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SR 85 Express Lanes Project
Santa Clara County

Water Quality Study Report

Prepared for:

Caltrans

VTA

URS

Prepared by:

WRECO

July 2013

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Water Quality Study Report

Submitted to:
Santa Clara Valley Transportation Authority and California Department of Transportation

This report has been prepared by or under the supervision of the following Registered Engineer. The Registered Civil Engineer attests to the technical information contained herein and has judged the qualifications of any technical specialists providing engineering data upon which recommendations, conclusions, and decisions are based.

Analette Ochoa., P.E.
Registered Civil Engineer

7/10/13
Date

July 2013

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Executive Summary

The California Department of Transportation (Caltrans), in cooperation with the Santa Clara Valley Transportation Authority (VTA), proposes to convert the existing High-Occupancy Vehicle (HOV) lanes on State Route (SR) 85 to High-Occupancy Toll (HOT) lanes (hereafter known as express lanes). The express lanes would allow HOVs to continue to use the lanes without cost and eligible single-occupant vehicles (SOVs) to pay a toll. The express lanes would be implemented on northbound and southbound SR 85 from US 101 in southern San Jose to US 101 in Mountain View in Santa Clara County (Figures 1 and 2). The project would also include the continuation of the express lanes for 3.3 miles of a 5.5-mile segment on US 101 in southern San Jose. Express lane advance notification signage would also be added in a 4.1-mile segment in Mountain View, for a total project length of 33.7 miles. In addition, an auxiliary lane would be added to a 1.1-mile segment of northbound SR 85 between the existing South DeAnza Boulevard on-ramp and the Stevens Creek Road off-ramp. Work on the US 101 segments will mainly consist of striping and signing and will not include widening or any changes in system or HOV lane access. The project does not require any right-of-way acquisition.

The purpose of this Water Quality Study Report is to evaluate the potential for water quality impacts to existing surface water and/or groundwater resources within the project limits. The general approach of the project is to avoid or minimize impacts and to implement measures for any unavoidable impacts. This study considered all proposed project activities that may result in impacts to water resources, erosion of stream banks, and an increase in sediment load and other pollutants to surface and ground waters.

The SR 85 Express Lanes Project (project) is within the jurisdiction of the San Francisco Bay Regional Water Quality Control Board. There are a total of 21 waterway crossings in the project limits, which comprise 18 different creeks: Matadero Creek, Adobe Creek, Permanente Creek, Stevens Creek, Permanente Diversion, Regnart Creek, Calabazas Creek, Rodeo Creek, Saratoga Creek, Vasona Creek, San Tomas Aquino Creek, Smith Creek, Smith Creek (East Channel), Los Gatos Creek, Ross Creek, Guadalupe River, Canoas Creek and Coyote Creek. These water bodies discharge into the San Francisco Bay and eventually to the Pacific Ocean.

Of the direct receiving water bodies (waterways) that cross or run parallel to SR 85, Matadero Creek, Permanente Creek, Stevens Creek, Calabazas Creek, Saratoga Creek, Los Gatos Creek, Guadalupe River, and Coyote Creek are listed on the 2010 Integrated Report (Clean Water Act Section 303[d] List / 305[b] Report) as impaired for select pollutants. The Guadalupe River total maximum daily load (TMDL) for mercury was approved by the U.S. EPA on June 1, 2010. The San Francisco Bay TMDL for mercury was approved by the U.S. EPA on February 12, 2008, and for PCBs on March 29, 2010. The TMDL for diazinon and pesticide related toxicity in urban creeks within the SFBRWQCB jurisdiction was approved by the U.S. EPA on May 16, 2007.

In general, the main areas where potential water quality impacts may occur are within the creeks crossing SR 85 and the biotic/aquatic or wetland areas adjacent to creek crossings and parallel to SR 85. These areas are surface water resources under the jurisdiction of the California

Department of Fish and Game, the United States Army Corps of Engineers, or Santa Clara Valley Water District (SCVWD), a local government agency that provides water resource management in a service area within the project limits. The project is within the Santa Clara Watershed Basin. Based on United States Geological Survey topography maps, there are nine perennial streams: Stevens Creek, Calabazas Creek, Regnart Creek, Rodeo Creek, Saratoga Creek, Vasona Creek, Guadalupe River, Ross Creek and Coyote Creek.

The project would add impervious area and involve grading, which could result in additional stormwater runoff, soil erosion, and suspended solids being introduced into waterways. Potential project impacts to stormwater runoff would be addressed with the use of pollution prevention measures or Best Management Practices. As the project lies in an area that is susceptible to hydromodification impacts, mitigation measures would be designed to meet the hydromodification requirements set forth in the Municipal Regional Stormwater NPDES permit. The project would not affect stream or riparian habitats, or wetlands or waters of the United States.

Short-term impacts could result from construction activities such as grading work. The SR 85 bridges over Saratoga Creek and San Tomas Aquino Creek would be widened. However, the widening would involve closing the gap between the northbound and southbound bridges and would not cause any fill in the channel. The construction activities would be avoided in these channels. Bridge widening is not proposed for the other creeks. Based on the preliminary geotechnical information (URS, 2011), the groundwater table is not anticipated to be high; therefore, dewatering would not be necessary. Temporary best management practices would be considered for this project to prevent potential water quality degradation during construction.

Long-term impacts from the project could result from fill in the jurisdictional water resources, potential increases to the velocity and volume of downstream flows due to added impervious areas, and sediment transported from erosion. Stormwater runoff from the SR 85 corridor potentially carries pollutants into natural flowing streams as well as into adjacent jurisdictional biotic/aquatic areas. Permanent Best Management Practices would be considered to address these impacts, to promote infiltration, reduce erosion, and collect and treat roadway runoff. Potential types of permanent pollution prevention design measures to be considered for this project are listed in Section 5.2.5 of this report.

The project's overall design goal would be to avoid impacts to water resources to the maximum extent practicable, promote infiltration of stormwater runoff, maximize treatment of stormwater runoff, and reduce erosion by metering or detaining post-project runoff rates to meet the hydromodification mitigation requirements. By meeting these goals and incorporating other applicable National Pollutant Discharge Elimination System requirements, water quality impacts should be minimized and therefore should not be significant.

Acronyms

AIA	Additional Impervious Area
BATEA	Best Available Technology Economically Achievable
BCT	Best Conventional Technology
BMPs	Best Management Practices
BSA	Biological Study Area
Caltrans	California Department of Transportation
CDFW	California Department of Fish and Wildlife
CGP	Construction General Permit
CWA	Clean Water Act
DSA	Disturbed Soil Area
EPA	Environmental Protection Agency
ESA	Environmentally Sensitive Areas
GIS	Geographic Information Survey
HCP/NCCP	Santa Clara Valley Habitat Conservation Plan/Natural Community Conservation Plan
HMP	Hydromodification Management Plan
HOV	High Occupancy Vehicle
MRP	Municipal Regional Permit
MS4	Municipal Separate Storm Sewer System
NES	Natural Environment Study
NOC	Notice of Construction
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
RWQCB	Regional Water Quality Control Board
SCVURPPP	Santa Clara Valley Urban Runoff Pollution Prevention Program
SCVWD	Santa Clara Valley Water District
SMARTS	Storm Water Multiple Application and Report Tracking System
SOV	Single Occupancy Vehicle
SR	State Route
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TMDL	Total Maximum Daily Load
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Survey
VTA	Santa Clara Valley Transportation Authority
WDRs	Waste Discharge Requirements

1 GENERAL DESCRIPTION

The California Department of Transportation (Caltrans), in cooperation with the Santa Clara Valley Transportation Authority (VTA), proposes to convert the existing High-Occupancy Vehicle (HOV) lanes on State Route (SR) 85 to High-Occupancy Toll (HOT) lanes (hereafter known as express lanes). The express lanes would allow HOVs to continue to use the lanes without cost and eligible single-occupant vehicles (SOVs) to pay a toll. The express lanes would be implemented on northbound and southbound SR 85 from US 101 in southern San Jose to US 101 in Mountain View in Santa Clara County (Figure 1 and Figure 2). In addition, an auxiliary lane would be added to a 1.1-mile segment of northbound SR 85 between the existing South DeAnza Boulevard on-ramp and Stevens Creek Road off-ramp. The project would also include the continuation of the express lanes for 3.3 miles on a 5.5-mile segment on US 101 in southern San Jose. Express lane advance notification signage would also be added in a 4.1-mile segment in Mountain View, for a total project length of 33.7 miles. Work on the US 101 segments will mainly consist of striping and signing and will not include widening or any changes in system or HOV lane access. The project does not require any right-of-way acquisition.

1.1 Project History

The proposed project was originally conceived in 2003 as part of a VTA Adhoc Financial Stability Committee recommendation. In 2004 the California Legislature passed Assembly Bill 2032 authorizing the VTA, as part of a demonstration project to conduct, administer, and operate a value pricing and transit development program under which SOVs may use designated HOV lanes at certain times of the day for a fee. A Feasibility Study was completed in 2005. In 2007, Assembly Bill 574 was passed, removing the “demonstration” category from the law and allowing the VTA to implement a value pricing program within any two corridors in the Santa Clara County HOV system.

VTA began preliminary engineering and public outreach in 2007, and the VTA Board approved a Silicon Valley Express Lane Program in December 2008. Work on the development of SR 85 express lanes has been ongoing since 2007. As part of the preliminary engineering work, over 19 express lanes access configurations were reviewed, public outreach was conducted, and a technical memorandum was prepared that was used as input for the approval of the Silicon Valley Express Lanes Program by VTA Board of Directors. Approval of the project’s Project Study Report (PSR) advanced work into the preliminary engineering and environmental approval phase.

Net revenue generated from the use of the SR 85 express lanes would be used in the SR 85 corridor for highway improvements including transit service and operations.

1.2 Project Description

SR 85 is a 24.1-mile-long freeway that connects Mountain View to southern San Jose. SR 85 passes through Mountain View, Los Altos, Sunnyvale, Cupertino, Saratoga, Los Gatos, Campbell, and San Jose. SR 85 also intersects with SR 237, I-280, SR 17, and SR 87. SR 85 has three lanes in each direction, which consist of two mixed-flow lanes and one HOV lane.

The project would convert existing HOV lanes to express lanes along SR 85 and a portion of US 101. The purpose of the project is to manage traffic congestion in the most congested HOV segments of the freeway between SR 87 and I-280 and maintain consistency with provisions defined in Assembly Bill 2032 (2004) and Assembly Bill 574 (2007) to implement express lanes in an HOV lane system in Santa Clara County.

The proposed schedule identifies completion of the project approval and environmental document phase in late 2013, start of construction in late 2014, and opening of the express lanes to traffic in late 2015.

Two alternatives are proposed: Build and No Build.

1.2.1 Build Alternative

The Build Alternative would convert the existing single HOV lanes into express lane facilities that would have one lane between US 101 in southern San Jose and SR 87, two lanes between SR 87 and I-280, and one lane between I-280 and US 101 in Mountain View. Conversion of the HOV lanes to express lanes would allow use by SOVs with active FasTrak accounts and toll tags.

1.2.1.1 Express Lane Configuration

Like the existing HOV lanes, the express lanes would be adjacent to the center median. The striping that separates the lanes from the general purpose lanes would be changed from the existing dashed line for the HOV lane to a 2-foot-wide double-line striped buffer zone for the express lanes. The striped buffer zone would have gaps in multiple locations where vehicles can enter and exit the express lanes (called access points). The buffer zones serve to limit vehicle movement into and out of the express lanes to the designated access points.

The project would include signage to advise express lane users that entering or exiting the facility anywhere other than designated buffer zones is a traffic violation.

1.2.1.2 US 101/SR 85 Direct Connectors

At the south end of the project in southern San Jose, both the northbound and southbound HOV direct connectors from SR 85 to US 101 will be converted to express connectors, allowing SOVs with valid FasTrak devices to use the direct connectors. The southern end of the proposed express lanes on US 101 will coincide with the beginning/ending of the double HOV lanes under the Metcalf Road overcrossing.

At the north end of the project in Mountain View, the buffer-separated express lane facility will end on SR 85 shortly before the US 101/SR 85 interchange. The direct connectors at this location are not proposed to be part of the SR 85 Express Lanes project and would remain as HOV-only connectors. In the northbound direction on SR 85, the express lane would terminate in advance of the direct connectors, allowing enough distance for SOVs to exit the lane and merge across the general purpose lanes to use the general purpose ramp from northbound SR 85 to northbound US 101. In the southbound direction, the express lane would start shortly after the direct connector terminates on SR 85, allowing enough distance for SOVs entering southbound SR 85 from the general purpose ramp to merge across the general purpose lanes and enter the express lane.

1.2.1.3 Right-of-Way Requirements

The project would be constructed entirely within the existing right-of-way.

1.2.1.4 Construction

In the segments of SR 85 between US 101 in southern San Jose and SR 87 and between I-280 and US 101 in Mountain View, the 2-foot-wide buffer would be created by reducing the width of the existing HOV lane and the adjacent general purpose lane from 12 feet to 11 feet. The rest of the general purpose lanes would remain 12 feet wide.

In the segment of SR 85 between SR 87 and I-280, where a second express lane would be added in each direction, pavement widening would be conducted in the median to accommodate the express lanes and buffer zones. The median would be paved and the existing thrie-beam barrier would be replaced with a Type 60 concrete barrier.

SR 85 bridge decks would be widened at Almaden Expressway (northbound side only), Camden Avenue, Oka Road, Pollard Road, and Saratoga Avenue, as well as at the San Tomas Aquino Creek and Saratoga Creek crossings. The existing gaps between the northbound and southbound bridges at these locations would be closed except at Almaden Expressway, where the northbound bridge would be widened on the inside (toward the median). Bridge widening work would take place along the banks of San Tomas Aquino and Saratoga creeks, but no in-water work is proposed.

An auxiliary lane would be added to a 1.1-mile segment of northbound SR 85 between the existing South De Anza Boulevard on-ramp and Stevens Creek Boulevard off-ramp. The purpose of the auxiliary lane is to improve traffic operations during peak periods. The existing pavement would be widened by up to 14 feet to the outside (northeast). To accommodate the auxiliary lane, the existing embankments at the abutments of the South Stelling Road and McClellan Road overcrossings adjacent to northbound SR 85 would be replaced with retaining walls. No culvert extensions, sound wall modifications, or additional right-of-way would be required.

Overhead signs and tolling devices would be mounted on cantilever structures supported on cast-in-drilled-hole or driven piles in the median. The piles for the overhead signs would be from 3 to 6 feet in diameter and extend to approximately 30 feet below ground surface. The piles for the tolling devices would be 1 to 2 feet in diameter and would extend to approximately 10 feet below ground surface. Some Traffic Operations Systems (TOS) equipment such as traffic monitoring stations, Closed Circuit Televisions, cabinets, and controllers would be installed along the outside edge of pavement within the existing right-of-way. Maintenance pullouts would be installed in shoulder areas to allow access to the TOS equipment. The specific locations of these features would be developed during final project design.

Trenching would be conducted along the outside edge of pavement for installation of conduits. The depth of trenching would be 3 to 5 feet below the roadway surface. Conduits would be jacked across the freeway to the median where needed to provide power and communication feeds to the new overhead signage and tolling equipment.

Project construction would take place at night as well as on weekends and non-peak weekday hours. During construction, some lane closures could be required, but full freeway closures are not expected to be necessary.

1.2.1.5 Drainage, Disturbed Soil Area, and Risk Level

Concentrated flow conveyance systems, such as ditches, berms, swales, flared end sections and outlet protection, and velocity dissipation devices would be considered for this project. Overside drains may also be used for conveying runoff to the Best Management Practices (BMPs) designed at the ramp locations with a drop. Outlet protection and velocity dissipation BMPs would be placed at all outlets of drainage systems that discharge into earth-lined ditches/basins. The existing roadway drainage design would either be modified to fit with new drainage systems or removed and replaced by new systems. The change in drainage would result in changes in the interception of surface runoff. The drainage facilities would be developed during the design phase and shown on the plans.

The total disturbed soil area (DSA) is 75.4 acres within Santa Clara County. The DSA includes the proposed total construction area, including staging areas. Areas of overlay were not included in the calculations. This includes any soil that will be exposed through the removal of pavement. The net additional impervious area (AIA) is 40.1 acres. The AIA was calculated by subtracting the total existing impervious area intended to be removed from the total new impervious area. The reworked impervious area is 27.4 acres. The reworked impervious area is from PM 5.9 (Station 940+57) to PM 17.8 (Station 1576+35).

Based on the combined sediment and receiving water risk, the risk level for all the project planning watersheds is Risk Level 2. The requirements for Risk Level 2 projects are presented in Attachment D of the Construction General Permit (Order No. 2009-0009-DWQ). The project risk level(s) will be further evaluated and verified during the project design phase. Stormwater sampling is required at all discharge locations for this project.

1.2.2 No Build Alternative

The No Build Alternative assumes no modifications would be made to the current SR 85 corridor, including the continuous access HOV lane, other than routine maintenance and rehabilitation of the facility and any currently planned and programmed projects within the area.

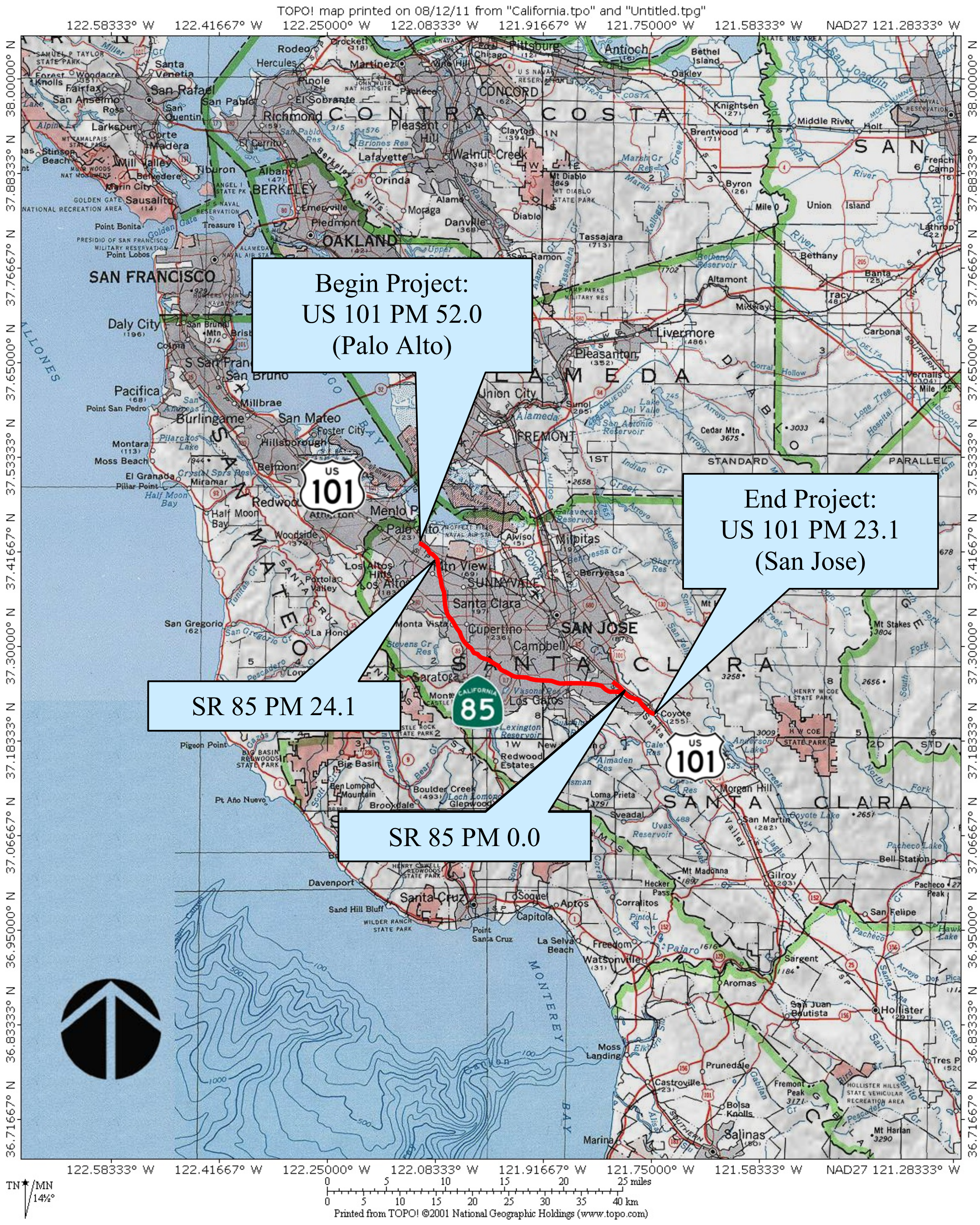

Figure 1. Location Map

Source: United States Geological Survey (USGS)

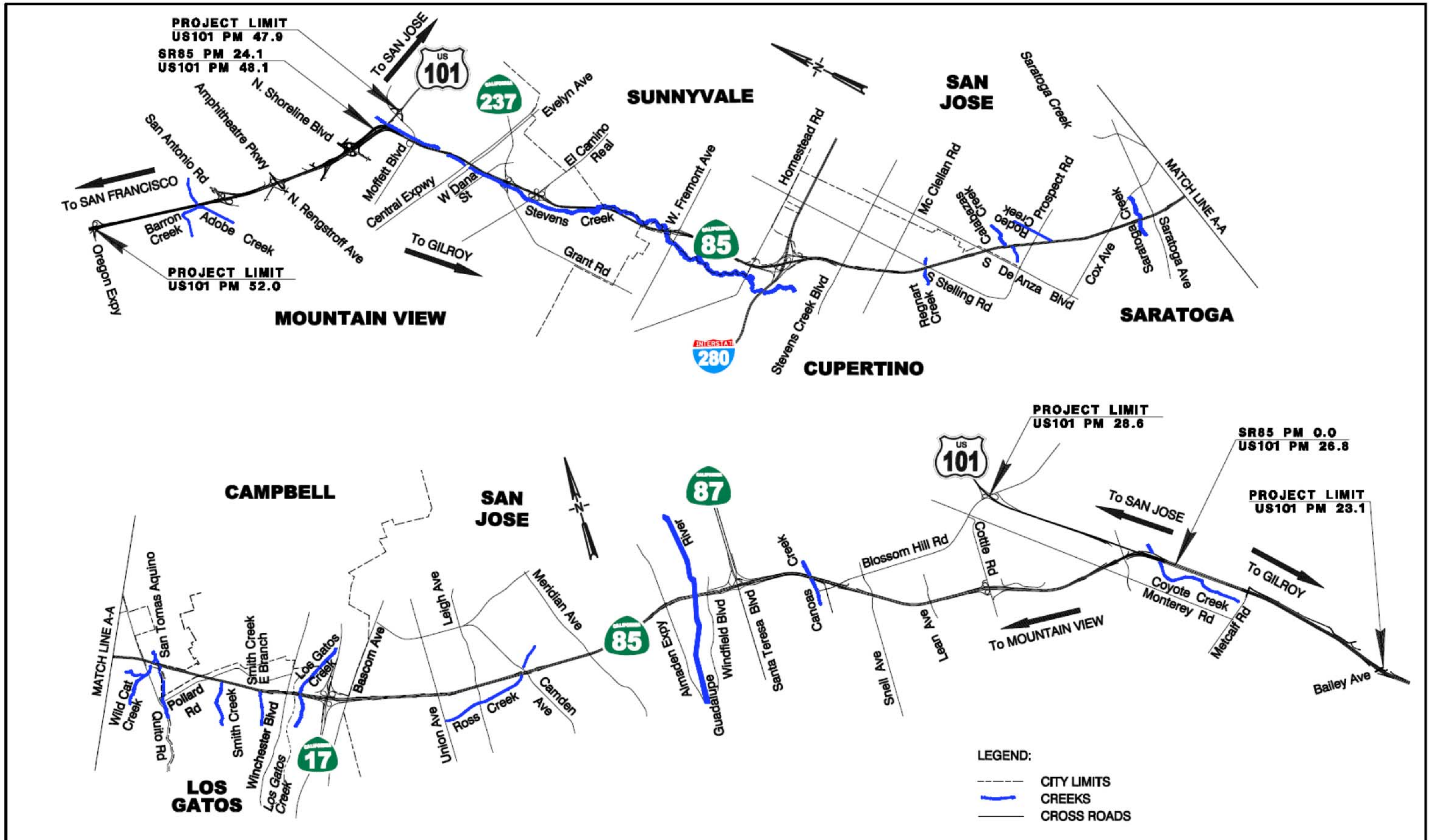

Figure 2. Vicinity Map and Waterway Crossings

Source: URS, 2012

2 REGULATORY SECTION

This section summarizes the regulatory context in which issues associated with water quality are mandated at the federal, state, and local levels.

2.1 Federal Requirements

The primary regulation at the federal level for the quality of surface and ground water is the Clean Water Act. Details are summarized in the sections below.

2.1.1 Clean Water Act

In 1972, the U.S. government passed the Federal Water Pollution Control Act, which later came to be known as the Clean Water Act (CWA). This is the major federal legislation governing water quality is the Clean Water Act, as amended by the Water Quality Act of 1987 (Act).This legislation, issued by the United States Environmental Protection Agency (EPA), established the contemporary legal foundation and structure for regulating water quality throughout the United States. The objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters." The list below summarizes some of its more important sections:

- Sections 303 and 304 provide for water quality standards, criteria, and guidelines for all surface Waters of the United States.
- Section 401 requires an applicant for any federal project that proposes an activity that may result in a discharge to Waters of the US to obtain certification from the state that the discharge will comply with other provisions of the CWA. The Waters of the US include all navigable water bodies and all water bodies that drain into a navigable water body.
- Section 402 established the National Pollutant Discharge Elimination System (NPDES), a permitting system for the discharge of any pollutant (except for dredge or fill material) into Waters of the US. The State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Boards (RWQCB) administer this permitting program in the State of California; later sections will discuss the NPDES in detail.
- Section 404 establishes a permit program for the discharge of dredge or fill material into Waters of the U.S. The United States Army Corps of Engineers (USACE) administers this permit program.

2.1.2 National Pollutant Discharge Elimination System

The NPDES permit was established in the CWA to regulate municipal and industrial discharges to surface Waters of the U.S. The ultimate objective of the CWA is zero pollutant discharge but it recognizes the need for a system to regulate non-zero pollutant discharges until the zero pollutant objective is feasible. Section 402 of the CWA established the NPDES for this purpose. The NPDES regulates all pollutant discharges, particularly point source discharges, to the Waters of the U.S.

Passage of the Water Quality Act of 1987 amended the CWA to specifically include stormwater discharges as a type of point source discharge and established the framework for regulating municipal and industrial stormwater discharges under the NPDES program. This amendment added stormwater related discharges associated with construction projects to the list of discharges that require a NPDES permit. This inclusion of stormwater related discharge is why construction projects are subject to the requirements of the NPDES and must satisfy the requirements of all applicable NPDES permits.

Allowable concentrations and mass emissions of pollutants are only set at a regional level. These set concentrations and mass emissions of pollutants are specifically allowed either through site-specific NPDES permits or through other regulatory mechanisms, such as Total Maximum Daily Loads (TMDLs).

Non-point pollution sources are defined as sources originating over a wide area rather than from a definable point. Non-point pollution often enters receiving water bodies in the form of surface water runoff and is not conveyed by way of pipelines or discrete conveyances. As defined in federal regulations, non-point sources are generally exempt from the NPDES permit program requirements. However, non-point source discharges caused by general construction activities are controlled by the NPDES program.

The goal of NPDES non-point source regulations is to improve the quality of stormwater discharged to receiving waters to the “maximum extent practicable” through the use of BMPs. BMPs can include the development and implementation of various practices, including structural measures (e.g., the construction of biofiltration strips/swales, and detention basins), regulatory measures (e.g., local authority over drainage facility design), public policy measures (e.g., labeling of storm drain inlets as to the impacts of dumping on receiving waters), and educational measures (e.g., workshops informing the public of the impacts of household chemicals dumped into storm drains).

CWA Federal Regulations define “municipal separate storm sewer” to mean “a conveyance or system of conveyances (including roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, manmade channels, or storm drains): (i) owned or operated by a State, city, town, borough, county…” Pursuant to the CWA Section 402, NPDES Permits are required and issued for discharges from a Municipal Separate Storm Sewer System (MS4) serving a population of 100,000 or more for Phase I, and serving a population of 10,000 or more for Phase II. Caltrans, as the owner of an MS4, has its own Statewide NPDES Permit (See Section 2.2.2). The County of Santa Clara, along with the cities of San Jose, Milpitas, Palo Alto and Santa Clara have Phase I NPDES permits.

2.2 State Requirements

Contemporary water quality regulation began in the State of California with the Dickey Act, which was passed in 1949. The Dickey Act created the RWQCBs and the State Water Quality Control Board, which was later combined with the State Water Resources Board and became known as the SWRCB. In 1962, the State of California passed the Porter-Cologne Water Quality Act, which provides the basis for contemporary water quality regulation in the state.

In the State of California, the SWRCB now administers water rights, water pollution control, and federal as well as state water quality functions throughout the state. Each of the RWQCBs is responsible for the protection of beneficial uses of water resources according to federal, state and local regulatory requirements within its jurisdiction and each uses planning, permitting and enforcement authorities to meet these responsibilities. In particular, the SWRCB administers statewide NPDES permits, and the RWQCBs administer local NPDES permits.

2.2.1 Porter Cologne Water Quality Act

The Porter-Cologne Act significantly expanded the mandate and authority of the SWRCB and RWQCBs to regulate water quality, including the requirement of a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or otherwise) to land or surface waters that may impair a beneficial use of surface or ground water of the State. The San Francisco Bay RWQCB regulates water quality in the project area in accordance with the Water Quality Control Plan for the San Francisco Bay Basin (Basin Plan). The Basin Plan presents beneficial uses that the RWQCB has specifically designated for local aquifers, streams, marshes, rivers, and the Bay, as well as the water quality objectives, and criteria that must be met to protect these uses.

2.2.2 Caltrans NPDES Permit

The SWRCB issued Caltrans' Statewide NPDES Storm Water Permit (Order No. 99-06-DWQ, adopted July 15, 1999) to cover all Department projects and facilities in the state. In compliance with this permit, Caltrans developed the Statewide Storm Water Management Plan (SWMP) to address stormwater pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The permit expired in 2004 and is currently undergoing SWRCB review for re-authorization. However, Caltrans received a memo from the SWRCB on August 4, 2004 that the existing permit continues to be effective until a new permit is issued. Caltrans continues to strictly abide by its NPDES Storm Water permit requirements.

Caltrans' SWMP describes the minimum procedures and practices that Caltrans uses to reduce the pollutants it discharges from storm drainage systems that Caltrans owns or operates. It also outlines procedures and responsibilities for protecting water quality at Caltrans' facilities, including the selection and implementation of BMPs. In general, Caltrans is required to reduce pollutants in stormwater discharges to the maximum extent practicable. Pollutants must be reduced using the Best Available Technology Economically Achievable (BATEA), using the Best Conventional Technology (BCT). Caltrans' Permit requires Caltrans to also comply with the requirements of the Construction General Permit described in Section 2.2.3. The project would be expected to follow the guidelines and procedures outlined in the SWMP.

2.2.3 NPDES Construction General Permit

In accordance with NPDES regulations to minimize the potential effects of construction runoff on receiving water quality, the State requires that any construction activity affecting one acre or more must obtain coverage under the NPDES Construction General Permit for Storm Water

Discharges Associated with Construction Activity (Order No. 2009-0009-DWQ). Permit applicants are required to prepare a Storm Water Pollution Prevention Plan (SWPPP) and implement BMPs to reduce construction effects on receiving water quality.

Examples of typical construction site BMPs incorporated in SWPPPs include: temporary mulching; seeding or other suitable stabilization measures to protect uncovered soils; storing materials and equipment to ensure that spills or leaks cannot enter storm drain systems or surface water; spill prevention and cleanup plan development and implementation; traps, filters, or other devices at drop inlets to prevent contaminants from entering storm drains; and barriers that minimize the amount of uncontrolled runoff which could enter drains or surface water.

Caltrans' permit (DWQ No. 99-06-DWQ) references the Construction General Permit to regulate stormwater discharges from all Caltrans' construction projects except for those projects that the RWQCB determines should be covered by an individual permit. Caltrans is required to notify the RWQCB that a project is to be covered under this permit by filing a Notification of Intent.

2.3 Regional and Local Requirements

The project is in the jurisdiction of the Santa Clara Valley Water District (SCVWD), a local government agency that provides water resource management in the project limits, as shown in Figure 2. The project is also within the jurisdiction of the San Francisco Bay RWQCB. The project is adjacent to cities and counties that are subject to a Regionwide Municipal Regional Permit (MRP) for discharging stormwater to San Francisco Bay and tributary creeks. The agencies in Santa Clara County have formed a countywide program known as the Santa Clara Valley Urban Runoff Pollution Prevention Program (SCVURPPP) to assist with compliance with their permit requirements. SCVURPPP is an association of 13 cities and towns in Santa Clara Valley, Santa Clara County, and the SCVWD that share a common NPDES permit to discharge stormwater to South San Francisco Bay. Member agencies (co-permittees) include the municipalities of Cupertino, Los Altos, Los Altos Hills, Milpitas, Mountain View, Palo Alto, San Jose, Santa Clara, Sunnyvale, Campbell, Los Gatos, Monte Sereno, and Saratoga; Santa Clara County; and the SCVWD.

A permit to discharge stormwater from urban areas in Santa Clara County was issued to the SCVURPPP by the San Francisco Bay RWQCB in 1990 and reissued in 1995. As part of the NPDES permit requirements, the SCVURPPP produced an Urban Runoff Management Plan and submits annual work plans and reports to the Regional Water Quality Control Board. This also included a Hydromodification Management Plan (HMP). The goal of an HMP is to manage increased peak runoff flows and volumes (hydromodification) to avoid erosion of stream channels and degradation of water quality both on and off project sites. This NPDES permit expired on February 21, 2006, but was administratively extended by the San Francisco Bay RWQCB, which proposed to replace the countywide municipal stormwater permits with an MRP (updated on October 14, 2009) for all 76 Bay Area municipalities in an effort to standardize stormwater requirements in the region.

Minimal impacts will occur to waters of the State at San Tomas Aquino and Saratoga creeks. Compensatory mitigation for minimal impacts to waters of the State will be provided through payment of an in-lieu fee to the Santa Clara Valley Habitat Conservation Plan/ Natural Community Conservation Plan (HCP/NCCP). If mitigation through the HCP/NCCP is not feasible for impacts to waters of the State, off-site mitigation will be implemented in coordination with the RWQCB, as described in the Natural Environment Study (NES; URS 2013). The project would implement any general Waste Discharge Requirements (WDRs) issued by the RWQCB.

The project is a “covered project” in the HCP/NCCP. The HCP/NCCP covers southern Santa Clara County and includes the entire SR 85 Express Lanes Project alignment. The objective of the HCP/NCCP is to provide measures to protect, enhance, and restore natural resources within the study area. The NES (URS 2013) addresses the measures that would be incorporated for consistency with the HCP/NCCP.

3 AFFECTED ENVIRONMENT/EXISTING CONDITIONS

3.1 Study Methods and Procedures

The methods and procedures considered for the development of this report are the federal, state, and local water quality laws and regulations relevant to the project study area. These laws and regulations are the CWA, California's Porter-Cologne Water Quality Control Act, and Santa Clara County regulations.

Water quality related permits at the statewide level for the SR 85 Express Lanes Project were also studied and addressed in this report, including Caltrans' NPDES statewide permit and CGP for construction and dewatering and the local MRP. The water quality requirements of the RWQCB were also researched, such as those pertaining to water resources with beneficial uses and water quality objectives. The San Francisco Bay RWQCB established a General Basin Plan with goals and policies that apply to the county's water resources regarding beneficial uses and water quality objectives.

As part of this Water Quality Study, the project team reviewed existing topographic data from the United States Geological Survey, erosion and climate data from the United States Department of Agriculture Natural Resources Conservation Service (NRCS) Web Soil Survey, and hydrology and surface streams information from the Flood Insurance Study Report from the Federal Emergency Management Agency. General information regarding channel geomorphology, existing groundwater, and biotic and aquatic groups specific to the study area was considered in order to evaluate the impacts that would result from the construction of the project and the operation and maintenance of this highway. Detailed geomorphic information would be developed as part of the preparation of the Geotechnical Report during the project design phase.

3.2 Study Area

The project corridor is in Santa Clara County, south of the San Francisco Bay. The alignment extends from the US 101/SR 85 connector in southern San Jose to the US 101/SR 85 connector in Mountain View, traversing the cities of Cupertino, Saratoga, Campbell, Los Gatos, Sunnyvale, Los Altos, Mountain View, and San Jose. The project corridor includes 5.5 miles of US 101 in southern San Jose and 4.1 miles of US 101 in Mountain View.

The profile along the project alignment varies from depressed sections as much as 39 ft below the surrounding development to embankments as high as 27 ft. Development at the project site includes the freeway, numerous overcrossings and undercrossings, roadway interchanges, freeway interchanges at SR 87, SR 17, Interstate 280 (I-280), and SR 237, bridges over the waterways, and connector ramps at US 101.

3.3 Population and Land Use

Per the SCVWD website, Santa Clara County is home to a diverse population of approximately 1,800,000 people. The Association of Bay Area Governments (ABAG) (2009) projections estimate that the county population could rise to 2,431,400 by the year 2035, almost a 35 percent increase from the current levels. The project area is entirely within the existing roadway right-of-way. The adjacent land uses include commercial, light industry, agriculture and residential (URS 2011).

3.4 Topography

The project corridor is located in the Santa Clara Valley, which encompasses 1,300 square miles at the southern end of the San Francisco Bay. The valley is bordered on the west by the Santa Cruz Mountains and on the east by the Diablo Range. The two ranges converge near the community of Coyote, which is located near the southern end of the project alignment.

Throughout the 27 miles of project alignment, existing slopes are generally 2:1 (H:V), and in special cases 1.5:1 (H:V). At the southernmost project segment, along US 101 between Metcalf Road and SR 85, the northbound roadway is generally positioned in well-vegetated cuts, while the southbound roadway is located in both fills and well-vegetated cuts. A concrete barrier wall is located in the US 101 median; the ground surface on the west side of the median typically is well-vegetated, whereas the east side is typically paved. Typically there is a differential height of several feet of the ground surface along this median wall.

Along SR 85, between US 101 and Almaden Expressway, the roadway surface is close to original grade. Only a few retaining walls are present and are located mostly at the interchanges. Along SR 85, between Almaden Expressway and I-280, the roadway is located in deep cuts retained by concrete retaining walls. Vegetated sloped soil toes are present at the base of the retaining walls. Along SR 85, from I-280 to US 101, the roadway is positioned on embankment fill, with numerous sound walls near the hinge points. Where present, cut faces vary considerably in height and slopes are well vegetated.

The northernmost project segment, along US 101 between SR 85 and Oregon Expressway, is level because the area is located in relatively flat topography. Consequently, cuts and fills are small.

3.5 Soils and Geology

General information about the soils in the project area indicates that the soils are rich in alluvial deposits, originating from the erosion of the Diablo Range and the Santa Cruz Mountains. The alluvial and sedimentary soil deposits consist of alternating layers of loam, clay, gravel, sand and mixtures of these elements.

The Natural Resources Conservation Service (NRCS) has classified 20 soil associations for Santa Clara County alone (Silva, undated), and each soil association is composed of up to five or six different individual soils. The soils were grouped based on physiographic land divisions, a parameter that takes into account both the topography and the origin of landforms. The five major types of landforms found in the basin include alluvial fans, basin land, low terrace land, high terrace land, and uplands (Weir and Storie 1947). Native soils within the study area are alluvial and fluvial deposits consisting predominantly of soft to very stiff lean clay overlying interlayers and discontinuous lenses of medium dense to very dense, silty and clayey sand and gravel, and firm to very stiff, lean clay and sandy clay. Table 1 lists the various geological features presented in the Preliminary Geotechnical Report prepared by URS (2011). The soils are classified as Xerorthents-Urban land-Botella and are composed of poorly drained clays and urban fill soils with poor permeability (URS 2011). The soil information showing Hydrologic group can be found in Appendix D. The most dominant hydrologic soil group in the vicinity of the project is D.

3.6 Erosion Potential

The erosion potential is low for the valley floor soils (Schaaf and Wheeler, 2009). Soils in the foothills have a greater potential for erosion. Most of project is highly urbanized with well disturbed and highly variable soils. The urban areas and mud flat lands are also characterized by clay alluvium soils of the Botella, Reyes, Novato, Tamba, Clear Lake, Pescadero, and Cropley Series. These soils are considered to have low to moderate erosion potential.

Table 1. Subsurface Conditions Along SR 85 Project Alignment

Location	Subsurface Condition
Coyote Creek Bridge	Consist of approximately 10 ft of very stiff to hard clay, underlain by 4 ft of medium dense silty sand over 6 ft of stiff to hard plastic clay. These soils underlain by soft to medium claystone of the Santa Clara Formation between a depth of 20 and 82 ft below ground surface.
Great Oaks Interchange	Consist of 35 ft of firm to very stiff clay and stiff sandy silt overlying 45-50 ft of medium dense to very dense, variably clayey, variably silty sand with interbeds of clay and gravel. These soils are underlain by stiff to very stiff variably sandy clay to the maximum 101 ft exploration depth.
Perimeter Road Undercrossing	Consist of stiff to very stiff silty clay and sandy clayey silt in upper 15-20 ft, overlying 7-15 ft of medium dense to very dense silty sand and sandy silt. These soils are underlain by interbedded layers of stiff to very stiff clay and silt, and dense to very dense sand and gravel.
Almaden Expressway Interchange	Native soils are alluvial and fluvial deposits consisting of firm to very stiff lean clay with low to intermediate plasticity in the upper 20-30 ft, underlain by thick layers of medium dense to very dense sand and gravel with occasional cobbles and boulders.
Ross Creek	Consist of medium dense to very dense clayey sands and gravels with occasional interbeds of clay, cobbles, and boulders.
Russo Drive Pedestrian Overcrossing	Consist of medium dense silty gravel and loose to medium dense, clayey, silty sand to a depth of 10-15 ft, overlying 30 ft of stiff to hard clay. Layers of medium dense to very dense clayey sand, silty sand, and stiff to hard variably sandy clay with thin gravel interbeds were encountered 15-81 ft below ground surface.
Meridian Avenue Overcrossing	Consist of interlayered stiff to hard sandy clay, and dense to very dense, clayey, gravelly sands and sandy gravels. Cobbles and possibly boulders encountered 10-30 ft below ground surface.
Dent Avenue Pedestrian Overcrossing	Underlain by interlayered stiff to hard, variably sandy, variably gravelly clay; dense to very dense, variably clayey, silty sand; and dense to very dense, variably clayey, silty gravel. Cobbles encountered 10-30 ft below ground surface.
Camden Avenue Interchange	Native soils are alluvial and fluvial deposits consisting of medium dense to very dense sand and gravel with occasional cobble layers and boulders Also encountered minor interlayers of stiff to hard lean clay with low plasticity.
Leigh Avenue Overcrossing	Consist predominantly of dense to very dense clayey sand with gravel interbedded to a depth of 100 ft below ground surface. Cobbles and possibly boulders encountered at isolated locations.
Union Avenue Interchange	Consist predominantly of dense to very dense silty sand, and clayey sand interbedded with gravel. Random beds of stiff to hard, gravelly, sandy clay also encountered. Cobbles and possibly boulders also encountered at depths below 10 ft.
Samaritan/ White Oaks Pedestrian Overcrossing	Consist of a 2-3 ft cap of sandy silt and lean clay over dense to very dense clayey sand with gravel interbedded. Cobbles and possibly boulders also encountered.
Basom Avenue to Winchester Boulevard	Consist of mostly granular soils; an occasional 4 ft layer of sandy silt underlain by silty and clayey sand and silty and clayey gravels.
Winchester Boulevard to Quito Road	Consist of dense to very dense clayey and silty sands and gravel and stiff to hard lean asn sandy clays. Silty and clayey sands predominate in the upper 20-30 ft. More clays and clayey gravels present near Smith Creek and Pollard Road, and silty and clayey sands dominate the area near Pollard Road and San Tomas Aquinas Creek. The area near San Tomas Aquinas Creek and Wildcat Creek consist of 20-30 ft of clayey gravel beneath 8 ft of surficial silt. In the vicinity of Quinto Road, the upper 20-30 ft consist of silts, clays, silty sands and clayey sands; this layer is underlain by silty and sandy clays more than 40 ft thick.
Quito Road to Cox Avenue	Soils west of Quito Road are more granular because of younger alluvial fan deposits associated with Saratoga Creek. A 4 ft surface layer of firm to very stiff sandy silt is underlain by layers of dense to very dense silty sand with gravel and stiff to hard lean and sandy clays. The silty sand with gravel layer is generally 20-35 ft except from Saratoga Avenue to Saratoga Creek where there are more silts and clays. Near Cox Avenue the surficial silt layers extend to a depth of 15-20 ft below ground surface.
Cox Avenue to Rodeo Creek	Consist of silty and clayey sands, sandy and clayey silts, and lean and sandy clays. These layers are discontinuous between borings and usually contain some gravel. The sands are usually dense to very dense, and the clays and silts are stiff to hard.
Rodeo Creek	Consists of an upper lean and sandy clay layer varying in thickness from 4-54 ft, underlain by 5-25 ft of dense to very dense silty sand and/or clayey gravel. In the upper layer, the low plasticity clays are very stiff to hard and generally contain gravel.
Stevens Creek Boulevard	Consists of a 40-50 ft deep upper layer predominantly of medium dense to very dense silty sand with gravel, below 50 ft is a layer of very stiff to hard lean clay. At some locations in the upper layer, the sand contains thin (3 ft) layers of firm to stiff sandy silt with gravel and stiff lean clay with gravel. In the vicinity of Stevens Creek Boulevard, there are numerous layers of clayey gravel to the maximum exploratory depth of 56 ft.
Homestead Road Overcrossing	Consists of dense to compact gravel to 48 ft below ground surface, with a 10 ft thick interbed of dense sandy silt.
Dalles Pedestrian Overcrossing	Consists of layers of compact to very dense silty sand, silty gravel, and silty sand to about 28 ft below ground surface.
Fremont Avenue Undercrossing	Consists of layers of silty and sandy gravel and silty sand to about 25 ft below ground surface.
Stevens Creek Bridge (37-185)	In creek bed, consists of layers of silty sand, silty and sandy gravel, and silt to a maximum depth of 25 ft; cobbles were encountered below 28 ft.
Stevens Creek Bridge (37-189)	At abutments, consists of interbedded slightly compact to very dense silty sand, gravel, coarse sand and loose silt in depths ranging 48-80 ft below ground surface; occasional cobbles were also encountered.
Route Separation at El Camino Real	Consists of slightly compact to very dense silt, silty sand coarse sand, gravelly sand and gravel to depths 70-75 ft below ground surface. Under these layers, deposits become dense to very dense.
Stevens Creek Northwest Connector	Consists of alternating layers of slightly compact to very stiff silt, organic silt, very stiff silty clay, soft clay, slightly compact silty sand and dense sand to a depth of 60 ft below ground surface. Below these layers are dense to compact gravel and sand, which are underlain by a layer of stiff blue clay to 80 ft below ground surface.
Mountain View Overhead	Consists of layers of mostly loose to slightly compact silty sand, clean sand, silt with sand, and some gravel lenses to 75 ft below ground surface. A different boring in this section revealed stiff black silty clay to a depth of 18 ft, underlain by very loose to slightly compact silty sand, sand, and sandy silt to a depth of 68 ft. Beneath these layers is a dense to very dense layer of sand and gravel to a depth of 72 ft below ground surface.
Stevens Creek Bridge (37-197)	Consists of deposits of loose to dense silty sand and silty gravel, and soft to very stiff silty clay in the upper 30 ft. Beneath 30 ft, general granular layers include dense silty sand, clayey gravel, sandy gravel, medium to coarse sand to a depth of 50-80 ft below ground surface. Consists of occasional interbedded soft to stiff silty clay and clay.
Middlefield Road Overcrossing	Consists of alternating layers of loose to dense silty sand, clayey sand and gravel, and soft to stiff clayey silt to 72 ft below ground surface.
Moffett Boulevard Undercrossing	Within the upper 20-25 ft, consists of layers of soft to very stiff silty clay, which were underlain mostly by granular layers consisting of loose to very dense sand and gravel, silty sand, clayey sand, and silty gravel. These granular layers extend to depths of 67-93 ft below ground surface.
SR 85/ US 101 Separation	To a depth of 30-35 ft below ground surface, consists of layers of soft to stiff silty clay, with interbedded loose to compact clean sand and gravel. Below a depth of 35 ft, consists of alternating beds of slightly compact to dense silty sand, clayey sand, clean sand and gravel, as well as soft to very stiff silty clay to depths 60-80 ft below ground surface.
Along US 101 between North Shoreline Boulevard to Oregon Expressway	Consists of alluvium composed of complexly interbedded lean and fat clay, clayey, silty sand, and well-graded sand with silt; the clay alluvium is soft to very stiff, and the sand interbeds are medium dense to dense. Fine grained soils encountered between depths of 10-50 ft are classified as medium stiff to stiff lean clay, and soils below 50 ft are alternating layers of medium stiff to very stiff lean and fat clay.

3.7 Flooding Sources

According to the Santa Clara Basin Watershed Management Initiative (2000), Calabazas Creek has a history of chronic flooding. On December 22, 1955, over 160 homes were flooded to a depth of up to 3 ft in Sunnyvale alone. More recent flooding has occurred in 1978, 1980, 1983, 1986, 1995, and 1998. The majority of the recent flooding is attributed to inadequate culverts, easily blocked by debris or overwhelmed by flood flow.

The written history of flooding in the Basin dates to the founding of Mission Santa Clara and Pueblo San Jose de Guadalupe in 1777. Accounts of flooding were recorded in 1779, 1862, 1867, 1869, and 1911. The storm of December 1955 caused widespread flooding throughout the Basin, the Guadalupe River alone inundating some 5,200 acres. Flooding would have been even more severe if the upstream storage reservoirs had not been nearly empty prior to the storm. Major flooding also occurred in April 1958, when flood waters covered portions of downtown San Jose to a depth of up to 4 ft. In recent years, the Guadalupe River has flooded San Jose communities during the winters of 1980, 1982, 1983, and 1995.

Table 2 lists the identified floodplains within the project limits. Zone AE represents areas with a 1 percent annual chance of flooding (100-year flood), where base flood elevations have been determined through detailed methods of analysis. Zone AO represents a 1 percent or greater chance of shallow flooding each year, with an average depth ranging from 1 foot to 3 feet. Zone A represents areas with a 1 percent annual chance of flooding, where the floodplain has been analyzed by approximate methods and base flood elevations have not been determined.

Table 2. Floodplain Information

Route	Begin Post Mile	End Post Mile	Creek(s)	Flood Hazard Zone
US 101	52.18	49.61	Matadero Creek, Adobe Creek,	AE
US 101	49.52	49.42	Permanente Creek	AO
US 101	48.05	48.03	Stevens Creek	A
SR 85	23.15	23.13	Stevens Creek	A
SR 85	21.14	21.10	Stevens Creek	A
SR 85	20.87	20.86	Permanente Diversion	A
SR 85	20.22	20.18	Stevens Creek	A
SR 85	--	--	Regnart Creek	None
SR 85	15.80	15.70	Calabazas Creek	AE
SR 85	15.20	15.20	Rodeo Creek	A
SR 85	14.06	14.03	Saratoga Creek	A
SR 85	12.92	12.90	Vasona Creek	A
SR 85	12.84	12.80	San Tomas Aquino Creek	A
SR 85	--	--	Smith Creek	None
SR 85	11.02	10.99	Los Gatos Creek	AE
SR 85	8.20	8.17	Ross Creek	A
SR 85	5.87	5.64	Guadalupe River	A
SR 85	4.32	4.26	Canoas Creek	A
US 101	27.24	27.83	Coyote Creek	AO
US 101	26.12	25.82	Coyote Creek	AE
US 101	25.50	25.21	Coyote Creek	AE
US 101	24.73	24.55	Coyote Creek	AE
US 101	23.16	22.92	Coyote Creek	AE

3.8 General Water Resources Setting

3.8.1 Climate and Precipitation

The climate in this area is characterized as a Mediterranean semi-arid climate, which is temperate year-round, with warm and dry weather lasting from late spring through early fall. This consists of mild winters, mild summers, small daily and seasonal temperature ranges and high relative humidity. Based on statistical data from the Weather Channel, extreme temperatures range from an average low temperature of 41^{o}F in December and January to an average high temperature of 84^{o}F in July and August in Mountain View, Cupertino, Saratoga, and San Jose. Average monthly precipitation varies from less than 0.1 inch to 3 inches in the months of July and January, respectively. Annual precipitation ranges from less than 16 inches in the valley to more than 28 inches in the upland areas.

3.8.2 Regional Hydrology

The project lies in the Santa Clara sub-basin, bordered by Diablo Range on the west and the Santa Cruz Mountains on the east. It extends from the northern border of Santa Clara County to the groundwater divide near the town of Morgan Hill. The hydrology along SR 85 is controlled by existing creeks and drainages, with extensive runoff contribution from urban and residential development, roadways, and parking areas. SR 85 crosses several large watersheds, and most of the creeks and drainages it crosses flow into the South San Francisco Bay. The main tributaries include Coyote Creek, the Guadalupe River, and Los Gatos Creek.

3.8.3 Local Hydrology

The water bodies of the Santa Clara sub-basin include the rivers and creeks that drain its 13 separate watersheds, the southern portion of the South San Francisco Bay, and the wetlands surrounding the South San Francisco Bay. The SR 85 alignment travels through the following watersheds: Matadero Creek, Adobe Creek, Permanente Creek, Stevens Creek, Calabazas Creek, San Tomas Aquino Creek, Guadalupe River, Los Gatos Creek, Saratoga Creek, Ross Creek, Canoas Creek and Coyote Creek, as shown in Figure 3.

3.9 Existing Creek Crossings and Watershed

Eighteen waterways cross the project alignment within the project limits between US 101 in south San Jose and US 101 in Mountain View (Figure 2) with Stevens Creek crossing the highway alignment four times. The sizes and types of these crossings are listed in Table 3.

Table 3. Drainage Facilities at Major Crossings

Waterway	Alignment	Station at Crossing	Drainage Facility
Matadero Creek	US 101	1947+30	81 ft long by 133 ft wide double span concrete bridge
Adobe Creek	US 101	1909+80	65 ft long by 133 ft wide single span concrete bridge
Permanente Creek	US 101	1832+30	12 ft x 12 ft reinforced concrete box culvert
Stevens Creek	US 101	1771+50	50 ft long by 201 ft wide dual span concrete bridge
	SR 85	1850+67	122 ft long by 151 ft wide triple span concrete bridge
	SR 85	1743+50	35 ft long by 125 ft wide single span concrete bridge
	SR 85	1695+73	121 ft long by 163 ft wide triple span concrete bridge
Permanente Diversion	SR 85	1731+00	10 ft x 10 ft reinforced concrete box culvert
Regnart Creek	SR 85	1570+00	12 ft x 7 ft reinforced concrete box culvert
Calabazas Creek	SR 85	1459+50	156 ft long dual span concrete bridges
Rodeo Creek	SR 85	1431+50	11 ft x 7 ft reinforced concrete box culvert
Saratoga Creek	SR 85	1370+67	100 ft long single span concrete bridge
Vasona Creek	SR 85	1310+50	Double 12 ft x 12 ft reinforced concrete box culvert
San Tomas Aquino Creek	SR 85	1305+50	105 ft long single span concrete bridges
Smith Creek	SR 85	1263+00	60” reinforced concrete pipe culvert
Smith Creek East Channel	SR 85	1236+92	Unknown culvert size
Los Gatos Creek	SR 85	1210+25	178 ft long dual span concrete bridges
Ross Creek	SR 85	1061+54	Double 10 ft x 12 ft reinforced concrete box culvert
Guadalupe River	SR 85	935+15	1,620 ft long 10-span concrete bridges
Canoas Creek	SR 85	855+29	124 ft long single span concrete bridges
Coyote Creek	US 101	615+50	475 ft long triple span concrete bridges 474 ft long triple span concrete bridges 474 ft long triple span concrete bridges 773 ft long four span concrete bridges

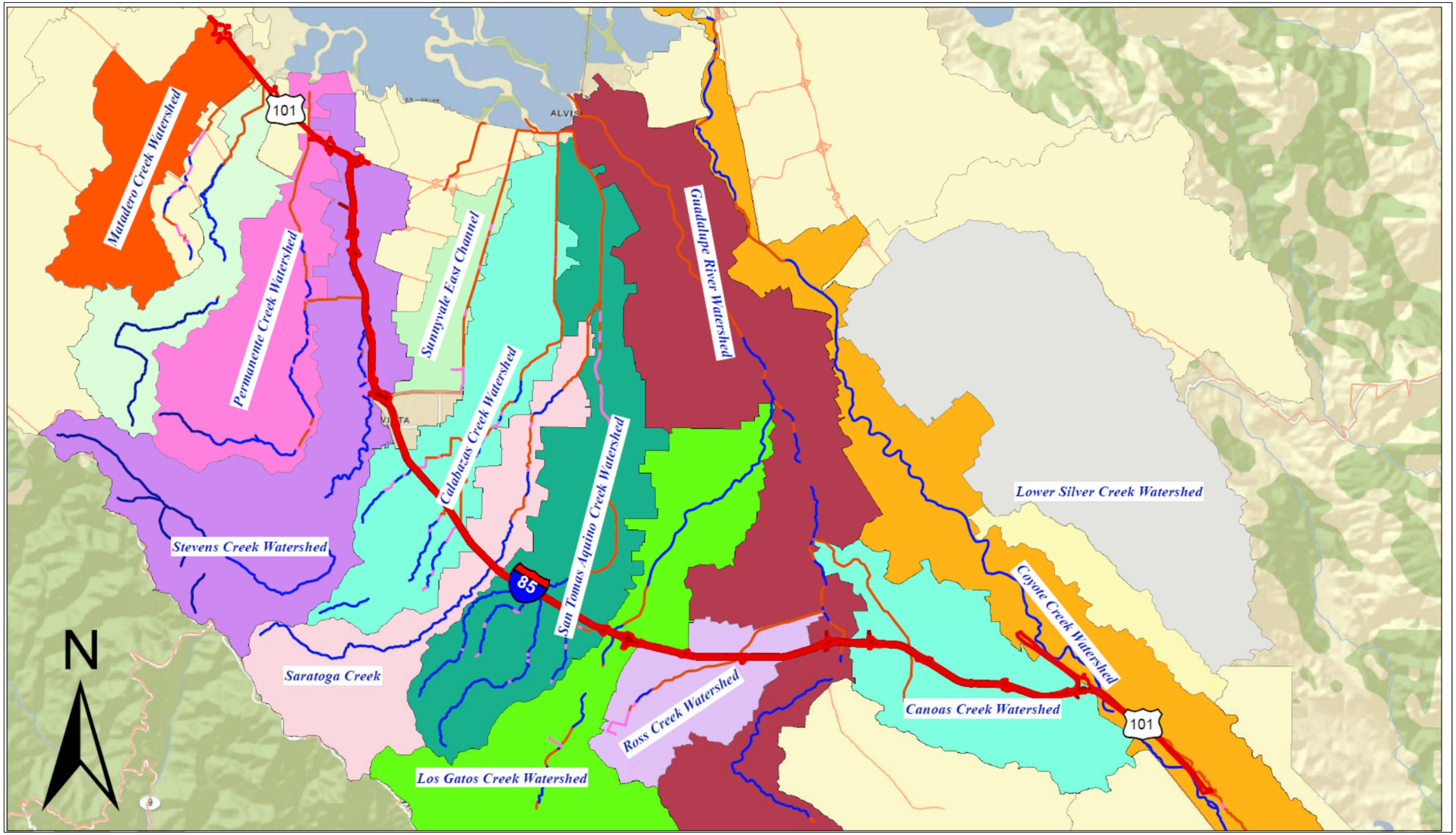

Figure 3. Watershed Map for the Major Creeks Crossing the Project Alignment

Source: Oakland Museum Maps, accessed August, 2011

The following sections discuss the watersheds and the creeks associated with the project.

3.9.1 Matadero Creek Watershed

The Matadero Creek watershed is approximately 14 square miles. Eleven square miles are within mountainous areas, and three square miles are in gently sloping terrain. Within the City of Palo Alto, the watershed is almost fully urbanized. Overall, 76 percent of the watershed area is urbanized for residential, commercial, industrial, and institutional use. There is open space in the foothills, which covers approximately 24 percent of the watershed area. About 40 to 60 percent of the fully urbanized area near the project site is impervious. The impervious area is expected to increase in the future from probable developments (Tetra Tech, 2006).

Matadero Creek (Station 1947+30): Matadero Creek crosses US 101 approximately 3,200 ft southeast of the Oregon Expressway interchange. The creek originates near the towns of Los Altos Hills and Palo Alto Hills, flowing northeast through unincorporated areas of Santa Clara County and the City of Palo Alto.

3.9.2 Adobe Creek Watershed

The watershed area of Adobe Creek is approximately 13.5 square miles; 10.4 square miles from Adobe Creek and 3.1 square miles from Barron Creek (FEMA, 1999a). Adobe Creek originates in the highlands of the unincorporated areas of Santa Clara County and Palo Alto Hills. Land use within the City of Palo Alto and City of Los Altos is fully urbanized. Open space is limited to the area in the foothills of the upstream watershed. Approximately 70 percent of the watershed area is urbanized, and 30 percent is open space. Currently, the area surrounding the project site is 40 to 60 percent impervious; future residential or commercial developments could increase the impervious area (Tetra Tech, 2006).

Adobe Creek (Station 1909+80): Adobe Creek crosses US 101 between the Matadero Creek crossing (approximately 3,700 ft northwest of the creek crossing) and the San Antonio Road interchange (approximately 1,800 ft southeast of the creek crossing). Adobe Creek has its confluence with Barron Creek at the upstream face of the US 101 highway crossing.

3.9.3 Permanente Creek Watershed

The total area for the Permanente Creek watershed is approximately 17.5 square miles. At the US 101 crossing, the watershed area is approximately 15.8 square miles. The cities of Mountain View and Los Altos are fully developed and cover approximately 55 percent of the watershed area. In addition to the urbanized area, approximately 8 percent of the area is used as non-urbanized development, such as a golf course and a mine. The remaining 37 percent is open space, predominantly located in the ridge foothills. Permanente Creek crosses US 101 between the North Rengstorff Avenue interchange (approximately 2,200 northwest of the creek crossing) and the Shoreline Boulevard interchange (approximately 3,100 ft southeast of the creek crossing).

Permanente Creek (Station 1832+30): Permanente Creek crosses US 101 in a 216 ft long single 12 ft x 12 ft (span x rise) reinforced concrete box (RCB) culvert. The creek originates in the Santa Cruz Mountains, travels 19 miles north to the San Francisco Bay, and passes through unincorporated areas of Santa Clara County as well as the City of Cupertino, Town of Los Altos Hills, City of Los Altos, and City of Mountain View. At the downstream end of the project site, Permanente Creek passes through a twin RCB culvert at Charleston Road and a bridge at Amphitheatre Parkway to discharge to Mountain View Slough; the creek eventually outfalls to the San Francisco Bay. The channel upstream of the US 101 cross culvert is a 12 ft x 9 ft (width x depth) concrete lined channel. There is a 3 ft drop immediately upstream of the US 101 cross culvert.

3.9.4 Stevens Creek Watershed

The northernmost section of the project lies within the Stevens Creek watershed. The watershed drains approximately 29 square miles into San Francisco Bay. Approximately 34% of the watershed consists of urbanized portions of the cities of Cupertino, Sunnyvale and Mountain View. In addition to the urbanized area, approximately 2% of the area is used as non-urbanized development, such as agriculture, golf courses and mines. The remaining 64% is open space located in the Santa Cruz Mountains (Tetra Tech, 2006).

Stevens Creek crosses the project in four different locations. These crossings are documented below.

Stevens Creek at US 101 (Station 1771+50): Stevens Creek crosses US 101 just east of the US 101/SR 85 interchange under a 50 ft long, 201 ft wide dual span concrete bridge in a concrete-lined trapezoidal channel.

Stevens Creek (Station 1850+67): Stevens Creek crosses SR 85 0.3 miles north of the Central Expressway interchange under a 122 ft long, 151 ft wide triple-span bridge in a natural channel.

Stevens Creek (Station 1743+50): Stevens Creek crosses SR 85 roughly halfway between the El Camino Real and Fremont Avenue interchanges under a 35 ft long, 125 ft wide single span bridge in a natural channel.

Stevens Creek (Station 1695+73): Stevens Creek crosses SR 85 0.2 mi north of the Fremont Avenue interchange under a 121 ft long, 163 ft wide triple-span bridge in a natural channel.

3.9.5 Calabazas Creek Watershed

The Calabazas Creek watershed drains approximately 20 square miles into the San Francisco Bay. The total drainage area is 22.7 square miles, 2.2 square miles of which are rural. The Calabazas Creek watershed is highly urbanized, predominantly with high-density residential neighborhoods. Calabazas Creek originates 1,920 ft above mean sea level in the Santa Cruz Mountains and flows north through the cities of Sunnyvale and Santa Clara. As the creek nears I-280, it receives some of the diverted flow from Junipero Serra Channel; the remaining flow from Junipero Serra Channel is diverted into Sunnyvale East Channel. Calabazas Creek joins San Tomas Aquino Creek at sea level near San Francisco Bay. There are no flood control facility reservoirs on Calabazas Creek. Calabazas Creek has three tributaries: Regnart Creek, Rodeo

Creek and Prospect Creek. Rodeo Creek and Regnart Creek also cross the project alignment upstream of their confluences with Calabazas Creek.

Calabazas Creek (Station 1459+50): Calabazas Creek crosses the project alignment approximately 0.3 miles southwest of the De Anza Boulevard interchange. At SR 85, Calabazas Creek is conveyed under three separate dual-span concrete bridges, ranging from 149 ft to 156 ft in length and 26 ft to 70 ft in width. At the project location the channel is trapezoidal and is primarily straight with some meandering. The channel slope in the project vicinity varies between 1 and 1.5 percent with considerable spot erosion.

Rodeo Creek (Station 1431+50): Rodeo Creek is a tributary to Calabazas Creek. The creek begins in western Saratoga and flows to the northeast through the cities of Saratoga and San Jose. Upstream of Prospect Road, Rodeo Creek crosses SR 85 between the South De Anza interchange and the Saratoga Avenue interchange. The crossing of SR 85 consists of an 11 ft wide by 7 ft tall concrete box culvert. Downstream of SR 85, it consists of a trapezoidal channel with a concrete lined 8 ft bottom and steep side slopes of terraced rock mesh. The 100-year flow in the channel is about 300 cfs. A hydraulic analysis (SCVWD) has shown that Rodeo Creek has the capacity to convey the base flood (300-320 cfs) from the confluence with Calabazas Creek to downstream of SR 85. The Rodeo Creek watershed is part of the larger Calabazas Creek watershed, previously discussed.

Regnart Creek (1570+00): Regnart Creek crosses SR 85 adjacent to the Stelling Road undercrossing, 0.8 miles northwest of the De Anza Boulevard interchange. The creek originates in the foothills of the Santa Cruz Mountains and flows to the northeast through the City of Cupertino. In northeastern Cupertino, approximately 2 miles downstream of the SR 85 crossing, Regnart Creek outfalls into Calabazas Creek.

At Festival Drive, just upstream of SR 85, Regnart Creek enters a 12 ft wide by 7 ft tall concrete box culvert. Downstream of the freeway, Regnart Creek remains in a box culvert as it passes under Stelling Road and Jollyman Park, eventually daylighting approximately 0.4 miles downstream. Regnart Creek watershed is part of the larger Calabazas Creek watershed, previously discussed.

3.9.6 San Tomas Aquino Watershed

The San Tomas Creek watershed drains approximately 45 square miles into the San Francisco Bay. The major tributaries in the watershed that cross the project alignment are Saratoga Creek, Smith Creek, Vasona Creek and San Tomas Aquino Creek. Most of the watershed is developed with high density residential areas and additional areas developed for commercial and industrial uses.

Saratoga Creek (Station 1370+67): Saratoga Creek crosses SR 85 just northwest of Saratoga Avenue. The creek begins in the Santa Cruz Mountains and flows to the northeast through unincorporated Santa Clara County as well as the cities of Saratoga, San Jose and Santa Clara. Much of the southern portion of the creek consists of natural channel, while downstream portions of the channel have been straightened and/or hardened.

Vasona Creek (Station 1310+50): Vasona Creek crosses SR 85 roughly halfway between the Winchester Boulevard and Saratoga Road interchanges. The creek flows through portions of unincorporated Santa Clara County and the City of Saratoga, primarily in a natural channel. Approximately 0.2 miles upstream of the SR 85 crossing is the confluence with Wildcat Creek.

San Tomas Aquino Creek (Station 1305+50): San Tomas Aquino Creek crosses SR 85 roughly halfway between the Winchester Boulevard and Saratoga Road interchanges, just southeast of the Vasona Creek crossing. The creek originates in the foothills of the Santa Cruz Mountains and flows to the northeast through the cities of Saratoga, San Jose, Campbell and Santa Clara. Approximately 8 miles downstream of the SR 85 crossing, Saratoga Creek enters San Tomas Aquino Creek. San Tomas Aquino Creek flows downstream through Santa Clara to the Guadalupe Slough and finally into the southern San Francisco Bay. Over half of the stream channel has been hardened and/or realigned to provide drainage and flood protection.

Smith Creek (Station 1263+00): Smith Creek crosses SR 85 approximately 0.8 miles northwest of Winchester Boulevard. It flows through the cities of Monte Sereno and Cupertino as well as the Town of Los Gatos. Much of the channel has been engineered, and some portions of the creek consist of underground culverts. Approximately 1.1 miles downstream of the SR 85 crossing, Smith Creek enters San Tomas Aquino Creek.

The watershed area for Smith Creek is 0.8 square miles at the SR 85 crossing. This area consists almost entirely of developed land, primarily residential areas of Monte Sereno and Los Gatos, as well as the La Rinconada Country Club golf course.

Adjacent to SR 85 on the south side, Smith Creek is conveyed in a rectangular concrete channel as it passes under the railroad tracks. Under SR 85, Smith Creek is conveyed through a circular reinforced concrete pipe culvert. The size could not be confirmed, but the size of the pipe culvert appears to be approximately 60 inches. Downstream of the crossing, it remains underground in a concrete box culvert until it daylights at West Hacienda Avenue.

3.9.7 Guadalupe River Watershed

The Guadalupe River watershed drains approximately 171 square miles into the San Francisco Bay. The Guadalupe River begins at the confluence of Alamitos and Guadalupe creeks, and flows 19 miles through heavily urbanized portions of San Jose, ultimately discharging into South San Francisco Bay through Alviso Slough. The Guadalupe River watershed is the second largest watershed in the Santa Clara Basin. The main tributaries of the watershed that cross the project alignment are: Guadalupe River, Los Gatos Creek, Ross Creek, and Canoas Creek.

Los Gatos Creek (Station 1210+25): Los Gatos Creek crosses SR 85 at the western end of the SR 17 interchange. The creek originates in the Santa Cruz Mountains and follows SR 17 as it winds through the mountains. The lower portions of the creek pass through Los Gatos, Campbell, and San Jose. Upstream of the crossing, it flows primarily in a natural channel, though downstream, some portions have been straightened. Downstream of SR 85, it continues to parallel SR 17 until it outfalls into Guadalupe River downstream (north) of I-280.

Ross Creek (Station 1061+54): Ross Creek crosses SR 85 at the western end of the Camden Avenue interchange. Ross Creek has a drainage area of 10 square miles and flows to the northeast through eastern Los Gatos and portions of southern San Jose. With the exception of the upstream-most portion, nearly the entire creek channel has been straightened. Approximately 2.2 miles downstream of the SR 856 crossing, Ross Creek enters Guadalupe River.

Upstream of the freeway, the creek is conveyed in an 8 ft wide trapezoidal channel with 1:1 (H:V) side slopes. It is conveyed under SR 85 through a double 10 ft wide by 12 ft tall box culvert. Downstream of the freeway, the culvert continues under Camden Avenue and outfalls into an 8 ft wide trapezoidal channel with 1:1 (H:V) side slopes. According to as-builts from Caltrans, a significant portion of Ross Creek surrounding SR 85 was lowered to accommodate SR 85 and the realigned Camden Avenue in the 1990s.

Canoas Creek (Station 855+29): Canoas Creek crosses SR 85 between the SR 87 interchange and the Blossom Hill Road interchange. The creek flows to the northwest through the City of San Jose in a straightened channel. Approximately 3.6 miles downstream of the crossing, Canoas Creek enters Guadalupe River.

Guadalupe River (Station 935+15): Guadalupe River crosses SR 85 between the SR 87 interchange and the Almaden Expressway interchange. The River originates in the Santa Cruz Mountains and flows to the north through unincorporated Santa Clara County and the City of San Jose. Upstream of the SR 85 crossing, most of Guadalupe River flows in a natural channel.

3.9.8 Coyote Creek Watershed

The Coyote Creek watershed is the largest in the Santa Clara Basin and drains approximately 320 square miles into the Lower San Francisco Bay. The southernmost portion of the project flows into this watershed. The project alignment crosses Coyote Creek near the ramp between the SR 85 and US 101 freeways. South of the SR 85 and US 101 interchange the creek flows parallel along the project alignment and crosses US 101 a few more times outside (to the south of) the southern project limit. Coyote Creek originates in the mountains northeast of the City of Morgan Hill and flows northwest through unincorporated areas between Morgan Hill and San Jose and then through urbanized areas of San Jose and Milpitas before it discharges into the Bay.

3.9.9 Beneficial Uses of Receiving Water Bodies

Beneficial uses are critical to water quality management in California. According to state law, the beneficial uses of California’s waters that may be protected against quality degradation include, but are not limited to, “domestic; municipal; agricultural and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves” (Water Code Section 13050). Beneficial uses for surface and ground waters are divided into the 20 standard categories with definitions listed in 0. Protection and enhancement of existing and potential beneficial uses are the primary goals of water quality planning. The receiving water bodies in the project with designated beneficial uses are listed in Table 4.

3.9.10 Water Quality Objectives

The 1972 Amendments to the federal Water Pollution Control Act declared that elimination of discharge of pollutants into navigable waters (SWRCB, 1972) is a national goal. The establishment of a base or reference point is a prerequisite to water quality control. The RWQCB needs to utilize current technical guidelines, available historical data, and enforcement feasibility when formulating water quality objectives.

The general water quality objectives established for all San Francisco Bay hydrologic basins are color, tastes and odor, floating material, suspended material, sulfide, settleable material, oil and grease, bacteria, biostimulatory substances, sediment, turbidity, pH, population and community ecology, dissolved oxygen, temperature, toxicity, pesticides, un-ionized ammonia, salinity, chemical constituents, organic substances, and radioactive substances. See Appendix A for more information regarding the general objectives for surface waters.

The 2010 Integrated Report (Clean Water Act Section 303[d] List / 305[b] Report) lists Matadero Creek, Permanente Creek, Stevens Creek, Calabazas Creek, Saratoga Creek, Los Gatos Creek, Guadalupe River, Coyote Creek and San Francisco Bay South as impaired water bodies. Table 5 lists the impaired water bodies, pollutants, sources and proposed or approved U.S. Environmental Protection Agency (EPA) total maximum daily load (TMDL) date.

The Guadalupe River TMDL for mercury was approved by the U.S. EPA on June 1, 2010. The San Francisco Bay TMDL for mercury was approved by the U.S. EPA on February 12, 2008, and for PCBs on March 29, 2010. The TMDL for diazinon and pesticide related toxicity in urban creeks within the SFBRWQCB jurisdiction was approved by the U.S. EPA on May 16, 2007.

Table 4. Beneficial Uses of Water in the Project Area (Santa Clara Basin)

Waterbody	AGR	MUN	FRSH	GWR	IND	PROC	COMM	SHELL	COLD	EST	MAR	MIGR	RARE	SPWN	WARM	WILD	REC-1	REC-2	NAV
Matadero Creek									E			E	E	E	E	E	E	E	
Adobe Creek									E						E	E	E	E	
Permanente Creek				E					E				E	E	E	E	E	E	
Stevens Creek			E	E					E			E	E	E	E	E	E	E	
Permanente Creek				E					E				E	E	E	E	E	E	
Calabazas Creek	E			E					E						E	E	E	E	
Saratoga Creek	E		E	E					E						E	E	E	E	
San Tomas Aquino									E				E		E	E	E	E	
Smith Creek		E	E						E					E	E	E	E	E	
Los Gatos Creek		E	E	E					E			P	E	P	E	E	E	P	
Ross Creek				E											E	E	E	E	
Guadalupe River				E					E			E	E	E	E	E	E	E	
Canoas Creek															E	E	E	E	
Coyote Creek				E			E		E			E	E	E	E	E	E	E	

Source: San Francisco Bay Basin's Water Quality Control Plan (December 31, 2011)

Notes:
AGR—Agricultural Supply
COLD—Cold Freshwater Habitat
COMM—Commercial and Sport Fishing
EST—Estuarine Habitat
FRSH—Freshwater Replenishment
GWR—Ground water Recharge
IND—Industrial Service Supply
MAR—Marine Habitat
MIGR—Migration of Aquatic Organisms
MUN—Municipal and Domestic Supply
NAV—Navigation
PROC—Industrial Process Supply
RARE—Rare, Threatened, or Endangered Species
REC-1—Water Contact Recreation
REC-2—Non-contact Water Recreation
SHELL—Shellfish Harvesting
SPWN—Spawning, Reproduction, and/or Early Development
WARM—Warm Freshwater Habitat
WILD—Wildlife Habitat
E-Existing Beneficial Uses
P-Potential Beneficial Uses

Table 5. Limited Water Quality Segments within the Project Limits

Stream Name	303(d) Listed Pollutant	Potential Source	TMDL Completion Date
Matadero Creek	Diazinon	Urban Runoff/Storm Sewers	2007
	Trash	Illegal dumping, Urban Runoff/Storm Sewers	2021
Permanente Creek	Diazinon	Urban Runoff/Storm Sewers	2007
	Selenium, Total	Source Unknown	2021
	Toxicity	Source Unknown	2021
	Trash	Illegal dumping, Urban Runoff/Storm Sewers	2021
Stevens Creek	Diazinon	Urban Runoff/Storm Sewers	2007
	Temperature, water	Channelization, Habitat Modification, Removal of Riparian Vegetation	2021
	Toxicity	Source Unknown	2019
	Trash	Illegal dumping, Urban Runoff/Storm Sewers	2021
Calabazas Creek	Diazinon	Urban Runoff/Storm Sewers	2007
Saratoga Creek	Diazinon	Urban Runoff/Storm Sewers	2007
	Trash	Illegal dumping, Urban Runoff/Storm Sewers	2021
Los Gatos Creek	Diazinon	Urban Runoff/Storm Sewers	2007
Guadalupe River	Diazinon	Urban Runoff/Storm Sewers	2007
	Mercury	Mine Tailings	2008
	Trash	Illegal dumping, Urban Runoff/Storm Sewers	2021
Coyote Creek	Diazinon	Source Unknown	2007
	Trash	Illegal dumping, Urban Runoff/Storm Sewers	2021
San Francisco Bay South	Chlordane	Nonpoint Source	2013
	DDT (Dichlorodiphenyltrichloroethane)	Nonpoint Source	2013
	Dieldrin	Nonpoint Source	2013
	Dioxin compounds (including 2,3,7,8-TCDD)	Atmospheric Deposition	2019
	Furan Compounds	Atmospheric Deposition	2019
	Invasive Species	Ballast Water	2019
	Mercury	Atmospheric Deposition, Industrial Point Sources, Municipal Point Sources, Natural Sources, Nonpoint Source, Resource Extraction	2008
	PCBs (Polychlorinated biphenyls)	Unknown Nonpoint Source	2008
	PCBs (Polychlorinated biphenyls) (dioxin-like)	Unknown Nonpoint Source	2008
	Selenium	Domestic Use of Ground	2019

3.9.11 Hydromodification Susceptibility

The project would add approximately 40.1 ac of impervious area from the widening of SR 85. An increase in impervious area would result in more storm water runoff due to a decrease in infiltration by previously pervious areas. The additional runoff would cause a faster and larger peak in the project's hydrograph, which could potentially increase downstream erosion to unlined channels.

In general, the susceptibility of the receiving waterways and outfalls would be dependent on several factors: channel lining, channel slope, watershed size, watershed composition, and proximity to a tidal water body. BMPs would be implemented wherever feasible, to minimize impacts from additional runoff from widened roadways, and by maintaining existing flow patterns of watercourses as well as surrounding soil composition.

The project alignment follows the western margin of the Santa Clara Valley within the San Francisco Bay block, located in the central portion of the Coast Range's geomorphic province of California (URS 2011). Fluvial sand, gravel and clay deposits are present along the banks and engineered channel of Coyote Creek and along several other drainages crossed by the alignment including the Guadalupe River, Los Gatos Creek, Saratoga Creek and Stevens Creek.

Based on the HMP maps (see Figure 4), the project lies in an area susceptible to hydromodification. An increase in impervious surface area can be evaluated using computer modeling, such as the Bay Area Hydrology Model, and by evaluating a watershed for cumulative effects from impervious surface and pollutant runoff. This computer modeling is not possible during this phase of the project. However, as survey information becomes available during the design phase, this task will be performed.

For the preliminary study purposes, only the channels that are lined or which do not have any added impervious area due to the proposed project are considered exempt from hydromodification susceptibility. The remaining channels are considered susceptible and would be analyzed in detail during the design phase of the project. Section 3.10 presents the channels' conditions and their susceptibility to hydromodification impacts based on WRECO's field assessment.

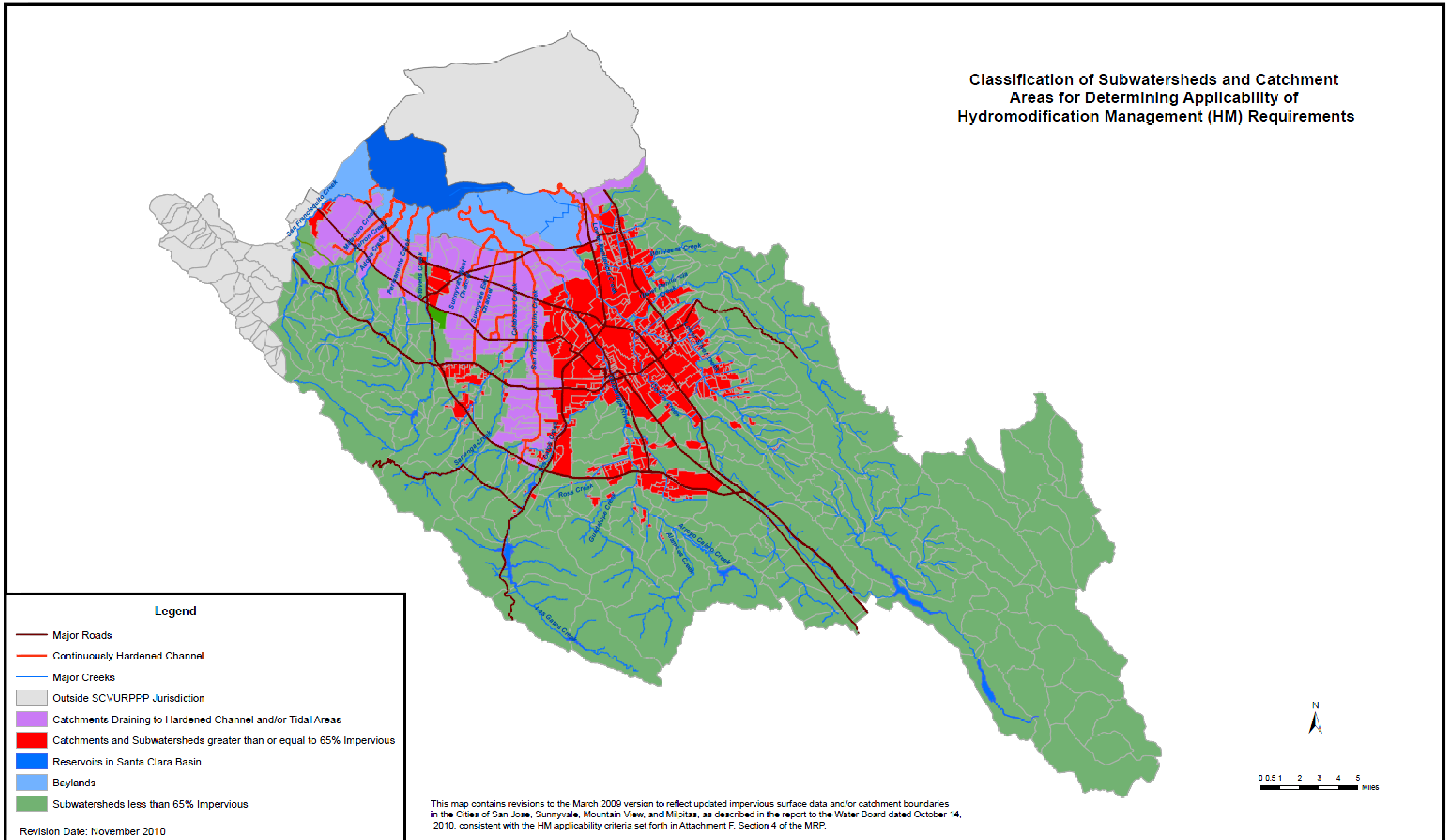

Figure 4. Santa Clara County HMP Map

Source: SCVURPPP

3.10 Channel Crossing Characteristics

The following section explores the characteristics of the channel crossings along the project corridor. Specifically, characteristics that define the stability and susceptibility of the channel to hydromodification are presented, based on information collected through research and WRECO's site visits.

Matadero Creek

Matadero Creek flows in a natural channel with steep slopes through the unincorporated areas of Santa Clara County. In the City of Palo Alto, Matadero Creek travels in a U-shaped concrete channel with relatively flat slopes. This creek is a concrete lined channel at the US 101 crossing. At the downstream end of the project site, Matadero Creek discharges into the Palo Alto Flood Basin, which eventually outfalls to the San Francisco Bay. This area is a straightened, earthen bed channel with a longitudinal slope of less than 0.1 percent. The project would not add any new impervious area to this waterway; thus, the channel is not susceptible to hydromodification.

Photo 1. Matadero Creek entering bridge under US 101 (looking downstream)

Adobe Creek

Adobe Creek flows in a natural channel with moderate to steep slopes within the City of Los Altos and Town of Los Altos Hills. In the City of Palo Alto, Adobe Creek travels in a wide rectangular concrete channel with very flat slopes. The slope of the channel within the project area is less than 0.1 percent. At the downstream end of its US 101 crossing, Adobe Creek discharges to Charleston Slough, which eventually outfalls to the San Francisco Bay. Because the project would not add impervious area to the Adobe Creek watershed, the channel is not susceptible to hydromodification.

Photo 2. Adobe Creek at bridge under US 101 (looking upstream)

Permanente Creek

Permanente Creek is a rectangular concrete lined channel upstream and downstream of the RCB culvert crossing and has very flat slopes of 0.1 percent. The end of the transition from the concrete lined channel to the earthen channel takes place approximately 200 ft downstream from the cross culvert (Tetra Tech, 2006). The project would not add any new impervious area to the watershed draining to this channel; thus, there would be no hydromodification impacts due to the construction of the project.

Photo 3. Permanente Creek at box culvert under US 101 (looking upstream)

Stevens Creek

Stevens Creek flows in a defined channel through Cupertino, Los Altos, Sunnyvale, and Mountain View and outfalls into the South San Francisco Bay north of Moffett Field. As it flows through the city of Mountain View, much of the creek is channelized with artificial materials used for bank stabilization and flood control. There would be no new added impervious area due to the project; therefore, there would be no hydromodification impacts due to the construction of the project.

Regnart Creek

Regnart Creek is primarily contained in a concrete channel except for its uppermost 2/3 mile. Upstream of the freeway crossing, the channel has a concrete-lined invert and steep side slopes of terraced rock mesh. Downstream of the freeway, Regnart Creek remains in a box culvert as it passes under Stelling Road and Jollyman Park, eventually daylighting approximately 0.4 miles downstream. The channel appears to be stable and would have low susceptibility to hydromodification from the project.

Photo 4. Regnart Creek entering box culvert under Festival Drive and SR 85 (looking downstream)

Calabazas Creek

Calabazas Creek is conveyed in a natural channel both upstream and downstream of the bridge, but under the bridge, the channel is lined with concrete tiles (Photo 5). Volumes of fluvial sediments, reaching as much as 3 ft high, have deposited through portions of Calabazas Creek (Photo 5). Downstream of the bridge, Calabazas Creek transitions to a natural channel with vegetated banks (Photo 6). The channel slope in the project vicinity varies between 1 and 1.5 percent, with considerable spot erosion. Based on the field assessment, this channel would be considered highly susceptible to hydromodification impacts.

Photo 5. Aggradation in Calabazas Creek under the SR 85 bridge

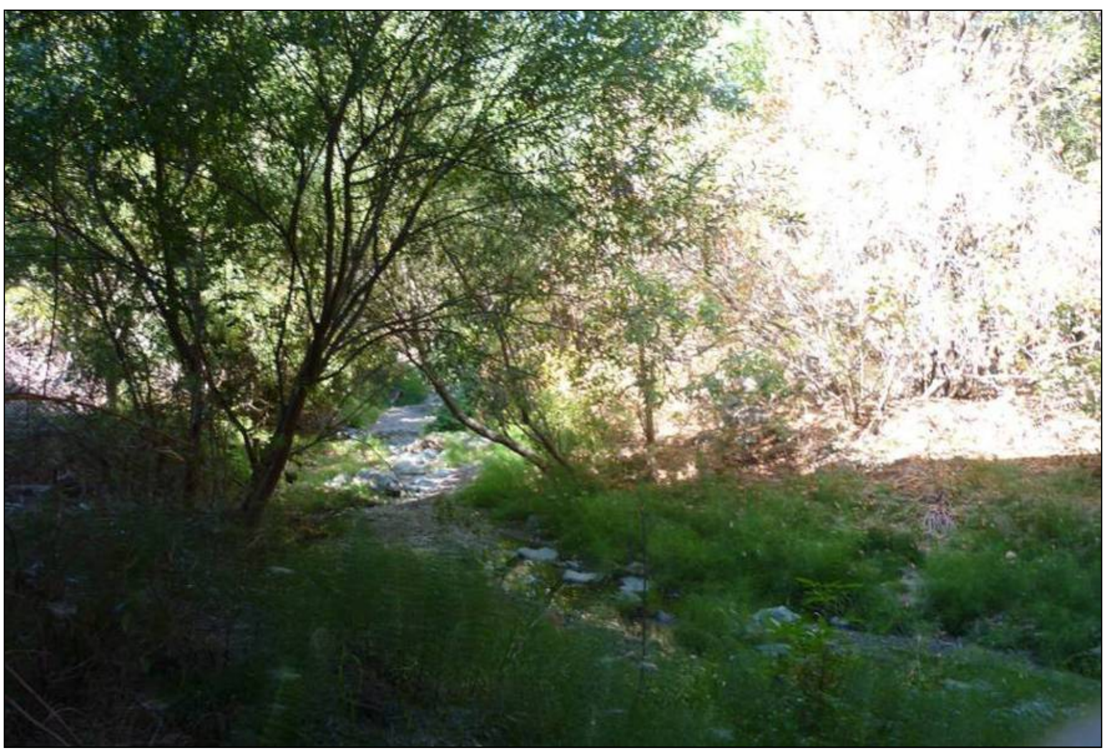

Photo 6. Calabazas Creek looking downstream from the SR 85 bridge crossing

Rodeo Creek

Rodeo Creek is conveyed under SR 85 through an 11 ft wide by 7 ft tall concrete box culvert. Rodeo Creek has been realigned from its natural channel and consists of a combination of earth and concrete lined channels as well as sections of underground culvert. Directly upstream of the freeway, Rodeo Creek is confined within a box culvert (Photo 7), while downstream it is composed of a trapezoidal channel. The trapezoidal channel has an 8 ft wide concrete lined bottom and steep side slopes of terraced rock mesh. There are patches of vegetation downstream of the bridge location. Based on the field assessment, the channel appears to be stable with no signs of erosion and has low to moderate susceptibility to hydromodification impacts.

Photo 7. Rodeo Creek looking upstream toward SR 85

Photo 8. Directly downstream of SR 85 crossing, looking downstream

Saratoga Creek

The channel slope of Saratoga Creek is generally steep in the mountainous areas and flattens to a minimal slope across the valley floor. At the SR 85 crossing, the creek is conveyed under the freeway through four separate single span concrete bridges and has a natural channel bed and banks, with moderate to dense vegetation on the banks. The channel appears to be stable with well-established vegetation on the channel slopes and with little signs of erosion (Photo 9). At the bridge location, large rocks line the abutment with sparse to moderate vegetation (Photo 10). Based on the conditions, the channel has low to moderate susceptibility to hydromodification impacts.

Photo 9. Saratoga Creek downstream of SR 85 crossing

Photo 10. Saratoga Creek underneath SR 85 looking upstream

Vasona Creek and San Tomas Aquino Creek

At the SR 85 crossing, Vasona Creek is conveyed through a double 12 ft by 12 ft concrete box culvert (Photo 11 and Photo 13). Both upstream and downstream of the crossing, it flows within a natural channel. Just downstream of the highway crossing, Vasona Creek converges with San Tomas Aquino Creek. Based on the field assessment, the Vasona Creek channel appears to be aggrading, with moderate to dense vegetation along the banks and a meandering thalweg. Similarly, signs of aggradation were also found in San Tomas Aquino Creek in addition to some spots of erosion. This aggradation could be occurring due to the check dam downstream of the confluence of the two channels (Photo 12). The banks of San Tomas Aquino Creek have sparse to moderate vegetation. Due to the check dam downstream of the confluence of the channel, the increase in impervious areas from the project would have a minimal impact to the channel stability.

Photo 11. San Tomas Aquino Creek, looking upstream toward SR 85 bridge

Photo 12. Check Dam downstream of confluence of Vasona Creek and San Tomas Aquino Creek

Photo 13. SR 85 bridge crossing over Vasona Creek

Smith Creek

At the SR 85 crossing, Smith Creek is conveyed under the highway through an approximately 60" reinforced concrete pipe culvert. The watershed area consists almost entirely of developed land, primarily residential areas of Monte Sereno and Los Gatos, as well as the La Rinconada Country Club golf course. Upstream and downstream of the SR 85 crossing, Smith Creek flows through a 7 ft by 7 ft rectangular channel. Downstream of the crossing, it remains underground in a concrete box culvert until it daylights at West Hacienda Avenue. Because the channel is lined, it is not considered to be susceptible to hydromodification due to an increase in flow caused by the project.

Photo 14. Smith Creek looking downstream towards SR 85

Los Gatos Creek

At the SR 85 crossing, Los Gatos Creek is conveyed under three separate dual span bridges (Photo 15). Based on the field assessment, at the project location the channel is natural with visible signs of aggradation. The channel banks have sparse to moderate vegetation with heavy patches of vegetation at some locations. Approximately 0.5 miles downstream of the project alignment, there are radial gates that appear to control the amount of discharge flowing past the gates. Based on the channel characteristics, Los Gatos Creek appears to be low to moderately susceptible to changes in channel stability due to an increase in flow caused by added impervious area.

Photo 15. Los Gatos Creek under SR 85 looking upstream

Photo 16. Los Gatos Creek upstream of SR 85

Photo 17. Radial Gates 0.5 mi downstream of SR 85 crossing

Ross Creek

Ross Creek is conveyed through a double 10 ft wide by 12 ft tall box culvert at the SR 85 crossing. Upstream of the freeway, the creek flows in an 8 ft wide trapezoidal channel with 1:1 (H:V) side slopes. Downstream of the freeway, the culvert continues under Camden Avenue in the box culvert before it outfalls into an 8 ft wide trapezoidal channel with 1:1 (H:V) side slopes. The downstream condition would be verified in the field during the next phase of the project. Because Ross Creek is either a box culvert or a lined channel in the project vicinity, it is unlikely that an increase in flow due to added impervious area from the project would affect the channel stability. See Photo 18 and Photo 19.

Photo 18. Ross Creek looking downstream at SR 85 crossing

Photo 19. Ross Creek, looking upstream from SR 85 crossing

Guadalupe River

Guadalupe River is conveyed under SR 85 in a straightened earth channel under consecutive bridges. On either side of the channel, there is moderate to heavy riparian vegetation (Photo 20). Historically, both sedimentation and erosion have been problems along stretches of Guadalupe River. The presence of vegetation along the channel lowers the risk of the added impervious area from the project impacting the channel stability. However, because of historical evidence of erosion, the channel would be considered susceptible to hydromodification due to increased flow caused by added impervious area from the project.

Photo 20. Guadalupe River near the SR 85 bridge location

Canoas Creek

Canoas Creek is conveyed under SR 85 in a concrete-lined trapezoidal concrete channel. The channel is 10 ft wide and has side slopes approximately 15 ft high. The side slopes are at a slope of 1:1 (H:V) and are lined with concrete-filled sand bags (see Photo 21 and Photo 22). These creek conditions are continued downstream of the SR 85 crossing. The well-established channel characteristics along with no proposed widening in the SR 85 section of the roadway flowing into Canoas Creek, makes the channel stability less susceptible to hydromodification due to the project.

Photo 21. Canoas Creek, looking downstream

Photo 22. Canoas Creek under SR 85, looking upstream

Coyote Creek

At the US 101 crossing, Coyote Creek is a partially straightened gravel and earth channel (Photo 24 and Photo 25). Directly upstream and downstream of the bridge crossing, Coyote Creek is moderately to heavily vegetated (Photo 23). However, this vegetation does not extend underneath the bridge. There is some evidence of aggradation at the downstream end of the US 101 bridge crossing. The channel would be susceptible to hydromodification, but the project would not add impervious area to the creek's watershed, and therefore no impacts would occur.

Photo 23. Coyote Creek, looking downstream

Photo 24. Coyote Creek under US 101, looking upstream

Photo 25. Coyote Creek under US 101, looking downstream

3.11 Existing Groundwater Resources Environment

The groundwater basin in Santa Clara County is divided into three sub-basins: Santa Clara Valley Sub-basin, Coyote Sub-basin, and Llagas Sub-basin. The project lies in the Santa Clara Valley Sub-basin (Figure 5).

The Santa Clara Valley Sub-basin is located in the northern part of Santa Clara County and extends from Coyote Narrows at Metcalf Road to the County's northern boundary. The sub-basin is bounded by the Diablo Range on the east and the Santa Cruz Mountains on the west. The Santa Clara Valley Sub-basin is approximately 22 miles long and 15 miles wide, with a surface area of 225 square miles. The northern areas of the sub-basin are categorized as a confined zone and are overlaid with a series of clay layers resulting in a low permeability zone. The southern area of the sub-basin is an unconfined zone, or forebay, where the clay layer does not restrict recharge.

Per the SCVWD Groundwater Management Plan, from the early 1900s through mid-1960s, water levels declined more than 200 ft due to groundwater pumping-induced subsidence in this basin. To replace the water pumped, the SCVWD recharges the sub-basin with local and imported water via 393 acres of percolation ponds. With the importation of surface water via the Hetch Hetchy Aqueduct and South San Francisco Bay Aqueduct and the introduction of an artificial recharge program, the water levels have increased since 1965. The recharging of the sub-basin not only helped maintain the groundwater supplies, but also helped with the land subsidence problem. The groundwater quality of the Santa Clara Valley Sub-basin is generally of bicarbonate type with sodium and calcium as the principal cations.

Per the Urban Water Management Plan (2010), the overall groundwater quality in Santa Clara County is very good, and water quality objectives are achieved in most wells. The SCVWD monitors groundwater quality to assess current conditions and identify trends or areas of special concern. Wells are monitored for major ions, such as calcium and sodium, nutrients such as nitrate, and trace elements such as iron. Wells are also monitored for man-made contaminants, such as organic solvents.

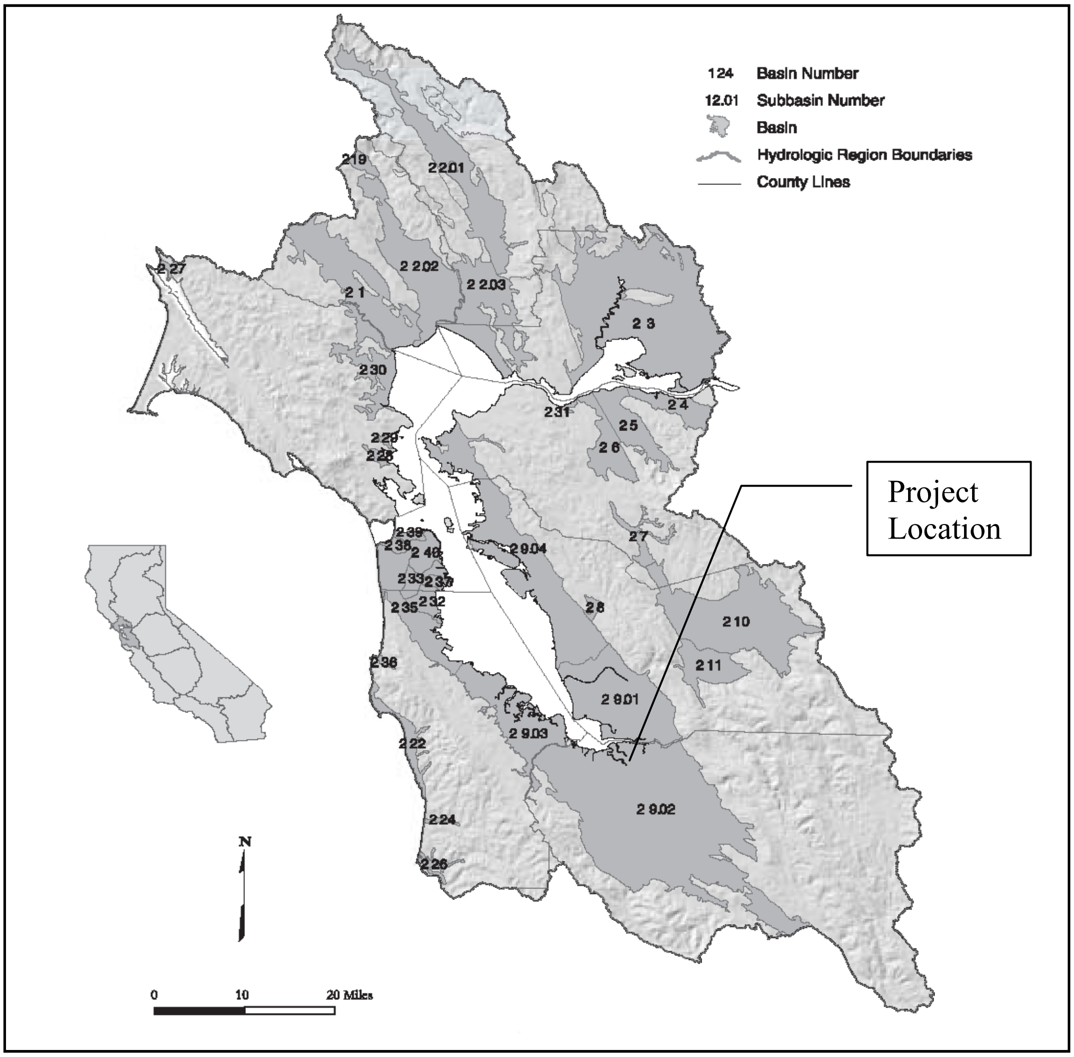

Figure 5. San Francisco Bay Area Basin and Sub-basin Map

3.11.1 Study Area and Recharge Areas

The project is in the San Francisco Bay Hydrologic Region. The SCVWD operates several percolation ponds for recharging groundwater facilities. The channels associated with this project that have offstream recharge facilities are Stevens Creek, Los Gatos Creek, Vasona Creek, Guadalupe River, and Coyote Creek.

URS performed a geotechnical study more specific to the project that provided additional information on groundwater resources. They conducted a groundwater study within the proposed SR 85 improvement segment based on historic boring data, as-built information, and current topography and geologic information. Per the report, groundwater was encountered from 23 ft to 78 ft below ground surface at elevations 119 ft to 196 ft.

Table 6 shows the locations and groundwater elevations and provides brief descriptions of sub-soil characteristics and compositions (URS 2011).

Table 6. Groundwater Information

Bridge/Structure	Groundwater Condition
Coyote Creek	Encountered between Elevation 196 ft and Elevation 186 ft during 1988 explorations, is controlled primarily by water levels in the creek. Historic records indicate groundwater levels have been as high as a few ft below ground surface.
Bernal Road UC	Encountered at depths of 50 to 75 ft (Elevation 157 ft to Elevation 143 ft). Historic groundwater levels are as shallow as about 15 to 20 ft below ground surface.
Perimeter Road Undercrossing	Encountered at depths of 75 to 72 ft (Elevation 119 ft to Elevation 123 ft). Historic groundwater levels are as shallow as 10 to 15 ft below ground surface.
Almaden Expressway Interchange	Not encountered within the maximum 100 ft depth of exploration during summer of 1988. Groundwater levels are expected to be primarily controlled by water levels in the adjacent Guadalupe River. Historic records indicate groundwater levels have been as high as 15 ft below ground surface.
Ross Creek	Encountered at depths of between 18 and 24 ft (Eleva. 192-185 ft) in 1988 exploration. Water levels are expected to follow water levels in the Ross Creek, which was dry in 1988 explorations. Groundwater levels have been as shallow as present ground surface after periods of heavy rainfall.
Russo Drive POC & Dent Avenue POC	Not encountered within the maximum depth of exploration (64 to 84 ft) during summer of 1988. Historic records indicate groundwater levels as high as 20 ft below ground surface.
Camden Avenue Interchange	Encountered at depths of 18 to 43 ft (Elevations 192 ft to 166 ft) at the time of drilling in 1988. Historic groundwater levels in the area have been as high as present ground surface or a few ft below ground surface, after heavy rainfall.
Leigh Ave. /Union Ave. Interchanges, & Samaritan/ White Oaks POC	Not encountered within the maximum 100 ft depth of exploration during summer of 1988. Historic records indicate groundwater levels in the area have been as high as 15 to 25 ft below ground surface.
Los Gatos Creek/Bascom Ave.	Varied from 9 ft at Los Gatos Creek to about 76 ft near Bascom Ave. in 1988 explorations.
Winchester Boulevard to Quito Road	Minimum depth encountered during 1988 explorations was about 20 ft. Historic (1958) explorations near Pollard Road revealed groundwater as shallow as 1.5 ft deep.
Quito Road to Rodeo Creek	During 1988 explorations, groundwater depths varied from 8 ft near Calabazas Creek to over 100 ft near Saratoga-Sunnyvale Road. The majority of hollow stem auger borings drilled in 1988 revealed dry conditions to the maximum depth of exploration.
Homestead Road OC	Not encountered to terminal depth of 48 ft in rotary wash during 1960 explorations.
Dalles POC	Not encountered to terminal depth of 28 ft in boring during 1963 explorations.
Fremont Avenue UC	Not encountered to terminal depth of 25 ft in sample borings in 1959 explorations.
Stevens Creek Bridge	Not encountered to terminal depths of 48 to 80 ft in sampler borings during 1959 explorations, but water level in Stevens Creek ranged from elevation 183.7 to 184.1.
Route Sep., El Camino Real	Not encountered to terminal depths of 70-75 ft in rotary wash borings in 1960 explorations.
Stevens Creek NW Connector	Encountered in boring at a depth of 43 ft below ground surface (Elev. 67.3) in 1960 explorations.
Mountain View Overhead	Encountered in boring at depth of 46.8 ft below ground surface (Elev. 42.5) in 1960 explorations.
Stevens Creek Bridge	Not encountered in 1960 rotary wash borings, but groundwater was encountered in cone penetration test at a depth of 60 ft (Elev. 12.2 ft).
Middlefield Road OC	Not encountered in 1962 rotary wash boring, but groundwater was encountered in cone penetration test at a depth of 49 ft (Elevation 15.4 ft).
Moffett Boulevard UC	Was not encountered in 1959 rotary wash borings to terminal depths of 67 to 93 ft.
SR 85/US 101 Separation	Not encountered in 1959 rotary wash borings to terminal depths of 60 to 80 ft below ground surface, but measured in cone penetration tests at depths of 23.5 ft, 25.1 ft, and 26.2 ft (Elev. 13.8, 11.8, and 11.3, respectively).
North Shoreline Boulevard	Encountered in auger borings ranged from 3 to 28 ft below ground surface. Groundwater levels may very considerable with seasonal rainfall or with tidal cycles.

3.11.2 Local Area Springs and/or Wells

SCVWD manages the groundwater basin that underlies Santa Clara Valley to ensure that sufficient water is present to enable the owners of wells to withdraw the water they need without causing land subsidence. Various measures are implemented by the SCVWD to protect the quality of groundwater. There are about 6,700 registered public and private supply wells located in Santa Clara County. Private wells are responsible for only 1 to 2 percent of total withdrawals from the groundwater basin underlying Santa Clara Valley (SCVWD 1995).

3.11.3 Objectives for Ground Water Quality and Local Ground Water Constituents

The San Francisco Bay RWQCB's Basin Plan sets general water quality objectives addressing bacteria, organic and non-organic chemical constituents, taste and odor, and radioactivity for all groundwater in the area. The Basin Plan states that: 1) groundwater shall be free of organic and inorganic chemical constituents in concentrations that adversely affect beneficial uses; 2) groundwater shall not contain taste or odor producing substances in concentrations that adversely affect beneficial uses; and 3) radionuclides shall not be present in concentrations deleterious to humans, plants, animals, or aquatic life. The basin's existing beneficial uses are municipal and domestic water supply (MUN), industrial process water supply (PROC) and industrial service water supply (IND); in addition, the basin has the potential beneficial use of agricultural water supply (AGR). Appendix A summarizes water quality objectives based on beneficial uses established by the San Francisco Bay RWQCB.

Based on examination of Geographic Information Survey (GIS) information from the SWRCB, the project is located within the Santa Clara Valley groundwater basin and Santa Clara sub-basin (basin identification number 2-9.02). This basin's existing beneficial uses are municipal and domestic water supply (MUN), industrial process water supply (PROC), and industrial service water supply (IND); the basin has the potential beneficial use of agricultural water supply (AGR).

3.12 Other Existing Water Quality Considerations

3.12.1 Biotic/Aquatic Considerations

Areas within the project limits that potentially contain biotic and aquatic species of significance are characterized by whether they are under the jurisdiction of the USACE, the California Coastal Commission, or the California Department of Fish and Wildlife (CDFW).

Per the NES (URS 2013), approximately 7.67 acres of potentially jurisdictional waters of the U.S. were identified in the biological study area (BSA). Of the 7.67 acres, approximately 0.69 acre are wetlands and 6.98 acres are non-wetland waters of the U.S. Waters within the BSA include perennial, intermittent and ephemeral streams, and freshwater wetlands. Non-wetland waters are regulated by the USACE under the federal CWA and the federal Rivers and Harbors Act; by the RWQCB under the CWA and the Porter-Cologne Water Quality Act; and by the CDFW under Section 1600 of the Fish and Game Code. Wetlands are regulated by the USACE under the CWA, the RWQCB and the Porter-Cologne Water Quality Act. Table 7 lists the potential jurisdictional wetlands and other waters of the U.S. in the BSA. For the locations corresponding to the labels in the table, refer to the NES (URS 2013).

Table 7. Jurisdictional Waters/Wetlands within the Biological Study Area

Location	Route	Approximate Post Mile	Waters of the US Areas (acres)	Wetland Area (acres)
Matadero Creek	US 101	51.37	0.15	0
Adobe Creek	US 101	50.66	0.15	0
Permanente Creek-Culverted water	US 101	--	0.06	0
Permanente Creek	US 101	--	0.01	0
Permanente Creek	US 101	--	0.01	0
Stevens Creek	US 101	48.04	0.14	0
Stevens Creek	SR 85	R(1)22.95	0.16	0
Stevens Creek	SR 85	R20.96	0.07	0
Stevens Creek	SR 85	R20.02	0.23	0
Calabazas Creek and stormwater drain	SR 85	R15.40	0.24	<0.01
Saratoga Creek	SR 85	R13.91	0.20	0
Wildcat Creek	SR 85	12.72	0.13	0
San Tomas Aquino Creek	SR 85	R12.68	0.11	0
Los Gatos Creek	SR 85	R10.80	0.41	0.03
Ross Creek	SR 85	8.15	0.15	0
Guadalupe River	SR 85	5.59	4.23*	0.08
Canoas Creek	SR 85	4.28	0.13	0
Coyote Creek	US 101	R26.47, R26.60	0.40	0.43, <0.01
South Side US 101	US 101	595+00	0	0.14
North Side US 101	US 101	592+00	0	<0.01
Total			**6.98**	**0.69**

Source: URS 2013

Note:
(1). "R" in post mile refers to realigned routes.
*Includes 3.86 acres of recharge pond area

The NES also defines different vegetation communities within the BSA, some of which are riparian in nature. The total areas within the project limits are shown in Table 8.

Table 8. Areas of Riparian Vegetation

Vegetation Type	Area within BSA (acres)
Arroyo willow forest	25.86
Black cottonwood forest	0.63
California bay riparian forest	0.54
California sycamore woodland	0.34
Cattail marsh	0.07
Coast live oak woodland	2.57
Fremont cottonwood forest	1.76
Red willow forest	0.19
Sandbar willow thicket	<0.01
Serpentine grassland	0.83
White alder forest	0.01

Source: URS 2013

4 ENVIRONMENTAL CONSEQUENCES AND PROJECT IMPACTS

The following sections present potential temporary and permanent water quality impacts anticipated from the proposed project activities. The discussions include Caltrans' procedures for identifying potential impacts.

4.1 Temporary Impacts to Stormwater

During construction, the Build Alternative for the project has the potential for temporary water quality impacts due to grading activities and removal of existing vegetation, which can cause increased erosion. Stormwater runoff from the project site may transport pollutants to nearby creeks and storm drains if BMPs are not properly implemented. Stormwater runoff drains into the creeks listed in Table 3 and eventually discharges to Lower South San Francisco Bay. Generally, as the disturbed soil areas (DSAs) increase, the potential for temporary water quality impacts also increases. The proposed project has an estimated DSA of 75.4 acres. Based on the preliminary calculated area, the project would have potential water quality impacts during construction.

Fueling or maintenance of construction vehicles would occur within the project site during construction, so there is risk of accidental spills or releases of fuels, oils, or other potentially toxic materials. An accidental release of these materials may pose a threat to water quality if contaminants enter storm drains, open channels, or surface water receiving bodies. The magnitude of the impact from an accidental release depends on the amount and type of material spilled.

4.2 Temporary Impacts to Groundwater

The proposed improvements for the project do not involve substantial excavations that affect groundwater resources. Excavation work would mostly consist of roadbed construction for the new express lanes. Based on preliminary geotechnical information, we anticipate that groundwater is deep, and the Build Alternative does not propose to construct walls or conduct deep excavation; therefore, dewatering would not be anticipated for the project.

4.3 Temporary Impacts to Water Resources

The project proposes to widen the SR 85 bridges over Saratoga Creek and San Tomas Aquino Creek; however, the work would consist of connecting the northbound and southbound bridges and, per URS (2013), construction activities would be avoided in the creek. The project does not propose widening at any other bridge sites, and no temporary creek diversions would be necessary. Project construction activities such as vegetation removal could cause temporary impacts to streams or riparian habitats in the project area. Potential temporary impacts would be avoided or minimized with the implementation of the BMPs described in this report.

4.4 Permanent Impacts to Stormwater

The Federal Highway Administration found that street and highway stormwater runoff has the potential to affect receiving water quality. The nature of these impacts depends on the uses and flow rate or volume of the receiving water, rainfall characteristics, and street or highway characteristics. Heavy metals associated with vehicle tire and brake wear, oil and grease, and exhaust emissions are the primary pollutants associated with transportation corridors.

Generally, highway stormwater runoff has the following pollutants: Total Suspended Solids, nitrate nitrogen, Total Kjeldahl Nitrogen, phosphorous, ortho-phosphate, copper, lead and zinc (Caltrans, November 2003). Some sources of these pollutants are natural erosion, phosphorus from tree leaves, combustion products from fossil fuels, and the wearing of brake pads and tires. The No-Build Alternative may have potential permanent water quality impacts due to continuing congestion, leading to a greater deposition of particulates from exhaust and heavy metals from braking. There are no known existing treatment BMPs along SR 85 within the project limits to treat roadway runoff; therefore, the water quality of the receiving water bodies would still be affected by highway runoff as a result of this alternative. However, treatment BMPs would be proposed for the project. The BMPs that would be considered include biofiltration devices, infiltration devices, media filters, and detention devices.

Highway widening projects increase impervious areas and therefore potentially increase the volume and velocity of stormwater flow to downstream receiving water bodies. In addition, pollutant loading can also be increased. The added impervious area is directly related to the potential permanent water quality impacts. The proposed increase in impervious area is estimated to be approximately 40.1 acres. Stormwater runoff from the project drains into creek crossings beneath SR 85. It also drains into nearby storm drain systems, which ultimately discharge into San Francisco Bay. Stormwater runoff volumes and velocities from the project area are expected to increase with the implementation of the project due to the increase in impervious surfaces.

However, it is expected that in comparison with the overall watershed of the creeks, the increase in flow due to the proposed widening of the roadway would be less than significant (see Table 9); thus, the widening of SR 85 would not pose a significant risk to water quality. The increase in roadway runoff would be minimal in comparison to the overall watersheds of the creeks for (less than 1.43% at each crossing). The project’s design goal is to maximize and promote infiltration and metering or detaining flows prior to discharge to a receiving water body or to an MS4. By meeting this design goal, permanent water quality impacts are not expected to be significant.

Table 9. Added Impervious Area by Creek

Location	Increased Impervious Area (ac)	Watershed Area (ac)	Increased Area (%)
Matadero Creek	0	8,704	0%
Adobe Creek	0	8,640	0%
Permanente Creek	0	10,112	0%
Stevens Creek	0	23,296	0%
Regnart Creek	3.33	799	0.24%
Calabazas Creek	5.26	2,816	0.09%
Rodeo Creek	1.50	654	0.42%
Saratoga Creek	1.97	7,104	0.05%
Vasona Creek	3.27	2,793	0.11%
San Tomas Aquino Creek	0.14	2,337	0.01%
Smith Creek	1.16	512	0.18%
Smith Creek East Channel	2.11	148	1.43%
Los Gatos Creek	8.60	28,224	0.02%
Ross Creek	10.16	4,240	0.18%
Guadalupe River	2.64	34,048	0.01%
Canoas Creek	0	8,000	0%
Coyote Creek	0	146,560	0%
Total	**40.14**	**288,987**	**0.01%**

4.5 Permanent Impacts to Groundwater

The proposed widening required for the project may have localized impacts to the flow of groundwater. Existing groundwater recharge areas within the project limits would be slightly affected due to the increase in impervious areas, which decreases the amount of areas available for infiltration. However, the impacts would not be significant in comparison to the overall groundwater area and due to the highly variable nature of the existing groundwater flow paths. In addition, because groundwater resources in the area do not represent a sole source aquifer, no significant impacts to water quality in groundwater wells are anticipated.

4.6 Permanent Impacts to Water Resources

Bridge widening is proposed for the SR 85 bridges over Saratoga Creek and San Tomas Aquino Creek. The proposed widening would only close the gap between the northbound and southbound bridges. Construction would be conducted from the bridge decks and creek banks, in the riparian zone but above the ordinary high water mark. There is no other bridge widening or culvert extensions are proposed in waters of the U.S., including wetlands. No permanent impacts to waters of the U.S. are anticipated as a result of project-related construction activities. Minimal impacts will occur to waters of the State at San Tomas Aquino and Saratoga creeks. Compensatory mitigation for minimal impacts to waters of the State will be provided through payment of an in-lieu fee to the Santa Clara Valley HCP/NCCP. If mitigation through the HCP/NCCP is not feasible for impacts to waters of the State, off-site mitigation will be implemented in coordination with the RWQCB, as described in the NES (URS 2013). The project would implement any general WDRs issued by the RWQCB.

5 AVOIDANCE, MINIMIZATION, AND/OR MITIGATION MEASURES

The SR 85 Express Lanes Project has one build alternative, which includes avoiding or minimizing environmental impacts while maintaining the project's need and purpose. This project would have less than significant impacts to water quality with the following avoidance, minimization, and proposed mitigation measures incorporated.

5.1 Avoidance and or Minimization Measures for Water Resources

Wetlands and waters of the U.S. and State that are within the project limits would not be impacted. The project would maximize avoidance of environmentally sensitive areas (ESAs) that exist within or are adjacent to the project limits. Delineation of these areas can be achieved through field verification. Once verified, these locations would be delineated on all project contract plans. Measures would be employed to prevent any construction material or debris from entering surface waters or their channels. BMPs for erosion control would be implemented and in place prior to, during, and after construction in order to ensure that no silt or sediment enters surface waters.

Minimal impacts will occur to waters of the State at San Tomas Aquino and Saratoga creeks. Compensatory mitigation for minimal impacts to waters of the State will be provided through payment of an in-lieu fee to the Santa Clara Valley HCP/NCCP. If mitigation through the HCP/NCCP is not feasible for impacts to waters of the State, off-site mitigation will be implemented in coordination with the RWQCB, as described in the NES (URS 2012). The project would implement any general WDRs issued by the RWQCB.

Caltrans' Standard Specifications require the Contractor to submit a Storm Water Pollution Prevention Plan. This plan must meet the standards and objectives to minimize water pollution impacts set forth in section 7-1.01G of Caltrans' Standard Specifications. The Storm Water Pollution Prevention Plan must also be in compliance with the goals and restrictions identified in the San Francisco Bay RWQCB's Basin Plan.

More detailed information on avoidance and minimization measures is provided in the NES (URS, 2012).

5.2 Avoidance and or Minimization Measures for Storm Water and Ground Water

The overall design features for water quality impacts is a condition of Caltrans' NPDES permit with the SWRCB and other regulatory agencies requirements. Implementation of details for these design features or BMPs would be developed and incorporated into the project design and operations prior to the project startup. To avoid storm water impacts, the project should be phased to minimize soil-disturbing work during an anticipated rain event. Permanent design pollution prevention and treatment BMPs should be installed early in the construction process when feasible in order to provide stabilization of disturbed soil and prevent construction stormwater impacts to receiving waters. The order of work specification should be modified during the design phase to reflect the installation of permanent and temporary storm water controls, especially prior to soil disturbing work during an anticipated rain event. With proper implementation of these design features or BMPs, short-term construction-related water quality impacts and permanent water quality impacts would be avoided or minimized.

5.2.1 Construction General Permit

In accordance with the CGP, this project is required to perform a risk assessment and determine the project risk level. Due to the length of the project, risk assessments were completed based on the planning watersheds within the project. Table 10 lists the planning watersheds and risk factors used to determine the risk levels for the project. A map of the planning watersheds within the project area and figures identifying the factors used for the risk assessment are included in Appendix E.

Table 10. Risk Assessment by Planning Watershed (along SR 85 alignment)

<table>
<tr><th>Planning Watershed</th><th>R</th><th>K</th><th>LS</th><th>R x K x LS</th><th>Sediment Risk</th><th>Receiving Water Risk</th><th>Risk Level</th></tr>
<tr><td>Lower Silver Creek</td><td rowspan="4">35.44</td><td rowspan="4">0.32</td><td rowspan="2">5.42</td><td rowspan="2">61</td><td rowspan="2">Medium</td><td rowspan="4">High</td><td rowspan="4">2</td></tr>
<tr><td>Yuerba Buena Creek</td></tr>
<tr><td>Undefined 1</td><td>0.81</td><td>9</td><td rowspan="2">Low</td></tr>
<tr><td>Undefined 2</td><td>0.36</td><td>4</td></tr>
</table>

The sediment risk factor is determined from the product of the rainfall runoff erosivity factor (R), the soil erodibility factor (K), and the length-slope factor (LS). The R factor was determined from the U.S. EPA "Stormwater Phase II Final Rule Construction Rainfall Erosivity Waiver" Fact Sheet 3.1 (EPA 833-F-00-014, Revised March 2012). The K and LS factors were determined from Caltrans Stormwater Design Application website. To be conservative, the maximum K and LS values within each planning watershed were used to determine the sediment risk. The sediment risk is classified as low when the product of the R, K, and LS factors is less than 15, medium when the product is between 15 and 75, and high when the value is greater than 75.

The receiving water risk can be classified as low or high. The Caltrans Stormwater Design Application website identifies the entire Project as being within watersheds classified as having a high receiving water risk.

Based on the combined sediment and receiving water risk, the risk level for all the project planning watershed is Risk Level 2. The requirements for Risk Level 2 projects are presented in Attachment D of the Construction General Permit (Order No. 2009-0009-DWQ) and are summarized in Section 6 of this report.

The project risk level(s) will be further evaluated and verified during the project design phase.

5.2.2 Caltrans' Standard Procedures and Practices

The project is classified as a major reconstruction project because it has an estimated DSA of 75.4 acres. Measures would be considered to address potential temporary, as well as permanent water quality impacts. According to Caltrans' NPDES permit and the CGP, BMPs would be incorporated into the contract documents of this project to reduce the discharge of pollutants temporarily, during construction, and permanently to the maximum extent practicable. Caltrans' Storm Water Handbooks, including the Project Planning and Design Guide (2010), provide guidance for evaluating projects to determine the need for and feasibility of BMPs, design pollution prevention BMPs, and permanent treatment BMPs. Construction Site BMPs are implemented during construction activities to reduce pollutants in stormwater discharges throughout construction. Design pollution prevention BMPs are permanent measures to improve stormwater quality by reducing erosion, stabilizing DSAs, and maximizing vegetated surfaces. Treatment BMPs are permanent devices and facilities that treat stormwater runoff.

5.2.3 Project Construction

Because the project would involve soil disturbance of more than 1 acre, a Notification of Intent would need to be filed with the SWRCB's Storm Water Multiple Application and Report Tracking System (SMARTS). This project does not qualify for a low rainfall erosivity waiver. Caltrans would require its contractors to implement a SWPPP to comply with the conditions of the Caltrans' NPDES permit and to address the temporary water quality impacts resulting from the construction activities associated with this project.

The SWPPP would be submitted by the contractor and approved by Caltrans prior to start of construction. It is intended to address construction-phase impacts. The SWPPP required for this project would include the following elements:

- Project Description – The project description includes maps and other information related to construction activities and potential sources of pollutants.
- Minimum Construction Control Measures – These measures may include limiting construction access routes, stabilization of areas denuded by construction, and using sediment controls and filtration.
- Erosion and Sediment Control – The SWPPP is required to contain a description of soil stabilization practices, control measures to prevent a net increase in sediment load in stormwater, controls to reduce tracking sediment onto roads, and controls to reduce wind erosion.
- Non-Stormwater Management – The SWPPP includes provisions to reduce and control discharges other than stormwater.
- Post-Construction Stormwater Management – The SWPPP includes a list of stormwater control measures that would provide ongoing (permanent) protection for water resources.
- Waste Management and Disposal – The SWPPP includes a waste management section including equipment maintenance waste, used oil, batteries, etc. All waste must be disposed of as required by state and federal law.
- Maintenance, Inspection, and Repair – The SWPPP requires an ongoing program to ensure that all controls are in place and operating as designed.
- Monitoring – This provision requires documented inspections of the control measures.

- Reports – The contractor would prepare an annual report on the construction project and submit this report on July 15 each year. This report would be submitted on the SMARTS website to the SWRCB.
- Training – The SWPPP would provide documentation on the training and qualifications of the designated Qualified SWPPP Developer and Qualified SWPPP Practitioner. Trained personnel must do inspections, maintenance, and repair of construction site BMPs.
- Construction Site Monitoring Program – The SWPPP includes a Construction Site Monitoring Program detailing the procedures and methods related to the visual monitoring and sampling and analysis plans for non-visible pollutants, sediment and turbidity, pH, suspended sediment concentration and bioassessment.

To obtain permit coverage under the CGP, all dischargers must electronically file Project Registration Documents, Notice of Termination, changes of information, sampling and monitoring information, annual reporting, and other compliance documents required through the SWRCB's SMARTS.

Caltrans is required to reduce pollutants in stormwater discharges to the maximum extent practicable. For discharges from a construction site, pollutants must be reduced using Best Available Technology Economically Achievable; and conventional pollutants must be reduced using Best Conventional Technology.

5.2.4 List of Proposed Temporary Construction Site BMPs

Potential temporary impacts to water quality can be prevented or minimized by implementing standard BMPs recommended for a particular construction activity.

Adverse impacts can occur during construction-related activities. Soil erosion, especially during heavy rainfall, can increase the suspended solids, dissolved solids, and organic pollutants in stormwater runoff generated within the project area. These conditions would likely persist until completion of construction activities and implementation of long-term erosion control measures.

Erosion control measures can be applied to all exposed areas during construction, including the trapping of sediments within the construction area through the placing of barriers, such as silt fences, at the perimeter of downstream drainage points or through the construction of temporary detention basins. Other methods of minimizing erosion impacts include the implementation of hydromulching and/or limiting the amount and length of exposure of graded soil. In addition to these erosion control measures, the use of compost is strongly encouraged by Caltrans. Compost not only improves erosion resistance and vegetation establishment, but it also helps immobilize heavy metals that are common among the highways. Compost can be considered or specified at the design phase of the project.

Caltrans' Project Planning and Design Guide describes approved erosion control BMPs (2010). Temporary erosion control and water quality measures will be defined in detail in the Erosion Control and Water Pollution Control design sheets prepared for the project, which will also include the specifications for the SWPPP. The proposed construction site BMPs will be reviewed and approved by the Construction Stormwater Coordinator during the Plans, Specifications and Estimate phase.

The project site may be adjacent to ESAs (URS, 2012). If so, ESA provisions would be provided that may include, but are not limited to, the use of temporary orange fencing to delineate the proposed limit of work in areas adjacent to sensitive resources, or to delineate and exclude sensitive resources from potential construction impacts. Contractor encroachment into ESAs would be prohibited (including the staging/operation of heavy equipment or casting of excavation materials).

The SR 85 bridges over Saratoga Creek and San Tomas Aquino Creek would be widened to close the gap between the northbound and southbound bridge decks. Construction activities in the creeks would be avoided. There would be no widening at other bridge locations. Therefore, dewatering or temporary creek diversions would not be necessary. None of the work is anticipated to take place in wetlands or waters of the U.S., and the contractor would be required to protect them when work is conducted in the adjacent areas. Minimal impacts will occur to waters of the State at San Tomas Aquino and Saratoga creeks. Compensatory mitigation will be provided through payment of an in-lieu fee to the Santa Clara Valley HCP/NCCP, or off-site mitigation will be implemented in coordination with the RWQCB, as described in the NES (URS 2012). The project would implement any general WDRs issued by the RWQCB.

Non-stormwater waste management is also essential to minimize the potential for water quality impacts on a project site. Accidental spills of petroleum hydrocarbons (such as fuels and lubricating oils), concrete wastewater, and possibly sanitary wastes are also of concern during construction activities. An accidental release of these wastes can adversely affect surface water quality, vegetation, and wildlife habitat.

A spill on the roadway would trigger immediate response actions to report, contain, and mitigate the incident. The California Office of Emergency Services has developed a Hazardous Materials Incident Contingency Plan, which provides a program for response to spills involving hazardous materials. The plan designates a chain of command for notification, evacuation, response, and cleanup of spills. Caltrans also has spill contingency procedures and response crews.

Included in Table 11 are the suggested minimum temporary control BMPs that would be necessary for the project, per the Project Planning and Design Guide. Further evaluation of the BMPs necessary for this project to comply with the CGP and Caltrans' permit will be detailed during the Plans, Specifications and Estimate phase. Furthermore, during construction the Contractor would be required to detail in the SWPPP actual in-field implementation of BMPs, plus amend the SWPPP as necessary to match field conditions and phasing of the project.

Table 11. Temporary BMPs

Temporary BMP	Purpose	Cost Type
Soil Stabilization		
Move-In/Move-Out	Mobilization locations where permanent erosion control or re-vegetation to sustain slopes is required within the project.	Bid Item
Temporary Cover	Plastic covers for stockpiles.	Bid Item
Temporary Fence (Type ESA)	High visibility fence to designate areas off-limits to the contractor.	Bid Item
Sediment Control		
Temporary Fiber Rolls	Degradable fibers rolled tightly and placed on the toe and face of slopes to intercept runoff.	Bid Item
Temporary Silt Fence	Linear, permeable fabric barriers to intercept sediment-laden sheet flow. Placed downslope of exposed soil areas, along channels and project perimeter.	Bid Item
Temporary Gravel Bag Berm	Single row of gravel bags installed end to end to form a barrier across a slope to intercept runoff. Can be used to divert or detain moderately concentrated flows.	Bid Item
Temporary Check Dams	Small constructed device of rock or other product placed across a channel or ditch to reduce flow velocity.	Bid Item
Temporary Drainage Inlet Protection	Runoff detainment devices used at storm drain inlets that is subject to runoff from construction activities.	Bid Item
Tracking Control		
Temporary construction entrances/exits	Points of entrance/exit to a construction site that are stabilized to reduce the tracking of mud and dirt onto public roads.	Bid Item
Street Sweeping	Removal of tracked sediment to prevent it entering a storm drain or watercourse.	Bid Item
Non-Stormwater Management		
All other anticipated non-stormwater management measures are covered under the Construction Site Management lump sum.		
Waste Management and Materials Pollution Control		
Temporary Concrete Washout Facilities	Specified vehicle washing areas to contain concrete waste materials.	Bid Item
All other anticipated waste management and materials pollution control measures are covered under Construction Site Management lump sum.		
Construction Site Management		
Controlling potential sources of water pollution before these pollutants come in contact with stormwater systems or watercourses. Covers: • spill prevention and control • materials management • stockpile management • waste management • hazardous waste management • contaminated soil • concrete waste • sanitary and septic waste and liquid waste		Lump Sum

Temporary BMP	Purpose	Cost Type
Non-stormwater management consists of: • water control and conservation • illegal connection and discharge detection and reporting • vehicle and equipment cleaning • vehicle and equipment fueling and maintenance • material and equipment used over water • structure removal over or adjacent to water • paving, sealing, saw cutting and grinding operations • thermoplastic striping and pavement markers • concrete curing and concrete finishing Miscellaneous construction site management includes: • training of employees and subcontractors • proper selection, deployment and repair of construction site BMPs		

Several other temporary water quality or construction site BMPs are listed in Caltrans' Statewide SWMP, and each should be considered for inclusion as the design progresses. Due to minimal impacts to the waters of the State, this project may have to apply for coverage under the Statewide Permit (Order No. 2004-0004-DWQ). Per the permit, the project would implement any general Waste WDRs issued by the RWQCB. In addition to the temporary BMPs listed in Table 10, the project would incorporate applicable measures specified in the Santa Clara Valley HCP/NCCP (CSC 2012). The BMPs as listed in the NES (URS 2013) include, but are not limited to, the following:

1. Prior to construction, wetlands located in the project area would be fenced off using ESA fencing. Placement of the ESA fencing would be done under the supervision of a qualified biologist. The fencing would be placed 5 ft away from each wetland feature.
2. Appropriate erosion control measures would be used to reduce siltation and runoff of contaminants into wetlands and adjacent, ponds, streams, or riparian woodland/scrub. The contractor would not be allowed to stockpile brush, loose soils, or other debris material on stream banks. Only native plant species would be used in erosion control or revegetation seed mix. Any hydroseed mulch used for revegetation must also be certified weed-free. Dry-farmed straw would not be used, and certified weed-free straw would be required where erosion control straw is to be used. Filter fences and mesh would be of material that would not entrap reptiles and amphibians. Erosion-control measures would be placed between a water or wetland and the outer edge of the project site (CSC 2012).
3. All off-road construction equipment would be cleaned of potential noxious weed sources (mud, vegetation) before entry into the project area. Equipment would be considered free of soil, seeds, and other such debris when a visual inspection does not disclose such material. Disassembly of equipment components or specialized inspection tools is not required.
4. Vehicles and equipment would be parked on pavement, existing roads, or specified staging areas.
5. Trash generated by covered activities would be promptly and properly removed from the site (CSC 2012).
6. No construction or maintenance vehicles would be refueled within 200 ft of avoided wetlands and ponds unless a bermed and lined refueling area is constructed and hazardous material absorbent pads are available in the event of a spill (CSC 2012).

7. Equipment storage, fueling, and staging areas would be sited on disturbed areas or on non-sensitive nonnative grassland land cover types, when these sites are available, to minimize risk of direct discharge into riparian areas or other sensitive land cover types (CSC 2012).
8. All temporarily disturbed areas, such as staging areas, would be returned to pre-project or ecologically improved conditions within 1 year of the completing construction or the impact would be considered permanent. Alternatively, if active restoration is used to restore the site within 5 years and the restoration is successful, the impact would be considered temporary (CSC 2012).

5.2.5 Permanent Pollution Prevention Design Measures

In order to comply with the Statewide Permit (Order No. 99-06 DWQ), Caltrans would take measures to reduce, to the maximum extent practicable, pollutant loadings from the facility once construction is complete. The permit stipulates that permanent measures that control pollutant discharges must be considered and implemented for all new or reconstructed facilities. Permanent control measures located within Caltrans' right-of-way reduce pollutants in stormwater runoff from the roadway. These measures reduce the suspended particulate loads, and thus pollutants associated with the particulates, from entering waterways. The measures would be incorporated into the final engineering design or landscape design of the project and would take into account expected runoff from the roadway. In addition, the NPDES permit also stipulates that an operation and maintenance program be implemented for permanent control measures. This category of water quality control measures can be identified as including both design pollution prevention BMPs and treatment BMPs.

Many design elements that are traditionally part of highway, drainage, and landscape design for a project are considered beneficial to pollution prevention. The particular discipline designers must consider all of the items listed below in the proper project design. In addition, the following elements should be considered with respect to the potential water quality impacts:

5.2.6 List of Proposed Design Pollution Prevention BMPs

- Consideration of downstream effects related to potentially increased flow –
  The project would discharge into unlined channels; therefore, necessary erosion control should be applied to the ditches. Increased sediment loads may be transported to downstream waterways; therefore, permanent erosion control measures should be applied to all new or exposed slopes.

  a) Designer should provide specification in contract documents that the Contractor shall minimize disturbed areas by locating temporary roadways to avoid stands of trees and shrubs and to follow existing contours to reduce areas of cut and fill

  b) Designer should, when specifying the removal of vegetation, consider provisions included in the contract documents to minimize impacts (increased exposure or wind damage) to the adjacent vegetation that would be preserved

- Concentrated flow conveyance systems – The project would :
  a) have the potential to create water gullies
  b) create or modify existing slopes
  c) require the concentration of surface runoff
  d) require cross drains
  Each of these conditions would require the proper design of these drainage facilities to handle concentrated flows:
    - Ditches, berms, dikes, and/or swales
    - Overside drains
    - Flared end sections
    - Outlet protection/velocity dissipation devices
- Slope/surface protection systems – The project would create or modify existing slopes requiring the application of one or more of the following control measures:
  a) Vegetated surfaces
  b) Hard surfaces
- Preservation of existing vegetation – At all locations, preserving existing vegetation is beneficial
  The following general steps should be taken to preserve existing vegetation during the Design Phase (Caltrans, 2010):

  c) Identify and delineate in contract documents all vegetation to be retained

  d) Designer should provide specification in contract documents that the Contractor shall delineate the areas to be preserved in the field prior to the start of soil-disturbing activities

In accordance with Caltrans policy, landscaping and irrigation that is damaged or removed during project construction would be replaced in kind. In the 1.1-mile auxiliary lane segment of northbound SR 85, replacement landscaping and irrigation would be considered between the existing retaining walls and sound walls in areas where landscaping is now either sparse or absent. Detailed landscape and irrigation replacement plans would be developed during final project design.

5.2.7 List of Proposed Treatment BMPs

This project is considering treatment BMPs because it is a major reconstruction project that directly or indirectly discharges to a surface water body and creates more than 1 acre of impervious surfaces.

Caltrans' July 2010 Project Planning and Design Guide provides updated guidance for determination of preferred treatment BMPs based on the estimated ability of a BMP to infiltrate the water quality volume. The methodology prefers the use of biofiltration devices that can potentially infiltrate over 90% of the water quality volume, using either native or amended soils. If biofiltration devices are estimated to infiltrate less than 90% of the water quality volume, then infiltration devices should be evaluated. If infiltration devices are estimated to infiltrate less than

90% of the water quality volume, then earthen BMPs (detention devices and Austin sand filters) should be evaluated for the percent of water quality volume infiltrated. The preferred treatment devices for this project would be biofiltration devices with amended soil or infiltration devices (if the device infiltrates over 90% of the water quality volume); otherwise, "BMP Selection Matrix A," of the Project Planning and Design Guide should be used. Based on preliminary treatment analysis, the feasible treatment BMPs for the project are biofiltration strips, infiltration devices, Austin sand filters and detention devices.

Potential treatment BMP locations are limited due to the following site conditions: most of the project alignment has slide slopes in cut, steep slopes, retaining/sound walls and vector control considerations. As such, the treatment of all newly created impervious areas is not currently feasible without further design efforts; further detailed drainage and stormwater design efforts will be made during the design phase to achieve the required treatment of impervious area.

In addition to treatment BMPs, the project would incorporate BMPs to maintain or restore pre-project hydrology to the levels that would satisfy hydromodification requirements per the SCVURPPP. The proposed measures to address hydromodification impacts can include structural measures, such as underground detention, and non-structural measures, through the modification of proposed treatment BMPs to accommodate flow and volume control. The proposed measures must be designed to show that runoff discharge rates and durations match the pre-project discharge rates and durations from 10% of the pre-project 2-year peak flows up through the pre-project 10-year peak flows. The post-project discharge rates should not exceed the pre-project rates by more than 10% for more than 10% of the record duration. For the outfalls susceptible to hydromodification impacts, an increase in impervious surface area can be evaluated using computer modeling, such as the Bay Area Hydrology Model (BAHM), and by evaluating a watershed for cumulative effects from impervious surface and pollutant runoff. This computer modeling would be performed during the project design phase when detailed survey information becomes available.

5.2.8 Project Operation and Maintenance

Because Caltrans' Maintenance Unit is responsible for maintaining SR 85 and BMPs facilities once the project is complete, the Maintenance Unit would be involved in the development process from conception through construction. The Maintenance Unit field representative has unique insight into local problems and maintenance and safety concerns. Caltrans' Maintenance Unit typically comments on the following project-related issues:

- Drainage patterns (particularly known areas of flooding, debris, etc.)
- Stability of slopes and roadbed (help determine if the project can be built and maintained economically)
- Possible material borrow or spoil sites
- Concerns of the local residents
- Existing and potential erosion problems
- Facilities within the right-of-way that would affect alternative designs
- Special problems such as deer crossings, endangered species, etc.

- Whether facilities are safe to maintain
- Known ESAs
- Frequency of traction sand use and estimate of sand quantity applied annually

The Maintenance Stormwater Coordinator would be involved in the design review of any permanent stormwater treatment BMPs and would need to approve any such devices at the end of the Plans, Specifications and Estimate phase.

5.3 Water Quality Assessment Checklist

This Water Quality Assessment Checklist is a summary of the stormwater quality evaluation process presented in the State California Environmental Quality Act Environmental Checklist Form.

The following list of questions is from the Hydrology and Water Quality Checklist from Section 8 of the California Environmental Quality Act Environmental Checklist Form. The possible answers are: "Potentially Significant Impact," "Less than Significant," "Less than Significant Impact," and "No Impact."

Would the Project:

a) *Violate any water quality standards or waste discharge requirements?*

Less than Significant Impact

The primary potential for impacts to water quality is soil erosion or suspended solids being introduced into the waterways. The proposed project has a proposed soil disturbance of 1 ac or more, and therefore shall be regulated under the NPDES General Permit for Storm Water Discharges Associated with Construction and Land Disturbance Activities (Order No. 2009-0009-DWQ, NPDES No. CAS000002). This CGP is also referenced in Caltrans' NPDES Permit, from the SWRCB (Order No. 99-06-DWQ, NPDES No. CAS000003). Stormwater discharges from Caltrans' transportation properties, facilities, and activities are regulated through this Permit. Minimization measures that comply with Caltrans' NPDES permit such as requiring the contractor to submit a SWPPP prior to start of construction and implementing permanent BMPs such as erosion control and treatment BMPs in the project to address long-term impacts, would focus on the control of sediment and suspended solids from entering the waterways. Therefore, the proposed project would comply with all water quality standards and waste discharge requirements, and the impact to water quality would be less than significant.

b) *Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of preexisting nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?*

Less than Significant Impact

Groundwater recharge is reduced when the ground is compacted or when it is covered completely (by development) so less water can seep into the soil. The additional impervious area is small in relation with the size of the groundwater basin located within the project limits; therefore, groundwater recharge impacts would be insignificant for the project.

Implementing permanent Treatment BMPs to the maximum extent practicable, such as biofiltration swales with underdrain and amended soils and biofiltration strips, would also promote infiltration within the project limits.

c) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?*

Less Than Significant Impact

The existing culverts would not be extended and/or replaced to accommodate the wider roadway and there would be no proposed changes to the existing drainage pattern. No stream or river would be altered such that substantial erosion or siltation would result. The objective of the drainage design is to limit the design water surface elevations and velocities to no greater than the existing conditions, or to what can be handled by the existing conditions, at the boundary of the proposed project. Long-term erosion and sediment controls would be addressed with the design permanent treatment BMPs. Short-term erosion and sediment controls would be addressed with the construction site BMPs. These BMPs would be implemented to ensure that sediment potential would not increase.

d) *Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?*

Less Than Significant Impact

Existing drainage patterns would remain. While the proposed project would introduce additional pavement/impervious surface area, the effect on the flow rate and amount of surface runoff would be negligible, as the project's NPDES permit (Order No. R2-2009- 0074) requires implementing hydromodification mitigation to minimize the rate and amount of surface runoff discharging to receiving water bodies. The design goal of hydromodification mitigation is to maintain pre-construction stormwater discharge flows by metering or detaining these flows prior to discharging to a receiving water body.

e) *Create or contribute runoff water which would exceed the capacity of existing or planned storm water drainage systems or provide substantial additional sources of polluted runoff?*

Less than Significant

The project would increase the total impervious surface within the proposed project limits and, therefore, increase the volume of stormwater runoff. Drainage systems would be upsized as necessary. Potential sources of pollutants from the right-of-way include: total suspended solids, nutrients, pesticides, particulate metals, dissolved metals, pathogens, litter, biochemical oxygen demand, and total dissolved solids. Existing drainage facilities throughout the proposed project limits, however, will be extended, replaced, repaired, and/or improved as necessary to provide proper offsite and highway drainage. In compliance with Caltrans' NPDES requirements, water quality treatment BMPs will be included where practicable, which could include biofiltration swales with underdrains and soil amendments as necessary, detention basins, media filters, or biofiltration strips at various locations throughout the proposed project area. The impact to runoff, therefore, would be less than significant.

f) *Otherwise substantially degrade water quality?*

Less than Significant Impact

The project would follow the requirements set forth in the NPDES permits. These permits require the contractor to submit a SWPPP with the appropriate temporary and permanent BMPs to eliminate the degradation of water quality to the maximum extent practicable.

6 PERMITS AND COORDINATION

Permits from the following listed agencies are anticipated. Some of the agencies that issue these permits have differing jurisdiction over all or specific parts of the project, depending on the resources present at any one location along each project segment. Therefore, specific permit jurisdiction and requirements will be determined at the time applications are prepared or sought.

- General Permit for Discharges of Storm Water from Small Municipal Separate Storm Sewer Systems from the cities of Cupertino, Saratoga, Campbell, Los Gatos and San Jose.
- Dewatering Permit. As discussed in Section 5.2.4, the dewatering is not anticipated due to deep groundwater levels and because no is work planned in the water bodies. Therefore, a dewatering permit would not be required.
- SWRCB CGP Order Number 2009-0009-DWQ, NPDES Number CAS000002
- SWRCB, Caltrans' Statewide NPDES Storm Water Permit (Order Number 99-06-DWQ)
- Impacts to waters of the State at Saratoga Creek and San Tomas Aquino Creek will be determined during the permitting process and will involve consultation with the RWQCB.

Work within creeks would be avoided during the construction of the project, so a CWA 401 Water Quality Certification would not be required from the SFBRWQCB. The SFBRWQCB joint Application for 401 Water Quality Certification and/or Report of Waste Discharge would be submitted because the project is subject to waste discharge requirements under the Porter-Cologne Water Quality Control Act.

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Appendix A Water Quality Objectives

Appendix A.1 Objectives for Surface Waters

OBJECTIVES FOR SURFACE WATERS

GENERAL OBJECTIVES

The following objectives apply to all surface waters:

BACTERIA
Table 3-1 provides a summary of the bacterial water quality objectives and identifies the sources of those objectives. Table 3-2 summarizes U.S. EPA's water quality criteria for water contact recreation based on the frequency of use a particular area receives. These criteria will be used to differentiate between pollution sources or to supplement objectives for water contact recreation.

BIOACCUMULATION
Many pollutants can accumulate on particles, in sediment, or bioaccumulate in fish and other aquatic organisms. Controllable water quality factors shall not cause a detrimental increase in concentrations of toxic substances found in bottom sediments or aquatic life. Effects on aquatic organisms, wildlife, and human health will be considered.

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. Changes in chlorophyll a and associated phytoplankton communities follow complex dynamics that are sometimes associated with a discharge of biostimulatory substances. Irregular and extreme levels of chlorophyll a or phytoplankton blooms may indicate exceedance of this objective and require investigation.

COLOR
Waters shall be free of coloration that causes nuisance or adversely affects beneficial uses.

DISSOLVED OXYGEN
For all tidal waters, the following objectives shall apply:

In the Bay:

- Downstream of Carquinez Bridge - 5.0 mg/l minimum
- Upstream of Carquinez Bridge - 7.0 mg/l minimum

For nontidal waters, the following objectives shall apply:
Waters designated as:

- Cold water habitat - 7.0 mg/l minimum
- Warm water habitat - 5.0 mg/l minimum

The median dissolved oxygen concentration for any three consecutive months shall not be less than 80 percent of the dissolved oxygen content at saturation.
Dissolved oxygen is a general index of the state of the health of receiving waters. Although minimum concentrations of 5 mg/l and 7 mg/l are frequently used as objectives to protect fish

life, higher concentrations are generally desirable to protect sensitive aquatic forms. In areas unaffected by waste discharges, a level of about 85 percent of oxygen saturation exists. A three month median objective of 80 percent of oxygen saturation allows for some degradation from this level, but still requires a consistently high oxygen content in the receiving water.

FLOATING MATERIAL
Waters shall not contain floating material, including solids, liquids, foams, and scum, in concentrations that cause nuisance or adversely affect beneficial uses.

OIL AND GREASE
Waters shall not contain oils, greases, waxes, or other 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.

POPULATION AND COMMUNITY ECOLOGY
All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce significant alterations in population or community ecology or receiving water biota. In addition, the health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors.

pH
The pH shall not be depressed below 6.5 nor raised above 8.5. This encompasses the pH range usually found in waters within the basin. Controllable water quality factors shall not cause changes greater than 0.5 units in normal ambient pH levels.

RADIOACTIVITY
Radionuclides shall not be present in concentrations that result in the accumulation of radionuclides in the food web to an extent that presents a hazard to human, plant, animal, or aquatic life. Waters designated for use as domestic or municipal supply shall not contain concentrations of radionuclides in excess of the limits specified in Table 4 of Section 64443 (Radioactivity) of Title 22 of the California Code of Regulations (CCR), which is incorporated by reference into this Plan. This incorporation is prospective, including future changes to the incorporated provisions as the changes take effect (see Table 3-5).

SALINITY
Controllable water quality factors shall not increase the total dissolved solids or salinity of waters of the state so as to adversely affect beneficial uses, particularly fish migration and estuarine habitat.

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. Controllable

water quality factors shall not cause a detrimental increase in the concentrations of toxic pollutants in sediments or aquatic life.

SETTLEABLE MATERIAL
Waters shall not contain substances in concentrations that result in the deposition of material 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.

SULFIDE
All water shall be free from dissolved sulfide concentrations above natural background levels. Sulfide occurs in Bay muds as a result of bacterial action on organic matter in an anaerobic environment. Concentrations of only a few hundredths of a milligram per liter can cause a noticeable odor or be toxic to aquatic life. Violation of the sulfide objective will reflect violation of dissolved oxygen objectives as sulfides cannot exist to a significant degree in an oxygenated environment.

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.

TEMPERATURE
Temperature objectives for enclosed bays and estuaries are as specified in the Water Quality Control Plan for Control of Temperature in the Coastal and Interstate Waters and Enclosed Bays of California, including any revisions to the plan.
In addition, the following temperature objectives apply to surface waters:

- The natural receiving water temperature of inland surface 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.
- The temperature of any cold or warm freshwater habitat shall not be increased by more than 5°F (2.8°C) above natural receiving water temperature

TOXICITY
All waters shall be maintained free of toxic substances in concentrations that are lethal to or that produce other detrimental responses in aquatic organisms. Detrimental responses include, but are not limited to, decreased growth rate and decreased reproductive success of resident or indicator species. There shall be no acute toxicity in ambient waters. Acute toxicity is defined as a median of less than 90 percent survival, or less than 70 percent survival, 10 percent of the time, of test organisms in a 96-hour static or continuous flow test.

There shall be no chronic toxicity in ambient waters. Chronic toxicity is a detrimental biological effect on growth rate, reproduction, fertilization success, larval development, population abundance, community composition, or any other relevant measure of the health of an organism, population, or community. Attainment of this objective will be determined by analyses of indicator organisms, species diversity, population density, growth anomalies, or toxicity tests (including those described in Chapter 4), or other methods selected by the Water Board. The Water Board will also consider other relevant information and numeric criteria and guidelines for toxic substances developed by other agencies as appropriate. The health and life history characteristics of aquatic organisms in waters affected by controllable water quality factors shall not differ significantly from those for the same waters in areas unaffected by controllable water quality factors.

TURBIDITY
Waters shall be free of changes in turbidity that cause nuisance or adversely affect beneficial uses. Increases from normal background light penetration or turbidity relatable to waste discharge shall not be greater than 10 percent in areas where natural turbidity is greater than 50 NTU.

UN-IONIZED AMMONIA
The discharge of wastes shall not cause receiving waters to contain concentrations of un-ionized ammonia in excess of the following limits (in mg/l as N):

- Annual Median - 0.025
- Maximum, Central Bay (as depicted in Figure 2-5) and upstream - 0.16
- Maximum, Lower Bay (as depicted in Figures 2-6 and 2-7) - 0.4

The intent of this objective is to protect against the chronic toxic effects of ammonia in the receiving waters. An ammonia objective is needed for the following reasons:

- Ammonia (specifically un-ionized ammonia) is a demonstrated toxicant. Ammonia is generally accepted as one of the principle toxicants in municipal waste discharges. Some industries also discharge significant quantities of ammonia.
- Exceptions to the effluent toxicity limitations in Chapter 4 of the Plan allow for the discharge of ammonia in toxic amounts. In most instances, ammonia will be diluted or degraded to a nontoxic state fairly rapidly. However, this does not occur in all cases, the South Bay being a notable example. The ammonia limit is recommended in order to preclude any buildup of ammonia in the receiving water.
- A more stringent maximum objective is desirable for the northern reach of the Bay for the protection of the migratory corridor running through Central Bay, San Pablo Bay, and upstream reaches.

Appendix A.2 Objectives for Ground Water

OBJECTIVES GROUNDWATER FOR GROUNDWATER

Groundwater objectives consist primarily of narrative objectives combined with a limited number of numerical objectives. Additionally, the Water Board will establish basin- and/or site-specific numerical groundwater objectives as necessary. For example, the Water Board has groundwater basin-specific objectives for the Alameda Creek watershed above Niles to include the Livermore-Amador Valley as shown in Table 3-7.

The maintenance of existing high quality of groundwater (i.e., “background”) is the primary groundwater objective. In addition, at a minimum, groundwater shall not contain concentrations of bacteria, chemical constituents, radioactivity, or substances producing taste and odor in excess of the objectives described below unless naturally occurring background concentrations are greater. Under existing law, the Water Board regulates waste discharges to land that could affect water quality, including both groundwater and surface water quality. Waste discharges that reach groundwater are regulated to protect both groundwater and any surface water in continuity with groundwater. Waste discharges that affect groundwater that is in continuity with surface water cannot cause violations of any applicable surface water standards.

BACTERIA

In groundwater with a beneficial use of municipal and domestic supply, the median of the most probable number of coliform organisms over any seven-day period shall be less than 1.1 most probable number per 100 milliliters (MPN/100 mL) (based on multiple tube fermentation technique; equivalent test results based on other analytical techniques as specified in the National Primary Drinking Water Regulation, 40 CFR, Part 141.21 (f), revised June 10, 1992, are acceptable).

ORGANIC AND INORGANIC CHEMICAL CONSTITUENTS

All groundwater shall be maintained free of organic and inorganic chemical constituents in concentrations that adversely affect beneficial uses. To evaluate compliance with water quality objectives, the Water Board will consider all relevant and scientifically valid evidence, including relevant and scientifically valid numerical criteria and guidelines developed and/or published by other agencies and organizations (e.g., U.S. Environmental Protection Agency (U.S. EPA), the State Water Board, California Department of Health Services (DHS), U.S. Food and Drug Administration, National Academy of Sciences, California Environmental Protection Agency’s (Cal/EPA) Office of Environmental Health Hazard Assessment (OEHHA), U.S. Agency for Toxic
Substances and Disease Registry, Cal/EPA Department of Toxic Substances Control (DTSC), and other appropriate organizations.)

At a minimum, groundwater designated for use as domestic or municipal supply (MUN) shall not contain concentrations of constituents in excess of the maximum (MCLs) or secondary maximum contaminant levels (SMCLs) specified in the following provisions of Title 22, which are incorporated by reference into this plan: Tables 64431-A (Inorganic Chemicals) of Section 64431, Table 64433.2-A (Fluoride) of Section 64433.2, and Table 64444-A (Organic Chemicals) of Section 64444. This incorporation-by- reference is prospective, including future changes to the incorporated provisions as the changes take effect. (See Table 3-5.)

Groundwater with a beneficial use of agricultural supply shall not contain concentrations of chemical constituents in amounts that adversely affect such beneficial use. In determining compliance with this objective, the Water Board will consider as evidence relevant and scientifically valid water quality goals from sources such as the Food and Agricultural Organizations of the United Nations; University of California Cooperative Extension, Committee of Experts; and McKee and Wolf's "Water Quality Criteria," as well as other relevant and scientifically valid evidence. At a minimum, groundwater designated for use as agricultural supply (AGR) shall not contain concentrations of constituents in excess of the levels specified in Table 3-6.

Groundwater with a beneficial use of freshwater replenishment shall not contain concentrations of chemicals in amounts that will adversely affect the beneficial use of the receiving surface water. Groundwater with a beneficial use of industrial service supply or industrial process supply shall not contain pollutant levels that impair current or potential industrial uses.

RADIOACTIVITY
At a minimum, groundwater designated for use as domestic or municipal supply (MUN) shall not contain concentrations of radionuclides in excess of the MCLs specified in Table 4 (Radioactivity) of Section 64443 of Title 22, which is incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. (See Table 3-5.)

TASTE AND ODOR
Groundwater designated for use as domestic or municipal supply (MUN) shall not contain taste or odor-producing substances in concentrations that cause a nuisance or adversely affect beneficial uses. At a minimum, groundwater designated for use as domestic or municipal supply shall not contain concentrations in excess of the SMCLs specified in Tables 64449-A (Secondary MCLs-Consumer Acceptance Limits) and 64449-B (Secondary MCLs-Ranges) of Section 64449 of Title 22, which is incorporated by reference into this plan. This incorporation-by-reference is prospective, including future changes to the incorporated provisions as the changes take effect. (See Table 3-5.)

Appendix B Descriptions of Beneficial Uses

(From the San Francisco Bay, Region 2, Basin Plan)

BENEFICIAL USE DEFINITIONS

Beneficial uses for surface and groundwaters are divided into the twenty standard categories listed below. One of the principal purposes of this standardization is to facilitate establishment of both qualitative and numerical water quality objectives that will be compatible on a statewide basis.

Municipal and Domestic Supply (MUN)
Uses of water for community, military, or individual water supply systems including, but not limited to, drinking water supply. According to State Board Resolution No. 88-63, "Sources of Drinking Water Policy" all surface waters are considered suitable, or potentially suitable, for municipal or domestic water supply except where:

a. TDS exceeds 3000 mg/l (5000 uS/cm electrical conductivity);
b. Contamination exists, that cannot reasonably be treated for domestic use;
c. The source is not sufficient to supply an average sustained yield of 200 gallons per day;
d. The water is in collection or treatment systems of municipal or industrial wastewaters, process waters, mining wastewaters, or storm water runoff; and;
e. The water is in systems for conveying or holding agricultural drainage waters.

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.

Industrial Process Supply (PROC)
Uses of water for industrial activities that depend primarily on water quality (i.e., waters used for manufacturing, food processing, etc.).

Industrial Service Supply (IND)
Uses of water for industrial activities that do not depend primarily on water quality including, but not limited to, mining, cooling water supply, hydraulic conveyance, gravel washing, fire protection, or oil well repressurization.

Ground Water Recharge (GWR)
Uses of water for natural or artificial recharge of groundwater 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.

Freshwater Replenishment (FRSH)
Uses of water for natural or artificial maintenance of surface water quantity or quality.

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.
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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.

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.

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.

Migration of Aquatic Organisms (MIGR)
Uses of water that support habitats necessary for migration, acclimatization between fresh water and salt water, and protection of aquatic organisms that are temporary inhabitants of waters within the region.

Spawning, Reproduction, and/or Early Development (SPWN)
Uses of water that support high quality aquatic habitats suitable for reproduction and early development of fish.

Appendix C San Francisco Bay Hydrologic Region Ground Water Data

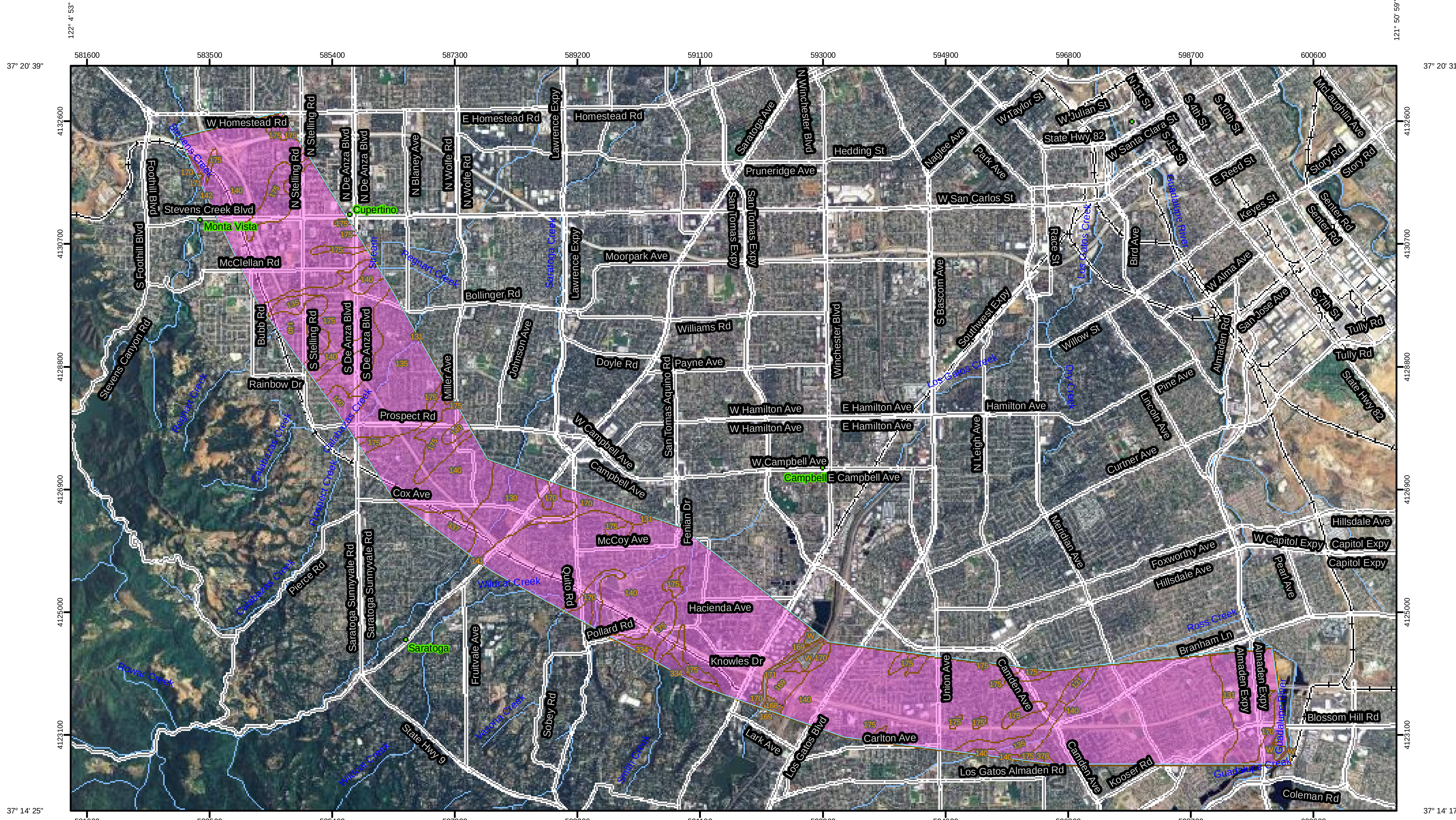
(From the Department of Water Resources)

Table 18 San Francisco Bay Hydrologic Region groundwater data

Basin/Subbasin	Basin Name	Area (acres)	Groundwater Budget Type	Well Yields (gpm)		Active Monitoring			TDS (mg/L)	
				Maximum	Average	Levels	Quality	Title 22	Average	Range
2-1	PETALUMA VALLEY	46,100	C	100	-	16	7	24	347	58-650
2-2	NAPA-SONOMA VALLEY									
2-2.01	NAPA VALLEY	45,900	A	3,000	223	19	10	23	272	150-370
2-2.02	SONOMA VALLEY	44,700	C	1,140	516	18	9	35	321	100-550
2-2.03	NAPA-SONOMA LOWLANDS	40,500	C	300	98	0	6	9	185	50-300
2-3	SUISUN-FAIRFIELD VALLEY	133,600	C	500	200	21	17	35	410	160-740
2-4	PITTSBURG PLAIN	11,600	C	-	-	-	-	9	-	-
2-5	CLAYTON VALLEY	17,800	C	-	-	-	-	48	-	-
2-6	YGNACIO VALLEY	15,500	C	-	-	-	-	-	-	-
2-7	SAN RAMON VALLEY	7,060	C	-	-	-	-	-	-	-
2-8	CASTRO VALLEY	1,820	C	-	-	-	-	-	-	-
2-9	SANTA CLARA VALLEY									
2-9.01	NILES CONE	57,900	A	3,000	2,000	350	120	20	-	-
2-9.02	SANTA CLARA	190,000	C	-	-	-	10	234	408	200-931
2-9.03	SAN MATEO PLAIN	48,100	C	-	-	-	2	14	407	300-480
2-9.04	EAST BAY PLAIN	77,400	A	1,000	UNK	29	16	7	638	364-1,420
2-10	LIVERMORE VALLEY	69,500	A	-	-	-	-	36	-	-
2-11	SUNOL VALLEY	16,600	C	-	-	-	-	2	-	-
2-19	KENWOOD VALLEY	3,170	C	-	-	-	-	13	-	-
2-22	HALF MOON BAY TERRACE	9,150	C	-	-	5	-	9	-	-
2-24	SAN GREGORIO VALLEY	1,070	C	-	-	-	-	-	-	-
2-26	PESCADERO VALLEY	2,900	C	-	-	3	-	4	-	-
2-27	SAND POINT AREA	1,400	C	-	-	-	-	6	-	-
2-28	ROSS VALLEY	1,770	C	-	-	-	-	-	-	-
2-29	SAN RAFAEL VALLEY	880	C	-	-	-	-	-	-	-
2-30	NOVATO VALLEY	20,500	C	-	-	-	-	1	-	-
2-31	ARROYO DEL HAMBRE VALLEY	790	C	-	-	-	-	-	-	-
2-32	VISITACION VALLEY	880	C	-	-	-	-	-	-	-
2-33	ISLAIS VALLEY	1,550	C	-	-	-	-	-	-	-
2-35	MERCED VALLEY	10,400	C	-	-	-	-	10	-	-
2-36	SAN PEDRO VALLEY	880	C	-	-	-	-	-	-	-
2-37	SOUTH SAN FRANCISCO	2,170	C	-	-	-	-	-	-	-
2-38	LOBOS	2,400	A	-	-	-	-	-	-	-
2-39	MARINA	220	A	-	-	-	-	-	-	-
2-40	DOWNTOWN SAN FRANCISCO	7,600	C	-	-	-	-	-	-	-

Appendix D Soil Information

(From the Natural Resources Conservation Service- Web Soil Survey)



Map Scale: 1:56,700 if printed on B size (11" x 17") sheet.

0 500 1,000 2,000 3,000 Meters

0 3,500 7,000 14,000 21,000 Feet

MAP LEGEND

Area of Interest (AOI)

Area of Interest (AOI)

Soils

Soil Map Units

Soil Ratings

A

A/D

B

B/D

C

C/D

D

Not rated or not available

Political Features

Cities

Water Features

Streams and Canals

Transportation

Rails

Interstate Highways

US Routes

Major Roads

MAP INFORMATION

Map Scale: 1:56,700 if printed on B size (11" × 17") sheet.

The soil surveys that comprise your AOI were mapped at 1:24,000.

Please rely on the bar scale on each map sheet for accurate map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: UTM Zone 10N NAD83

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Santa Clara Area, California, Western Part
Survey Area Data: Version 1, Jul 27, 2010

Date(s) aerial images were photographed: 6/13/2005

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Santa Clara Area, California, Western Part (CA641)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
130	Urban land-Still complex, 0 to 2 percent slopes	D	270.6	3.3%
131	Urban land-Elpaloalto complex, 0 to 2 percent slopes	D	344.8	4.2%
135	Urban land-Stevenscreek complex, 0 to 2 percent slopes	D	577.1	7.0%
140	Urban land-Flaskan complex, 0 to 2 percent slopes	D	5,601.7	68.1%
141	Urban land-Flaskan complex, 2 to 9 percent slopes	D	0.2	0.0%
142	Flaskan sandy loam, 15 to 30 percent slopes	C	0.5	0.0%
168	Elder fine sandy loam, protected, 0 to 2 percent slopes	A	12.1	0.1%
169	Urbanland-Elder complex, 0 to 2 percent slopes, protected	D	70.4	0.9%
170	Urbanland-Landelspark complex, 0 to 2 percent slopes	D	252.1	3.1%
171	Elder fine sandy loam, 0 to 2 percent slopes, rarely flooded	A	27.6	0.3%
175	Urbanland-Botella complex, 0 to 2 percent slopes	D	891.8	10.8%
334	Urban Land-Montavista-Togasara complex, 9 to 15 percent slopes	D	47.9	0.6%
337	Urban Land-Togasara-Montavista complex, 2 to 9 percent slopes	D	80.5	1.0%
378	Urbanland-Alumrock-Zeppelin complex, 9 to 15 percent slopes	D	3.3	0.0%
W	Water		49.4	0.6%
Totals for Area of Interest			**8,230.0**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

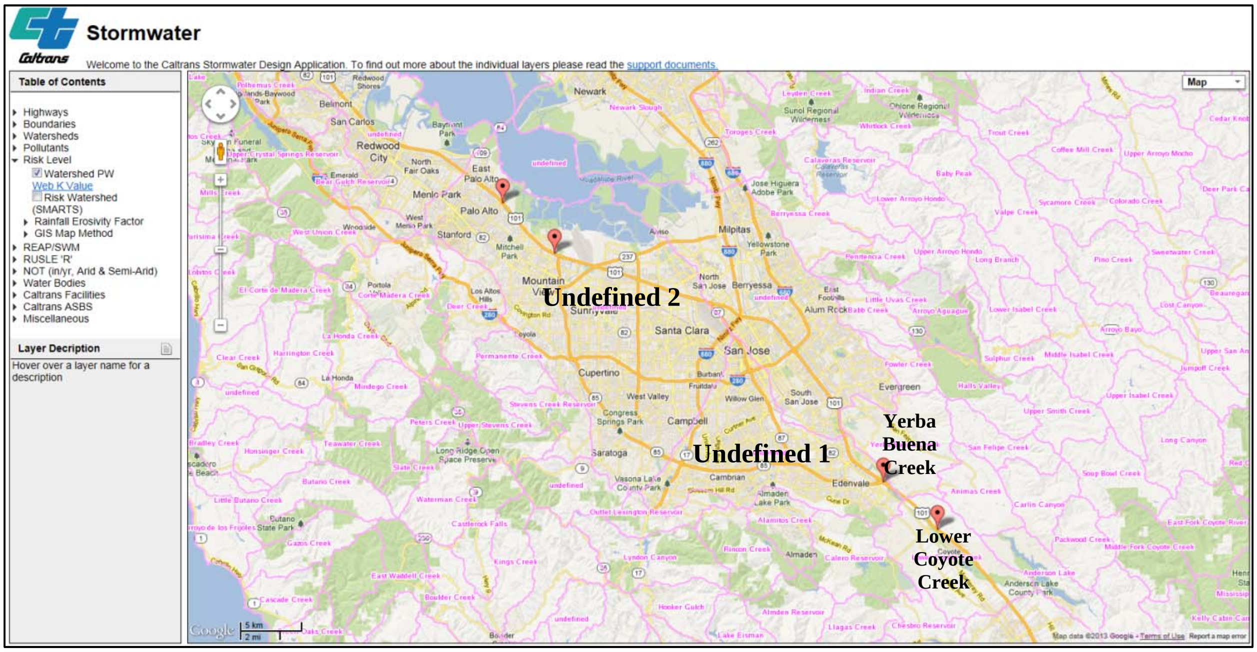
Aggregation Method: Dominant Condition

Component Percent Cutoff: *None Specified*

Tie-break Rule: Higher

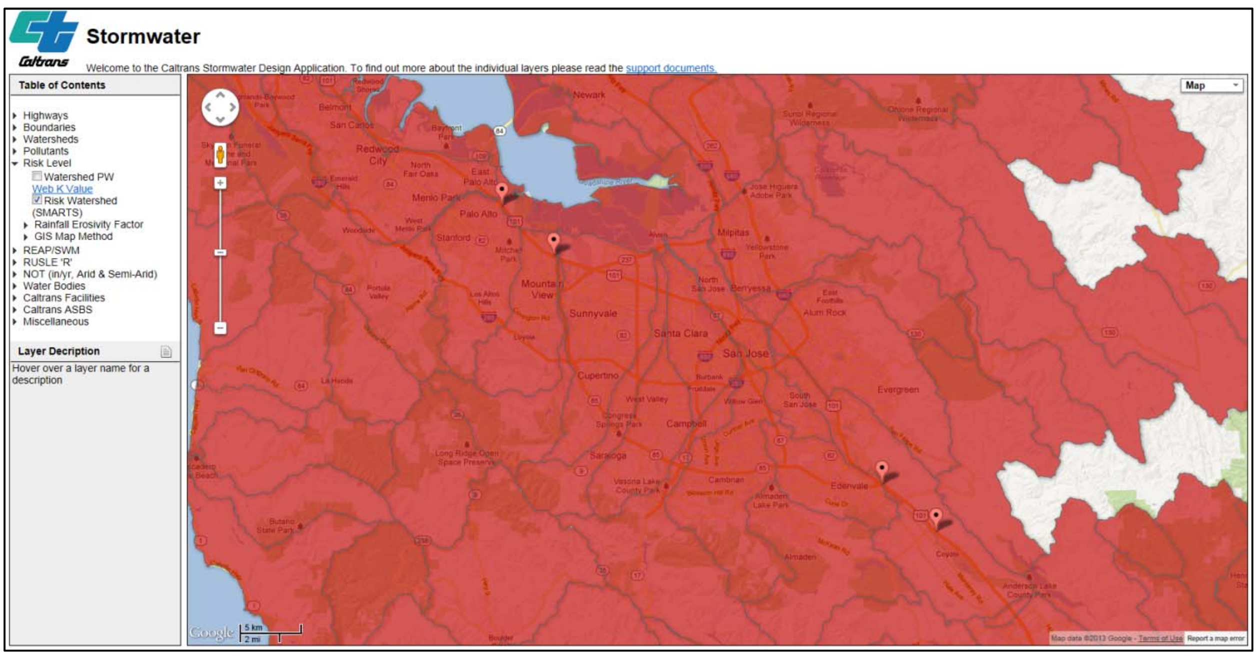
Appendix E Risk Level Determination Documentation

(From the Caltrans Stormwater Design Application)



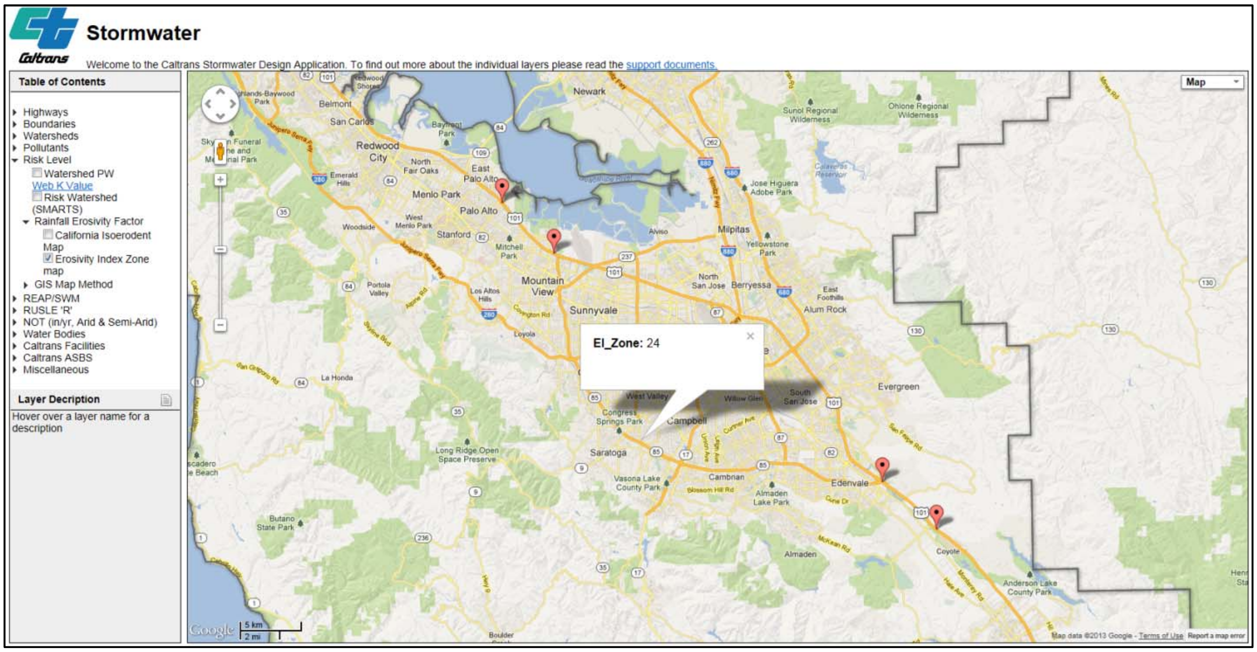
Planning Watershed Map

Source: Caltrans



Receiving Water Risk Map

Source: Caltrans



Erosivity Index Zone

Source: Caltrans

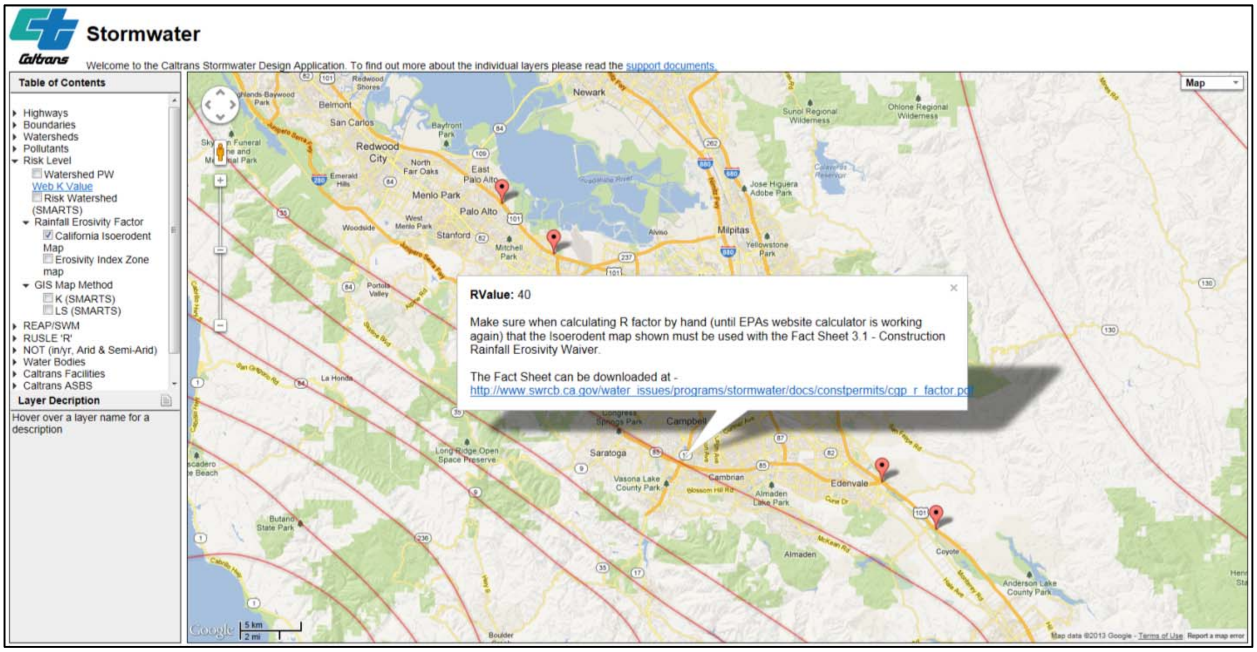
Table 1. Erosivity Index (%EI Values extracted from USDA Manual 703)

All values are at the end of the day listed below - Linear interpolation between dates is acceptable.
EI as a percentage of Average Annual R Value Computed for Geographic Areas Shown in Figure 1

Month	Jan	Jan	Jan	Feb	Mar	Mar	Mar	Apr	Apr	May	May	Jun	Jun	Jul	Jul	Aug	Aug	Sept	Sept	Oct	Oct	Nov	Nov	Dec	Dec
Day	1	16	31	15	1	16	31	15	30	15	30	14	29	14	29	13	28	12	27	12	27	11	26	11	31
EI Zone																									
1	0	4.3	8.3	12.8	17.3	21.6	25.1	28	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53	56	60.8	66.8	71	75.7	82	89.1	95.2	100
2	0	4.3	8.3	12.8	17.3	21.6	25.1	28.0	30.9	34.9	39.1	42.6	45.4	48.2	50.8	53.0	56.0	60.8	66.8	71.0	75.7	82.0	89.1	95.2	100
3	0	7.4	13.8	20.9	26.5	31.8	35.3	38.5	40.2	41.6	42.5	43.6	44.5	45.1	45.7	46.4	47.7	49.4	52.8	57.0	64.5	73.1	83.3	92.3	100
4	0	3.9	7.9	12.6	17.4	21.6	25.2	28.7	31.9	35.1	38.2	42.0	44.9	46.7	48.2	50.1	53.1	56.6	62.2	67.9	75.2	83.5	90.5	96.0	100
5	0	2.3	3.6	4.7	6.0	7.7	10.7	13.9	17.8	21.2	24.5	28.1	31.1	33.1	35.3	38.2	43.2	48.7	57.3	67.8	77.9	86.0	91.3	96.9	100
6	0	0.0	0.0	0.5	2.0	4.1	8.1	12.6	17.6	21.6	25.5	29.6	34.5	40.0	45.7	50.7	55.6	60.2	66.5	75.5	85.6	95.9	99.5	99.9	100
7	0	0.0	0.0	0.0	0.0	1.2	4.9	8.5	13.9	19.0	26.0	35.4	43.9	48.8	53.9	64.5	73.4	77.5	80.4	84.8	89.9	96.6	99.2	99.7	100
8	0	0.0	0.0	0.0	0.0	0.9	3.6	7.8	15.0	20.2	27.4	38.1	49.8	57.9	65.0	75.6	82.7	86.8	89.4	93.4	96.3	99.1	100.0	100.0	100
9	0	0.8	3.1	4.7	7.4	11.7	17.8	22.5	27.0	31.4	36.0	41.6	46.4	50.1	53.4	57.4	61.7	64.9	69.7	79.0	89.6	97.4	100.0	100.0	100
10	0	0.3	0.5	0.9	2.0	4.3	9.2	13.1	18.0	22.7	29.2	39.5	46.3	48.8	51.1	57.2	64.4	67.7	71.1	77.2	85.1	92.5	96.5	99.0	100
11	0	5.4	11.3	18.8	26.3	33.2	37.4	40.7	42.5	44.3	45.4	46.5	47.1	47.4	47.8	48.3	49.4	50.7	53.6	57.5	65.5	76.2	87.4	94.8	100
12	0	3.5	7.8	14.0	21.1	27.4	31.5	35.0	37.3	39.8	41.9	44.3	45.6	46.3	46.8	47.9	50.0	52.9	57.9	62.3	69.3	81.3	91.5	96.7	100
13	0	0.0	0.0	1.8	7.2	11.9	16.7	19.7	24.0	31.2	42.4	55.0	60.0	60.8	61.2	62.6	65.3	67.6	71.6	76.1	83.1	93.3	98.2	99.6	100
14	0	0.7	1.8	3.3	6.9	16.5	26.6	29.9	32.0	35.4	40.2	45.1	51.9	61.1	67.5	70.7	72.8	75.4	78.6	81.9	86.4	93.6	97.7	99.3	100
15	0	0.0	0.0	0.5	2.0	4.4	8.7	12.0	16.6	21.4	29.7	44.5	56.0	60.8	63.9	69.1	74.5	79.1	83.1	87.0	90.9	96.6	99.1	99.8	100
16	0	0.0	0.0	0.5	2.0	5.5	12.3	16.2	20.9	26.4	35.2	48.1	58.1	63.1	66.5	71.9	77.0	81.6	85.1	88.4	91.5	96.3	98.7	99.6	100
17	0	0.0	0.0	0.7	2.8	6.1	10.7	12.9	16.1	21.9	32.8	45.9	55.5	60.3	64.0	71.2	77.2	80.3	83.1	87.7	92.6	97.2	99.1	99.8	100
18	0	0.0	0.0	0.6	2.5	6.2	12.4	16.4	20.2	23.9	29.3	37.7	45.6	49.8	53.3	58.4	64.3	69.0	75.0	86.6	93.9	96.6	98.0	100.0	100
19	0	1.0	2.6	7.4	16.4	23.5	28.0	31.0	33.5	37.0	41.7	48.1	51.1	52.0	52.5	53.6	55.7	57.6	61.1	65.8	74.7	88.0	95.8	98.7	100
20	0	9.8	18.5	25.4	30.2	35.6	38.9	41.5	42.9	44.0	45.2	48.2	50.8	51.7	52.5	54.6	57.4	58.5	60.1	63.2	69.6	76.7	85.4	92.4	100
21	0	7.5	13.6	18.1	21.1	24.4	27.0	29.4	31.7	34.6	37.3	39.6	41.6	43.4	45.4	48.1	51.3	53.3	56.6	62.4	72.4	81.3	88.9	94.7	100
22	0	1.2	1.6	1.6	1.6	1.6	1.6	2.2	3.9	4.6	6.4	14.2	32.8	47.2	58.8	69.1	76.0	82.0	87.1	96.7	99.9	99.9	99.9	99.9	100
24	0	12.2	23.6	33.0	39.7	47.1	51.7	55.9	57.7	58.6	58.9	59.1	59.1	59.2	59.2	59.3	59.5	60.0	61.4	63.0	66.5	71.8	81.3	89.6	100

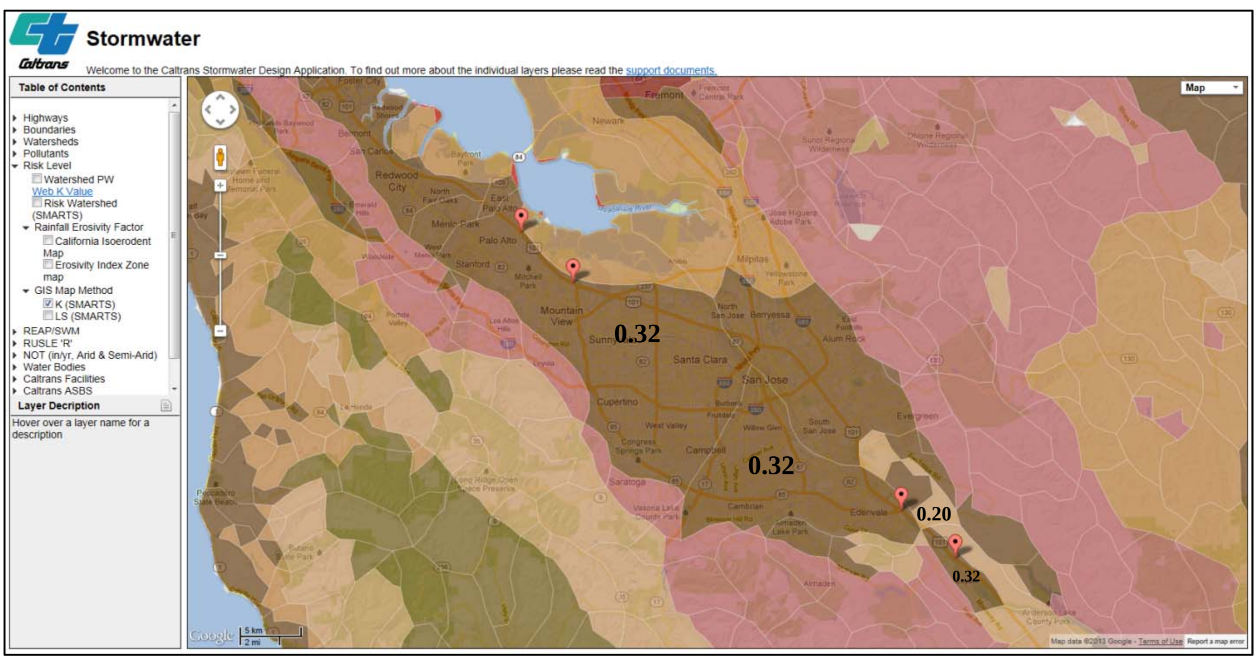
Estimated Construction Start: January 31, 2014
Estimated Construction Completion: January 7, 2015
EI Percentage = (100 – 23.6)% + 12.2% = 88.6%

Source: U.S. EPA

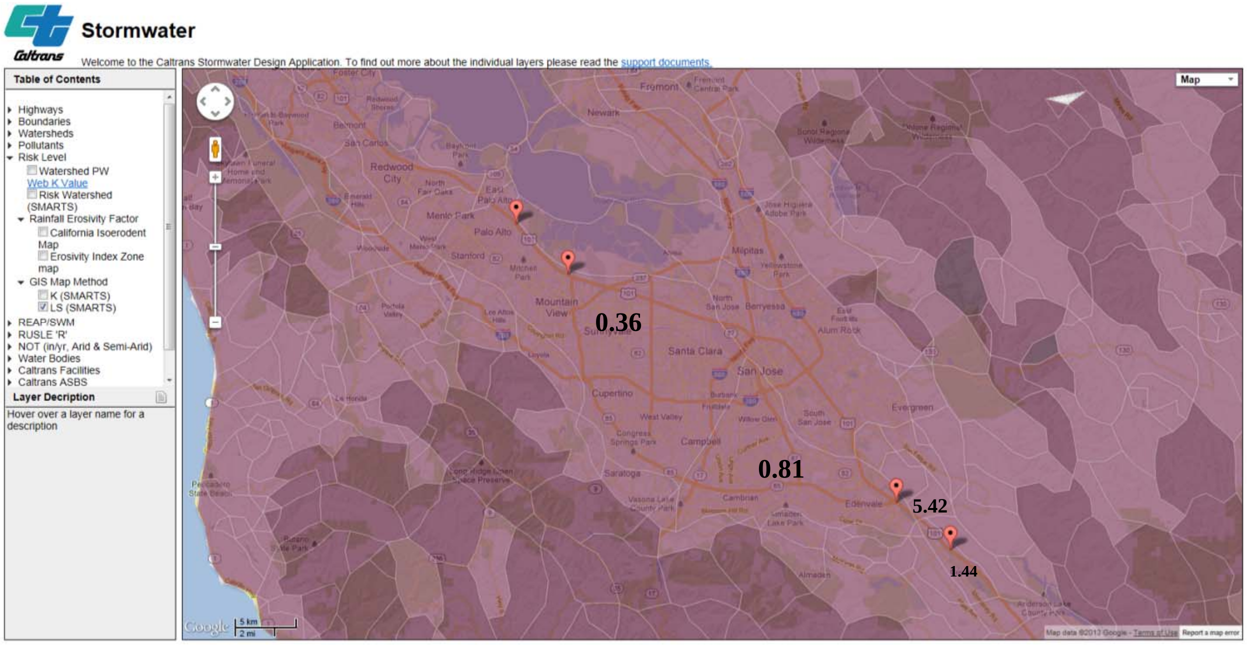


Annual Erosion Index from Isoerodent Map Source: Caltrans

R Factor = 40 x 88.6% = 35.44



K Factor Map Source: Caltrans



LS Factor Map

Source: Caltrans