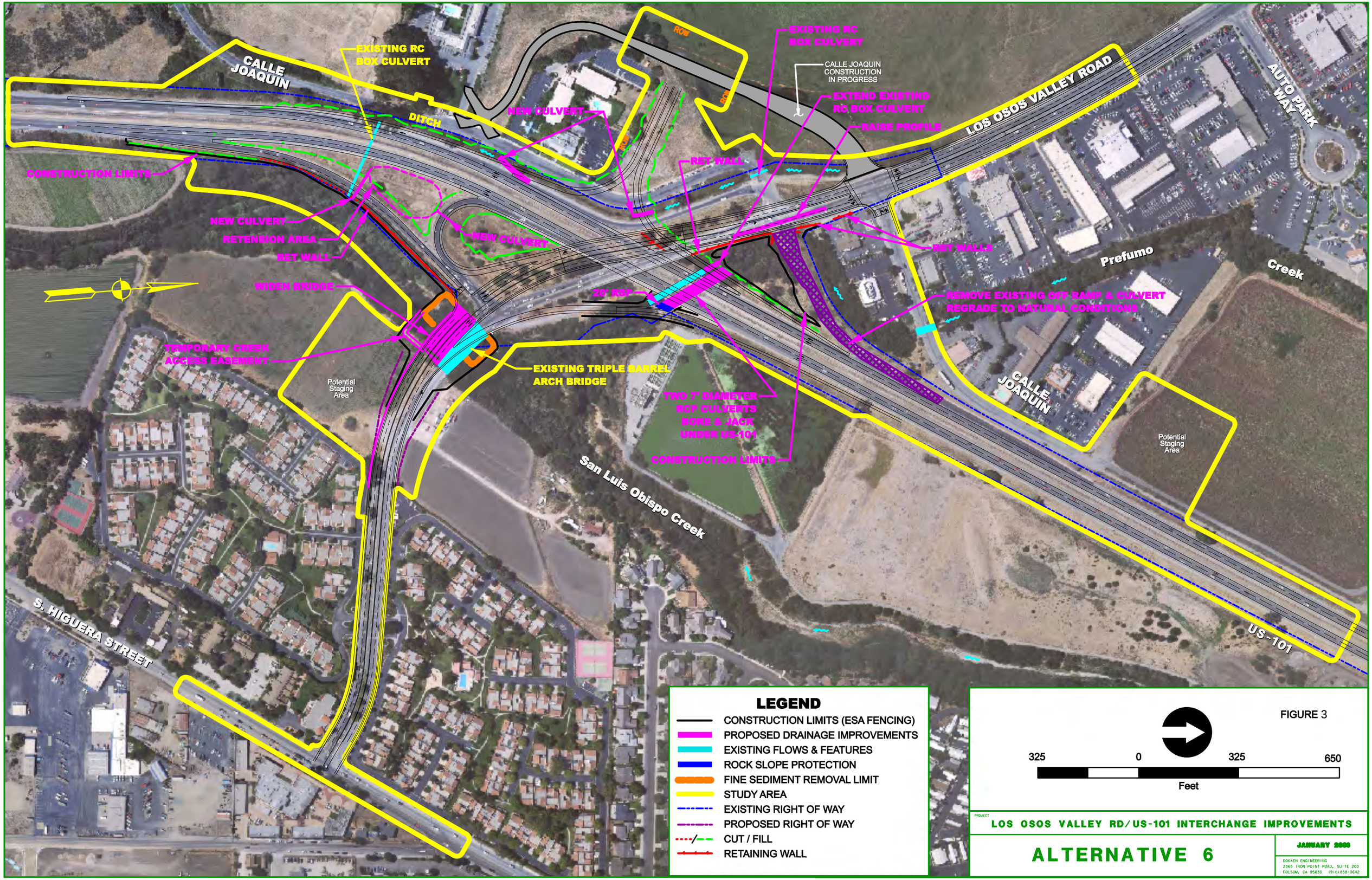
Alternative 3 is the minimum build alternative for this project and is the locally preferred alternative (Figure 2). This alternative proposes to widen Los Osos Valley Road between the recently constructed Calle Joaquin intersection with Los Osos Valley Road west of US 101 and the Los Verdes community east of US 101 to 4 lanes, including the existing Los Osos Valley Road Overcrossing structure, and San Luis Obispo Creek culvert crossing. The widening will be accomplished by constructing a separate US 101 overcrossing to carry the 2 eastbound lanes. Los Osos Valley Road will be a split profile over US 101 to accommodate the westbound lanes on the existing overcrossing. The project will lengthen the San Luis Obispo Creek culvert crossing on the south side and construct a cantilevered sidewalk on the north side. These widening efforts will accommodate four 12 foot through-lanes, bike lanes, sidewalks (on both sides), and a median 5' to 16' in width, which will be used for left turn pockets where needed. The northbound US 101 off-ramp will widened from the intersection with Los Osos Valley Road to 500 feet south. The southbound on-ramp will be reconstructed near the current location opposite the southbound off-ramp.

Alternative 6 -- Moderate Build, Near Full Standard

This alternative proposes to widen Los Osos Valley Road between Calle Joaquin west and the Los Verdes Communities east of US 101 (Figure 3). The existing Los Osos Valley Road OC will be replaced to improve the profile, vertical clearance and space required for the south-bound hook off-ramp. The existing north-bound loop on-ramp to US 101 will be reconstructed and the north-bound off-ramp will be widened. A new north-bound diagonal on-ramp to US 101 may be added in the NE quadrant of the interchange as a phased improvement. An auxiliary lane will be added to north-bound US 101 beginning at the terminus of the north-bound loop on-ramp and ending 1000 feet beyond the terminus of the north-bound diagonal on-ramp. The north-bound diagonal on-ramp would be supported by retaining walls and an additional bridge over Prefumo Creek. The existing south-bound on- and off- ramps from US 101 will be removed. South of Los Osos Valley Road, new south-bound on- and off-ramps from US 101 would be constructed in a 'Hook Ramp' configuration. Calle Joaquin south of Los Osos Valley Road is being realigned to accommodate the realigned south-bound US 101 ramps and to create a 'Four-Leg' intersection with Calle Joaquin north of Los Osos Valley Road.

1.3 APPROACH TO WATER QUALITY ASSESSMENT

The purpose of this Water Quality Assessment Report is to determine whether the proposed Los Osos Valley Road/US 101 Interchange improvements project will have an adverse impact on water quality. The determination of impacts is based on the anticipated change in pollutant loads due to construction activities required in the stream channels, the excavation required on land in proximity to the stream banks, pollutant loads anticipated during construction, and changes in impervious area percentage between the existing condition and the post-project condition. The analysis includes consideration of BMPs to be implemented as part of the project. This assessment also discusses existing water quality regulations and the methods for complying with those regulations.


CALLE JOAQUIN
EXISTING RC BOX CULVERT
DITCH
NEW CULVERT
ROW
EXISTING RC BOX CULVERT
CALLE JOAQUIN CONSTRUCTION IN PROGRESS
EXTEND EXISTING RC BOX CULVERT
RAISE PROFILE
LOS OSOS VALLEY ROAD
AUTO PARK WAY
CONSTRUCTION LIMITS
RET WALL
NEW CULVERT
RETENSION AREA
RET WALL
NEW CULVERT
WIDEN BRIDGE
20' RSP
RET WALLS
Prefumo
Creek
REMOVE EXISTING OFF RAMP & CULVERT
REGRADE TO NATURAL CONDITIONS
TEMPORARY CREEK ACCESS EASEMENT
Potential Staging Area
EXISTING TRIPLE BARREL ARCH BRIDGE
TWO 7' DIAMETER RCP CULVERTS BORE & JACK UNDER US-101
CONSTRUCTION LIMITS
CALLE JOAQUIN
Potential Staging Area
San Luis Obispo Creek
S. HIGUERA STREET
US-101
LEGEND
CONSTRUCTION LIMITS (ESA FENCING)
PROPOSED DRAINAGE IMPROVEMENTS
EXISTING FLOWS & FEATURES
ROCK SLOPE PROTECTION
FINE SEDIMENT REMOVAL LIMIT
STUDY AREA
EXISTING RIGHT OF WAY
PROPOSED RIGHT OF WAY
CUT / FILL
RETAINING WALL
FIGURE 3
325 0 325 650
Feet
PROJECT
LOS OSOS VALLEY RD/US-101 INTERCHANGE IMPROVEMENTS
ALTERNATIVE 6
JANUARY 2006
DOKKEN ENGINEERING
2365 IRON POINT ROAD, SUITE 200
FOLSOM, CA 95630 (916)858-0642

2.0 AFFECTED ENVIRONMENT

2.1 SURFACE WATER RESOURCES

The project area is located in the San Luis Obispo Creek Watershed which is approximately 84 square miles (Figure 4). The area of watershed influencing the Project site is approximately 49 square miles (Figure 5). San Luis Obispo Creek originates approximately 9 miles upstream of the Project site. Prefumo Creek and Froom Creek are both tributaries to the San Luis Obispo Creek. Prefumo Creek begins at the Laguna Lake located 1 mile upstream of the Project site. Froom Creek begins 3.4 miles upstream of the Project site. The confluence of San Luis Obispo Creek and Prefumo Creek occurs approximately 390 ft upstream of the LOVR crossing with San Luis Obispo Creek. The Froom Creek confluence with San Luis Obispo Creek occurs approximately 1,200 ft downstream of the LOVR crossing with San Luis Obispo Creek.

2.2 GROUNDWATER RESOURCES

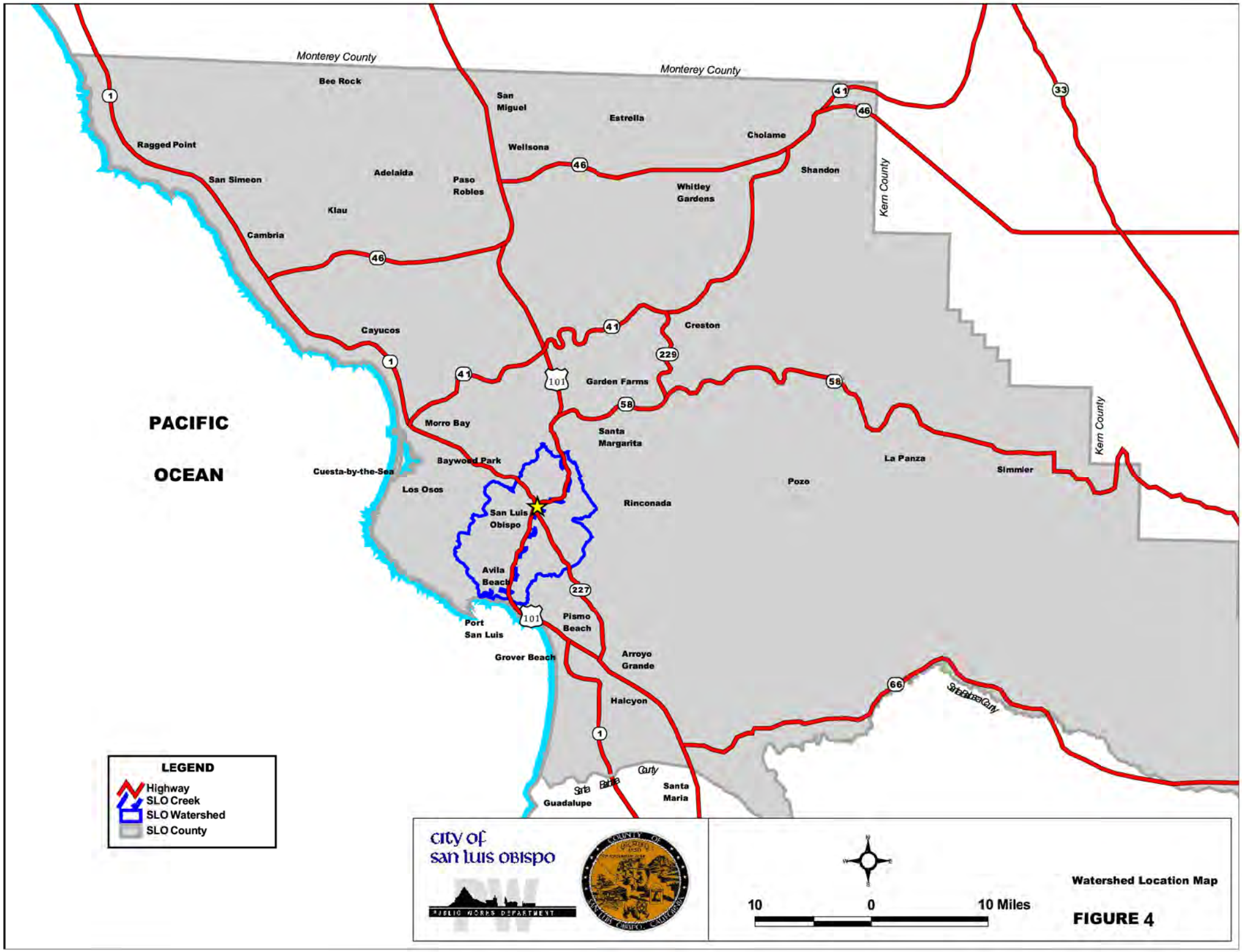
Three wells currently supply approximately 250 acre feet of water for domestic use. The groundwater basin is relatively small and recharges very quickly following normal rainfall periods, but it also lowers relatively quickly following the end of the rainy season.

The San Luis-Edna Valley Groundwater Basin is an elongate trough of relatively recent (Pleistocene and Holocene age) sediments approximately 13 miles long and 1 to 2 miles wide. It is recharged primarily by streams flowing in from the northeast, and it is naturally drained by streams flowing out of the basin, primarily San Luis Obispo and Pismo Creeks. The largest source of inflow is San Luis Obispo Creek.

2.3 TOPOGRAPHY

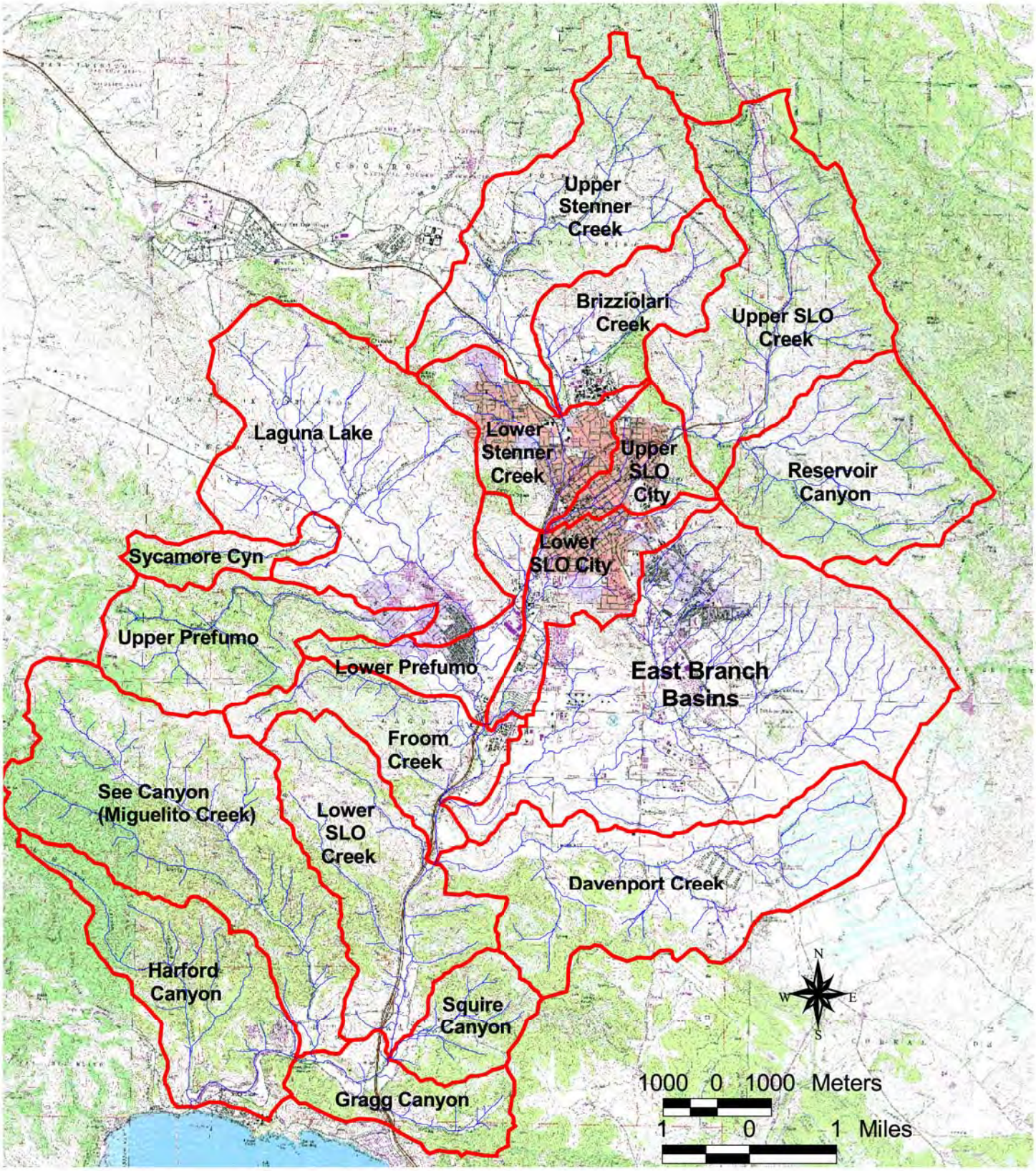
Regionally, the project area is located within the Coast Ranges and has varied slopes on and adjacent to the project site, including the Irish Hills and Los Osos Valley. The interchange sits at the edge of the Los Osos Valley, against the Irish Hills, and where three creeks run through the project area. The creeks include San Lois Obispo Creek, Prefumo Creek, and Froom Creek.

San Luis Obispo Creek is incised into an alluvial plain within the downtown and upper residential area of City of San Luis Obispo, it crosses the broader upper Los Osos Valley and the lower Laguna Lake area before changing its character below Froom Creek and Los Osos Valley Road. The creek descends through a narrow alluvial valley bounded by the steep Irish Hills in this area. The narrowest part of this segment (only about 125 meters wide) begins near the confluence of Davenport Creek with San Luis Obispo Creek, and is aptly called “The Narrows” by local residents. The San Luis Obispo Valley downstream of the Narrows ranges from about 300 meters to 600 meters wide.



Watershed Location Map

FIGURE 4



City of San Luis Obispo

Public Works Department

Watershed and Major Sub-Basins

Figure 5

2.4 SOILS/EROSION POTENTIAL

The alluvial floodplain deposits in the lower San Luis Obispo Creek area, below LOVR and in the Laguna Lake area show little or no indication of horizonation or soil profile development and consist of recent alluvium. The Soil Survey indicates that these soils have a gleyed horizon located at a depth of about three or four feet. The blue-gray or grayed color is indicative of poorly drained or anoxic conditions created by a permanent high ground water table during the period these soils developed. This apparently is a relict feature, as the high groundwater table is now only a seasonal occurrence, with the water table likely lowered several meters (three to four) by the historic incision of San Luis Obispo Creek in this area. The dark colors of the surface soils indicate high organic matter accumulation, such as occurs in a swampy flood plain or backwater environment of lower velocity flows, consistent with the flatter stream gradients in this and the Laguna Lake areas.

Bank erosion is also occurring at channel bends on Reach 7 of San Luis Obispo Creek between South Higuera Street and Los Osos Valley Road. Reach 8 of the creek is a two km stretch between the Los Osos Valley Road Bridge and the Prado Road Bridge that is also experiencing bank erosion including a large bend, with a steep near vertical bank downstream of Prado Road. San Luis Obispo Creek makes a sharp bend upstream of the Los Osos Valley Road Bridge where a wide low dense willow thicket floodplain on the east side is enabling sediment to accumulate. Incision is also a problem with the floodplain terrace reaching about three meters above the channel bed. On the west side, Prefumo Creek joins SLO Creek about 100 meters upstream of the Los Osos Valley Road Bridge. This reach of Prefumo is also actively being incised.

2.5CLIMATE AND PRECIPITATION

The climate of the project area is generally Mediterranean, with warm, dry summers and cooler, relatively damp winters. Along the coast, mild temperatures are the rule throughout the year due to the moderating influence of the Pacific Ocean. This effect is diminished inland in proportion to distance from the ocean or by major intervening terrain features, such as the coastal mountain ranges. As a result, a considerably wider range of temperature conditions characterizes inland areas. Maximum summertime temperatures average about 70 degrees Fahrenheit near the coast, while inland valleys are often in the high 90's. Average minimum winter temperatures range from the low 30's along the coast to the low 20's inland.

Regional meteorology is largely dominated by a persistent high pressure area which commonly resides over the eastern Pacific Ocean. Seasonal variations in the strength and position of this pressure cell cause seasonal changes in the weather patterns of the area. From November through April the Pacific High tends to migrate southward, allowing northern storms to move across the County. About 90% of the total annual rainfall is received during this period. Winter conditions are usually mild, with intermittent periods of precipitation followed by mostly clear days. Local weather station data indicate that annual rainfall amounts average about 24 inches with fully two-thirds of the precipitation coming during November through February.

2.6 POPULATION AND LAND USE

In general, the areas surrounding LOVR/US 101 Interchange consist of suburban residential and open space. The land uses north and east of the project site include suburban expansion of the City of San Luis Obispo, mostly low density residential development, and some farmland. West and south of the project site there is mainly open space.

2.7 EXISTING WATER QUALITY

The CCRWQCB has implemented a program to measure existing water quality in the region. Data for the current project area come from a monitoring station at San Luis Obispo Creek at Los Osos Valley Road (Site Tag 310SLV) and are reported by the Central Coast Ambient Monitoring Program accessed January 8, 2008 at http://www.ccamp.org/ca300/3/Sites/310slv/310SLV.htm.

Several analytical criteria exceed objective established for these water bodies and are listed below in Table 1.

Table 1. Existing Water Quality in San Luis Obispo Creek at Los Osos Valley Road.

Analyte	Max	Min	Mean	GeoMean	Samples	Hits	First	Last	Crit.	Ref.	Qual.
Chloride	123	78	98	97	9	4	1/1/2002	7/1/2002	100	Waterbody Objective for San Luis Obispo Creek	Threatened
Coliform, Fecal	1100	8	199	73	15	2	1/1/2002	3/1/2003	400	Basin Plan Water Body Contact Recreation	Threatened
Dissolved Solids, Total	740	483	672	667	16	13	1/1/2002	3/1/2003	650	Waterbody Objective for San Luis Obispo Creek	Non-supporting
Nitrate as N	22.2	5.4	17.5	16.9	16	15	1/1/2002	3/1/2003	10	Basin Plan Municipal and Domestic Supply	Non-supporting
Nitrate as NO3	98.8	24	78.1	75.2	16	15	1/1/2002	3/1/2003	45	Basin Plan Municipal and Domestic Supply	Non-supporting
Oxygen, Dissolved	10.4	6.5	7.7	7.7	65	14	1/1/2002	3/1/2003	7	Basin Plan Cold Water Fish Habitat	Non-supporting

Oxygen, Saturation	111	71	83	82	65	39	1/1/2002	3/1/2003	85	Basin Plan General	Non-supporting
Sodium	134	80	108	106	9	9	1/1/2002	7/1/2002	50	Waterbody Objective for San Luis Obispo Creek	Non-supporting
Sulfate	131	97	114	113	9	6	1/1/2002	7/1/2002	100	Waterbody Objective for San Luis Obispo Creek	Non-supporting

2.8POLLUTANTS OF CONCERN

In the City of San Luis Obispo, urban runoff discharged to the Municipal Separate Storm Drain System (MS4) is eventually discharged to surface waters, including the San Luis Obispo Creek. Several pollutants are commonly associated with storm water runoff, including sediment, nutrients, bacteria and viruses, organic compounds, trash and debris, oxygen-demanding substances, oil and grease, toxic pollutants such as pesticides, and metals. These pollutants are described in more detail below. Pollutants of concern during construction include sediments, trash, oil and grease, fuel from equipment, and materials used for concrete and asphalt installation.

Sediment

Natural sediment loads are important to downstream environments because they provide habitat, substrate, and nutrition; however, increased sediment loads can result in negative effects to downstream environments. Excessive sediment can be detrimental to aquatic life by interfering with photosynthesis, respiration, growth, and reproduction. In addition, pollutants that adhere to sediment such as nutrients, trace metals, and hydrocarbons can have other harmful effects on the aquatic environment when they occur in elevated levels. Total suspended solids (TSS) is a measure of the amount of sediment mixed with the water column.

Nutrients

Nutrients are typically composed of phosphorus and/or nitrogen. Elevated levels in surface waters cause algal blooms and excessive vegetative growth. As nutrients are absorbed, the vegetative growth decomposes, utilizing oxygen in the process and reducing dissolved oxygen levels. Dissolved oxygen is critical for support of aquatic life. The ammonium form of nitrogen (found in wastewater discharge) converts to nitrite and nitrate in the presence of oxygen, which further reduces dissolved oxygen levels in water.

Bacteria and Viruses

Bacterial levels in urban runoff can exceed public health standards for water contact recreation, creating a harmful environment. The source is animal or human fecal

waste. Bacteria and viruses thrive under certain conditions and can alter the aquatic habitat and create a harmful environment for aquatic life.

Organic Compounds

Organic compounds are carbon-based and are found in pesticides, solvents, and hydrocarbons. Elevated levels can directly or indirectly constitute a hazard to life or health. During cleaning activities, these compounds can be washed off into storm drains. Dirt, grease, and grime may adsorb concentrations that are harmful or hazardous to aquatic life.

Oxygen-Demanding Substances

Oxygen-demanding substances include plant debris (such as leaves and lawn clippings), animal wastes, and other organic matter. Microorganisms use dissolved oxygen during consumption of these substances, which reduces a water body's capacity to support aquatic life. One measure of oxygen demand is chemical oxygen demand (COD), which is the amount of oxygen required for chemical oxidation of pollutants in water.

Trash and Debris

Trash and debris can have a significant effect on the recreational value of a water body and aquatic habitat. It also can interfere with aquatic life respiration and can be harmful or hazardous to aquatic animals that accidentally ingest floating debris.

Oil and Grease

Primary sources of oil and grease are petroleum hydrocarbon products, motor products from leaking vehicles, fats, and waxes. Elevated oil and grease concentrations can affect the aesthetic value of the water body and can create a harmful environment for aquatic life and species that use the San Luis Obispo Creek for foraging and nesting.

Pesticides

Pesticides, chemical agents designed to control pest organisms, can persist in the environment and bioaccumulate (concentrate within the body) over several years, resulting in health problems for the affected organism. Pesticides have been repeatedly detected in surface waters and precipitation.

Metals

Bioavailable forms of trace metals are toxic to aquatic life. The most common metals found in urban runoff are lead, zinc, and copper. Sources of heavy metals in surface waters include emissions and deposits from automobiles, industrial wastewater, and common household chemicals. At high concentrations, metals are toxic to aquatic life. Humans can be impacted by contaminated groundwater resources and bioaccumulation of metals in fish and shellfish.

2.9 REGULATORY SETTING

Discharges into waters of the United States are subject to the regulatory authority of the U.S. Army Corps of Engineers (Corps) under Section 404 of the federal Clean Water Act (CWA); the State Water Resources Control Board (SWRCB) and the Central Coast Regional Water Quality Control Board (CCRWQCB) under Sections 401, 402, and 303(d) of the CWA and the California Porter-Cologne Water Quality Act, and by the California Department of Fish and Game (CDFG) under Sections 1601-1603 of the California Fish and Game Code.

Federal Requirements of the Clean Water Act

Section 404

The Corps regulates discharges or fills into waters of the United States under Section 404 of the CWA via the Nationwide Permit (NWP) or Individual Permit program. There are several categories of NWPs, and these can be used for projects that fall under specific categories. A Preconstruction Notification (PCN) to the Corps district engineer is required for most activities that result in the loss of greater than 0.04 hectare (0.1 acre) of waters of the U.S. The Corps reviews the PCN on a case-by-case basis to determine whether the adverse effects (on the aquatic environment) of proposed work are minimal. The Corps will also determine whether a particular drainage is considered Waters of the U.S. and whether it is subject to regulation under Section 404.

Section 402

Direct discharges of pollutants into waters of the United States are not allowed, except in accordance with the National Pollution Discharge Elimination System (NPDES) program established in Section 402 of the CWA. The major purpose of the NPDES program is to protect human health and the environment. Pursuant to the NPDES program, permits that apply to storm water discharges from MS4s, specific industrial activities, and construction activities (0.4 hectare [I acre] or more) have been issued. NPDES permits establish enforceable effluent limitations on discharges, require monitoring of discharges, designate reporting requirements, and require the permittee to perform BMPs. Industrial (point source) storm water permits are required to meet effluent limitations; municipal permits are governed by the maximum extent practicable (MEP) or Best Available Technology (BAT)/Best Control Technology (BCT) application of BMPs.

Section 401

Section 401 of the CWA specifies that any applicant for a federal license or permit to conduct any activity, including but not limited to the construction or operation of facilities that may result in any discharge into navigable waters, shall provide the federal licensing or permitting agency with a certification from the State in which the discharge originates or will originate from the State agency with jurisdiction over those waters (CCRWQCB) that the project will comply with water quality standards, protect beneficial uses, meet water quality objectives, and comply with the State anti-degradation policy.

Section 303

Section 303(d) of the Clean Water Act requires that the State adopt water quality objectives for surface waters. The Basin Plan and Resolution No. R8-2004-0001 contain water quality objectives that are considered necessary to protect the specific beneficial uses the Basin Plan identifies. Section 303(d) specifically requires the State to develop a list of impaired water bodies and subsequent numeric Total Maximum Daily Loads (TMDL) for whichever constituents impair a particular water body. These constituents include inorganic and organic chemical compounds, metals, sediment, and biological agents.

The TMDL is the total amount of a constituent that can be discharged while meeting water quality objectives and protecting beneficial uses. It is the sum of the individual load allocations for point source inputs (e.g., an industrial plant), load allocations for nonpoint source inputs (e.g., runoff from urban areas), and natural background, with a margin of safety.

The most recent 303 (d) impaired waters list for the State was approved by the SWRCB in 2006 and shows San Luis Obispo Creek below West Marsh Street as listed or proposed to be for pathogens, nitrate as nitrates, and nutrients. Prefumo Creek is also proposed to be listed for nitrate as nitrates. These impairments and proposed TMDL completion dates are summarized in the following table accessed on the internet January 10, 2008 www.waterboards.ca.gov/tmdl/docs/303dlists2006/final/r3_final303dlist.pdf and www.waterboards.ca.gov/tmdl/docs/303dlists2006/final/statetcl_final303d.pdf.

Table 2. Proposed 2006 CWA Section 303 (d) List of Water Quality Limited Segments

Region/ Type	Name	Calwater Watershed	Pollutant/Stressor	Potential Sources	Size Affected	Proposed TMDL Completion
3R	San Luis Obispo Creek (below West Marsh Street)	31024012	Pathogens	Source unknown	9.6 miles	2004
	San Luis Obispo Creek (below West Marsh Street)	31024012	Nitrate as Nitrate (NO3)	Source unknown	9.6 miles	2019
	San Luis Obispo Creek (below West Marsh Street)	31024012	Nutrients	Municipal Point Sources, Agriculture, Irrigated Crop Production, Agriculture-storm runoff	9.6 miles	2005
	Prefumo Creek	31024012	Nitrate as Nitrate (NO3)	Source unknown	7.7 miles	2019

State Requirements

Porter-Cologne Water Quality Control Act

The Porter-Cologne Act establishes a regulatory program to protect water quality and beneficial uses of State waters. It empowers the Regional Boards to formulate and adopt, for all areas within the regions, a Basin Plan that designates beneficial uses and establishes such water quality objectives that in its judgment will ensure reasonable protection of beneficial uses. Each Regional Board establishes water quality objectives that will ensure the reasonable protection of beneficial uses and the prevention of nuisance. The Water Code provides flexibility for some change in water quality, provided that beneficial uses are not adversely affected.

California Fish and Game Code Sections 1601-1603

The CDFG, through provisions of the California Fish and Game Code (Sections 1601-1603), is empowered to issue agreements for any alteration of a river, stream, or lake where fish or wildlife resources may be adversely affected. Streams and rivers are defined by the presence of a channel bed and banks and at least an intermittent flow of water. CDFG typically extends the limits of its jurisdiction laterally beyond the channel banks for streams that support riparian vegetation. In these situations, the outer edge of the riparian vegetation is generally used as the lateral extent of the stream and CDFG jurisdiction.

The California Fish and Game Code Section 1602 requires any person, State or local governmental agency, or public utility to notify the CDFG before beginning any activity that will result in one or more of the following: (1) substantial obstruction or diversion of the natural flow of a river, stream, or lake, (2) substantial change in or use of any material from the bed, channel, or bank of a river, stream, or lake, or (3) deposit or disposal of debris, waste, or other material containing crumbled, flaked, or ground pavement where it can pass into a river, stream, or lake. The Fish and Game Code Section 1602 applies to all perennial, intermittent, and ephemeral rivers, streams, and lakes in the State.

State Requirements under Section 402 of the Clean Water Act

General Construction Activity NPDES Permit (General Permit)

In accordance with NPDES regulations, the State requires that any construction activity disturbing 1 acre or more of soil comply with the State General Permit (Water Quality Order No. 99-08-DWQ). In order to obtain authorization for proposed storm water discharge pursuant to this permit, the landowner (discharger) is required to submit a Notice of Intent to the SWRCB, prepare an SWPPP, and implement BMPs detailed in the SWPPP during construction activities. Dischargers are required to implement BAT and BCT to reduce or eliminate storm water pollution. The purpose of the SWPPP is to prevent all construction pollutants from contacting storm water and to keep all products of erosion from moving off site into receiving waters. The proposed project is subject to the requirements of this permit because it will disturb more than 1 acre of soil.

Local Requirements under Section 402 of the CWA

Municipal NPDES Permit

The City of San Luis Obispo is not currently covered under the NPDES MS4 permit program since it has not completed the Stormwater Management Plan (SWMP) required for the City under Phase II of the NPDES Stormwater Program. San Luis Obispo County however has completed a SWMP (2006) and the management measures outlined in that document are intended to be regionally integrated and are pertinent to the current project.

San Luis Obispo Creek Watershed Waterway Management Plan (WMP).

San Luis Obispo Creek (SLO Creek) and its tributaries have significant recurrent flooding and bank instability. These problems require active channel management that must be undertaken under the authority of ACOE Nationwide Permits for wetlands fill to construct bank repair projects. Regulatory Agencies collectively requested preparation of a comprehensive, watershed-based management plan for SLO Creek concerning these ongoing maintenance needs and regarding potential cumulative impacts on creek resources.

A three volume Waterway Management Plan (WMP) was prepared in response to that request and forms the basis for future project planning, decision making and permitting and activities for the current project should be consistent with this planning document. Volume I contains inventory information, a detailed hydrologic/hydraulic analysis of the watershed and its main tributaries, and an identification of the management problems and management needs of the waterways. Alternatives are reviewed for addressing flooding, bank instability, and habitat protection and enhancement, and a preferred project is presented. Volume II presents a Stream Management and Maintenance Program (SMMP) for the waterways of the San Luis Obispo Creek Watershed. This document outlines the planning, design, and permitting approach the City and County will utilize for routine stream maintenance, such as vegetation management, bank repair, and sediment removal. Policies and Best Management Practices for these activities are also described. Volume III is a Drainage Design Manual (DDM), which contains revised policies for floodplain and stream corridor management and provides new design flows for stream channels within the City of San Luis Obispo. Procedures for hydrologic and hydraulic analysis, and guidelines and design criteria for the design of channel, storm drain systems, stormwater infiltration facilities, bank repair and stream restoration, and erosion control are presented in the DDM.

2.10 BENEFICIAL USES

Beneficial uses of the San Luis Obispo Creek Watershed are outlined in the Basin Plan. Beneficial uses of water are those necessary for the survival or well-being of humans, plants, and wildlife. Examples of beneficial uses include drinking water supplies, swimming, industrial and agricultural water supply, and the support of freshwater and marine habitats and their organisms.

Beneficial Uses for Surface Waters

The designated beneficial uses for San Luis Obispo Creek, Froom Creek, and Prefumo Creek are:

Municipal and Domestic Supply (MUN)

Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply.

Water Contact Recreation (REC-1)

Uses of water for recreational activities involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, swimming, wading, water-skiing, skin and scuba diving, surfing, white water activities, fishing, or use of natural hot springs.

Non-Contact Water Recreation (REC-2)

Uses of water for recreational activities involving proximity to water, but not normally involving body contact with water, where ingestion of water is reasonably possible. These uses include, but are not limited to, picnicking, sunbathing, hiking, beachcombing, camping, boating tidepool and marine life study, hunting, sightseeing, or aesthetic enjoyment in conjunction with the above activities.

Wildlife Habitat (WILD)

Uses of water that support terrestrial ecosystems including, but not limited to, preservation and enhancement of terrestrial habitats, vegetation, wildlife (e.g., mammals, birds, reptiles, amphibians, invertebrates), or wildlife water and food sources.

Commercial and Sport Fishing (COMM)

Uses of water for commercial or recreational collection of fish, shellfish, or other organisms including, but not limited to, uses involving organisms intended for human consumption or bait purposes.

In addition to the beneficial uses listed above, San Luis Obispo Creek, and Prefumo Creek have the following designated uses:

Agricultural Supply (AGR)

Uses of water for farming, horticulture, or ranching including, but not limited to, irrigation, stock watering, or support of vegetation for range grazing.

Ground Water Recharge (GWR)

Uses of water for natural or artificial recharge of ground water for purposes of future extraction, maintenance of water quality, or halting of saltwater intrusion into freshwater aquifers. Ground water recharge includes recharge of surface water underflow.

Cold Fresh Water Habitat (COLD)
Uses of water that support cold water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish or wildlife, including invertebrates.

Migration of Aquatic Organisms (MIGR)
Uses of water that support habitats necessary for migration or other temporary activities by aquatic organisms, such as anadromous fish.

Spawning, Reproduction, and/or Early Development (SPWN)

Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Freshwater Replenishment (FRSH)
Uses of water for natural or artificial maintenance of surface water quantity or quality (e.g., salinity) which includes a water body that supplies water to a different type of water body, such as, streams that supply reservoirs and lakes, or estuaries; or reservoirs and lakes that supply streams. This includes only immediate upstream water bodies and not their tributaries.

In addition to all the beneficial uses listed above, San Luis Obispo Creek, is also designated for the following use:

Warm Fresh Water Habitat (WARM)
Uses of water that support warm water ecosystems including, but not limited to, preservation or enhancement of aquatic habitats, vegetation, fish, or wildlife, including invertebrates.

Last, Froom and Prefumo Creeks are also listed for:

Rare, Threatened, or Endangered Species (RARE)
Uses of water that support habitats necessary, at least in part, for the survival and successful maintenance of plant or animal species established under state or federal law as rare, threatened, or endangered.

Beneficial Uses for Ground Waters
Ground water throughout the Central Coastal Basin, except for that found in the Soda Lake Sub-basin, is suitable for agricultural water supply, municipal and domestic water supply, and industrial use.

2.11 WATER QUALITY OBJECTIVES

As required by the Porter-Cologne Act, the CCRWQCB has developed water quality objectives for waters within its jurisdiction to protect the beneficial uses of those waters and has published them in the Basin Plan. The Basin Plan also establishes implementation programs to achieve these water quality objectives and requires

monitoring to evaluate the effectiveness of these programs. Water quality objectives must comply with the State anti-degradation policy (State Board Resolution No. 68-16), which is designed to maintain high-quality waters while allowing some flexibility if beneficial uses are not unreasonably affected.

Surface Water Quality Objectives

Surface water quality objectives for all inland waters established in the Basin Plan are listed in Table 3 and include both general objectives and objectives specific to pertinent beneficial uses. There are no site specific objectives for the San Luis Obispo Creek or its tributaries.

Table 3. OBJECTIVES FOR INLAND SURFACE WATERS	
General Objectives	
Constituent	**Concentration**
Color	Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses. Coloration attributable to materials of waste origin shall not be greater than 15 units or 10 percent above natural background color, whichever is greater.
Tastes and Odors	Waters shall not contain taste or odor-producing substances in concentrations that impart undesirable tastes or odors to fish flesh or other edible products of aquatic origin, that cause nuisance, or that adversely affect beneficial uses.
Floating Material	Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.
Suspended Material	Waters shall not contain suspended material in concentrations that cause nuisance or adversely affect beneficial uses.
Settleable Material	Waters shall not contain settleable material in concentrations that result in deposition of material that causes nuisance or adversely affects beneficial uses.
Oil and Grease	Waters shall not contain oils, greases, waxes, or other similar materials in concentrations that result in a visible film or coating on the surface of the water or on objects in the water, that cause nuisance, or that otherwise adversely affect beneficial uses.
Biostimulatory Substances	Waters shall not contain biostimulatory substances in concentrations that promote aquatic growths to the extent that such growths cause nuisance or adversely affect beneficial uses.
Sediment	The suspended sediment load and suspended sediment discharge rate of surface waters shall not be altered in such a manner as to cause nuisance or adversely affect beneficial uses.
Turbidity	Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increase in turbidity attributable to controllable water quality factors shall not exceed the following limits: 1. Where natural turbidity is between 0 and 50 Jackson Turbidity Units (JTU), increases shall not exceed 20 percent. 2. Where natural turbidity is between 50 and 100 JTU, increases shall not exceed 10 JTU. 3. Where natural turbidity is greater than 100 JTU, increases shall not exceed 10 percent. Allowable zones of dilution within which higher concentrations will be tolerated will be defined for each discharge in discharge permits.
pH	For waters not mentioned by a specific beneficial use, the pH value shall not be depressed below 7.0 or raised above 8.5.
Dissolved Oxygen	For waters not mentioned by a specific beneficial use, dissolved oxygen

	concentration shall not be reduced below 5.0 mg/l at any time. Median values should not fall below 85 percent saturation as a result of controllable water quality conditions.
Temperature	Natural receiving water temperature of intrastate waters shall not be altered unless it can be demonstrated to the satisfaction of the Regional Board that such alteration in temperature does not adversely affect beneficial uses.
Toxicity	All waters shall be maintained free of toxic substances in concentrations which are toxic to, or which produce detrimental physiological responses in, human, plant, animal, or aquatic life. Compliance with this objective will be determined by use of indicator organisms, analyses of species diversity, population density, growth anomalies, toxicity bioassays of appropriate duration, or other appropriate methods as specified by the Regional Board. Survival of aquatic life in surface waters subjected to a waste discharge or other controllable water quality conditions, shall not be less than that for the same water body in areas unaffected by the waste discharge or, when necessary, for other control water that is consistent with the requirements for "experimental water" as described in Standard Methods for the Examination of Water and Wastewater, latest edition. As a minimum, compliance with this objective shall be evaluated with a 96-hour bioassay. In addition, effluent limits based upon acute bioassays of effluents will be prescribed where appropriate, additional numerical receiving water objectives for specific toxicants will be established as sufficient data become available, and source control of toxic substances is encouraged. The discharge of wastes shall not cause concentrations of unionized ammonia (NH_3) to exceed 0.025 mg/l (as N) in receiving waters.
Pesticides	No individual pesticide or combination of pesticides shall reach concentrations that adversely affect beneficial uses. There shall be no increase in pesticide concentrations found in bottom sediments or aquatic life. For waters where existing concentrations are presently nondetectable or where beneficial uses would be impaired by concentrations in excess of nondetectable levels, total identifiable chlorinated hydrocarbon pesticides shall not be present at concentrations detectable within the accuracy of analytical methods prescribed in Standard Methods for the Examination of Water and Wastewater, latest edition, or other equivalent methods approved by the Executive Officer.
Chemical Constituents	Where wastewater effluents are returned to land for irrigation uses, regulatory controls shall be consistent with Title 22 of the California Code of Regulations and other relevant local controls.
Other Organics	Waters shall not contain organic substances in concentrations greater than the following: Methylene Blue Activated Substances 0.2 mg/l Phenols 0.1 mg/l PCB's 0.3 μg/l Phthalate Esters 0.002 μg/l
Radioactivity	Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life; or result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life.
MUNICIPAL AND DOMESTIC SUPPLY (MUN) Objectives	
pH	The pH value shall neither be depressed below 6.5 nor raised above 8.3.
Organic Chemicals	All inland surface waters, enclosed bays, and estuaries shall not contain concentrations of organic chemicals in excess of the limiting concentrations set forth in California Code of Regulations, Title 22, Chapter 15, Article 5.5, Section 64444.5, Table 5.
Chemical Constituents	Waters shall not contain concentrations of chemical constituents in excess of the limits specified in California Code of Regulations, Title 22, Article 4, Chapter 15, Section 64435, Tables 2 and 3.

Phenol	Waters shall not contain phenol concentrations in excess of 1.0 µg/l.
Radioactivity	Waters shall not contain concentrations of radionuclides in excess of the limits specified in California Code of Regulations, Title 22, Chapter 15, Article 5, Sections 64441 and 64443, Table 4.
AGRICULTURAL SUPPLY (AGR) Objectives	
pH	The pH value shall neither be depressed below 6.5 nor raised above 8.3.
Dissolved Oxygen	Dissolved oxygen concentration shall not be reduced below 2.0 mg/l at any time.
Chemical Constituents	Waters shall not contain concentrations of chemical constituents in amounts which adversely affect the agricultural beneficial use. Interpretation of adverse effect shall be as derived from the University of California Agricultural Extension Service guidelines. In addition, waters used for irrigation and livestock watering shall not exceed concentrations for those chemicals listed in Table 3-4.

Table 3-4. Water Quality Objectives for Agricultural Water Use

	Maximum Concentration (mg/l)[a]	
ELEMENT	Irrigation supply[b]	Livestock watering
Aluminum	5.0	5.0
Arsenic	0.1	0.2
Beryllium	0.1	--
Boron	0.75	5.0
Cadmium0.01	0.05	
Chromium	0.10	1.0
Cobalt	0.05	1.0
Copper	0.2	0.5
Fluoride	1.0	2.0
Iron	5.0	--
Lead	5.0	0.1[c]
Lithium	2.5[d]	--
Manganese	0.2	--
Mercury	--	0.01
Molybdenum	0.01	0.5
Nickel	0.2	--
Nitrate + Nitrite	--	100
Nitrite	--	10
Selenium 0.02	0.05	
Vanadium	0.1	0.10
Zinc	2.0	25

a. Values based primarily on "Water Quality Criteria 1972" National Academy of Sciences-National Academy of Engineers, Environmental Study Board, ad hoc Committee on Water Quality Criteria furnished as recommended guidelines by University of California Agriculture Extension Service, January 7, 1974; maximum values are to be considered as 90 percentile values not to be exceeded.
b. Values provided will normally not adversely affect plants or soils; no data available for mercury, silver, tin, titanium, and tungsten.
c. Lead is accumulative and problems may begin at threshold value (0.05 mg/l).
d. Recommended maximum concentration for irrigation
e. citrus is 0.075 mg/l.

Salt concentrations for irrigation waters shall be controlled through

	implementation of the anti-degradation policy to the effect that mineral constituents of currently or potentially usable waters shall not be increased. It is emphasized that no controllable water quality factor shall degrade the quality of any ground water resource or adversely affect long-term soil productivity. Where wastewater effluents are returned to land for irrigation uses, regulatory controls shall be consistent with Title 22 of the California Code of Regulations and with relevant controls for local irrigation sources.
WATER CONTACT RECREATION (REC-1) Objectives	
pH	The pH value shall neither be depressed below 6.5 nor raised above 8.3.
Bacteria	Fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 200/100 ml, nor shall more than ten percent of total samples during any 30-day period exceed 400/100 ml.
NON-CONTACT WATER RECREATION (REC-2) Objectives	
pH	The pH value shall neither be depressed below 6.5 nor raised above 8.3.
Bacteria	Fecal coliform concentration, based on a minimum of not less than five samples for any 30-day period, shall not exceed a log mean of 2000/100 ml, nor shall more than ten percent of samples collected during any 30-day period exceed 4000/100 ml.
COLD FRESHWATER HABITAT (COLD) Objectives	
pH	The pH value shall not be depressed below 7.0 or raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters.
Dissolved Oxygen	The dissolved oxygen concentration shall not be reduced below 7.0 mg/l at any time.
Temperature	At no time or place shall the temperature be increased by more than 5°F above natural receiving water temperature.
Chemical Constituents	Waters shall not contain concentrations of chemical constituents known to be deleterious to fish or wildlife in excess of the limits listed in Table 3-5. Table 3-5 Toxic Metal Concentrations not to be Exceeded in Aquatic Life Habitats, mg/l[a,b]

METAL	HARD (> 100 mg/l $CaCO_3$)	SOFT (< 100 mg/l $CaCO_3$)
Cadmium[c]	.03	.004
Chromium	.05	.05
Copper	.03	.01
Lead	.03	.03
Mercury[d]	.0002	.0002
Nickel[e]	.4	.1
Zinc	.2	.004

a. Based on limiting values recommended in the National Academy of Sciences-National Academy of Engineers "Water Quality Criteria 1972." Values are 90 percentile values except as noted in qualifying note "d."
b. Revision of Table 3-5 is currently in progress by the Regional Board.
c. Lower cadmium values not to be exceeded for crustaceans and waters designated SPWN are 0.003 mg/l in hard water and 0.0004 mg/l in soft water.
d. Total mercury values should not exceed 0.05 µg/l as an average value; maximum acceptable concentration of total mercury in any aquatic organism is a total B.O.D. burden of 0.5 µg/l wet weight.
e. Value cited as objective pertains to nickel salts (not pure

	metallic nickel).
WARM FRESHWATER HABITAT (WARM) Objectives	
pH	The pH value shall not be depressed below 7.0 or raised above 8.5. Changes in normal ambient pH levels shall not exceed 0.5 in fresh waters.
Dissolved Oxygen	The dissolved oxygen concentration shall not be reduced below 5.0 mg/l at any time.
Temperature	At no time or place shall the temperature of any water be increased by more than 5°F above natural receiving temperature.
Chemical Constituents	Waters shall not contain concentrations of chemical constituents known to be deleterious to fish or wildlife in excess of the limits listed below in Table 3-5.
FISH SPAWNING (SPWN) Objectives	
Cadmium	Cadmium shall not exceed .003 mg/l in hard water or .0004 mg/l in soft water at any time. (Hard water is defined as water exceeding 100 mg/l $CaCO_3$.)
Dissolved Oxygen	The dissolved oxygen concentration shall not be reduced below 7.0 mg/l at any time.

Groundwater Quality Objectives

Groundwater quality objectives established in the Basin Plan are listed in Table 4 and include both general objectives and objectives specific to pertinent beneficial uses. There are no site specific objectives for the San Luis Obispo Creek or its tributaries.

Table 4. OBJECTIVES FOR GROUNDWATER	
General Objectives	
Constituent	**Concentration**
Tastes and Odors	Waters shall not contain taste or odor-producing substances in concentrations that adversely affect beneficial uses.
Radioactivity	Radionuclides shall not be present in concentrations that are deleterious to human, plant, animal, or aquatic life; or result in the accumulation of radionuclides in the food web to an extent which presents a hazard to human, plant, animal, or aquatic life.
MUNICIPAL AND DOMESTIC SUPPLY (MUN) Objectives	
Bacteria	The median concentration of coliform organisms over any seven-day period shall be less than 2.2/100 ml.
Organic Chemicals	Ground waters shall not contain concentrations of organic chemicals in excess of the limiting concentrations set forth in California Code of Regulations, Title 22, Chapter 15, Article 5.5, Section 64444.5, Table 5.
Chemical Constituents	Ground waters shall not contain concentrations of chemical constituents in excess of the limits specified in California Code of Regulations, Title 22, Chapter 15, Article 4, Section 64435, Tables 2 and 3.
Radioactivity	Ground waters shall not contain concentrations of radionuclides in excess of the limits specified in California Code of Regulations, Title 22, Chapter 15, Article 5, Section 64443, Table 4.
AGRICULTURAL SUPPLY (AGR) Objectives	
Chemical Constituents	Ground waters shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use. Interpretation of adverse effect shall be as derived from the University of California Agricultural Extension Service guidelines. In addition, waters used for irrigation and livestock watering shall not

exceed concentrations for those chemicals listed in Table 3-4.

Table 3-4. Water Quality Objectives for Agricultural Water Use

ELEMENT	Maximum Concentration (mg/l)[a] Irrigation supply[b]	Livestock watering
Aluminum	5.0	5.0
Arsenic	0.1	0.2
Beryllium	0.1	--
Boron	0.75	5.0
Cadmium	0.01	0.05
Chromium	0.10	1.0
Cobalt	0.05	1.0
Copper	0.2	0.5
Fluoride	1.0	2.0
Iron	5.0	--
Lead	5.0	0.1[c]
Lithium	2.5[d]	--
Manganese	0.2	--
Mercury	--	0.01
Molybdenum	0.01	0.5
Nickel	0.2	--
Nitrate + Nitrite	--	100
Nitrite	--	10
Selenium	0.02	0.05
Vanadium	0.1	0.10
Zinc	2.0	25

a. Values based primarily on "Water Quality Criteria 1972" National Academy of Sciences-National Academy of Engineers, Environmental Study Board, ad hoc Committee on Water Quality Criteria furnished as recommended guidelines by University of California Agriculture Extension Service, January 7, 1974; maximum values are to be considered as 90 percentile values not to be exceeded.

b. Values provided will normally not adversely affect plants or soils; no data available for mercury, silver, tin, titanium, and tungsten.

c. Lead is accumulative and problems may begin at threshold value (0.05 mg/l).

f. Recommended maximum concentration for irrigation

g. citrus is 0.075 mg/l.

The salinity control aspects of ground water management will account for effects from all sources.

3.0 ENVIRONMENTAL CONSEQUENCES

3.1 IMPACT ASSESSMENT METHODOLOGY

The purpose of this Water Quality Assessment Report is to analyze the difference between the existing conditions and the project build conditions with respect to water quality impacts. The assessment takes the following into consideration:

- Application of BMPs (number of BMPs, new technologies, effectiveness)
- Discharges into impaired waters (listed pursuant to Section 303[d] of the CWA or subject to a TMDL)
- Pollutant loads (change in land use)
- Impervious area and relation to amount of runoff (increase or decrease)

Existing interchange creates 8.8 acres of impervious area within the state right of way. The project is anticipated to disturb 16.0 acres of state right of way for Alternative 3 and 19.2 acres of state right of way for Alternative 6. Alternative 3 improvements would produce an additional 1.0 acre of impervious within state right of way. Alternative 6 would produce a larger footprint and would add 2.0 acres of impervious within state right of way. Anticipated increase in pollutant loading would occur temporarily during the construction phase of the project. Because the project consists of a permanent increase in impervious surfaces under either alternative, there remains potential for a permanent increase in runoff and pollutant loading without implementation of construction, design, and treatment BMPs.

3.2 POTENTIAL IMPACTS TO WATER QUALITY

Construction Impacts

Pollutants of concern during construction in and adjacent to sensitive stream habitats include sediments, trash, oil and grease fuels from equipment, and materials used for concrete and asphalt installation. Using broad scale state wide trends in construction data versus existing highway conditions, Caltrans published in 2002 a "Runoff Characterization Study" that details which pollutants are statistically more often found in higher concentrations during construction projects than those found on existing highway system. For metals, these include higher concentrations of Dissolved Arsenic, Dissolved Chromium, Total Chromium, and Total Nickel. In the comparison of conventional constituents, Dissolved Ortho-Phosphate and Total Phosphorus were higher at construction sites while conventional constituents, TSS and Hardness are significantly higher for construction site runoff than highway runoff.

Each of these pollutants on its own or in combination with other pollutants can have a detrimental effect on water quality and aquatic habitats. There is some potential for pollutants to enter the creeks during construction work. Construction will require special consideration to prevent adverse direct impacts to the surface waters. This specifically includes measures to block pollutants from entering the creeks and to prevent soil erosion that would result from construction activities. Activities in the

creeks may necessitate innovative BMPs, more frequent inspections, and more deliberate work processes, with respect to water quality protection.

Under the Caltrans Specific NPDES Permit (No. CAS000003), the project will be required to prepare an SWPPP and implement erosion and sediment control BMPs detailed in the SWPPP during construction activities. Caltrans Storm Water Quality Manuals (SWPPP/WPCP Preparation Manual) will be used as project guidance to develop the SWPPP. If the construction BMPs from Table 5 are properly designed, implemented, and maintained, these will contribute to ensuring no adverse water quality impacts would occur during construction.

A series of mitigation and minimization measures outlined in the following chapter will also ensure that no adverse water quality impacts occur during construction of the project.

Table 5: Construction BMPs

Category	**BMP No.**	**BMP** Name
Temporary Soil Stabilization	SS-1	Scheduling
	SS-2	Preservation of Existing Vegetation
	SS-3	Hydraulic Mulch
	SS-4	Hydroseeding
	SS-5	Soil Binders
	SS-6	Straw Mulch
	SS-7	Geotextiles, Plastic Covers and Erosion Control Blankets/Mats
	SS-8	Wood Mulching
	SS-9	Earth Dikes/Drainage Swales and Lined Ditches
	SS-10	Outlet Protection/Velocity Dissipation Devices
	SS-11	Slope Drains
Temporary Sediment Control	SC- I	Silt Fence
	SC-2	Sediment/Desilting Basin
	SC-3	Sediment Trap
	SC-4	Check Dam
	SC-5	Fiber Rolls
	SC-6	Gravel Bag Berm
	SC-7	Street Sweeping and Vacuuming
	SC-8	Sandbag Barrier
	SC-9	Straw Bale Barrier
	SC-10	Storm Drain Inlet Protection
Wind Erosion Control	WE-I	Wind Erosion Control
Tracking Control	TC- I	Stabilized Construction Entrance/Exit
	TC-2	Stabilized Construction Roadway
	TC-3	Entrance/Outlet Tire Wash
Non-Stormwater Control	NS-1	Water Conservation Practices
	NS-2	Dewatering Operations
	NS-3	Paving and Grinding Operations
	NS-4	Temporary Stream Crossing
	NS-5	Clear Water Diversion
	NS-6	Illicit Connections/Illegal Discharge Detection and Reporting
	NS-7	Potable Water/Irrigation
	NS-8	Vehicle and Equipment Cleaning
	NS-9	Vehicle and Equipment Fueling

	NS-10	Vehicle and Equipment Maintenance
	NS-11	Pile Driving Operations
	NS-12	Concrete Curing
	NS-13	Material and Equipment Use over Water
	NS-14	Concrete Finishing
	NS- 15	Structure Demolition/Removal over or Adjacent to Water
Waste Management and Materials Pollution Control	WM-1	Material Delivery and Storage
	WM-2	Material Use
	WM-3	Stockpile Management
	WM-4	Spill Prevention and Control
	WM-5	Solid Waste Management
	WM-6	Hazardous Waste Management
	WM-7	Contaminated Soil Management
	WM-8	Concrete Waste Management
	WM-9	Sanitary/Septic Waste Management
	WM-10	Liquid Waste Management

Post-Construction Impacts

Two viable build alternatives (Alternative 3 and Alternative 6) for the proposed improvements satisfy the purpose and need for this project. The major differences between the alternatives that influence water quality concerns relate to the type and location of the southbound on/off ramps the configuration of the northbound on/off ramp intersection with Los Osos Valley Road. One alternative retains the existing overcrossing and adds a second US 101 overcrossing while the other includes replacement of the overcrossing.

Consultation with Table 3-14 in Caltrans (2003) Discharge Characterization Study Report indicates that pollutants of concern during operation of a transportation facility typically include a series of conventional pollutants, various trace metals, and nutrients (especially NO3-N). An increase in an impervious area will increase the volume of runoff during a storm, which will more effectively transport pollutants to receiving waters and may lead to downstream erosion without implementation of treatment BMPs.

A “Targeted Design Constituent” (TDC) approach is used by Caltrans as a statewide design guidance criterion for addressing “Primary Pollutants of Concern”. Targeted Design Constituents can include: phosphorus; nitrogen; total copper; dissolved copper; total lead; dissolved lead; total zinc; dissolved zinc; sediments; and general metals [unspecified metals]. A project must consider treatment to target a TDC when an affected water body within the project limits is on the 303(d) list for the one or more of these constituents. The TDC must also be a pollutant that has been identified during Departmental runoff characterization studies to be discharging with a load or concentration that commonly exceeds allowable standards and must be considered treatable by currently available Department-approved Treatment BMPs. Nitrogen is classified as a TDC in the current project.

Several treatment BMPs are (Detention devices, Media filters and Multi-Chambered Treatment Trains) proposed to ensure that water quality impacts are not adverse. With incorporation of these measures impacts water quality would actually be improved over

current conditions since at present no treatment BMPs are installed. The measures outlined in the following chapter would result in no net increase in storm water discharge rate and no net increase in pollutant discharge rates to San Luis Obispo Creek.

4.0 AVOIDANCE, MINIMIZATION, and/or MITIGATION MEASURES

Water Quality cross-cuts several issues for the current project due to special status species inhabiting the stream and surrounding environs. Consequently some of the following measures are labeled primarily as Water Quality Minimization Measures while others are primarily considered Biological Mitigation Measures, although all pertain to water quality issues.

There are seven temporary and/or construction related restrictions that pertain to construction BMPs, etc. These are accompanied by several permanent measures consisting of design and treatment BMPs. When taken together these measures ensure that there would be no adverse impacts to water quality under either build alternative.

Temporary Measures

The following seven minimization or mitigation measures are best described as temporary.

Minimization Measure WQ-1: Implement Erosion-Control Measures During Project Construction.
To minimize the mobilization of sediment to adjacent water bodies, the following erosion- and sediment-control measures would be included in the Storm Water Pollution Prevention Plan to be included in the construction specifications, based on standard City measures and standard dust-reduction measures.

- Cover or apply nontoxic soil stabilizers to inactive construction areas that could contribute sediment to waterways within 48 hours of predicted rainfall event.
- Enclose and cover exposed stockpiles of dirt or other loose, granular construction materials that could contribute sediment to waterways.
- Contain soil and filter runoff from disturbed areas by berms, vegetated filters, silt fencing, straw wattle, plastic sheeting, catch basins, or other means necessary to prevent the escape of sediment from the disturbed area.
- Prohibit the placement of earth or organic material where it may be directly carried into a stream, marsh, slough, lagoon, or body of standing water.
- Prohibit the following types of materials from being rinsed or washed into streets, shoulder areas, or gutters: concrete, solvents and adhesives, fuels, dirt, gasoline, asphalt, and concrete saw slurry.
- Conduct dewatering activities according to the provisions of the Storm Water Pollution Prevention Plan. Prohibit placement of dewatered materials in local water bodies or in storm drains leading to such bodies without implementation of proper construction water quality control measures.

Minimization Measure WQ-2: Implement Measures to Control Turbidity.
If water is flowing in the streams during construction, the City of San Luis Obispo or its contractor(s) will control the release of sediment to the creeks during construction by installing a sheet-pile cofferdam or other method that will control turbidity to the

specifications given below. This will ensure that activities result in minimal increase in turbidity or suspended solids in the channel.

During installation of the cofferdam, the City or its contractor will monitor turbidity and suspended solids during the installation of the cofferdam, construction, and removal of the cofferdam. If levels exceed the Central Coast Regional Water Quality Control Board Basin Plan standards, the city or its contractor will stop work until levels are within Basin Plan limits. Basin plan standards for turbidity state that project activities will not cause an increase in ambient river turbidity by more than 20% above background turbidity where the natural turbidity is between 0 and 50 Jackson Turbidity Units, an increase by more than 10% where natural turbidity is over 100 Jackson Turbidity Units (Central Coast Regional Water Quality Control Board 1998). During the first week of construction, turbidity measurements will be taken upstream of the project construction area and at a distance of 200 feet downstream of the project construction area (or far enough downstream where applicable mixing has occurred) to provide a baseline comparison conditions. During the construction period, measurements will be taken two times per day and will be taken where flow regime is applicable to the relative flow regime around the construction zone, so the sample is representative of the water quality affected by construction. If turbidity limits are exceeded above the applicable turbidity level, operations will stop and the Regional Water Quality Control Board will be notified. Investigation of the cause of the significant turbidity increase will be conducted and corrections made in construction operations where applicable. This minimization may be modified in coordination with the Regional Water Quality Control Board and/or other regulatory entities, provided that in no case will turbidity levels be allowed to increase as a result of the project such that beneficial uses of the streams become substantially degraded or impaired.

Minimization Measure WQ-3: Implement a Spill Prevention and Control Program.
The City of San Luis Obispo and/or its contractor(s) will develop and implement a spill prevention and control program to minimize the potential for and effects from spills of hazardous, toxic, or petroleum substances during project construction. The federal reportable spill quantity for petroleum products, as defined in the Environmental Protection Agency's Code of Federal Regulations (40 Code of Federal Regulations 110) is any oil spill that (1) violates applicable water quality standards, (2) causes a film or sheen upon or discoloration of the water surface or adjoining shoreline, or (3) causes a sludge or emulsion to be deposited beneath the surface of the water or adjoining shorelines. If a spill is reportable, the contractor's superintendent will notify the relevant San Luis Obispo County officials, which have spill response and clean-up ordinances to govern emergency spill response. A written description of reportable releases must be submitted to the Central Coast Regional Water Quality Control Board. This submittal must include a description of the release, including the type of material and an estimate of the amount spilled, the date of the release, an explanation of why the spill occurred, and a description of the steps taken to prevent and control future releases. The releases must be documented on a spill report form. If an appreciable spill occurs and results determine that project activities

have adversely affected groundwater quality, a detailed analysis will be performed by a Registered Environmental Assessor to identify the likely cause of contamination. This analysis will conform to American Society for Testing and Materials standards, and will include recommendations for reducing or eliminating the source or mechanisms of contamination. Based on this analysis, the City and/or its contractors will select and implement measures to control contamination, with a performance standard that groundwater quality must be returned to baseline conditions. These measures will be subject to City approval.

Mitigation Measure BIO-5: Protect Water Quality and Prevent Erosion in Wetlands and Drainages.
To protect water quality in seasonal wetlands, freshwater marsh, and Prefumo, San Luis Obispo, and Froom Creeks, the City will implement the following best management practices before and during construction:

- All earthwork or foundation activities involving creeks, culverts, and bridges will occur in the dry season (generally between June 1 and October 1).
- All work in the drainages that may contain fish will be limited to the low-flow period in the dry season.
- Equipment used in and around waters of the United States will be in good working order and free of dripping or leaking engine fluids. All vehicle maintenance, staging, and materials storage will occur at least 91 meters (300 feet) from all waters of the United States. Any necessary equipment washing will occur where the water cannot flow into the stream channel.
- Any surplus concrete rubble, asphalt, or other rubble from construction will be taken to an approved disposal site.
- An erosion control plan will be prepared and implemented for the proposed project.

It will include the following provisions and protocols:

- Discharge from dewatering operations, if needed, and runoff from disturbed areas will be made to conform to the water quality requirements of the waste discharge permit issued by the Regional Water Quality Control Board.
- Material stockpiles will be located in non-traffic areas only. Side slopes will not be steeper than 2:1. All stockpile areas will be surrounded by a filter fabric fence and interceptor dike.
- Erosion control measures will be applied throughout construction of the proposed project.

The SWPPP for the project will enhance protection of water sources by providing BMPs for temporary soil stabilization, temporary sediment control, wind erosion control, tracking control, non-stormwater management, and waste management and material pollution control (Caltrans 2003 (2)). Disturbed soil areas will be limited by the contracts special provisions. And the contract will include bid items for all of the site-specific BMPs needed along with a temporary construction site BMP implementation strategy that will be developed during PS&E.

The contractor is required to have 110% of construction site BMP material on hand at all times; as to protect the entire project area in the event of a precipitation event. The contractor will conduct periodic maintenance of erosion and sediment control measures. All temporary erosion and sediment control measures will be removed after the working area is stabilized or as directed by the engineer. An appropriate seed mix of native species will be planted on disturbed areas upon completion of construction. Sandbagged silt fences will be installed in all named and unnamed waterways in which construction work occurs, both upstream and downstream of the construction site. Any accumulated sediment will be removed and trucked to an approved disposal site.

Minimization Measure BIO-18: Implement Water Quality Measures.
The City will avoid or minimize increased sediment input to the project area channel. As part of the National Pollution Discharge Elimination System General Construction Activity Storm Water Permit, a Storm Water Pollution Prevention Plan will be implemented that includes the following:

- conducting all construction work according to site-specific construction plans that minimize the potential for sediment input to the aquatic system;
- identifying all areas requiring clearing, grading, revegetation, and recontouring, and minimizing the areas to be cleared, graded, and recontoured;
- grading spoil sites to minimize surface erosion;
- avoiding riparian and wetland vegetation wherever possible and identifying and fencing specific trees to protect existing riparian habitat;
- covering bare areas with mulch and revegetating all cleared areas;
- avoiding equipment operation in flowing water during in-channel activities by constructing coffer dams and diverting all streamflows through or around construction sites; and
- constructing sediment catch basins across stream channels immediately below the project site when performing in-channel construction to prevent silt- and sediment-laden water from entering the main streamflow (accumulated sediments will be periodically removed from the catch basin).

Increased pollutant input to the project area channel will also be minimized and avoided by:

- preventing raw cement, concrete or concrete washings, asphalt, paint or other coating material, oil or other petroleum products, or any other substances that could be hazardous to aquatic life from contaminating the soil or entering watercourses;
- establishing a spill prevention and countermeasure plan before project construction that includes strict onsite handling rules to keep construction and maintenance materials out of drainages and waterways;
- cleaning up all spills immediately according to the spill prevention and countermeasure plan and notifying California Department of Fish and Game and

National Oceanic and Atmospheric Administration Fisheries immediately of any spills and cleanup activities;

- providing areas located outside the ordinary highwater mark for staging and storing equipment, materials, fuels, lubricants, solvents, and other possible contaminants;
- removing vehicles from the normal high-water area of the waterway before refueling and lubricating; and
- avoiding operation of equipment in flowing water.

Implementation of measures to avoid or minimize the effects of increased sediment input will also avoid and minimize increased input of pollutants associated with sediments (e.g., mercury) and the potential for subsequent effects on steelhead.

Mitigation Measure BIO-23: Minimize Loss of Steelhead Spawning and Rearing Habitat as a Result of Permanent Changes to Stream Hydraulics, Sediment Processes, and Channel Bottom Stabilization.
The potential for loss of steelhead spawning and rearing habitat will be avoided or minimized by the following measures:

- the amount of riparian vegetation removal, including vegetation providing shaded riverine aquatic cover, substrate, and instream woody material necessary to ensure suitable fish passage conditions will be minimized, and existing spawning and rearing habitat will be maintained;
- disturbance to the stream width, depth, velocity, and slope will be minimized and modified or disturbed portions of the stream, banks, and riparian areas will be restored as nearly as possible to their preproject contours (i.e., elevations, profile, and gradient);
- native riparian vegetation and/or large woody material will be included where rock slope protection (rock slope protection) is needed;
- environmentally sensitive areas will be fenced to prevent encroachment of equipment and personnel into riparian areas, stream channels, and banks to the maximum extent practicable (see Measure BIO-1);
- disturbance and removal of aquatic vegetation will be avoided to the extent practicable; temporary fills, coffer dams, and other in-channel structures will be removed in a manner that minimizes disturbance to downstream flows and water quality and restores pre-existing streambed gradient and contours; and fine sediments removed downstream of the Los Osos Valley Road bridge (approximately 60.96 meters (200 feet)) will be replaced with appropriately-sized spawning gravels (0.5 inch to 3.0 inches).

Mitigation Measure BIO-24: Avoid Substantial Increases in Water Temperature as a Result of Lost Shade and Disturbance to Streambed and Banks.
The potential for substantial increases in water temperature will be avoided or minimized by the following measures:

- exclusionary fencing will be used to minimize the potential for the accidental removal of more vegetation than is necessary to complete construction (see Measure BIO-1);
- soil compaction will be minimized by using equipment that can reach over sensitive areas, thereby ensuring suitable soil conditions for mitigation plantings;
- disturbance to the stream width, depth, velocity, and slope will be minimized and modified or disturbed portions of the stream, banks, and riparian areas will be restored as nearly as possible to their pre-project contours (i.e., elevations, profile, and gradient); and gaps in the post-construction canopy (i.e., shade), will be reduced by restricting extensions of streambank rock slope protection or other bank protection (e.g., sheet piles or bank and channel armoring) to the minimum necessary to protect essential infrastructure.

The entire State owned facility will be retrofitted with permanent storm water treatment BMPs to the maximum extent practicable to ensure that no adverse impacts occur to water quality due to future project operation.

Minimization Measure WQ-4: Design and Implement Detention Basin between the mainline US 101 and the northbound offramp or within northbound loop onramp.
A detention basin will be constructed in between the mainline US 101 and the northbound offramp or within the interior of the Northbound loop onramp. Stormwater from the eastern portion of the overcrossing and from the reconstructed onramp would then be then transported to the basin before ultimately draining into San Luis Obispo Creek. This treatment will allow pollutants to settle in the basin due to throttling of the discharge rate of stormwater flows.

Minimization Measure WQ-5: Where Possible Use San Luis Obispo Creek Waterway Management Plan Design Criteria
Although the project is a transportation project and BMPs must meet Caltrans standards, all treatment BMPs should also meet local standards, established in the San Luis Obispo Creek Waterway Management Plan, when these local specifications do not contradict with Caltrans guidance.

Minimization Measure WQ-6: Permanent Treatment BMPs
Appropriate permanent treatment BMPs will be implemented during final design.
Proposed BMPs may include Infiltration or Detention devices, Media filters and Multi-Chambered Treatment Trains.

5.0 REFERENCES

California Department of Transportation

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