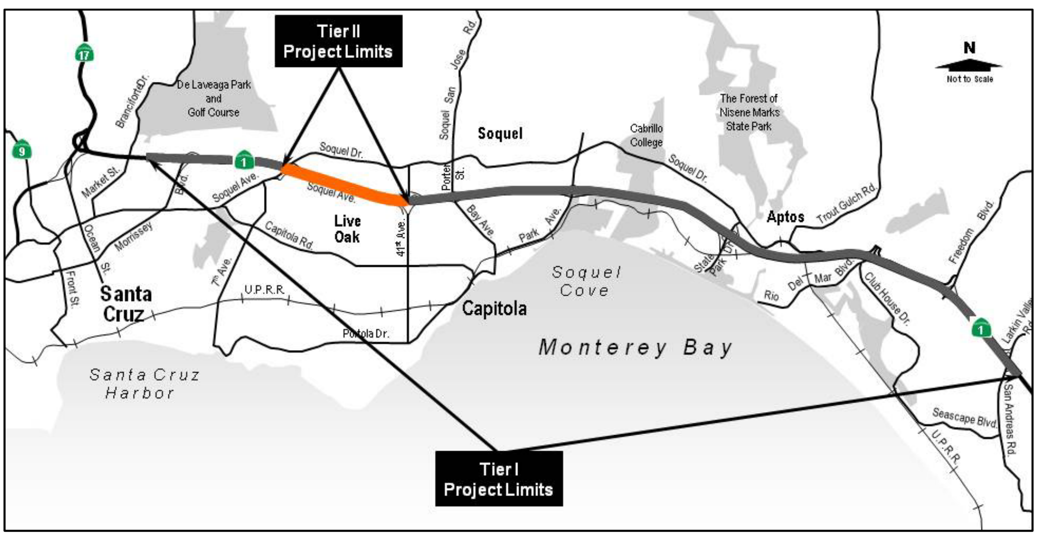
SANTA CRUZ ROUTE 1

TIER I – CORRIDOR ANALYSIS OF HIGH OCCUPANCY VEHICLE (HOV) LANES AND TRANSPORTATION SYSTEM MANAGEMENT ALTERNATIVES AND TIER II – BUILD PROJECT ANALYSIS OF 41ST AVENUE TO SOQUEL AVENUE/DRIVE AUXILIARY LANES AND CHANTICLEER AVENUE PEDESTRIAN-BICYCLE OVERCROSSING

SANTA CRUZ COUNTY, CALIFORNIA
DISTRICT 5 – SCr – 1, (R7.24/16.13)
EA 0C7300 / PI 05-0000-0023

Tier I and Tier II Draft Environmental Impact Report/ Environmental Assessment



Prepared by the
Federal Highway Administration and
State of California Department of Transportation
November 2015

Caltrans

DEPARTMENT OF TRANSPORTATION UNITED STATES OF AMERICA

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General Information about This Document

What's in this document?

The California Department of Transportation (Caltrans or the Department) and the Federal Highway Administration (FHWA) have prepared this Tier I and Tier II Draft Environmental Impact Report/Environmental Assessment, which examines the potential environmental impacts of alternatives being considered for the proposed Tier I and Tier II projects located on Route 1 in Santa Cruz County, California. The Department is the lead agency under the California Environmental Quality Act and the Federal Highway Administration is the lead agency under the National Environmental Policy Act. The document describes why the project is being proposed, alternatives for the project, the existing environment that could be affected by the project, potential impacts from each of the alternatives, and the proposed avoidance, minimization, and/or mitigation measures.

What you should do.

- Please read the document.
  - The document is available electronically at http://www.dot.ca.gov/dist05/projects
  - Additional copies of the document, as well as the supporting technical studies used in preparing it, are available for review at the Caltrans office at 50 Higuera Street, San Luis Obispo, CA; Santa Cruz County Regional Transportation Commission at 1523 Pacific Avenue, Santa Cruz, CA; and at the following public libraries:
    - Aptos: 7695 Soquel Drive, Aptos, CA 95003-3899
    - Capitola: 2005 Wharf Road, Capitola, CA 95010-2002
    - Central: 224 Church Street, Santa Cruz, CA 95060-3873
    - Live Oak: 2380 Portola Drive, Santa Cruz, CA 95062-4203
    - Watsonville: 275 Main Street, Suite 100, Watsonville, CA 95076-5133
- Attend the public hearing on Thursday December 3, 2015 from 6:00 to 8:30 p.m. at the Live Oak Elementary School, Multi-Purpose Room, 1916 Capitola Road, Santa Cruz, CA 95065.
- We would like to hear what you think. If you have any comments regarding the proposed project, please attend the open forum hearing and/or send your written comments to the Department by the deadline. Submit comments via U.S. mail to

  Matt Fowler, Senior Environmental Planner
  Environmental Analysis
  California Department of Transportation
  50 Higuera Street
  San Luis Obispo, CA 93401

  Submit comments by e-mail to matt.c.fowler@dot.ca.gov

  Be sure to submit comments by the deadline: Monday January 18, 2016 at 5:00 p.m.

What happens next?

After comments are received from the public and reviewing agencies, Caltrans and the Federal Highway Administration may (1) give environmental approval to the proposed project, (2) do additional environmental studies, or (3) abandon the project. If the project is given environmental approval and funding is appropriated, Caltrans could design and construct all or part of the project.

For individuals with sensory disabilities, this document is available in Braille, in large print, on audiocassette, or on computer disk. To obtain a copy in one of these alternate formats, please call or write to Caltrans, Attn.: Matt C. Fowler, Environmental Analysis, 50 Higuera Street, San Luis Obispo, CA 93401; (805) 542-4603 Voice, or use the California Relay Service TTY number, (800) 735-2922 or 711.

FHWA Highway ID No. ____________

SCH# 2004032147
05-SCR-1-PM R7.24/16.13
EA: 0C7300

Tier I evaluation of High-Occupancy Vehicle and Transportation System Management alternatives for a distance of 8.9 miles from 0.4 mile south of Larkin Valley [PM R7.24] to 0.3 mile north of Morrissey Boulevard [PM 16.13] and Tier II evaluation of Auxiliary Lane improvements for a distance of 1.4 miles from 41st Avenue to Soquel Avenue/ Soquel Drive on Route 1 in Santa Cruz County

SANTA CRUZ ROUTE 1

TIER I – CORRIDOR ANALYSIS OF HIGH OCCUPANCY VEHICLE (HOV) LANES AND TRANSPORTATION SYSTEM MANAGEMENT ALTERNATIVES AND TIER II – BUILD PROJECT ANALYSIS OF 41ST AVENUE TO SOQUEL AVENUE/DRIVE AUXILIARY LANES AND CHANTICLEER AVENUE PEDESTRIAN-BICYCLE OVERCROSSING

DRAFT ENVIRONMENTAL IMPACT REPORT/ ENVIRONMENTAL ASSESSMENT

Submitted Pursuant to: (State) Division 13, California Public Resources Code
(Federal) 42 USC 4332(2)(C)

U.S. Department of Transportation
Federal Highway Administration

THE STATE OF CALIFORNIA
Department of Transportation

10/28/15
Date of Approval

Timothy Gubbins
District Director
California Department of Transportation
CEQA Lead Agency

11/2/15
Date of Approval

Vincent Mammano
Division Administrator
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Summary

S.1 Introduction

The California Department of Transportation (Caltrans), in cooperation with the Federal Highway Administration (FHWA) and the Santa Cruz County Regional Transportation Commission (RTC), proposes improvements to State Route 1 (Route 1) in Santa Cruz County. This project is divided into two components: the Tier I component from approximately 0.4 mile south of the San Andreas-Larkin Valley Road interchange to 0.3 mile north of the Morrissey Boulevard interchange, a distance of approximately 8.9 miles; and the Tier II component from 41st Avenue to Soquel Avenue/Drive. This stretch of Route 1 is subject to recurrent congestion that affects highway operations. Proposed improvements under consideration include the following major features: mainline high-occupancy vehicle (HOV) lanes, HOV on-ramp bypass lanes, auxiliary lanes, pedestrian and bicycle overcrossings, and reconstructed interchanges. Both the proposed Tier I and Tier II components are included in RTC's Highway 1 Corridor Investment Program, a program of funding for corridor improvements that RTC seeks to implement over time as funding becomes available.

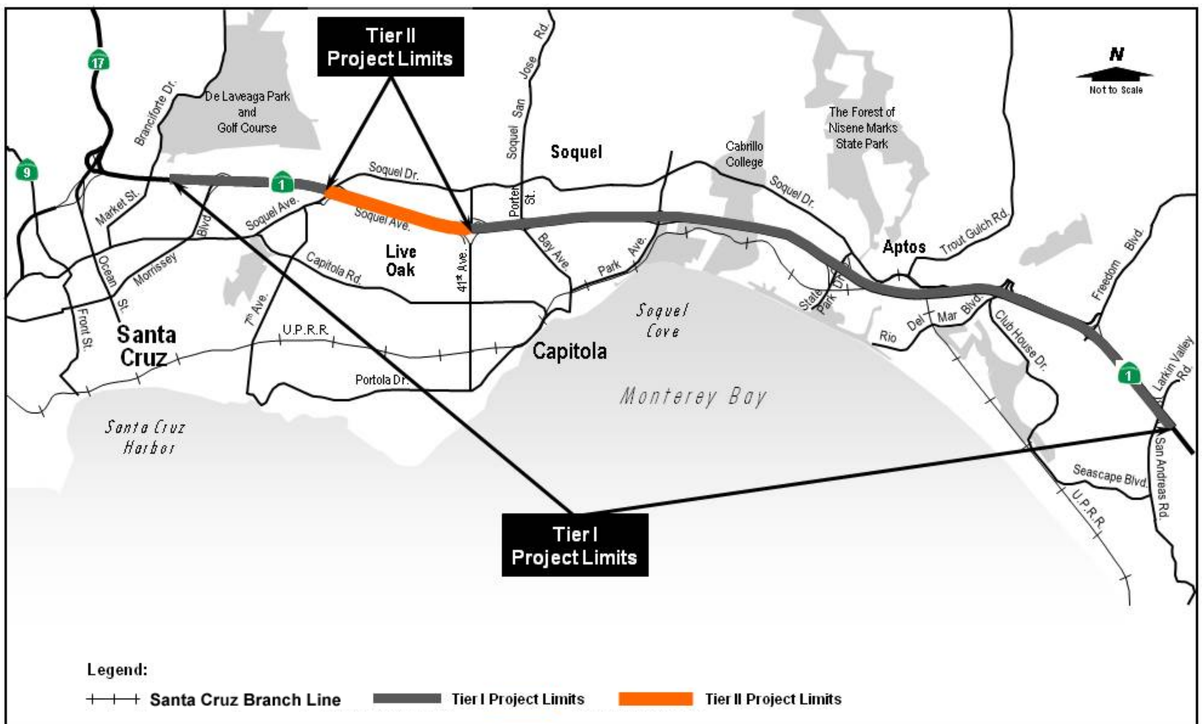
The Federal Highway Administration is the Federal Lead Agency for the project under the National Environmental Policy Act, and Caltrans is the State Lead Agency under the California Environmental Quality Act. This project has been evaluated as a combined Tier I/ Tier II Draft Environmental Impact Report/Environmental Assessment (Tier I/II DEIR/EA). Tiering or tiered environmental review is a streamlining tool for environmental review, under both state and federal law. This process allows agencies to conduct environmental review of large projects that will be phased in over an extended period of time. Under the Tier I project, three alternatives are being considered: an HOV lane alternative, a Corridor Transportation Management (TSM) alternative, and a No Build Alternative. The Tier I corridor portion of this environmental document analyzes the reasonably foreseeable environmental impacts of the ultimate construction and operation of those alternatives under consideration within the study corridor at a master-plan level. As portions of the Tier I project are ultimately programmed for design and construction, they will become Tier II projects and will be analyzed in separate Tier II environmental documents. The tiered approach is being used for the corridor because it is anticipated that funding to implement a program of transportation improvements within the corridor will occur over a multi-year time frame.

The Tier II component of this Tier I/II DEIR/EA also analyzes a project-level Auxiliary Lane Alternative and a No Build Alternative between 41st Avenue and Soquel Avenue/Drive within the larger project corridor. Unlike the Tier I Corridor Alternatives discussed above, it is anticipated that construction of the Tier II Auxiliary Lane Alternative would begin in 2019.

The Tier II portion of this environmental document analyzes the environmental impacts of construction and operation of the proposed alternatives at a project level.

S.2 Overview of Project Area

Route 1 is the primary route connecting communities in the southern and central areas of Santa Cruz County and is the only continuous commuter route linking Watsonville, Capitola, Aptos, Cabrillo College, Santa Cruz, and the University of California at Santa Cruz. Approximately 25 percent of commuters using Route 1 continue on Route 17 to jobs in Santa Clara County. Route 1 also is the southern terminus for Route 9 and Route 17, which bring heavy tourist traffic to coastal destinations in Santa Cruz and Monterey counties. Route 1 is a High Emphasis Route in the Caltrans Interregional Transportation Strategic Plan.



Tier I/ Tier II Environmental Impact Report/Environmental Assessment Santa Cruz Route 1 Improvement Project
PROJECT VICINITY

Route 1 between San Andreas Road and the Route 1/17 interchange is a four-lane divided freeway with a median width of approximately 8 to 63 feet. Within the Tier I project limits there are nine interchanges, two roadway overcrossings, and two Santa Cruz Branch Rail Line overhead bridge structures.

The Santa Cruz Route 1 HOV Lane Project is included in the 2014 Regional Transportation Plan as a financially unconstrained project, reflecting RTC’s long-term commitment to this Tier I project. Traffic data compiled for the Tier I project in 2009 estimated the average daily traffic volume on Route 1 within the project limits to be as high as 104,000 vehicles (both directions combined). Traffic conditions are most congested in the commute directions—northbound in the morning, southbound in the evening during the peak hour.

S.3 Purpose and Need

The purpose of the proposed Tier I project on Route 1 within the project limits is to achieve the following:

- Reduce congestion.
- Promote the use of alternative transportation modes as means to increase transportation system capacity.
- Encourage carpooling and ridesharing.

The purpose of the Tier II project is to

- Reduce congestion.
- Improve safety.
- Promote the use of alternative transportation modes as means to increase transportation system capacity.

The main distinction between the Tier I and Tier II project purposes is that the Tier II project also addresses a congestion-related safety need within its limits, but will not promote carpooling in the Route 1 corridor. The Tier II project would promote the use of alternative modes and increase the capacity of the transportation system by providing a bicycle and pedestrian overcrossing of Route 1 at Chanticleer Avenue, as well as a new sidewalk along a portion of Soquel Avenue at Chanticleer Avenue, reducing travel distance for bicyclists and pedestrians.

The Tier I and Tier II projects are intended to address specific deficiencies and needs on Route 1, as described in the following subsection.

S.3.1 Need

The Tier I and Tier II projects address the following needs resulting from deficiencies on Route 1 within the project limits:

- Several bottlenecks along Route 1 in the southbound and northbound directions cause recurrent congestion during peak hours.
- Travel time delays due to congestion are experienced by commuters, commerce, and emergency vehicles.
- “Cut-through” traffic, or traffic on local streets, occurs and is increasing because drivers seek to avoid congestion on the highway.

- Limited opportunities exist for pedestrians and bicyclists to safely get across Route 1 within the project corridor.

Within the Tier I project limits, in addition to the common needs identified above, there is a need to address the following corridor-wide deficiencies:

- Insufficient incentives to increase transit service in the Route 1 corridor because congestion threatens reliability and cost-effective transit service delivery.
- Inadequate facilities to support carpool and rideshare vehicles over single-occupant vehicles, reducing travel time savings and reliability.

The Tier II project, in addition to the common needs identified above, also addresses the following need:

- Improve operational safety to address accident rates in excess of the statewide average.

S.4 Proposed Action

S.4.1 Tier I Corridor Alternatives

Tier I Corridor HOV Lane Alternative

The Tier I Corridor HOV Lane Alternative would expand the existing four-lane highway to a six-lane facility by adding one HOV lane in each direction next to the median and auxiliary lanes on the outside in each direction. Expanding the highway from four lanes to six lanes would be achieved by building the new lane in the existing freeway median and widening the freeway footprint in those locations where the median is not wide enough to fit the new lane.

The Tier I Corridor HOV Lane Alternative would modify or reconstruct all nine interchanges within the project limits to improve merging operations and ramp geometry. The Bay Avenue/Porter Street and 41st Avenue interchanges would be modified to operate as one interchange, with a frontage road to connect the two halves of the interchange. Where feasible, design deficiencies on existing ramps would be corrected. Ramp metering and HOV bypass lanes and mixed-flow lanes would be added to Route 1 on-ramps within the project limits; on-ramp transit stops would also be provided. The Tier I Corridor HOV Lane Alternative would include auxiliary lanes between Freedom Boulevard and Bay Avenue/Porter Street and between 41st Avenue and Soquel Avenue/Drive. Transportation Operations System infrastructure, such as changeable message signs, highway advisory radio, microwave detection systems, and vehicle detection systems, would also be provided under the Tier I Corridor TSM Alternative. One difference between the Tier I Corridor HOV Alternative and the Tier I Corridor TSM Alternative is that the Tier I Corridor HOV Alternative would not construct a northbound auxiliary lane between State Park Drive and Park Avenue.

Bridge structures and the Capitola Avenue overcrossing would be modified or replaced to accommodate the proposed HOV lanes. New and widened highway crossing structures would include shoulder and sidewalk facilities to accommodate pedestrians and bicycles. The Tier I Corridor HOV Lane Alternative would include three new pedestrian/bicycle overcrossings over Route 1 at Mar Vista Drive, Chanticleer Avenue, and Trevethan Avenue. The proposed interchange improvement would also enhance pedestrian and bicycle facilities along local roadways within the interchange areas.

The two existing Santa Cruz Branch Line Railroad bridges over Route 1 in Aptos would be replaced with longer bridges at the same elevation, and the highway profile would be lowered to achieve standard vertical clearance under the bridge to make room for the HOV and auxiliary lanes and to minimize environmental impacts. These bridges would include improvements to pedestrian and bicycle facilities. The existing Route 1 bridge over Aptos Creek, located between the two railroad bridges, has two traffic lanes in each direction and would be widened on the outside, northbound and southbound, to accommodate the HOV and auxiliary lanes.

Tier I Corridor TSM Alternative

The Tier I Corridor TSM Alternative proposes to add auxiliary lanes along the highway between major interchange pairs from Morrissey Boulevard to Freedom Boulevard, provide ramp metering, construct HOV bypass lanes and mixed-flow lanes on on-ramps, and improve nonstandard geometric elements at various ramps. The Tier I Corridor TSM Alternative also would include Transportation Operations System electronic equipment as described for the Tier I Corridor HOV Lane Alternative. In addition, the Tier I Corridor TSM Alternative would reconstruct the north and south Aptos railroad bridges and lower Route 1 in Aptos to achieve standard vertical clearance; reconstruct the State Park Drive, Capitola Avenue, and 41st Avenue overcrossings; widen the Aptos Creek Bridge; and construct three new pedestrian/ bicycle overcrossings over Route 1 at Mar Vista Drive, Chanticleer Avenue, and Trevethan Avenue. All of the aforementioned reconstructed bridges would include improvements to pedestrian and bicycle facilities. The Tier I Corridor TSM Alternative shares many features with the Tier I Corridor HOV Lane Alternative, the major exceptions being HOV lanes would not be constructed along the mainline and, of the nine interchanges within the project limits, only the Soquel Drive/Soquel Avenue interchange would be reconfigured.

S.4.2 Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative would add an auxiliary lane to both the northbound and southbound sides of Route 1 between the 41st Avenue and Soquel Avenue/Drive interchanges. In addition, an Americans with Disabilities Act-compliant pedestrian and bicycle overcrossing would be constructed at Chanticleer Avenue[1]. The total roadway widening would be approximately 1.4 miles along Route 1.

The new auxiliary lanes would be 12 feet wide. In the southbound direction, the width needed for the new lane would be added in the median, and the median barrier would be shifted approximately 5 feet toward the northbound side of the freeway to make room for the new lane and a standard 10-foot wide shoulder. Where the new southbound lane meets the existing ramps, outside shoulder widening would occur to achieve standard 10-foot wide shoulders. In the northbound direction, the project proposes to pave a 10-foot-wide median shoulder and widen to the outside to add the 12-foot wide auxiliary lane and a new 10-foot wide shoulder.

The pedestrian/bicycle overcrossing constructed at Chanticleer Avenue would connect to a new 360-foot long by 6-foot wide sidewalk on Chanticleer Avenue on the south side of Route 1. The sidewalk, located along the south side of Soquel Drive, would be separated from the street by a 4-foot wide park strip.

Retaining walls would be constructed as part of the roadway widening along Route 1, with a total of four separate walls: three on the north side of the roadway and one on the south side. One of the retaining walls would start after the 41st Avenue on-ramp and extend approximately 150 feet; two other retaining walls on the northbound side would be 375 and 408 feet. On the southbound side, a 350-foot-long wall would be constructed along the highway mainline and Soquel Avenue, over the Rodeo Creek Gulch culvert.

S.4.3 No Build Alternative

The No Build Alternative offers a basis for comparing the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative in the future analysis year of 2035. Although the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative are separate projects, the assumptions regarding the No Build Alternative conditions are the same. Both assume no major construction on Route 1 through the Tier I corridor project limits or Tier II project limits other than currently planned and programmed improvements and continued routine maintenance. Planned and programmed improvements that are assumed in the No Build Alternative are the following, as contained in the 2014 Regional Transportation Plan:

- Construction of auxiliary lanes between the Soquel Avenue/Soquel Drive and Morrissey Boulevard interchanges (construction completed in December 2013).
- Replacement of the La Fonda Avenue overcrossing of Route 1, included as part of the Highway 1 Soquel/Morrissey Auxiliary Lanes Project (construction completed in 2013).

[1] The overcrossing at Chanticleer is included in both the Tier I and Tier II Projects. The Tier I program of improvements encompasses the current Tier II Auxiliary Lane Project, which has been identified as the first phase of overall program of improvements.

- Reconstruction of bridges and addition of a merge lane in each direction between Highway 17 and the Morrissey/La Fonda area for the Highway 1/17 Merge Lanes Project (construction completed in 2008).
- Installation of median barrier on Route 1 from Freedom Boulevard to Rio Del Mar Boulevard.
- Installation of a Class 1 bicycle and pedestrian facility on Morrissey Boulevard over Highway 1.
- Implementation of single interchange improvements at 41st Avenue and Bay Avenue/Porter Avenue as detailed and expensed in the Highway 1 HOV Project (RTC 24) as a standalone project, if the RTC project does not proceed.

The No Build Alternative also includes planned improvements to roadways and roadsides on Rio Del Mar Boulevard from Esplanade to Route 1, which includes the addition of bike lanes, transit turnouts, left-turn pockets, merge lanes, and intersection improvements. Road work includes major rehabilitation and maintenance of road and roadsides.

S.5 Joint California Environmental Quality Act/National Environmental Policy Act Document

The proposed project is a joint project by the California Department of Transportation (Department) and the Federal Highway Administration and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act and the National Environmental Policy Act. The Federal Highway Administration is the lead agency under the National Environmental Policy Act. The Department is the lead agency under the California Environmental Quality Act.

Some impacts determined to be significant under the California Environmental Quality Act may not lead to a determination of significance under the National Environmental Policy Act. Because the National Environmental Policy Act is concerned with the significance of the project as a whole, quite often a "lower level" document is prepared for the National Environmental Policy Act. One of the most common joint document types is an Environmental Impact Report/Environmental Assessment (EIR/EA).

After receiving comments from the public and reviewing agencies, a Final EIR/EA will be prepared. The Department may prepare additional environmental and/or engineering studies to address comments. The Final EIR/EA will include responses to comments received on the Draft EIR/EA and will identify the preferred alternative. If the decision is made to approve the project, a Notice of Determination will be published for compliance with the California Environmental Quality Act, and the Federal Highway Administration will decide whether to issue a Finding of No Significant Impact (FONSI) or require an Environmental Impact

Statement (EIS) for compliance with the National Environmental Policy Act. A Notice of Availability (NOA) of the FONSI will be sent to the affected units of federal, state, and local government, and to the State Clearinghouse in compliance with Executive Order 12372.

S.6 Tiered Environmental Documents

As mentioned in the introduction of this section, tiering is a staged approach to satisfying the National Environmental Policy Act as described in the Council on Environmental Quality's *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act* (40 *Code of Federal Regulations* 1500 – 1508) and in Federal Highway Administration's *Environmental Impact and Related Procedures* (23 *Code of Federal Regulations* 771). Similarly, the California Environmental Quality Act provides for tiered or master Environmental Impact Statements (California Environmental Quality Act Guideline Sections 15175 – 15179.5). The Master Environmental Impact Report is intended to streamline later environmental review and evaluate to the greatest extent feasible cumulative impacts, growth-inducing impacts, and irreversible significant effects on the environment of subsequent projects. Specifically, California Environmental Quality Act Guidelines Section 15175 (b) (6) provides that a state highway project or mass transit project that will be subject to multiple stages of review or approval are appropriate for a Master Environmental Impact Report.

Tiering addresses broad programs and issues related to the entire corridor in the Tier I analysis. As specific projects within the corridor are ready for implementation, impacts of that action are evaluated in subsequent Tier II studies. The tiered process supports decision-making on issues that are ripe for decision and provides a means to preserve those decisions. The Tier I portion of this document provides fact-based analyses that supports informed decision making on the 8.9-mile corridor and discloses issues associated with the selection of a Tier I Corridor HOV Lane Alternative or Tier I Corridor TSM Alternative. Identification of a Tier I Corridor Alternative will not result directly in construction; however, it will provide the basis for decision makers to select a program of transportation improvements within the corridor.

The Tier II portion of the environmental document examines a project-level Auxiliary Lane Alternative and a No Build Alternative. The Tier II corridor segment is within the project limits of the Tier I corridor and would represent the first implementation phase of transportation improvements for the 8.9-mile corridor.

S.7 Project Impacts

The Tier I Corridor HOV Lane Alternative would provide congestion relief and encourage carpooling and transit use. Vehicles in the HOV lanes would travel in free-flow conditions in 2035, while mixed-flow traffic would experience improved speeds (still below free-flow conditions) and reductions in delay. Improved highway operations would support increased freeway-oriented bus services that would encourage new riders to use transit. The Tier I Corridor TSM Alternative is expected to produce incremental congestion relief by providing operational improvements and separating traffic movements entering and exiting the freeway from mainline traffic flow.

The project can generally be accomplished within the existing Caltrans highway right-of-way, but some additional right-of-way acquisition will be required. Widening would result in impacts both within and outside the existing right-of-way. The Project Development Team has incorporated a variety of design measures to reduce impacts in developing the preliminary design of the project, such as limiting widening to one side of the existing roadway, using retaining walls, and pursuing design exceptions for nonstandard inside shoulder and median widths.

Environmental impacts expected to occur under the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative would include visual changes; minor floodplain encroachments and increases in impervious surfaces and runoff; noise; impacts to natural communities that provide habitat for various species of concern; filling in wetlands and other waters of the United States under jurisdiction of the United States Army Corps of Engineers, the California Department of Fish and Wildlife, and the California Coastal Commission; and potential for impacts to Central California Coast steelhead, tidewater goby, and California red-legged frog. The Tier I Corridor HOV Lane Alternative would require displacement of businesses, residences, and parking.

Tables S-1 and S-2 summarize environmental impacts of the project to assist the reader in understanding and comparing the effects of the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative, respectively, on various resources. Both adverse and beneficial effects are listed, but issues for which impacts are minor or negligible are not included in the table. All impacts are addressed with avoidance, minimization, and/or mitigation measures for each potential impact in their respective sections of Chapter 2.

Coordination with Other Agencies

The proposed Tier I Corridor Alternatives will require coordination with the following agencies:

- U.S. Army Corps of Engineers
- U.S. Fish and Wildlife Service
- National Marine Fisheries Service
- California Department of Fish and Wildlife
- California Coastal Commission
- Regional Water Quality Control Board
- California Public Utilities Commission

- County of Santa Cruz
- City of Santa Cruz
- City of Capitola

The proposed Tier II Auxiliary Lane Alternative will require coordination with the following agencies:

- National Marine Fisheries Service
- California Department of Fish and Wildlife
- Regional Water Quality Control Board
- U.S. Army Corps of Engineers
- County of Santa Cruz

Permits and approvals may be required from some of the above agencies. A list of required permits and approvals is provided in Section 1.6, Permits and Approvals Needed.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Permanent Impacts			
Land Use	Would convert 1.8 acres from a range of land uses to transportation use.	Would convert 11.59 acres from a variety of land uses to transportation use.	No Impacts.
Consistency with State, Regional, and Local Plans	Project would be consistent with local planning goals and policies. This alternative would be less effective than the Tier I Corridor HOV Lane Alternative in encouraging use of alternative modes, and reducing through traffic on local streets.	Project would be consistent with local planning goals and policies. This alternative would be more effective than the Tier I Corridor TSM Alternative in encouraging use of alternative modes and reducing through traffic on local streets.	Implementation of the No Build Alternative would not support achievement of the local and regional goals aimed at improving the transportation system.
Coastal Zone	Tier I Corridor TSM Alternative is generally consistent with policies from the Santa Cruz County and City of Santa Cruz Local Coastal Programs. This alternative would preserve park and recreational land uses as stated in the Local Coastal Programs, and they would improve access to these resources by decreasing congestion and delay along Route 1. However, this alternative could result in policy inconsistencies related to the topics of scenic and visual resources, biological resources, wetland and creek protection, and historical resources.	Tier I Corridor HOV Lane Alternative is consistent with policies from the Santa Cruz County and City of Santa Cruz Local Coastal Programs. This alternative would preserve park and recreational land uses as stated in the Local Coastal Programs, and they would improve access to these resources by decreasing congestion and delay along Route 1. However, this alternative could result in policy inconsistencies related to the topics of scenic and visual resources, biological resources, wetland and creek protection, and historical resources.	The No Build Alternative would not be consistent with some coastal zone policies. Under this alternative, traffic conditions would continue to worsen along Route 1, which would not improve access to beaches or recreational land uses, as outline in the Local Coastal Programs.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact		Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Growth		Proposed project would serve existing growth already planned and projected for the corridor and is not likely to stimulate unplanned residential or related commercial growth.	Proposed project would serve existing growth already planned and projected for the corridor and is not likely to stimulate unplanned residential or related commercial growth.	No Impacts.
Community Character and Cohesion		The Tier I Corridor TSM Alternative would not causes adverse impacts on community character or cohesion. The communities and neighborhoods along Route 1 are already divided by a multi-lane highway. The addition of soundwalls and relocations that would be necessary would not further divide existing communities.	The Tier I Corridor HOV Lane Alternative would not causes adverse impacts on community character or cohesion. The communities and neighborhoods along Route 1 are already divided by a multi-lane highway. The addition of soundwalls and relocations that would be necessary would not further divide existing communities.	No Impacts.
Environmental Justice		Tier I Corridor TSM Alternative would not cause disproportionately high and adverse effects on any minority or low-income populations per Executive Order 12898 regarding Environmental Justice.	Tier I Corridor HOV Lane Alternative would not cause disproportionately high and adverse effects on any minority or low-income populations per Executive Order 12898 regarding Environmental Justice.	No Impacts.
Relocations	**Business**	No commercial establishments would be displaced.	12 business units displaced.	No Impacts.
	Residential	No residential units would be displaced.	8 residential units displaced.	
Utilities		110 utility lines would likely require relocation. Utility relocations may require short-term, limited interruptions of service. Coordination with providers would avoid unscheduled interruptions in service.	142 utility lines would likely require relocation. Utility relocations may require short-term, limited interruptions of service. Coordination with providers would avoid unscheduled interruptions in service.	No Impacts.
Emergency Services		Project would have potential for emergency service delays during construction. Tier I Corridor TSM Alternative would provide minimal benefits due to planned operational improvements on Route 1. Implementation of the Transportation	Project would have potential for emergency service delays during construction only. Tier I Corridor HOV Lane Alternative would increase the capacity of Route 1, allowing emergency services to better respond to emergencies while using Route 1.	No Impacts.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
	Management Plan in compliance with Caltrans and local policies would involve planning with emergency service providers throughout the project construction to avoid emergency service delays.	Implementation of the Transportation Management Plan in compliance with Caltrans and local policies would involve planning with emergency service providers throughout the project construction to avoid emergency service delays.	
Traffic and Transportation	Congestion and stop-and-go conditions would continue, but ramp metering and auxiliary lanes would enable Route 1 to serve more peak-period travel demand than under no-build conditions. Reduction in delay to 22 minutes northbound in the morning and 50 minutes southbound in the evening. During the morning peak hour, northbound travel time would be reduced by 42 percent, while southbound travel time would be reduced by 59 percent. During the evening peak hour, southbound travel time would increase by 2 percent, while the average travel speed would decrease by 9 percent. Densities in the traffic study area would improve slightly.	Adding HOV lanes, as well as ramp metering and auxiliary lanes, is expected to improve the ability of Route 1 to meet future travel demand within the study area. Reduction in delay to 6 minutes northbound in the morning and 9 minutes southbound in the evening. During the morning peak hour, northbound travel time would be reduced by 73 percent, while southbound travel time would be reduced by 59 percent. During the evening peak hour, southbound travel time would decrease by 69 percent, while the average travel speed would increase by 200 percent. Densities in the traffic study area would improve, reducing by more than 50 percent the average peak hour densities of mixed flow lanes in the dominant commute directions (northbound in the morning and southbound in the evening).	Heavily congested stop-and-go conditions with peak-direction delays of 48 to 49 minutes during peak periods with average speeds of 11 to 12 miles per hour in 2035. Congestion would extend beyond freeway onto ramps and local streets.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Pedestrian and Bicycle Facilities	New pedestrian/bicycle overcrossings at Trevethan, Chanticleer, and Mar Vista. Interchange improvements would make conditions more pedestrian and bicycle friendly.	New pedestrian/bicycle overcrossings at Trevethan Avenue, Chanticleer Avenue, and Mar Vista Drive. Interchange improvements would make conditions more pedestrian and bicycle friendly.	Some new bicycle facilities planned, but would have impacts to pedestrian and bicycle circulation from traffic congestion on local streets.
Transit	Capacity improvements and the deployment of Intelligent Transportation Systems technologies would provide slightly improved highway conditions that would benefit transit operations on Route 1 when compared to the No Build Alternative.	Project would have the potential to capture an additional 40 percent of latent express bus ridership. Long-term impacts on bus travel would generally be positive because of reduced traffic delay and travel times along Route 1 and at surrounding project area intersections and on parallel local streets.	All study intersections would operate at unacceptable levels of service. Travel conditions would depress transit ridership.
Parking	No parking impacts.	171 parking spaces removed from businesses that would remain.	No Impacts.
Visual/Aesthetics	Substantial visual changes would occur from the highway from the addition of auxiliary lanes; bridge widening; installation of pedestrian/bicycle overcrossings and reconstruction of existing ramps; new soundwalls and retaining walls; and removal of trees and mature vegetation.	Substantial visual changes from the highway would occur from the addition of HOV and auxiliary lanes; bridge widening; installation of pedestrian/bicycle overcrossings and reconstruction of existing ramps and interchange modifications; new soundwalls and retaining walls; and removal of trees and mature vegetation.	No Impacts.
Cultural Resources	The Tier I Corridor TSM Alternative may adversely affect portions of the three unevaluated archaeological sites and their potential buried archaeological deposits within the archaeological Area of Potential Effects.	The Tier I Corridor HOV Lane Alternative may adversely affect portions of the three unevaluated archaeological sites and their potential buried archaeological deposits within the archaeological Area of Potential Effects.	No Impacts.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Hydrology and Floodplain	Portions of the project site are located within the fringe of the 100-year floodplain into which the project would have a minor encroachment. A minor increase in impervious surface areas from the widened pavement areas would occur, resulting in minor increases to the peak amount of stormwater runoff. The TSM Alternative would have a lesser effect than the HOV Alternative on the natural and beneficial floodplain values at locations in which project elements encroach upon the 100-year floodplain.	Portions of the project site are located within the fringe of the 100-year floodplain into which the project would have an encroachment. The project would increase the amount of impervious surface, resulting in minor increases to the peak amount of stormwater runoff. The HOV Lane Alternative would have a greater effect than the TSM Alternative on the natural and beneficial floodplain values at locations in which project elements encroach upon the 100-year floodplain.	No Impacts.
Water Quality and Stormwater Runoff	For the Tier I Corridor TSM Alternative, the total proposed increase in impervious area throughout the entire project area is 22 total acres. Construction of future Tier II projects has a potential for temporary water quality impacts due to grading activities and removal of existing vegetation, and the potential for stormwater runoff to transport pollutants from the construction site to nearby creeks and storm drains if Best Management Practices are not properly implemented.	For the Tier I Corridor HOV Lane Alternative, the total proposed increase throughout the entire project area in impervious area is 64 total acres. Construction of future Tier II projects has a potential for temporary water quality impacts due to grading activities and removal of existing vegetation, and the potential for stormwater runoff to transport pollutants from the construction site to nearby creeks and storm drains if Best Management Practices are not properly implemented.	Permanent water quality impacts from roadway runoff due to worsening congestion, greater deposition of particulates from exhaust and heavy metals from braking.
Geology/Soils/Seismic/ Topography	There is low erosion potential, no new embankments are anticipated, and the project area is not expected to have any significant amounts of expansive soils. The primary seismic hazard is the potential for moderate to severe ground shaking from earthquakes, and the liquefaction and lateral spreading that could occur after an earthquake.	There is low erosion potential, no new embankments are anticipated, and the project area is not expected to have any significant amounts of expansive soils. The primary seismic hazard is the potential for moderate to severe ground shaking from earthquakes, and the liquefaction and lateral spreading that could occur after an earthquake.	No Impacts.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Hazardous Materials	Wooden utility poles along the roadside may be coated with creosote. Soils in these areas may contain aerially deposited lead generated by motor vehicle exhaust. Existing or acquired structures may have joint compound materials made of asbestos-containing materials. They may also contain lead-based paint or other hazardous materials and may exceed hazardous water criteria. These hazardous materials have the potential to result in the accidental release of hazardous waste and/or hazardous materials during construction of the project.	Wooden utility poles along the roadside may be coated with creosote. Soils in these areas may contain aerially deposited lead generated by motor vehicle exhaust. Existing or acquired structures may have joint compound materials made of asbestos-containing materials. They may also contain lead-based paint or other hazardous materials and may exceed hazardous water criteria. These hazardous materials have the potential to result in the accidental release of hazardous waste and/or hazardous materials during construction of the project.	No Impacts.
Air Quality	When 2035 conditions are compared with the 2003 baseline, the Tier I Corridor TSM Alternative would reduce emissions of the criteria pollutants other than sulfur oxides during peak hours, although it would have higher emissions of criteria pollutants than the No Build Alternative. In 2035 annual emissions would decrease under the Tier I TSM Alternative in comparison to baseline conditions (2003), but would increase when compared with the No-Build Alternative. Because the study area has not recently exceeded ambient air quality standards, it is unlikely that the standards would be exceeded in the future when total emissions are lower.	The Tier I Corridor HOV Lane Alternative would generally reduce emissions. In 2035, concentrations of all criteria pollutants would be substantially reduced in comparison with the 2003 baseline conditions. In comparison with the No-Build Alternative, annual emissions of all criteria pollutants would be reduced, although there would be a minor increase in peak emissions for certain criteria pollutants. Because the study area has not recently exceeded ambient air quality standards, it is unlikely that the standards would be exceeded in the future when total emissions are lower.	No Impacts.
Noise	108 noise receptors approach or exceed noise abatement criteria.	130 noise receptors approach or exceed noise abatement criteria.	No Impacts.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Energy	The Tier I Corridor TSM Alternative would have a minimal effect in reducing energy consumption.	Improvements in traffic operations under the Tier I Corridor HOV Lane Alternative would reduce operating energy use, whether in the form of petroleum fuels or alternative sources.	No Impacts.
Natural Communities	Permanent and temporary effects on the following natural communities located adjacent to proposed highway features are anticipated: Riverine/ Freshwater Marsh (0.30 acre), Riparian Forest (4.58 acres), Coast Live Oak Woodland (4.89 acres), Mixed Conifer Woodland (2.03 acres), Eucalyptus Woodland (0.28 acre) Coastal Scrub (0.87 acre), Annual Grassland (0.58 acre), Ruderal/Disturbed (3.61 acres), and Landscaped/Developed (43.64 acres).	Impacts to the same communities, but impact greater due to larger footprint: Riverine/Freshwater Marsh (1.08 acres), Riparian Forest (8.88 acres), Coast Live Oak Woodland (9.45 acres), Mixed Conifer Woodland (6.08 acres), Eucalyptus Woodland (1.02 acre) Coastal Scrub (2.76 acres), Annual Grassland (4.53 acres), Ruderal/Disturbed (13.31 acres), and Landscaped/Developed (104.67 acres).	No Impacts.
Wetlands and other Waters	Project would permanently impact 0.23 acre of U.S. Army Corps of Engineers wetlands, 0.10 acre of U.S. Army Corps of Engineers other waters, 2.20 acres under the jurisdiction of a Local Coastal Plan approved by the Coastal Commission, and 3.58 acres of California Department of Fish and Wildlife jurisdiction wetland area. Permanent impacts would result from changes in bank configuration, loss of riparian habitat associated with road widening and culvert extensions, realignment of existing roadways, and construction of new road sections.	Project would permanently impact 0.78 acre of U.S. Army Corps of Engineers wetlands, 0.15 acre of U.S. Army Corps of Engineers other waters, 3.22 acres under the jurisdiction of a Local Coastal Plan approved by the Coastal Commission, and 8.98 acres of California Department of Fish and Wildlife jurisdiction wetland area. Permanent impacts would result from similar activities and elements as described for the Tier I Corridor TSM Alternative.	No Impacts.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Special-Status Species	No permanent impacts on special-status plant species are anticipated; however, due to the long project timeframe, and despite the primarily urban or disturbed conditions present, there is a potential that special-status plant species could become established before project construction and additional floristic surveys will be required. The following special-status animal species could potentially be affected through streambed disturbance, encroachment upon suitable habitat, and tree removal: foothill yellow-legged frog, California red-legged frog, Santa Cruz long-toed salamander, California tiger salamander, western pond turtle, tidewater goby, central California coast steelhead, monarch butterfly, California linderiella, Cooper's hawk, tricolored blackbird, great blue heron, short-eared owl, burrowing owl, white-tailed kite, least Bell's vireo, pallid bat, hoary bat, roosting bats, American badger, and nesting birds protected under the Migratory Bird Treaty Act.	No permanent impacts on special-status plant species are anticipated; however, due to the long project timeframe and despite the primarily urban or disturbed conditions present, there is a potential that special-status plant species could become established before project construction and additional floristic surveys will be required. The same special-status animal species that may be affected by the Tier I Corridor TSM Alternative have the potential to be affected by the Tier I Corridor HOV Lane Alternative; however, in general, the HOV Lane Alternative would encroach upon a larger area of suitable habitat than the TSM Alternative.	No Impacts.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Threatened and Endangered Species	Permanent impacts to waters of the United States would result in permanent loss of habitat for tidewater goby, central California coast steelhead, and California red-legged frog. Section 7 consultation with the United States Fish and Wildlife Service and the National Marine Fisheries Service will be required. The project may affect, but is not likely to adversely affect California tiger salamander; however, Valencia Lagoon may provide marginal habitat for the species; additional surveys may be required if the project activities occur in this area. The project may affect, and is likely to adversely affect, Santa Cruz long-toed salamander. Consultation with the United States Fish and Wildlife Service would be required. Least Bell’s vireo, marsh sandwort, Monterey spineflower, robust spineflower, seaside bird’s beak, San Francisco popcorn flower, and Santa Cruz tarplant are unlikely to be affected by the project. Impacts to fully-protected white tail kite will be avoided.	Impacts could occur to the same threatened and endangered species as identified for the Tier I Corridor TSM Alternative; however, the Tier I Corridor HOV Lane Alternative project footprint is larger, and therefore would encroach upon a greater area of suitable habitat and has greater potential for impact to these species.	No Impacts.
Nesting Birds	Suitable habitat is present for several special-status bird species and nesting birds protected under the Migratory Bird Treaty Act. The removal of vegetation could affect nesting birds and their habitat.	Impacts could affect the same nesting bird species as identified for the Tier I Corridor TSM Alternative; however, the Tier I Corridor HOV Lane Alternative project footprint is larger, and therefore would encroach upon a greater area of suitable habitat than the TSM Alternative and has greater potential impacts on these species.	No Impacts.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Temporary, Construction Phase Impacts			
Traffic and Transportation/ Pedestrian and Bicycle Facilities	Short-term traffic disruptions in vicinity of Route 1 interchanges and traffic on the highway may be disrupted by trucks hauling materials and debris. Each construction stage would maintain both of the existing two lanes of traffic on Route 1 in each direction during daytime construction. Striping operations, traffic control set-up, installation of a storm drain crossing, asphalt pavement overlay, and short-term overcrossing falsework erection would occur at night using lane and mainline closures, as allowed on the closure charts that would be developed during the design phase. It is anticipated that future tiered projects under either of the Tier I Corridor Alternatives may require temporary closure of existing bicycle, transit, or pedestrian facilities at times, and may require temporary rerouting of transit service due to interchange work and ramp closures. Minor detours during short-term closures. During construction of ramp conforms, traffic would be diverted to next interchange. Some nighttime work would be required.	Similar impacts to Tier I TSM Alternative, but the impacts would occur for a greater duration due to the greater complexity of the HOV Lane Alternative.	No Impacts.
Utilities	The potential exists for construction activities to encounter unexpected utilities within the area of roadway improvements. In addition, utility relocations may require short-term, limited interruptions of service.	The potential exists for construction activities to encounter unexpected utilities within the area of roadway improvements. In addition, utility relocations may require short-term, limited interruptions of service.	No Impact.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Community Impacts	Construction impacts, including noise and fugitive dust from construction activities and short-term roadway closures requiring alternative traffic routing, would have greater effects on residents of the immediate project area than upon other Route 1 users. These effects would be experienced by ethnic minority and low-income individuals only to the extent that these populations are concentrated in the immediate project area. However, these effects would not fall disproportionately on ethnic minority and low-income individuals because all residents of the immediate project area would experience the same effects.	Construction impacts, including noise and fugitive dust from construction activities and short-term roadway closures requiring alternative traffic routing, would have greater effects on residents of the immediate project area than upon other Route 1 users. These effects would be experienced by ethnic minority and low-income individuals only to the extent that these populations are concentrated in the immediate project area. However, these effects would not fall disproportionately on ethnic minority and low-income individuals because all residents of the immediate project area would experience the same effects.	No Impact.
Visual/Aesthetics	Construction activities would involve use of equipment, stockpiling of soils and materials, and other visual signs of construction. Approximately 61 acres of existing vegetation would be cleared for construction, with 23 acres of that available for replanting.	Construction activities would involve use of equipment, stockpiling of soils and materials, and other visual signs of construction. Approximately 109 acres of existing vegetation would be cleared for construction and paving operations. Of the area cleared, approximately 65 acres would be available for replanting.	No Impacts.
Cultural Resources	No adverse effect to historic resources within the architectural Area of Potential Effects. Potential to adversely affect portions of the three unevaluated archaeological sites.	No adverse effect to historic resources within the architectural Area of Potential Effects. Potential to adversely affect portions of the three unevaluated archaeological sites.	No Impacts.
Hydrology, Water Quality, and Stormwater Runoff	Construction activities could result in temporary changes in water volume or flow and increased siltation, sedimentation, erosion, and water turbidity. There is a potential for temporary water quality impacts due to grading activities and removal of existing vegetation, which can cause	Construction activities could result in temporary changes in water volume or flow and increased siltation, sedimentation, erosion, and water turbidity. There is a potential for temporary water quality impacts due to grading activities and removal of existing vegetation, which can cause increased erosion.	No Impacts.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
	increased erosion. Stormwater runoff from the project site may transport pollutants to nearby creeks and storm drains if Best Management Practices are not properly implemented.	Stormwater runoff from the project site may transport pollutants to nearby creeks and storm drains if Best Management Practices are not properly implemented.	
Paleontology	High potential for fossil remains that could be scientifically important to be uncovered by excavations during project construction.	High potential for fossil remains that could be scientifically important to be uncovered by excavations during project construction. The potential for paleontological impacts is greater under this alternative.	No Impacts.
Hazardous Waste/ Materials	Wooden utility poles along the roadside may be coated with creosote. Soils in these areas may contain aerially deposited lead generated by motor vehicle exhaust. Existing or acquired structures may have joint compound materials made of asbestos-containing materials. They may also contain lead-based paint or other hazardous materials and may exceed hazardous water criteria. These hazardous materials have the potential to result in the accidental release of hazardous waste and/or hazardous materials during construction of the project.	Wooden utility poles along the roadside may be coated with creosote. Soils in these areas may contain aerially deposited lead generated by motor vehicle exhaust. Existing or acquired structures may have joint compound materials made of asbestos-containing materials. They may also contain lead-based paint or other hazardous materials and may exceed hazardous water criteria. These hazardous materials have the potential to result in the accidental release of hazardous waste and/or hazardous materials during construction of the project.	No Impacts.
Air Quality	Short-term degradation of air quality may occur due to the release of particulate emissions (i.e., airborne dust) generated by excavation, grading, hauling, and various other activities related to construction. Emissions from construction equipment are also anticipated and would include carbon monoxide, nitrogen oxides, volatile organic compounds, directly emitted particulate matter (PM_{10} and $PM_{2.5}$), and toxic air contaminants such as diesel	Same as Tier I Corridor TSM Alternative.	No Impacts

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
	exhaust particulate matter.		
Noise	No adverse noise impacts because construction would be conducted in accordance with Caltrans Standard Specifications, would be short-term and intermittent, and would be dominated by local traffic noise.	No adverse noise impacts because construction would be conducted in accordance with Caltrans Standard Specifications, would be short-term and intermittent, and would be dominated by local traffic noise.	No Impacts.
Natural Communities	Permanent and temporary effects on the following natural communities located adjacent to proposed highway features are anticipated: Riverine/ Freshwater Marsh (0.30 acre), Riparian Forest (4.58 acres), Coast Live Oak Woodland (4.89 acres), Mixed Conifer Woodland (2.03 acres), Eucalyptus Woodland (0.28 acre) Coastal Scrub (0.87 acre), Annual Grassland (0.58 acre), Ruderal/Disturbed (3.61 acres), and Landscaped/Developed (43.64 acres).	Impacts to the same communities, but impact greater due to larger footprint: Riverine/Freshwater Marsh (1.08 acres), Riparian Forest (8.88 acres), Coast Live Oak Woodland (9.45 acres), Mixed Conifer Woodland (6.08 acres), Eucalyptus Woodland (1.02 acres) Coastal Scrub (2.76 acres), Annual Grassland (4.53 acres), Ruderal/Disturbed (13.31 acres), and Landscaped/Developed (104.67 acres).	No Impacts.
Wetlands and other Waters	Project would temporarily impact 0.03 acre of U.S. Army Corps of Engineers wetlands, 0.02 acre of U.S. Army Corps of Engineers other waters, 0.33 acre under the jurisdiction of a Local Coastal Plan approved by the Coastal Commission, and 0.95 acre of California Department of Fish and Wildlife jurisdiction wetland area. Temporary impacts would result from stream diversion installation and removal, streambed disturbance during culvert removal and replacement, removal and reconstruction of roadside ditches, vegetation removal, and road construction.	Project would temporarily impact 0.22 acre of U.S. Army Corps of Engineers wetlands, 0.10 acre of U.S. Army Corps of Engineers other waters, 0.46 acre under the jurisdiction of a Local Coastal Plan approved by the Coastal Commission, and 1.41 acres of California Department of Fish and Wildlife jurisdiction wetland area. Temporary impacts would result from similar activities and elements as described for the Tier I Corridor TSM Alternative.	No Impacts.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
Special-Status Species	The following special-status species could be affected by the aforementioned construction impacts: foothill yellow-legged frog, California red-legged frog, Santa Cruz long-toed salamander, California tiger salamander, western pond turtle, tidewater goby, Central California Coast steelhead, monarch butterfly, California linderiella, Cooper's hawk, Tricolored blackbird, great blue heron, short-eared owl, burrowing owl, white-tailed kite, Least Bell's vireo, pallid bat, hoary bat, roosting bats, American badger, and nesting birds.	The same construction period impacts to special-status species identified for the Tier I Corridor TSM Alternative would result, although the project footprint is larger and there could be a greater area of impacted habitat and potentially greater impacts on these species.	No Impacts.
Threatened and Endangered Species	Construction noise and movements of workers could disturb bird nesting or bat roosting. Temporary dewatering/diversion of streams could interrupt passage for fish and amphibians. Removal of mature trees could affect nesting birds. The following special-status species could potentially be affected by the aforementioned construction impacts: tidewater goby, Central California Coast steelhead, and California red-legged frog. Section 7 consultation with the United States Fish and Wildlife Service and the National Marine Fisheries Service will be required. The project may affect, and is likely to adversely affect, the Santa Cruz long-toed salamander. Consultation with the U.S. Fish and Wildlife Service would be required. The removal of vegetation and/or the removal of nests could directly impact the white-tailed	The same construction period impacts to special-status species identified for the Tier I Corridor TSM Alternative would result, although the project footprint is larger and there could be a greater area of impacted habitat and potentially greater impacts on these species.	No Impacts.

Table S-1: Summary of Environmental Impacts Tier I Corridor Alternatives

Potential Impact	Tier I Corridor TSM Alternative	Tier I Corridor HOV Lane Alternative	No Build Alternative
	kite. Least Bell's vireo, marsh sandwort, Monterey spineflower, robust spineflower, seaside bird's beak, San Francisco popcorn flower, and Santa Cruz tarplant are unlikely to be affected by the project.		
Nesting Birds	The removal of vegetation and/or the removal of nests could directly affect nests and any eggs or young residing in nests of birds protected under the Migratory Bird Treaty Act. Because birds can be sensitive to noise disturbance, indirect impacts could also result from noise and disturbance associated with construction, which could alter perching, foraging, and/or nesting behaviors.	The same construction period impacts to nesting bird species identified for the Tier I Corridor TSM Alternative would result, although the project footprint is larger and there could be a greater area of impacted habitat and potentially greater impacts on these species.	No Impacts.

Table S-2: Summary of Environmental Impacts Tier II Auxiliary Lane Alternative

Potential Impact		Tier II Auxiliary Lane Alternative	No Build Alternative
Permanent Impacts			
Land Use		Would convert 0.33 acre of land to transportation use.	No Impacts.
Consistency with State, Regional, and Local Plans		Project would be consistent with local planning goals and policies.	Implementation of the No Build Alternative would not support achievement of the local and regional goals aimed at improving the transportation system.
Coastal Zone		The Tier II project is located outside of coastal zone jurisdiction; no coastal zone determinations will be required.	Project area is outside of Coastal Zone. No Impacts.
Growth		The growth impacts under the Tier II Auxiliary Lane Alternative would be less than significant because there are fewer benefits under this alternative as compared to the Tier I Corridor Alternatives.	No Impacts.
Community Character and Cohesion		The Tier II project would not causes adverse impacts on community character or cohesion. The communities and neighborhoods along Route 1 are already divided by a multi-lane highway. The addition of a soundwall would not further divide existing communities.	No Impacts.
Environmental Justice		Tier II Auxiliary Lane Alternative would not cause disproportionately high and adverse effects on any minority or low-income populations per Executive Order 12898 regarding Environmental Justice.	No Impacts.
Relocations	**Business**	No relocations.	No Impacts.
	Residential	No relocations.	No Impacts.
Utilities		Fifteen utility lines would likely require relocation. Utility relocations may require short-term, limited interruptions of service. Potential for emergency service delays during construction. Coordination with providers would avoid unscheduled interruptions in service.	No Impacts.

Table S-2: Summary of Environmental Impacts Tier II Auxiliary Lane Alternative

Potential Impact	Tier II Auxiliary Lane Alternative	No Build Alternative
Emergency Services	Would improve the functionality of Route 1 within this segment, allowing emergency service providers to improve response times.	No Impacts.
Traffic and Transportation	The addition of auxiliary lanes on Route 1 between Soquel Avenue and 41st Avenue would improve the ability of Route 1 to meet future demand within the traffic study area. When compared to the No Build Alternative, traffic conditions would improve substantially in the northbound direction during the morning peak hour and marginally in the reverse commute directions (southbound in the morning peak hour and northbound in the evening peak hour); however, additional traffic along with the already-congested conditions in the southbound direction during the evening peak hour would lead to a slight decline in traffic operating condition.	No improvements would occur on the facility, resulting in worsening traffic conditions.
Pedestrian and Bicycle Facilities	The new pedestrian and bicycle overcrossing at Chanticleer Avenue would have a positive impact on multimodal connectivity by providing a new dedicated crossing of the freeway between Soquel Avenue and 41st Avenue.	No improvements would occur on the facility, resulting in worsening traffic conditions.
Parking	No parking impacts.	No Impacts.
Transit	Incremental relief would be provided for transit due to improvement of highway operations under the Tier II Auxiliary Lane Alternative.	Travel conditions would continue to deteriorate on Route 1, which could negatively affect transit ridership.
Visual/Aesthetics	Substantial visual changes from highway widening/addition of lanes and removal of trees and mature vegetation, as well as increase in hardscape such as pavement, overcrossing structure and walls.	No Impacts.
Cultural Resources	No anticipated adverse effect to historic or archaeological resources.	No Impacts.
Hydrology and Floodplain	Increases in the amount of impervious surface would occur, resulting in a corresponding increase in the amount of stormwater runoff. The Tier II Auxiliary Lane Alternative would not result in any encroachment into any area of 100-year floodplain and therefore would not affect natural and beneficial floodplain values.	No Impacts.

Table S-2: Summary of Environmental Impacts Tier II Auxiliary Lane Alternative

Potential Impact	Tier II Auxiliary Lane Alternative	No Build Alternative
Water Quality and Stormwater Runoff	The Tier II Auxiliary Lane Alternative would increase the impervious area by 4.89 acres. This additional impervious surface would increase the volume of highway runoff that enters the storm drain system and local creeks.	No new impervious surface would be added; however the worsening of highway congestion could result in greater deposition of particulates from exhaust and heavy metals from braking, which would be transported by runoff into receiving water bodies.
Geology/Soils/Seismic/ Topography	There is low erosion potential, low potential for landslides, no new embankments are anticipated, and the project area is not expected to have any significant amounts of expansive soils.	No Impacts.
Hazardous Materials	See construction impact for Tier II Auxiliary Lane Alternative below.	No Impacts.
Air Quality	Because the relationship between emissions factors and speeds varies for each pollutant, the reductions in congestion that would occur under the Tier II Auxiliary Lane Alternative, described above under Traffic and Transportation, may correspond to reduced emissions for some criteria pollutants and increases for other criteria pollutants. Reduced congestion corresponds to reductions in the amount of acceleration and deceleration associated with "stop-and-go" traffic conditions,	No Impacts.
Noise	Seven receivers approach noise abatement criteria for which it has been determined that abatement in the form of soundwalls is feasible but not reasonable and is therefore not recommended. Abatement in the form of noise insulation is recommended for the one residence that will realize a severe noise increase.	No Impacts.
Energy	The Tier II Auxiliary Lane Alternative would have a minimal effect in reducing energy consumption because improvements proposed under this alternative would not entirely relieve traffic congestion.	No Impacts.

Table S-2: Summary of Environmental Impacts Tier II Auxiliary Lane Alternative

Potential Impact	Tier II Auxiliary Lane Alternative	No Build Alternative
Natural Communities	Permanent effects to the following natural communities would occur: Riverine/ Freshwater Marsh (0.02 acre), Riparian Forest (0.13 acre), Coast Live Oak Woodland (0.001 acre), Ruderal/Disturbed (0.19 acre) and Landscaped/ Developed communities (5.55 acres).	No Impacts.
Wetlands and other Waters	Project would permanently impact 0.02 acre of U.S. Army Corps of Engineers other waters at the ditch adjacent to the Soquel Drive-In, and 0.15 acre of California Department of Fish and Wildlife jurisdiction wetland area at Rodeo Creek Gulch and the ditch adjacent to the Soquel Drive-In. Proposed permanent and temporary impact areas at the ditch adjacent to the Soquel Drive-In consist of roadway widening and retaining wall construction that would encroach into the active channel of this seasonal roadside ditch. Proposed permanent and temporary impact areas at the Rodeo Creek Gulch consist of roadway widening and retaining wall construction on existing road berm areas directly above and draining into the channel of Rodeo Creek Gulch. No project work is proposed in the active channel.	No Impacts.
Special-Status Species	No impacts on special-status plant species are anticipated; however, there is a potential that special-status species could become established before project construction and additional surveys will be conducted prior to the final environmental document to confirm presence or absence of special-status plant species. Potential impacts to California red-legged frog and tidewater goby could result, as discussed under Threatened and Endangered Species. This alternative also has the potential to affect foothill yellow-legged frog, western pond turtle, roosting bats and nesting birds.	No Impacts.
Threatened and Endangered Species	Permanent impacts to California red-legged frog could occur due to habitat loss at Rodeo Creek Gulch and the ditch adjacent to the Soquel Drive-In. Potential impacts to tidewater goby would occur due to habitat loss at Rodeo Creek Gulch. Section 7 consultation with the United States Fish and Wildlife Service will be required for these species. The riparian forest habitat associated with Rodeo Creek Gulch also provides potential nesting habitat for a variety of bird species protected under the Migratory Bird Treaty Act.	No Impacts.

Table S-2: Summary of Environmental Impacts Tier II Auxiliary Lane Alternative

Potential Impact	Tier II Auxiliary Lane Alternative	No Build Alternative
Nesting Birds	Suitable habitat is present for several special-status bird species. The removal of vegetation could affect nesting birds and their habitat.	No Impacts.
Temporary, Construction Phase Impacts		
Traffic and Transportation/ Pedestrian and Bicycle Facilities	Short term and intermittent delays in traffic due to construction. Bicycle and pedestrian access to be maintained.	No Impacts.
Utilities	The potential exists for construction activities to encounter unexpected utilities within the area of roadway improvements. In addition, utility relocations may require short-term, limited interruptions of service.	No Impacts.
Community Impacts	Construction impacts, including noise and fugitive dust from construction activities and short-term roadway closures requiring alternative traffic routing, would have greater effects on residents of the immediate project area than upon other Route 1 users. These effects would be experienced by ethnic minority and low-income individuals only to the extent that these populations are concentrated in the immediate project area. However, these effects would not fall disproportionately on ethnic minority and low-income individuals because all residents of the immediate project area would experience the same effects.	No Impacts.
Visual/Aesthetics	Construction activities would involve use of equipment, stockpiling of soils and materials, and other visual signs of construction. Approximately 9.3 acres of existing vegetation within the highway corridor would be removed by construction activities. Of these, approximately 3 acres would be available for replanting.	No Impacts.
Hydrology, Water Quality and Stormwater Runoff	Construction activities under the Tier II Auxiliary Lane Alternative could result in temporary changes in water volume or flow and increased siltation, sedimentation, erosion, and water turbidity from bankside activities and construction access. There is a 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 Best Management Practices are not properly implemented.	No Impacts.

Table S-2: Summary of Environmental Impacts Tier II Auxiliary Lane Alternative

Potential Impact	Tier II Auxiliary Lane Alternative	No Build Alternative
Paleontology	High potential for fossil remains that could be scientifically important to be uncovered by excavations during project construction.	No Impacts.
Hazardous Waste/ Materials	Wooden utility poles along the roadside may be coated with creosote. Soils in these areas may contain aerially deposited lead generated by motor vehicle exhaust. Existing or acquired structures may have joint compound materials made of asbestos-containing materials. They may also contain lead-based paint or other hazardous materials and may exceed hazardous water criteria. These hazardous materials have the potential to result in the accidental release of hazardous waste and/or hazardous materials during construction of the project. In addition, there are 14 Recognized Environmental Conditions sites.	No Impacts.
Air Quality	Short-term degradation of air quality may occur due to the release of particulate emissions (i.e., airborne dust) generated by excavation, grading, hauling, and various other activities related to construction. Emissions from construction equipment are also anticipated and would include carbon monoxide, nitrogen oxides, volatile organic compounds, directly emitted particulate matter (PM_{10} and $PM_{2.5}$), and toxic air contaminants such as diesel exhaust particulate matter.	No Impacts.
Emergency Services	Project would have the potential for emergency service delays during construction. Implementation of the Traffic Management Plan in compliance with Caltrans and local policies would involve planning with emergency service providers throughout the project construction to avoid emergency service delays.	No Impacts.
Noise	There would be short-term and intermittent increases in noise levels due to construction activities.	No Impacts.
Natural Communities	Temporary effects to the following natural communities would occur: Riverine/ Freshwater Marsh (0.06 acre), Riparian Forest (0.09 acre), Coast Live Oak Woodland (0.12 acre), Ruderal/Disturbed (0.07 acre) and Landscaped/Developed communities (5.22 acres).	No Impacts.

Table S-2: Summary of Environmental Impacts Tier II Auxiliary Lane Alternative

Potential Impact	Tier II Auxiliary Lane Alternative	No Build Alternative
Wetlands and other Waters	Project would temporarily impact 0.06 acre of United States Army Corps of Engineers other waters at the ditch adjacent to the Soquel Drive-In, and 0.15 acre of California Department of Fish and Wildlife jurisdiction wetland area at Rodeo Creek Gulch and the ditch adjacent to the Soquel Drive-In. Proposed permanent and temporary impact areas at the ditch adjacent to the Soquel Drive-In consist of roadway widening and retaining wall construction that would encroach into the active channel of this seasonal roadside ditch. Proposed permanent and temporary impact areas at the Rodeo Creek Gulch consist of roadway widening and retaining wall construction on existing road berm areas directly above and draining into the channel of Rodeo Creek Gulch. No construction work is proposed in the active channel.	No Impacts.
Special-Status Species	Construction noise, movement of workers, and tree/vegetation removal could disturb nesting birds. Construction activities at the ditch adjacent to the Soquel Drive-In and Rodeo Creek Gulch have the potential to affect tidewater goby and California red-legged frog. This alternative also has the potential to affect foothill yellow-legged frog, western pond turtle, roosting bats, and nesting birds.	No Impacts.
Threatened and Endangered Species	Construction noise, movement of workers, and tree/vegetation removal could disturb nesting birds. Construction activities at the ditch adjacent to the Soquel Drive-In and Rodeo Creek Gulch have the potential to affect tidewater goby and California red-legged frog. Potential Impacts to the California red legged frog and tidewater goby will require consultation with the United States Fish and Wildlife Service. The riparian forest habitat associated with Rodeo Creek Gulch also provides potential nesting habitat for a variety of bird species protected under the Migratory Bird Treaty Act.	No Impacts.
Nesting Birds	The removal of vegetation and/or the removal of nests could directly affect nests and any eggs or young residing in nests of birds protected under the Migratory Bird Treaty Act. As birds can be sensitive to noise disturbance, indirect impacts could also result from noise and disturbance associated with construction, which could alter perching, foraging, and/or nesting behaviors.	No Impacts.

Chapter 1 Proposed Project

1.1 Introduction

The California Department of Transportation (Caltrans or the Department), in cooperation with the Federal Highway Administration and the Santa Cruz County Regional Transportation Commission (RTC), proposes to improve State Route 1 (Route 1) in Santa Cruz County. This project is divided into two components: the Tier I component from approximately 0.4 mile south of the San Andreas-Larkin Valley Road interchange to 0.3 mile north of the Morrissey Boulevard interchange, a distance of approximately 8.9 miles; and the Tier II component from 41st Avenue to Soquel Avenue/Drive, approximately 1.4 miles long. Both the proposed Tier I and Tier II components are included in RTC's Highway 1 Corridor Investment Program, a program of funding for corridor improvements that RTC seeks to implement over time as funding becomes available.

1.1.1 Project Background

This stretch of Route 1 is subject to recurrent congestion that affects highway operations, such as difficulties entering the Route 1 mainline from on-ramps and exiting to off-ramps. Proposed improvements under consideration consist of long range (Tier I) and near-term (Tier II) improvements including the following major features: mainline high-occupancy vehicle (HOV) lanes, HOV on-ramp bypass lanes, reconstructed bridges and interchanges, auxiliary lanes, and pedestrian and bicycle overcrossings.

The Federal Highway Administration is the Federal Lead Agency for the project under the National Environmental Policy Act, and Caltrans is the State Lead Agency under the California Environmental Quality Act.

This project has been evaluated as a combined Tier I/Tier II Draft Environmental Impact Report/Environmental Assessment (Tier I/II DEIR/EA). Tiering or tiered environmental review is a streamlining tool for environmental review, under both state and federal law. This process allows agencies to conduct environmental review of large projects that will be phased in over an extended period of time. Three Tier I Corridor Alternatives are evaluated in the DEIR/EA: a Tier I Corridor HOV Lane Alternative, a Tier I Corridor Transportation System Management (TSM) Alternative, and a No Build Alternative. The project limits of the Tier I corridor extend from south of the San Andreas/Larkin Valley Road interchange to north of the Morrissey Boulevard interchange, a distance of approximately 8.9 miles.

The Tier I corridor portion of this environmental document analyzes the reasonably foreseeable environmental impacts of the ultimate construction and operation of those alternatives under consideration within the study corridor at a master-plan level. As portions of the Tier I project are ultimately programmed for design and construction, they will become Tier II projects and will be analyzed in separate Tier II environmental documents. The tiered approach is being used for the corridor because it is anticipated that funding to implement transportation improvements within the corridor will occur over a multiyear time frame.

The DEIR/EA also analyzes a Tier II project-level Auxiliary Lane Alternative and a No Build Alternative between 41st Avenue and Soquel Avenue/Drive within the larger project corridor. Unlike the Tier I Corridor Alternatives discussed above, it is anticipated that construction of the Tier II Auxiliary Lane Alternative would begin in 2019.

Route 1 is a statutorily identified route on California's Interregional Road System, which emphasizes goods movement. Caltrans' Interregional Transportation Strategic Plan identifies Route 1 as a High Emphasis Route from the Carmel Bridge in Monterey County to Route 17 in Santa Cruz County. A High Emphasis Route is a subset of roadways within the Interregional Road System that is accorded additional consideration when establishing funding priorities because they connect major economic centers. The proposed Tier II project is financially constrained in the RTC's Santa Cruz County 2014 Regional Transportation Plan. This proposed project is programmed for engineering and right-of-way in the State and Regional Transportation Improvement Programs.

Route 1 is the primary route connecting communities in the southern and central areas of Santa Cruz County and is the only continuous commuter route linking Watsonville, Capitola, Aptos, Cabrillo College, Santa Cruz, and the University of California at Santa Cruz. Approximately 25 percent of commuters using Route 1 continue on Route 17 to jobs in Santa Clara County. Route 1 is also the southern terminus for State Routes 9 and 17, which bring heavy tourist traffic to coastal destinations in Santa Cruz and Monterey counties.

1.1.2 Project Funding

The Santa Cruz Route 1 HOV Lane Project is included in the 2014 Regional Transportation Plan as a financially unconstrained project, reflecting RTC's long-term commitment to this (Tier I) project.

As noted in the Regional Transportation Plan, "unconstrained" projects are those that cannot be implemented over the next 22 years unless there are significant changes in the amount of local, state, and federal funding available for transportation. To facilitate implementation of the Tier I project over time, the RTP also identifies separate phases that are shown in the Project Implementation Plan. Consistent with this approach, the Tier I/II DEIR/EA allows RTC to make incremental improvements in the corridor as future funding opportunities allow.

Tier I – Funding Scenarios for Incremental Development of the Route 1 Corridor

Projections of available future funding for transportation projects are very difficult to make given uncertainties associated with state and federal legislation and economic conditions. With the tiered environmental approach, the Tier I/II DEIR/EA will be used as a planning-level study of cumulative impacts from which smaller future projects may be identified and analyzed consistent with available resources. Following is an overview of potential revenue sources projected over a 25-year period for incremental implementation of the Tier I Capital Investment Program for the Route 1 corridor.

Existing Revenue Sources

This projection is based on historical revenues from funding sources currently available. California State Transportation Improvement Program funds, made up primarily of revenues from the State excise tax on gasoline, are generally considered most appropriate for larger, regional projects on the state highway system. State Transportation Improvement Program funds are programmed every 2 years and can vary from $3 million to $5 million per year, which means that over 25 years (approximately 12 State Transportation Improvement Program cycles), this source would yield approximately $75 million to $125 million (unescalated).

The RTC has also historically received $2.5 million to $3 million annually in federal Regional Surface Transportation Program funds. These funds are more flexible than State Transportation Improvement Program funds and have traditionally been applied to a wide range of project types, including local road improvements, bike and pedestrian projects, state highway projects, and rail and transit projects. Because the demand on these funds is great and not likely to diminish soon, this scenario assumes that no Regional Surface Transportation Program funds will be directed to any Tier II projects on the Route 1 corridor.

Local Sales Tax and other Revenue Generating Measures

In November 2004, RTC sponsored a local ½-cent sales tax ballot measure dedicated to certain transportation projects. That measure failed to get the 2/3 majority vote needed to pass. In 2007, RTC sponsored outreach efforts to generate community support for another sales tax measure, but in early 2008, those plans were put on hold due to a weakening economy. The RTC is monitoring legislative proposals to lower the voter threshold to 55 percent for new local revenues, including vehicle registration fees and sales tax measures to address the backlog of transportation needs in Santa Cruz County, as was done successfully for education purposes. For this discussion, it is assumed that this measure will be taken to the voters in 2016. Based on past polling of likely county voters, the expenditure plan for such a measure would include a mix of transportation projects and programs to gain sufficient broad-based voter support. For this analysis only, a future hypothetical expenditure plan would include some funds for Route 1.

A ½-cent sales tax in Santa Cruz County would currently generate approximately $15 million annually. Although this amount might grow with inflation, so would the costs for projects and programs. For simplicity, this analysis does not include inflation in this estimate or assume any economic growth. If one-third of revenues from the measure were dedicated to Route 1, available funds would be $5 million per year, or $125 million over a 25-year period. This revenue is added to the estimated yield from the State Transportation Improvement Program ($75 million to $125 million), resulting in a total of approximately $200 million to $250 million available for incremental development of the Capital Investment Program for the Route 1 corridor.

Other potential local revenue sources include a vehicle registration fee, which might generate approximately $2.3 million per year, and a regional traffic impact fee, which might generate $4 million annually.

Other Potential Funding

From time to time, opportunities arise to fund projects that are essentially "one-time" events. California Proposition 1B, passed in 2006, is an example that provided $4.5 billion in funding for transportation projects statewide that could be delivered quickly, including $13.8 million from the Proposition 1B Corridor Mobility Improvement Account for the Highway 1 Soquel/Morrissey Auxiliary Lanes Project, construction of which was completed in December 2013. Another example includes federal sources such as the American Recovery and Reinvestment Act of 2009, which provided more than $12 million for transportation projects in Santa Cruz County. Additionally, federal earmarks and special grant programs have historically provided funds for highway projects nationwide.

Tier II – Funding for Route 1 41st Avenue/Soquel Avenue Auxiliary Lanes and Chanticleer Overcrossing Project

In December 2011, RTC designated $4 million of the region's share of 2012 State Transportation Improvement Program funds for final design and right-of-way phases of the Tier II Route 1 41st Avenue/Soquel Avenue Auxiliary Lanes and Chanticleer Overcrossing Project, subsequently approved by the California Transportation Commission in the adopted 2012 State Transportation Improvement Program. Work on the final design and right-of-way phase of the project development process is anticipated to begin in 2017, following state and federal approval of the Tier I/II DEIR/EA, and is anticipated to take 1-year to complete.

Funding the construction phase of the Tier II project will be considered by RTC in forthcoming funding cycles. Preliminary construction cost estimates for the Tier II project total approximately $23 million, including right-of-way, utilities, design support (plans, specifications and estimates), and construction management and support. Given the historic level of transportation revenue streams summarized above, it may be necessary to build the

Tier II project in phases. Below is a breakout of the Tier II project into individual elements and preliminary cost estimates.

Tier II Project Elements	Construction (includes management and support)
Northbound Auxiliary Lane between 41st Avenue and Soquel Avenue	$11,000,000
Southbound Auxiliary Lane between 41st Avenue and Soquel Avenue	$7,000,000
Pedestrian Overcrossing of Route 1 at Chanticleer Avenue	$5,000,000
Estimated Total	**$23,000,000**

To minimize impacts to existing local roads adjacent to the State Highway System in the project area, it would be necessary to shift the centerline of Route 1 to the north as part of construction of the Tier II project. Accordingly, the northbound auxiliary lane must be included in any phased project development effort. The other Tier II project elements would be included as funding allows, in order to realize an economy of scale in the construction effort and to minimize disruption to motorists and the surrounding community inherent in a multiphase construction program. Construction is anticipated to begin in FY18/19.

1.1.3 Project Phasing

Tier I Corridor Alternatives

The prioritization of Tier I improvements or project phasing will be performed separately for freeway and interchange improvements based on their potential to relieve congestion and minimize or avoid traffic hot spots within the project corridor. As currently planned, the following are the primary elements of the phased improvements under a limited funding scenario:

1. Construct pedestrian overcrossings and auxiliary lanes in phases, including limited ramp improvements and replacement of the Santa Cruz Branch Rail Line, Aptos Creek and Capitola Avenue Bridges. The widening to accommodate auxiliary lanes would be to the outside to be consistent with the Tier I corridor project alternatives considered in this environmental document.
2. Construct full interchange improvements, including widening of local roadways and interchange structures.
3. Construct new median HOV lanes if the Tier I Corridor HOV Lane Alternative is selected for the Route 1 Corridor.

The improvements listed above will be prioritized based on traffic operational conditions; therefore, the timetable for improvements within the study corridor will be established based on estimated delay, queuing, vehicle miles traveled along the corridor, and available funding to implement the projects.

Tier II Auxiliary Lane Alternative

In April 2010, a traffic operations analysis was performed to prioritize the auxiliary lane improvements for funding and construction, independent of the preferred alternative that is selected for the Tier I corridor based on the potential to relieve congestion and at the same time minimize “hot spots” along the corridor. Each auxiliary lane reach was analyzed independently, and 10 Measures of Effectiveness were compared. It was determined that construction of auxiliary lanes between 41st Avenue and Soquel Drive would provide an effective benefit.

1.1.4 Construction Cost Estimates

Tier I Corridor Alternatives

Planning level construction and right-of-way cost estimates for the Tier I Corridor Alternatives are $400 million for the HOV Lanes Alternative and $170 million for the TSM Alternative. Typically, project development costs (environmental documentation, final design engineering, right-of-way administration, and construction management) would be an additional 40 to 45 percent of the estimated construction cost.

Tier II Auxiliary Lane Alternative

The preliminary capital construction cost estimate (excluding design support and construction management and support) for the Tier II Auxiliary Lane Alternative is $17.9 million, which includes $1.3 million of right-of-way and utilities costs. The estimated capital construction cost (including right-of-way and utilities) for the northbound auxiliary lanes between 41st Avenue and Soquel Drive is $8.5 million, the southbound auxiliary lanes between 41st Avenue and Soquel Drive is $5.0 million, and the Chanticleer Avenue pedestrian overcrossing is $4.4 million.

1.1.5 Independent Utility and Logical Termini

The portion of Route 1 that is studied in the Tier I/II DEIR/EA is an area of high congestion due to the high volume of commuter, tourist, and goods movement traffic. Within the study corridor, many motorists are also using Route 1 to gain access to Route 9 and Route 17, which both have their southern termini immediately west of the project corridor. Roadway features within the study area include nine interchanges and two roadway overcrossings.

The Tier I project provides logical termini by identifying a program of transportation improvements for the entire 8.9-mile long corridor that is subject to congested conditions. The study corridor is of sufficient length and the analysis of sufficient rigor to identify the major environmental issues stemming from the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative. The proposed transportation improvements are long range and comprehensive, such that if implemented, they can function without additional transportation investment beyond that proposed in the Tier I/II DEIR/EA.

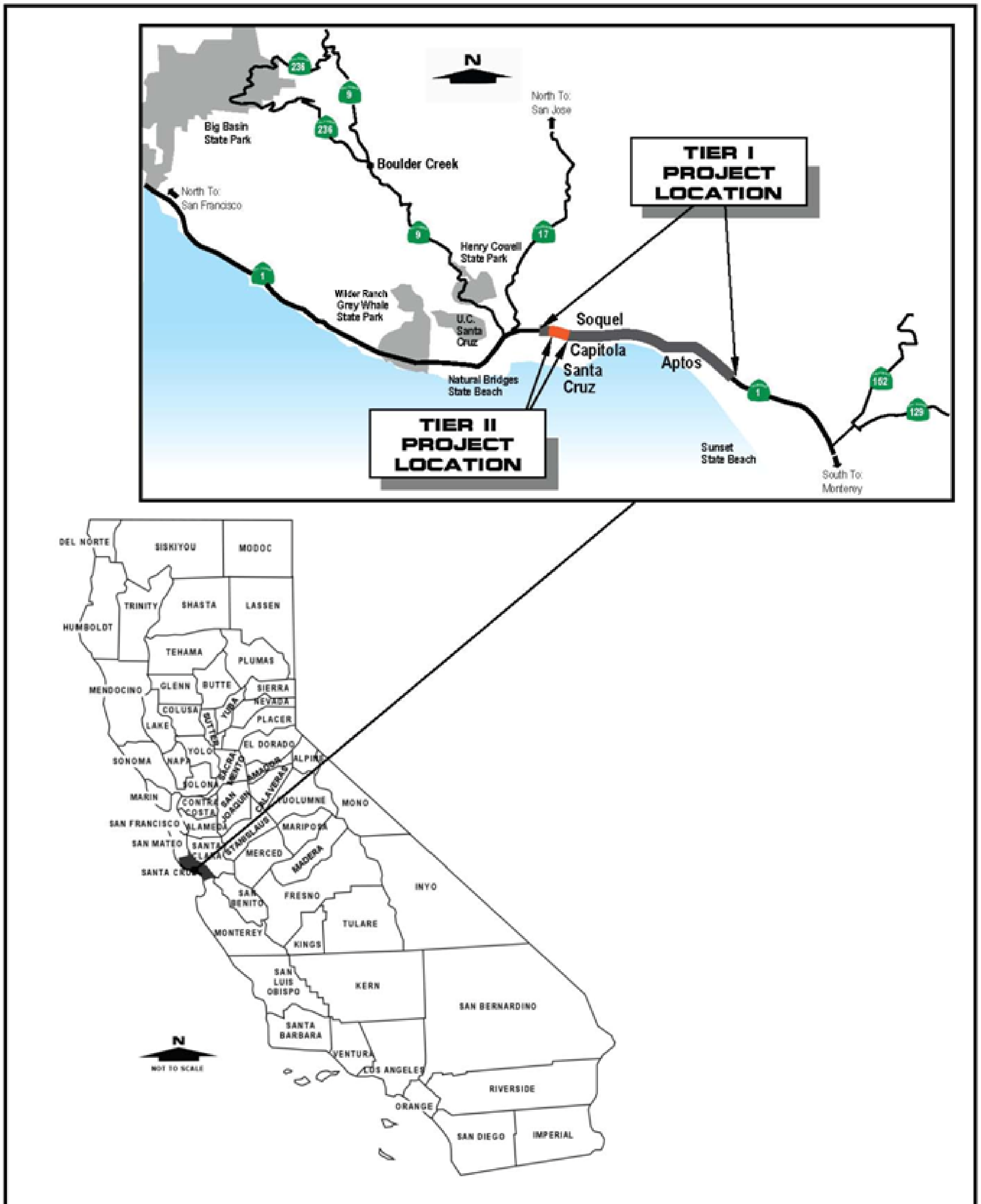
It is recognized that the preferred Tier I project will likely be implemented in a phased approach. The project sponsor has developed an implementation plan based on traffic operation criteria to ensure that each of the corridor improvement phases identified as a future construction-level project will have independent utility because they will individually provide a benefit to traffic operations on Route 1. The initial Tier II project from 41st Avenue to Soquel Avenue/Drive has independent utility because it will resolve a congestion problem within that portion of Route 1. Section 1.1.3 discusses the criteria to be used to program future tiered projects for construction.

1.2 Project Location

The proposed Tier I and Tier II project locations are in Santa Cruz County, California, as shown in Figure 1-1. Route 1 is a state highway owned and operated by Caltrans that runs along much of the California coast. Within the project corridor, Route 1 traverses the county in an east-west direction. The landforms are characterized by rolling landscape that has been urbanized with natural areas interspersed. The western portions of the project corridor around Santa Cruz, Capitola, and Soquel are more developed than the eastern areas, where vegetated slopes are predominant. Route 1 is the only continuous, high-capacity route connecting these areas.

The Tier I eastern project limit is just south of the village of Aptos, approximately 0.4 mile south of the San Andreas-Larkin Valley Road interchange; the Tier I project then traverses the villages of Soquel, Live Oak and unincorporated Santa Cruz County. The western Tier I project limit is in the City of Santa Cruz, approximately 0.4 mile north of the Morrissey Boulevard interchange.

Once the highway crosses Salinas Road, near the Monterey County/Santa Cruz County line, Route 1 makes a swift transition from a narrow two-lane highway to a four-lane freeway that continues westward to the Route 17 interchange in Santa Cruz (the Route 1/Route 17 interchange is locally known as The Fishhook due to its tight loop ramps that resemble a fishhook when viewed from above). Near the western Tier I project limit Route 1 is the southern terminus for Route 17, and farther west Route 1 is also the southern terminus for Route 9.



Santa Cruz Route 1

Tier I and Tier II Environmental Impact Report/Environmental Assessment

Figure 1-1: Project Vicinity Map

The median width of Route 1 between San Andreas Road and the Route 1/Route 17 interchange varies from approximately 8 to 63 feet. Within the Tier I project limits there are nine interchanges, two roadway overcrossings, and two Santa Cruz Branch Rail Line overhead bridge structures.

The Tier II project limits, which lie within the larger Tier I corridor, begin at 41st Avenue on the east and extend a distance of 1.4 miles westward to Soquel Avenue. Route 1 is a four-lane divided freeway through the Tier II project limits. The Tier II project limits are shown in Figure 1-2.

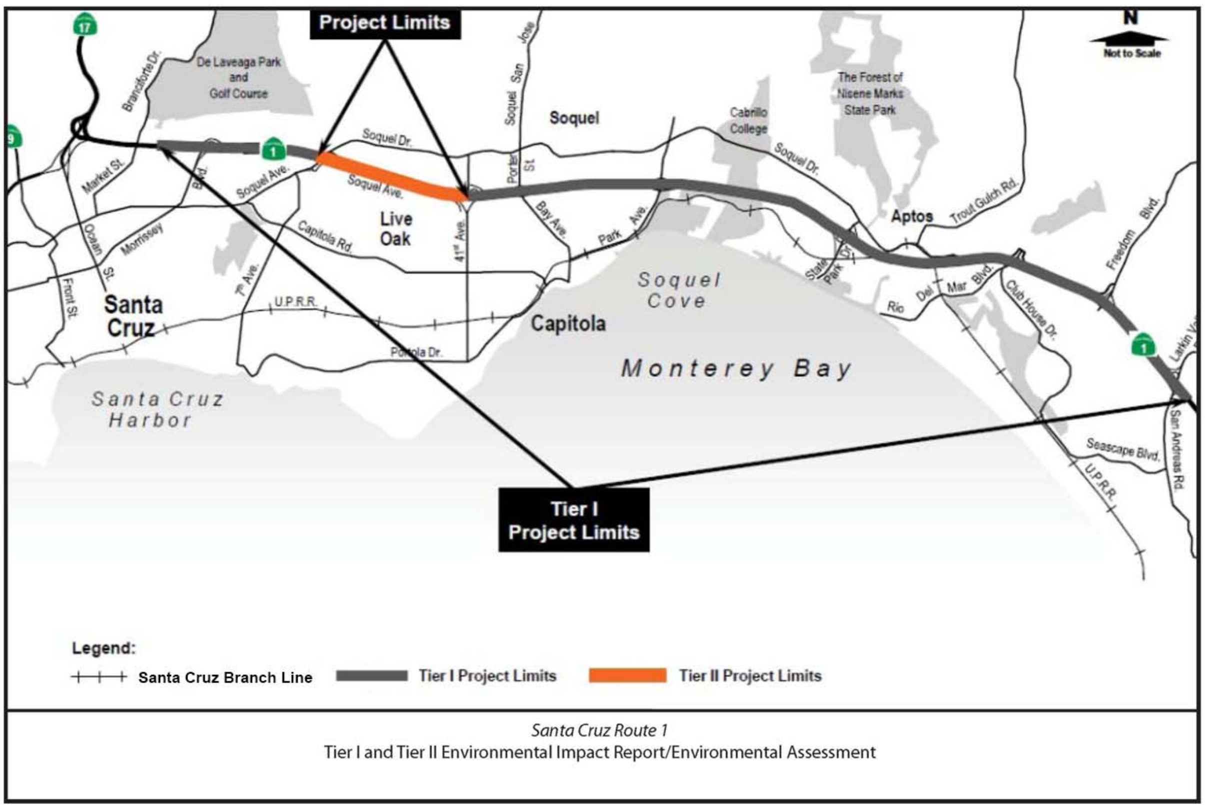


Figure 1-2: Project Location Map

1.3 Purpose and Need

Because this environmental document analyzes two individual projects (Tier I and Tier II), the purpose and need for each of the undertakings, while largely sharing common factors, do have some distinctions. The sections below present the purpose and need for the Tier I and Tier II projects and identify both the common and distinct aspects of each.

1.3.1 Purpose

The purpose of the proposed Tier I project on Route 1 within the project limits is to achieve the following:

- Reduce congestion.
- Promote the use of alternative transportation modes as means to increase transportation system capacity.
- Encourage carpooling and ridesharing.

The purpose of the Tier II project is to:

- Reduce congestion.
- Improve safety.
- Promote the use of alternative transportation modes as means to increase transportation system capacity.

The main distinction between the Tier I and Tier II project purposes is the Tier II project also addresses a congestion-related safety need within its limits, but will not promote carpooling in the Route 1 corridor. The Tier II project would promote the use of alternative modes and increase the capacity of the transportation system by providing a bicycle and pedestrian overcrossing of Route 1 at Chanticleer Avenue, as well as a new sidewalk along a portion of Soquel Avenue at Chanticleer Avenue, reducing travel distance for bicyclists and pedestrians.

The Tier I and Tier II projects are intended to address specific deficiencies and needs on Route 1, as described in the following subsection.

1.3.2 Need

The Tier I and Tier II projects address the following needs resulting from deficiencies on Route 1 within the project limits:

- Several bottlenecks along Route 1 in the southbound and northbound directions cause recurrent congestion during peak hours.
- Travel time delays due to congestion are experienced by commuters, commerce, and emergency vehicles.
- “Cut-through” traffic, or traffic on local streets, occurs and is increasing because drivers seek to avoid congestion on the highway.
- Limited opportunities exist for pedestrians and bicyclists to safely get across Route 1 within the project corridor.

Within the Tier I project limits, in addition to the common needs identified above there is a need to address the following corridor-wide deficiencies:

- Insufficient incentives to increase transit service in the Route 1 corridor because congestion threatens reliability and cost-effective transit service delivery.

- Inadequate facilities to support carpool and rideshare vehicles over single-occupant vehicles, reducing travel time savings and reliability.

The Tier II project, in addition to the common needs identified above, also addresses the following need:

- Improve operational safety to address accident rates in excess of the statewide average.

The discussion that follows provides more detailed information on the needs identified above for the Tier I and Tier II project alternatives.

Travel Time Delays Due to Congestion

Many commuters living in Santa Cruz County travel north on Route 1 to Route 17 to jobs located in the Santa Clara Valley/Silicon Valley and San Francisco Bay Area. The population of Santa Cruz County has doubled in the past 30 years. This population growth, in addition to growth in tourism and coastal travel, has exacerbated traffic congestion on Route 1. During this time, operational improvements have been made to the route within the project corridor, but no capacity enhancements. In recent decades, this segment of Route 1 has become heavily congested during morning and evening commute times. Traffic data compiled for the Tier I project in 2009 estimated the average daily traffic volume on Route 1 within the project limits to be as high as 104,000 vehicles (both directions combined) (Traffic Operations Report, 2012).

Route 1 experiences extended periods of congestion, generally from 6:00 a.m. to noon and 2:00 p.m. to 8:00 p.m. (Traffic Operations Report, 2012). These extended periods were used in order to observe the “heating up” and “cooling off” of traffic conditions before and after the respective peak periods of 7 a.m. to 10 a.m. and 3 p.m. to 6 p.m. In each case, one hour is included prior to the peak period, and two hours are included following the end of the peak period, in order to provide context for better understanding the peak period conditions. The peak hour represents the highest 1-hour traffic volumes during the morning and early evening. During the morning peak period from 7:00 a.m. to 10:00 a.m., the northbound direction is heavy with commuters heading into the downtown Santa Cruz area and toward Route 17 to the Santa Clara Valley and San Francisco Bay Area. During the evening peak period from 3:00 p.m. to 6:00 p.m., most traffic travels southbound on Route 1 from downtown Santa Cruz and State Routes 17 and 9.

Congestion-related queuing on Route 1 currently extends for several miles. During the evening peak period, southbound traffic queues from the Bay Avenue/Porter Street interchange, extending north through the Route 1/Route 17 interchange toward Pasatiempo Drive and north on Route 1 toward the Route 9 junction (approximately 1mile). Northbound queues during the morning peak period extend from Morrissey Boulevard to beyond Freedom Boulevard (approximately 7 miles).

The traffic analysis prepared for the projects shows that, within the project limits during the morning peak hour, under baseline conditions, the average per vehicle delay is 14 minutes in the northbound direction and 0 minutes in the southbound direction. During the evening peak hour, the average per vehicle delay is 6 minutes in the northbound direction and 15 minutes in the southbound direction. Travel speeds are as low as 26 miles per hour. These data indicate that traffic conditions are most congested in the commute directions: northbound in the morning and southbound in the evening. Based on traffic analysis, by the year 2035, traffic performance is expected to worsen. Travel demand would continue to increase as population grows and the region matures. If no capacity improvements are made, Route 1 would not be able to accommodate future travel demand, and delays would escalate. In the southbound direction during the evening peak hour, delays would grow to 49 minutes, which is an increase of 227 percent compared to baseline delays of 15 minutes. In the northbound direction during the morning peak, traffic delays would average 48 minutes per vehicle, which amounts to a 243 percent increase over baseline conditions of 14 minutes (Traffic Operations Report, 2012).

Operational Deficiencies

Recurrent congestion and impeded merging and weaving movements characterize Route 1 within the project corridor. Highway interchanges also carry heavy traffic volumes. In certain areas, traffic on the freeway on-ramps has limited distance in which to merge, causing mainline traffic flow to break down and leading to bottlenecks. This further impedes the lane changes and merges of traffic entering and exiting the mainline. Bottlenecks primarily occur northbound in the morning and evening, and southbound in the evening. The effects of congestion are more pronounced in the peak travel directions – northbound in the morning and southbound in the evening. As shown Table 1-1, within the project limits, during the morning peak hour, there is a baseline of 38,517 vehicle miles traveled in the northbound direction, and 30,348 vehicle miles traveled in the southbound direction. During the evening peak hour, there is a baseline of 32,349 vehicle miles traveled in the northbound direction and 35,661 vehicle miles traveled in the southbound direction. Travel speeds are as low as 26 miles per hour, showing congested, stop-and-go conditions.

Table 1-1: Baseline Peak-Hour Measures of Effectiveness

	Northbound		Southbound	
	Morning	Evening	Morning	Evening
Travel Speeds (mph)	30	39	60	26
Travel Time (minutes/vehicle)	23	15	10	27
Vehicle Hours Traveled	1,274	823	507	1,391
Vehicle Miles Traveled	38,517	32,349	30,348	35,661
Delay (minutes/vehicle)	14	6	0	15

Note: Baseline data were collected in 2001 and 2003; follow-up studies in 2010 showed that 2010 volumes were lower than the 2001/2003 volumes. More information about baseline traffic conditions is provided in Section 2.1.5.
Source: Traffic Operations Report, 2012.

The primary bottleneck in the northbound direction has traditionally been the Route 1/ Route 17 junction. Recurrent congestion caused by this bottleneck during peak hours previously began at Soquel Avenue and the Route 1/Route 17 junction and extended beyond Freedom Boulevard, until the recently completed Route 1/17 Merge Lanes Project improved traffic operations to reduce this bottleneck. This bottleneck has been further alleviated following completion of the Highway 1 Soquel/Morrissey Auxiliary Lanes Project, which was completed in December 2013. Nonetheless, increased congestion resulting from traffic volumes exceeding capacity is projected by year 2035, creating a growing bottleneck on Route 1 between Soquel Avenue and Morrissey Boulevard if no capacity and operational improvements are implemented (Traffic Operations Report, 2012). Traffic modeling considered completion of the two aforementioned projects in the no-build scenario. Traffic model results for years 2015 and 2035 show a northbound bottleneck will persist in the Soquel-Morrissey stretch in the a.m. peak hour (Traffic Operations Report, 2012).

In the southbound direction, multiple bottlenecks occur, with the primary bottleneck located near the Bay Avenue/ Porter Street interchange. Recurrent congestion on Route 1 between Ocean Street and Bay Avenue/Porter Street functions as a meter by delaying through-traffic demand for points south. Traffic analysis indicates that improvements to relieve congestion only within this northern segment of the highway corridor would create spill-over congestion into the southern segment and create a new bottleneck near, or just south of the Route 1/State Park Drive interchange (Traffic Operations Report, 2012); therefore, the proposed project corridor study area and limits extend south to the San Andreas/ Larkin Valley Road interchange.

Heavy traffic volumes on the highway interchanges contribute to operational deficiencies. Traffic analysis indicates that, under baseline conditions, the following seven intersections experience per vehicle delays ranging from 46 seconds to 6 minutes during the morning peak period (7:00 a.m. to 10:00 a.m.):

- Fairmount Avenue/Route 1 Southbound Ramps
- Park Avenue/Route 1 Northbound Ramps
- Park Avenue/Kennedy Drive/McGregor Drive
- State Park Drive/McGregor Drive
- Rio Del Mar Boulevard/Soquel Drive
- Freedom Boulevard/Route 1 Northbound Ramps
- Freedom Boulevard/Route 1 Southbound Ramps

During the evening peak period (3:00 p.m. to 6:00 p.m.), the following five intersections experience per vehicle delays ranging from 36 seconds to 4 minutes:

- Fairmount Avenue/Route 1 Southbound Ramps
- Park Avenue/Kennedy Drive/McGregor Drive
- State Park Drive/McGregor Drive
- Rio Del Mar Boulevard/Soquel Drive
- Freedom Boulevard/Route 1 Southbound Ramps

Without the proposed Tier I Corridor improvements, the traffic analysis shows that 23 of the 25 intersections at or near Route 1 ramps that were analyzed would have per vehicle delays of 30 seconds or more, with some delays exceeding 16 minutes per vehicle, indicating long queues and delays (Traffic Operations Report, 2012). This is primarily due to anticipated continued growth in travel demand, resulting in increased traffic volumes at these intersections and the lack of capacity to handle such traffic. The Tier II Auxiliary Lane Alternative was found to provide the greatest improvement in corridor operations when compared with other operational improvements that are proposed as part of the Tier I Corridor HOV Lane Alternative (Traffic Operations Report, 2012). This analysis considered the potential of the individual Tier II project improvements encompassed within the Tier I Corridor HOV Lane Alternative to relieve congestion and minimize/avoid air quality hot spots in the corridor.

"Cut-Through" Traffic on Local Streets

Recurrent congestion on Route 1 contributes to the use of local streets for regional trips. "Cut-through" traffic, or traffic on local streets, commonly occurs because drivers seek to avoid congestion on the highway. This contributes to congestion on these streets and circuitous travel routes, resulting in increased travel distances for motorists. For example, Google Earth (accessed June 9, 2015) shows that, during typical weekday evening commute hours, there is slow traffic in the following segments of Soquel Drive (which runs parallel to Route 1):

- Between Chanticleer Avenue and 41st Avenue (Tier II study area)
- Between 41st Avenue and Porter Street, and in the vicinity of Park Avenue (Tier I Study area)

Limited Pedestrian and Bicycle Access across Route 1

Within the project corridor, there is limited opportunity for pedestrians and bicyclists to get across Route 1. Existing crossings are limited to the nine highway interchanges, in addition to the overcrossings at La Fonda Avenue and Capitola Avenue. Existing overcrossings at Capitola Avenue, Soquel Avenue, and Morrissey Boulevard do not have standard bicycle lanes, although a bicycle lane is planned on the Morrissey Boulevard overcrossing as a separate, future project. All of the overcrossings provide sidewalks, although some provide sidewalk on only one side, and the sidewalks on the Capitola Avenue and Soquel Avenue overcrossings do not meet current Americans with Disabilities Act guidelines. The free right turns currently in place where highway ramps meet local streets make longer, skewed crossings for pedestrians and cyclists, and these travelers must compete with vehicles making high-speed turns. Furthermore, free right-turning vehicles can proceed with their turn without stopping for red lights. These current operational features and the lack of standard sidewalks and bicycle lanes on available Route 1 overcrossings, in addition to the limited number of existing Route 1 crossings, impedes bicycle and pedestrian access between communities and land uses north and south of Route 1 within the project corridor. The lack of access and facilities, such as standard sidewalks, crosswalks, and bicycle lanes serve to discourage these modes of travel.

Lack of Facilities and Incentives to Increase Transit Use and Ridesharing

Currently, transit buses, vanpools, and other carpoolers travel in mixed-flow traffic lanes on Route 1. There are no facilities in place, such as HOV lanes and HOV bypass lanes on highway ramps, to improve travel time and reliability for these users of the highway; therefore, transit buses, vanpools, and other carpoolers traveling along Route 1 are subjected to the same congested travel conditions as single-occupant automobiles, traveling at speeds as low as 11 miles per hour during peak periods. This results in a lack of incentive for drivers to carpool, vanpool, or shift their mode to transit because they would not reap any benefits of travel time savings or improved reliability over their single-occupancy commute. The lack of incentive for drivers to shift their mode to transit inhibits the ability of transit providers to invest in improved and increased service. As congestion worsens, transit travel times increase and reliability degrades, which can result in a decline in transit mode share. As explained below, there is high transit ridership in Santa Cruz County and the potential to capture substantially more transit patrons – referred to as latent demand.

While comparable suburban areas would have transit ridership of approximately 2 percent of the total highway trips, the transit ridership in this corridor is approximately twice that, showing high existing transit demand (Transit Market Analysis Study, 2008). The high transit ridership is largely due to a high proportion of low-income service workers and is also due to University of California Santa Cruz student ridership. Santa Cruz Metro is the primary transit provider in Santa Cruz County. Santa Cruz Metro operates 34 urban collector, express, and urban local feeder routes in the study area from three transit centers in downtown Santa Cruz, at the Capitola Mall, and downtown Watsonville. The Metro Base is under construction and located northwest of the Route 9/Route 1 interchange. The following Santa Cruz Metro routes use part of Route 1 within the project corridor: Route 91 – Watsonville to Santa Cruz Commuter Express; Routes 54, 55, and 56 – Mid-County Service; and Routes 69A and 69 W – Capitola Avenue/Santa Cruz/Watsonville. In addition, Santa Cruz Metro jointly operates the Highway 17 Express Service with Amtrak and the Santa Clara Valley Transportation Authority, which serves a San Jose-based transit market. Much of the express bus ridership originates in Watsonville. There is a large, low-income “captive-rider” market in Watsonville commuting into Santa Cruz. “Captive” riders describe transit users who use transit because they do not have access to an automobile for a variety of reasons.

A Transit Market Analysis Study (2008) prepared in conjunction with the proposed Tier I project found that average daily express bus ridership in the corridor varied from 2,300 riders per day in 2003 to approximately 2,000 riders per day in 2006, excluding Highway 17 ridership. Projected 2035 transit ridership, without Highway 17 ridership, would be between 2,300 riders per day with current service frequency and travel times and 2,800 riders per day if transit service frequency were increased to that of 2003 (prior to the 2003 and 2004 service cuts) while maintaining current travel times. This represents a growth of approximately 18 to 21 percent, respectively. With Highway 17 ridership included, the future express bus ridership would vary between 3,400 and 3,700 riders per day. The latent demand for express transit in the corridor was estimated to be approximately an additional 40 percent of the projected future transit ridership (without Highway 17 service). The latent demand for Highway 17 service was not included in this analysis because that express demand is driven by a San Jose-based employment market.

Thus, research shows that there is a ridership-driven need to provide increased transit service on routes that use Route 1. The express buses would be subjected to very congested travel conditions on the freeway by year 2035 if no highway capacity improvements are implemented (Traffic Operations Report, 2012; Transit Market Analysis Study 2008). The identified latent demand would not be captured, and ridership would likely decrease due to longer travel times and decreased reliability that would result from the anticipated highway and interchange congestion.

With increasing congestion and an increased demand for alternative modes of transportation, the expansion of transit services is needed to support the needs of Santa Cruz County residents; however, there is a lack of transit-supportive facilities on Route 1 and a lack of travel time and reliability incentives for drivers to carpool and vanpool.

Although Route 1 currently includes park-and-ride lots to support transit users, vanpools, carpools, and other HOV users, there are no incentives, such as ramp metering with HOV bypass lanes or mainline HOV lanes to encourage additional transit use and ridesharing. Express buses move slowly in congested, mixed-flow traffic. Recurrent congestion increases transit operating costs and acts as a disincentive for increasing service. Without capacity improvements, increased future congestion will restrict the demand for express bus service on Route 1. The Santa Cruz County Board of Supervisors, City Council, local businesses, and residents support carpooling and alternative transportation modes. The Santa Cruz Regional Transportation Commission, which is composed of representatives of local jurisdictions and the entire Santa Cruz County Board of Supervisors, continues to take actions that support planning, programs, and funding in support of carpooling and alternative transportation modes. Recent public polls in Santa Cruz County demonstrate strong support for alternative transportation modes. The Tier I project seeks capacity improvements that encourage alternative modes, such as HOV mainline lanes, HOV on-ramp bypass lanes, transit stops at highway ramps, and pedestrian/bicycle crossings over the highway (also provided for Tier II). HOV lanes would provide time-saving incentives for users of ridesharing and express transit.

In addition to the transit support service facilities that could be provided by the Tier I project, Metro plans to expand annual service hours from 205,000 to 300,000 hours by 2015. Additionally, other transit projects, such as the Santa Cruz Branch Rail Line and the Monterey Bay Sanctuary Scenic Trail Network planning effort, would create incentives for alternative modes of transportation by expanding the transit and bicycle facility network. On October 24, 2008, the Santa Cruz Metropolitan Transit District Board formally endorsed the proposed Tier I Corridor HOV Lane Alternative and agreed it is a transit project as much as a highway project, that it would benefit Metro by improving travel time by approximately 30 percent, increasing ridership by approximately 40 percent, and providing improved service reliability.

Accidents and Operational Safety

Within the Tier II project limits both the mainline portion of Route 1 between post miles 13.5 and 14.9 as well as the Route 1 southbound off-ramp to 41st Avenue and the northbound off-ramp to Soquel Drive experience accident rates in excess of the statewide average for similar facilities. Accident rate data for these segments were generated from the Traffic Accident Surveillance Analysis System, collected over a three year time period from July 1, 2008 to June 30, 2011 and are shown in Tables 1-2, 1-3, and 1-4 below.

Table 1-2: Three-Year Accident Data
Route 1 – 41st Avenue to Soquel Avenue
Accidents per Million Vehicle Miles

	Fatal	Fatal + Injury	Total[1]
Actual Recorded	0.007	0.38	1.18
Statewide Average	0.008	0.30	0.82
[1]Totals include all accidents, not only collisions that resulted in injuries or fatalities.			

Table 1-3: Three-Year Accident Data
Route 1 – Southbound Off-Ramp to 41st Avenue
Accidents per Million Vehicles

	Fatal	Fatal + Injury	Total[1]
Actual Recorded	0.000	0.30	1.41
Statewide Average	0.003	0.35	1.01
[1]Totals include all accidents, not only collisions that resulted in injuries or fatalities.			

Table 1-4: Three-Year Accident Data
Route 1 – Northbound Off-Ramp to Soquel Drive
Accidents per Million Vehicles

	Fatal	Fatal + Injury	Total[1]
Actual Recorded	0.000	0.10	0.72
Statewide Average	0.001	0.17	0.54
[1]Totals include all accidents, not only collisions that resulted in injuries or fatalities.			

The Tier II project would reduce congestion and improve mainline weaving maneuvers on Route 1 by providing an auxiliary lane. It would also improve safety at the 41St Avenue southbound off-ramp and the Soquel northbound off-ramp by providing speed-reduction warning signs at both ramps as well as curve warning signage at the northbound ramp to Soquel Drive.

1.4 Project Description

This section describes the proposed project improvements and the project alternatives developed to meet the purpose and need, while avoiding or minimizing environmental impacts. The alternatives are the Tier I Corridor HOV Lane Alternative, the Tier I Corridor TSM Alternative, and the Tier II Auxiliary Lane Alternative.

The proposed Tier I and Tier II project locations are in Santa Cruz County, California, on Route 1.The Tier I eastern project limit is just south of the village of Aptos, approximately 0.4 mile south of the San Andreas-Larkin Valley Road interchange; the Tier I project then traverses the villages of Soquel, Live Oak and unincorporated Santa Cruz County. The western Tier I project limit is in the City of Santa Cruz, approximately 0.4 mile north of the Morrissey Boulevard interchange, for a total length of 8.9 miles. The Tier II project limits, which lie within the Tier I corridor, begin at 41st Avenue on the east and extend a distance of 1.4 miles westward to Soquel Avenue.

Within the Tier I and Tier II project limits, Route 1 is a four-lane divided freeway with 12-foot lanes. In the southbound direction the existing inside paved shoulder width varies from approximately 4 feet to 18 feet and in the northbound direction the existing inside paved shoulder width varies from 7 feet to 18 feet. In the southbound direction in the project corridor, the outside shoulder width varies from 8 feet to 12 feet. In the northbound direction in the project corridor, the outside shoulder width varies from 6 feet to 8 feet.

The purpose of the Tier I project is to reduce congestion, promote the use of alternative transportation modes as means to increase transportation system capacity, and encourage carpooling and ridesharing. The purpose of the Tier II project is to reduce congestion, improve safety, and promote the use of alternative transportation modes as means to increase transportation system capacity.

1.5 Alternatives

This section describes the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative that were analyzed in this document. The Project Development Team studied various design alternatives and options. In an effort to reduce and avoid impacts, the Project Development Team also considered preliminary environmental information to better understand the impacts of those alternatives. The views of stakeholders were elicited through public information meetings and meetings with local agency staff and elected officials. From this preliminary analysis and public outreach, a longer list of alternatives and options was narrowed to include the alternatives described below.

The Tier I Corridor HOV Lane and TSM Alternatives were originally conceived as construction-level study alternatives, under the assumption that funding would be available in the near future. The Project Development Team recognized that funding sources to construct either of those alternatives would be limited in the short term and that implementation of the Tier I project would occur over a multi-year period. To make a decision on the types of transportation improvements that would occur within the corridor in the future, Tier I project implementation alternatives were identified. The team decided to study the HOV Lane and TSM Alternatives in a Tier I or Master Plan environmental document. The Tier I/II DEIR/EA will allow for the identification of a preferred corridor alternative for the 8.9-mile-long project corridor and facilitate the programming of funds. At the same time, the team also recognized that there was sufficient funding to implement a construction-level Tier II project within the corridor that would have more immediate congestion-relief benefits. Accordingly, a Tier II Auxiliary Lane and Pedestrian/Bicycle Overcrossing Alternative is also defined and analyzed in the Tier I/II DEIR/EA.

The Tier I corridor analysis includes three alternatives: a Tier I Corridor HOV Lane Alternative, a Tier I Corridor TSM Alternative, and a Tier I No Build Alternative. As funding becomes available, the high-priority improvements in the corridor would become subsequent incremental (Tier II) construction-level projects and would be subject to separate environmental reviews.

The Tier II corridor analysis considers an Auxiliary Lane Alternative and Pedestrian/Bicycle Overcrossing, and a No Build Alternative. The Tier II project is located between 41st Avenue and Soquel Avenue/Drive. It is anticipated that construction of the Tier II project could begin in 2019.

Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives

The Tier I HOV Lane and TSM Alternatives share many features, such as: the addition of auxiliary lanes, new pedestrian/bicycle overcrossings over Route 1, and Transportation Operations System elements. These common design features are described below.

Auxiliary Lanes

Auxiliary lanes are designed to reduce conflicts between traffic entering and exiting the highway by connecting the on-ramp of one interchange to the off-ramp of the next; they are not designed to serve through traffic. Auxiliary lanes would be constructed to improve merging operations at the locations listed below:

- Freedom Boulevard and Rio Del Mar Boulevard – northbound and southbound
- Rio Del Mar Boulevard and State Park Drive – northbound and southbound

- State Park Drive and Park Avenue – both directions in the TSM Alternative; southbound only in the HOV Lane Alternative
- Park Avenue and Bay Avenue/Porter Street – northbound and southbound
- 41st Avenue and Soquel Avenue/Drive – northbound and southbound

New Pedestrian/Bicycle Overcrossings

Both Tier I alternatives would construct new pedestrian/bicycle overcrossings of Route 1 at the following locations:

- Mar Vista Drive – The crossing would start on the north side of Route 1 and parallel the highway eastward for approximately 600 feet, doubling back westward as it climbs before crossing the highway and McGregor Drive at a right angle and then descending by switchbacks to and along Mar Vista Drive for approximately 550 feet; the final design will be determined as part of the Tier II design/environmental analysis of this facility.
- Chanticleer Avenue – The crossing would start at the Chanticleer Avenue cul-de-sac on the north side of Route 1 and run parallel the highway for approximately 400 feet to the west and then cross Route 1 and Soquel Avenue (frontage road) on a curved alignment, terminating just west of Chanticleer Avenue on the south side of the highway and Soquel Avenue (frontage road).
- Trevethan Avenue – The crossing would start on the north side of Route 1 at Trevethan Avenue and parallel the highway approximately 600 feet before crossing on an angle and continuing along the banks of the western tributary to Arana Gulch to terminate close to Harbor High School; multiple configurations are possible, with the final design to be determined as part of the subsequent design/environmental analysis of this facility.

Other Common Features of the Tier I Corridor Alternatives

The Tier I Corridor Alternatives would include reconstruction of the Santa Cruz Branch Rail Line bridges over Route 1 and the State Park Drive, Capitola Avenue, 41st Avenue, and Soquel Avenue overcrossings. The Santa Cruz Branch Line railroad underpass structures are proposed to be modified or replaced to accommodate highway widening to match the ultimate six-through-lane concept, including shoulder and sidewalk facilities to accommodate pedestrians and bicycles. These modifications will lower the highway profile to provide standard clearances. In addition the Aptos Creek Bridge would be widened.

Both build alternatives would include Transportation Operations System elements such as changeable message signs, closed-circuit television, microwave detection systems, and vehicle detection systems. In addition, ramp metering and HOV on-ramp bypass lanes with highway patrol enforcement areas would be constructed on the Route 1 ramps within the Tier I project limits; however, only the HOV Lane Alternative would include HOV lanes on the mainline.

Table 1-5 summarizes the major features of the Tier I Corridor Alternatives.

Table 1-5: Major Project Features
Tier I Project Alternatives

Project Features	HOV Lane Alternative	TSM Alternative	No Build Alternative
Highway Mainline Changes			
HOV lanes	X		
Lower highway profile at Santa Cruz Branch Line bridge crossings[1]	X	X	
Auxiliary Lane Improvements			
Northbound and southbound between Freedom Boulevard and Rio Del Mar Boulevard	X	X	
Northbound and southbound between Rio Del Mar Boulevard and State Park Drive	X	X	
Northbound between State Park Drive and Park Avenue		X	
Southbound between State Park Drive and Park Avenue	X	X	
Northbound and southbound between Park Avenue and Bay Avenue/Porter Street	X	X	
Northbound and southbound from 41st Avenue to Soquel Avenue/Drive	X	X	
Highway Interchange Improvements			
Reconfigure all nine interchanges within project limits	X		
Reconstruct State Park Drive, 41st Avenue, and Soquel overcrossings		X	
Ramp metering	X	X	
On-ramp HOV bypass lanes	X	X	
On-ramp California Highway Patrol enforcement areas	X	X	
Stormwater drainage and treatment facilities	X	X	
New Pedestrian/Bicycle Overcrossings			
Mar Vista Drive Crossing	X	X	
Chanticleer Avenue Crossing	X	X	
Trevethan Avenue Crossing	X	X	
Santa Cruz Branch Line Bridges Replacement	X	X	
Aptos Creek Bridge Widening	X	X	
Capitola Avenue Overcrossing Replacement	X	X	
Retaining Walls	X	X	
Soundwalls	X	X	
Traffic Signal Coordination	X	X	X
Transportation Operations System	X	X	X
Transit-Supportive Improvements	X		

1. Existing highway profile does not meet vertical clearance standards for railroad bridge crossings.

1.5.1 Tier I Corridor HOV Lane Alternative

The Tier I Corridor HOV Lane Alternative includes the following main components, which are discussed in detail below and are shown in Figure 1-3 and in plan view in Appendix G:

- Highway mainline to include northbound and southbound HOV lanes throughout the project limits;
- Auxiliary lanes;
- Highway interchange reconfigurations and improvements such as ramp metering, on-ramp HOV bypass lanes and California Highway Patrol enforcement areas, and stormwater drainage/treatment facilities;
- Construction of three pedestrian/bicycle overcrossings;
- Reconstruction of two Santa Cruz Branch Rail Line overcrossings in Aptos;
- Widening of the Aptos Creek Bridge;
- Replacement of the Capitola Avenue overcrossing;
- Retaining walls;
- Soundwalls; and
- Traffic signal coordination and other transportation operation system improvements.

The Tier I Corridor HOV Lane Alternative would expand the existing four-lane highway to a six through-lane facility by adding HOV lanes in both the northbound and southbound directions. HOV lanes would be constructed entirely within the existing median where possible. In those areas where the median is not wide enough to accommodate additional lanes, widening would occur outside of the existing freeway footprint. The southernmost 1.5 miles of the freeway can accommodate an HOV lane inside the existing median. From approximately Freedom Boulevard to Soquel Drive, the existing median is not wide enough to accommodate an HOV lane, so the space needed for the additional lanes would be achieved through a combination of median conversion within existing right-of-way and acquisition of property adjacent to the freeway. Plan drawings depicting the Tier I Corridor HOV Lane Alternative are presented in Appendix G, Figures HOV-1 through HOV-20.

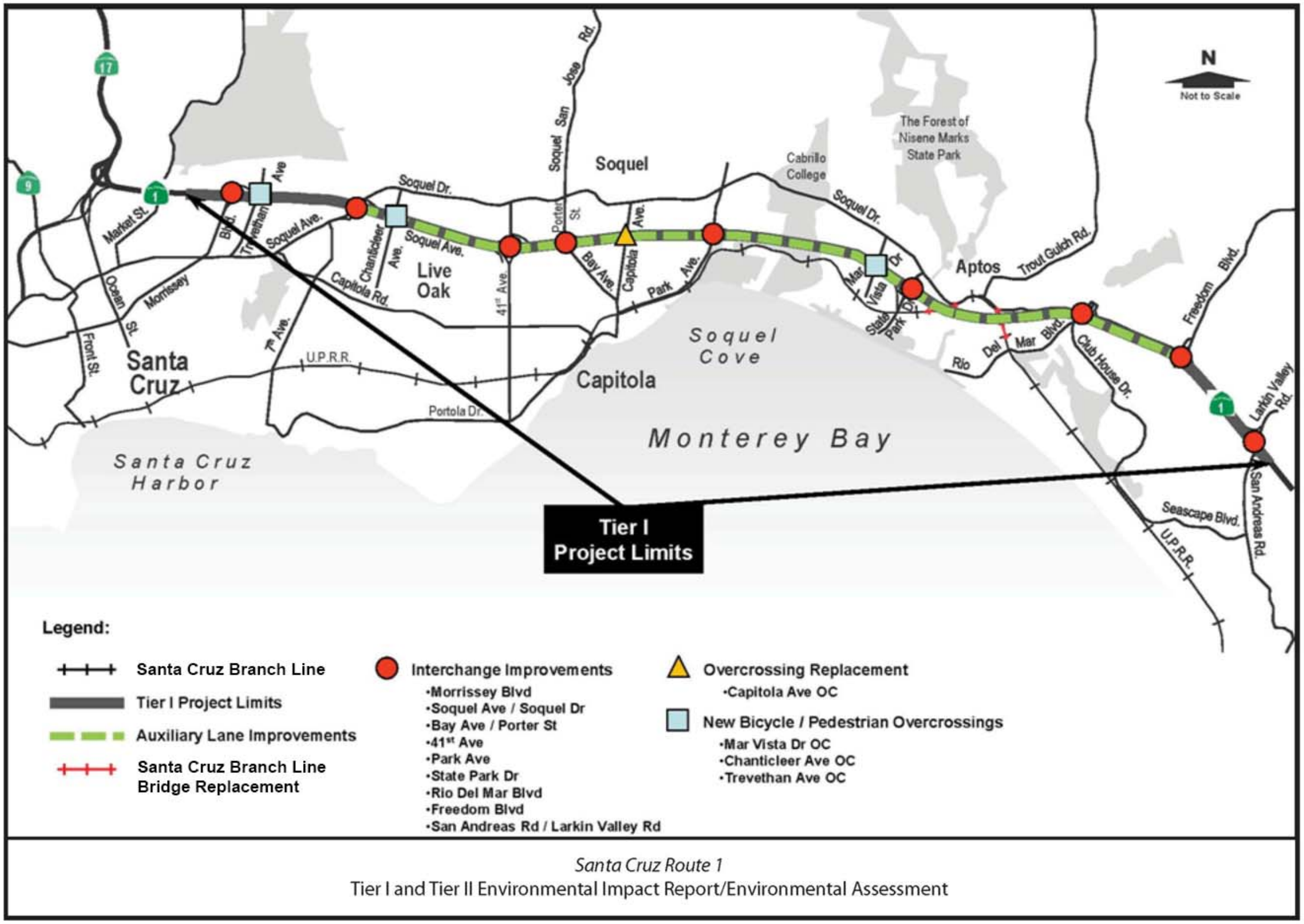


Figure 1-3: Tier I Corridor HOV Lane Alternative – Project Features

A mandatory standard median width (22 feet) set by Caltrans in its Highway Design Manual is proposed through most of the project corridor, north of Freedom Boulevard. The mandatory standard median width comprises two 10-foot-wide inside shoulders and a 2-foot-wide barrier. Where meeting the mandatory median width standard would result in acquiring property on the non-highway side of existing frontage roads, inside shoulder widths of 5 feet are proposed to reduce property requirements and impacts. Five feet is a nonstandard inside shoulder width for a Caltrans facility. This exception to shoulder-width design standards has received conceptual review in meetings between Caltrans and the project sponsor. All projects requiring design exceptions must ultimately be approved by Caltrans.

The Tier I Corridor HOV Lane Alternative would modify or reconstruct all nine interchanges within the project corridor to improve merging operations and ramp geometry by increasing the length of lanes for acceleration and deceleration, adding HOV bypass lanes and mixed-flow lanes to on-ramps, and improving sight distances. The Bay Avenue/Porter Street and 41st Avenue interchanges would be modified to operate as one interchange with frontage roads connecting the two interchanges. Where feasible, design deficiencies on existing ramps would be corrected to meet current design standards. Ramp metering and HOV bypass lanes would be provided on all Route 1 on-ramps. This alternative would include auxiliary lanes between all interchange ramps (with the exception of a northbound auxiliary lane between State Park Drive and Park Avenue) and Transportation Operations System elements, such as changeable message signs, microwave detection systems, and vehicle detection systems. Bridge structures and the Capitola Avenue overcrossing would be modified or replaced to accommodate the HOV lanes. New and widened highway crossing structures would include shoulder and sidewalk facilities to accommodate pedestrians and bicycles. The HOV Lane Alternative would include three new pedestrian/bicycle overcrossings of Route 1. The two existing Santa Cruz Branch Line structures over Route 1 in Aptos would be replaced with longer bridges at the same elevation, and the highway profile would be lowered to achieve standard vertical clearance under the bridges to make room for the HOV and auxiliary lanes. In addition, this design configuration would reduce environmental impacts. The existing Route 1 bridge over Aptos Creek would be widened on the outside to accommodate the HOV lanes in each direction. The existing Capitola Avenue overcrossing would be replaced with a longer structure.

Retaining walls would be constructed to minimize property acquisitions and reduce environmental impacts. At locations where frontage roads are adjacent to Route 1, concrete barriers would be constructed to separate the highway and frontage road.

Changes to Highway Mainline with the Tier I Corridor HOV Lane Alternative

- Route 1 would be expanded to allow for two standard-width (12-foot) mixed-flow lanes, one standard-width (12-foot) HOV lane, and standard-width outside (10-foot) shoulders in each direction.
- The proposed lanes would be constructed within the existing 45-foot median. In locations where the existing median width is less than 45 feet, widening would occur both in the median and at the outside, generally within the existing Route 1 right-of-way.
- Where auxiliary lanes are proposed, widening by approximately 12 feet outside of the existing highway footprint would occur.
- A mandatory standard median width of 22 feet is proposed through most of the corridor.
- The highway centerline would be shifted northward in the vicinity of the Santa Cruz Branch Line crossings in Aptos to reduce impacts to wetlands. The bridge over Aptos Creek would be widened to allow for four new lanes: two HOV, two auxiliary, and pedestrian/bicycle facilities.
- Route 1 would be lowered to obtain vertical clearance at the Santa Cruz Branch Line crossings in Aptos (see Appendix G, Figures HOV-14 and HOV-15). A mandatory standard median width of 22 feet is proposed to minimize impact to the railroad bridge.
- At three locations, median and inside shoulder widths would be nonstandard to reduce impacts to adjacent streets. The three locations are: McGregor Drive, Cabrillo College Drive, and Kennedy Drive. At these three constrained locations, the inside shoulder in the constrained direction would be a nonstandard 5 feet, and the median would be a nonstandard 17 feet.

Auxiliary Lane Improvements with the Tier I Corridor HOV Lane Alternative

The auxiliary lane improvements are discussed above in Section 1.5 Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives.

Interchange Improvements with the Tier I Corridor HOV Lane Alternative

All nine interchanges within the project corridor would be modified under the Tier I Corridor HOV Lane Alternative, including overcrossing and undercrossing widening or replacement. These modifications would improve merging operations and ramp geometrics, and accessibility and safety for pedestrians and bicyclists. Major interchange improvements would include the following:

- Reconfiguration of intersections, including replacement or widening of highway overcrossings and undercrossings.
- Intersections of freeway ramps with local roads would be modified to shorten the pedestrian and bike crossing distances. Additionally, free right turns would be eliminated

where feasible and traffic signals installed to improve traffic flow and slow vehicle traffic speeds through the bike and pedestrian crossing areas.

- Local roadways would be widened at the interchanges to accommodate the anticipated travel demand.
- Drainage and stormwater runoff treatment facilities would be provided.

Interchange improvements and design reconfigurations proposed for each interchange are listed in Table 1-6.

Table 1-6: Interchange Improvements and Reconfigurations Tier I Corridor HOV Lane Alternative

Route 1 Interchange Location	Project Plan Sheet No.[1]	Tier I Corridor HOV Lane Alternative Features
San Andreas/ Larkin Valley Roads Interchange	HOV-20	The existing northbound cloverleaf off-ramp free right-turn onto Larkin Valley Road would be eliminated in favor of a signalized 90-degree intersection.
		A signalized intersection would be provided at the San Andreas Road ramps and the free right-turns would be eliminated.
		The existing on-ramps would be widened to accommodate HOV bypass lanes.
		The southbound Route 1 bridge over San Andreas/Larkin Valley Road would be widened into the median to accommodate the HOV lanes.
		San Andreas/Larkin Valley Roads would be widened within the Tier I project limits to add turn lanes.
		New sidewalks would be added along San Andreas/Larkin Valley Roads within the Tier I project limits.
Freedom Boulevard Interchange	HOV-18	The existing ramp termini at Freedom Boulevard would be modified to provide less-skewed intersections with Freedom Boulevard. These intersections would be signalized, and free right-turns would be eliminated.
		The southbound off-ramp would be widened to two exit lanes.
		The existing on-ramps would be widened to accommodate HOV bypass lanes.
		Freedom Boulevard would be widened within the Tier I project limits to add turn lanes.
		The Freedom Boulevard/Bonita Drive intersection would be enlarged to add turn lanes and achieve acceptable level of service.
		The Freedom Boulevard bridge would be replaced with a wider structure that would accommodate a new turn lane on Freedom Boulevard and the new HOV lanes on Route 1.
		New sidewalks would be added along Freedom Boulevard within the Tier I project limits.
Rio Del Mar Boulevard Interchange	HOV-16	The northbound on-ramp would be realigned to form the north leg of a four-way intersection with Rio Del Mar Boulevard and the northbound off-ramp. This intersection would be signalized, and free right turns would be eliminated
		The northbound off-ramp would be widened to two exit lanes.
		The southbound ramps would be widened, the intersection with Rio Del Mar Boulevard signalized, and free right-turns eliminated.

Table 1-6: Interchange Improvements and Reconfigurations Tier I Corridor HOV Lane Alternative

Route 1 Interchange Location	Project Plan Sheet No.[1]	Tier I Corridor HOV Lane Alternative Features
		The existing on-ramps would be widened to accommodate HOV bypass lanes.
		Soquel Drive would be shifted northward to accommodate the roadway widening along the northbound off-ramp.
		Rio Del Mar Boulevard would be widened within the Tier I project limits to add turn lanes and a through lane in each direction.
		The Rio Del Mar Boulevard bridge over Route 1 would be replaced with a longer, wider bridge to accommodate a new turn lane and a through lane in each direction on Rio Del Mar Boulevard and the new HOV lanes on Route 1.
		Sidewalk would be added along eastbound Rio Del Mar Boulevard within the Tier I project limits; the sidewalk on westbound Rio Del Mar Boulevard would be retained.
State Park Drive Interchange	HOV-13	The existing northbound cloverleaf on-ramp free-right turn would be changed to a signalized right turn.
		The existing northbound off-ramp terminus would be modified to form, together with the realigned northbound on-ramp terminus, the south leg of a signalized intersection with State Park Drive.
		The northbound and southbound off-ramps would be widened to two exit lanes.
		The existing on-ramps would be widened to accommodate HOV bypass lanes.
		State Park Drive would be widened within the Tier I project limits to add turn lanes and a through lane in each direction.
		The State Park Drive bridge over Route 1 would be replaced with a longer, wider bridge to accommodate a new through-lane in each direction on State Park Drive and the new HOV lanes on Route 1.
		Sidewalk would be added along eastbound State Park Drive within the Tier I project limits; the sidewalk along westbound State Park Drive would be retained.
Park Avenue Interchange	HOV-10	The existing diamond interchange ramp design would be retained and ramps would be widened.
		The northbound and southbound off-ramps would be widened to two exit lanes.
		The existing on-ramps would be widened to accommodate HOV bypass lanes.
		Park Avenue would be widened within the Tier I project limits to add turn lanes.
		The two Route 1 bridges over Park Avenue would be replaced with one, wider structure to accommodate the new HOV lanes on Route 1.
		Sidewalk would be added within the Tier I project limits along westbound Park Avenue; the sidewalk along eastbound Park Avenue would be retained.
Bay Avenue/ Porter Street and 41st Avenue	HOV-7	Improvements at the Bay Avenue/Porter Street and 41st Avenue interchanges would be designed so that these two interchanges would work as a single interchange connected by a collector/frontage road running between the interchanges.

Table 1-6: Interchange Improvements and Reconfigurations Tier I Corridor HOV Lane Alternative

Route 1 Interchange Location	Project Plan Sheet No.[1]	Tier I Corridor HOV Lane Alternative Features
Interchanges		The freeway ramps would be reconstructed to form less-skewed intersections with Bay Avenue/Porter Street.
		The existing southbound Route 1 off-ramp to Bay Avenue/Porter Street would be eliminated. Southbound traffic bound for Bay Avenue/Porter Street would exit at the 41st Avenue two-lane off-ramp and continue on a new southbound collector/frontage road to Bay Avenue/Porter Street.
		The existing two-lane on-ramp from Porter Street to northbound Route 1 would be modified to become a northbound collector/frontage road serving traffic bound for 41st Avenue or northbound Route 1.
		Northbound traffic exiting Route 1 would either bear right to intersect with Porter Street and continue north, or stay left and continue on a new structure over Porter Street, join the northbound collector/frontage road, and end at a new signalized intersection at 41st Avenue.
		At 41st Avenue, southbound on- and off-ramps would be eliminated and replaced with a diagonal off-ramp and a collector/frontage road serving traffic bound for Bay Avenue/Porter Street or southbound Route 1. The new ramp and collector/frontage road would form a signalized intersection with 41st Avenue.
		At 41st Avenue, the northbound on-ramps would be realigned.
		New on-ramps would include HOV bypass lanes.
		41st Avenue would be widened within the Tier I project limits to add turn lanes and eastbound though lanes over Route 1.
		Bay Avenue/Porter Street would be widened to add right-turn lanes at the on-ramps.
		A new bridge over Soquel Creek and Soquel Wharf Road would be constructed for the new southbound collector/frontage road from 41st Avenue to Bay Avenue/Porter Street.
		The 41st Avenue bridge over Route 1 would be replaced with a longer, wider bridge to accommodate the new eastbound through lane and turn lanes on 41st Avenue, and the new HOV lanes on Route 1. Northbound and southbound Class I bike paths would be constructed between 41st Avenue and Bay Avenue/Porter Street on either side of the new collector/frontage roads, respectively.
Soquel Avenue/ Drive Interchange	HOV-3	The northbound off-ramp would be realigned to a signalized 90-degree intersection with Soquel Drive. The existing access to Commercial Way would be eliminated.
		The westbound Soquel Drive on-ramp to northbound Route 1 would be modified to eliminate the free right-turn access.
		The existing northbound loop on-ramp from eastbound Soquel Avenue would be realigned and its free-right terminus would become a signalized 90-degree intersection.
		A new, wider southbound diagonal off-ramp that adds turn lanes at its terminus and a new loop on-ramp would form the north leg of a signalized intersection at Soquel Avenue.
		The existing southbound hook on-ramp would be widened to add an HOV bypass lane and realigned to be made standard.

**Table 1-6: Interchange Improvements and Reconfigurations
Tier I Corridor HOV Lane Alternative**

Route 1 Interchange Location	Project Plan Sheet No.[1]	Tier I Corridor HOV Lane Alternative Features
		The northbound and southbound off-ramps would be widened to two exit lanes.
		All new on-ramps would include HOV bypass lanes.
		Soquel Avenue within the Tier I project limits would be widened to add an eastbound through lane and turn lanes.
		Salisbury Lane would be shifted eastward to form an intersection with the realigned northbound off-ramp and loop on-ramp.
		The Soquel Drive bridge over Route 1 would be replaced with a longer, wider bridge to add an eastbound through lane and a turn lane to Soquel Drive and accommodate the new HOV lanes on Route 1.
		The culvert at Arana Gulch would be extended underneath the widened Route 1 and new southbound off-ramp.
		Sidewalk would be added along eastbound Soquel Drive within the Tier I (and Tier II) project limits; the sidewalk along westbound Soquel Drive would be retained.
Morrissey Boulevard Interchange	HOV-1	The southbound exit would be realigned to terminate at a new signalized intersection with Morrissey Boulevard.
		The existing southbound on-ramp would be eliminated and replaced with a new, wider diagonal ramp with a signalized terminus.
		The existing southbound off- and on-ramp at Elk Street would be eliminated.
		The existing northbound loop on-ramp would be eliminated, as would access to Rooney Street from this northbound loop.
		The northbound off-ramp would be widened to two exit lanes.
		New on-ramps would include HOV bypass lanes.
		Morrissey Boulevard is being replaced with a wider bridge to add an eastbound through lane and turn lanes, and realigned to form a straight line between its intersections with Fairmont Avenue and Rooney Street.
		The Morrissey Boulevard bridge is being replaced with a longer, wider bridge to accommodate a new eastbound through lane and turn lanes on Morrissey Boulevard and new HOV lanes on Route 1.
		Sidewalk would be added along eastbound Morrissey Boulevard within the Tier I project limits; the sidewalk along westbound Morrissey Boulevard would be retained.
Transit-Related Facilities	NA	Both on-ramps and both off-ramps at the reconfigured Park Avenue interchange include options for bus pads and bus shelters.
		Ramps and collectors at the Bay Avenue/Porter Street and 41st Avenue interchanges include options for bus pads and shelters.
[1] Project plan sheets are provided in Appendix G.		

Transit Supportive Planning and Design

The Tier I Corridor HOV Lane Alternative would not preclude the development of the following features from being added in the future to facilitate freeway-oriented transit services and operations:

- The reconfigured Park Avenue and Bay Avenue/Porter Street/41st Avenue interchanges would allow for future bus pads and bus stop shelters to be constructed as part of a separate project.
- Future park-and-ride lots are under consideration by RTC at the Larkin Valley Road/San Andreas Road and 41st Avenue interchanges, to be coordinated with the bus facilities as part of a future project.

The aforementioned features are not part of the proposed project and would be subject to future environmental clearance. The proposed Tier I project is simply taking into consideration potential future transit projects as a collaborative planning effort.

New Pedestrian/Bicycle Overcrossings

The proposed pedestrian/bicycle overcrossings are discussed above in Section 1.5 Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives.

1.5.2 Tier I Corridor TSM Alternative

The Tier I Corridor TSM Alternative was formulated to provide Route 1 improvements that would partially address the purpose and need, and could be achieved at lower cost and with fewer impacts than the Tier I Corridor HOV Lane Alternative. TSM strategies typically consist of improvements that can benefit the operations of existing facilities without increasing the number of through lanes.

As discussed in Section 1.5 Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives, the Tier I Corridor TSM Alternative proposes to add auxiliary lanes, ramp metering and HOV on-ramp bypass lanes; improve existing nonstandard geometric elements at various ramps; and incorporate other TSM elements, such as changeable message signs, closed circuit television, microwave detection systems, and vehicle detection systems.). In short, the TSM Alternative shares many of the Tier I Corridor HOV Lane Alternative features, except HOV lanes would not be constructed along the mainline and the Soquel Drive interchange would be the only interchange reconfigured. Plan drawings depicting the TSM Alternative are presented in Appendix H, Figures TSM-1 through TSM-20. An overview of the major features of the TSM Alternative is provided in Figure 1-4 and in plan view in Appendix H.

Auxiliary Lanes

The majority of auxiliary lane improvements are discussed above in Section 1.5 Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives. In addition, the TSM Alternative would have both a southbound and northbound auxiliary lane between State Park Drive and Park Avenue — improvements that are not included in the HOV Lane Alternative.

Interchange Improvements

Improvements to interchanges proposed under the Tier I Corridor TSM Alternative include the following:

- The Soquel Avenue northbound off-ramp from Route 1 would be realigned and widened from one to two exit lanes for a distance of approximately 1,300 feet, widening to four lanes at its intersection with Soquel Drive. The northbound off-ramp/Commercial Way connection would be eliminated, and Commercial Way would become a cul-de-sac north of the realigned ramp. The intersection of the northbound off-ramp with Soquel Drive would be enlarged to achieve an acceptable level of service for the anticipated traffic volume.
- Improve existing nonstandard geometric elements at various ramps.
- Provide HOV bypass lanes on all except northbound Morrissey Boulevard on-ramps.
- Add California Highway Patrol enforcement areas at on-ramps with HOV bypass lanes.

New Pedestrian/Bicycle Overcrossings

The proposed pedestrian/bicycle overcrossings are discussed above in Section 1.5 Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives.

Other Improvements

The details of the other improvements are included above in Section 1.5 Common Design Features of the Tier I Corridor HOV Lane and TSM Alternatives.

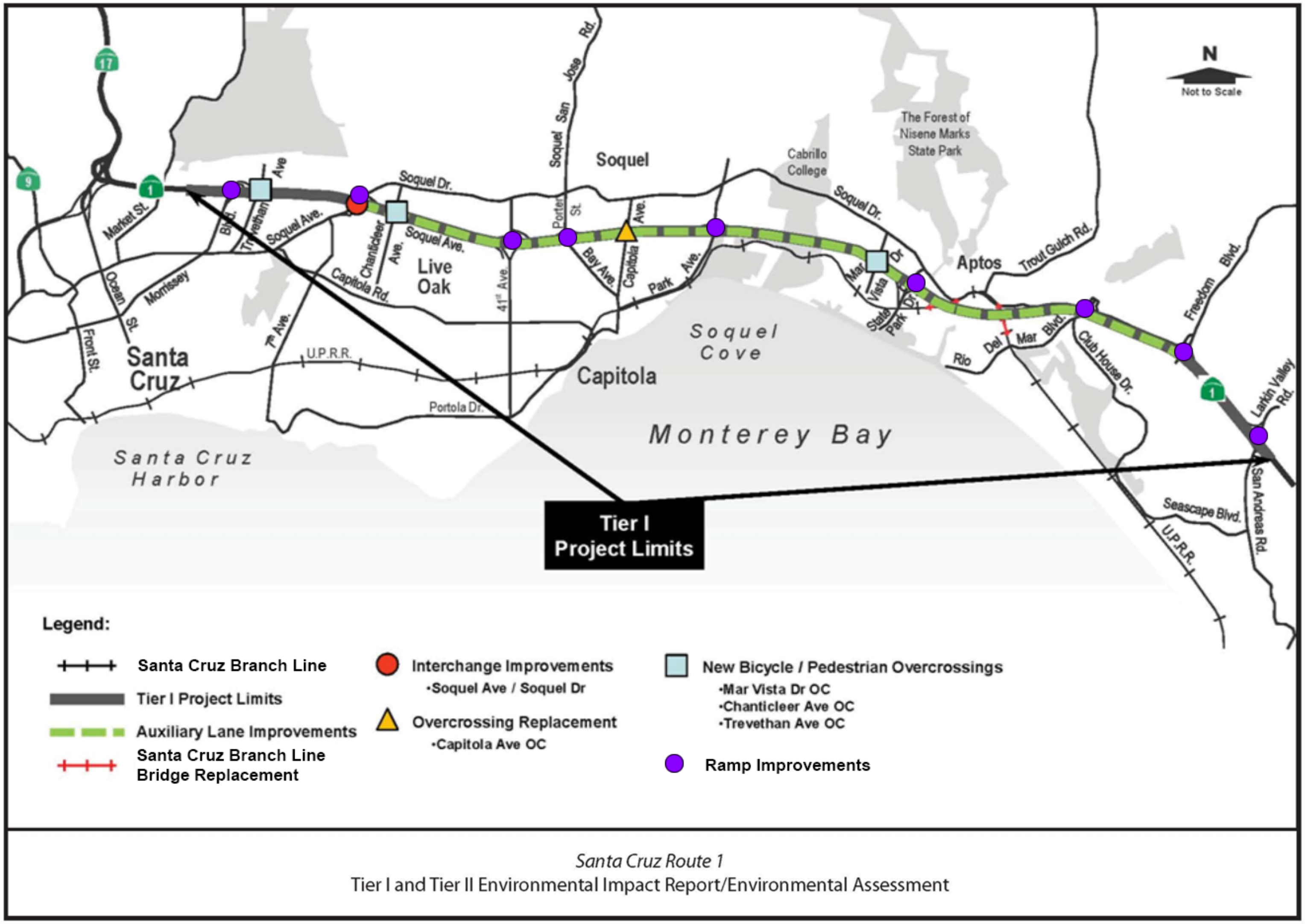


Figure 1-4: Tier I Corridor TSM Alternative – Project Features

1.5.3 Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative would construct northbound and southbound auxiliary lanes on Route 1 from 41st Avenue to Soquel Drive and make other improvements, as discussed below. Figure 1-5 shows features of the Auxiliary Lane Alternative, and Appendix I provides a plan view of the proposed Tier II project. To construct the Auxiliary Lane Alternative, right-of-way would be acquired along Soquel Avenue west of Chanticleer Avenue and at the Chanticleer Avenue cul-de-sac north of Route 1 to accommodate the bicycle/pedestrian overcrossing.

Auxiliary Lanes

The Tier II Auxiliary Lane Alternative proposes to widen Route 1 by adding an auxiliary lane in both the northbound and southbound directions between the 41st Avenue and Soquel Avenue/Drive interchanges. The total roadway widening would be approximately 1.4 miles in length. Southbound, the auxiliary lane would begin at the existing Soquel Avenue on-ramp and end at the existing off-ramp to 41st Avenue. Northbound, the auxiliary lane would begin just south of the 41st Avenue overcrossing, at the existing loop on-ramp from northbound 41st Avenue. North of the overcrossing, the on-ramp from 41st Avenue to northbound Route 1 would merge with the new auxiliary lane, approximately 1,000 feet downstream from the loop ramp.

The new auxiliary lanes would be 12 feet wide. In the southbound direction, the width needed for the new lane would be added in the median, and the median barrier would be shifted approximately 5 feet toward the northbound side of the freeway to make room for the new lane and a standard 10-foot-wide shoulder. Where the new southbound lane meets the existing ramps, outside shoulder widening would occur to achieve standard 10-foot-wide shoulders. In the northbound direction, the Tier II project proposes to pave a 10-foot-wide median shoulder and widen to the outside to add the 12-foot-wide auxiliary lane and a new 10-foot-wide shoulder.

As part of the widening in the northbound direction, the Tier II project proposes to repair an existing pavement failure in the outside lane and shoulder by improving the pavement section, installing a retaining wall and, if necessary, replacing the underlying County-owned sanitary sewer line crossing Route 1. A new concrete median barrier would also be constructed.

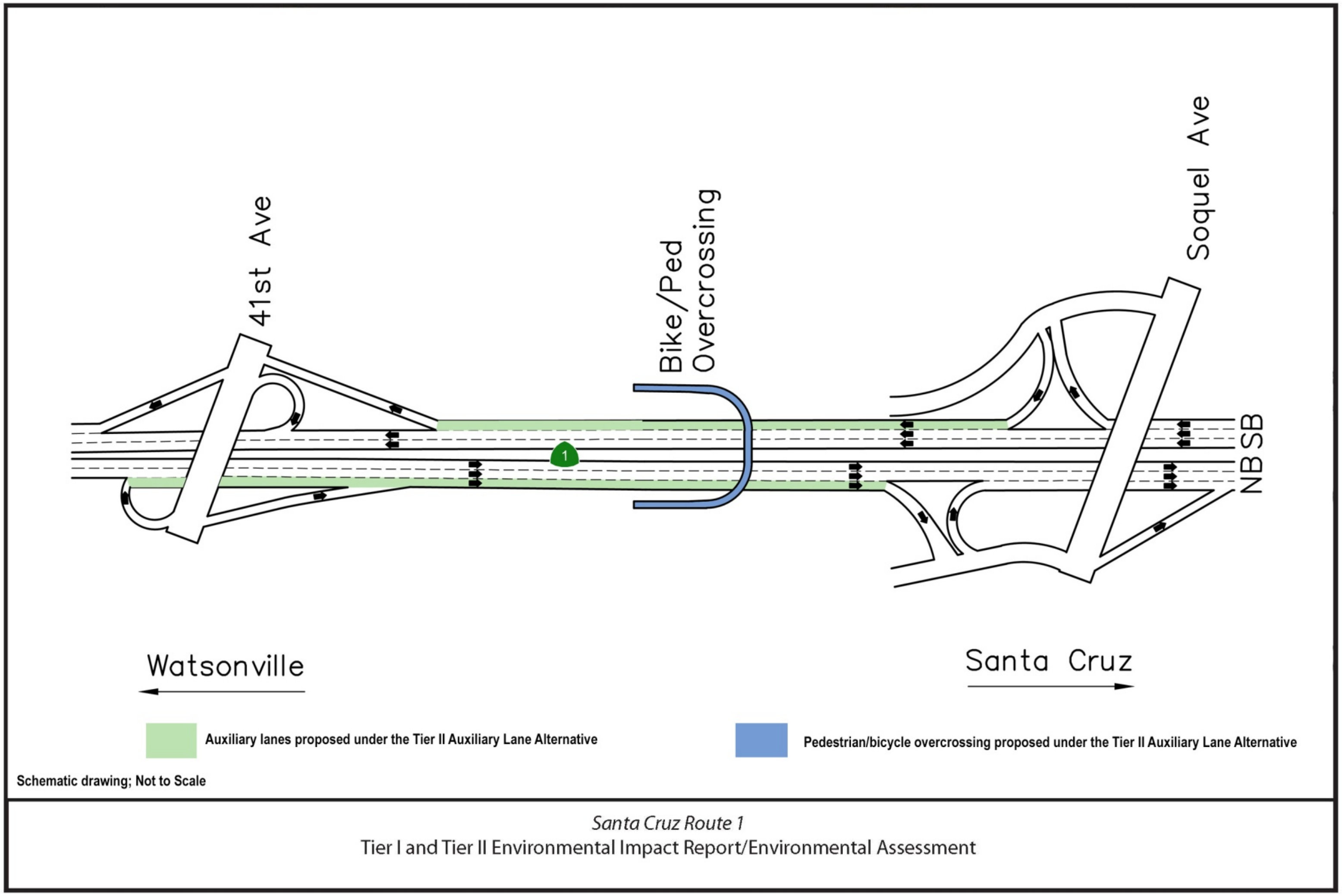


Figure 1-5: Tier II Auxiliary Lane Alternative – Project Features

Pedestrian/Bicycle Overcrossing

A new horseshoe-shaped pedestrian overcrossing is proposed over Route 1 at Chanticleer Avenue.[1] The overcrossing would vary in width from 14 feet along the ramps to 16 feet around the curves. Ramps from Chanticleer Avenue up to the overcrossing would be at a grade of approximately 5 percent. Up to where the overcrossing exceeds approximately 10 feet in height, the ramp would be built on retained fill; beyond that point, the bridge would rest on columns along the north right-of-way of Route 1, in the Route 1 median, behind the curb between Route 1 and Soquel Avenue, and along the south side of Soquel Avenue. The design of the ramps and bridge would include architectural texture or other aesthetic treatment. (See Section 2.16 for a visual simulation of the proposed Chanticleer Avenue pedestrian/bicycle overcrossing.)

In addition, a new 360-foot-long by 6-foot-wide sidewalk would be constructed along the south side of Soquel Avenue, starting at Chanticleer Avenue. The sidewalk would be separated from the street by a 4-foot-wide strip.

Retaining Walls

Retaining walls would be constructed as part of the roadway widening, with four separate walls: three on the north side of Route 1 and one on the south side. One of the retaining walls would start after the 41st Avenue on-ramp and extend approximately 150 feet; two other retaining walls on the northbound side would be 375 and 408 feet. On the southbound side, a 350-foot-long wall would be constructed along the highway mainline and Soquel Avenue, over the Rodeo Gulch culvert.

Three of the walls would be located to allow widening for an additional mainline lane on Route 1 in each direction in the future. The wall proposed along the northbound on-ramp at 41st Avenue would have to be demolished and replaced if the highway were to be widened in the future. Two of the walls would span Rodeo Creek Gulch, where there is an existing 9-foot arch concrete culvert, and one would be constructed within a narrow jurisdictional wetland area on the northbound side of Route 1, adjacent to a 39-inch culvert crossing.

1.5.4 No Build Alternative

The No Build Alternative offers a basis for comparing the effects of the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative with doing none of the proposed improvements. The No Build Alternative assumes there would be no major construction on Route 1 through the Tier I project limits other than currently planned and programmed improvements and continued routine maintenance. The following planned and programmed

[1] The overcrossing at Chanticleer is included in both the Tier I and Tier II Projects. The Tier I program of improvements encompasses the current Tier II Auxiliary Lane Project, which has been identified as the first phase of the overall program of improvements.

improvements included in the No Build Alternative are contained in the 2014 Regional Transportation Plan:

- Construction of auxiliary lanes between the Soquel Drive and Morrissey Boulevard interchanges for the Soquel to Morrissey Auxiliary Lanes Project; construction completed in December 2013.
- Replacement of the La Fonda Avenue overcrossing of Route 1, included as part of the Soquel to Morrissey Auxiliary Lanes project; construction completed in 2013.
- Reconstruction of bridges and addition of a merge lane in each direction between Highway 17 and the Morrissey/La Fonda area for the Highway 1/17 Merge Lanes Project; construction completed in 2008.
- Installation of median barrier on Route 1 from Freedom Boulevard to Rio Del Mar Boulevard.
- Installation of a Class 1 bicycle and pedestrian facility on Morrissey Boulevard over Highway 1.
- Implementation of single interchange improvements at 41st Avenue and Bay Avenue/Porter Avenue, as detailed and expensed in the Highway 1 HOV Project (RTC 24) as a standalone project, if the RTC project does not proceed.

The No Build Alternative would also include improvements of roadways and roadsides on Rio Del Mar Boulevard from Esplanade to Route 1, which entails the addition of bike lanes, transit turnouts, left-turn pockets, merge lanes, and intersection improvements. Roadwork would include major rehabilitation and ongoing maintenance. If the No Build Alternative is selected, it is highly likely that other improvements would be planned and programmed in the future.

1.5.5 Final Decision on Tier I and Tier II Alternatives

After the public circulation period, all comments will be considered, and the Department and Federal Highway Administration will select a preferred alternative for Tier I and a preferred alternative for Tier II projects and will make the final determination of the effect on the environment. As required by State law, the Department will certify that the projects comply with California Environmental Quality Act, prepare findings for all significant impacts identified, prepare a Statement of Overriding Considerations for impacts that will not be mitigated below a level of significance, and certify that the findings and Statement of Overriding Considerations have been considered prior to approval. The Department will then file a Notice of Determination with the State Clearinghouse that will identify whether the projects will have significant impacts, if mitigation measures were included as conditions of approval, that findings were made, and that a Statement of Overriding Considerations was adopted. Similarly, if the Federal Highway Administration (FHWA) determines that the

National Environmental Policy Act action does not significantly impact the environment, FHWA will issue a Finding of No Significant Impact (FONSI) in accordance with the National Environmental Policy Act.

1.5.6 Alternatives Considered but Eliminated from Further Discussion

A variety of alternatives and options was considered in developing the alternatives to be evaluated in this Tier I/II DEIR/EA. This section presents the different alternatives and options that were considered and the reasons why each was eliminated from further discussion. This EIR/EA sets forth only those alternatives necessary to permit a reasoned choice; other alternatives were withdrawn from further consideration because they would not avoid or substantially lessen any significant effects of the project, and/or they would not feasibly attain most of the basic objectives of the project. The alternatives must be limited to those that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR must examine in detail only those that could feasibly attain most of the basic objectives of the project. The alternatives described below were considered as alternatives for the full Tier I Corridor of improvements. With regard to Tier II improvements, no build alternatives or options were considered other than the Tier II Auxiliary Lane Alternative identified in Section 1.5.3.

Widen to Eight Lanes with Mixed-Flow and HOV Options

Comments received during project scoping suggested widening Route 1 to eight lanes within the project limits, either with one new mixed-flow lane and one HOV lane in each direction, or with two new mixed-flow lanes in each direction. These comments indicated that eight-lane widening was needed to address long-term travel demand requirements or that limiting the new lanes to HOV use only during peak periods would adversely affect other traffic. These alternatives were considered and eliminated from further discussion. This alternative would have resulted in a wider roadway than under the HOV Lane Alternative, resulting in greater environmental impacts. Eight-lane widening would have exceeded the original purpose and need statement as approved by RTC, which specifically defined the project as widening to six lanes to accommodate one HOV lane in each direction. Without specifically dedicating an HOV lane in each direction, this alternative would have been less effective than the HOV Lane Alternative in addressing the aspects of the project purpose related to promoting the use of alternative transportation modes as means to increase transportation system capacity, and encouraging carpooling and ridesharing.

Reversible HOV Lanes

The Reversible HOV Lanes Alternative was suggested by members of the community to minimize highway widening while still providing peak-period HOV lanes. This alternative proposed to construct one reversible HOV lane in the median of Route 1, which would allow for northbound during the morning peak period and southbound during the evening peak period. A reversible HOV lane treatment is typically used for a traffic peak directional split of 65 percent or more, which is not the case for Santa Cruz traffic within the project limits, where traffic volumes are more evenly split between the northbound and southbound directions. Under Baseline conditions, during the morning peak period, 57 percent of hourly vehicle trips travel in the northbound direction, and 43 percent in the southbound direction. During the evening peak period, northbound and southbound traffic is more evenly matched, with 51 percent of hourly vehicle trips in the southbound direction and 49 percent in the northbound direction (Traffic Operations Report, 2012). Because travel demand for this project is in both directions during both peak periods, a single reversible HOV lane would not have met the basic project objectives of reducing congestion, encouraging the use of alternative modes, improving travel times, and reducing travel delay. Moreover, when implemented, a reversible lane operation would be extremely challenging and costly to operate. For these reasons, this alternative was eliminated.

High-Occupancy Toll Lanes

A High-Occupancy Toll (HOT) Lanes Alternative would have constructed two additional high-occupancy toll lanes while maintaining a standard median width of 22 feet. It would have required additional widening to provide sufficient enforcement areas to cite violators. The incremental increase in widening had the potential for additional environmental impacts. A HOT Lanes Feasibility Study, conducted in 2002, showed that HOT lanes would not be cost effective within the project limits given the extra cost of constructing this type of facility and limited capacity for toll-paying motorists due to the anticipated demand of multi-occupant vehicles; therefore, this alternative would not meet the project purpose of reducing congestion by encouraging use of alternative modes. This alternative was therefore eliminated from further discussion.

Other Options Considered but Eliminated from Further Discussion

The following interchange configuration options were considered for the Tier I HOV Lane Alternative (which includes the reconfiguration of all nine interchanges within the Tier I project limits) and the Tier I TSM Alternative (which includes the reconfiguration of one interchange at Soquel Drive), but they were removed from further consideration for the reasons described below. The Tier II Auxiliary Lane Alternative does not include the reconfiguration of interchanges; therefore, it did not include consideration of these options.

Diamond Interchange Configurations

Diamond interchange configurations were evaluated to improve conditions for bicyclists and pedestrians and reduce the “footprint” of several of the interchanges within the project limits. Diamond configurations are the preferred geometry for bicyclists and pedestrians because they eliminate high-speed, free-flowing loop and free right-turn ramps in favor of perpendicular intersections with crosswalks. This alternative responded to the project purpose to encourage the use of alternative travel modes. Diamond ramps were considered for all interchanges within the project limits. Also under this alternative, the 41st Avenue and Bay Avenue/Porter Street interchange complex was conceived as a single integrated interchange system, using one-way frontage roads between 41st Avenue and Bay Avenue/ Porter Street, with single on- and off-ramps in each direction, providing direct local road connections for motorists without getting on the freeway, and providing bicycle and pedestrian access between 41st Avenue and Bay Avenue/Porter Street. Traffic operations analysis showed a conventional diamond interchange configuration resulted in unacceptable levels of service at Soquel Avenue, 41st Avenue, and State Park Drive, all of which would need supplemental ramps for acceptable traffic operations. At Larkin Valley Road, a full diamond is not warranted. The other interchanges within the project limits will incorporate diamond ramp configurations.

Single Point Diamond (Urban) Interchanges

Single point diamond, or urban, interchanges have a similar footprint to a tight diamond and can, depending on the traffic demand, improve operations compared to a tight diamond. The single point diamond interchange would compress the two intersections of a diamond interchange into one single intersection above Route 1.However, these interchange configurations have substantial aesthetic and cost implications. This configuration would require bridge structures for on- and off-ramps, a wider bridge over Route 1 to make room for compressed on- and off-ramps, and additional roadway width at the intersection to allow for multiple turn lanes. In addition to the added cost for structural engineering and construction and the aesthetic impacts of bridge widening, the wider expanses of pavement would worsen conditions for pedestrians and bicyclists, compared to the existing interchange configurations in the study area. The single point diamond or urban interchange configuration did not address the alternative travel mode project purpose and involved unnecessary environmental impacts; therefore, it was eliminated from further consideration for the Route 1 project.

Braided Ramp Configurations near 41st Avenue/Bay Avenue

A braided ramp configuration was considered for Tier I HOV Lane Alternative at the 41st Avenue and Bay Avenue/Porter Street interchanges during the Caltrans Project Study Report phase. The braided ramp option would have allowed for exit ramps from Route 1 and the entrance ramp from the local lanes to cross over and under one another. This option was rejected because it would not provide movements between 41st Avenue and Bay Avenue. Because this local movement is critical for access and circulation in this area of the county, and because local traffic constitutes a very large proportion of total traffic in this segment of the project, the braided ramp configuration was determined nonresponsive to the project need and eliminated from further discussion.

1.6 Permits and Approvals Needed

Based on the impacts identified in Chapter 2 of the Tier I/II DEIR/EA, the environmental permits and approvals shown in Table 1-7 are anticipated to be required for the Tier I Corridor Alternatives. The construction segments of the Tier I corridor would be implemented over a multi-year time frame and would be subject to separate environmental review. For this reason, the permits and approvals that will ultimately be required for future tiered projects are subject to change.

In addition to those permits and approvals shown in Table 1-7, the Location Hydraulic Study will be reviewed by the Federal Emergency Management Agency and the Santa Cruz County Planning Department to evaluate impacts to the affected watershed and floodplains, and the required permits. These agencies will determine if a floodplain map revision is necessary. The necessary permits will be obtained on completion of final design of the selected alternative.

Based on the impacts identified in Chapter 2 of the Tier I/II DEIR/EA, it is anticipated that the permits and approvals presented in Table 1-8 will be required for the Tier II Auxiliary Lane Alternative. As indicated in Table 1-8, consultation with the Federal Emergency Management Agency and the Santa Cruz County Planning Department will be conducted for those agencies to review the findings specific to the Tier II project in the Location Hydraulic Study and determine whether any revisions of Floodplain Maps would be needed.

Table 1-7: Anticipated Permits and Approvals Required Tier I Corridor Alternatives

Agency	Anticipated Permit/Approval	Future Activities
United States Fish and Wildlife Service	• Consultation under the Federal Endangered Species Act Section 7 for potential impacts to California red-legged frog, tidewater goby, California tiger salamander, Santa Cruz long-toed salamander, least Bell's vireo, marsh sandwort, Monterey spineflower, robust spineflower, and Santa Cruz tarplant; • Obtain biological opinion, specifying terms and conditions, and authorization for incidental take of endangered or threatened species.	Permitting and approval activities will be initiated as future projects are programmed and funded.
National Marine Fisheries Service	• Consultation under the Federal Endangered Species Act Section 7 for potential impacts to central California coast steelhead (will be circulated to National Marine Fisheries Service through the Fish and Wildlife Service); • Consultation under the Federal Endangered Species Act Section 9 to regulate "take" of federally endangered or threatened species, or candidate species; • Biological opinion, specifying terms and conditions, and authorizations for incidental take of endangered or threatened species.	Permitting and approval activities will be initiated as future projects are programmed and funded.
California Department of Fish and Wildlife	• 1602 Agreement for Streambed Alteration; • Section 2080.1 (Section 2081 Incidental Take Permit) Permit/Agreement for potential impacts to marsh sandwort, Santa Cruz tarplant, and least Bell's vireo.	Permitting and approval activities will be initiated as future projects are programmed and funded.
Regional Water Quality Control Board	• Water Quality Certification pursuant to Section 401 of the Clean Water Act; • Construction General National Pollutant Discharge Elimination System Permit requirements through Caltrans National Pollutant Discharge Elimination System Permit; • National Pollutant Discharge Elimination System Municipal Separate Storm Sewer Systems General Permit.	Permitting and approval activities will be initiated as future projects are programmed and funded.
United States Army Corps of Engineers	Section 404 Permit for filling or dredging waters of the United States (to include evaluation of constraints to federally protected biological resources).	Permitting and approval activities will be initiated as future projects are programmed and funded.
California Coastal Commission	• California Coastal Commission Development Permit from Santa Cruz County for development in Coastal Zones; • Consult with California Coastal Commission for discharge into Critical Coastal Areas and for federal consistency determination.	Permitting and approval activities will be initiated as future projects are programmed and funded

Table 1-7: Anticipated Permits and Approvals Required Tier I Corridor Alternatives

Agency	Anticipated Permit/Approval	Future Activities
State Historic Preservation Officer	Finding of Effect Concurrence	As future projects are programmed, evaluation of remaining sites will be completed. If sites are determined eligible, a Finding of Effect will be prepared.
Federal Emergency Management Agency	Determination of any need to revise Floodplain Map.	Permitting and approval activities will be initiated as future projects are programmed and funded.
Santa Cruz County Planning Department	Determination of any need to revise Floodplain Map.	Permitting and approval activities will be initiated as future projects are programmed and funded.

Table 1-8: Anticipated Permits and Approvals Required Tier II Auxiliary Lane Alternative

Agency	Anticipated Permit/Approval	Future Activities
United States Fish and Wildlife Service	• Consultation under the Federal Endangered Species Act Section 7 for potential impacts to tidewater goby and California red-legged frog; • Biological opinion, specifying terms and conditions, and authorizations for incidental take of endangered or threatened species.	Biological Assessment to be prepared by project sponsor and consultation initiated following identification of a preferred alternative.
California Department of Fish and Wildlife	• 1602 Agreement for Streambed Alteration; • Section 2080.1 (Section 2081 Incidental Take Permit) Agreement for Threatened and Endangered Species.	• Application for the 1602 Agreement to be submitted during the final design phase of the Tier II project; • Copies of Biological Assessment and non-jeopardy biological finding to be provided to California Department of Fish and Wildlife for agreement with Section 2080 of the California Fish and Game Code.
Regional Water Quality Control Board	• Obtain Water Quality Certification pursuant to Section 401 of the Clean Water Act; • Construction General National Pollutant Discharge Elimination System Permit requirements through Caltrans National Pollutant Discharge Elimination System Permit; • National Pollutant Discharge Elimination System Municipal Separate Storm Sewer Systems General Permit.	• Application for the Section 401 permit to be submitted during the final design phase of the Tier II project. • Caltrans Statewide Pollutant Discharge Elimination System Permit (Phase I). The County of Santa Cruz and cities of Capitola and Santa Cruz hold the National Pollutant Discharge Elimination System Permits (Phase II).
United States Army Corps of Engineers	Section 404 Permit for filling or dredging waters of the United States (to include evaluation of constraints to federally protected biological resources).	Application for Section 404 permit anticipated during final design phase of the Tier II project.
Federal Emergency Management Agency	Determination of any need to revise Floodplain Map.	Floodplain Map revision, if needed.
Santa Cruz County Planning Department	Determination of any need to revise Floodplain Map.	Floodplain Map revision, if needed.

Chapter 2 Affected Environment, Environmental Consequences, and Avoidance, Minimization, and/or Mitigation Measures

This chapter examines the impacts that the project would have on the human, physical, and biological environments in the project area. It describes the existing environment that could be affected by the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative, potential impacts from each of these alternatives, and proposed avoidance, minimization, and/or mitigation measures.

As part of the scoping and environmental analysis conducted for the project, the following environmental issues were considered, but no adverse impacts were identified. Consequently, there is no further discussion of these issues in this document:

- Wild and Scenic Rivers – No rivers classified as wild and scenic are present in the proposed project area.
- Timberlands – No timberlands are located in the proposed project area.
- Farmlands – No farmlands would be affected by the project.
- Parks and Recreation – No parks and recreation facilities would be affected as a result of the Tier I Corridor Alternatives or Tier II Auxiliary Lane Alternative (Community Impact Assessment, 2015). A discussion of all parks and recreational resources located within 0.5 miles of the proposed project is provided in Appendix B.
- Community Impacts: Economic – Economic impacts were considered during project scoping, but no adverse impacts were identified.

2.1 Human Environment

2.1.1 Land Use

This section evaluates potential impacts to land use that could result from operation of the Tier I and Tier II project alternatives. Impacts to land use that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

2.1.1.1 Existing and Future Land Use

Affected Environment

The information in this section is derived from the *Community Impact Assessment* (2015) prepared for the proposed project.

Tier I Corridor Alternatives

The limits of the Tier I Corridor Alternatives, on Route 1 from approximately 0.4 mile south of the San Andreas-Larkin Valley Road interchange to 0.3 mile north of the Morrissey Boulevard interchange and covering a distance of approximately 8.9 miles, traverse the cities of Santa Cruz and Capitola; the villages of Live Oak, Soquel, and Aptos; and unincorporated Santa Cruz County. Urban residential land uses predominate along most of the Route 1 corridor, with some commercial and industrial property located primarily in the unincorporated areas. Major public facilities include the Dominican Santa Cruz Hospital and Cabrillo College, as well as the Arana Gulch Open Space, De Laveaga Park and Golf Course, and numerous other state, regional, and local parks and coastal recreation areas.

Route 1 is the major north-south transportation route for the residents of Santa Cruz and Monterey counties. Traffic on Route 1 is affected by a pronounced commute pattern between housing in southern Santa Cruz County and jobs in the Santa Cruz area and farther north in Silicon Valley. Residential growth in the Route 1 corridor communities in Santa Cruz County is projected to be slowing by the Association of Monterey Bay Area Governments. Because Watsonville and the unincorporated areas of the county have most of the remaining room to build housing, housing growth in Watsonville and the unincorporated urban service areas of Aptos and Freedom make up more than 70 percent of the total projected housing growth in Santa Cruz County between 2000 and 2030. Many jobs in the Santa Cruz area are service jobs; however, the lower paid service workers and many of those with moderate incomes cannot afford to live in Santa Cruz. The resulting jobs/housing imbalance will reinforce the south-to-north commute pattern because the relatively job-rich Santa Cruz area will continue to draw workers from the southern part of the county where housing is more available and more affordable. Increased demand for workers in the Santa Cruz area, plus commute trips to Silicon Valley is expected to exacerbate recurrent peak-period highway congestion in the project area.

Based on 2014 Association of Monterey Bay Area Governments population, housing, and employment forecasts, Santa Cruz County is expected to experience continued growth over the next 30 years, but at a slower rate than the state and the nation. The region is expected to continue to see population and housing growth associated with job growth outside the region. In particular, job growth in Silicon Valley, combined with high housing prices, is expected to lead to an increase in the number of commuters traveling to the San Francisco Bay Area. As a result of this projected growth, Santa Cruz County and its cities will share challenges in providing an adequate supply and range of housing opportunities; developing economic and employment opportunities; locating housing and jobs in proximity to one another; and maintaining the quality of life for residents.

Existing land uses in the study area are shown in Figure 2.1.1-1 and are described below. The City of Santa Cruz is the county seat and commercial capital of Santa Cruz County. Its land uses are a mix of residential, commercial, park, industrial, and open space.

The City of Santa Cruz

North of Route 1 within the study area, land uses include De Laveaga Park and Golf Course, De Laveaga Elementary School, and residential areas. South of Route 1 are Harbor High School, Branciforte Elementary School, Gault Elementary School, the Yacht Harbor and Wharf, Arana Gulch Open Space, Tyrell Park/Natural History Museum, several interior and shoreline parks, and residential areas.

The City of Santa Cruz is experiencing low to moderate population growth, but that growth will continue to decline because the city is relatively built out. Limited remaining residentially zoned vacant land will require the City to focus on infill development in the urban core and along transportation corridors. Rising residential land values has led to erosion of the commercial land inventory. A few vacant or underutilized industrial parcels are left that could accommodate future employment centers. Santa Cruz's average household size dropped from 2.44 to 2.39 persons between 2000 and 2010. From 2000 to 2010, the city experienced a 15.4 percent decline in residents aged 25 to 44, while the number of residents from ages 45 to 64 increased by 21.8 percent.

The City of Capitola

The city of Capitola sits on the northeast shore of Monterey Bay between the unincorporated areas of Live Oak and Aptos. Its land uses are a mix of residential, commercial, park, and open space, and include the 41st Avenue and Auto Plaza commercial area; Capitola Elementary School and New Brighton Junior High School; Capitola Wharf; open space areas such as Capitola City Beach, the Soquel Creek waterway, and New Brighton State Beach; and residential neighborhoods. Natural resource areas include the Monterey Bay and beach area, Soquel Creek and Lagoon, Rodeo Creek Gulch, and several riparian corridors and monarch butterfly groves.

Industrial uses in Capitola account for a small percentage of total land area; the most prominent industrial area is along Kennedy Drive, which fronts Route 1. Capitola is basically built out, with very little vacant land and little opportunity for annexation. Growth is expected to focus on intensification of existing land uses and scattered infill development.

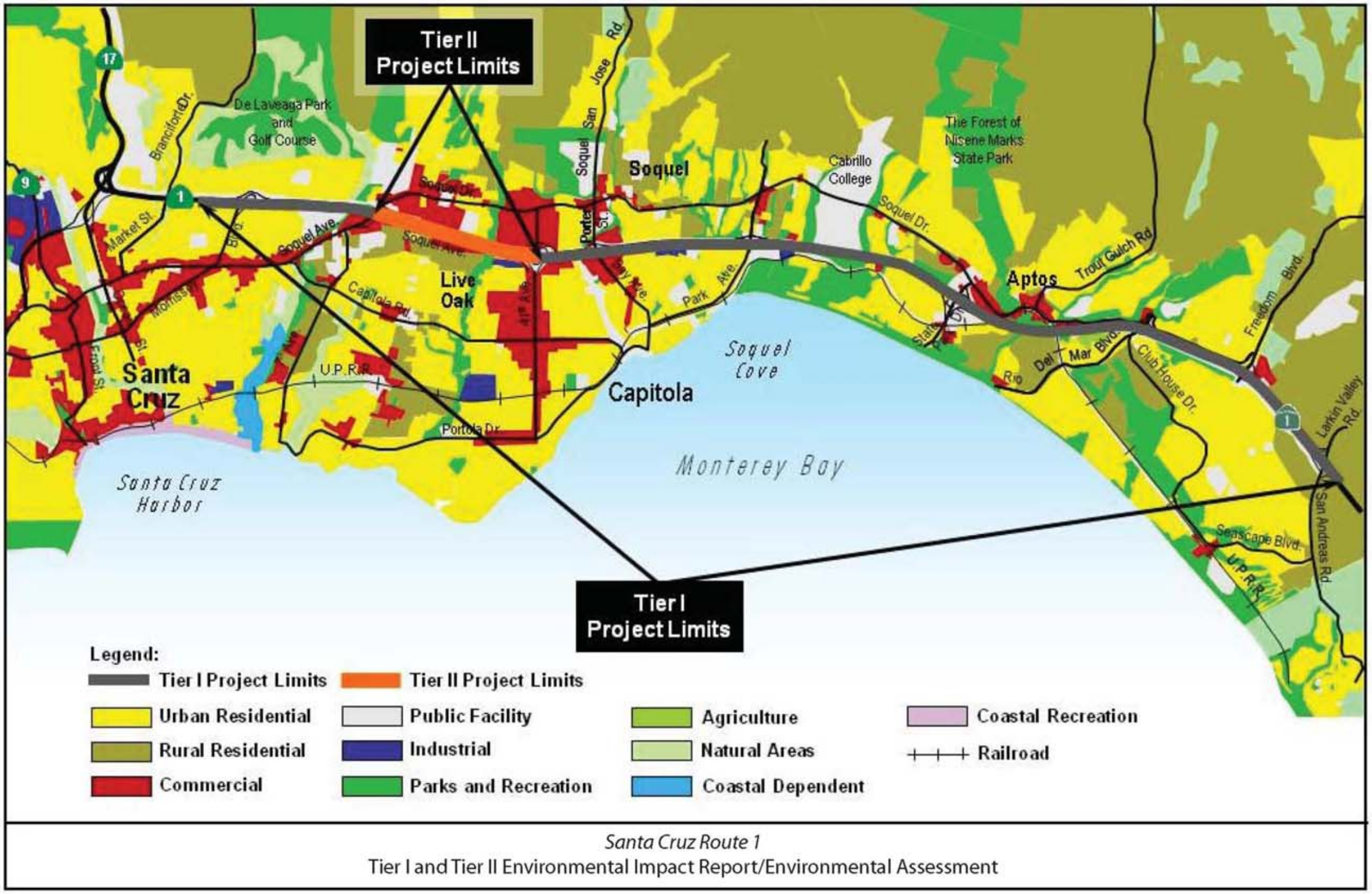


Figure 2.1.1-1: Existing Land Use

The Village of Live Oak

Live Oak is an unincorporated area that straddles Route 1 between the cities of Santa Cruz and Capitola. Its land uses are primarily residential, commercial, and industrial, and include the Oak Wood Cemetery, Dominican Hospital, Holy Cross Cemetery, Live Oak Elementary School, and several shoreline and interior parks.

Unincorporated Area of Soquel

The unincorporated area of Soquel is located north of Route 1 between Live Oak to the west and Aptos to the east and has a total area of approximately 1 square mile. Its major land uses include Anna Jean Cummings County Park, Soquel Village and Porter Library, Soquel High School, Soquel Elementary School, Soquel Lions Park, Richard Vessey Park, Willowbrook Park, and residential and industrial areas. The 97-acre O'Neill Ranch is northwest of the Village and adjacent to the high school.

Unincorporated Area of Aptos

The unincorporated area of Aptos straddles Route 1 east of Soquel and has a total area of approximately 7 square miles. Its land uses include commercial retail, office, industrial, and residential. Aptos is home to Cabrillo College, Aptos High School, Aptos Village, Aptos Village County Park, Aptos Branch Library, Calvary Cemetery, Polo Grounds Regional Park, Aptos Seascape Golf Course, and several interior and shoreline parks.

Several major projects are currently in various phases of planning in the project vicinity. These projects, which are listed in Table 2.1.1-1, are located in the city and county of Santa Cruz and the communities of Aptos and Soquel.

Table 2.1.1-1: Major Projects within the Tier I and Tier II Study Area

Name	Jurisdiction	Proposed Uses	Status
Residential Projects			
Redwood Commons*	City of Santa Cruz	A development of 36 single-room occupancy residential units to be constructed within Santa Cruz, at 1606 Soquel Avenue, approximately 0.47-mile from Route 1.	Completed
Canterbury Park	Aptos	A development of 19 new 2-, 3-, and 4-bedroom townhomes located at Canterbury Drive and Sea Ridge Road. The townhomes are priced to be affordable to moderate-income families and should open in April 2013.	Completed
Aptos Blue	Aptos	Development of a 40-unit complex for low-income individuals. Located on part of the original Aptos Ranch.	Completed
St. Stephen's Senior Housing	City of Santa Cruz	Development of up to 40 units of affordable housing for seniors, located on vacant lands on the site of St. Stephen's Church off of Soquel Avenue.	Permit application pending
Hyatt Place Hotel	City of Santa Cruz	A development for a 111-room hotel property to be constructed at 407 Broadway, approximately 1-mile from Route 1.	Permit application pending

Table 2.1.1-1: Major Projects within the Tier I and Tier II Study Area

Name	Jurisdiction	Proposed Uses	Status
Erlach Site on Cunnison Lane—MidPen Housing Project	Soquel	Development of a 102-unit affordable housing project at 3250 – 3420 Cunnison Lane, approximately 0.35 mile from Route 1.	Permit approved – project on hold
Nigh Property*	Soquel	A proposed 100-unit residential development to be constructed at 5940 Soquel Avenue, approximately 0.33 mile from Route 1.	Permit application pending
Tannery Arts Center	Santa Cruz County	The project, which is located approximately 0.3 mile from Route 1, includes three phases: • The Tannery Artist Lofts, 100 units of affordable housing for artists (completed) • The Digital Media and Creative Arts Center, which includes rehabilitation of the historic buildings on the property to be used as studio space for artists (under construction) • The Performing Arts Center (fundraising stage)	In operation
Multi-Use Development Projects			
The Farm Neighborhood Park and Community Center*	Santa Cruz County	Development of a 2-story community center, 39 units of housing, 0.75 mile of meandering pathways, a skate feature, 1/2 basketball court, children's play structures, a bocce ball court, nature interpretive signage, a pedestrian bridge, a dog enclosure, community and heritage gardens, oak woodland habitat restoration, turf and picnic areas, landscaping, a restroom, and parking areas. Located at 3120 Cunnison Lane, Soquel, CA 95073, approximately 0.5 mile from Route 1.	Permit application has been submitted
350 Ocean Street	City of Santa Cruz	A mixed-use project including 82 residential condominiums, 8,900 square feet of retail commercial space, and a 7,500-square-foot gymnasium and spa, located at 350 Ocean Street, approximately 0.98 mile from Route 1.	Completed.
Heart of Soquel - Soquel Creek Linear Park and Parking Improvements	Santa Cruz County	A potential development of community facility projects such as pedestrian and vehicular safety and circulation improvements, environmental enhancement, and facility improvements for potential event hosting activities located at Soquel Drive and Porter Street, Soquel, CA 95073, approximately 0.32 mile from Route 1.	Unknown
Pacific Station	Santa Cruz County	The current conceptual plan is for a 5-story, mixed-use, transit-oriented development with the expanded METRO center on the ground floor, along with limited commercial uses; parking on the second floor; and affordable housing with limited office space on the remaining 3 floors, approximately 1 mile from Route 1.	In planning phase.
Transportation Projects			
Metrobase	City of Santa Cruz	A development that would consolidate all of METRO's Operations, Administration, Fueling, Maintenance, and ParaCruz facilities in the Harvey West area of Santa Cruz, to be constructed near the end of State Route 9, at the intersection of River Street and Route 1.	Under construction

Table 2.1.1-1: Major Projects within the Tier I and Tier II Study Area

Name	Jurisdiction	Proposed Uses	Status
Rio del Mar Boulevard Improvements	City of Santa Cruz	Roadway improvements.	Under construction
Deploy Intelligent Transportation System on Route 1*	City of Santa Cruz	Deploy Intelligent Transportation System technology on Route 1.	Under construction
Route 1 Soquel to Morrissey Auxiliary Lanes Project	City of Santa Cruz	Construction of auxiliary lanes between the Soquel Avenue/Drive and Morrissey Boulevard interchanges. Also includes replacement of the Route 1/La Fonda Avenue overcrossing.	Completed
Route 1 San Lorenzo Bridge Widening	City of Santa Cruz	Widen the Route 1 San Lorenzo River Bridge to improve flow from Highway 17 through the Junction of Route 1 and Highway 9.	Planning phase
Route 1/9 Intersection Improvements	City of Santa Cruz	Improvements to the intersection of Route 1 and Highway 9 in the city of Santa Cruz.	Planning phase
Route 1/Harkins Slough Road Interchange – Santa Cruz	City of Santa Cruz	Reconstruct interchange on Route 1 at Harkins Slough Road in the city of Watsonville.	Planning Phase
Bicycle and Pedestrian (Class I)	City of Santa Cruz	Construction on Route 1 at Morrissey Boulevard	Under construction
Santa Cruz Branch Line	Santa Cruz County	Conversion of a 32 mile coastal freight rail corridor to a mix of passenger rail, transit, bicycle, and pedestrian uses.	Feasibility and planning phase

Source: Santa Cruz County Redevelopment Agency, September 2011; City of Santa Cruz Planning and Community Development Department, February 2008, March 2011, March 2013, and August 2014. City of Santa Cruz Economic Development Department, March 2013, August 2014.

* Project located within the Tier II Study Area.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative begins on Route 1 at the Soquel Avenue/Soquel Drive interchange and ends at the 41st Avenue interchange. The Tier II project is located in the City of Capitola and in unincorporated areas within the villages of Live Oak and Soquel. Descriptions of each of these areas are provided above in the Tier I Corridor Alternatives section. Existing land uses within the Tier II project limits are primarily residential, commercial, and industrial, and include several schools, parks, libraries, and cemeteries. Land uses in the Tier II study area, along with schools, parks, churches, and hospitals, can be seen below in Figure 2.1.1-2.

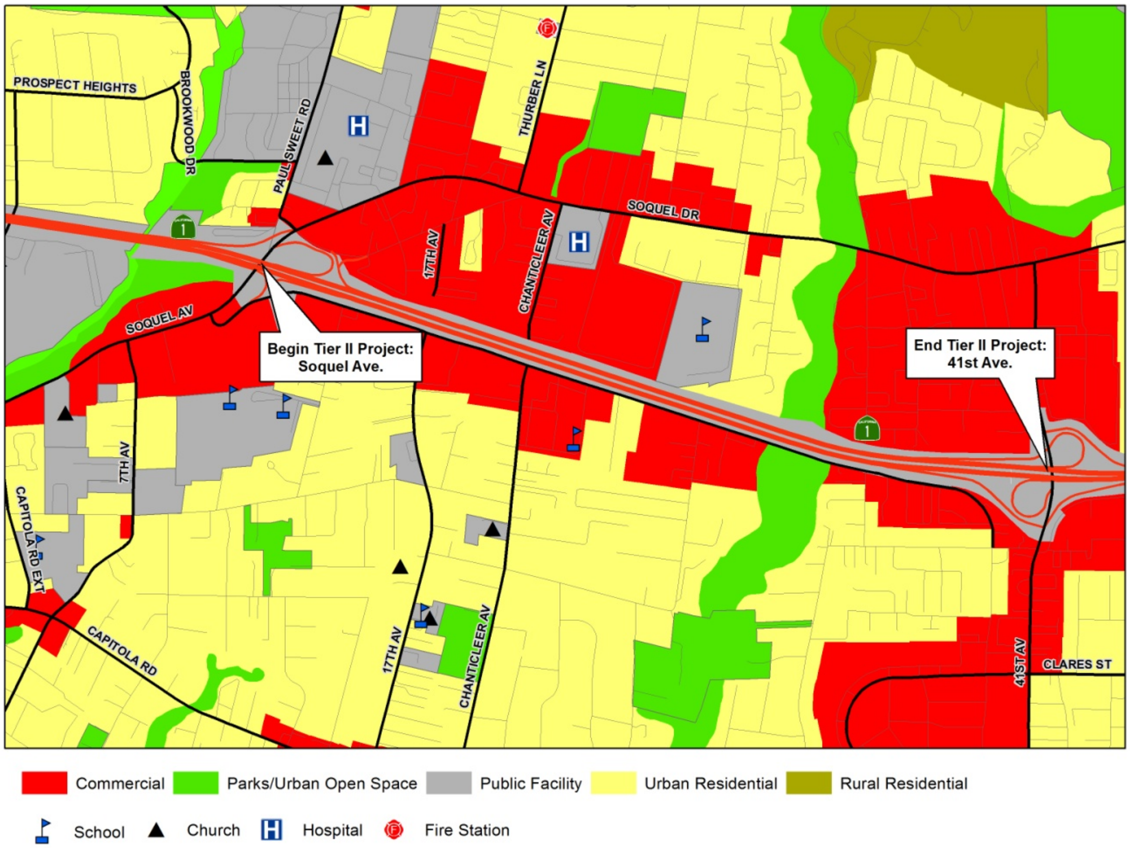


Figure 2.1.1-2: Tier II Study Area

Several residential and roadway projects are currently in various phases of the planning process within the Tier II Auxiliary Lane Alternative project limits. Residential projects are located in Soquel while planned transportation projects affect the entire Route 1 corridor. These are listed above in Table 2.1.1-1.

Environmental Consequences

Tier I Corridor Alternatives

The Tier I Corridor Alternatives would require the acquisition of property in order to be implemented, discussed further in Section 2.1.3.2 Relocations and Real Property Acquisitions. The TSM Alternative would convert 1.80 acres of land to transportation use, including approximately 0.27 acre of industrial land uses, 0.35 acre of commercial uses, and 0.34 acre of residential land uses.

The HOV Lane Alternative would convert approximately 11.59 acres of land to transportation use, based on the current engineering estimate. This would include approximately 5.5 acres of commercial land, 0.27 acre of industrial land use, and 1.46 acres of residential land use.

The right-of-way impacts of the Tier I Corridor HOV Lane Alternative would be substantially greater than the Tier I Corridor TSM Alternative owing to the wider footprint of the HOV Lane Alternative; however, overall, the Tier I build alternatives would result in only a minor conversion of land from the corridor perspective.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative would convert a minor amount of land relative to the study corridor from its existing uses to transportation uses. Approximately 0.33 acre would be converted to transportation land uses. No residential or commercial structures would be displaced by the Tier II Auxiliary Lane Alternative.

No Build Alternative

The No Build Alternative under the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative would not convert any existing land uses to transportation uses. Implementation of the No Build Alternative would have no direct effect on land uses in the project area, and location and the characteristics of corridor transportation facilities and uses generally would not change. The Route 1/ Highway 17 Merge Lanes project would be constructed, improving traffic operations at the north of the corridor. Traffic congestion elsewhere in the corridor would worsen, however, including increased diversion of freeway traffic to local arterials. This could adversely affect land uses abutting these arterials, as vehicles would make use of local streets rather than the Route 1 mainline.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

Because no actual construction would take place as a result of selecting a Tier I Corridor Alternative, no avoidance, minimization, and/or mitigation measures are required at this time. As portions of the Tier I corridor are programmed as Tier II construction-level projects, they will be subject to separate environmental review. Based on the impacts that have been identified in this section, the following avoidance and minimization measures are provided to minimize impacts to right-of-way acquisition. These measures are subject to revision based on the changes in the setting, project design, or regulatory requirements in place when individual corridor projects undergo environmental review.

- Adjust project alignment to fit within existing right-of-way where feasible;
- Include retaining walls in the design instead of grading out vertical differentials where feasible;
- Propose exceptions to design standards that would impact the right-of-way.

In addition, the measures identified in Section 2.1.3.2 Relocations and Real Property Acquisitions, Avoidance, Minimization, and/or Mitigation measures also apply.

Tier II Auxiliary Lane Alternative

The following avoidance measures apply to the Tier II Auxiliary Lane Alternative.

- The project alignment has been adjusted to fit within existing right-of-way where feasible;
- In the vicinity of Rodeo Gulch, retaining walls will be included on both sides of the roadway to minimize impacts;
- Exceptions to design standards are proposed to reduce right-of-way impact in the vicinity of the Chanticleer Avenue pedestrian overcrossing.

In addition, the measures identified in Section 2.1.3.2 Relocations and Real Property Acquisitions, Avoidance, Minimization, and/or Mitigation measures also apply.

2.1.1.2 Consistency with State, Regional, and Local Plans

The following section describes local, regional, and state plans regarding the affected areas within the Tier I and Tier II project limits. Both the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative are subject to the guidance and policies of these general plans and town plans. The area plans address growth and development within both the Tier I and Tier II project vicinities.

Affected Environment

The information in this section is derived from the *Community Impact Assessment* (2014) prepared for the proposed project.

Future growth and development within the study area is guided by land use policies and programs set forth in the *Santa Cruz County 1994 General Plan and Local Coastal Program*; the *City of Santa Cruz General Plan and Local Coastal Program, 2030*; the *City of Capitola General Plan;* and village design plans for the unincorporated areas of Soquel and Aptos.

Santa Cruz County 1994 General Plan and Local Coastal Program. The 1994 General Plan for Santa Cruz County, adopted in May 1994, includes the Local Coastal Program Land Use Plan; various Village, Town, Community, and Specific Plans for local jurisdictions within the County; and the General Plan and Local Coastal Program Environmental Impact Report. These documents follow a basic policy of maintaining separation of urban and rural areas, encouraging new development in urban areas, and protecting agricultural land and natural resources in the rural areas. The primary areas of concern as the County approaches build-out are to (1) provide adequate services, particularly water, to present and future residents; (2) provide affordable housing; (3) preserve the County's environmental quality; and (4) prevent conversions of agricultural lands.

The Circulation Element of the *1994 General Plan and Local Coastal Program* for Santa Cruz County promotes the need to make more efficient use of the existing transportation system through a TSM program. This approach supports capacity improvements and alternatives to driving alone during peak periods. Additionally, the Circulation Element places an emphasis on increasing the provision of transit, pedestrian, and bicycle facilities throughout Santa Cruz. The following goals are relevant to the proposed Tier I and Tier II projects:

- Transportation System: Provide a convenient, safe, economical transportation system for the movement of people and goods, promoting the wise use of resources, particularly energy and clean air, and the health and comfort of residents.
- Mode Choice: Provide the public with choices in transportation modes on a well-integrated system.
- Limit Increase in Automobile Use: Limit the increase in automobile usage to minimize adverse impacts. Increase transit ridership, carpooling, vanpooling, walking, bicycling, etc.
- Efficiency: Provide for more efficient use of existing transportation facilities.
- Access: Provide for the special transportation needs of the elderly and disabled.
- Bikeway System: Develop and implement a comprehensive bikeway system that promotes bicycle travel as a viable transportation mode and meets the recreation and travel needs of the citizens of Santa Cruz County.
- Safety: Reduce the number and severity of bicycle accidents.

City of Santa Cruz General Plan and Local Coastal Program, 2030. The *General Plan/Local Coastal Program* for the City of Santa Cruz, adopted in June 2012, includes policies and guidelines for land use for the city as a whole, as well as area and specific plans that refine and customize the policies of the *General Plan* for distinct areas to enhance their unique character.

Land-use goals for the study area are formulated to maintain and build upon the city’s diverse natural and built environment. The *General Plan* stipulates that development and intensification of residential, commercial, and industrial lands should be focused within the city’s existing boundaries. The Pacific Ocean, agricultural/grazing lands, publicly owned open space, and natural areas will also be preserved to create a boundary and contain urban developments. Objectives, programs, and policies related to the proposed project are to develop the following:

- Land-use patterns, street design, parking, and access solutions that facilitate multiple transportation alternatives;

- A safe, sustainable, efficient, adaptive, and accessible transportation system; and
- A safe, efficient, and adaptive road system by acknowledging and managing congestion, and ensuring road safety for all users.

The Mobility Chapter of the *City of Santa Cruz General Plan and Local Coastal Program* looks at ways to facilitate transportation alternatives, keep transportation and road systems safe and efficient, and systematically interconnect bicycle and pedestrian facilities. The proposals below aim to encourage greater use of alternative transportation modes and reduce automobile travel in concert with other parts of the Plan that foster supportive land uses, building types, and activities. Goals, policies, and actions of the Mobility Chapter that are related to the proposed project are to:

- Reduce automobile dependence by encouraging appropriate neighborhood and activity center development by creating walkable, transit-oriented activity centers throughout the city; connect activity centers with pedestrian and bicycle paths, and implement pedestrian and bicycle improvements that support transit ridership.
- Ensure that sidewalks, transit centers, and major transit stops are conveniently located, usable, and accessible to all.
- Provide leadership on sustainable regional mobility.
- Increase the efficiency of the multi-modal transportation system to:
  - Design for and accommodate multiple transportation modes;
  - Promote alternative transportation improvements with TSM strategies, road improvements, and widening/expansion projects that can achieve an acceptable level of service; and
  - Incorporate pedestrian, bicycle, and mass transit facilities in the design of bridges and road projects.
- Acknowledge and manage congestion.
- Create a citywide interconnected system of safe, inviting, and accessible pedestrian ways and bikeways.

City of Capitola General Plan. The General Plan for the City of Capitola was updated and adopted in June 2014. The Housing Element of the General Plan was updated in 2010. Policies and programs to guide development consistent with the goals and quality of life desired by Capitola residents include maintaining Capitola's existing small-town scale and character; providing year-round opportunities for residents of all ages to meet and gather in public places; protecting and enhancing the quality of life within residential neighborhoods; and providing a balanced transportation system.

Specific policies of relevance to the proposed project are to:

- Provide a balanced multimodal transportation system that enhances mobility in a safe and sustainable manner;
- Support regional efforts to increase the capacity of Highway 1 to accommodate future forecasted traffic demands, including the proposed Highway 1 high-occupancy vehicle (HOV) project;
- Continue to maintain the established Level of Service C or better at intersections throughout Capitola, with the exception of the Village area, Bay Avenue, and 41st Avenue;
- Support regional efforts to improve the availability, affordability, reliability, and convenience of public transportation service in Capitola;
- Provide a complete network of bikeways and bicycle facilities in Capitola; and
- Provide high-quality pedestrian facilities that support walking and the enjoyment of the outdoors in Capitola.

Soquel Village Plan. Major land use objectives of the Soquel Village Plan, adopted May 1990, are to make the village more pedestrian-oriented and to limit traffic improvements to accommodate existing, not future, regional traffic. Specific goals of relevance to the proposed project are:

- Make the village more pedestrian-oriented.
- Accommodate regional traffic in a manner that does not compromise the goals of enhancing the pedestrian environment and cohesive village character.
- Provide adequate parking for existing and future needs.

Aptos Village Plan. The Aptos Village Area Plan, adopted in February 2010, identifies land use, circulation, and community design issues that focus on developing and maintaining the Village as a community focal point; encouraging mixed-use development; achieving a pedestrian environment; preserving architectural quality; and integrating the creek system, open space, and the Forest of Nisene Marks in maintaining Village character.

Of particular relevance to the proposed project are the goals of facilitating access to the Village for the Aptos community, minimizing regional automobile traffic through the Village, and promoting the prosperity of business and residential activities of distinctive “village” nature. Related policies are to support an update of the County Regional Transportation Plan that relieves the Village of through regional traffic, encouraging a variety of transit modes serving the Village, and establishing a system of bicycle pathways connecting the Village to surrounding areas and activities.

Environmental Consequences

Tier I Corridor Alternatives

The Tier I Corridor Alternatives are consistent with local planning goals and policies. Either alternative would serve local jurisdictions' stated objectives for improving the existing Route 1 corridor. The Tier I Corridor HOV Lane Alternative would be more effective than the Tier I Corridor TSM Alternative in encouraging use of alternative modes and reducing through traffic on local streets.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative is consistent with local planning goals and policies and is identified in regional plans and studies. Because the project is aimed at reducing congestion and improving safety, the Tier II Auxiliary Lane Alternative objectives are consistent with adopted local planning goals and policies for improving the existing Route 1 corridor.

No Build Alternative

Implementation of the No Build Alternative would not support achievement of the local and regional goals aimed at improving the transportation system.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

Because no actual construction would take place as a result of selecting a Tier I Corridor Alternative, no avoidance, minimization, and/or mitigation measures are required at this time. As portions of the Tier I corridor are programmed as Tier II construction-level projects, they will be subject to separate environmental review. Based on the impacts analysis provided above, no conceptual avoidance, minimization, and/or mitigation measures are required for either of the Tier I Corridor Alternatives.

Tier II Auxiliary Lane Alternative

No mitigation measures are necessary for the Tier II Auxiliary Lane Alternative.

2.1.1.3 Coastal Zone

Regulatory Setting

This project has the potential to affect resources protected by the Coastal Zone Management Act of 1972. The Coastal Zone Management Act is the primary federal law enacted to preserve and protect coastal resources. The Coastal Zone Management Act sets up a program under which coastal states are encouraged to develop coastal management programs. States with an approved coastal management plan are able to review federal permits and activities to determine if they are consistent with the state's management plan.

California has developed a coastal zone management plan and has enacted its own law, the California Coastal Act of 1976, to protect the coastline. The policies established by the California Coastal Act are similar to those for the Coastal Zone Management Act: they include the protection and expansion of public access and recreation; the protection, enhancement, and restoration of environmentally sensitive areas; the protection of agricultural lands; the protection of scenic beauty; and the protection of property and life from coastal hazards. The California Coastal Commission is responsible for implementation and oversight under the California Coastal Act.

Just as the federal Coastal Zone Management Act delegates power to coastal states to develop their own coastal management plans, the California Coastal Act delegates power to local governments to enact their own local coastal programs. Local coastal programs determine the short- and long-term use of coastal resources in their jurisdiction consistent with the California Coastal Act goals. A federal consistency determination may be needed as well.

Affected Environment

The information in this section is derived from the *Community Impact Assessment* (2014) prepared for the proposed project.

As shown in Figure 2.1.1-3, the segment of Route 1 between the southern project limit near the San Andreas Road/Larkin Valley Road interchange and east of the Bay Avenue - Porter Street interchange lies within the coastal zone. Significant coastal resources within this area include Valencia Lagoon, Valencia Channel, freshwater marsh/riverine habitat, and riparian forest. The Valencia Lagoon and Valencia Channel are located on the southern side of Route 1, between Freedom Boulevard and Rio Del Mar Boulevard. Valencia Channel is hydrologically connected to the Valencia Lagoon; both contain riverine and freshwater marsh, scrub-shrub wetland, and riparian forest habitats. Freshwater marsh/riverine habitat is primarily located within the Valencia Channel and within Aptos Creek. Riparian forest is located between the Union Pacific railroad tracks and Spreckles Drive and in pockets surrounding Route 1 from Mar Vista Drive to the end of the coastal zone east of the Bay Avenue - Porter Street interchange.

The California Coastal Commission defines the Local Coastal Program within Santa Cruz County as part of the Central Coast Area. Both the city and county of Santa Cruz have Local Coastal Programs incorporated into their respective general plans.

Land uses in this portion of the coastal zone include parks and recreation, residential, commercial, and public facilities. Wetlands and other biological resources in the coastal zone are discussed in Section 2.3.

Environmental Consequences

Tier 1 Corridor Alternatives

Table 2.1.1-2 evaluates whether the Tier I Corridor Alternatives are consistent with relevant policies from the Local Coastal Programs of the city and county of Santa Cruz.

As shown in Table 2.1.1-2, the Tier I Corridor Alternatives are potentially inconsistent with policies from the Santa Cruz County and City of Santa Cruz Local Coastal Programs regarding visual resources, biological resources, wetland and creek protection, and historical resources. However, measures are identified in the respective sections of this EIR/EIS to address the potential inconsistencies. The Tier I Corridor Alternatives would be consistent with other policies from the local coastal programs because they would preserve park and recreational land uses as stated in the Local Coastal Programs, and they would improve access to these resources by decreasing congestion and delay along Route 1. As portions of the Tier I corridor are programmed as Tier II construction-level projects, the future Tier II projects that are located within the coastal zone would require a Coastal Development Permit from Santa Cruz County. In addition, consultation with the California Coastal Commission regarding discharges into Critical Coastal Areas and a federal consistency determination would also be needed for future Tier II projects located within the coastal zone. Specific impacts to biological resources as they pertain to the Local Coastal Program are discussed in Section 2.3 and impacts to wetlands are discussed in Section 2.3.2. Visual changes to the coastal zone are discussed in Section 2.1.6, and historical resources are discussed in Section 2.1.7.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative is located outside of coastal zone jurisdiction; therefore, no coastal zone determinations would be required.

No Build Alternative

As shown in Table 2.1.1-2, the Tier I No Build Alternative would be consistent with some coastal zone policies. However, it would be inconsistent with policies that relate to improving access to coastal resources because, under this alternative, traffic conditions would continue to worsen along Route 1, which would not improve access to beaches or recreational land uses, as outline in the Local Coastal Programs.

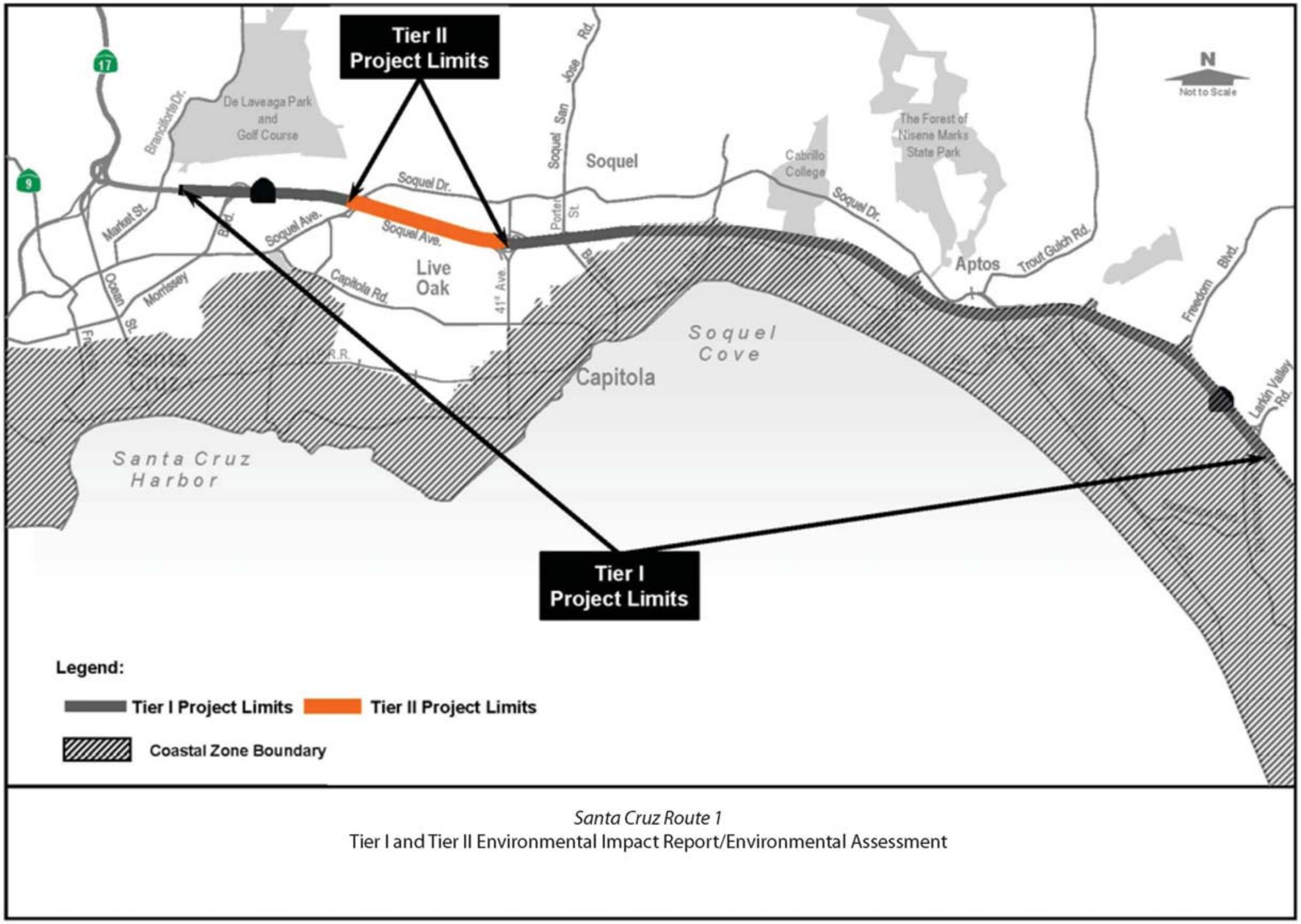


Figure 2.1.1-3: Coastal Zone Boundary

Table 2.1.1-2: Potential Inconsistency with Local Coastal Programs

Subject of Policy	Local Policies	Assessment
Scenic and Visual Resources	County of Santa Cruz – Local Coastal Program: • Policy 5.10.2 – Development within visual resources • Policy 5.10.4 – Preserving natural buffers • Policy 5.10.8 – Significant tree removal ordinance	***Tier I Corridor Alternatives*** The project would be potentially inconsistent with these policies because substantial visual changes would occur from the highway due to the addition of auxiliary lanes, bridge widening; installation of pedestrian/bicycle overcrossings; reconstruction of existing ramps; construction of new soundwalls and retaining walls; and removal of trees and mature vegetation. Avoidance, minimization, and/or mitigation measures to address these impacts include aesthetic treatments, vine plantings, and revegetation of disturbed areas.
		No Build Alternative The No Build Alternative would be consistent with these policies because it would not cause substantial visual changes to occur, nor would it require the removal of trees.
Biological Resources	County of Santa Cruz – Local Coastal Program: • Policy 5.1.6 – Development within sensitive habitats • Policy 5.1.7 – Protection of sensitive habitats City of Santa Cruz – Local Coastal Program – Environmental Quality Element Policies 4.5.3 – Protection of monarch butterfly	***Tier I Corridor Alternatives*** The Tier I Corridor Alternatives would affect sensitive habitats and is potentially inconsistent with policies that relate to protection of sensitive habitats. The project would have permanent and temporary effects on riverine/freshwater marsh, riparian forest, coast live oak woodland, mixed conifer woodland, coastal scrub, and annual grassland. Removal of this habitat could affect foothill yellow-legged frog, California red-legged frog, Santa Cruz long-toed salamander, California tiger salamander, western pond turtle, tidewater goby, central California coast steelhead, monarch butterfly, California linderiella, Cooper's hawk, tricolored blackbird, great blue heron, short-eared owl, burrowing owl, white-tailed kite, least Bell's vireo, pallid bat, hoary bat, roosting bats, badger, and nesting birds. Avoidance, minimization, and/or mitigation measures, such as compensatory mitigation, monitoring, and revegetating, will be implemented to avoid and minimize impacts. Onsite and in-kind mitigation for temporary impacts would be provided at a 1:1 ratio, and permanent impacts would be mitigated at a 2:1 ratio, unless otherwise directed by regulatory agencies.
		No Build Alternative The No Build Alternative would be consistent with these policies because it would not affect sensitive habitats.

<table>
<tr><th colspan="3">Table 2.1.1-2: Potential Inconsistency with Local Coastal Programs</th></tr>
<tr><th>Subject of Policy</th><th>Local Policies</th><th>Assessment</th></tr>
<tr><td rowspan="2">Wetland and Creek Protection</td><td rowspan="2">County of Santa Cruz – Local Coastal Program:
• Policy 5.2.2 – Riparian corridor and wetland protection
• Policy 5.2.3 – Activities within riparian corridors and wetlands
• Policy 5.2.5 – Setbacks from wetlands
City of Santa Cruz – Local Coastal Program – Environmental Quality Element Policies 4.2.2, 4.2.2.4 – Minimize the impact of development upon riparian and wetland areas</td><td>Tier I Corridor Alternatives
The project would be potentially inconsistent with these policies. The Tier I Corridor Alternatives would permanently affect 0.23 acre of U.S. Army Corps of Engineers wetlands, 0.10 acre of U.S. Army Corps of Engineers other waters, 2.20 acres under the jurisdiction of Local Coastal Plans approved by the California Coastal Commission, and 3.58 acres of California Department of Fish and Wildlife jurisdiction wetland area. Permanent impacts would result from changes in bank configuration, loss of riparian habitat associated with road widening and culvert extensions, realignment of existing roadways, and construction of new road sections. Onsite and in-kind mitigation for temporary impacts would be provided at a 1:1 ratio, and permanent impacts to wetlands would be mitigated at a 3:1 ratio.</td></tr>
<tr><td>No Build Alternative
The No Build Alternative would be consistent with these policies because it would not affect wetlands or other waters.</td></tr>
<tr><td rowspan="2">Historical Resources</td><td rowspan="2">County of Santa Cruz – Local Coastal Program:
• Policy 5.19.3 – Development around archeological resources</td><td>Tier I Corridor Alternatives
The project would be potentially inconsistent with this policy. The Tier I Corridor Alternatives may adversely affect portions of three unevaluated archaeological sites and their potential buried archaeological deposits within the archaeological Area of Potential Effects. If discovered during ground disturbing activities, comply with 36 Code of Federal Regulations 800.13 (b)(3) and, if applicable, part (c), as stipulated in the 2004 Section 106 Programmatic Agreement for Federal-aid Highway Programs in California regarding post-review discoveries.</td></tr>
<tr><td>No Build Alternative
The No Build Alternative would be consistent with these policies because it would not affect archaeological deposits.</td></tr>
<tr><td rowspan="2">Traffic/ Circulation</td><td rowspan="2">County of Santa Cruz – Local Coastal Program:
• Policy 3.14.2 – Priority to road improvements that provide access to recreational resources</td><td>Tier I Corridor Alternatives
The Tier I Corridor Alternatives would be consistent with this policy by improving access to these resources by decreasing congestion and delay along Route 1.</td></tr>
<tr><td>No Build Alternative
The No Build Alternative would be potentially inconsistent with these policies because it would not improve access to beaches or recreational land uses.</td></tr>
</table>

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

Based on the impacts that have been identified in this section, the following avoidance, minimization, and mitigation measures are provided. These measures are subject to revision based on the changes in the setting, project design, or regulatory requirements in place when individual corridor projects undergo environmental review.

Avoidance and minimization measures will employ sound resource conservation principles, such as minimizing and avoiding impacts to protected natural resources. Design approaches will also be employed to minimize impacts to the maximum extent feasible, such as widening to one or the other side of the highway, requesting design exceptions for reduced inside shoulder widths, and the placement of retaining walls to reduce right-of-way requirements.

Tier II Auxiliary Lane Alternative

Because the Tier II Auxiliary Lane Alternative is located outside the coastal zone and would have no impact on the coastal zone, no associated avoidance, minimization, and/or mitigation measures are required.

2.1.2 Growth

This section analyzes growth-related impacts associated with the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative. The analysis considers the potential impact of corridor improvements on growth and development in the study area. Because the Tier II project is within the limits of the Tier I Corridor Alternatives and is subject to the same market factors, local jurisdiction land-use policies, and development pressures, this analysis applies to both the Tier I and Tier II alternatives. Cumulative impacts are discussed in Section 2.5.

2.1.2.1 Regulatory Setting

The Council on Environmental Quality regulations, which established the steps necessary to comply with the National Environmental Policy Act of 1969, require evaluation of potential environmental consequences of all proposed federal activities and programs. This provision includes a requirement to examine indirect consequences, which are due to the proposed action and are later in time or farther removed in distance, but are still reasonably foreseeable. The Council on Environmental Quality regulations (40 *Code of Federal Regulations* 1508.8) refer to these consequences as secondary impacts. Secondary impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

The California Environmental Quality Act also requires the analysis of a project's potential to induce growth. The California Environmental Quality Act Guidelines (Section 15126.2[d]), require that environmental documents "…discuss the ways in which the proposed project could foster economic or population growth, or the construction of additional housing, either directly or indirectly, in the surrounding environment… ."

Additionally, the Caltrans Standard Environmental Reference outlines a "First-cut Screening" method that provides a general guidance in determining the potential for project-related growth. The addition of HOV and auxiliary lanes in the proposed project corridor has the potential to change accessibility; therefore, there is the potential for project-related growth. Factors, including project type, project location, land availability and price, land use controls, and the regional economy in the project area were analyzed, and based on this information, it was determined whether project-related growth is reasonably foreseeable and, if reasonably foreseeable, its effect on resources of concern.

Affected Environment

The information in this section is derived from the proposed project's *Highway 1 Growth Inducement Study* (2008) and the *Community Impact Assessment* (2015).

To be comprehensive in selecting study areas that could be affected by the project, the growth-related impact analysis addressed the impacts of both the Tier I and Tier II projects, and included communities in the northern part of Monterey County, such as Castroville and Fort Ord, even though they are relatively far from the project area.

While there are differences among the jurisdictions, both counties and the communities included in the growth study have relatively restrictive residential growth policies and plans. Other than the City of Marina, they generally plan for slow, controlled growth that relies mostly on infill or expansion contiguous to existing urbanized areas. While its general plan promotes more infill developments, the City of Marina is planning for large developments, which include Fort Ord and possible development of the Armstrong Ranch north of the city.

The growth impact analysis examined the relationship of the proposed project to economic and population growth or the construction of additional housing in the project area. It focused on the potential for the Tier I and Tier II projects to facilitate or accelerate growth beyond what is included in planned developments, or promote growth to shift to the project area from elsewhere in the region. The analysis initially considered the Tier I and Tier II projects' influence on area growth due to savings in travel time resulting from the highway improvements. This influence of the Tier I and Tier II projects was then considered within the context of other relevant factors such as the relative cost and availability of housing, accessibility of amenities, local and regional growth policies, and development constraints.

The improvement in travel time and accessibility in the Route 1 corridor would be achieved through the adoption of a Tier I Corridor Alternative and, ultimately, by implementation of subsequent Tier II projects, beginning with the Tier II project evaluated in this EIR/EA. To assess the potential effects of the accessibility changes of the Tier I and Tier II projects, the study used a three-step approach:

1. Use of an analytical model to estimate project-related changes in residential growth for sample corridor neighborhoods, with and without consideration of planned growth limits.
2. Consideration of growth trends, local government plans and policies, housing prices and availability, availability of supporting infrastructure, public attitudes toward growth, terrain, and land use.
3. Input to and review of the study results by an expert panel. The panel that convened for the Route 1 study included local planning officials, a real estate developer and private-sector planners. It included representatives of the cities of Santa Cruz, Capitola, Watsonville, and Marina; the counties of Santa Cruz and Monterey: Castroville; and the University of California, Santa Cruz; and Cabrillo College in Aptos. The study selected and analyzed four residential areas that may be affected by any growth that would result from the adoption of a Tier I Corridor Alternative and by the implementation of the current Tier II project and future Tier II projects (Figure 2.1.2-1):

Figure 2.1.2-1: Residential Study Areas

- R1 Aptos
- R2 North Watsonville (planned Buena Vista/Airport annexation area)
- R3 Castroville
- R4 Fort Ord

Criteria for selecting the areas with which to test the change in accessibility to jobs included the following:

- Proximity to the Route 1 corridor;
- A reasonable range of commute times that would be affected by the proposed project; and
- Potential for future growth per Association of Monterey Bay Area Governments' projections (i.e., to identify areas that could absorb additional population of one to several thousand or more population before reaching build-out, which was a chief reason for not focusing on the cities of Santa Cruz and Capitola).

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

The growth assessment concluded that although the project would improve travel times and provide additional through traffic capacity, it would not cause unplanned growth because these changes would not be sufficient to outweigh the various local factors that limit growth in the project corridor. Analysis of the changes in accessibility from the neighborhoods to jobs in areas served by the improved Route 1 resulted in these specific findings:

- The Tier I Corridor TSM Alternative would have very little effect on residential growth; and
- The Tier I Corridor HOV Lane Alternative would increase relative growth somewhat in Aptos and only slightly in north Watsonville while decreasing relative growth in the other two sample communities.

It was concluded that the proposed project is not likely to stimulate unplanned residential or commercial growth and would therefore have less than significant impacts on growth along the Route 1 corridor. The lack of developable land, relative availability and affordability of housing, constraint of land use plans in the corridor, and negative public attitudes towards growth are major factors preventing unplanned growth in areas where the project benefits would influence growth.

The expert panel agreed with this assessment, concluding that the highway improvements would be insignificant with respect to land use, and that land use policy and zoning constraints make local growth more supply driven than demand driven.

The proposed project would serve existing growth already planned and projected for the corridor and is not likely to stimulate unplanned residential or related commercial growth.

Furthermore, based on the growth model analysis performed and considering the comments from the expert panel, it was concluded that project-related growth is not reasonably foreseeable for the Route 1 corridor. Based on the first-cut screening process recommended by Caltrans, no further analysis was required.

Additionally, growth due the Tier II Auxiliary Lane Alternative is not reasonably foreseeable. Travel time improvements under the Tier II Auxiliary Lane Alterative would be less than the travel time improvements under the Tier I Corridor Alternatives, indicating greater benefits under the Tier I Corridor Alternatives with regards to traffic. Because there are fewer benefits under the Tier II Auxiliary Lane Alternative, there is a reduced potential to stimulate unplanned growth. Thus, the growth potential under the Tier II Auxiliary Lane Alternative is less than the growth potential under the Tier I Corridor Alternatives. Therefore, growth impacts under the Tier II Auxiliary Lane Alternative are not anticipated.

No Build Alternative

Route 1 would not experience any improvements under the No Build Alternative; congestion and delay would continue to worsen. Thus, the No Build Alternative would not encourage growth.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

Because growth impacts are not anticipated, no avoidance, minimization, and/or mitigation measures are required under the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative.

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2.1.3 Community Impacts

This section evaluates potential impacts that could result from the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative, including environmental justice impacts, property acquisition and relocations, and impacts to neighborhood cohesion. Community impacts that would occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

2.1.3.1 Community Character and Cohesion

Regulatory Setting

The National Environmental Policy Act of 1969, as amended, established that the federal government use all practicable means to ensure that all Americans have safe, healthful, productive, and aesthetically and culturally pleasing surroundings (42 United States Code 4331[b][2]). The Federal Highway Administration, in its implementation of the National Environmental Policy Act (23 Code of Federal Regulations 109[h]), directs that final decisions regarding projects are to be made in the best overall public interest. This requires taking into account adverse environmental impacts, such as destruction or disruption of human-made resources, community cohesion, and the availability of public facilities and services.

Under the California Environmental Quality Act (CEQA), an economic or social change by itself is not to be considered a significant effect on the environment. However, if a social or economic change is related to a physical change, then social or economic change may be considered in determining whether the physical change is significant. Since this project would result in physical change to the environment, it is appropriate to consider changes to community character and cohesion in assessing the significance of the project’s effects.

Affected Environment

The information in this section is derived from the proposed project’s Community Impact Assessment (2014).

Community cohesion is defined as the degree to which residents have a sense of belonging to their neighborhood or experience attachment to community groups and institutions as a result of continued association over time. The proposed project would pass through portions of Santa Cruz County, a thriving region composed of a diverse mix of residential, commercial, and natural communities that includes the cities of Santa Cruz, Capitola, and unincorporated areas. Information regarding the communities and neighborhoods, demographics and economic base of the communities affected by the proposed project is presented below.

Communities and Neighborhoods

Tier I Corridor Alternatives

The Tier I Corridor Alternatives traverse the cities of Santa Cruz and Capitola; the villages of Live Oak, Soquel, and Aptos; and unincorporated Santa Cruz County. Each is described below.

City of Santa Cruz

There are two planning areas within the study area in the city of Santa Cruz: Upper Eastside and Lower Eastside. The Upper Eastside planning area, which straddles Route 1, is bounded by Soquel Avenue to the south and extends north of the northern project boundary. The planning area is primarily residential and is served by several neighborhood and community parks and four schools.

The Lower Eastside planning area, located to the south of the Upper Eastside planning area, is bounded by Soquel Avenue to the north and Monterey Bay to the south. The area is primarily residential, with some commercial and industrial areas, and is home to six neighborhood parks and two schools.

City of Capitola

The city of Capitola sits on the northeast shore of Monterey Bay between the unincorporated areas of Live Oak and Aptos. Capitola residential areas include neighborhoods such as Depot Hill, the Village, and parts of the Jewel Box, which have older, Victorian-era homes. More recent residential developments include the Venetian Court, Sunset-Riverview, Upper Village, and Cliffwood Heights areas. The main commercial area is the Village, and the only significant industrial area is the Kennedy Drive area, which fronts Route 1. In addition, there are five neighborhood parks and one community park scattered throughout the study area.

The Village of Live Oak

Live Oak straddles Route 1 between the cities of Santa Cruz and Capitola. North of Route 1, the area is primarily residential and open space, with development concentrated to the east and west of Thurber Lane. South of Route 1, the area is made up of diverse residential and commercial neighborhoods.

Unincorporated Area of Soquel

The unincorporated area of Soquel is north of Route 1 between Live Oak to the west and Aptos to the east and has a total area of approximately 1 square mile. Its major land uses include Anna Jean Cummings County Park, Soquel Village and Porter Library, Soquel High School, Soquel Elementary School, Soquel Lions Park, Richard Vessey Park, Willowbrook Park, and residential and industrial areas. The 97-acre O’Neill Ranch is northwest of the Village and adjacent to the high school.

Unincorporated Area of Aptos

The unincorporated area of Aptos straddles Route 1 east of Soquel and has a total area of approximately 7 square miles. Its land uses include commercial retail, office, industrial, and residential. Aptos is home to Cabrillo College, Aptos High School, Aptos Village, Aptos Village County Park, Aptos Branch Library, Calvary Cemetery, Polo Grounds Regional Park, Aptos Seascape Golf Course, and several interior and shoreline parks.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative begins on Route 1 at the Soquel Avenue/Soquel Drive interchange and ends at the 41st Avenue interchange. The Tier II project is located in the City of Capitola and in unincorporated areas within the villages of Live Oak and Soquel. Descriptions of each of these areas are provided above in the Tier I Corridor Alternatives section.

Census Tract Block Groups for Study Areas

Tier I Corridor Alternatives

An area consisting of Census Tract Block Groups fronting on the Route 1 corridor encompassing the project limits is the geographic basis for the community impact study for the Tier I Corridor Alternatives. Demographic characteristics of the Tier I Corridor Alternatives study area, including population, housing, and employment; household size and composition; ethnic composition; and household income, are based primarily on data from the 2010 U.S. Census. The Census Tract Block Groups that make up the Tier I Corridor study area are Census Tract 1001 (Block Groups 1 and 2), 1002 (Block Groups 1 through 5 and 7), 1211 (Block Group 2), 1212 (Block Groups 4 and 5), 1213 (Block Groups 1, 3, and 4), 1214.01 (Block Groups 1 and 2), 1214.02 (Block Groups 1 and 3), 1214.03 (Block Groups 1 and 2), 1217 (Block Groups 1 through 4), 1218 (Block Groups 1 through 3), 1220.01 (Block Groups 2, 3, and 5), 1220.02 (Block Groups 1 and 2), 1220.03 (Block Groups 1 through 5), 1221 (Block Groups 1 through 3), 1222.01 (Block Groups 5 and 6), 1222.02 (Block Group 1), 1222.03 (Block Groups 1 and 2), and 1224 (Block Groups 3 and 6). Figure 2.1.3-1 shows the location of these Census Tract Block Groups.

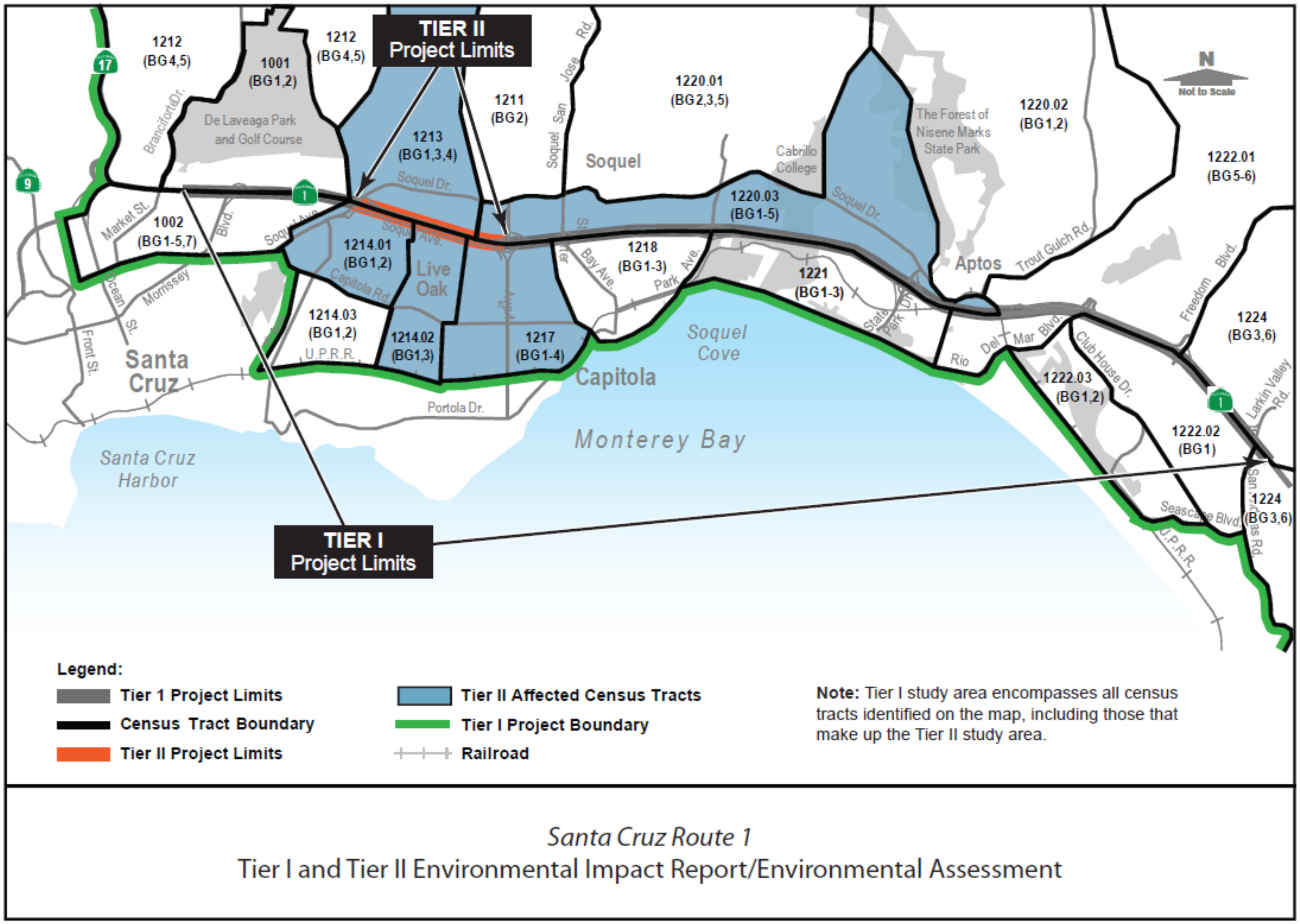

Figure 2.1.3-1: Tier I and Tier II Socioeconomic Study Area Census Tracts

Census Tract Block Group data were used when it was available for this analysis; however, not all 2010 U.S. Census data have been released at the block group level, such as for the categories of median household incomes and labor force characteristics. In those instances when Census Tract Block Group data were not available, Census Tract level information was used. Each table below states whether census tract data were used in place of block group data.

Tier II Auxiliary Lane Alternative

Demographic characteristics of the Tier II Auxiliary Lane Alternative study area, including population, housing, and employment; household size and composition; ethnic composition; and household income, are based primarily on data from the 2010 U.S. Census. For this analysis, the Tier II Auxiliary Lane Alternative study area is defined as the Census Tract Block Groups that intersect with the proposed project alignment, shown by the orange line in Figure 2.1.3-1 below. The Census Tract Block Groups included in the study area for the Tier II Auxiliary Lane Alternative are 1213 (Block Groups 1, 3, and 4), 1214.01 (Block Groups 1 and 2), 1214.02 (Block Groups 1 and 3), 1217 (Block Groups 1 through 4), and 1220.03 (Block Groups 1 through 5). The remaining, non-shaded census tracts, are only part of the Tier I study area.

Population and Demographics

Tier I Corridor Alternatives

Ethnic composition, household characteristics, and household income data are shown for the Tier I Corridor Alternatives in Tables 2.1.3-1, 2.1.3-2, and 2.1.3-3.

As illustrated by the 2010 U.S. Census data in Table 2.1.3-1, the ethnic composition of the Tier I study area is predominately white, with a greater percentage of the population identifying as white than in Santa Cruz County, the City of Santa Cruz, or Capitola. The percentage of the Tier I study area population that identifies as Hispanic is less than that of the County of Santa Cruz, but on par with the cities of Santa Cruz and Capitola. This indicates a relatively small minority population in the Tier I study area. The total percentage in Tables 2.1.3-1 and 2.1.3-4 does not add up to 100 percent because it is common for some people to count themselves more than once. For example, a person may self-identify as Hispanic or Latino and also self-identify as any of the races listed in the table. This double-counting leads to total percentages exceeding 100 percent.

Table 2.1.3-1: Ethnic Composition of the Tier I Corridor Alternatives Study Area

Residents, by Ethnicity	Study Area – Tier I		Santa Cruz County		City of Santa Cruz		City of Capitola	
	Number of Residents	%	Number of Residents	%	Number of Residents	%	Number of Residents	%
White	44,161	74	156,397	60	39,985	67	7,075	71
Black or African-American	551	1	2,304	1	979	2	109	1
American Indian and Alaska Native	193	>0.5	978	>0.5	238	>0.5	30	>0.5
Asian	2,277	4	10,658	4	4,476	7	407	4
Native Hawaiian and Other Pacific Islander	81	>0.5	292	>0.5	97	>0.5	8	>0.5
Some Other Race	138	>0.5	612	>0.5	187	>0.5	21	>0.5
Two or More Races	1,837	3	7,049	3	2,360	4	311	3
Hispanic or Latino (of any race)	10,627	18	84,092	32	11,624	19	1,957	20
Total	**59,865**		**262,382**		**59,946**		**9,918**	

Source: U.S. Census Bureau, 2010.

Table 2.1.3-2: Household Characteristics of the Tier I Corridor Alternatives Study Area

Geographic Area	Number of Households	Average Household Size	Total Number of Families	% of Family Households
Study Area – Tier I	24,480	2.46	14,647	60
Santa Cruz County	94,335	2.66	57,770	61
City of Santa Cruz	21,657	2.39	10,005	46
City of Capitola	4,626	2.11	2,286	49

Source: U.S. Census Bureau, 2010.

Table 2.1.3-3: Household Income of the Tier I Corridor Alternatives Study Area

Geographic Area	Median Household Income	% Households below Poverty Threshold
Study Area – Tier I*	$75,610	9.1
Santa Cruz County	$66,030	12.0
City of Santa Cruz	$63,110	10.4
City of Capitola	$50,696	17.1

*Block Group data not available; Census tract data used to determine study area totals.
Source: U.S. Census Bureau, 2010.

Tier II Auxiliary Lane Alternative

Ethnic composition, household characteristics, and household income data for the Tier II Auxiliary Lane Alternative study area, as defined above, are shown in Tables 2.1.3-4, 2.1.3-5, and 2.1.3-6. (See the Tier I Corridor Alternatives description of population and demographics for Santa Cruz County and the city of Capitola.)

Table 2.1.3-4: Ethnic Composition of the Tier II Auxiliary Lane Alternative Study Area

Residents, by Ethnicity	Number of Residents	%
White	13,741	67
Black or African-American	238	1
American Indian and Alaska Native	66	>0.5
Asian	1,020	5
Native Hawaiian and Other Pacific Islander	36	>0.5
Some Other Race	43	>0.5
Two or More Races	644	9
Hispanic or Latino (of any race)	4,800	23
Total Persons	**20,588**	

Source: U.S. Census Bureau, 2010.

Table 2.1.3-5: Household Characteristics of the Tier II Auxiliary Lane Alternative Study Area

Geographic Area	Number of Households	Average Household Size	Total Number of Families	% of Family Households
Study Area – Tier II	8,245	2.52	4,735	58.5

Source: U.S. Census Bureau, 2010.

Table 2.1.3-6: Household Income of the Tier II Auxiliary Lane Alternative Study Area

Geographic Area	Median Household Income	% Households below Poverty Threshold
Study Area – Tier II	$67,106	9.7

Census tract level data used to determine study area totals.
Source: U.S. Census Bureau, 2010.

Of the total population in the Tier II study area, a smaller percentage is white than in the Tier I study area, but this percentage is greater than the percentage of white residents in the county. In addition, a higher percentage of the Tier II study area population identified as minority ethnicities than in Tier I study area, but this percentage is lower than the percentage of minority residents in Santa Cruz County.

The percentage of family households in the Tier II study area is on par with the percentages for the Tier I study area and Santa Cruz County. The median household income in the Tier II study area is lower than the median household income in the Tier I study area; however the percentage of households below the poverty threshold is similar. This indicates the Tier II study area is composed of a more affluent resident population when compared to the county.

Economic Base

Tier I Corridor Alternatives

The labor force within the Tier I Corridor Alternatives study area is characterized by exceptionally high educational attainment. Within the city of Santa Cruz, more than 57 percent of the labor force has a college degree or higher. The largest local private employers include a diverse array of manufacturing, business services, retail, hotel and food services, and biotechnology companies. According to the 2010 U.S. Census data, occupational patterns are similar in the County of Santa Cruz and the cities of Santa Cruz and Capitola, as shown in Table 2.1.3-7.

Tier II Auxiliary Lane Alternative

Like the Tier I Corridor Alternatives study area, the Tier II Auxiliary Lane Alternative study area labor force is also characterized by exceptionally high educational attainment. The largest local private employers include a diverse array of manufacturing, business services, retail, hotel and food services, and biotechnology companies. Occupational patterns for the Tier II Auxiliary Lane Alternative study area are shown in Table 2.1.3-8.

Table 2.1.3-7: Labor Force by Occupation for the Tier I Corridor Alternatives Study Area (Civilians, Aged 16+)

Labor Force Sector	Study Area – Tier I		Santa Cruz County		City of Santa Cruz		City of Capitola	
	Number	%	Number	%	Number	%	Number	%
Agriculture, forestry, fishing and hunting, and mining	903	2.2	7,401	5.8	407	1.3	31	0.6
Construction	3,222	7.9	9,591	7.5	1,725	5.7	221	4.4
Manufacturing	3,598	8.8	11,591	9.1	2,307	7.6	515	10.3
Wholesale trade	1,465	3.6	3,784	3.0	727	2.4	90	1.8
Retail trade	4,706	11.5	13,612	10.6	3,110	10.3	711	14.2
Transportation and warehousing, and utilities	975	2.4	3,115	2.4	636	2.1	65	1.3
Information	1,045	2.5	2,626	2.1	553	1.8	206	4.1
Finance, insurance, real estate and rental and leasing	2,182	5.3	6,084	4.8	961	3.2	298	5.9
Professional, scientific, management, administrative, and waste management	5,058	12.4	15,321	12.0	3,453	11.4	456	9.1
Educational, health and social services	9,173	22.4	30,300	23.7	9,503	31.3	1,273	25.4
Arts, entertainment, recreation, accommodation and food services	4,080	10.0	12,779	10.0	3,926	12.9	609	12.1
Other services (except Public Administration)	2,767	6.7	7,180	5.6	1,773	5.8	439	7.0
Public Administration	1,698	4.1	4,563	3.6	1,240	4.1	193	3.8
Employed Labor Force	40,872	92.6	127,947	91.6	30,321	92.5	5,017	90.4
Unemployed Labor Force	3,242	7.4	11,698	8.4	2,452	7.5	532	9.6
Total Labor Force	**44,129**		**139,645**		**32,773**		**5,549**	

Census tract level data used to determine study area totals.

Source: U.S. Census Bureau, 2010.

Table 2.1.3-8: Labor Force by Occupation for the Tier II Auxiliary Lane Alternative Study Area (Civilians, Aged 16+)

Labor Force Sector	Tier II Auxiliary Lane Alternative Study Area	
	Number	%
Agriculture, forestry, fishing and hunting, and mining	11	>0.1
Construction	950	7.1
Manufacturing	1,171	8.7
Wholesale trade	352	2.6
Retail trade	1,556	11.7
Transportation and warehousing, and utilities	271	2.0
Information	349	2.6
Finance, insurance, real estate and rental and leasing	468	3.5
Professional, scientific, management, administrative, and waste management	1,593	11.9
Educational, health and social services	2,768	20.8
Arts, entertainment, recreation, accommodation and food services	1,344	10.1
Other services (except Public Administration)	998	7.4
Public Administration	470	3.5
Employed Labor Force	12,301	92.2
Unemployed Labor Force	1,036	7.8
Total Labor Force	**13,337**	

Census tract level data used to determine study area totals.

Source: U.S. Census Bureau, 2010.

Environmental Consequences

Neighborhood Cohesion

None of the communities and neighborhoods adjacent to Route 1 would experience disruption in cohesion, nor would there be placement of physical barriers nor loss of community facilities or institutions, as a result of the proposed project.

Tier I Corridor HOV Lane Alternative

The Tier I Corridor HOV Lane Alternative would reduce congestion and diversion of freeway traffic to local streets, which would also improve local circulation and access. The HOV Lane Alternative would also encourage carpooling and public transit use, increasing the use of community-oriented transportation options. Pedestrian/bicycle overcrossings constructed with the HOV Lane Alternative would improve local circulation and safety and reduce the highway barrier effect.

There are 20 recommended soundwalls under the HOV Lane Alternative, none of which would divide or introduce a new physical barrier to the communities and neighborhoods in the study area described in the Affected Environment section. These communities and neighborhoods along Route 1 are already divided by a multi-lane highway; therefore, the addition of soundwalls would not further divide any communities or neighborhoods. In addition, the character of existing communities and neighborhoods would not be altered, as soundwalls are already present along the Route 1 corridor.

There would be approximately five single-family and three multi-family residential units and 12 businesses relocated with the Tier I Corridor HOV Lane Alternative. (See Section 2.1.3.2, Relocation and Real Property Acquisition, below for more information.) Seven of the residential units to be relocated are in the vicinity of the Morrissey Boulevard/Pacheco Avenue Interchange. Five are located east of Morrissey Boulevard along the alignment of the proposed widening of the southbound Route 1 on-ramp from Morrissey Boulevard. Two are located west of Morrissey Boulevard, at the location of the proposed redesigned off-ramp from southbound Route 1 to Morrissey Boulevard. The other residential unit to be relocated is in the vicinity of the Soquel Drive Interchange, located south of Route 1 and west of Soquel Avenue, on the same assessor's parcel as six commercial units to be relocated, as described below.

Eleven of the commercial units to be relocated are in the vicinity of the Soquel Drive/Route 1 Interchanges. Two are located immediately north of the Route 1 right of way, at the locations of the proposed reconfigured northbound Route 1 on- and off-ramps to Soquel Drive; one of these units is east of Soquel Drive and the other west of Soquel Drive. Nine of the units are located immediately south of the Route 1 right of way, west of Soquel Drive, at the location of the proposed on-ramp to southbound Route 1. Six of these nine commercial units are located on one assessor's parcel (which is shared with one residential unit, described above), and three are located on an adjacent assessor's parcel. The other commercial unit to be relocated is in the vicinity of the Porter Street/Bay Avenue Interchange, immediately north of Route 1 right of way at the location of the proposed widening of the northbound off ramp from Route 1 to Porter Street.

These relocations are not expected to cause a substantial adverse effect on community cohesion or character. The neighborhoods in which relocations would occur are adjacent to Route 1, and the relocation of these properties, which are all located along the existing right of way, would not alter the existing character. The settings of these neighborhoods currently include highway infrastructure. Additionally, the cohesion of the overall neighborhoods in which the relocations would occur would not be affected. Because all properties that would be relocated are along the existing Route 1 right of way, there would be no dividing of neighborhoods, and no separation of neighborhoods from community facilities. No community facilities would be displaced. No growth or increase in urbanization is anticipated in these areas, as they are already fully developed. More information on the locations of property acquisitions is provided in Section 2.1.3.2. It is anticipated, based on market research, which includes research from internet real estate sites and local boards of realtors, that the affected residents and businesses can be relocated within the immediate area (Draft Relocation Impact Study 2013). In instances of partial property acquisitions, access would be maintained to avoid long-term effects on residents, businesses, and communities.

Tier I Corridor TSM Alternative

The Tier I Corridor TSM Alternative would provide incremental congestion relief and improve freeway on and off movements. Pedestrian/bicycle overcrossings constructed with the TSM Alternative would improve local circulation and safety and reduce the highway barrier effect. There would be no relocations with the TSM Alternative.

There are 15 recommended soundwalls under the TSM Alternative, none of which would divide or introduce a new physical barrier to the communities and neighborhoods in the study area. These communities and neighborhoods along Route 1 are already divided by a multi-lane highway; therefore, the addition of soundwalls would not further divide any communities or neighborhoods. In addition, the character of existing communities and neighborhoods would not be altered, as soundwalls are already present along the Route 1 corridor.

Tier II Auxiliary Lane Alternative

None of the communities or neighborhoods adjacent to Route 1 would experience a direct disruption in neighborhood cohesion as a result of the Tier II Auxiliary Lane Alternative. Proposed modifications would not require substantial property or any community facilities.

There is one recommended soundwall under the Tier II Auxiliary Lane Alternative, which would not divide or introduce a new physical barrier to the community. The communities and neighborhoods along Route 1 are already divided by a multi-lane highway; therefore, the addition of soundwalls would not further divide any communities or neighborhoods. In addition, the character of existing communities and neighborhoods would not be altered, as soundwalls are already present along the Route 1 corridor.

There would be no relocations with the Tier II Auxiliary Lane Alternative. In instances of partial property acquisitions, access would be maintained to avoid long-term effects on residents, businesses, and communities.

No Build Alternative

Continued worsening of congestion under the No Build Alternative, leading to increased diversion of freeway traffic to local streets, would adversely affect the small-town “feel” of these local communities.

Avoidance, Minimization, and/or Mitigation Measures

The proposed alternatives would have no economic impacts and no impacts to community cohesion; therefore no avoidance, minimization and/or mitigation measures are proposed.

2.1.3.2 Relocations and Real Property Acquisition

Regulatory Setting

The Department's Relocation Assistance Program (RAP) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Title 49 Code of Federal Regulations (CFR) Part 24. The purpose of the Relocation Assistance Program is to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole. Please see Appendix D for a summary of the Program.

All relocation services and benefits are administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 United States Code [USC] 2000d, et seq.). Please see Appendix C for a copy of the Department's Title VI Policy Statement.

Affected Environment

The information presented in this section is based on the Draft Relocation Impact Study (2013) and the Community Impact Assessment (2014). The following description focuses on two planning areas within the City of Santa Cruz in which direct impacts would occur. These planning areas, the Upper Eastside and Lower Eastside, are located in the eastern half of the Tier I study area.

Upper Eastside

The Upper Eastside Planning Area, which straddles Route 1, is bounded by Soquel Avenue to the south and extends to north of the northern project limit. The planning area is primarily residential and is served by several neighborhood and community parks, and by four school sites: De Laveaga Elementary, Costanoa Continuation School, Branciforte Junior High, and Harbor High. De Laveaga Park, which constitutes more than a third of the area's total acreage, provides recreational opportunities for area residents. Upper Eastside neighborhoods and communities include the Carbonera, Branciforte Drive/Goss Street, De Laveaga, and Emeline/County Health Center areas.

Lower Eastside

The Lower Eastside planning area, located to the south of the Upper Eastside planning area, is bounded by Soquel Avenue to the north and Monterey Bay to the south. The area is primarily residential, with some commercial and industrial areas, and is home to six neighborhood parks and two school sites (Gault Elementary and Branciforte Elementary). The Yacht Harbor, beaches, San Lorenzo Park, San Lorenzo River, and Arana Gulch provide recreational opportunities and neighborhood identity. Neighborhoods and communities in the planning area include the Mentel Avenue, South Park Way, and Seabright Avenue/Murray Street areas.

Environmental Consequences

Tier I Corridor HOV Lane Alternative

The Tier I Corridor HOV Lane Alternative would convert 11.59 acres of land to transportation use and would require full and partial acquisition of residential, commercial, governmental, and vacant property adjacent to Route 1. The following information is taken from the Draft Relocation Impact Study (2014). Table 2.1.3-9 summarizes the full and partial acquisitions for residential and commercial properties. Table 2.1.3-10 summarizes the potential residential and nonresidential relocations. A total of 55 permanent partial acquisitions and 10 full permanent acquisitions would be required for the Tier I HOV Lane Alternative. During construction, 54 temporary acquisitions would also be required.

Table 2.1.3-9: Residential and Nonresidential Permanent Property Acquisitions for the Tier I Corridor HOV Lane Alternative

	Partial Acquisitions	Full Acquisitions
Residential	9	5
Commercial[1]	30	4
Total	**55**	**10**

1 The category of commercial property includes industrial properties.
2 Governmental properties consist of parcels (mostly city street right of way) owned by units of government.

Table 2.1.3-10: Residential and Nonresidential Relocations for the Tier I Corridor HOV Lane Alternative

	Single-Family Units	Mobile Homes	Multi-Family		Estimated Total Residential Units (Units/Residents)[1]	Nonresidential Units (Businesses/ Employees)[2]
			Buildings	Units		
HOV Lane Alternative	5	0	2	3	8 / 20	11/ 48

1 Estimate of residents based on an average of 2.46 residents per unit (2010 U.S. Census).
2 Estimate of employees based on a visual survey of potentially affected parcels; members of the study team observed potentially affected parcels to determine the approximate number of employees at each (Draft Relocation Impact Study, 2013).

Eight residential units would be subject to relocation under the Tier I Corridor HOV Lane Alternative. This represents less than 1 percent of the total occupied dwelling units in the study area. Based on review of 2010 Census Tract Block data, approximately 20 residents would be relocated. In addition, 11 businesses would be relocated under the HOV Lane Alternative (one of the 12 businesses identified in the Draft Relocation Impact Study [2014] is vacant, and therefore relocation would not be required). In total, 119 parcels — including those parcels requiring full acquisition, partial acquisition, and temporary construction easements — would be required for this alternative.

The areas in which relocations would occur can be seen on the Tier I Corridor HOV Lane Alternative Plan Drawings in Appendix G. The planning concept footprint, shown with a dotted blue line, shows the footprint of the project. Relocations would occur in the vicinities of the Morrissey Boulevard Interchange (plan sheet HOV-1), the Soquel Drive Interchange (plan sheet HOV-3), and the Porter Street/Bay Avenue Interchange (plan sheet HOV-7).

Market research documented in the Draft Relocation Impact Study (2014), which includes research from internet real estate sites and local board of realtors, indicates that there are adequate resources in the cities of Santa Cruz and Capitola to accommodate relocation of the displaced residential and nonresidential units. A full inventory of available relocation resources and a correlation with the units taken will be conducted and identified in the Final Relocation Impact Study, prior to project approval.

Tier I Corridor TSM Alternative

The Tier I Corridor TSM Alternative would convert 1.80 acres of land to transportation use and would affect 52 parcel ownerships. There would be some partial acquisitions under the TSM Alternative; however the impacted properties would not be displaced, and therefore relocations are not anticipated. Table 2.1.3-11 summarizes the full and partial acquisitions for residential and commercial properties. No full acquisitions would be required. The Tier I TSM Alternative would require a total of 18 partial acquisitions, including two residential, nine commercial, and seven governmental properties. . These acquisitions would include partial acquisitions of parking or storage space for some parcels or a reduction in expansion area. The resulting final impacts will be determined during the acquisition phase of the project, as some of the partially affected properties may request some sort of relocation assistance. The remainder of the affected parcels would be subject to temporary construction easements.

Table 2.1.3-11: Residential and Nonresidential Permanent Property Acquisitions for the Tier I Corridor TSM Alternative

	Partial Acquisitions	Full Acquisitions
Residential	2	0
Commercial	9	0
Total	**18**	**0**

[1] The category of commercial property includes industrial properties.
[2] Governmental properties consist of parcels (mostly city street right of way) owned by units of government.

Tier II Auxiliary Lane Alternative

Right-of-way would be acquired on both sides of Route 1 to accommodate the pedestrian/ bicycle overcrossing approach ramps for the Tier II Auxiliary Lane Alternative. Six permanent partial acquisitions would be required, as shown in Table 2.1.3-12. In addition, one temporary acquisition would be required during construction. In total, just under one-third of an acre of land would be required. These would be partial acquisitions, and no relocations would be required.

These acquisitions can be seen on the Tier II Auxiliary Lane Alternative Plan Drawings in Appendix I. Locations where acquisitions would occur are labeled as such.

Table 2.1.3-12: Residential and Nonresidential Property Acquisitions for the Tier II Auxiliary Lane Alternative

	Partial Acquisitions	Full Acquisitions
Residential	1	0
Commercial	4	0
Public	1	0
Total	**6**	**0**

No Build Alternative

No residential or nonresidential uses would be subject to property acquisition or relocations for the No Build Alternative.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

No actual construction would take place as a result of selecting a Tier I Corridor Alternative; therefore, no avoidance, minimization, and/or mitigation measures are required at this time. Each of the construction projects tiered from the Tier I Corridor Alternatives would be subject to separate environmental review. Based on the currently known environmental consequences, the measures discussed below are provided on a conceptual basis to inform the reader of what might be required. In the future, design refinements, changes in the setting, or revised regulatory requirements could alter the measures that would ultimately be required. The Tier I Corridor TSM Alternative is not anticipated to result in permanent community impacts that would require impact avoidance, minimization, or mitigation measures.

The conceptual measures anticipated to be implemented under the Tier I Corridor HOV Lane Alternative include the following related to relocations:

- Caltrans' Relocation Assistance Program would be applied to ensure that persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole (see Appendix D for a summary of the Relocation Assistance Program).
- Relocation services and benefits would be administered without regard to race, color, national origin, or sex in compliance with Title VI of the Civil Rights Act (42 United States Code 2000d, *et seq*.). (See Appendix C, Caltrans' Title VI Policy Statement.)

The conceptual measures anticipated to be implemented under the Tier I Corridor HOV Lane Alternative include the following related to partial acquisitions:

- Modifications to the design of future Tier II projects to avoid or further minimize partial acquisitions.
- Adjustments of the project profile to reduce the right-of-way requirements.
- Provision of financial compensation for partial property loss in accordance with procedures in the Caltrans Right-Of-Way Manual.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative would not result in short-term or permanent community impacts that would require impact avoidance, minimization, or mitigation measures. However, in addition to the minimization of right-of-way requirements that is incorporated into the project design, financial compensation for partial property loss will be provided in accordance with procedures in the Caltrans Right-Of-Way Manual.

2.1.3.3 Environmental Justice

Regulatory Setting

All projects involving a federal action (funding, permit, or land) must comply with Executive Order (EO) 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, signed by President William J. Clinton on February 11, 1994. This EO directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Low income is defined based on the Department of Health and Human Services poverty guidelines. For 2013, this was $23,550 for a family of four.

All considerations under Title VI of the Civil Rights Act of 1964 and related statutes have also been included in this project. The Department's commitment to upholding the mandates of Title VI is demonstrated by its Title VI Policy Statement, signed by the Director, which can be found in Appendix C of this document.

Affected Environment

The information presented below is based on the Community Impact Assessment (2014).

Tier I Corridor Alternatives

Executive Order 12898 directs federal agencies to address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations. "Low income" is not officially defined by the Department of Health and Human Services or the U.S. Census Bureau. The U.S. Census Bureau annually updates poverty thresholds that are used for calculating all official poverty population statistics (the Department of Health and Human Services poverty guidelines are a simplified version of the poverty thresholds that is used for administrative purposes). The U.S. Census Bureau's poverty threshold was used to obtain the "low income" statistics presented in Tables 2.1.3-13 and 2.1.3-14. The 2013 U.S. Census poverty threshold is $23,707 for a family of four.

The Tier I Corridor Alternatives study area includes a variety of neighborhoods and a multi-ethnic population. The ethnic composition of the Tier I Corridor Alternatives study area and vicinity, as summarized in Table 2.1.3-13, is comparable to that of Capitola. The city of Santa Cruz is slightly more diverse, with minorities representing approximately 33 percent of the population, while Santa Cruz County has a 40 percent minority population.

Table 2.1.3-13: Minority and Low-Income Populations in the Tier I Corridor Alternatives Study Area

	Study Area – Tier I*	Santa Cruz County	City of Santa Cruz	City of Capitola
Percentage of Population Identified as Minority	26	40	33	29
Percentage of Persons Identified as Low-Income (defined as below the US Census poverty threshold)	9.9	13.7	20.2	10.4

*Census tract level data were used to determine study area low-income percentages because block group level data were not available. Block group level data were used to determine minority percentages.

Source: U.S. Census Bureau, 2010.

Table 2.1.3-13 also shows that the percentage of persons living below the poverty threshold is lower in the Tier I Corridor Alternatives study area (just under 10 percent) than within either the City or County of Santa Cruz (20.2 and 13.7 percent, respectively). Capitola has the second lowest percentage (10.4 percent) of persons living under the poverty threshold in the study area.[1]

Table 2.1.3-14: Minority and Low-Income Populations in the Tier II Auxiliary Lane Alternative Study Area

	Study Area – Tier II*	Santa Cruz County	City of Capitola
Percentage of Population Identified as Minority	33.2	40	29
Percentage of Persons Identified as Low-Income (defined as below the US Census poverty threshold)	11.3	13.7	10.4

*Census tract level data were used to determine study area totals.

Source: U.S. Census Bureau, 2010.

There would be a potential for environmental justice impacts if the population in any Census Tract Block Group met or exceeded either of the following criteria, as suggested by the Council on Environmental Quality:

1. The Census Tract Block Group contained 50 percent or more minority or low-income population; or

[1] Please note that the percentages of persons living below the poverty threshold shown in Table 2.1.3-10 differs from the percentages shown in Table 2.1.3-3 in Section 2.1.3.1 (Community Character and Cohesion), because Table 2.1.3-3 presents the percentages of households living below the poverty threshold.

2. The percentage of minority or low-income population in any Census Tract Block Group was more than 10 percentage points greater than the average in the city and/or county in which the Census Tract Block Group is located.

Based on the above criteria and 2010 U.S. Census Data for the study area, the population in one out of the 16 Census Tracts adjacent to Route 1 contains a higher than average proportion of low-income or minority individuals. This Census Tract is described as follows:

- **Census Tract 1213; Block Group 4 –** Located north of Route 1, between Soquel Drive and South Rodeo Ranch Road, minorities represent approximately 75 percent of the population in the block group. Low-income residents represent slightly more than 9 percent of the local population.

Environmental Consequences

Tier I Corridor Alternatives

The congestion relief and enhanced operational and accessibility benefits of the Tier I Corridor Alternatives would accrue to area residents and other users of the Route 1 corridor. In addition, the HOV Lane Alternative would also benefit low-income ethnic communities in Watsonville who use public transit to and from the city of Santa Cruz and other areas north of Santa Cruz. Noise and visual impacts of the Tier I Corridor Alternatives would primarily affect area residents, but these impacts would be distributed along the entire 8.9-mile-long corridor. Because the project study area includes somewhat wealthier residents and a lesser proportion of minorities than within Santa Cruz County or the city of Santa Cruz as a whole, impacts would not fall disproportionately on low-income and minority populations.

No residential or business displacements would occur under the TSM Alternative and the minor land acquisitions would not affect the functionality of the residential or commercial land-uses. Five residential units and 11 businesses establishments, affecting approximately 20 residents and 48 employees would occur under the HOV Lane Alternative. Some sliver acquisitions of land associated with residential and commercial properties, primarily affecting parking, would also occur. These relocations and land acquisitions would be located at a various locations along the project, including Census Tract 1213 Block Group 4 which was identified as a minority and/or low-income population subject to environmental justice review.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative study area includes a variety of neighborhoods and a multi-ethnic population reflective of the Tier I Corridor Alternatives study area. The minority composition for the Tier II Auxiliary Lane Alternative study area and vicinity, as summarized in Table 2.1.3-14, is comparable to Santa Cruz County, with a lower minority population residing in the city of Capitola.

Table 2.1.3-14 also shows that the percentage of persons living below the poverty threshold is lower in the Tier II Auxiliary Lane Alternative study area (just over 11 percent) than within the County of Santa Cruz (13.7 percent).[2]

Based on the criteria discussed above (under the Tier I Corridor Alternatives) and 2010 U.S. Census Data for the Tier II Auxiliary Lane Alternative study area, the population in one out of five Census Tracts adjacent to Route 1 contains a higher than average proportion of low-income or minority individuals. This Census Tract is described as follows.

- **Census Tract 1213; Block Group 4 –** Located north of Route 1, between Soquel Drive and South Rodeo Ranch Road, minorities represent approximately 75 percent of the population in the area. Low-income residents represent slightly more than 9 percent of the local population.

Under the Auxiliary Lane Alternative, right-of-way requirements would be limited to the acquisition of small portions of parcels adjacent to Route 1. There would be five permanent partial acquisitions and one temporary acquisition required, with acquisition amounts ranging from 100 square feet to 9,200 square feet; cumulatively one third of an acre would be required. No displacements would occur. There would be no disproportionate adverse effects on minority and low-income populations.

Noise and visual impacts of the Tier II Auxiliary Lane Alternative would also affect area residents along the 1.4-mile section of Route 1, including Census Tract 1213, Block Group 4, which has a higher proportion of low-income and minority population than Santa Cruz County. However, these impacts would be realized throughout the Tier II project area; therefore, impacts would not fall disproportionately on low-income and minority populations.

No Build Alternative

No residential or business displacements would occur under this alternative; the benefits of improved access for low-income and minority populations, as well as the general population, would not be realized under this alternative. Therefore, disproportionately high and adverse effects on minority and low-income populations within the project area would not occur.

Avoidance, Minimization, and/or Mitigation Measures

Based on the above discussion and analysis, the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative would not cause disproportionately high and adverse effects on any minority or low-income populations per Executive Order 12898 regarding environmental justice. Therefore no avoidance, minimization and/or mitigation measures are proposed.

[2] Please note that the percentages of persons living below the poverty threshold shown in Table 2.1.3-11 differs from the percentages shown in Table 2.1.3-6 in Section 2.1.3.1 (Community Character and Cohesion), because Table 2.1.3-6 presents the percentages of households living below the poverty threshold.

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2.1.4 Utilities and Emergency Services

This section evaluates potential impacts to utilities and emergency services that could result from operation of the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative. Impacts to utilities and emergency services that could occur during project construction are discussed in Section 2.4 and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

Caltrans has mandatory standards, policies, and procedures for the placement and protection of underground utility facilities within highway right-of-way, as specified in Chapter 13 of the Right-of-Way Manual and the Policy on High- and Low-Risk Underground Facilities within Highway Rights-of-Way. These policies require placement and relocation of utilities to be approved through an encroachment permit process, and they govern identification, location, and clearances, as well as activities during construction. Construction of the project would need to comply with Caltrans requirements.

Impacts associated with utility relocations are addressed in this environmental document pursuant to California Public Utilities Code GO-131D filing requirements.

Affected Environment

The information in this section is derived from the proposed project's Community Impact Assessment (2015).

Tier I Corridor Alternatives

Utilities

There are more than 300 utility lines within the project area that include:

- Overhead electrical and transmission lines;
- Underground electrical, gas, sanitary sewer, water, television/cable, telephone, storm drain, and oil lines;
- Water and gas line casings on existing bridge structures; and
- Water, electric, telephone, and television lines on existing structures.

Pacific Gas & Electric (PG&E) provides gas and electricity services in the study area. AT&T maintains the local telephone service, and Comcast is the main cable service provider.

The Soquel Creek Water District provides water service to Capitola and the unincorporated communities of Aptos, La Selva Beach, Opal Cliffs, Rio Del Mar, Seascape, and Soquel. The Santa Cruz Water Department provides water service to the City of Santa Cruz.

Wastewater collection and treatment within the study area are provided by the City of Santa Cruz Public Works Department and the Santa Cruz County Sanitation District, which also serve Live Oak, Capitola, Soquel, and Aptos.

Solid waste collection, recycling, and yard waste disposal are provided by Waste Management through franchise agreements with Santa Cruz County and the cities of Santa Cruz and Capitola. The county operates two solid waste facilities: the Buena Vista Landfill west of Watsonville and the Ben Lomond Transfer Station near the town of Ben Lomond. In addition, the City of Santa Cruz operates a sanitary landfill located approximately 3 miles west of the city.

Emergency Services

There are two hospitals in the study area, both of which offer emergency services. Police protection and traffic enforcement are provided by the Santa Cruz County Sheriff's Department, California Highway Patrol, and the police departments of the cities of Santa Cruz, Capitola, and Aptos. The Santa Cruz Fire Department, the Aptos-La Selva Fire Protection District, and the Central Fire Protection District provide fire protection and emergency rescue services. There are seven fire stations within the study area.

Table 2.1.4-1 summarizes the emergency services within the corridor.

Table 2.1.4-1: Existing Emergency Services in the Study Area

Service	Address
Hospitals	
Dominican Santa Cruz Hospital	1555 Soquel Drive, Santa Cruz
Sutter Maternity and Surgery Center of Santa Cruz	2900 Chanticleer Avenue, Santa Cruz
Police Stations	
Santa Cruz County Sheriff	870 17th Avenue # 4, Santa Cruz
Santa Cruz County Sheriff's Department	701 Ocean Street # 340, Santa Cruz
Santa Cruz Police Department	155 Center Street, Santa Cruz
California Highway Patrol	10395 Soquel Avenue, Aptos
Capitola Police Department	422 Capitola Avenue, Capitola
Santa Cruz County Sheriff's Department	19 Rancho Del Mar # D, Aptos
Fire Stations	
Santa Cruz Fire Department, Station 2	230 Walnut Avenue, Santa Cruz
Central Fire Protection District of Santa Cruz County Station 1	930 Seventeenth Avenue, Santa Cruz
Central Fire Protection District of Santa Cruz County Station 2	3445 Thurber Lane, Santa Cruz
Central Fire Protection District of Santa Cruz County Station 3	4747 Soquel Drive, Soquel
Central Fire Protection District of Santa Cruz County Station 4	405 Capitola Avenue, Capitola
Aptos–La Selva District, Aptos Station (Station 1)	6934 Soquel Drive, Aptos
Aptos-La Selva District, Rio del Mar Station	300 Bonita Drive, Aptos
Source: Community Impact Assessment 2015.	

Tier II Auxiliary Lane Alternative

Utilities

There are approximately 19 utility lines within the Tier II project area, including overhead electrical and transmission, underground gas, sanitary sewer, storm drain, television/cable, telephone, and fiber-optic lines. Service providers are identified above in the Tier I Corridor Alternatives section.

Emergency Services

Emergency services would be provided by the same agencies identified above in the Tier I Corridor Alternatives section (Table 2.1.4-1).

Environmental Consequences

Tier I Corridor Alternatives

Utilities

As described in Section 2.4.2, there is potential for utilities to be affected during construction activities under the Tier I Corridor HOV Lane Alternative and the Tier I Corridor TSM Alternative. Under the HOV Lane Alternative, 142 utility lines would likely require relocation to avoid conflicts with the proposed improvements, such as placement of bridge columns, footings, and new pavement. Under the TSM Alternative, 110 utility lines would likely require relocation. Precise field locations may vary for utilities such as PG&E's 21-kilovolt electrical lines, and relocation details would be worked out with the utility providers during the final design phase of the project in accordance with Caltrans procedures.

Emergency Services

The long-term effect of the project would be to reduce congestion and thereby enhance accessibility for emergency services within the project area, which would benefit the community. While the Tier I Corridor TSM Alternative would have minimal benefit, the Tier I Corridor HOV Lane Alternative would increase the capacity of Route 1, allowing emergency service providers to better respond to emergencies during peak traffic periods while using Route 1. Short-term impacts to emergency services would occur during construction; these impacts are discussed in Section 2.4.3.

Tier II Auxiliary Lane Alternative

Utilities

The Design Team has determined that utilities could be affected during construction under the Tier II Auxiliary Lane Alternative, as described in Section 2.4.3. Under the Auxiliary Lane Alternative, 15 utility lines would likely require relocation to avoid conflicts with the proposed improvements. The affected utilities include:

- Five storm drain facilities, including 600 feet of reinforced concrete pipe (ranging from 9 to 18 inches in diameter) to be protected in place, and one storm drain manhole to be modified or extended.
- Three sewer facilities, compromising 500 linear feet of sanitary sewer lines to be protected in place.
- Nine electrical facilities, including eight PG&E poles to be relocated and 210 linear feet of 21-kilovolt electrical line.
- One gas facility with 90 linear feet of gas line to be protected in place.
- One cable facility with 80 linear feet of cable to be relocated.

Precise field locations may vary for utilities, such as the 21-kilovolt electrical lines, and relocation details would be worked out with the utility providers during the final design phase of the project in accordance with Caltrans procedures.

Emergency Services

The Tier II Auxiliary Lane Alternative would improve traffic operations (merging) in this section of Route 1, allowing emergency service providers to better respond to emergencies while using Route 1 in this area. Short-term impacts to emergency services would occur during construction; these construction impacts are discussed in Section 2.4.3, Utilities and Emergency Services.

No Build Alternative

Under the No Build Alternative, congestion on the roadway would continue to worsen in the area, further impacting service provider response times. This would result in an adverse impact on emergency services using Route 1.

Avoidance, Minimization, and Mitigation Measures

Tier I Corridor Alternatives

The Tier I Corridor Alternatives would not result in actual construction; therefore, no avoidance, minimization, and/or mitigation measures are required. Project-specific impacts on utilities will be assessed after a Tier I corridor alternative is selected and Tier II construction-level projects are developed; these will be subject to separate environmental review.

As described in Section 2.4.2, in compliance with Caltrans policies, coordination with utility providers would be initiated during the preliminary engineering phase of future projects and would continue through final design and construction. There would be coordination with utility providers to plan utility relocations, to identify potential conflicts, to ensure that construction of the proposed project minimizes disruption to utility operations, and to formulate strategies for overcoming problems that may arise. Design, construction, and inspection of utilities relocated for the project would be done in accordance with Caltrans requirements.

Measures to avoid or minimize disruptions to emergency services and utilities during project construction are presented in Section 2.4.2.

Tier II Auxiliary Lane Alternative

The impact avoidance and minimization measures described in Section 2.4.3 for the Tier I Corridor Alternatives are also applicable to the Tier II Auxiliary Lane Alternative and are required to be implemented as part of the Tier II project.

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2.1.5 Traffic and Transportation/Pedestrian and Bicycle Facilities

This section evaluates potential traffic impacts that could result from the Tier I and Tier II project alternatives, including impacts and benefits to vehicular traffic, transit, and bicycle and pedestrian facilities. Also included in this section is a comparison of the Tier I HOV Lane Alternative to the addition of a mixed flow lane, which is summarized from the HOV Report (2007). Impacts that would occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

The Federal Highway Administration directs that full consideration be given to the safe accommodation of pedestrians and bicyclists during the development of federal-aid highway projects (see 23 *Code of Federal Regulations* 652). It further directs that the special needs of the elderly and the disabled must be considered in all federal-aid projects that include pedestrian facilities. When current or anticipated pedestrian and/or bicycle traffic presents a potential conflict with motor vehicle traffic, every effort must be made to minimize the detrimental effects on all highway users that share the facility.

In July 1999, the U.S. Department of Transportation issued an Accessibility Policy Statement pledging a fully accessible multimodal transportation system. Accessibility in federally assisted programs is governed by the U.S. Department of Transportation regulations (49 *Code of Federal Regulations* 27) implementing Section 504 of the Rehabilitation Act (29 United States Code 794). The Federal Highway Administration has enacted regulations for the implementation of the 1990 Americans with Disabilities Act, including a commitment to build transportation facilities that provide equal access for all persons. These regulations require application of the Americans with Disabilities Act requirements to federal-aid projects, including Transportation Enhancement Activities.

Affected Environment

The information in this section is derived from the *Traffic Operations Report* (2012), the HOV Report (2007), the *Community Impact Assessment* (2015), and the SR 1 HOV Lane Widening Project Parking Impact Analysis Memo (2011) prepared for the proposed project. The following sections describe the baseline conditions and traffic operations along Route 1 and include the project limits of the Tier I and Tier II Corridor Alternatives. The project team conducted a series of traffic counts within the study corridor, twice in 2001 and once in 2003. As the study area expanded southward during the course of this study, additional counts were conducted in 2003 for the southern portion of the study area. In November 2010, new traffic counts were collected by Caltrans (Caltrans 2010, Traffic and Vehicle Data System) for the study area and were used to compare against the 2001/2003 counts. In the middle and south segments portions of the corridor, the 2010 traffic volumes were 4 to 5 percent lower than the

2001/2003 counts. In the northern portion, 2010 volumes were 22 percent lower than the earlier counts. This variation is expected due to the economic downturn, especially at the northern end of the corridor, which is a job destination and a gateway to jobs in the Santa Clara Valley and San Francisco Bay Area. Despite these reductions in volumes, and even if these reduced volumes were sustained until opening year of the project, the purpose and need for the project would remain and changes to the final project design would likely be insignificant. Therefore, baseline traffic conditions were based on the 2001 and 2003 traffic data.

Compatibility of the traffic data from years 2001 and 2003 was also analyzed. It was determined that the volumes were within about 10 percent of each other, which is within the acceptable range of variability.

Baseline Roadway Network

Route 1 serves local traffic between the cities and communities in Santa Cruz County, commuter traffic continuing on SR 17 to jobs in Santa Clara County, and Santa Cruz commuters who work in Monterey County. Route 1 is the primary route for goods movement between Santa Cruz County communities. Route 1 also is the southern terminus for SR 9 and SR 17, which bring tourist and recreational-oriented traffic to coastal destinations in Santa Cruz and Monterey counties. Route 1, from Larkin Valley Road to Morrissey Boulevard in Santa Cruz, is a highly traveled, heavily congested traffic corridor. The annual average daily traffic along Route 1 within the project limits on an average day in 2010 was as high as 104,000 vehicles in both directions (Caltrans 2010, Traffic and Vehicle Data System). The major arterial roadway network, comprising the traffic study area, is illustrated in Figure 2.1.5-1.

Major local arterial streets feed into Route 1. Each major arterial is striped with a Class II bicycle lane. The major, local arterial streets in the traffic study area include:

- **41st Avenue –** 41st Avenue is the most heavily traveled of all of the arterials in the study area and comprises Santa Cruz's main retail corridor. It extends north and south between Soquel Drive and Cliff Drive on the waterfront. It is two lanes in most locations, but it is as wide as six lanes in sections between Soquel Drive and Capitola Road.
- **Porter Street and Bay Avenue –** Porter Street and Bay Avenue are the northern and southern segments of an approximately 1-mile-long alignment that runs from Monterey Avenue, across Route 1, to the foot of the Santa Cruz Mountains. North of Soquel Drive, Porter Street turns into Old San Jose Road. Very heavily traveled, Porter Street is two lanes wide. Bay Avenue, with slightly lower volumes, is four lanes wide. Both provide access from Route 1 to Capitola Avenue, south of Route 1, and Soquel Drive to the north.

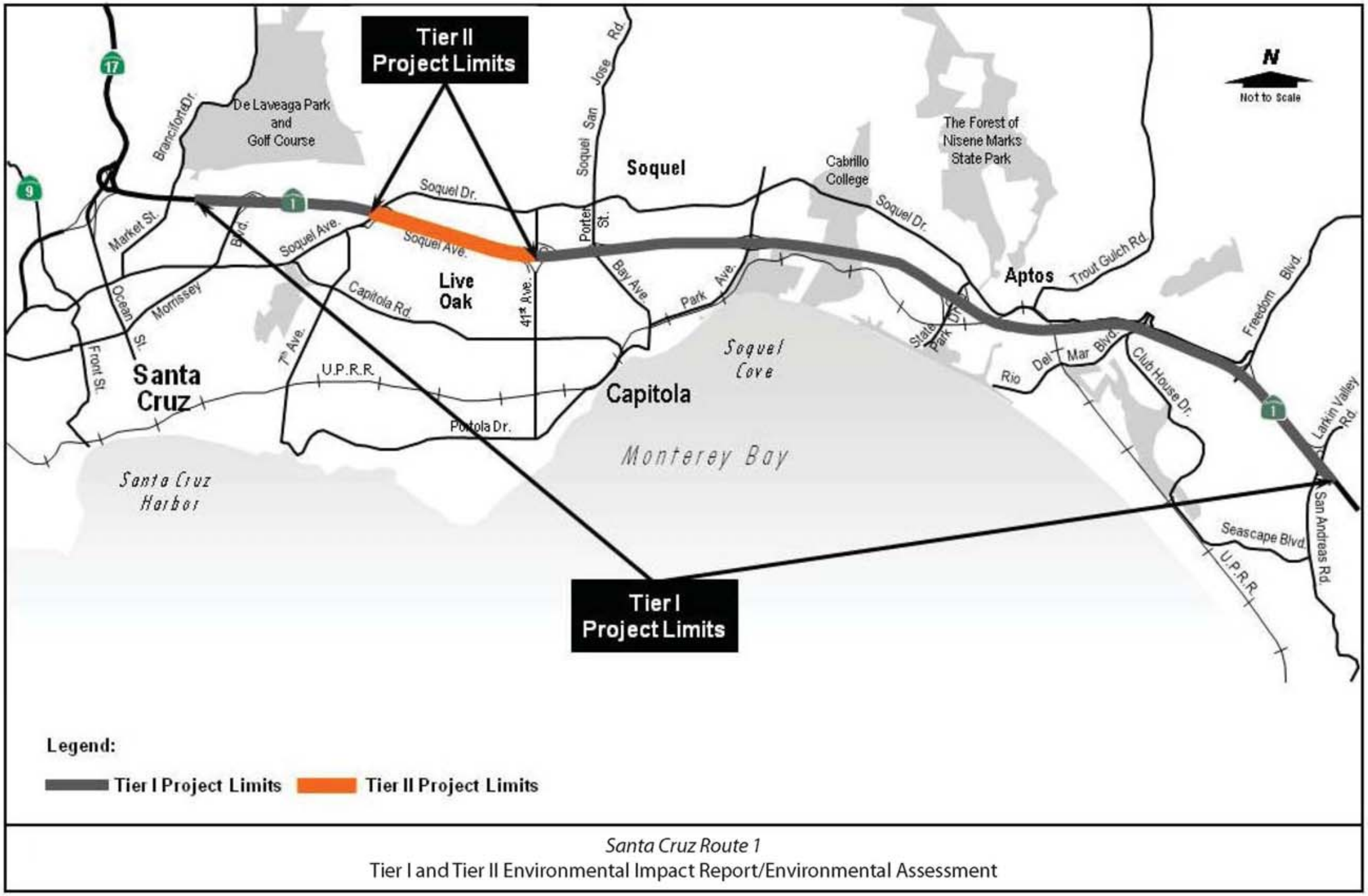

Figure 2.1.5-1: Arterial Roadway Network

- **Soquel Drive –** Soquel Drive is the main route parallel to Route 1 in the study area. It is approximately 8 miles long, starting in the north at its intersection with Soquel Avenue and ending at Freedom Boulevard at the southern end of the study area. It is two lanes wide for most of its distance. East of State Park Drive, it is primarily an access road for Route 1.
- **Soquel Avenue –** Soquel Avenue serves the southwestern part of the study area. To the east, it begins at Pacific Avenue and crosses over the San Lorenzo River. Just south of Route 1, Soquel Avenue turns right and continues south to Gross Road. Also at this junction, Soquel Avenue feeds into Soquel Drive, crossing over Route 1 and paralleling it on the north side. It is a 3.5-mile-long, primarily two-lane road that widens in some sections.
- **Rio Del Mar Boulevard –** Rio Del Mar Boulevard is the primary access route from Route 1 to the Rio Del Mar community. This two-lane road runs north-south for 1.4 miles from Beach Drive (private road) to Soquel Drive.
- **State Park Drive –** State Park Drive is a short (less than 1 mile long), two-lane road providing access from Route 1 to Seacliff Beach State Park to the south and Soquel Drive to the north. Its heavy volumes are a function of its connection with Soquel Drive and the Rancho Del Mar Shopping Center.
- **Park Avenue –** Park Avenue is a four-lane street dividing the city of Capitola to the west from the community of Aptos to the east. It begins in the hilly northern side of Capitola and runs south to Monterey Avenue, turning west to parallel the ocean after Coronado Street. It is 1.8 miles long.

Baseline Traffic Conditions on Route 1

Where this document refers to baseline traffic volumes or conditions, it refers to traffic data collected in 2001 and 2003.

Travel time surveys were conducted along the Route 1 study corridor in October 2003 during weekday morning, midday, and evening peak periods. The route surveyed, referred to as the "traffic study area," extends for 8.9 miles between San Andreas Road/Larkin Valley Road and the Branciforte Drive Overcrossing, just south of the Route 1/SR 17 interchange. Surveyed travel times were used to calibrate the traffic operations model for baseline freeway operations during weekday morning and evening peak-hour conditions.

Various measures of effectiveness were developed to evaluate baseline and future traffic operations within the traffic study area, including average travel time, travel speed, and vehicle miles traveled. Measures of effectiveness are performance measures used to quantify the achievement of the traffic operations objectives of a project.

Table 2.1.5-1 shows baseline peak-hour measures of effectiveness. Due to the extended period of congestion on Route 1, an extended peak period was considered for this study, consisting of a 6-hour extended peak: 6:00 a.m. to 12:00 p.m. in the morning and 2:00 p.m. to 8:00 p.m. in the evening. These extended periods were used in order to observe the "heating up" and "cooling off" of traffic conditions before and after the respective peak periods of 7 a.m. to 10 a.m. and 3 p.m. to 6 p.m. In each case, one hour is included prior to the peak period and two hours are included following the end of the peak period in order to provide context for better understanding the peak period conditions. The peak hour represents the highest traffic volumes in a 1-hour time frame within the peak period. During the morning peak period, the northbound direction is heavy with commuters heading into the downtown area and toward SR 17 to commute to Santa Clara Valley and the San Francisco Bay Area; whereas during the evening peak period, most traffic travels southbound from downtown Santa Cruz. Within the project limits, during the morning peak hour, there is a baseline of 38,517 vehicle miles traveled in the northbound direction, and 30,348 vehicle miles traveled in the southbound direction. During the evening peak hour there is a baseline of 32,349 vehicle miles traveled in the northbound direction and 35,661 vehicle miles traveled in the southbound direction. Thus, traffic conditions are most congested in the commute directions, northbound in the morning and southbound in the evening. Travel speeds are as low as 26 miles per hour, showing congested, stop-and-go traffic conditions.

Table 2.1.5-1: Baseline Peak-Hour Measures of Effectiveness

	Northbound		Southbound	
	Morning	**Evening**	**Morning**	**Evening**
Travel Speeds (mph)	30	39	60	26
Travel Time (minutes/vehicle)	23	15	10	27
Vehicle Hours Traveled	1,274	823	507	1,391
Vehicle Miles Traveled	38,517	32,349	30,348	35,661
Delay (minutes/vehicle)	14	6	0	15
Source: Traffic Operations Report, 2012.				

Baseline Intersection Operations

Project area intersections were categorized into two groups for the intersection analysis: signalized (i.e., controlled by traffic signals) and unsignalized (i.e., controlled by stop signs). SYNCHRO software was used to analyze both kinds of intersections.

The study evaluated 25 intersections on either side of Route 1, between the San Andreas Road/Larkin Valley Road and Morrissey Boulevard interchanges. These intersections are listed in Table 2.1.5-2. Of the 25 study intersections, 2 are under jurisdiction of the City of

Santa Cruz, 1 is under jurisdiction of the City of Capitola, 4 are under jurisdiction of Santa Cruz County, and the remaining 18 intersections are under jurisdiction of Caltrans.

Table 2.1.5-2: Intersections in the Traffic Study Area

#	Intersection	Jurisdiction	Type
1	Morrissey Boulevard/Rooney Street/Pacheco Avenue	City of Santa Cruz	Unsignalized
2	Rooney Street/Route 1 northbound ramps	Caltrans	Unsignalized
3	Fairmount Avenue/Route 1 southbound ramps	Caltrans	Unsignalized
4	Morrissey Boulevard/Fairmount Avenue	Caltrans	Signalized
5	Soquel Avenue/Route 1 southbound ramps	Caltrans	Signalized
6	Soquel Drive/Paul Sweet Road/Commercial Way	Caltrans	Signalized
7	41st Avenue/Route 1 northbound off-ramp	Caltrans	Signalized
8	41st Avenue/Route 1 southbound ramps	Caltrans	Signalized
9	Porter Street/S. Main Street	County of Santa Cruz	Signalized
10	Porter Street/Route 1 northbound ramps	Caltrans	Signalized
11	Bay Avenue/Route 1 southbound ramps	Caltrans	Signalized
12	Park Avenue/Route 1 northbound ramps	Caltrans	Signalized
13	Park Avenue/Route 1 southbound ramps	Caltrans	Signalized
14	Park Avenue/Kennedy Drive/McGregor Drive	City of Capitola	Unsignalized
15	State Park Drive/Route 1 northbound ramps	Caltrans	Signalized
16	State Park Drive/Route 1 southbound ramps	Caltrans	Signalized
17	State Park Drive/ McGregor Drive	County of Santa Cruz	Unsignalized
18	Rio Del Mar Boulevard/Route 1 northbound ramps	Caltrans	Signalized
19	Rio Del Mar Boulevard/Route 1 southbound ramps	Caltrans	Signalized
20	Rio Del Mar Boulevard/Soquel Drive	County of Santa Cruz	Signalized
21	Freedom Boulevard/Route 1 northbound ramps	Caltrans	Unsignalized
22	Freedom Boulevard/Route 1 southbound ramps	Caltrans	Unsignalized
23	Freedom Boulevard/Bonita Drive	County of Santa Cruz	Unsignalized
24	San Andreas Road/Larkin Road/ Route 1 northbound off-ramp	Caltrans	Unsignalized
25	San Andreas Road/Route 1 southbound ramps	Caltrans	Unsignalized
Source: Traffic Operations Report, 2012.			

Analysis shows that the study intersections currently vary in terms of the delays experienced during the peak periods of 7 a.m. to 10 a.m. and 3 p.m. to 6 p.m. The intersections experiencing delays of approximately one minute or more under baseline conditions are presented in Table 2.1.5-3. The per vehicle delay at these intersections ranges from 36 seconds to 6 minutes.

Table 2.1.5-3: Study Intersections with per Vehicle Delays of One Minute or Greater in Baseline Condition

Morning Peak			PM Peak		
Intersection	Delay		Intersection	Delay	
	Min	Sec		Min	Sec
Fairmount Avenue/Route 1 southbound ramps	1	56	Fairmount Avenue/Route 1 southbound ramps	1	52
Park Avenue/Route 1 northbound ramps	1	25	Park Avenue/Kennedy Drive/McGregor Drive	1	15
Park Avenue/Kennedy Drive/McGregor Drive	1	32	State Park Drive/ McGregor Drive	4	0
State Park Drive/ McGregor Drive	6	26			
Rio Del Mar Boulevard/ Soquel Drive	4	9	Freedom Boulevard/Route 1 southbound ramps	2	4
Source: Traffic Operations Report, 2012.					

Safety

While fatal and injury accidents are lower than average for facilities of this type in most of the project corridor, congestion-related accidents are common along Route 1 within the Tier I project limits, based on accident data for the years 2005 through 2008.

During the 3-year period, there were 931 accidents, with 4 fatalities and 275 injuries, resulting in an accident rate of 1.08, which is below the statewide average rate of 1.10, as shown in Table 2.1.5-4.

Table 2.1.5-4: Three-Year Accident Data – Route 1, Tier I Project Limits (08/01/2005 – 07/31/2008) (Accidents per Million Vehicle Miles)

	Fatal	Fatal + Injury	Total
Actual	0.005	0.32	1.08
Statewide Average	0.012	0.35	1.10

Source: Caltrans Traffic Accident Surveillance and Analysis System (TASAS), 2011.

Tier II Auxiliary Lane Alternative

In the northern portion of the project corridor, within the Tier II project limits from 41st Avenue to Soquel Avenue/Drive (post miles 13.5 to 14.9), both the mainline of Route 1 and the Route 1 southbound off-ramp to 41st Avenue experience accident rates exceeding the statewide average for similar facilities. Accident rate data for this portion of Route 1 were collected over a 3-year time period from July 1, 2008, to June 30, 2011.

There were 166 collisions reported during this period on the affected mainline portion. Weaving width can be a factor in the incidence of rear-ending and sideswiping accidents, which represent 77 percent of the collisions reported during the period. Increasing the weaving width by adding an auxiliary lane would provide more opportunities for lane change maneuvers and would serve as a speed change lane, reducing the speed differential between vehicles on the mainline and those exiting or merging onto the mainline.

At the southbound 41st Avenue off-ramp, 14 collisions were reported during the 3-year period. One-half of the collisions were attributable to broadsiding, followed by sideswiping. The Tier II project would provide speed-reduction signage at this ramp.

Accident information for the Tier II project limits is provided in Tables 2.1.5-5 and 2.1.5-6.

Table 2.1.5-5: Three-Year Accident Data – Route 1, Tier II Project Limits (07/01/2008 – 06/30/2011) (Accidents per Million Vehicle Miles)

	Fatal	Fatal + Injury	Total
Actual	0.007	0.38	1.18
Statewide Average	0.008	0.30	0.82

Table 2.1.5-6: Three-Year Accident Data – Southbound Off-Ramp to 41st Avenue (07/01/2008 – 06/30/2011) (Accidents per Million Vehicles)

	Fatal	Fatal + Injury	Total
Actual	0.000	0.30	1.41
Statewide Average	0.003	0.35	1.01

Baseline Transit, Bicycle/Pedestrian, and Parking Conditions

Transit Facilities

Metro is the primary transit provider in Santa Cruz County. It operates 50 urban collector, express, and urban local feeder routes in the study area and 2 transit centers – in downtown Santa Cruz and the Capitola Mall. Transit coverage in the study area includes Cabrillo College, Capitola Mall, Dominican Hospital, and Seacliff State Beach.

Metro also complements its regular fixed-route bus service with ParaCruz, which is a shared ride, door-to-door paratransit service, as defined in the Americans with Disabilities Act.

ParaCruz service is available to anyone certified as unable to use regular fixed-route service as a result of a disability, and it serves any location within 0.75 mile of any regular Metro bus route, except the Route 17 Express service.

Metro is currently constructing MetroBase, which is a major transit facility within the city of Santa Cruz. MetroBase will bring operations, maintenance, and administration under one facility to provide the needed infrastructure to achieve service expansion goals. The Major Transportation Investment Study completed in 1999 allocated funding for the Santa Cruz Metro to expand annual service hours from 220,000 to 350,000 hours by 2015.

Tier I and Tier II Corridor Alternatives - Bus routes serving the Route 1 study corridor within the limits of Tier I and Tier II Corridor Alternatives are described below. All of these bus routes, with the exception of Route 71, use part of Route 1 within the project limits. Route 91x is the only bus service operating on Route 1 within the limits of the Tier II Auxiliary Lane Alternative.

- **Route 17 Express Service –** The Route 17 express bus serves a San Jose-based transit market. Jointly operated by Metro, Amtrak, and the Santa Clara Valley Transportation Authority, this service originates at the Metro Center in downtown Santa Cruz. The express service has seven northbound weekday trips originating and five southbound weekday trips terminating at the Soquel park-and-ride lot. Congestion on Route 1 causes delays to the Route 17 express service. Metro is considering the option of extending the Route 17 service farther south to State Park Drive if travel conditions for express buses on Route 1 improve.
- **Route 91x – Watsonville to Santa Cruz Commuter Express –** This limited-stop Metro bus line originates at the Watsonville Transit Center near downtown Watsonville and terminates at the Metro Center in downtown Santa Cruz. This line serves Cabrillo College, west side Santa Cruz employment centers, downtown Watsonville, Capitola Mall, Dominican Hospital, the Soquel Drive park-and-ride lot, and the County Government Center.
- **Routes 54, 55, and 56 – Mid-County Service –** These Metro bus routes serve the areas of Capitola, Aptos, and La Selva Beach. The bus lines originate in the Capitola Mall and terminate in the Seacliff area. Only Route 54 provides weekend and weekly evening services, as well as an expanded service area to La Selva Beach. Weekday services are provided by all three Mid-County bus lines. These routes do not serve any of the park-and-ride lots within the study corridor.

Routes 69A, 69W, and 71 – Capitola Avenue/Santa Cruz/Watsonville – These local Metro bus routes originate at the Watsonville Transit Center and terminate at the Metro Center in the city of Santa Cruz. Both weekday and weekend services are provided. This route does not serve any of the park-and-ride lots within the study corridor.

Bicycle Facilities

Bicycle facilities in the study area are shown in Figure 2.1.5-2. The Santa Cruz County Planning Department’s Master Plan of Countywide Bikeways emphasizes safe and convenient bicycle routes that complement other transportation modes (e.g., transit, carpool) to serve places of employment, commercial districts, schools, beaches, and parks. The Master Plan of Countywide Bikeways defines a network of bikeways that coordinates with and complements the bikeway systems of local cities and adjacent counties. The bikeway network is made up of three types of facilities:

- Class I bikeways (bike paths), which provide a separated right-of-way for the exclusive use of bicycles and pedestrians
- Class II bikeways (bike lanes), which provide a striped lane for one-way travel on a street or highway
- Class III bikeways (bike routes), which provide for shared use with pedestrian or motor vehicle traffic

Tier I Corridor Alternatives – Many of the roadways within the Tier I project area and the city of Santa Cruz allow for safe bicycle travel. Class I bike paths exist along the San Lorenzo River levees, West Cliff Drive, and other locations, and Class II bike lanes exist along many of the city's arterial streets, including Water Street, Market Street, Soquel Avenue, Soquel Drive, Broadway, Capitola Road, and other high-activity corridors.

Many streets in the Capitola area, such as Capitola Road, Portola Drive, and Park Avenue, are equipped with Class II bicycle lanes. Although there are some gaps in the system, the City is progressing towards a more complete system for bicyclists using these bikeways for commuting and recreational purposes.

- Connecting the communities of Live Oak, Soquel, and Aptos to the cities of Santa Cruz and Capitola is a Class II bikeway that runs from the University of California at Santa Cruz campus to Watsonville along major streets including Soquel Avenue, Soquel Drive, and Freedom Boulevard. An alternate Class II route connects Soquel Drive to Watsonville along San Andreas Road.
- Class III bikeways (bike routes), which provide for shared use with pedestrian or motor vehicle traffic.

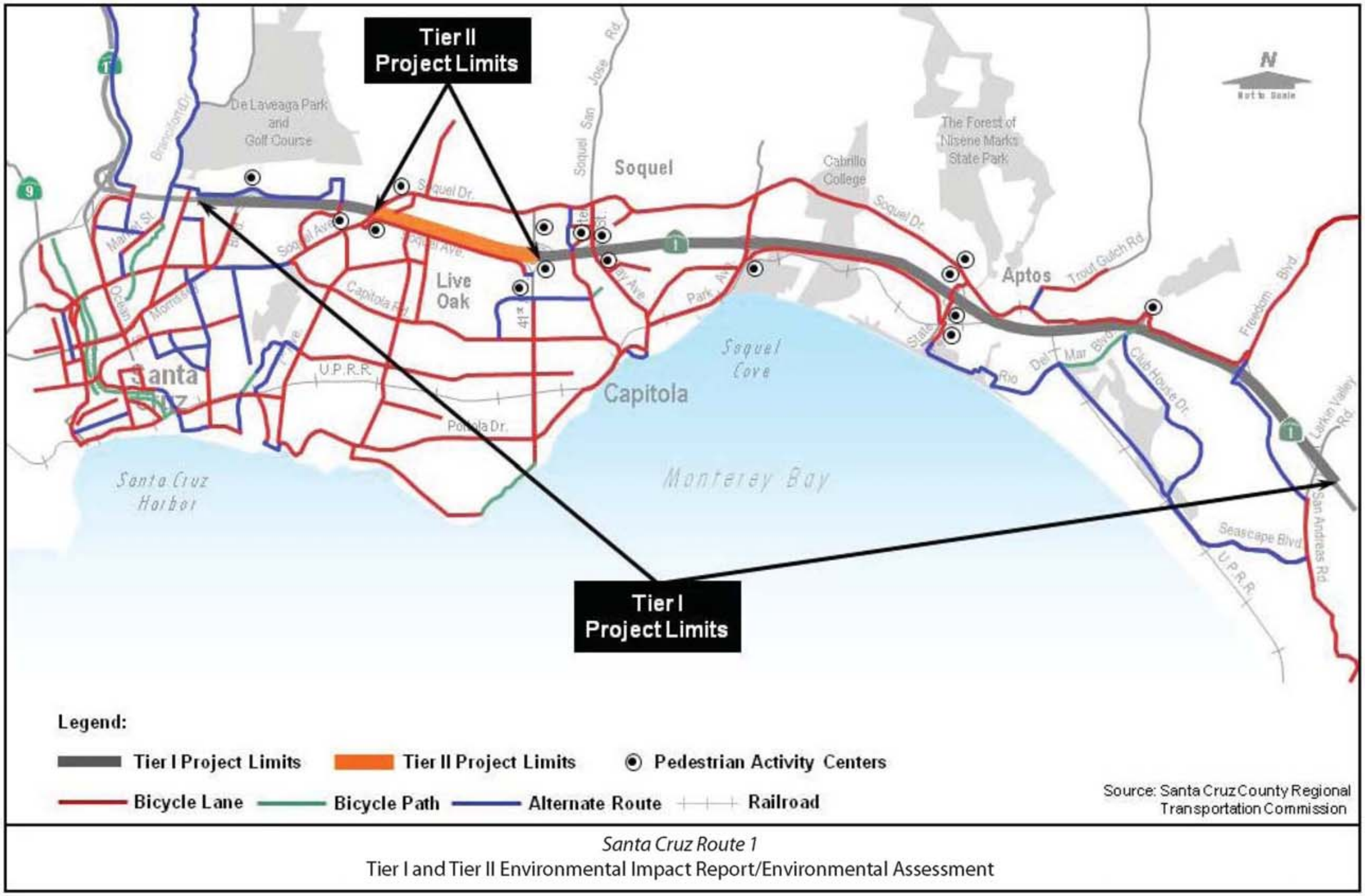

Figure 2.1.5-2: Bicycle and Pedestrian Facilities

Tier I Corridor Alternatives – Many of the roadways within the Tier I project area and the city of Santa Cruz allow for safe bicycle travel. Class I bike paths exist along the San Lorenzo River levees, West Cliff Drive, and other locations, and Class II bike lanes exist along many of the city's arterial streets, including Water Street, Market Street, Soquel Avenue, Soquel Drive, Broadway, Capitola Road, and other high-activity corridors.

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Other roads throughout the county, such as Sumner Avenue, Rio Del Mar Avenue, Western Drive, and Escalona Drive, are identified as Alternate Bicycle Routes. Alternate routes are streets that are favorable to cyclists but are not striped and not necessarily signed. These routes connect to designated bicycle facilities and transit facilities within the county.

Tier II Auxiliary Lane Alternative – The Tier II project area includes mainly Class I and Class II bicycle facilities. These facilities connect the communities of Live Oak, Soquel, and Aptos to the cities of Santa Cruz and Capitola with a Class II bike lane that runs from the University of California at Santa Cruz campus to Watsonville along major streets including Soquel Avenue, Soquel Drive, and Freedom Boulevard. An alternate Class II route connects Soquel Drive to Watsonville along San Andreas Road. Additionally, Clares Street within Capitola is designated as an alternate route for bicycles seeking access to the Capitola Mall Transit Facility.

Pedestrian Conditions

This section discusses baseline pedestrian conditions and general plan actions within the Tier I Corridor Alternatives study area. These conditions also apply to the Tier II project limits. Pedestrian activity centers in the study area are shown in Figure 2.1.5-2.

One of the goals of the Santa Cruz County General Plan is to encourage pedestrian travel as a viable means of transportation, by itself and in combination with other modes. Policies to promote pedestrian activity focus on maintaining existing pathways, constructing new walkways, providing adequate lighting and other amenities, and ensuring safe and convenient pedestrian access to transit facilities.

Within the city of Santa Cruz, sidewalks, promenades, and hiking trails currently provide residents with a system of pedestrian walkways. The City of Santa Cruz Master Transportation Study Report identified six major pedestrian activity centers and several activity areas throughout the city. The analysis considered location, intensity and types of uses, the street and block pattern, and the natural features of the identified areas. The six major activity centers include Downtown Santa Cruz, Beach and Boardwalk, University of California at Santa Cruz, Harvey West Park, the Mission Street Commercial Area, and the Soquel Avenue Eastside Business District. These areas are considered hubs of the city's economic, educational, recreational, cultural, and social life.

The 2014 Capitola General Plan identified several corridors as critical elements for a comprehensive pedestrian system. The baseline pedestrian network includes paths along the beach and cliff areas, as well as walkways through certain neighborhoods. Baseline pedestrian routes in the study area include those along 41st Avenue, Portola Drive, Capitola Avenue, and Park Avenue.

Improving pedestrian safety and amenities is one of the major goals of the Soquel Village Plan. Central to the design concept for Aptos Village is the creation and development of a pedestrian zone in the Village core that would connect residents with local recreational opportunities.

Parking

Throughout the Tier I and Tier II Corridor project limits, there is a mix of on-street and off-street parking facilities. On-street parking facility enforcement is provided by the various cities and villages within the Tier I and Tier II project corridor. Private parking lots and garages constitute the off-street parking within the study area. On-street and off-street parking facilities support a variety of commercial uses and residential properties within the project limits.

Within Santa Cruz County, there are six park-and-ride lots: three are adjacent to Route 1 and three are adjacent to Route 17, northwest of the project area. The locations of these facilities are listed below:

- Resurrection Church, Aptos (Route 1 and Old Dominion Court/Soquel Drive-Seacliff/ State Park Drive exit).
- Soquel Drive/Paul Sweet Road, Santa Cruz (Route 1 and Soquel Drive)
- Quaker Meetinghouse, Santa Cruz (Route 1 and Morrissey at 225 Rooney Street)
- Pasatiempo, Santa Cruz (Route 17 at the Pasatiempo exit)
- Scotts Valley Transit Center (Kings Village Road, off Mount Hermon Road)
- Summit Road (Route 17 at Summit Road)

Environmental Consequences

The following sections describe the environmental consequences of the Tier I and Tier II Corridor Alternatives.

Design Year Analysis

The traffic analysis was based on the balanced traffic forecasts developed for this project using the Year 2030 Association of Monterey Bay Area Governments Regional Travel Demand Model. This model assumes growth in population, housing and employment based on approved jurisdictional plans. The travel demand model synthesizes the land use, socioeconomic/demographic, and roadway networks into future travel patterns as well as traffic volumes. The project team then extrapolated the year 2030 projections to year 2035 for a 20-year design horizon.

The FREQ software package was used to model future freeway traffic conditions for the design year (2035) traffic operations, using the Association of Monterey Bay Area Governments model's traffic patterns and volumes. FREQ simulation was conducted for the northbound and southbound directions for the morning and evening peak periods.

Americans with Disabilities Act Compliance

The proposed pedestrian improvements incorporated into the Tier I and Tier II Corridor Alternatives discussed in the following sections would comply with Americans with Disabilities Act design criteria.

Tier I Corridor TSM Alternative

Peak-Hour Traffic Conditions in 2035

The addition of ramp metering and auxiliary lanes with the Tier I Corridor TSM Alternative would enable Route 1 to serve more peak-hour traffic demand than under no-build conditions; however, metering on-ramps would increase delays for traffic entering the freeway and affect the performance of arterials and local intersections. As shown in Table 2.1.5-7, overall freeway operations would improve with ramp metering, although metering the corridor's on-ramps would result in delays to mixed-flow traffic entering the freeway. The overall increase in traffic throughput can be seen in improvements relative to the measures of effectiveness described below, both in the reverse commute direction and in the morning principal commute direction (northbound). However, in the evening principal commute direction (southbound), there would be a slight increase in the average travel time (62 minutes, 2 percent increase), while the average travel speed would slightly decrease (10 mph, 9 percent decrease) due to the severe breakdown of State Route 1 by year 2035. Providing ramp metering and auxiliary lanes would not relieve the congestion in the peak commute direction, although it would increase the corridor's ability to carry more vehicles (Traffic Operations Report, 2012).

Table 2.1.5-7: Comparison of Measures of Effectiveness – Year 2035 No Build Alternative and Tier I Corridor TSM Alternative

Measures of Effectiveness		2035 No Build		2035 TSM		% Difference	
		AM	PM	AM	PM	AM	PM
Northbound							
Average Travel Time (minutes)	Peak Hour	59	34	34	29	–42	–15
	Peak Period	*39*	*22*	*27*	*18*	*–31*	*–18*
Average Speed (miles per hour)	Peak Hour	12	17	21	21	75	24
	Peak Period	*18*	*28*	*27*	*33*	*50*	*18*
Delay (minutes per vehicle)	Peak Hour	48	25	22	19	–54	–24
	Peak Period	*28*	*12*	*15*	*9*	*–46*	*–25*
Number of Vehicle Trips (per hour)	Peak Hour	2,767	3,114	3,986	3,858	44	24
	Peak Period	*3,129*	*3,157*	*3,645*	*3,546*	*16*	*12*
Number of Persons Trips (per hour)	Peak Hour	3,132	3,874	4,847	4,870	55	26
	Peak Period	*3,542*	*3,927*	*4,441*	*4,474*	*25*	*14*
Freeway Travel Time (vehicle hours traveled)	Peak Hour	2,749	1,784	2,260	1,871	–18	5
	Peak Period	*2,053*	*1,138*	*1,612*	*1,080*	*–21*	*–5*
Travel Distance (vehicle miles traveled)	Peak Hour	32,646	31,138	47,030	38,582	44	24
	Peak Period	*36,922*	*31,568*	*43,009*	*35,455*	*16*	*12*
Average Vehicle Occupancy (persons/vehicle)	Peak Hour	1.13	1.24	1.22	1.23	7	1
	Peak Period	*1.13*	*1.24*	*1.22*	*1.26*	*8*	*1*
Density (passenger cars per mile per lane)	Peak Hour	115	92	76	73	–34	–21
	Peak Period	*87*	*56*	*54*	*43*	*–38*	*–23*
Southbound							
Average Travel Time (minutes)	Peak Hour	29	61	12	62	–59	2
	Peak Period	*18*	*47*	*11*	*33*	*–39*	*–30*
Average Speed (miles per hour)	Peak Hour	22	11	54	10	145	–9
	Peak Period	*35*	*15*	*59*	*21*	*69*	*40*
Delay (minutes per vehicle)	Peak Hour	19	49	2	50	–89	2
	Peak Period	*8*	*35*	*1*	*21*	*–88*	*–40*
Number of Vehicle Trips (per hour)	Peak Hour	3,101	2,475	3,873	3,091	25	25
	Peak Period	*2,968*	*2,696*	*3,050*	*3,479*	*3*	*29*
Number of Persons Trips (per hour)	Peak Hour	3,597	2,911	4,623	3,750	29	29
	Peak Period	*3,443*	*3,168*	*3,638*	*4,216*	*6*	*33*
Freeway Travel Time (vehicle hours traveled)	Peak Hour	1,498	2,523	756	3,165	–50	25
	Peak Period	*884*	*2,101*	*540*	*1,903*	*–39*	*–9*
Travel Distance (vehicle miles traveled)	Peak Hour	32,248	28,956	40,278	36,169	25	25
	Peak Period	*30,863*	*31,544*	*31,715*	*40,707*	*3*	*29*
Average Vehicle Occupancy (persons/vehicle)	Peak Hour	1.16	1.18	1.19	1.21	3	3
	Peak Period	*1.16*	*1.18*	*1.19*	*1.21*	*3*	*3*
Density (passenger cars per mile per lane)	Peak Hour	70	113	29	124	–59	10
	Peak Period	*42*	*90*	*21*	*66*	*–50*	*–27*

Peak Period – 6:00 a.m. to 12:00 p.m. and 2:00 p.m. to 8:00 p.m.
Peak Hour – Highest 1-hour within the peak period.
Source: Traffic Operations Report, 2012.

Delay – Traffic delay in the northbound direction during the morning peak hour is expected to average 22 minutes per vehicle, which is a decrease of 54 percent compared to the No Build Alternative. In the southbound direction during the evening peak hour, delay is expected to be 50 minutes per vehicle, which is a 2 percent increase compared to the No Build Alternative. This slight increase in delay over no-build conditions in the peak evening commute would occur despite the overall increase in traffic throughput that would result from the TSM improvements.

Average Travel Time and Travel Speed – Compared to no-build conditions, traffic performance under the Tier I Corridor TSM Alternative would improve during the morning peak hour in both the northbound (42 percent reduction in travel time) and southbound (59 percent reduction in travel time) directions. In the southbound direction during the evening peak hour, there would be a slight increase in the average travel time (62 minutes, 2 percent increase), while the average travel speed would slightly decrease (10 miles per hour, 9 percent decrease). Providing ramp metering and auxiliary lanes would not relieve congestion in the peak evening commute direction, although it would increase the ability of the corridor to carry more vehicles.

On the other hand, because traffic demand would be considerably less in the reverse commute directions, providing ramp metering and auxiliary lanes would improve speed by approximately 24 percent in the northbound direction during the evening peak hour and by approximately 145 percent in the southbound direction during the morning peak hour.

Density – Densities in the traffic study area would improve slightly. The corridor would operate at densities of 76 passenger cars per mile per lane in the northbound direction during the morning peak hour and 124 passenger cars per mile per lane in the southbound direction during the evening peak hour. Reverse commute conditions (i.e., northbound during the evening peak hour and southbound during the morning peak hour) would improve, especially in the southbound direction during the morning peak hour, which would improve from 70 passenger cars per mile per lane under No-Build conditions to 29 under the Tier I Corridor TSM Alternative.

Vehicle Miles Traveled and Vehicle Hours Traveled – Under the Tier I Corridor TSM Alternative, in the peak commute directions during the peak hours, vehicle miles traveled would increase and, except for the southbound PM peak hour condition, the vehicle hours traveled would decrease slightly. During the southbound PM peak hour there would be an increase in vehicle hours traveled. Overall, this shows that the Tier I Corridor TSM Alternative would result in a very slight improvement in traffic congestion when compared to the No Build Alternative.

Intersection Operations, Access, and Circulation

The Tier I Corridor TSM Alternative would not achieve sufficient congestion relief to attract any substantial number of vehicles that had diverted to the local street system back to the freeway. Local access to, and circulation around, community facilities near these intersections would not improve relative to no-build conditions.

As shown in Table 2.1.5-8, all 25 study intersections would experience delay during both the morning and evening peak hours with the Tier I Corridor TSM Alternative in 2035. Compared to no-build conditions, traffic operations at study intersections with Tier I Corridor TSM Alternative improvements would worsen marginally. Ramp metering tends to increase delays at the on-ramp leading into the mainline, with the lost time expected to be made up through better mainline operations. In the very congested conditions expected by 2035, ramp metering without mainline freeway improvements does not appear to be a viable traffic management strategy (Traffic Operations Report, 2012).

Safety

As shown in Table 2.1.5-9, the total accident rates overall and by segment in 2035 under the Tier I Corridor TSM Alternative would be the same as the accident rates for the No Build Alternative and greater than the accident rates for the Tier I Corridor HOV Lane Alternative, except at the freeway segment between the Larkin Valley Road interchange and Freedom Boulevard interchange. To improve safety, the Tier I TSM Alternative proposes to improve the existing nonstandard geometric elements at various ramps.

Transit

Under the Tier I Corridor TSM Alternative, several roadway capacity improvements and the deployment of Intelligent Transportation Systems technologies are currently being proposed for Route 1. The improvements include ramp metering on existing interchange ramps and construction of auxiliary lanes between interchanges, HOV bypass lanes on on-ramps, and Transportation Operations System infrastructure such as changeable message signs and vehicle detection systems. These project features would provide slightly improved highway conditions that would benefit transit operations on Route 1 when compared to conditions achieved under the No Build Alternative.

However, based on discussions with Metro and results of the *Transit Market Analysis Study* (2008), these facility improvements would not be sufficient to support increased transit service frequencies or encourage additional transit ridership.

Table 2.1.5-8: Study Intersections with Year 2035 Per Vehicle Delays of One Minute or Greater under the TSM Alternative

Morning Peak			PM Peak		
	Delay			Delay	
Intersection	Min.	Sec.	Intersection	Min.	Sec.
Morrissey Blvd./Rooney St./ Pacheco Ave.	4	49	Morrissey Blvd./Rooney St./ Pacheco Ave.	2	52
Rooney St./Route 1 NB Ramps	14	27	Rooney St./Route 1 NB Ramps	3	10
Fairmount Ave./Route 1 SB Ramps	12	13	Fairmount Ave./Route 1 SB Ramps	7	34
Morrissey Blvd./Fairmount Ave.	5	19	Morrissey Blvd./Fairmount Ave.	3	57
Soquel Ave./Route 1 SB Ramps	2	8	Soquel Ave./Route 1 SB Ramps	3	22
Soquel Dr./Paul Sweet Rd./ Commercial Way	3	28	Soquel Dr./Paul Sweet Rd./ Commercial Way	2	28
41st Ave./Route 1 NB Off-Ramp	0	58	41st Ave./Route 1 NB Off-Ramp	1	23
			41st Ave./Route 1 SB Ramps	1	51
Porter St./S. Main St.	1	30	Porter St./Route 1 NB Ramps	2	23
Porter St./Route 1 NB Ramps	3	7	Bay Ave./Route 1 SB Ramps	4	58
Bay Ave./Route 1 SB Ramps	7	6	Park Ave./Route 1 NB Ramps	1	34
Park Ave./Route NB Ramps	5	12	Park Ave./Route 1 SB Ramps	4	30
Park Ave./Route 1 SB Ramps	6	23	Park Ave./Kennedy Dr./ McGregor Dr.	16	40
Park Ave./Kennedy Dr./ McGregor Dr.	16	40	State Park Dr./Route 1 NB Ramps	3	12
State Park Dr./Route 1 NB Ramps	6	22	State Park Dr./Route 1 SB Ramps	4	20
State Park Dr./Route 1 SB Ramps	4	49	State Park Dr./McGregor Dr.	16	40
State Park Dr./McGregor Dr.	16	40	Rio Del Mar Blvd./Route 1 NB Ramps	5	14
Rio Del Mar Blvd./Route 1 NB Ramps	12	18	Rio Del Mar Blvd./Route 1 SB Ramps	2	37
Rio Del Mar Blvd./Route 1 SB Ramps	16	40	Rio Del Mar Blvd./Soquel Dr.	8	15
Rio Del Mar Blvd./ Soquel Dr.	5	3	Freedom Blvd./Route 1 NB Ramps	16	40
Freedom Blvd./Route 1 NB ramps	16	40	Freedom Blvd./Route 1 SB Ramps	10	4

Table 2.1.5-8: Study Intersections with Year 2035 Per Vehicle Delays of One Minute or Greater under the TSM Alternative

Morning Peak			PM Peak		
	Delay			Delay	
Intersection	Min.	Sec.	Intersection	Min.	Sec.
Freedom Blvd./Route 1 SB Ramps	1	40	Freedom Blvd./Bonita Dr.	16	40
Freedom Blvd./Bonita Dr.	16	40	San Andreas Rd./Larkin Rd./ Route 1 NB Off-Ramp	11	30
San Andreas Rd./Larkin Rd./ Route 1 NB Off-Ramp	1	5	San Andreas Rd./Route 1 SB Ramps	16	40
San Andreas Rd./Route 1 SB Ramps	16	40			

Source: Traffic Operations Report, 2012.
NB = northbound; SB = southbound.

Table 2.1.5-9: Tier I Corridor Alternatives Year 2035 Accident Analysis (accidents per million vehicle miles)

Freeway Segment		No Build Conditions		Tier I Corridor TSM Alternative		Tier I Corridor HOV Lane Alternative	
From	To	Freeway Type	Total Crash Rate	Freeway Type	Total Crash Rate	Freeway Type	Total Crash Rate
Larkin Valley Road interchange (7.670)[a]	Freedom Boulevard interchange (8.354)	4-lane SF	0.907	4-lane SF	0.907	6-lane SF	0.931
Freedom Boulevard interchange (8.354)	Between State Park Drive and Park Avenue interchanges (11.797)	4-lane SF	1.388	4-lane SF	1.388	6-lane SF	1.099
Between State Park Drive and Park Avenue interchanges (11.797)	North of Bay Avenue interchange (13.277)	4-lane UF	1.708	4-lane UF	1.708	6-lane UF	1.256
North of Bay Avenue interchange (13.277)	South of 41st Avenue interchange (13.460)	6-lane UF	1.176	6-lane UF	1.176	8-lane UF	1.137

Table 2.1.5-9: Tier I Corridor Alternatives Year 2035 Accident Analysis (accidents per million vehicle miles)

Freeway Segment		No Build Conditions		Tier I Corridor TSM Alternative		Tier I Corridor HOV Lane Alternative	
From	To	Freeway Type	Total Crash Rate	Freeway Type	Total Crash Rate	Freeway Type	Total Crash Rate
South of 41st Avenue interchange (13.460)	North of 41st Avenue interchange (13.732)	4-lane UF	1.474	4-lane UF	1.474	6-lane UF	1.093
North of 41st Avenue interchange (13.732)	North of Soquel Avenue interchange (15.050)	4-lane SF	1.317	4-lane SF	1.317	6-lane SF	1.108
North of Soquel Avenue interchange (15.050)	Morrissey Boulevard interchange (15.819)	4-lane UF	1.878	4-lane UF	1.878	6-lane UF	1.222
Average (weighted by vehicle miles of travel per segment)			1.456		1.456		1.134

Notes:
[a] Location (Post mile)
SF =- Suburban Freeway
UF = Urban Freeway
Source: Traffic Operations Report, 2012.

Pedestrian and Bicycle Conditions

The three new pedestrian and bicycle overcrossings that would be constructed with the Tier I Corridor TSM Alternative would have a positive impact on the multimodal connectivity of the Route 1 corridor by helping users to overcome the north-south barrier presented by the freeway. These include the Mar Vista Drive, Chanticleer Avenue, and Trevethan Avenue overcrossings. Pedestrian improvements would comply with Americans with Disabilities Act design criteria.

Parking

There would be no removal of parking under the Tier I Corridor TSM Alternative.

Tier I Corridor HOV Lane Alternative

2035 Peak-Hour Traffic Conditions

Adding HOV lanes, as well as ramp metering and auxiliary lanes, is expected to improve the ability of Route 1 to meet future travel demand within the traffic study area. Vehicle throughput would increase by 63 percent in the northbound direction during the morning peak hour and by 79 percent in the southbound direction during the evening peak hour. The improved freeway conditions would draw vehicles that would otherwise divert onto parallel arterials back to Route 1, relieving the local city streets from excessive cut-through commuter traffic.

Delay – As shown in Table 2.1.5-10, compared to the No Build Alternative in 2035, the Tier I Corridor HOV Lane Alternative would substantially reduce delays in both the northbound and southbound directions. In the northbound direction, the AM peak hour delay would decrease by 42 minutes, or 88 percent; the PM peak hour delay would decrease by 40 minutes, or 84 percent. In the southbound direction, the AM peak hour delay would decrease by 17 minutes, or 89 percent; the PM peak hour delay would decrease by 40 minutes. or 82 percent.

Average Travel Speeds and Travel Times – Overall (combining HOV lane and mixed-flow lane speeds), the average peak hour speed on Route 1 would be between 33 miles per hour and 52 miles per hour, depending on the time and direction. This would be an improvement over the no-build condition, in which average speeds would be as low as 11 miles per hour. Average travel times would also improve by 50 to 73 percent, depending on the direction of travel and the peak period. For the northbound direction during the AM peak hour and in the southbound direction during the PM peak hour, travel times would improve by 73 percent and 69 percent, respectively.

Density - Traffic density in the northbound direction during the morning peak hour would improve from 115 passenger cars per mile per lane) to 42 passenger cars per mile per lane in the mixed-flow lanes and 14 passenger cars per mile per lane in the HOV lanes. Similarly, traffic density in the southbound direction during the evening peak hour would improve from 113 passenger cars per mile per lane to 37 passenger cars per mile per lane in the mixed-flow lanes and 19 passenger cars per mile per lane in the HOV lanes.

Vehicle Hours Traveled and Vehicle Miles Traveled – Decreases in freeway congestion and improvements in travel conditions would attract previous “cut-through” traffic back to the freeway from the arterials. Arterial vehicle miles traveled would decrease and freeway vehicle miles traveled would increase compared to no-build conditions. In the peak travel directions, there would be a 54 to 69 percent increase in vehicle miles traveled on the freeway compared to no-build conditions. Decreasing freeway congestion reduces corridor vehicle hours traveled because vehicles would spend less time on the freeway. Vehicle hours traveled in the peak travel directions would decrease by 32 to 53 percent, indicating more efficient freeway operations when compared to the No Build Alternative.

Table 2.1.5-10: Comparison of Measures of Effectiveness – Year 2035 No Build Alternative and Tier I Corridor HOV Alternative

Measures of Effectiveness		2035 No Build		2035 HOV		% Difference	
		AM	PM	AM	PM	AM	PM
Northbound							
Average Travel Time (minutes)	Peak Hour	59	34	16	13	–73	–62
	Peak Period	*39*	*22*	*13*	*11*	*–67*	*–50*
Average Speed (miles per hour)	Peak Hour	12	17	39	42	225	147
	Peak Period	*18*	*28*	*46*	*52*	*156*	*86*
Delay (minutes per vehicle)	Peak Hour	48	25	6	4	–88	–84
	Peak Period	*28*	*12*	*3*	*2*	*–89*	*–83*
Number of Vehicle Trips (per hour)	Peak Hour	2,767	3,114	4,510	4,898	63	57
	Peak Period	*3,129*	*3,157*	*4,213*	*4,118*	*35*	*30*
Number of Persons Trips (per hour)	Peak Hour	3,132	3,874	5,742	6,276	83	62
	Peak Period	*3,542*	*3,927*	*5,271*	*5,271*	*49*	*34*
Freeway Travel Time (vehicle hours traveled)	Peak Hour	2,749	1,784	1,285	1,126	–53	–37
	Peak Period	*2,053*	*1,138*	*1,025*	*773*	*–50*	*–32*
Travel Distance (vehicle miles traveled)	Peak Hour	32,646	31,138	50,360	47,555	54	53
	Peak Period	*36,922*	*31,568*	*47,269*	*40,048*	*28*	*27*
Average Vehicle Occupancy (persons/vehicle)	Peak Hour	1.13	1.24	1.27	1.28	12	3
	Peak Period	*1.13*	*1.24*	*1.25*	*1.28*	*11*	*3*
Density (passenger cars per mile per lane)	Peak Hour	115	92	42 (14)	37 (20)	N/A	N/A
	Peak Period	87	56	*34 (12)*	*27 (14)*	*N/A*	*N/A*
Southbound							
Average Travel Time (minutes)	Peak Hour	29	61	12	19	–59	–69
	Peak Period	*18*	*47*	*10*	*15*	*–44*	*–68*
Average Speed (miles per hour)	Peak Hour	22	11	52	33	136	200
	Peak Period	*35*	*15*	*59*	*42*	*69*	*180*
Delay (minutes per vehicle)	Peak Hour	19	49	2	9	-89	-82
	Peak Period	*8*	*35*	*1*	*5*	*-88*	*-86*
Number of Vehicle Trips (per hour)	Peak Hour	3,101	2,475	4,253	4,431	37	79
	Peak Period	*2,968*	*2,696*	*3,369*	*4,294*	*14*	*59*
Number of Persons Trips (per hour)	Peak Hour	3,597	2,911	5,181	5,684	44	95
	Peak Period	*3,443*	*3,168*	*4,090*	*5,443*	*19*	*72*
Freeway Travel Time (vehicle hours traveled)	Peak Hour	1,498	2,523	834	1,502	–44	–40
	Peak Period	*884*	*2,101*	*584*	*1,144*	*–34*	*–46*
Travel Distance (vehicle miles traveled)	Peak Hour	32,248	28,956	43,081	49,038	34	69
	Peak Period	*30,863*	*31,544*	*34,179*	*47,692*	*11*	*51*
Average Vehicle Occupancy (persons/vehicle)	Peak Hour	1.16	1.18	1.22	1.28	5	9
	Peak Period	*1.16*	*1.18*	*1.21*	*1.27*	*5*	*8*
Density (passenger cars per mile per lane)	Peak Hour	70	113	29 (11)	37 (19)	N/A	N/A
	Peak Period	*42*	*90*	*20 (8)*	*35 (13)*	*N/A*	*N/A*

Peak Period – 6:00 a.m. to 12:00 p.m. and 2:00 p.m. to 8:00 p.m.
Peak Hour – Highest 1-hour within the peak period.
28 (10) – Density of mixed-flow lanes (Density of HOV lane)
Source: Traffic Operations Report, 2012.

Induced Demand on Freeways

The relationship between increases in highway capacity and traffic is very complex, involving various travel behavior responses, residential and business location decisions, and changes in regional population and economic growth. If improvements increase a highway's travel speed, then the peak-period traffic using the highway will likely increase. This is due to at least six separate factors – route changes (e.g., from arterials to freeway), departure time changes, travel mode shifts, destination changes, additional trips, and new development/additional land use.

The first three factors leading to increases in the number of vehicles using the highway during peak periods do not represent "induced travel." They represent decisions by travelers concerning where and how they will make their trips. The fourth and fifth factors, destination changes and additional trips, represent induced travel. Neither of these is accounted for in most traffic models, including the one used to analyze the traffic effects for this project.

There is controversy concerning the relative contribution of induced travel to total traffic volume; however, recent research indicates that the contribution is small (Barr, 2000; Cervero, 2003; Trantech Management, Inc. & Hagler Bailly, 2001; Hartgen, 2003). One recent study in California, which examined the question of induced travel by comparing improved and unimproved highway segments, found no statistical difference and thus "no evidence of induced demand" (Mokhtarian, *et al.,* 2002:214; Handy 2003).

The sixth factor, induced travel from new development/additional land use, typically applies where a new highway provides access to an undeveloped area. By contrast, Route 1 is a well-established highway through Santa Cruz County, and the project area encompasses land already developed and densely populated. A project-specific growth inducement study was performed for this project and concluded that this project would not induce unplanned growth in the project corridor.

Intersection Operations, Access, and Circulation

Improved freeway corridor conditions with the Tier I Corridor HOV Lane Alternative would attract vehicles diverted to parallel arterials back to Route 1, relieving local city streets from excessive cut-through commuter traffic. Traffic volumes on the arterials would decrease relative to no-build conditions, while traffic volumes on the freeway would increase. This would improve access to facilities and regional circulation. The Tier I Corridor HOV Lane Alternative would produce conditions similar to those for the No Build Alternative.
Table 2.1.5-11 shows delays at 9 of the 26 study intersections during the morning peak hour and delays at 14 of the 26 intersections during the evening peak hour under the Tier I Corridor HOV Lane Alternative in 2035. Figure 2.1.5-3 lists the two-way traffic volumes on local streets for 2001 and 2035.

Table 2.1.5-11: Study Intersections with Year 2035 Per Vehicle Delays of One Minute or Greater under the HOV Alternative

Morning Peak			PM Peak		
	Delay			Delay	
Intersection	**Min**	**Sec**	**Intersection**	**Min**	**Sec**
Soquel Dr./Paul Sweet Road/ Route 1 NB Ramps	3	39	Morrissey Blvd./Pacheco Ave./Route 1 NB Ramps	1	17
Park Ave./Route 1 NB Ramps	1	34	Morrissey Blvd./ Fairmount Ave.	1	19
Park Ave./Route 1 SB Ramps	2	35	Soquel Dr./Paul Sweet Road/ Route 1 NB Ramps	2	56
Park Ave./Kennedy Dr./ McGregor Dr.	8	8	41st Ave./Route 1NB Ramps	1	5
State Park Dr./ McGregor Dr.	2	36	41st Ave./Route 1 SB Ramps	1	9
Rio Del Mar Blvd./Route 1 NB Ramps	1	25	Porter Street/Route 1 NB Ramps	1	26
Rio Del Mar Blvd./ Soquel Dr.	5	54	Park Ave./Route 1 NB Ramps	1	34
Soquel Dr./Soquel Ave./ Route 1 SB Off-Ramp	3	33	Park Ave./Route 1 SB Ramps	4	6
			Park Ave./Kennedy Dr./ McGregor Dr.	15	21
			State Park Dr./ McGregor Dr.	2	20
			Rio Del Mar Blvd./Route 1 NB Ramps	2	14
			Rio Del Mar Blvd./ Soquel Dr.	4	44
			Soquel Dr./Soquel Ave./ Route 1 SB Off-Ramp	3	22

Source: Traffic Operations Report, 2012.
NB = northbound; SB = southbound.

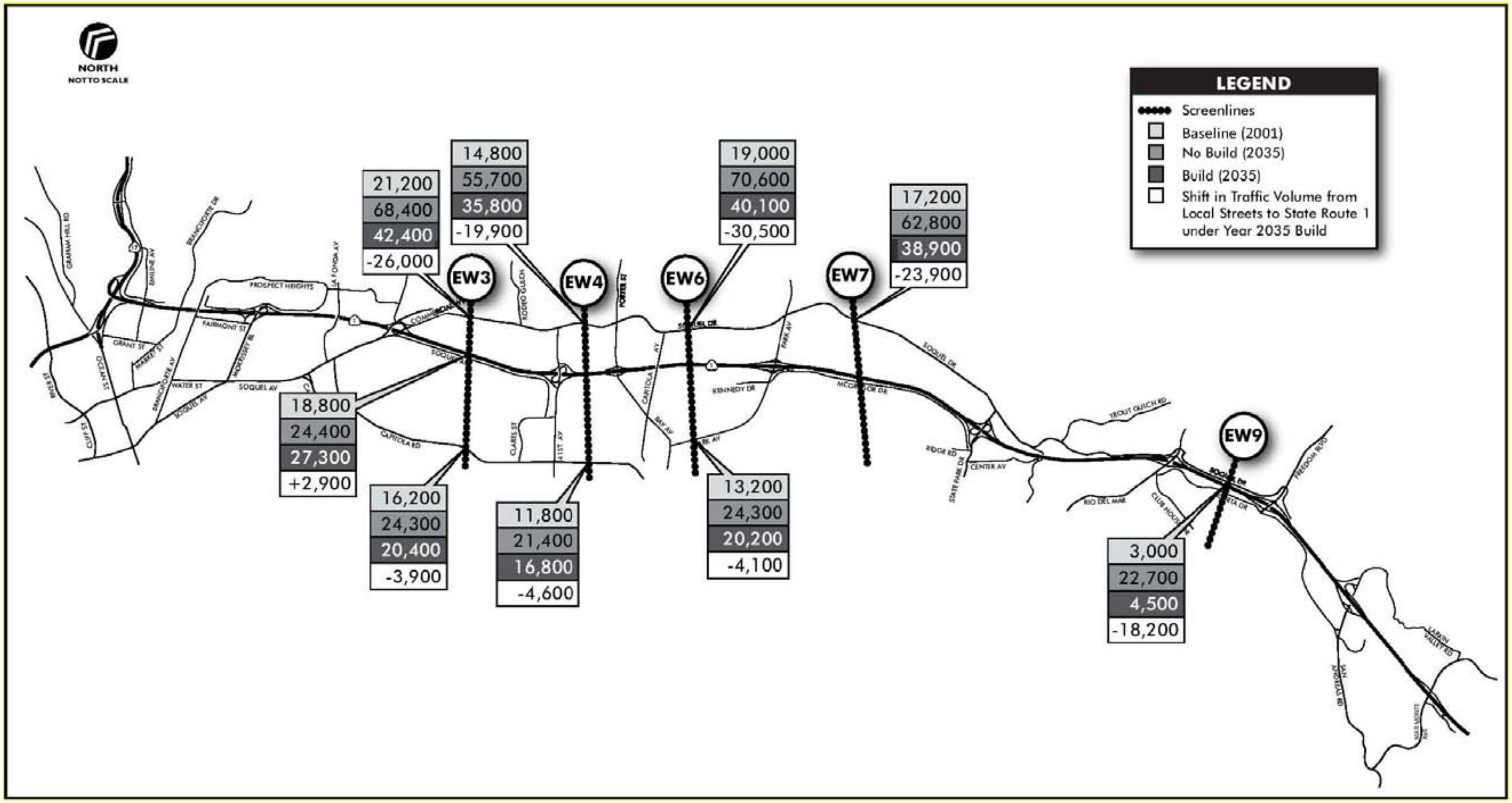

Figure 2.1.5-3: Two-Way Traffic Volumes on Local Streets for 2001 and 2035 with No Build Alternative and Tier I Corridor HOV Lane Alternative

Safety

Total accidents per million vehicle miles in 2035 for the No Build Alternative and Tier I Corridor Alternatives would be higher than the baseline rates at five of the seven freeway segments for which accident data are reported. The two freeway segments where the 2035 accident rates would be lower than baseline are the following:

- North of Bay Avenue interchange to south of 41st Avenue interchange; and
- South of 41st Avenue interchange to north of 41st Avenue interchange.

As shown in Table 2.1.5-9, total accident rates in 2035 would be lower overall and by segment with the Tier I Corridor HOV Lane Alternative than for the No Build Alternative and Tier I Corridor TSM Alternative conditions, except at the freeway segment located between the Larkin Valley Road interchange and Freedom Boulevard interchange. At this location, the total accident rate under Tier I Corridor HOV Lane Alternative conditions would be higher than under No Build Alternative and Tier I Corridor TSM Alternative conditions (i.e., 0.931 compared to 0.907). To improve safety, the Tier I HOV Lane Alternative proposes to improve the weave/merge geometry and widen the outside shoulder to 10 feet, allowing for evasive movements and better refuge for disabled vehicles.

Transit

The Tier I Corridor HOV Lane Alternative's long-term effects on bus travel would generally be positive because of reduced traffic delay and travel times along Route 1 and at surrounding project area intersections. With the addition of HOV lanes, results indicate that buses and other high occupancy vehicles would benefit from reductions in density (the number of passenger cars per mile per lane) in the HOV lane, when compared with the No-Build Alternative. Density would decrease during the AM and PM peak hours and peak periods in both directions. The greatest reduction in the density of passenger cars in the HOV lane, when compared with the No-Build Alternative, would occur during the northbound PM peak hour, when density would be reduced from 115 to 14 passenger vehicles per lane per hour in the HOV lane. The smallest reduction in density would occur during the southbound AM peak period, when density would be reduced from 42 to 8.

Transit enhancements under the Tier I Corridor TSM Alternative, such as more peak-period express service and connecting shuttle buses or expanded express routing to serve local destinations, would be generally supportive of transit, but they do not offer any real time savings. Even with the Tier I Corridor TSM Alternative enhancements, projected express bus ridership increases would likely not be realized, and Metro's ability to capture any of the latent demand would be severely impaired.

Under the Tier I Corridor HOV Lane Alternative, projected future transit ridership and latent demand can be realized. Elasticity analysis conducted as part of the transit study showed that the transit market is very sensitive to changes in travel time; therefore, the introduction of HOV lanes that would improve transit travel times is extremely important to capturing additional riders. Approximately half of the projected latent ridership could be captured by improvements in travel time with the addition of HOV lanes. If the runs that were cut back from Metro's three express routes in the past few years were added back or comparable express service were added, the rest of the latent demand could be captured. Capturing the latent market for transit also assumes bus pads at strategic corridor locations to improve rider access to the express buses and a pedestrian and bicycle friendly environment with access to and from park-and-ride lots and bus pad locations. The proposed Tier I Corridor HOV Lane Alternative would design the reconfigured interchanges to allow future installation of bus pads and shelters at the Park Avenue and Bay Street/Porter Avenue and 41st Avenue interchanges. Providing HOV lanes would also facilitate extension of the Route 17 express bus service farther south in the corridor to potential park-and-ride lots at State Park and farther south to help capture additional riders.

Pedestrian and Bicycle Conditions

Pedestrian Conditions – The Tier I Corridor HOV Lane Alternative would maintain or improve pedestrian facilities, including 5-foot-wide sidewalks at all nine interchanges within the project limits. Pedestrian improvements would comply with Americans with Disabilities Act design criteria. Changes to baseline pedestrian conditions would result at the following locations:

- <u>Morrissey/Pacheco Intersection</u> – The improved pedestrian network includes maintaining the existing four-way pedestrian crosswalk at the intersection of Pacheco Avenue, Morrissey Boulevard (Rooney Street), and Route 1 westbound on-and off-ramps north of the freeway. South of Route 1, the existing north-south crosswalks located on Morrissey Boulevard at Fairmount Avenue would be replaced with a four-way crosswalk allowing full pedestrian access to Fairmount Avenue and Morrissey Boulevard. Both of these intersections support Metro bus stops. The existing three-sided crosswalk at the intersection of Soquel Drive and Commercial Avenue would be maintained. This is an important interchange from a transit perspective because it includes major bus stops connecting Soquel Drive to Dominican Hospital Bay/Porter interchange. The existing crosswalks would be maintained at the Bay/Porter interchange.
- <u>Park Avenue, State Park Drive, and Rio Del Mar Interchanges</u> – The existing crosswalks would be maintained.
- <u>Freedom Boulevard Interchange</u> – The improved pedestrian network includes two four-way pedestrian crosswalks and one three-way crosswalk. There would be a four-way crosswalk at the intersection of Freedom Boulevard with Route 1 westbound on-and off-ramps north of the freeway and with eastbound on- and off-ramps; a new three-way intersection would be installed at Freedom Boulevard and Bonita Drive.

- San Andreas Road/Larkin Valley Road Interchange – Along with sidewalk improvements, the project plan would provide new crosswalks on one side of San Andreas Road/Larkin Valley Road to improve pedestrian safety at the on- and off-ramp locations.

Bicycle Impacts – According to the 2007 Santa Cruz County Bikeways Map and current aerial maps, Class II bike lanes exist at all Route 1 interchanges within the project limits. These bike lanes would not be affected by the project except during construction, as discussed in Section 2.4.4.

Pedestrian and Bicycle Overcrossings – The Tier I Corridor HOV Lane Alternative would also include three new pedestrian and bicycle overcrossings (at Mar Vista Drive, Chanticleer Avenue, and Trevethan Avenue), with the same improvements to local access and circulation as described for the Tier I Corridor TSM Alternative. These pedestrian and bicycle overcrossings would have a positive effect on multimodal connectivity by helping users to overcome the north-south barrier presented by the freeway.

Parking

Under the Tier I Corridor HOV Lane Alternative, an estimated 171 off-street parking spaces would be affected by the proposed project. A more detailed discussion of these parking impacts is provided below.

On-Street Parking Impacts – There would be a loss of 15 on-street parking spaces as a result of the Tier I Corridor HOV Lane Alternative, adjacent to the Morrissey Boulevard interchange.

Off-Street Parking Impacts – The Tier I Corridor HOV Lane Alternative would result in the loss of approximately 171 off-street parking spaces. These impacts would occur at four of the nine highway interchanges located within the Tier I project corridor: Bay Avenue/ Porter Street, 41st Avenue, Soquel Avenue, and Morrissey Boulevard interchanges. The numbers of parking spaces that would be affected by interchange area are listed in Table 2.1.5-12.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative extends from 41st Avenue to Soquel Avenue and was identified as the first phase of the proposed Tier I Corridor HOV Lane Alternative to be considered for immediate implementation. The 2035 design horizon traffic analysis for the Tier I HOV Lane Alternative and Tier I TSM Alternative (described above) included the Tier II Auxiliary Lane Alternative as part of the overall improvements.

Table 2.1.5-12: Off-Street Parking Inventory Reductions by Interchange

Route 1 Interchange	Parking Impact	Number of Spaces Removed
San Andreas Road/Larkin Valley Road	No	0
Freedom Boulevard	No	0
Rio Del Mar Boulevard	No	0
State Park Drive	No	0
Park Avenue	No	0
Bay Avenue/Porter Street	Yes	25
41st Avenue	Yes	26
Soquel Avenue	Yes	109
Morrissey Boulevard	Yes	11
Total		**171**

The prioritization of the Tier II Auxiliary Lane Alternative was based on an analysis of operational improvements proposed as part of the Tier I HOV Lane Alternative, which considered the potential of the individual (or independent) Tier II project improvements to relieve congestion and minimize/avoid air quality hotspots in the corridor and included traffic modeling using the FREQ simulation tool.

The prioritization analysis identified the Tier II Auxiliary Lane Alternative as the priority improvement to advance to the Tier II level of analysis based on its operational independence and funding likelihood. In the northbound direction, the Tier II Auxiliary Lane Alternative was found to provide the greatest improvement in corridor operations when compared with the other improvements evaluated in the prioritization analysis. Although the Tier II Auxiliary Lane Alternative was not found to provide the greatest improvement in corridor operations in the southbound direction, the Tier II Auxiliary Lane Alternative, as described in this EIR/EA, was prioritized in order to avoid construction disruption associated with constructing disconnected segments in the northbound and southbound directions, provide for pedestrian/bicycle crossing facility over Route 1, and coordinate with the proposed improvements at Highway 1/Highway 17 and Morrissey Boulevard interchanges that are being implemented through the most congested portion of the study corridor.

The prioritization analysis concluded that the Tier II Auxiliary Lane Alternative would have the following effects on motor vehicle traffic:

- Eliminate the existing bottleneck located between the Soquel Avenue and 41st Avenue interchanges in the northbound direction;
- Improve traffic operations along the northbound corridor in the AM peak hour;

- Slightly worsen traffic operations along the southbound corridor in the PM peak hour, but improve vehicle and person throughputs; and
- Negligibly improve the Highway 1 corridor operations in the non-peak directions of travel, southbound in the AM peak hour and northbound in the PM peak hour.

Safety

The 2035 safety analysis for the Tier I HOV Lane Alternative and Tier I TSM Alternative included the Tier II Auxiliary Lane Alternative as part of the overall improvements. This alternative resulted in no significant impacts relative to safety.

Transit

Although traffic operations on northbound Route 1 during the morning peak hour would improve under the Tier II Auxiliary Lane Alternative, there would still be considerable congestion in the corridor. The long-term impacts on bus travel would be similar to that under the No Build Alternative.

Pedestrian and Bicycle Conditions

Pedestrian Conditions – The Tier II Auxiliary Lane Alternative would improve existing pedestrian facilities. The Tier II Auxiliary Lane Alternative would include an Americans with Disabilities Act-compliant new pedestrian and bicycle overcrossing at Chanticleer Avenue. The overcrossing would help pedestrians overcome the north-south barrier presented by the existing freeway.

Bicycle Impacts – According to the 2007 Santa Cruz County Bikeways Map and current aerial maps, Class II bike lanes exist at all Route 1 interchanges within the Tier II Auxiliary Lane Alternative limits. These bike lanes would not be affected by the project except during construction, as discussed in Section 2.4.4.

The new pedestrian and bicycle overcrossings at Chanticleer Avenue would have a positive effect on multimodal connectivity by helping users overcome the north-south barrier presented by the existing freeway.

Parking

The Tier II Auxiliary Lane Alternative would not result in parking impacts.

No Build Alternative

As described in Section 1.5.4, the No-Build Alternative assumes that none of the improvements proposed for the Tier I or Tier II Corridors would be implemented.

Peak-Hour Traffic Conditions in 2035

The Route 1 study corridor currently experiences recurrent congestion, especially in the peak travel direction. When the traffic study was performed in 2007, the primary bottleneck in the northbound direction was the Route 1/SR 17 interchange. The traffic study was performed before completion of the Route 1/17 Merge Lanes Project (completed December 2008) and the Highway 1 Soquel/Morrissey Auxiliary Lanes Project (completed December 2013). Both projects have been included in the no-build traffic analysis for this project, using Association of Monterey Bay Area Governments traffic volume projections to 2035. Models for 2035 show a northbound bottleneck persists in the Soquel-Morrissey stretch in the a.m. peak hour (Traffic Operations Report, 2012).

According to the traffic operations analysis, traffic performance would worsen dramatically by year 2035 under no-build conditions. Travel demand would continue to increase as population grows and the region matures. At the same time, the corridor's ability to serve the growing vehicle volumes would decrease, while delays and densities would escalate. Measures of effectiveness for the No Build Alternative in 2035 are shown in Table 2.1.5-13.

Delay – Under no-build conditions, Route 1 would not be able to accommodate future travel demand. In the southbound direction, during the evening peak hour, delays would grow to 49 minutes, which is an increase of 227 percent compared to baseline delays of 15 minutes. In the northbound direction during the morning peak, traffic delays would average 48 minutes per vehicle, which amounts to a 243 percent increase over baseline conditions of 14 minutes.

Average Travel Speeds and Travel Times – Increases in traffic demand without capacity improvements would exacerbate recurrent traffic congestion, characterized by low travel speeds and longer travel times. In the northbound direction, the average vehicle speed during the morning and evening peak hours would drop from 30 miles per hour and 39 miles per hour under baseline conditions to 12 miles per hour and 17 miles per hour under no-build conditions in 2035. The average northbound travel time during the morning peak hour would be as high as 59 minutes, which is a 157 percent increase over baseline conditions. Of the 59 minutes of average travel time in the northbound direction during the morning peak hour, 48 minutes would be attributable to traffic delays. In the southbound direction during the evening peak hour, travel time would average 61 minutes, up from 27 minutes under baseline conditions, which is a 126 percent increase. Travel speeds in the evening peak hour in the southbound direction would be 11 miles per hour, which is a 58 percent decrease compared to baseline conditions.

Table 2.1.5-13: Comparison of Measures of Effectiveness – Baseline Conditions and Year 2035 No Build Alternative

Measures of Effectiveness		Baseline		2035 No Build		% Difference	
		AM	PM	AM	PM	AM	PM
Northbound							
Average Travel Time (minutes)	Peak Hour	23	15	59	34	157	127
	Peak Period	*16*	*12*	*39*	*22*	*144*	*83*
Average Speed (miles per hour)	Peak Hour	30	39	12	17	–60	–56
	Peak Period	*44*	*52*	*18*	*28*	*–59*	*–46*
Delay (minutes per vehicle)	Peak Hour	14	6	48	25	243	317
	Peak Period	*4*	*2*	*28*	*12*	*600*	*500*
Number of Vehicle Trips (per hour)	Peak Hour	2,923	3,235	2,767	3,114	–5	–4
	Peak Period	*3,045*	*2,805*	*3,129*	*3,157*	*3*	*13*
Number of Persons Trips (per hour)	Peak Hour	3,308	4,024	3,132	3,874	–5	–4
	Peak Period	*3,447*	*3,489*	*3,542*	*3,927*	*3*	*13*
Freeway Travel Time (vehicle hours traveled)	Peak Hour	1,274	823	2,749	1,784	116	117
	Peak Period	*821*	*544*	*2,053*	*1,138*	*150*	*109*
Travel Distance (vehicle miles traveled)	Peak Hour	38,517	32,349	32,646	31,138	–15	–4
	Peak Period	*35,933*	*28,045*	*36,922*	*31,568*	*3*	*13*
Average Vehicle Occupancy (persons/vehicle)	Peak Hour	1.13	1.24	1.13	1.24	0	0
	Peak Period	*1.13*	*1.24*	*1.13*	*1.24*	*0*	*0*
Density (passenger cars per mile per lane)	Peak Hour	49	41	115	92	135	124
	Peak Period	*35*	*27*	*87*	*56*	*149*	*107*
Southbound							
Average Travel Time (minutes)	Peak Hour	10	27	29	61	190	126
	Peak Period	*10*	*18*	*18*	*47*	*80*	*161*
Average Speed (miles per hour)	Peak Hour	60	26	22	11	–63	–58
	Peak Period	*61*	*39*	*35*	*15*	*–43*	*–62*
Delay (minutes per vehicle)	Peak Hour	0	15	19	49	N/A	227
	Peak Period	*0*	*6*	*8*	*35*	*N/A*	*483*
Number of Vehicle Trips (per hour)	Peak Hour	2,918	3,101	3,101	2,475	6	–20
	Peak Period	*2,332*	*2,885*	*2,968*	*2,696*	*27*	*–7*
Number of Persons Trips (per hour)	Peak Hour	3,385	3,664	3,597	2,911	6	–21
	Peak Period	*2,705*	*3,405*	*3,443*	*3,168*	*27*	*–7*
Freeway Travel Time (vehicle hours traveled)	Peak Hour	507	1,391	1,498	2,523	195	81
	Peak Period	*400*	*858*	*884*	*2,101*	*121*	*145*
Travel Distance (vehicle miles traveled)	Peak Hour	30,348	35,661	32,248	28,956	6	–19
	Peak Period	*24,251*	*33,182*	*30,863*	*31,544*	*27*	*–5*
Average Vehicle Occupancy (persons/vehicle)	Peak Hour	1.16	1.18	1.16	1.18	0	0
	Peak Period	*1.16*	*1.18*	*1.16*	*1.18*	*0*	*0*
Density (passenger cars per mile per lane)	Peak Hour	24	60	70	113	192	88
	Peak Period	*19*	*37*	*42*	*90*	*121*	*143*

Peak Period – 6:00 a.m. to 12:00 p.m. and 2:00 p.m. to 8:00 p.m.
Peak Hour – Highest 1-hour within the peak period.
Source: Traffic Operations Report, 2012.

Densities– Under baseline conditions, the peak commute directions (i.e., northbound during the morning peak hour and southbound during the evening peak hour) are already experiencing heavy congestion. By year 2035, traffic on Route 1 for both peak hours and directions would have densities ranging from 113 passenger cars per mile per lane (i.e., southbound direction during evening peak hour) to 115 passenger cars per mile per lane (i.e., northbound direction during the morning peak hour).

Vehicle Hours Traveled and Vehicle Miles Traveled – As congestion increases, so does the amount of time vehicles idle in traffic; therefore, the corridor vehicle hours traveled would also increase. The increase in corridor vehicle hours traveled would vary from 81 percent to 195 percent, depending on the direction and time of day (i.e., morning or evening). When freeway congestion increases, vehicles use local streets to circumvent freeway bottlenecks, increasing vehicle miles traveled on arterials and decreasing vehicle miles traveled on the freeway. As shown in Table 2.1.5-13, in the peak commute directions, peak-hour vehicle miles traveled on the freeway would decrease in 2035 compared to baseline conditions, indicating more travel on local streets to avoid congestion.

By 2035, the Route 1 corridor would be heavily congested with stop-and-go conditions during both peak periods. A freeway operating in such congested conditions for 6 continuous hours, twice a day (even assuming no accidents or incidents), is in need of demand management and capacity increase solutions.

Intersection Operations, Access, and Circulation

Not only would traffic volumes on Route 1 increase under Year 2035 no-build conditions, but traffic volumes on local parallel arterials also would increase. When there is severe congestion on the freeway during peak hours, “cut-through” traffic diverts to the local street network to circumvent bottlenecks on the highway, increasing congestion on these arterials, and affecting local circulation and access.

Under Year 2035 no-build- conditions, delays at all 25 study intersections are shown in Table 2.1.5-14 during both peak hours.

Also in year 2035 under no-build conditions, freeway mainline traffic congestion would extend onto freeway ramps and local streets. Traffic would experience higher delays entering the freeway, causing backups on the arterials.

Table 2.1.5-14: Study Intersections with per Vehicle Delays of One Minute or Greater under 2035 No Build Conditions

Morning Peak			PM Peak		
	Delay			Delay	
Intersection	Min	Sec	Intersection	Min	Sec
Morrissey Blvd./ Rooney St./ Pacheco Ave.	4	36	Morrissey Blvd./ Rooney St./ Pacheco Ave.	2	51
Rooney St./ Route 1 NB Ramps	14	0	Rooney St./ Route 1 NB Ramps	3	10
Fairmount Ave./ Route 1 SB Ramps	12	12	Fairmount Ave./ Route 1 SB Ramps	7	35
Morrissey Blvd./ Fairmount Avenue	5	17	Morrissey Blvd./ Fairmount Avenue	3	57
Soquel Ave./ Route 1 SB Ramps	2	12	Soquel Ave./ Route 1 SB Ramps	3	22
Soquel Dr./ Paul Sweet Rd./ Commercial Way	3	29	Soquel Dr./ Paul Sweet Rd./ Commercial Way	2	28
Porter St./ S. Main St.	1	28	41st Ave./ Route 1 NB Off-Ramp	1	23
Porter St./ Route 1 NB Ramps	3	14	41st Ave./ Route 1 SB Ramps	1	51
Bay Ave./ Route 1 SB Ramps	7	6	Porter St./ Route 1 NB Ramps	2	23
Park Ave./ Route 1 NB Ramps	5	13	Bay Ave./ Route 1 SB Ramps	4	59
Park Ave./ Route 1 SB Ramps	6	23	Park Ave./ Route 1 NB Ramps	1	34
Park Ave./ Kennedy Dr./ McGregor Dr.	16	40	Park Ave./ Route 1 SB Ramps	4	30
State Park Dr./ Route 1 NB Ramps	6	28	Park Ave./ Kennedy Dr./ McGregor Dr.	16	40
State Park Dr./ Route 1 SB Ramps	4	49	State Park Dr./ Route 1 NB Ramps	2	27
State Park Dr./ McGregor Dr.	16	40	State Park Dr./ Route 1 SB Ramps	4	20
Rio Del Mar Blvd./ Route 1 NB Ramps	12	20	State Park Dr./ McGregor Dr.	16	40
Rio Del Mar Blvd./ Route 1 SB Ramps	16	40	Rio Del Mar Blvd./ Route 1 NB Ramps	5	14
Rio Del Mar Blvd./ Soquel Dr.	4	59	Rio Del Mar Blvd./ Route 1 SB Ramps	2	37
Freedom Blvd./ Route 1 NB Ramps	16	40	Rio Del Mar Blvd./ Soquel Dr.	8	15

Table 2.1.5-14: Study Intersections with per Vehicle Delays of One Minute or Greater under 2035 No Build Conditions

Morning Peak			PM Peak		
	Delay			Delay	
Intersection	Min	Sec	Intersection	Min	Sec
Freedom Blvd./ Route 1 SB Ramps	1	40	Freedom Blvd./ Route 1 NB Ramps	16	40
Freedom Blvd./ Bonita Dr.	16	40	Freedom Blvd./ Route 1 SB Ramps	10	4
San Andreas Rd./ Larkin Rd./ Route 1 NB Off-Ramp	1	14	Freedom Blvd./ Bonita Dr.	16	40
San Andreas Rd./ Route 1 SB Ramps	16	40	San Andreas Rd./ Larkin Rd./ Route 1 NB Off-Ramp	11	31
			San Andreas Rd./ Route 1 SB Ramps	16	40

Source: Traffic Operations Report, 2012.
NB = northbound; SB = southbound.

Transit

Under the No Build Alternative, current transit operations would potentially decline due to anticipated increases in congestion, travel time, and delay on Route 1. Without capacity or operational improvements, travel time for transit trips would increase, and reliability of transit operations would be substantially degraded. Additionally, deteriorating travel conditions for transit operations would affect future transit ridership growth. The No-Build Alternative assumes no major construction on Route 1 through the project limits other than planned and programmed improvements and continued routine maintenance. By 2035 without capacity or operational enhancements on Route 1, congestion and travel time on Route 1 would worsen considerably. Buses and carpools would be subjected to very congested travel conditions.

Pedestrian and Bicycle Conditions

Planned pedestrian and bicycle improvements considered in the No Build Alternative would improve pedestrian and bicycle conditions on the local arterial network. These separate projects planned for implementation by 2035 include:

- Replacement of the La Fonda Avenue overcrossing of Route 1, included as part of the Soquel-Morrissey Auxiliary Lanes project, would create bicycle lanes and sidewalks on the new bridge;

- Improvements of roadways and roadsides on Rio del Mar Boulevard from Esplanade to Route 1, which includes the addition of bike lanes; and
- Installation of a Class 1 bicycle and pedestrian facility on Morrissey Boulevard overpass at Route 1.

The No Build Alternative would not result in the benefits to pedestrian and bicycle facilities described below for the Tier I Corridor Alternatives.

Parking

Baseline parking is not anticipated to change under the No Build Alternative.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

Selection of a Tier I Corridor Alternative would not result in actual construction. As portions of the Tier I corridor are programmed as Tier II projects, they will be subject to separate environmental review. Based on the impacts that have been identified in this section, the avoidance, minimization, and mitigation measures shown below are provided on a conceptual basis. These measures are subject to revision based on the changes in the setting, project design, or regulatory requirements in place when individual projects undergo environmental review.

Tier I Corridor TSM Alternative

The Tier I Corridor TSM Alternative would not result in permanent or long-term adverse effects to parking, transit, pedestrian, or bicycle facilities; therefore, impact minimization or mitigation measures are not anticipated to be needed. Overall the Tier I TSM Alternative would improve traffic throughput in the Route 1 corridor; the slight increase in delay in the southbound p.m. peak period is less than significant and does not require mitigation.

Tier I Corridor HOV Lane Alternative

The Tier I Corridor HOV Lane Alternative would not result in permanent or long-term adverse effects to circulation; therefore, no traffic impact minimization or mitigation measures are anticipated to be needed.

Based on current information, parking impacts under the Tier I Corridor HOV Lane Alternative may adversely affect identified commercial properties. The following impact mitigation measure is anticipated to be required to address impacts from parking loss:

- RTC and Caltrans will coordinate with all property owners/operators that would be affected by removal of off-street parking spaces and identify appropriate replacement parking locations, if necessary, to minimize the impacts to these properties.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative would not result in permanent or long-term adverse effects to parking, transit, pedestrian, or bicycle facilities; therefore, no impact minimization or mitigation measures are required.

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2.1.6 Visual/Aesthetics

This section evaluates potential impacts to visual resources and aesthetics that could result from operation of the Tier I and Tier II project alternatives. Impacts during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

The National Environmental Policy Act of 1969, as amended, establishes that the federal government use all practicable means to ensure all Americans safe, healthful, productive, and *aesthetically* (emphasis added) and culturally pleasing surroundings (42 United States Code 4331[b][2]). To further emphasize this point, the Federal Highway administration in its implementation of the National Environmental Policy Act (23 United States Code 109[h]), directs that final decisions regarding projects are to be made in the best overall public interest taking into account adverse environmental impacts, including among others, the destruction or disruption of aesthetic values.

Likewise, the California Environmental Quality Act establishes that it is the policy of the state to take all action necessary to provide the people of the State "with…enjoyment of *aesthetic*, natural, scenic and historic environmental qualities" (California Public Resources Code Section 21001[b]).

Assessment Methods

Assessments were prepared consistent with the methodologies established by Federal Highway Administration's *Visual Impact Assessment for Highway Projects* (1981). This methodology divides the views into landscape or character units that have distinct, but not necessarily homogenous, visual character. Typical views are selected for each unit to represent the views to/from the project.

Existing visual quality from the viewpoints is judged by three criteria: vividness, intactness, and unity. Descriptions for the three criteria are:

- Vividness: The memorability of the landscape components as they combine to form striking or distinctive patterns.
- Intactness: The integrity of visual order in the view and its freedom from visual encroachment.
- Unity: The visual coherence and composition of the landscape viewed to form a harmonious visual pattern.

Affected Environment

The information in this section is summarized from the Visual Impact Assessment (2013) prepared for the proposed project.

Within the project area, Route 1 traverses the county in an east-west direction, and the highway sits on a bench within the general southern slope of the landscape. The landforms are characterized by a rolling landscape that has been urbanized and with natural areas set aside for open space. The western portions of the project corridor, around Santa Cruz, Capitola, and Soquel, are more developed than the eastern areas of the corridor where cut slopes are more predominant. Most of the development is suburban with one- and two-story residential and commercial structures. Open space areas associated with numerous creeks and drainage ways cross the corridor from north to south. The strong visual presence of the drainage areas at roadway crossings is due to large stands of skyline trees (i.e., primarily eucalyptus species). Most interchanges and corridor locations have extensive plantings, including coast redwood trees, eucalyptus, and other evergreen trees, shrubs, and ground coverings. The fog that routinely rolls in from the Pacific Ocean can change the landscape by altering the quality of light and the way other visual elements are perceived.

No hillside or ridgelines are influenced by Route 1 except at the eastern end of the corridor between Rio Del Mar Boulevard and San Andreas Road/Larkin Valley Road; but distant ridgelines (beginning approximately 0.5 mile or more north of the corridor) can be seen from the corridor in areas where vegetation is sparse enough to allow them. These ridgelines generally run in a north to south direction paralleling the creeks but perpendicular to Route 1. Given the distance, the general density of vegetation, and the orientation of the slopes, direct views into the corridor from these ridgelines or out of the corridor to the ridgelines are likely to be obscured. Beginning at Rio Del Mar, there are slopes that parallel the corridor with residences that back onto the right-of-way, particularly along Monroe Avenue and Bonita Drive. Intervening vegetation blocks many of the views from these residences; however, some views into the corridor may be present. South of Freedom Boulevard, the existing roadway cuts through hills, which create visible slopes adjacent to the highway; however, no ridgelines are affected by the project.

In general, the project corridor has a moderately high visual quality, with site-specific locations ranging from high to moderate. Route 1 is listed within the State Scenic Highways System as eligible for future listing, but it has not been officially designated by the State, although it has been by Santa Cruz County. The 8.9 mile long corridor consists of many landscape types. Table 2.1.6-1 provides a summary of the visual character and quality of the Tier I Corridor Alternatives, which has been divided into four landscape units: Upland, Aptos, Soquel-Capitola, and Santa Cruz-Arana Gulch. Table 2.1.6-2 provides a similar summary of the Tier II Auxiliary Lane Alternative, which comprises the Tier I Soquel-Capitola landscape unit. Specifically, the Tier II Auxiliary Lane Alternative area is located between the 41st Avenue interchange and the Soquel Drive/Soquel Avenue interchange. For the Tier I and Tier II Alternatives, typical views were selected for each landscape unit to represent the views to and from the project. Seven typical views were selected for the existing Upland landscape units, nine typical views were selected for the Aptos and Soquel-Capitola landscape units, and eight typical views were selected for the Santa Cruz-Arana Gulch landscape units. Existing landscape units and typical views for each unit are shown in Figures 2.1.6-1 through 2.1.6-4.

Viewer sensitivity and viewer exposure are used to predict how the public might respond to visual changes that result from the highway improvements. Viewer exposure is typically assessed by considering the number of viewers exposed to the view, the type of viewer activity associated with the view, the duration of their view, the speed at which the viewer moves through the environment, and the position of the viewer. Four distinct viewer groups have been identified for the Tier I and Tier II Alternatives – highway travelers, community residents, commercial area employees and customers, and local street users:

Table 2.1.6-1: Summary of Landscape Units – Tier I Corridor Alternatives

Landscape Unit	Location	Existing Visual Resources	Existing Visual Quality
Upland	Southern end of the project from the San Andreas Road–Larkin Valley Road interchange to the western edge of the Rio Del Mar Boulevard interchange.	Rolling landscape as Route 1 climbs up out of the coastal area. A dominant visual feature is the cut slope between Freedom Boulevard and San Andreas Road, which is sparsely covered with native shrubs and grasses. The small shops on the north side of the highway between Freedom and Rio Del Mar boulevards also characterize this area. Other features in this unit are the two overcrossings at Rio Del Mar and Freedom boulevards. The San Andreas Road-Larkin Valley Road interchange is visible to local road travelers.	Moderately high. Landscape unit has an open and undeveloped appearance. Distant views to the surrounding hills to the north and east enhance the vividness of the unit. Large cut slope between San Andreas-Larkin Valley roads and Freedom Boulevard lowers the visual quality due to sparse vegetation and trees and minimal cover of vegetation.
Aptos	Western edge of the Rio Del Mar Boulevard interchange through Aptos and portions of Capitola to the Capitola Avenue overcrossing.	Dominant visual element is the tree vegetation associated with the creeks that cross the corridor. The vegetation in this area includes mature stands of eucalyptus, which dominate, and stands of pine, cedar, and redwoods. Built features in this area include commercial developments along Soquel Drive and homes along McGregor Drive.	High. Groves of mature trees and other vegetation dominate and create a vivid visual experience for highway travelers. Some areas along Soquel Drive frontage road have a lower visual quality due to features such as buildings, signage, and parking lots. Unity and intactness are

Table 2.1.6-1: Summary of Landscape Units – Tier I Corridor Alternatives

Landscape Unit	Location	Existing Visual Resources	Existing Visual Quality
		Visible highway elements include overcrossings for the Union Pacific Railroad, State Park Drive, Park Avenue, and Capitola Avenue.	lowered in this area due to the lack of integration into the landscape.
Soquel-Capitola* (*see additional description for the Tier II Project)	Capitola Avenue overcrossing to just east of the Soquel Avenue–Soquel Drive interchange.	More developed than adjacent Upland and Aptos units. Mix of suburban development and vegetated creek crossings (Soquel Creek and Rodeo Creek Gulch) dominated by skyline eucalyptus trees. Trees associated with the creeks are a visual counterpoint to the developments that are typical of this unit. Smaller-scale suburban 1- and 2-story residential and commercial structures and a "Big Box" retail development at 41st Avenue are partially screened by roadside vegetation.	Moderate. Vegetation and mature eucalyptus trees associated with creek crossings are vivid. Increased development has lowered the unity and intactness of this area. Highway landscaping screens views to and from the highway to a small extent, but the vegetative cover is thin in areas where frontage roads are located.
Santa Cruz–Arana Gulch	Soquel Avenue–Soquel Drive interchange to the western end of the project at the Morrissey Boulevard interchange.	This is the most urbanized and residential of the four units. Portions are dominated by vegetation, especially in the Arana Gulch vicinity. Arana Gulch is heavily wooded with mature stands of eucalyptus trees, which visually dominate the roadway views. Near the Morrissey Boulevard overcrossing, new plantings can be seen. These were installed as part of the Route 1/17 Merge Lanes Project. Harbor High School, adjacent to Route 1 at the La Fonda Avenue overcrossing, is screened by vegetation.	Moderate to moderately high. Arana Gulch vegetation and screen plantings along the highway create a relatively high unity and intactness. Skyline eucalyptus trees add a high degree of vividness. Residential development is low in density and height, creating a moderate degree of intactness and unity.

Table 2.1.6-2: Summary of Landscape Units – Tier II Auxiliary Lane Alternative

Landscape Unit	Location	Existing Visual Resources	Existing Visual Quality
Soquel-Capitola	41st Avenue to Soquel Avenue/ Drive	More developed than previous Upland and Aptos units. Mix of suburban development and vegetated creek crossings (Soquel Creek and Rodeo Creek Gulch) dominated by skyline eucalyptus trees. Trees associated with the creeks are a visual counterpoint to the developments that are typical in this unit. The smaller-scale suburban 1- and 2-story residential and commercial structures and “Big Box” retail development at 41st Avenue are partially screened by roadside vegetation.	Moderate. Vegetation and mature eucalyptus trees associated with creek crossings are vivid. Increased development has lowered the unity and intactness of this area. Highway landscaping partially screens views to and from the highway, but the vegetative cover is thin in areas where frontage roads are located.

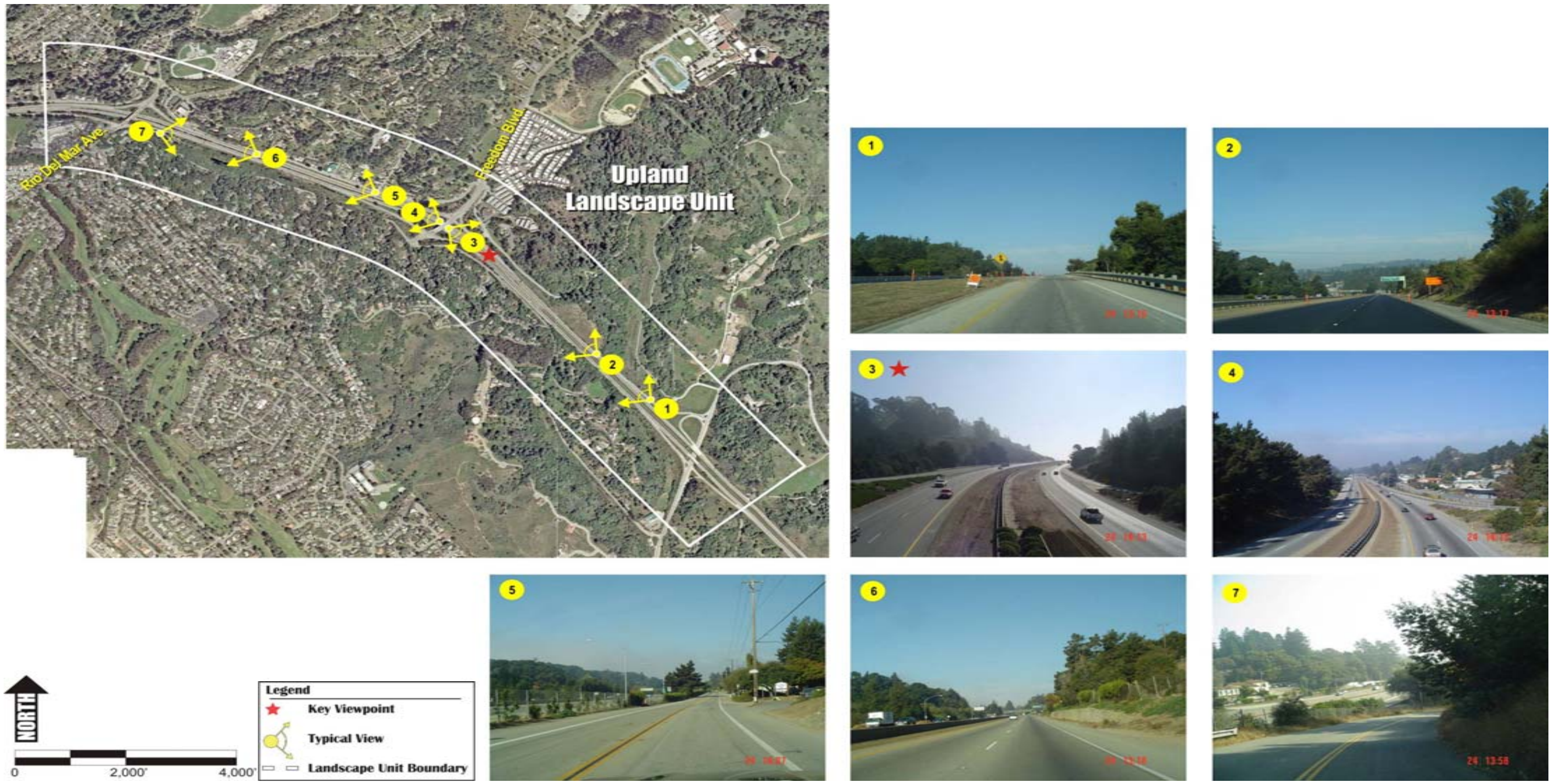


Figure 2.1.6-1: Existing Upland Landscape Unit and Typical Views (Tier I Corridor Alternatives only)

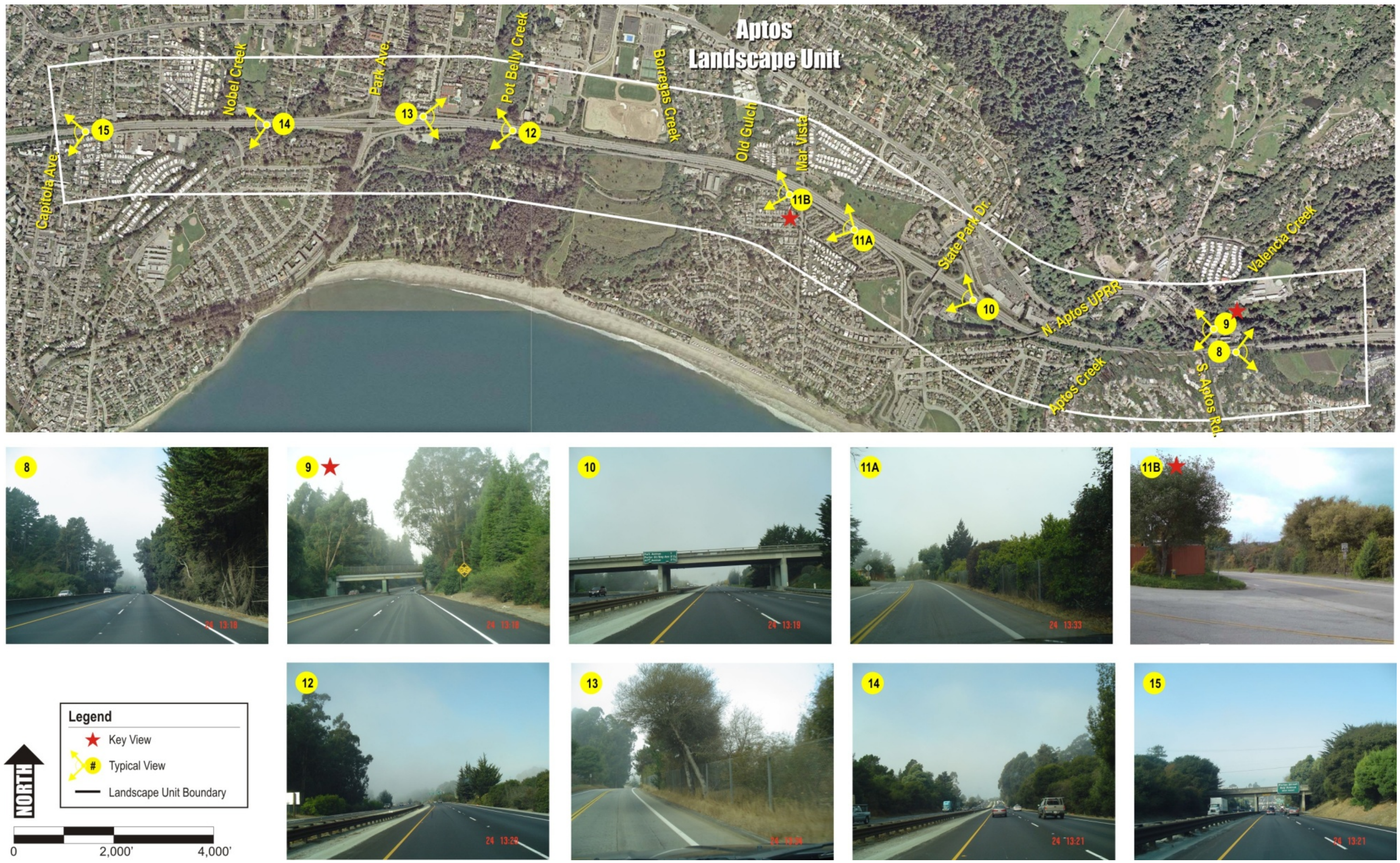


Figure 2.1.6-2: Existing Aptos Landscape Unit and Typical Views (Tier I Corridor Alternatives only)

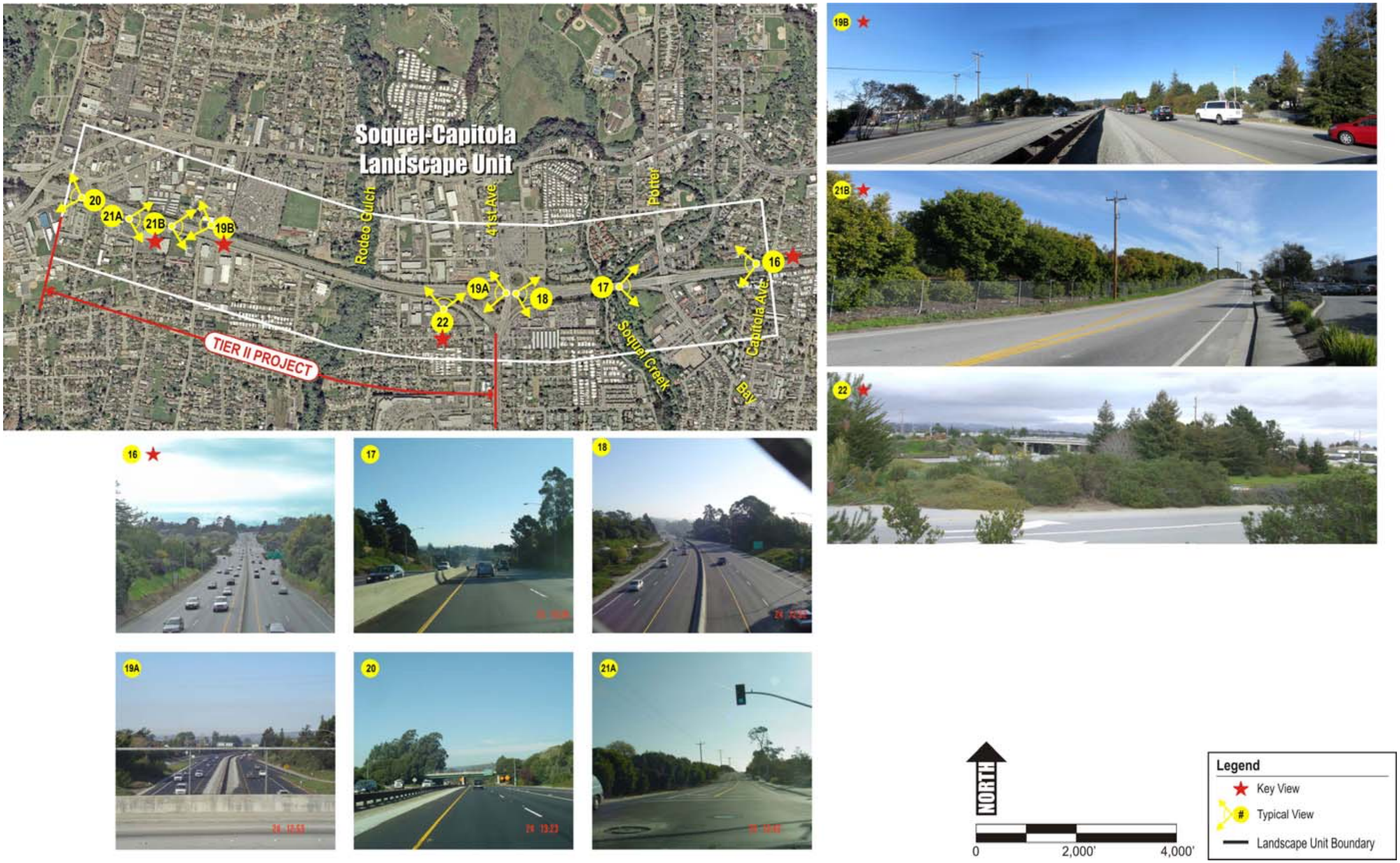


Figure 2.1.6-3: Existing Soquel-Capitola Landscape Unit and Typical Views (Tier I and Tier II Alternatives)

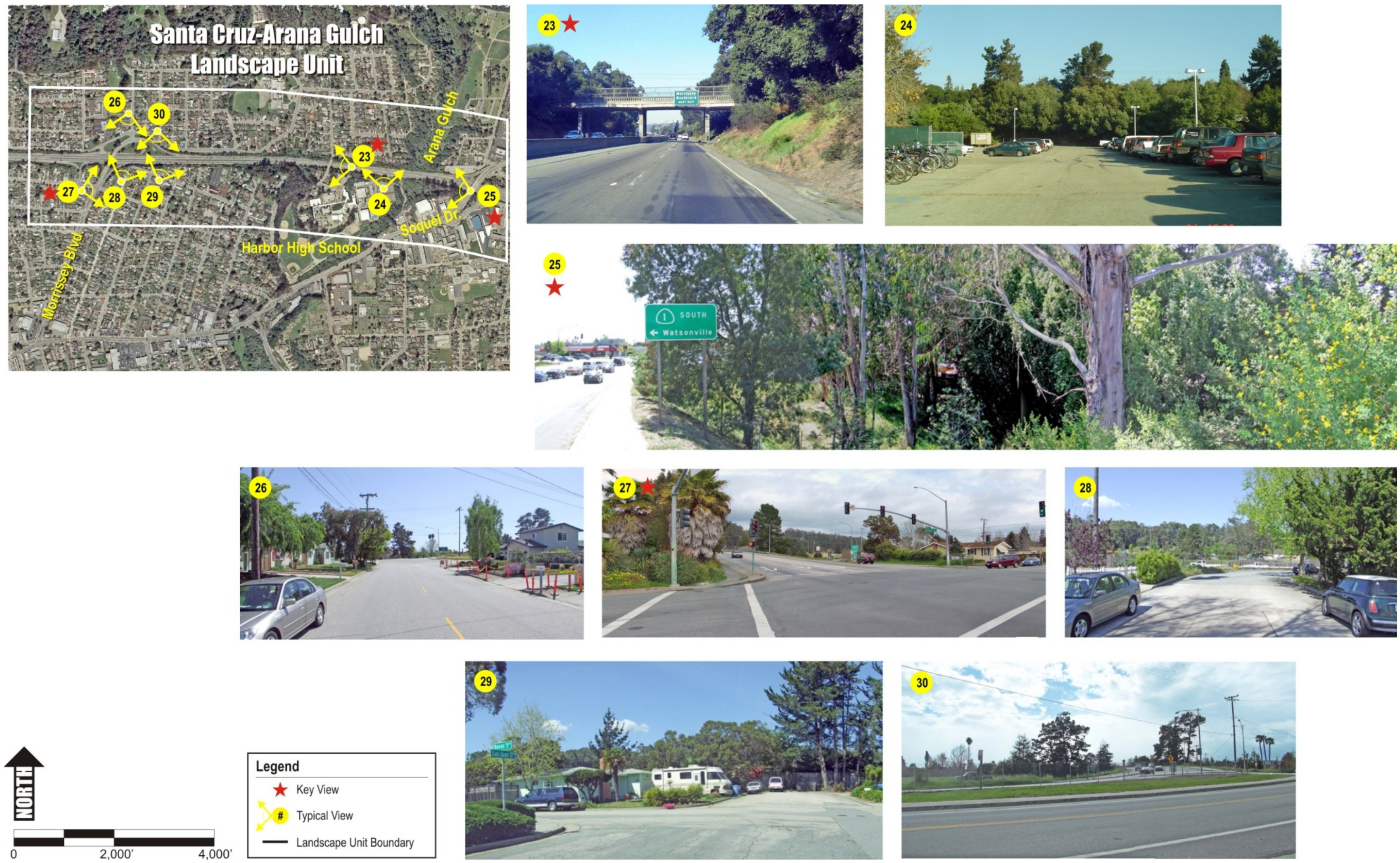


Figure 2.1.6-4: Existing Santa Cruz-Arana Gulch Landscape Unit and Typical Views (Tier I Corridor Alternatives only)

Tier I Corridor User Groups

- **Highway Travelers:** There are approximately 80,000 highway travelers per day in the southern portion of the project corridor and 100,000 in the northern portion near Morrissey Boulevard. Many drivers commute daily from the Santa Cruz-Capitola-Aptos area to jobs in the San Jose area. During periods of free-flow travel, the project can be traversed in approximately 10 minutes.

  Daily commuters may have an increased awareness of views from the road due to the amount of time they are exposed to the corridor each day, compared to tourists who may be seeing the road for the first time. With congested traffic, the length of time increases and drivers have a longer time to focus their attention on the highway elements. When traveling at posted speeds, these drivers tend to focus on long- to mid-range views straight ahead. Passengers tend to have more time and a wider range of views than drivers.

  In summary, the responses from freeway viewers are anticipated to be varied, depending on who they are (e.g., commuters, tourists, locals), but because the number of commuters and local residents outweighs those seeing the corridor for the first time (or even infrequently), it is anticipated that those within this viewer group would be moderately to highly sensitive to changes in the visual environment of the corridor. This level of sensitivity is also supported by the community's regulations and policies on aesthetics and vegetation preservation.

- **Community Residents:** There are many residents that live adjacent to the highway, particularly in the northern portion of the corridor in Santa Cruz. Many of these homes either directly face or back onto the highway, giving the residents fore- to mid-ground views of the corridor. In other locations, the homes are set farther back and may have commercial properties between the homes and the highway. These homes have mid- to background views of the highway. Most views of the highway are at least partially obscured by existing highway plantings.

  Residents can be expected to have a high concern about the project and its effect on views from their homes and neighborhoods. These views would be sustained given the amount of time each resident spends at home. In addition, residents have a concern about the views from the highway into their communities as would be expected of communities where tourism plays an important role in the local economy. These views into the community from the highway would be expected to be of short duration, given the travel times on the highway. In summary, community residents are anticipated to be highly sensitive to changes in the visual environment, where views are from their homes into the project area or from the project area into their community.

- **Commercial Area Employees and Customers:** Large sections of the Route 1 corridor are paralleled by frontage roads, which are in turn lined with commercial uses. These include stores, restaurants, auto dealerships, and even an increasingly rare drive-in cinema. Potentially, there are thousands of viewers per day with short-duration views into the highway corridor. These views would be fore- to mid-ground views, and they are partially obscured by the vine and shrub plantings along the right-of-way fence.

  Because it can be expected that most employees spend their time working, any views out of windows in the business into the corridor would likely be short in duration; however, because these viewers, much like the residential viewer, would see the view many times over, they would have a high sensitivity. Customers are also anticipated to have relatively short-duration views, mostly on their travel from the car into the business and in their car upon entering or leaving the parking lot. Depending on how frequently they visit the business, they may also see the view many times over.

  Within commercial areas, business owners frequently desire increasing the view to the business from roadway corridors such as Route 1. The removal of viewing obstructions, such as roadside vegetation is sometimes considered valuable to increasing the visibility of the business. Depending on the visual quality of the business, an open view may or may not be desirable of those traveling on the roadway.

  Given the varied opinions on the quality and quantity of the view, it is difficult to make a generalization for this viewer group; however, for the Route 1 corridor, there are some common concerns. It can be assumed that most of these individuals are from the local community, which has a high sensitivity to change (as evidenced by the community's regulations and policies on aesthetics and vegetation preservation), and these views would occur both while traveling to and from the business and out the windows of the business. Therefore, it is anticipated that these viewers would have a moderate to high awareness of the project and a high sensitivity to the change.

- **Local Street Users, including Drivers, Bicyclists, and Pedestrians:** Local street users, including drivers, bicyclists, and pedestrians, have short- to long-duration views into the Route 1 corridor every day (depending on the rate of travel). These include views from bridges over the highway, as well as from adjacent local streets. In many instances, the local street users are also local residents that may be traveling to the corridor. Because the speed of travel of these viewer groups is much slower than that of the highway traveler, it can be expected that they would have a greater awareness of changes to the visual environment than the highway user. Views to the corridor move from back- and mid-ground views to foreground views as they near the highway corridor.

  Much like the freeway traveler, the responses from local street viewers is anticipated to be varied, depending on who they are (e.g., residents, tourists, locals) and their mode of transportation, but because the number of local residents is anticipated to be greater than those seeing the corridor for the first time (or even infrequently), it is anticipated that those within this viewer group would be moderately to highly sensitive to changes in the visual environment of the corridor. This level of sensitivity is also evidenced by the community's regulations and policies on aesthetic and vegetation preservation.

Tier II Corridor User Groups

The categories for the viewer groups, exposure, and awareness are the same for Tier II as those described under Tier I. From the standpoint of a percentage makeup of all viewers, the numbers may be slightly different between the two project areas. It may be expected that the Tier II project area might have a higher percentage of viewers from the commercial group due to the proximity of businesses within the Tier II area compared to residential areas. Consequently, residents would be anticipated to be a smaller percentage of the overall viewership of the Tier II project area.

- **Highway Travelers:** The distance between the 41st Avenue interchange and the Soquel Avenue interchange (the area of the Tier II project) can be traversed in less than 2 minutes under free-flowing traffic conditions, which implies short-duration views for those traveling on Route I. Vegetation between the southbound lanes of Route 1 and the adjacent Soquel Avenue consists of a single row of large shrubs and small trees. In some instances, the vegetation is quite sparse, while in other areas it is dense to nearly the ground level. The existing vegetation along the northbound lanes of the freeway is thicker with redwood trees and tall shrubs, so views from the freeway to areas outside of the corridor are limited.

  As with the Tier I freeway users, the responses from freeway travelers under Tier II are anticipated to be varied, depending on who they are (e.g., commuters, tourists, locals), but because the number of commuters and local residents is larger than those seeing the corridor for the first time (or even infrequently), it is anticipated that those within this viewer group would be moderately to highly sensitive to changes in the visual environment of the corridor. This level of sensitivity is also supported by the community's regulations and policies on aesthetics and vegetation preservation.
- **Community Residents:** There are very few residential properties along the Tier II project area. Most of the land uses adjacent to the highway and/or frontage road are commercial. One area of exception is along Mattison Lane north of Route 1, where several residences back onto the highway corridor. For these residents, they are anticipated to have long-duration views to the corridor that are partially screened by vegetation.
- **Commercial Area Employees and Customers:** Through the Tier II project area, most of the buildings adjacent to the highway and/or frontage road are commercial. These include stores, restaurants, auto dealerships, and even an increasingly rare drive-in

cinema. Potentially, there are thousands of viewers per day with short-duration views into the highway corridor. These views would be fore- to mid-ground views, and they are partially obscured by the vine and shrub plantings along the right-of-way fence.

As described under Tier I for these viewers, there are varying opinions on the quality and quantity of the view for the commercial area viewer, and it is difficult to make a generalization for this viewer group; however, within the Tier II project area for the Route 1 corridor, there are some common concerns. It can be assumed that most of these individuals are from the local community, which has a high sensitivity to change (as evidenced by the community's regulations and policies on aesthetics and vegetation preservation), and these views would occur both while traveling to and from the business and out the windows of the business. Therefore, it is anticipated that these viewers would have a moderate to high awareness of the project and a high sensitivity to the change.

- **Local Street Users, including Drivers, Bicyclists, and Pedestrians:** Local street users within the Tier II project area, including drivers, bicyclists (there is an existing bike lane on Soquel Avenue through the project area), and pedestrians, have short- to long-duration filtered views into the Route 1 corridor every day, depending on the rate of travel. Because the speed of travel of these viewer groups is much slower than that of the highway traveler, it can be expected that they would have a greater awareness of changes to the visual environment than the highway user. Views to the corridor vary from mid-ground views to foreground views depending on the proximity to the highway corridor.

  Much like the freeway traveler, the responses from local street viewers under the Tier II project are anticipated to be varied, depending on who they are (e.g., residents, tourists, locals) and their mode of transportation, but because the number of local residents is anticipated to be larger than those seeing the corridor for the first time (or even infrequently), it is anticipated that those within this viewer group would be moderately to highly sensitive to changes in the visual environment of the corridor. This level of sensitivity is also supported by the community's regulations and policies on aesthetics and vegetation preservation.

Environmental Consequences

The visual impact of the project alternatives is determined by assessing the existing visual resource and change to the visual character and quality due to the proposed project features. It is then possible to consider viewer response to that change. The first step in determining visual resource change is to assess the compatibility of the proposed project with the existing visual character of the landscape. The second step is to compare the visual quality of the existing resources with the projected visual quality after the project is constructed. The resulting level of visual impact is determined by combining the severity of resource change with the viewer response to that change.

Tables 2.1.6-3 and 2.1.6-4 provide a summary of the visual elements that are proposed for the Tier I and Tier II alternatives. This summary includes elements such as walls and bridges, as well as landscape removal areas that would be highly noticeable changes in the environment, but it excludes those elements, such as culverts, that are not typically as visible in the landscape.

Table 2.1.6-3: Summary of Visual Elements – Tier I Build Alternatives

Project Visual Element	Units	Tier I HOV Lane Alternative	Tier I TSM Alternative
Structural Elements[1]			
New or Widened Over/ Undercrossings (Bridges)	Total No.	15	7
New Pedestrian Bridges (including Ramps)	Total No.	3	3
Retaining Walls	Linear Feet	33,000	16,000
Soundwalls	Linear Feet	17,800	23,600
Ramp Metering	Number of Interchanges	9	9
Landscape Elements			
Vegetation Removal	Acres	109	61
Replanting Areas – Trees, Shrubs, Groundcovers[2]	Acres	15	10
Replanting Areas – Shrubs and Groundcovers[2]	Acres	50	13
Miscellaneous Elements			
Glare Potential[3]	N/A	Moderate	Moderate
Local Streets Widened	N/A	Yes	No
New Concrete Median Barrier	N/A	Yes	Yes

1 While widening of the highway paving would be a noticeable element, it is implied with each alternative.
2 Based on Caltrans' setback requirements for trees, not all planting areas can include large trees as part of the planting palette.
3 Glare potential is considered possible from the relocation of street lights within interchanges and the reduction of vegetation along the edges of the highway, which would allow headlight glare into areas surrounding the highway; however, this effect is considered mitigable.

Table 2.1.6-4: Summary of Visual Elements – Tier II Auxiliary Lane Alternative

Project Visual Element	Units	Tier II Auxiliary Lane Alternative
Structural Elements[1]		
New or Widened Over/Undercrossings (Bridges)	Total No.	0
New Pedestrian Bridges (including Ramps)	Total No.	1
Retaining Walls	Linear Feet	1,200
Soundwalls	Linear Feet	310
Ramp Metering	Number of Interchanges	0
Landscape Elements		
Vegetation Removal	Acres	9.3
Replanting Areas – Trees, Shrubs, Groundcovers[2]	Acres	1
Replanting Areas – Shrubs and Groundcovers[2]	Acres	2
Miscellaneous Elements		
Glare Potential[3]	N/A	Moderate
Local Streets Widened	N/A	No
New Concrete Median Barrier	N/A	Yes

1 While widening of the highway paving would be a noticeable element, it is implied with each alternative.
2 Based on Caltrans' setback requirements for trees, not all planting areas can include large trees as part of the planting palette.
3 Glare potential is considered possible from the relocation of street lights within interchanges and the reduction of vegetation along the edges of the highway, which would allow headlight glare into areas surrounding the highway; however, this effect is considered mitigable.

Table 2.1.6-5 is a summary of the anticipated changes to the visual quality by landscape unit for each alternative. Note that the visual quality rating is an average for each landscape unit as a whole. Specific areas within the unit might have a higher or lower visual quality (including both pre- and post project).

Table 2.1.6-5: Summary of Anticipated Changes by Landscape Unit

Landscape Units	Anticipated Change to Visual Resource[1]	Anticipated Viewer Response[2]	Anticipated Visual Impact[2]
Tier I – HOV Lane Alternative			
Upland Unit	Moderate	Moderately High	Moderately High
Aptos Unit	High	High	High
Soquel-Capitola Unit	High	Moderately High	Moderately High
Santa Cruz-Arana Gulch Unit	High	High	High
Tier I – TSM Alternative			
Upland Unit	Moderate	Moderately High	Moderately High
Aptos Unit	High	High	High
Soquel-Capitola Unit	Moderately High	Moderately High	Moderately High
Santa Cruz-Arana Gulch Unit	Moderately High	High	Moderately High
Tier II – Auxiliary Lane Alternative			
Soquel-Capitola Unit	Moderate	Moderately High	Moderately High

1 See description of existing visual quality in Tables 2.1.6-1 and 2.6.1-2.
2 These values represent anticipated averages for the entire landscape unit. For an evaluation of specific points and the associated effects based on project alternatives, see Section 6 for a Key Viewpoint analysis.

Tier I Corridor Alternatives

The proposed Tier I Corridor Alternatives would be considered to have a substantial impact if they were to result in obstruction or impairment of important views from a public roadway or scenic vista, result in substantial modification to the height of the existing structures/ topography of the area, or cause a large reduction in the landscape/vegetation within the corridor.

The proposed improvements under either of the Tier I Corridor Alternatives would have an adverse impact on the visual quality of the corridor. In general, construction resulting in a wider facility would be visually apparent in the landscape. New soundwalls and retaining walls would limit views into or out of the highway corridor. These proposed soundwalls would be constructed adjacent to residential neighborhoods and would also affect their views out of the neighborhood, especially for those who face the highway. In addition, retaining walls would be located at drainage way crossings and in areas where slopes approach the highway. These changes would likely be perceived as increasing the urbanized character of the corridor.

Potential impacts to vegetation at creek crossings would entail the removal of numerous skyline eucalyptus trees; however, due to the thickness of these stands, many trees farther back in the stand from the highway would remain after construction, providing visual interest similar to the existing landscape. Vegetation within interchange areas and along the edges of the highway would likely be removed by construction activities. In some instances, there would not be adequate space for new plantings, while other locations would have reduced landscaping. Where replanting opportunities are limited, project mitigation would rely on architectural treatments to reduce adverse aesthetic effects.

The existing freeway is illuminated with street lighting along the corridor and within existing interchanges. The project alternatives are not anticipated to add a new source of light or glare; however, because the highway is being widened under these alternatives, it can be anticipated that the highway lighting would be moved and may be relocated closer to homes and businesses adjacent to the roadway. In addition, intervening plantings would be removed in some cases by the construction activities, which could increase glare to specific individual locations within the overall corridor. Minimization measures to reduce the impact of project lighting would be the use of cut-off and shielded fixtures. These measures would reduce light infiltration into these adjoining community areas.

Avoidance and minimization measures would involve input from the local community and include the addition of plants and trees to replace those removed by the project, as well as a community-based design through context-sensitive solutions. Architectural treatments would also be used to reduce the project impacts and maintain a moderate to moderately high degree of visual quality along the Route 1 corridor. With the removal of the existing vegetation, it would be possible to develop a primarily native plant palette rather than the existing non-native species that dominate the corridor currently. The impacts of the proposed project would likely affect the eligibility of this portion of Route 1 for future listing in the State Scenic Highways System due to the limitations of views imposed by the additional walls, both sound and retaining, proposed within the corridor.

Tier I Corridor HOV Lane Alternative

While the improvements proposed as part of the Tier I Corridor HOV Lane Alternative would add elements that are consistent with what viewers anticipate within a highway setting (e.g., roadway pavements, soundwalls, bridge crossings), the increase in these elements within the Route 1 corridor would represent a substantial increase in the overall urbanized appearance of the existing corridor. This, coupled with the removal of large amounts of vegetation, would greatly change the existing visual environment of the corridor.

- **Bridges:** Most existing bridges within the project area would be widened or replaced as part of the Tier I Corridor HOV Lane Alternative. The replacement bridges over the highway and highway overpasses over local streets would be widened to accommodate the new HOV lanes. The replacement structures are not anticipated to alter the existing visual quality of the highway; however, the removal of vegetation in the areas of the existing structures necessary to construct the bridges would create a long-term effect to the views along the highway.

New pedestrian bridges and associated ramps (to accommodate Americans with Disabilities Act requirements) would be constructed over the highway at Mar Vista Drive, Chanticleer Avenue, and between Park Way Court and Trevethan Drive. The ramps and bridges would add new elements to views along the highway because no such facilities currently exist. The final design of the bridges and associated ramps would have a large influence on the image created by these elements. The addition of these structures may add new views currently not part of the existing corridor viewscape.

- **Freeway Paving:** The Tier I Corridor HOV Lane Alternative would widen almost the entire project corridor from four lanes to six lanes, with additional auxiliary lanes in most stretches of the facility. Existing nonstandard inside and outside shoulders would be widened to 10 feet, except for some locations where the inside shoulder would be 5 feet to lessen impacts to adjacent frontage roads. The overall effect would be to increase paving within the corridor by more than one-third. In addition to the widened pavement on the ramps, ramp metering lights and signage would be added to the ramp areas.
- **Local Streets:** Portions of the local streets at each interchange would be widened on either side of the new bridge crossings, with bike lanes and sidewalks added at the following locations: Rio Del Mar Boulevard, State Park Drive, Park Avenue, Bay Avenue/Porter Street, 41st Avenue, Soquel Drive/Avenue, and Morrissey Boulevard. These features and the increased pavement width due to the wider cross section would create a more urban appearance. In addition, views into the corridor from the perspective of the local streets would be blocked by soundwalls at some locations, particularly along the McGregor frontage road and along some stretches of the Soquel Drive frontage road, which are both residential in character. Where bridges are replaced, the local street view would be altered by the removal of vegetation at these intersections, but the bridge replacements would not by themselves greatly change from the current views.
- **Soundwalls:** Of the elements associated with the project, soundwalls are one of the most visible and can create more controversy than other project elements because they block views as well as sound. The Tier I Corridor HOV Lane Alternative includes 18 proposed soundwalls, with a total length of approximately 17,800 linear feet. The effect of these walls not only ameliorates the sound from the corridor but also changes the views to and from the corridor.
- **Retaining Walls:** In addition to the new soundwalls, retaining walls would also be included as part of the Tier I Corridor HOV Lane Alternative. These retaining walls would either face into the corridor and be visible to travelers along the highway, or they

would face outward from the highway near the right-of-way line or edge of pavement and would face out into the community. Some of the walls facing the community may be partially or entirely screened by vegetation or structures outside of the right-of-way. There are approximately 33,000 linear feet of retaining wall proposed with this alternative.

In those areas that require it, cable railing would be provided on walls facing the highway. The purpose of the fencing is to protect maintenance staff and the general public and would consist of posts with three strands of cable. This type of fencing would be typical for both of the Tier I Corridor Alternatives. In those locations where walls face the community, barriers would be placed on top instead of cable railing.

In general, new walls, including retaining walls and soundwalls, within the corridor provide for the potential for graffiti/tagging. To some extent, graffiti can be deterred through the use of heavy textures on the walls, screening vegetation, and anti-graffiti coatings/stains. The possibility of this vandalism, along with possible minimization measures, should be considered in the design of these structures. Please see the Avoidance, Minimization, and/or Mitigation Measures at the end of this section for more details.

- **Lighting and Signage**: Some existing signage and light fixtures would be relocated to accommodate the proposed widening. In addition, new signage and lighting at the ramps could be expected to bring the highway up to current standards or to replace old fixtures with newer, more efficient ones.
- **Permanent Stormwater Treatment Best Management Practices:** Biofiltration-type Best Management Practices (stormwater treatment measures that allow stormwater to filter through dense vegetation and fast draining soils) may require no plantings higher than low ground covers. Overhanging branches from trees or shrubs will be removed as a requirement. Extensive removal of existing trees and shrubs at interchanges for treatment Best Management Practice placement may be expected. For structural type treatment Best Management Practices (i.e., Austin sand filters), all vegetation may be removed. Any trees or shrubs that encroach on the treatment Best Management Practices will be removed for the life of the facility.
- **Vegetation Removal:** The removal of existing vegetation to construct the bridges, soundwalls, and retaining walls and to widen the highway and ramps would have a large effect on the views within the corridor and into the corridor.
  It is likely that this would be the most notable effect from the project on the character and quality of the existing views. For the Tier I Corridor HOV Lane Alternative, approximately 109 acres of vegetated area would be cleared due to construction activities. Most noticeable would be removal of the mature vegetation and skyline trees.

Many of the areas can be replanted, provided they are not paved with the roadway widening. Approximately 65 acres would be available for planting. Of this amount, approximately 15 acres would be available for tree plantings, and another 14 acres would be covered in stormwater treatment facilities, some of which may be available for landscaping; however, it could be many years before the vegetation would reach the size of the existing vegetation.

Tier I Corridor TSM Alternative

General visual impacts associated with this alternative are due to the auxiliary lanes (i.e., widened pavement sections), reconfigurations on existing ramps, and associated signage/ramp metering lights. The summary below describes the anticipated changes to the visual environment by each project element.

- **Bridges:** Impacts associated with the bridge replacement or widening would be similar to those under the Tier I Corridor HOV Lane Alternative, but five fewer bridges would be affected by this alternative. Three new pedestrian bridges would be constructed at Mar Vista Drive and Chanticleer Avenue, and between Park Way Court and Trevethan Drive. Ramps are included in the Tier I Corridor TSM Alternative, and the associated impacts would be the same (see bridge impacts under the Tier I Corridor HOV Lane Alternative above).
- **Freeway Paving:** Additional paving would result from construction of auxiliary lanes. The result of this increase in paving would be especially noticeable to freeway travelers. User groups outside of the freeway would likely not notice the change due to the presence of existing and proposed soundwalls and vegetation at the creek crossings. The vegetation is outside of the highway right-of-way and would not be affected by the project. The addition of standard shoulders would also increase the paved surface within the corridor. In addition to the widened pavement on the ramps, ramp metering lights and signage would be installed at ramp areas.
- **Local Streets:** Widening to local streets would not occur under the Tier I Corridor TSM Alternative; however, the placement of soundwalls or retaining walls in some locations would alter the existing visual character along some local streets, as described above for the Tier I Corridor HOV Lane Alternative.
- **Soundwalls:** This alternative includes new soundwalls or extensions of existing soundwalls. Thirteen soundwalls are recommended for a combined length of approximately 23,600 linear feet.
- **Retaining Walls:** In addition to the new soundwalls, retaining walls would also be included as part of the Tier I Corridor TSM Alternative. More than 16,000 lineal feet of retaining wall is proposed for this alternative.

- **Vegetation Removal:** Approximately 61 acres of existing landscaping would be removed by this alternative. This removal would have a large effect on views within the corridor and into the corridor. Vegetation removal would be localized to areas of construction. It is anticipated that large areas of vegetation would remain within the corridor under this alternative. For areas disturbed by construction activities, approximately 23 acres are available for replanting. Approximately 10 acres of this amount would be available for tree planting and be consistent with Caltrans' setback requirements. It could be many years before vegetation would reach its current size and density.
- **Lighting and Signage**: Some existing signage and light fixtures would be relocated to accommodate the proposed highway improvements. In addition, new signage, ramp metering, and lighting at the ramps could be expected to bring the highway up to current standards or to replace old fixtures with newer, more efficient ones.

Key Viewpoints

Because it is not possible to analyze every possible view within the project area, the Federal Highway Administration analysis methodology recommends selecting many key viewpoints that represent the potential visual effects of the project and the viewer's experience. The key viewpoints include a representation of all critical visual elements of the proposed project and viewer group types and represent each landscape unit with views that might potentially be affected by the project. The numbering of the key viewpoints coincides with the numbers on the typical view photographs found in the landscape unit sheets (Figures 2.1.6-1 through 2.1.6-4).

Key viewpoints within the project area are described below:

- **Key Viewpoint #3, Upland Landscape Unit:** The key viewpoint within the Upland Landscape Unit was taken from the Freedom Boulevard Bridge over Route 1 looking to the east. This viewpoint was selected because it typifies the existing images on the southern end of the project and shows these from the viewpoint of a pedestrian on the bridge.
- **Key Viewpoint #9, Aptos Landscape Unit:** The photograph was taken from the right lane of northbound Route 1, looking to the west along Route 1. The bridge in the photograph is the South Aptos Railroad crossing. This view was selected because it shows the effects of the existing vegetation and their removal on the views within the corridor to highway travelers within the Aptos Landscape Unit. In general, this unit has a great deal of roadside vegetation, particularly at creek crossings.
- **Key Viewpoint #11B, Aptos Landscape Unit:** This key viewpoint is from the perspective of the residents along McGregor Drive. The photograph is taken looking to the north from the intersection of Margaret Avenue and McGregor Drive into the project

corridor. The view was selected as a key viewpoint because it shows the potential visual changes to the views from the residents that border the highway corridor.

- **Key Viewpoint #16, Soquel-Capitola Landscape Unit:** The photograph for this key viewpoint was taken from the Capitola Avenue overcrossing above the highway. The viewpoint was selected because it provides an overview of the proposed improvements to the Bay Street/Porter Street to 41st Avenue improvements. The view is from the perspective of a pedestrian on the bridge, but it demonstrates what can be anticipated by the highway traveler.
- **Key Viewpoint #19B, Soquel-Capitola Landscape Unit:** The photograph for this viewpoint is from the Route 1 median at Chanticleer Avenue, looking west along the northbound lanes of the highway. The view was selected to demonstrate the effects of the proposed pedestrian/bicycle bridge over the highway. The view is from the perspective of the Route 1 traveler.
- **Key Viewpoint #21B, Soquel-Capitola Landscape Unit:** The photograph for this key viewpoint is from the perspective of the pedestrian on Soquel Avenue looking east along the street. It was selected to demonstrate the effect of the proposed pedestrian/bicycle bridge to the local streetscape of Soquel Avenue.
- **Key Viewpoint #22, Soquel-Capitola Landscape Unit:** This photograph was taken along the right-of-way fence near the sidewalk along Soquel Avenue. The view is towards the north and into the 41st Avenue interchange. The view was selected as a key viewpoint because it demonstrates the anticipated changes to the 41st Avenue interchange.
- **Key Viewpoint #23, Santa Cruz-Arana Gulch Landscape Unit:** The photograph is taken from the northbound lanes of Route 1 looking to the west at the La Fonda Bridge overcrossing. The La Fonda Bridge and areas along the northbound lanes would include new elements that would be constructed as part of the separate auxiliary lanes project north of Soquel Drive. The Tier I Corridor HOV Lane Alternative would potentially add elements to the view. This viewpoint was selected as a key viewpoint to show the transitions between the two projects to the highway traveler.
- **Key Viewpoint #25, Santa Cruz-Arana Gulch Landscape Unit:** The view is within the Soquel Drive interchange looking southwest into the existing Arana Gulch area. The view is from the perspective of the traveler on Soquel Drive and was chosen to show the impacts associated with the proposed improvements within the Arana Gulch area.
- **Key Viewpoint #27, Santa Cruz-Arana Gulch Landscape Unit:** The photograph is taken from the Fairmount Avenue-Morrissey Boulevard intersection looking to the northeast towards the Route 1 southbound on-ramp. The view is from the perspective of a local neighborhood and was selected to show the anticipated improvements at the west

end of the project. These improvements are incremental based on several already-approved or constructed projects in this portion of the corridor.

Rendered simulations have been developed for each key viewpoint based on the proposed alternatives. Simulations were developed for the Tier I Corridor TSM Alternative for Key Viewpoints #3, #9, #11B, #16, #22, and #27. The Tier I Corridor HOV Lane Alternative also has simulations for each of these key viewpoints and has an additional simulation for Key Viewpoints #23 and #25. These two viewpoints have no corresponding improvements proposed as part of the Tier I Corridor TSM Alternative. For the Tier II Auxiliary Lane Alternative, with its smaller footprint, simulations were developed for Key Viewpoints #19B, #21B, and #23.

Table 2.1.6-6, which corresponds to the key viewpoint figures (Figures 2.1.6-5 through 2.1.6-17), provides a summary of each key viewpoint's summary analysis for the anticipated change to the visual resource, the anticipated viewer response to that change, and the overall anticipated visual impact for each alternative.

Table 2.1.6-6: Summary of Anticipated Visual Impacts by Key Viewpoint and by Tier I Corridor Alternative

Key Viewpoint	Anticipated Change to Visual Resource	Anticipated Viewer Response	Anticipated Visual Impact
Tier I Corridor HOV Lane Alternative			
Key Viewpoint #3	Moderately Low	Moderate	Moderate
Key Viewpoint #9	Moderately High	Moderately High	Moderately High
Key Viewpoint #11B*	Moderate	Moderately High	Moderately High
Key Viewpoint #16	Moderate	Moderate	Moderate
Key Viewpoint #22	Moderate	Moderate	Moderate
Key Viewpoint #23	Low	Moderate	Moderate
Key Viewpoint #25	High	High	High
Key Viewpoint #27	Low	Moderate	Moderate
Tier I Corridor TSM Alternative			
Key Viewpoint #3	Low	Moderate	Moderately Low
Key Viewpoint #9	Moderately High	Moderately High	Moderately High
Key Viewpoint #16	Moderately Low	Moderate	Moderate
Key Viewpoint #22	Moderate	Moderate	Moderate
Key Viewpoint #27	Low	Moderate	Moderate
*The images and analyses for these key viewpoints are the same for both of the Tier I Corridor Alternatives.			

Figure 2.1.6-5: Key Viewpoint #3 in the Upland Landscape Unit, Tier I Corridor HOV Lane Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

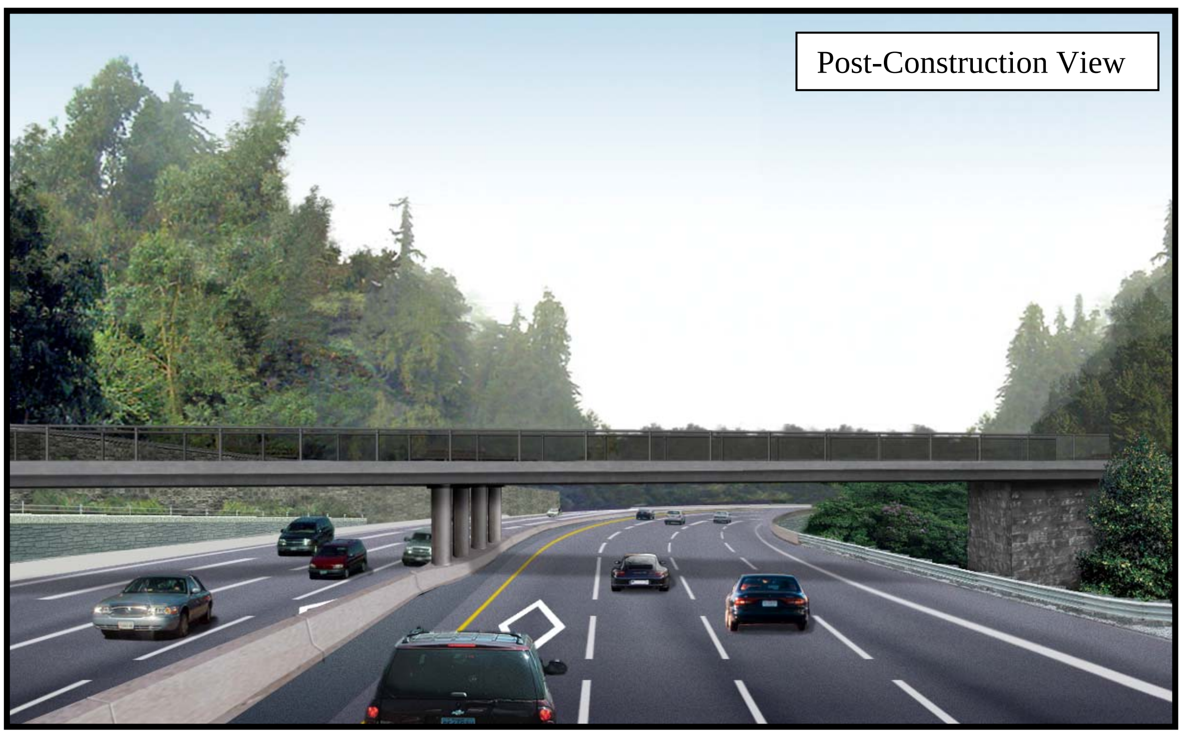


**Figure 2.1.6-6: Key Viewpoint #9 in the Aptos Landscape Unit,
Tier I Corridor HOV Lane Alternative**

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

**Figure 2.1.6-7: Key Viewpoint #11B in the Aptos Landscape Unit,
Tier I Corridor HOV Lane Alternative**

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

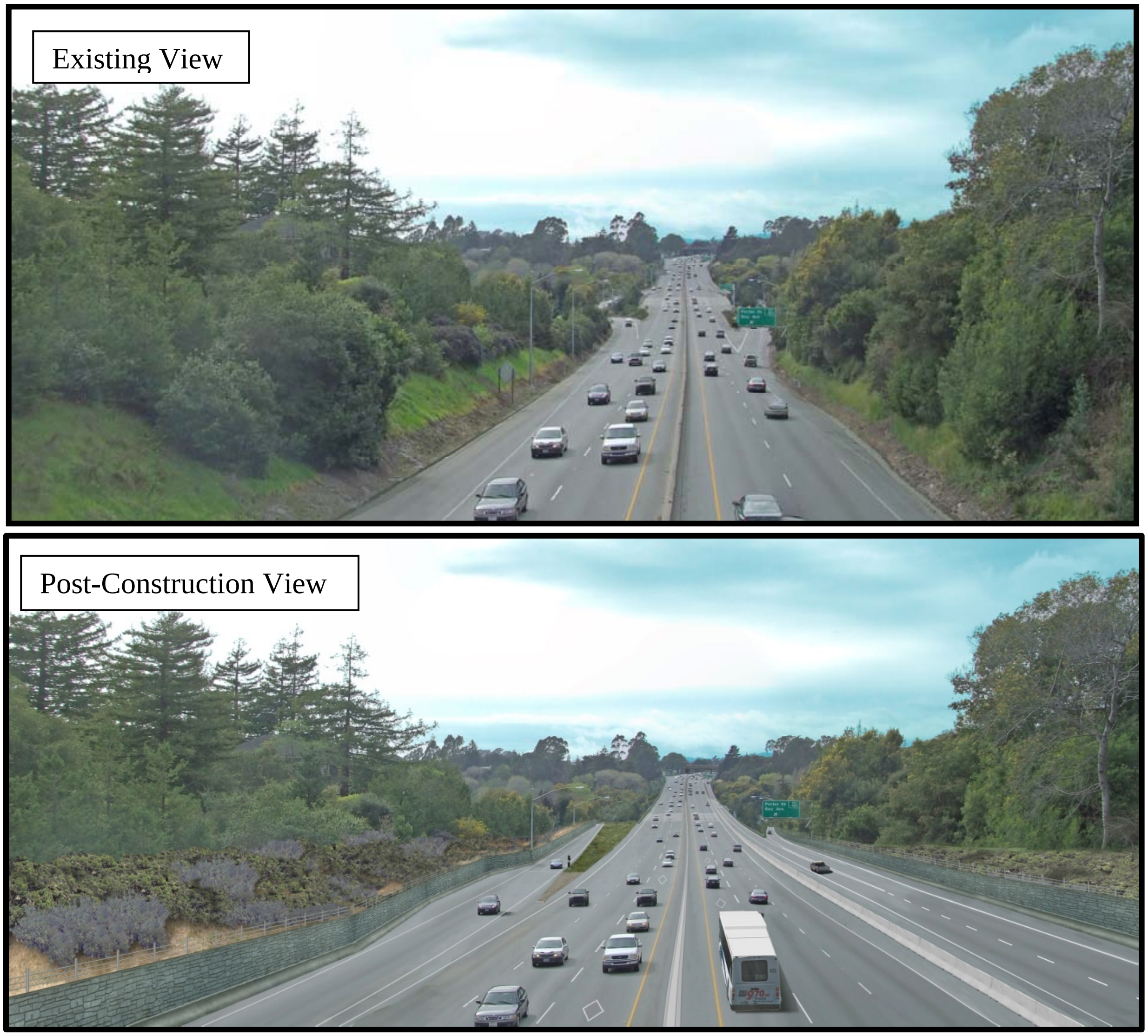


Figure 2.1.6-8: Key Viewpoint #16 in the Soquel-Capitola Landscape Unit, Tier I Corridor HOV Lane Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

Figure 2.1.6-9: Key Viewpoint #22 in the Soquel-Capitola Landscape Unit, Tier I Corridor HOV Lane Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

(Below) Existing view prior to Auxiliary Lane Project.

(Below) Anticipated existing view once Auxiliary Lane Project is completed; the image is from the Auxiliary Lanes Visual Assessment Report.

Figure 2.1.6-10: Key Viewpoint #23 in the Santa Cruz-Arana Gulch Landscape Unit, Tier I Corridor HOV Lane Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

Figure 2.1.6-11: Key Viewpoint #25 in the Santa Cruz-Arana Gulch Landscape Unit, Tier I Corridor HOV Lane Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

Figure 2.1.6-12: Key Viewpoint #27 in the Santa Cruz-Arana Gulch Landscape Unit, Tier I Corridor HOV Lane Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

Figure 2.1.6-13: Key Viewpoint #3 in the Upland Landscape Unit, Tier I Corridor TSM Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

Figure 2.1.6-14: Key Viewpoint #9 in the Aptos Landscape Unit, Tier I Corridor TSM Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

Figure 2.1.6-15: Key Viewpoint #16 in the Soquel-Capitola Landscape Unit, Tier I Corridor TSM Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

Figure 2.1.6-16: Key Viewpoint #22 in the Soquel-Capitola Landscape Unit, Tier I Corridor TSM Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

Figure 2.1.6-17: Key Viewpoint #27 in the Santa Cruz-Arana Gulch Landscape Unit, Tier I Corridor TSM Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

Tier II Auxiliary Lane Alternative

General impacts associated with this alternative would be associated with the addition of auxiliary lanes (i.e., widened pavement sections), reconfigurations of existing ramps at 41st Avenue and Soquel Avenue, associated signage/ramp metering lights, and the addition of a pedestrian/bicycle bridge at Chanticleer Avenue. The summary below describes the anticipated changes to the visual environment by each project element. Following that is a description by landscape unit of the anticipated effects to the visual environment.

- **Bridges:** The existing bridge structures at 41st Avenue and Soquel Avenue would remain in their current condition. A new pedestrian/bicycle bridge and associated ramps would be constructed at Chanticleer Avenue. Currently, the corridor has no pedestrian/bicycle bridges. From the standpoint of appearance, the bridge structure would appear similar to other bridges in the corridor, only narrower. The access ramps would be long structures that would provide access to the bridge for bicycles, pedestrians, and wheelchairs. These structures would have a similar appearance to the bridge, with columns and girders with fencing along the ramps. A schematic design for the bridge can be seen in Figure 2.1.6-18.
- **Freeway Paving:** Additional paving would be constructed in the corridor for the auxiliary lanes between the 41st Avenue and Soquel Avenue interchanges. The result of this increase in paving would be especially noticeable to the freeway travelers. For the viewer groups outside of the freeway travelers, the widened paving would be less noticeable due to the existing vegetation that would remain after construction; however, because this vegetation would not be a complete screen, there would likely be additional views into the corridor from adjacent areas, such as along Soquel Avenue. Furthermore, there would be new views into the corridor created by the pedestrian/bicycle bridge.
- **Local Streets:** The new pedestrian/bicycle bridge would be very noticeable to travelers on Soquel Avenue. From the perspective of the traveler on Soquel Avenue, there currently are no bridge structures over this local road; therefore, the proposed structure would be a new addition to the appearance of the roadway. In addition, some of the existing vegetation between the highway and Soquel Avenue could be removed by construction of the bridge, which would also open up views into the highway corridor that are currently at least partially screened.
- **Soundwalls:** One soundwall, with a length of 310 feet, may be proposed on the project. This wall would be located along the right-of-way north of Route 1 behind a residence that backs to the corridor from Mattison Lane. The proposed wall would be 8 feet tall. However, acoustic treatments are currently being proposed to address the concern. Depending on the affected homeowner, these may be used in place of the soundwall to achieve the same end, in which case the soundwall would not be constructed.

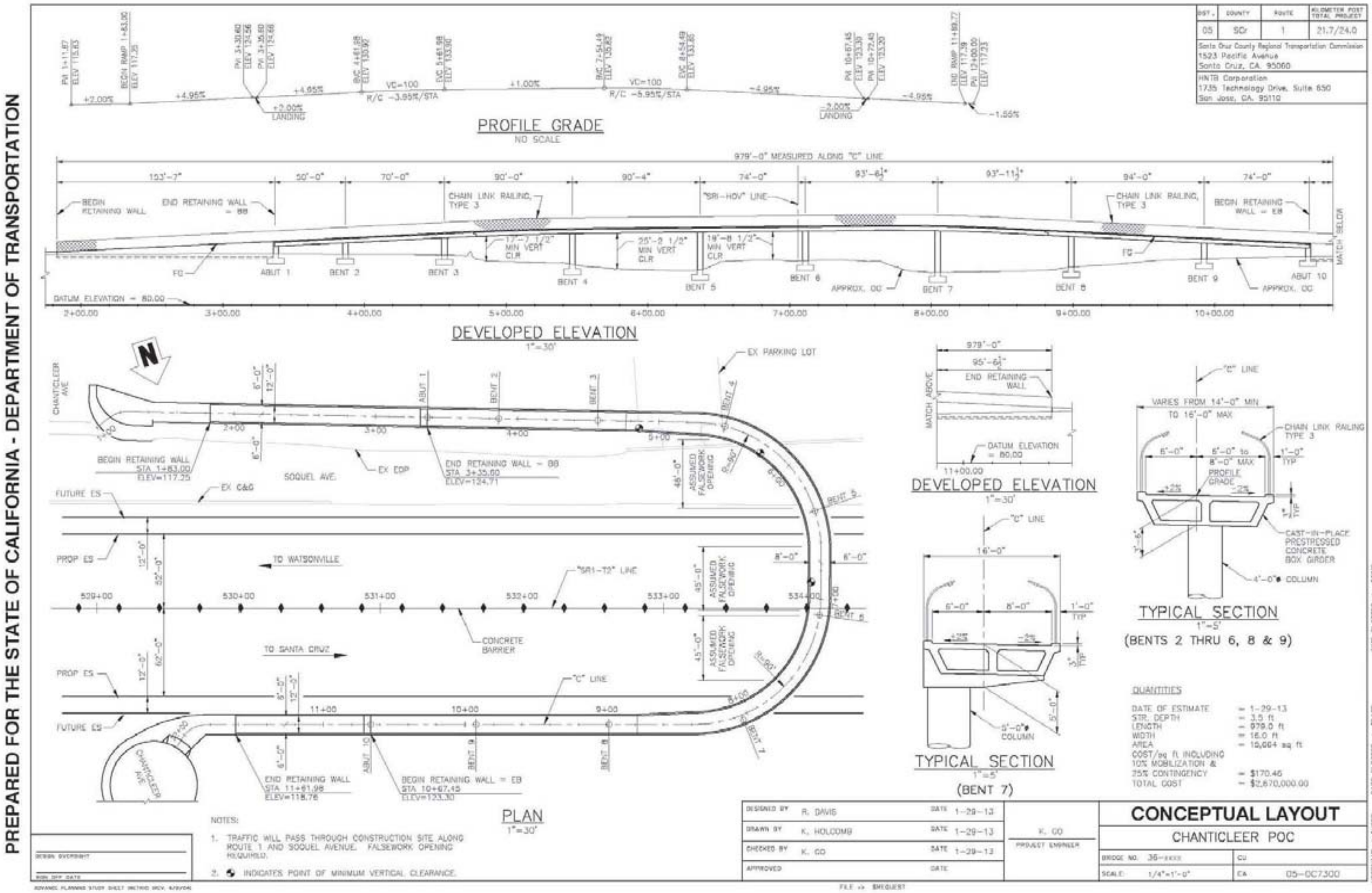


Figure 2.1.6-18: Conceptual Layout of Chanticleer Pedestrian/Bicycle Overcrossing

- **Retaining Walls:** Retaining walls would be included as part of the Tier II Auxiliary Lane Alternative. Approximately 1,200 lineal feet of retaining wall would be constructed. Along the northbound lanes, there are two retaining walls proposed to protect wetland areas, including at Rodeo Creek Gulch. These walls would face out from the highway corridor into the adjacent community; however, due to the extent of vegetation adjacent to the right-of-way at Rodeo Creek Gulch, it is anticipated that this wall would be at least partially screened from the adjacent community.

  A retaining wall is proposed between the highway and Soquel Avenue, approximately where the road crosses Rodeo Drive. This wall would be approximately 350 feet long and face onto Soquel Avenue. Due to the narrow area between the highway and Soquel Avenue, it is unlikely that enough vegetation could be planted to screen the wall, which would therefore be visible to travelers along Soquel Avenue. It is also anticipated that there would be views from Soquel Avenue into the highway corridor that do not currently exist at this location.

  An approximately 130-foot long retaining wall is proposed along the northbound on-ramp from 41st Avenue. This wall would face onto the ramp and would be visible to travelers on the ramp.

- **Lighting and Signage**: Some existing signage and light fixtures would be relocated to accommodate the proposed widening. In addition, new signage, ramp metering, and lighting at the ramps could be expected to bring the highway up to current standards or to replace old fixtures with newer, more efficient ones.
- **Vegetation Removal:** For the Tier II project alternative, approximately 9.3 acres of existing landscape would be removed by the project. The removal of existing vegetation from areas along the corridor is required to construct the bridge, retaining walls, and stormwater facilities, and to widen the highway. This would have a large effect on the views both within the corridor and into the corridor. It is not anticipated that the right-of-way for the entire corridor would need to be cleared. It is expected that vegetation along portions of the mainline between Soquel Avenue and the highway and along the northbound lanes of the highway would remain, except where the retaining walls and bridge are constructed. For areas disturbed by construction activities, approximately 3 acres are available for replanting under this alternative. Of this area, approximately 1 acre would be available for trees, given Caltrans setback requirements. It should be expected that it would be many years before the newly planted vegetation would reach the size of the existing. Figure 2.1.6-19 shows the areas where vegetation will be removed and subsequently replaced.

Figures 2.1.6-20 through 2.1.6-22 show Key Viewpoints for the Tier II Auxiliary Lane Alternative with mitigation 5 to 10 years after construction. Figures 2.1.6-23 and 2.1.6-24 show typical cross sections of the Tier II Auxiliary Lane Alternative. Figure 2.1.6-18 shows the conceptual layout of the Chanticleer Pedestrian/Bicycle Overcrossing. As summarized in Table 2.1.6-7, it is anticipated that the visual change as a result of the proposed project would be moderate to moderately high, viewer response would be moderate to high, and the visual impact of the proposed project would be moderate to moderately high.

Table 2.1.6-7: Summary of Anticipated Visual Impacts by Key Viewpoint for the Tier II Auxiliary Lane Alternative

Key Viewpoint	Anticipated Change to Visual Resource	Anticipated Viewer Response	Anticipated Visual Impact
Key Viewpoint #19B	Moderately High	High	Moderately High
Key Viewpoint #21B	Moderately High	Moderately High	Moderately High
Key Viewpoint #22	Moderate	Moderate	Moderate

Figure 2.1.6-19: Tier II Vegetation Removal and Replanting Areas

Figure 2.1.6-20: Key Viewpoint #19B in the Soquel-Capitola Landscape Unit, Tier II Auxiliary Lane Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

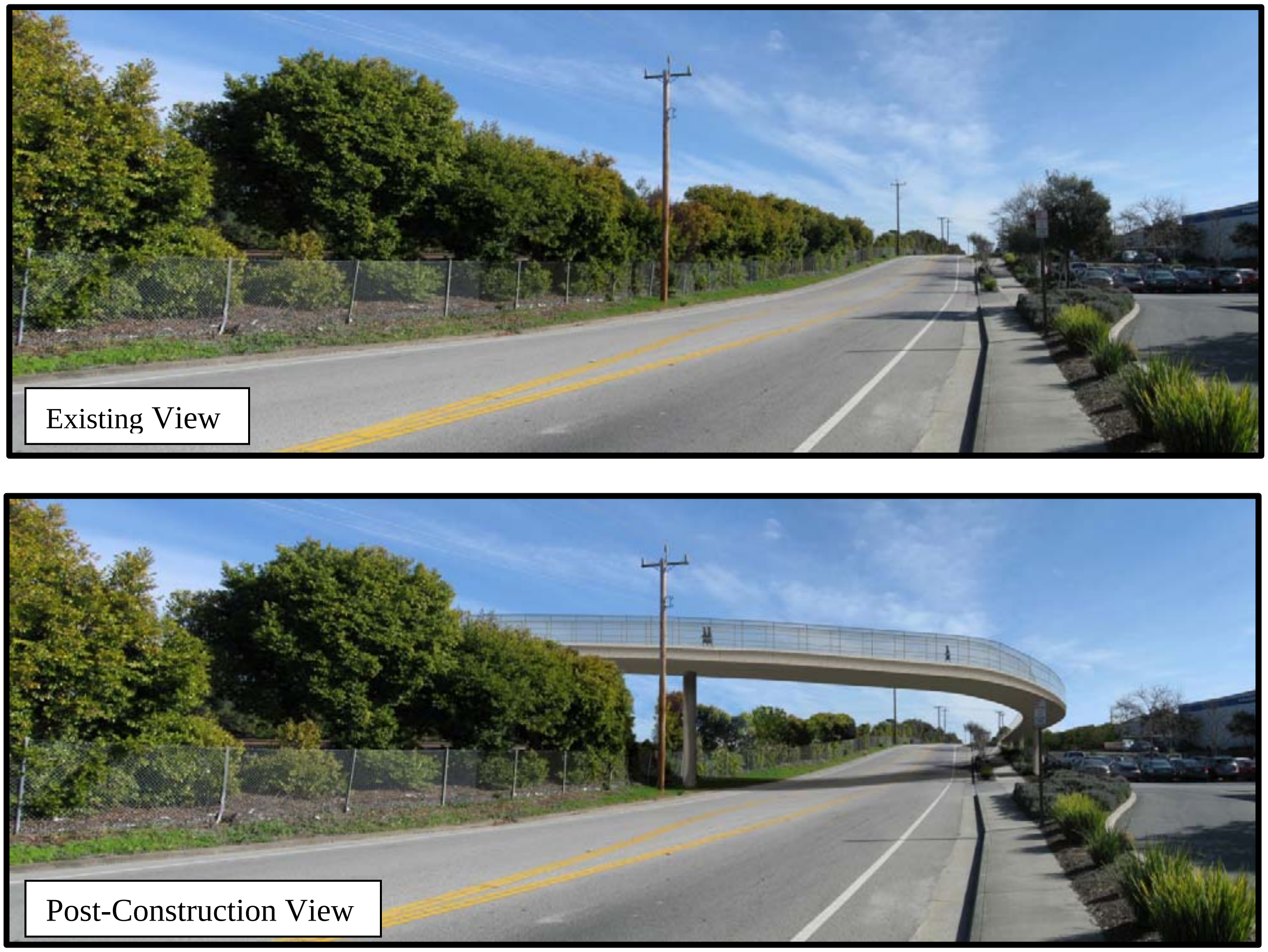
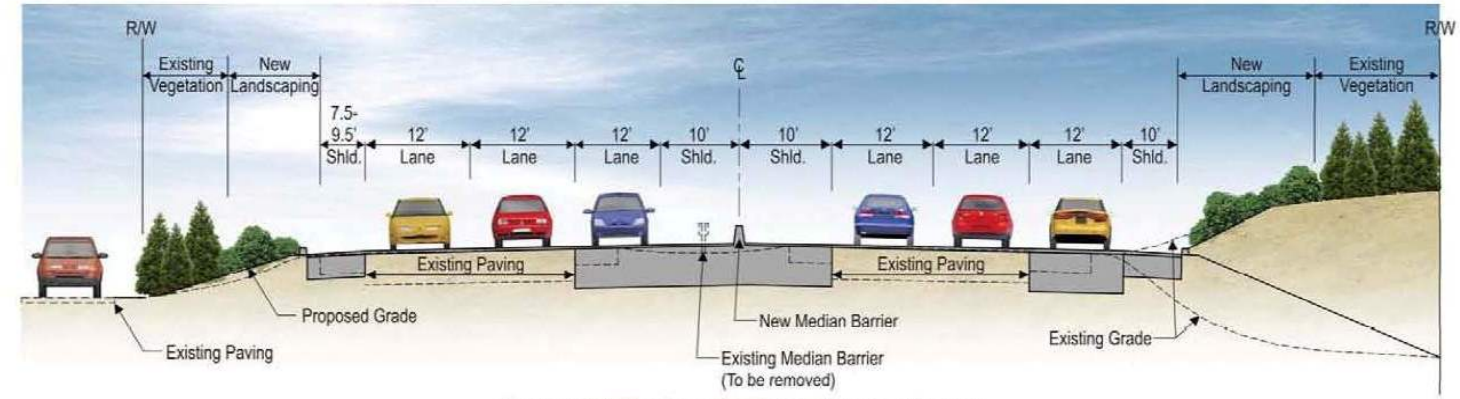


Figure 2.1.6-21: Key Viewpoint #21B in the Soquel-Capitola Landscape Unit, Tier II Auxiliary Lane Alternative

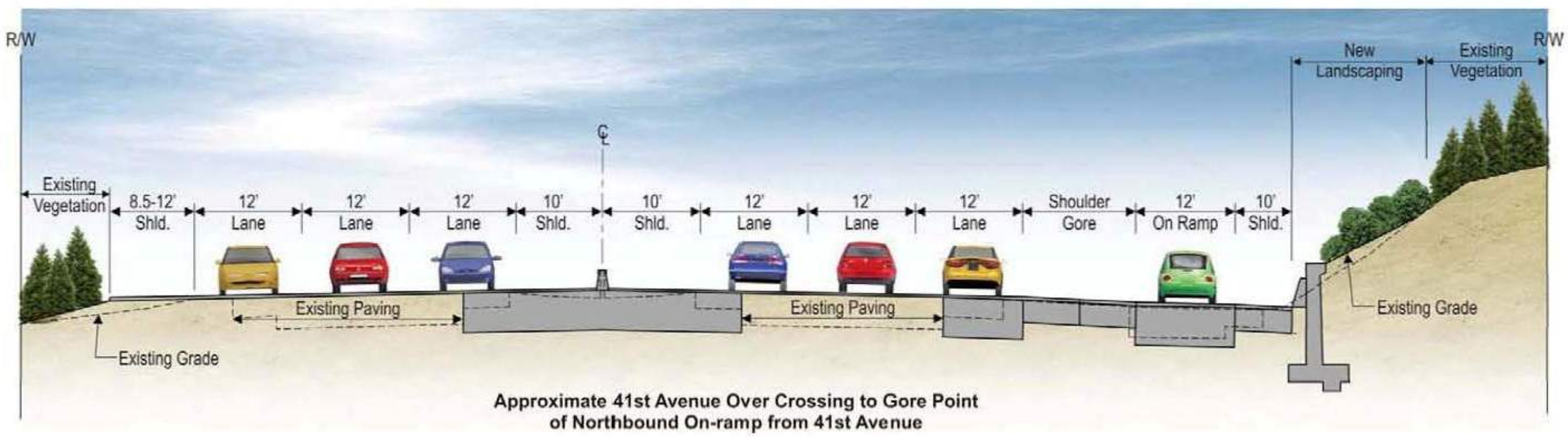
Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

Figure 2.1.6-22: Key Viewpoint #22 in the Soquel-Capitola Landscape Unit, Tier II Auxiliary Lane Alternative

Minimization measures depicted in the simulation include wall texture and new landscaping of disturbed areas. Aesthetic treatments to structures and specific plant types are representative only. Actual types of treatments and landscaping would be designed in collaboration with Caltrans' District Landscape Architect.

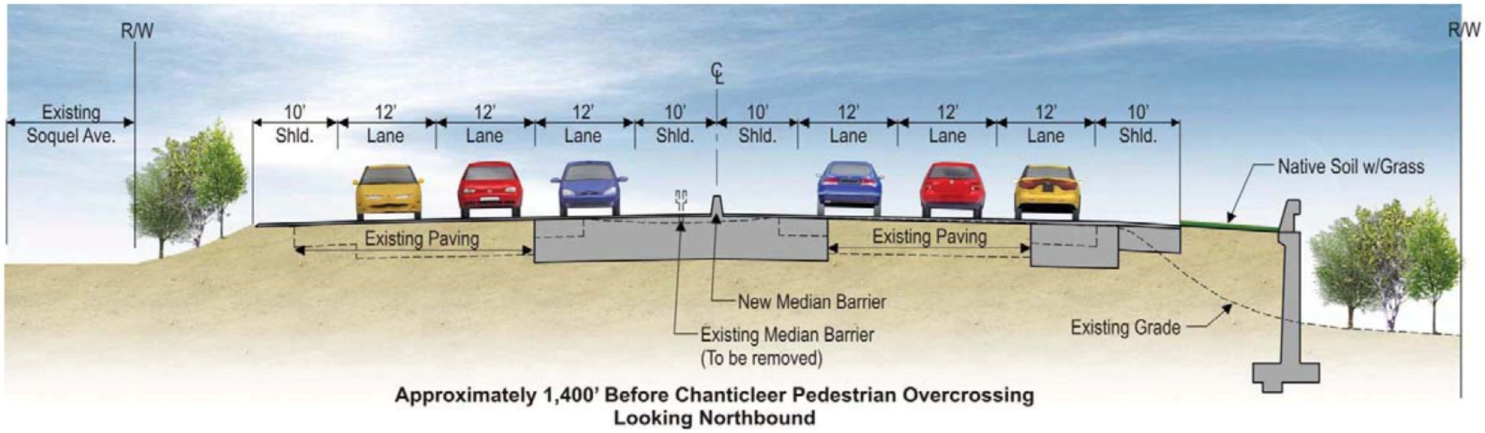


Typical Corridor Cross-Section, looking northbound except as noted (see alternate sections).



Approximate 41st Avenue Over Crossing to Gore Point of Northbound On-ramp from 41st Avenue

Figure 2.1.6-23: Typical Cross Section of Tier II Auxiliary Lane Alternative and One of Three Alternate Cross Sections



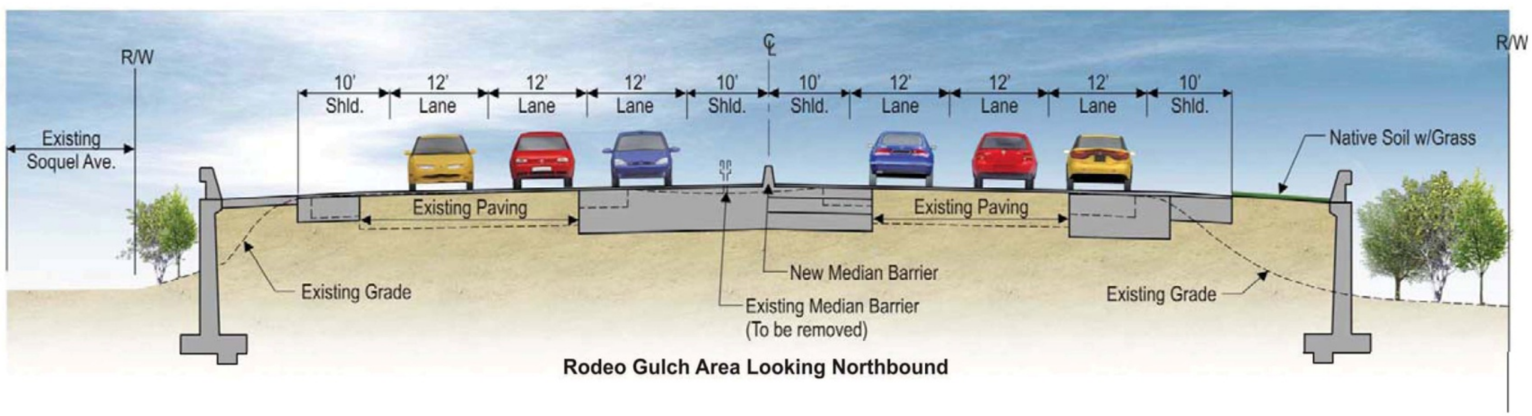


Figure 2.1.6-24: Two Alternate Cross Sections for Tier II Auxiliary Lane Alternative

No Build Alternative

Activities that would occur under the No Build Alternative include routine maintenance of the project corridor. The highway construction projects associated with the No Build Alternative would create some changes to the visual environment within the corridor. Each of these projects has received or is in process to receive its respective environmental clearances, including an analysis of the visual environment; therefore, these impacts are not analyzed here.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

The Tier I alternatives are being considered at the planning level only. Future implementation of projects would be determined as funding becomes available. In addition, the projects may be phased over time. Because it is not known when the projects would go forward, the mitigation measures described for the Tier I project would also apply to any Tier II projects moving forward, pending further environmental reviews for those projects.

Measures for Corridor Aesthetics:

- Work with the community during preliminary design to develop Corridor Aesthetic Guidelines for the project improvements through a formalized structure that allows for community input.

Measures to Preserve Existing Vegetation:

- Beginning with preliminary design and continuing through final design and construction, save and protect as much existing vegetation in the corridor as feasible, especially eucalyptus and other skyline trees.
- Survey exact locations for trees and include in plan set.
- Protect the drip zone of isolated trees with temporary fencing.
- Protect large infield areas of existing plantings to be preserved with temporary fencing.

Measures for Noise Barriers:

- Beginning with preliminary design and continuing through final design and construction, develop construction plans that apply aesthetic treatments to the soundwalls.
- Include vine plantings on one or both faces of soundwalls wherever feasible (given Caltrans setback and maintenance requirements). If vines are only planted on one side of the wall, include vine portals in the design of the wall to accommodate vine access to both sides of the wall.

Measures for Retaining Walls:

- Beginning with preliminary design and continuing through final design and construction, develop construction plans that apply aesthetic treatments to the retaining walls.

Measures for Bridge Aesthetics:

- Beginning with preliminary design and continuing through final design and construction, develop construction plans that apply aesthetic treatments to the proposed bridges in the corridor.

Measures for Fencing and Barriers:

- If bridge rail is used at the creek crossing retaining walls, use Type 80 rail with aesthetic treatment.
- Include aesthetic treatment on concrete median barrier consistent with the visual character of the corridor and the adjacent community.
- Replace existing chain link fencing between Route 1 and the adjacent frontage roads with ornamental fencing.

Measures for Landscape Plantings:

- Beginning with preliminary design and continuing through final design and construction, landscape and revegetate disturbed areas to the greatest extent feasible.
- Include skyline trees in the planting palette to bring down the scale of the new freeway elements.
- Include infill shrub planting between Route 1 and adjacent frontage roads to the maximum extent possible.
- Include vines on a minimum of 20 percent of the fencing between eastbound Route 1 and adjacent frontage roads.
- Where horticulturally appropriate, provide a permanent irrigation system to all plantings.
- Include an extended 3-year maintenance period as part of the construction period to provide a single source of maintenance through the establishment period.

Measures for Stormwater Treatment Facilities:

- Beginning with preliminary design and continuing through final design and construction, use drainage and water quality elements, where required, that maximize the allowable landscape.
- Locate basins so that they would be at least 10 feet from the edge of the Caltrans plant setback to allow landscape screening to be installed.

- Design basins so that they appear to be a natural landscape feature, such as a dry streambed or a riparian pool. They should be shaped in an informal, curvilinear manner.
- Basin slope grading should incorporate slope rounding, variable gradients, and be similar to the surrounding topography to de-emphasize the edge. If a wall or hard feature is necessary, it should be worked into the overall design concept.
- Employ grading design of any ponds or swales that is sympathetic to the corridor aesthetic guidelines.
- Locate maintenance access drives in unobtrusive areas away from local streets. Such drives should consist of inert materials or herbaceous groundcover that is visually compatible with the surrounding landscape.
- Basins should be designed so that chain-link perimeter fencing is not required.
- Design all visible concrete structures and surfaces to visually blend with the adjacent landscaping and natural plantings.
- Design rock slope protection to consist of aesthetically pleasing whole material with a variety of sizes.
- Limit the use of bioswales within corridor landscape areas. If they must be used, locate them in non-obtrusive areas and design should appear natural.

Tier II Auxiliary Lane Alternative

To address the adverse visual changes associated with the proposed Tier II Auxiliary Lane Alternative, the following avoidance, minimization, and/or mitigation measures are recommended. The measures proposed below will aid in reducing the adverse visual impacts of the project.

Measures to Preserve Existing Vegetation:

- Beginning with preliminary design and continuing through final design and construction, save and protect as much existing vegetation as feasible, especially eucalyptus and other skyline trees.
- Survey exact locations for trees and include in plan set.
- Protect the drip zone of isolated trees with temporary fencing.
- Protect large infield areas of existing plantings to be preserved with temporary fencing.

Measures for Noise Barriers (if included in final project):

- Beginning with preliminary design and continuing through final design and construction, develop construction plans that apply aesthetic treatments to the soundwalls.

- Include vine plantings on one or both faces of soundwalls wherever feasible (given Caltrans setback and maintenance requirements). If vines are only planted on one side of the wall, include vine portals in the design of the wall to accommodate vine access to both sides of the wall.

Measures for Retaining Walls:

- Beginning with preliminary design and continuing through final design and construction, develop construction plans that apply aesthetic treatments to the retaining walls.

Measures for Bridge Aesthetics:

- Beginning with preliminary design and continuing through final design and construction, develop construction plans that apply aesthetic treatments to the proposed bridges.

Measures for Fencing and Barriers:

- If bridge rail is used at Rodeo Creek Gulch retaining walls, use Type 80 rail with aesthetic treatment.
- Include aesthetic treatment on concrete median barrier consistent with the visual character of the corridor and the adjacent community.
- Replace existing chain link fencing between eastbound Route 1 and Soquel Avenue with ornamental fencing.

Measures for Landscape Plantings:

- Beginning with preliminary design and continuing through final design and construction, landscape and revegetate disturbed areas to the greatest extent feasible.
- Include skyline trees in the planting palette to bring down the scale of the new freeway elements.
- Include infill shrub planting between Route 1 and Soquel Avenue to the maximum extent possible.
- Include vines on a minimum of 20 percent of the fencing between eastbound Route 1 and Soquel Avenue.
- Where horticulturally appropriate, provide a permanent irrigation system to all plantings.
- Include an extended 3-year maintenance period as part of the construction period to provide a single source of maintenance through the establishment period.

Measures for Stormwater Treatment Facilities:

- Beginning with preliminary design and continuing through final design and construction, use drainage and water quality elements, where required, that maximize the allowable landscape.

- Locate basins so that they are at least 10 feet from the edge of the Caltrans plant setback to allow landscape screening to be installed.
- Design basins so that they appear to be a natural landscape feature, such as a dry streambed or a riparian pool. They shall be shaped in an informal, curvilinear manner.
- Basin slope grading shall incorporate slope rounding, variable gradients, and be similar to the surrounding topography to de-emphasize the edge. If a wall or hard feature is necessary, it shall be worked into the overall design concept.
- Employ grading design of any ponds or swales that is sympathetic to corridor aesthetics.
- Locate maintenance access drives in unobtrusive areas away from local streets. Such drives shall consist of inert materials or herbaceous groundcover that is visually compatible with the surrounding landscape.
- Basins shall be designed so that chain-link perimeter fencing is not required.
- Design all visible concrete structures and surfaces to visually blend with the adjacent landscaping and natural plantings.
- Design rock slope protection to consist of aesthetically pleasing whole material with a variety of sizes.
- Limit the use of bioswales within landscape areas. If they must be used, locate them in non-obtrusive areas and design them to appear natural.

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2.1.7 Cultural Resources

This section evaluates potential impacts to cultural resources that could result from operation of the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative. Impacts to cultural resources that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

"Cultural resources," as used in this document, refers to all "built environment" resources (e.g., structures, bridges, railroads, water conveyance systems.), culturally important resources, and archaeological resources (both prehistoric and historic), regardless of significance. Laws and regulations dealing with cultural resources include:

- The National Historic Preservation Act of 1966, as amended, sets forth national policy and procedures regarding historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for the National Register of Historic Places. Section 106 of the National Historic Preservation Act requires federal agencies to take into account the effects of their undertakings on such properties and to allow the Advisory Council on Historic Preservation the opportunity to comment on those undertakings, following regulations issued by the Advisory Council on Historic Preservation (36 *Code of Federal Regulations* 800). On January 1, 2014, the First Amended Section 106 Programmatic Agreement between the Advisory Council, the Federal Highway Administration, the State Historic Preservation Officer, and Caltrans went into effect for Caltrans projects, both state and local, with Federal Highway Administration involvement. The 2014 Section 106 Programmatic Agreement supersedes the 2004 Programmatic Agreement for Section 106 among the Federal Highway Administration, the State Historic Preservation Officer, the Advisory Council, and Caltrans. The Programmatic Agreement implements the Advisory Council's regulations, 36 *Code of Federal Regulations* 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans. FHWA's responsibilities under the Programmatic Agreement have been assigned to Caltrans as part of the Surface Transportation Project Delivery Program (23 United States Code 327).
- The Archaeological Resources Protection Act applies when a project may involve archaeological resources located on federal or tribal land. The Archaeological Resources Protection Act requires that a permit be obtained before excavation of an archaeological resource on such land can take place.

Historical resources are considered under the California Environmental Quality Act, as well as California Public Resources Code Section 5024.1, which established the California

Register of Historical Resources. Public Resources Code Section 5024 requires state agencies to identify and protect state-owned resources that meet National Register of Historic Places listing criteria. It further specifically requires Caltrans to inventory state-owned structures in its rights-of-way. Sections 5024(f) and 5024.5 require state agencies to provide notice to and consult with the State Historic Preservation Officer before altering, transferring, relocating, or demolishing state-owned historical resources that are listed on or are eligible for inclusion in the National Register or are registered or eligible for registration as California Historical Landmarks.

Affected Environment

The information in this section is derived from the proposed project's *Historic Properties Survey Report* (2010), which includes an *Archaeological Survey Report* (2010), and an *Historical Resources Evaluation Report* (2010).

Two study areas, or Areas of Potential Effects, for the proposed project were defined, one for archaeology and one for architecture and history. The archaeological Area of Potential Effects generally follows the existing right-of-way, marked by fencing along Route 1, and proposed right-of-way extending into adjacent private property in several locations. The archaeological Area of Potential Effects reflects potential direct effects of the proposed project alternatives including soundwalls, retaining wall foundations, bridge improvements, interchange improvements, and pedestrian/bicycle overcrossings, as well as construction staging areas. The architectural Area of Potential Effects encompasses the archaeological Area of Potential Effects and generally extends one parcel back from the proposed right-of-way boundary where historic-period resources are present. The architectural Area of Potential Effects reflects direct and indirect effects for the build alternatives and includes those areas in which the proposed project would have the potential to alter the character-defining features of any historic period properties.

Archaeological Resources

A records search was conducted at the Northwest Information Center of the California Historical Resources Information System, California State University, Sonoma, in November 2002 to obtain information concerning previously identified archaeological sites within or adjacent to the study area. All cultural resources records and reports for locations within 1-mile of the project area also were reviewed. Primary reference materials included United States Geologic Survey 7.5-minute base maps (showing previously recorded sites, isolated artifacts, and survey areas), site records, report files, *National Register of Historic Places –* Listed Properties and Determined Eligible Properties under the National Park Service National Register (1990 and supplements through November 2002), *California Register of*

Historical Resources (2000 and updates), *California Points of Historical Interest* (1992), and *California Historical Landmarks* (1996 and updates). Research was also conducted at the Bancroft Library, University of California Berkeley, Archives of the Santa Cruz Museum of Art and History, Aptos Chamber of Commerce, and Capitola Historical Museum. Field surveys were conducted between 2003 and 2007. The field survey area was 9.04 miles in length, measuring approximately 447 acres in total.

Thirteen prehistoric, historic period, or dual component (i.e., having both prehistoric and historic era artifacts) archaeological resources were identified within the archaeological Area of Potential Effects. Seven of the 13 resources are exempt in accordance with *Attachment 4 of the January 2014 Programmatic Agreement, Properties Exempt from Evaluation.* As shown in Table 2.1.7-1, of the six sites not covered by *Attachment 4 of the Programmatic Agreement*, two were previously determined ineligible for the National Register of Historic Places, with State Historic Preservation Officer concurrence, and a third site was determined ineligible in conjunction with a 2009-2010 Caltrans Highway 1 guardrail project, with State Historic Preservation Officer concurrence received in July 2010. The three remaining archaeological resources will require archaeological investigation; two of the sites (CA-SCR-2/H and CA-SCR-179) contain portions that have not been evaluated for the National Register. No portion of the third site, CA-SCR-168H, has been previously evaluated. National Register eligibility determinations of these sites will be made as corridor projects are programmed for construction and undergo environmental review, as discussed below.

Table 2.1.7-1: Status of Non-Exempt Archaeological Sites in the Area of Potential Effects

No.	Archaeological Site Number	OHP Reference Number (if any)	Status
1	CA-SCR-200	I-4224D	Not eligible for the National Register
2	CA-SCR-215H	I-4224D	Not eligible for the National Register
3	CA-SCR-353/H	FHW100607C	Not eligible for the National Register
4	CA-SCR-2/H	FHWA100607C (for noncontributing portion)	A portion of this site was evaluated and found to be not eligible for the National Register. A portion of this site is unevaluated within the current APE.
5	CA-SCR-179	FHWA880805A (for noncontributing portion)	A portion of this site was evaluated and found to be not eligible for the National Register. A portion of this site is unevaluated within the current APE.
6	CA-SCR-168/H	Not applicable	Unevaluated

The Native American Heritage Commission was contacted on October 22, 2003, and provided a description and location of the proposed project with a request for an examination of the Commission's sacred lands files and contact information for potentially concerned Native American individuals and organizations. The Native American Heritage Commission responded on November 18, 2003, indicating that there were no Native American sacred sites known in the immediate project area. The Native American Heritage Commission supplied a list of 13 Native American individuals/organizations that might have knowledge of local cultural resources. On November 25, 2003, letters were sent to these Native American representatives requesting input on additional cultural resources and specific concerns regarding the project.

A letter was mailed on November 5, 2004, to four additional Native American representatives. No responses were received from any of the 17 Native American representatives contacted. A project update letter was distributed to the 17 Native American representatives on January 14, 2005, which described surface survey results and outlined recommendations for archaeological testing. Follow-up telephone calls were made on January 19 and 20, 2005, and 10 representatives were successfully contacted. The current Tier II project does not contain any known archaeological resources; hence, no additional consultation is planned. For the future Tier II projects, consultation will be conducted if the project site has any archaeological resources. Interested Native American representatives will be offered an opportunity to attend a site tour, participate in monitoring during archaeological testing, and comment on the draft and final test reports.

Historical Resources

Neither the *Historic Resources Evaluation Report* nor two *Supplemental Historic Resources Evaluation Reports* identified properties within the architectural Area of Potential Effects that appear to be eligible for the National Register of Historic Places and/or the California Register of Historic Resources. A records search was conducted to identify historic-period buildings or structures within the architectural Area of Potential Effects. Sources reviewed included the National Register of Historic Places; California Register of Historic Resources; California Historical Landmarks, Points of Historic Interest publications and updates; Office of Historic Preservation Directory of Properties in the Historic Property Data File for Santa Cruz County (as of February 2010); and a records search at the Northwest Center of the California Historical Resources Information System at California State University, Sonoma. This search confirmed that no historic properties within the historical architectural Area of Potential Effects have been previously listed or determined eligible for the National Register of Historic Places. Age limits for buildings, structures, and features evaluated for National Register eligibility were extended for this project to include resources constructed in 1965 or before.

To confirm the dates of construction for buildings, structures, and objects within the architectural Area of Potential Effects, background research was done through the First American Real Estate Solutions commercial database; Santa Cruz County Assessor's online database; and review of historic and current United States Geologic Survey topographic maps, historic aerial photographs, and other documents. Additional research was conducted at the following locations: California State Library; California State Archives; California State Railroad Museum; Santa Cruz Museum of Art and History; Capitola History Museum; Aptos Chamber of Commerce; Santa Cruz County Public Library; the map collection and special collections of the University of California Santa Cruz; Bancroft Library, University of California, Berkeley; Shields Library at University of California, Davis; Santa Cruz County Assessor's Office; Santa Cruz County Recorder's Room and Surveyor's Office; and building permits from the City of Santa Cruz's Planning Department. Historical maps, plans, and photographs from the Right-of-Way Department and Map Files of Caltrans, District 5, San Luis Obispo, as well as Map Files of Caltrans, District 4, Oakland, and the Caltrans Headquarters Library, Sacramento, were also consulted. Property types identified as a result of this research included 19th- and 20th-century transportation, agricultural, residential/ community, and commercial development located along the Route 1 corridor. The Caltrans' Historic Highway Bridge Inventory also was consulted.

A letter informing interested parties about the proposed Santa Cruz Route 1 improvement project and requesting comments was sent to area planning agencies, local governments, historical societies, and museums on January 6, 2004. A copy of this letter and a list of its recipients are included in Appendix J, Agency Correspondence. One reply was received from the City of Santa Cruz Planning Department, which provided copies of the City's historic resources inventory, updates, and historic context report. A copy of this response is also provided in Appendix J. The data received from the City of Santa Cruz Planning Department were incorporated into the historical resource study.

Reconnaissance surveys helped to determine which buildings appeared to have been built in 1965 or earlier and would, therefore, be studied for this project.

Seventy-eight historic period buildings and structures, including residences, commercial buildings, religious structures, and bridge structures, were identified. Although two of the surveyed properties were considered locally significant by the County and/or City of Santa Cruz, none of the surveyed properties appear to be eligible for the National Register of Historic Places or California Register of Historical Resources; therefore, none of the surveyed properties are considered historical resources under the California Environmental Quality Act or the National Historic Preservation Act. The State Historic Preservation Officer concurred with these eligibility findings in a letter dated March 17, 2011. A copy of this letter is provided in Appendix J.

Environmental Consequences

Tier I Corridor Alternatives

Archaeological Resources

The Tier I Corridor HOV Lane Alternative and the Tier I Corridor TSM Alternative may adversely affect portions of the three unevaluated archaeological sites and their potential buried archaeological deposits within the archaeological Area of Potential Effects.

As corridor projects potentially affecting these sites are programmed and funded, Caltrans will conduct subsurface investigations to evaluate the archaeological sites and buried deposits to determine if they are eligible for the National Register of Historic Places. If determined eligible, Caltrans will prepare a Finding of Effects to evaluate the impacts of the subsequent Tier II actions.

If subsurface investigation (to be conducted after portions of the selected Tier I corridor alternative are programmed as Tier II projects) reveals that the proposed project has the potential to adversely affect a National Register of Historic Places-eligible resource, Caltrans will prepare a Memorandum of Agreement for execution by the Federal Highway Administration, State Historic Preservation Officer, Caltrans District 5 and, possibly, RTC. The Memorandum of Agreement would establish conditions and measures to minimize harm to the resources. Any archaeological sites or portions thereof that may be extant in the footprint of the preferred alternative, once it is selected, will be subject to testing for National Register of Historic Places eligibility prior to project construction.

Historical Resources

None of the properties evaluated for the Tier I Corridor Alternatives appear to meet the criteria for listing in either the National Register of Historic Places or the California Register of Historic Resources; therefore, no historical resources would be affected.

Tier II Auxiliary Lane Alternative

Archaeological Resources

There are no significant prehistoric or historic-period archaeological resources present within the project area of the Tier II Auxiliary Lane Alternative. A single recorded resource, CA-SCR-200, is present within the archaeological Area of Potential Effects; however, it has been previously determined ineligible.

Historical Resources

None of the properties evaluated for the Tier II Auxiliary Lane Alternative meet the criteria for listing in either the National Register of Historic Places or the California Register of Historic Resources; therefore, no historical resources would be affected.

No Build Alternative

The No Build Alternatives for both Tier I and Tier II would have no impact on cultural resources.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

As operationally independent projects within the Tier I Corridor are planned and programmed, they will be revisited as Tier II construction projects, with each subject to separate environmental review. Some of these future corridor projects will include portions of the three unevaluated archaeological sites, which would be investigated at that time. In the event that future studies find that a future Tier II project would adversely affect a National Register of Historic Places-eligible resource, avoidance, minimization, and/or mitigation measures would be implemented in accordance with conditions and measures identified in a Memorandum of Agreement that would be executed by the Federal Highway Administration, the State Historic Preservation Officer, Caltrans District 5, and possibly, RTC. In addition to any such measures, the following measure would address the potential to inadvertently encounter buried cultural resources:

- In the unlikely event that buried cultural resources are inadvertently discovered during any ground-disturbing activities, Caltrans and the Federal Highway Administration will comply with 36 *Code of Federal Regulations* 800.13 (b)(3) and, if applicable, part (c), as stipulated in the 2014 Section 106 Programmatic Agreement for Federal-aid Highway Programs in California regarding post-review discoveries.

Tier II Auxiliary Lane Alternative

It is not anticipated that construction and operation of the Tier II Auxiliary Lane Alternative analyzed in this environmental document would disturb any unknown buried cultural resources or historical resources; therefore, no avoidance, minimization, and/or mitigation measures are required.

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2.2 Physical Environment

2.2.1 Hydrology and Floodplain

Regulatory Setting

Executive Order 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Highway Administration requirements for compliance are outlined in 23 *Code of Federal Regulations* 650 Subpart A.

To comply, the following must be analyzed:

- The practicability of alternatives to any longitudinal encroachments.
- Risks of the action.
- Impacts on natural and beneficial floodplain values.
- Support of incompatible floodplain development.
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project.

The base floodplain is defined as "the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the base floodplain."

Affected Environment

The information in this section is derived from the *Location Hydraulic Study* (2013), the *Water Quality Study Report* (2013), and the *Drainage Report* (2013) prepared for the proposed project.

Tier I Corridor Alternatives

Hydrological Resources

Fifteen waterway crossings and one lagoon are located within the project limits. Figure 2.2.1-1 shows the locations of these hydrological resources. The 15 waterway crossings are listed in Table 2.2.1-1.

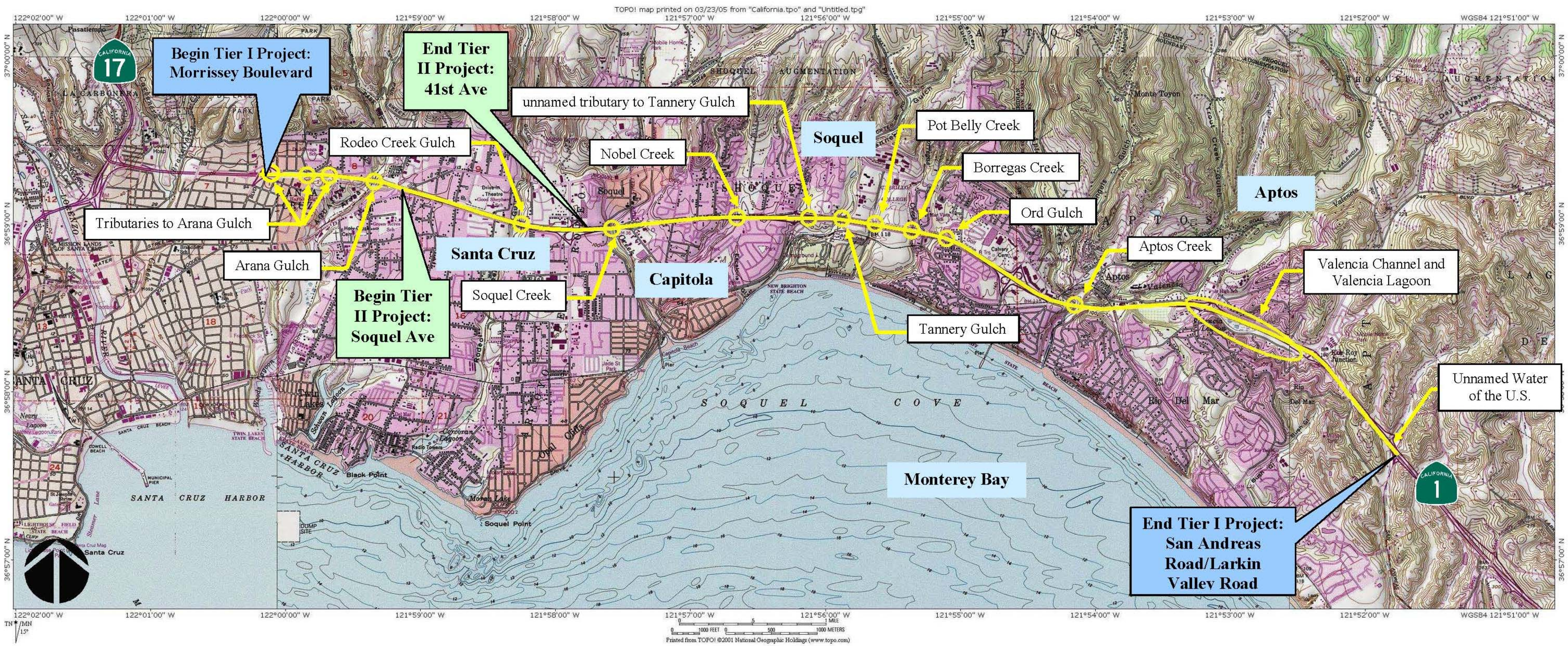
Within the project limits, Route 1 crosses 13 waterways via cross culverts, and two waterways (Aptos Creek and Soquel Creek) via bridges. Table 2.2.1-1 shows the culvert size or bridge span for 13 of the waterway crossings (the sizes of one culvert and one bridge span could not be identified, as indicated in Table 2.2.1-1.

Table 2.2.1-1: Drainage Facilities at Waterway Crossings

Waterway	Post Mile at Route 1 Crossing	Drainage Facility
Unnamed Waters of the U.S.	8.89	84-inch corrugated steel pipe
Valencia Channel	9.30	culvert size unknown
Aptos Creek	10.22	concrete bridge (Bridge Number 36-0011)
Ord Gulch	11.33	48-inch concrete culvert
Borregas Creek	11.50	48-inch concrete culvert
Pot Belly Creek	11.76	30-inch reinforced concrete pipe culvert
Tannery Gulch	12.00	6-foot by 6-foot reinforced concrete box culvert
Unnamed tributary to Tannery Gulch	12.25	48-inch reinforced concrete pipe culvert
Nobel Creek	12.71	6-foot by 6-foot reinforced concrete box culvert
Soquel Creek	13.55	98-foot-wide, 323-foot-span concrete arch span bridge (Bridge Number 36-0013)
Rodeo Creek Gulch	14.21	Concrete arch culvert approximately 9 feet in diameter
Arana Gulch	15.25	72-inch-high concrete arch culvert
Tributary to Arana Gulch	15.56	36-inch reinforced concrete pipe culvert
Tributary to Arana Gulch	15.68	4-foot by 4-foot reinforced concrete box culvert
Tributary to Arana Gulch	16.00	30-inch reinforced concrete pipe culvert
Source: Location Hydraulic Study, 2013.		

Federal Emergency Management Agency Delineated Floodplains

Flood Insurance Rate Maps were consulted to establish the Federal Emergency Management Agency’s 100-year floodplain boundaries. These maps are shown in Figures 2.2.1-2 through 2.2.1-5. Five of the 15 water crossings are associated with Federal Emergency Management Agency-delineated 100-year floodplains, located at Aptos Creek, Nobel Creek, Soquel Creek, Rodeo Creek Gulch, and Arana Gulch. There are no available Federal Emergency Management Agency floodplain studies or available historic information for Valencia Channel, Ord Gulch, Borregas Creek, Pot Belly Creek, Tannery Gulch, unnamed tributary to Tannery Gulch, or the tributaries to Arana Gulch. Based on preliminary (pre-final design) calculations, the estimated existing water surface elevation for the 100-year peak discharge at the cross section immediately upstream of Route 1 is 70.16. According to Flood Insurance Rate Map Number 06087C0351D, the 100-year water surface elevation overtops Route 1 at the Arana Gulch crossing.



Source: United States Geological Survey

Figure 2.2.1-1: Vicinity Map and Waterway Crossings

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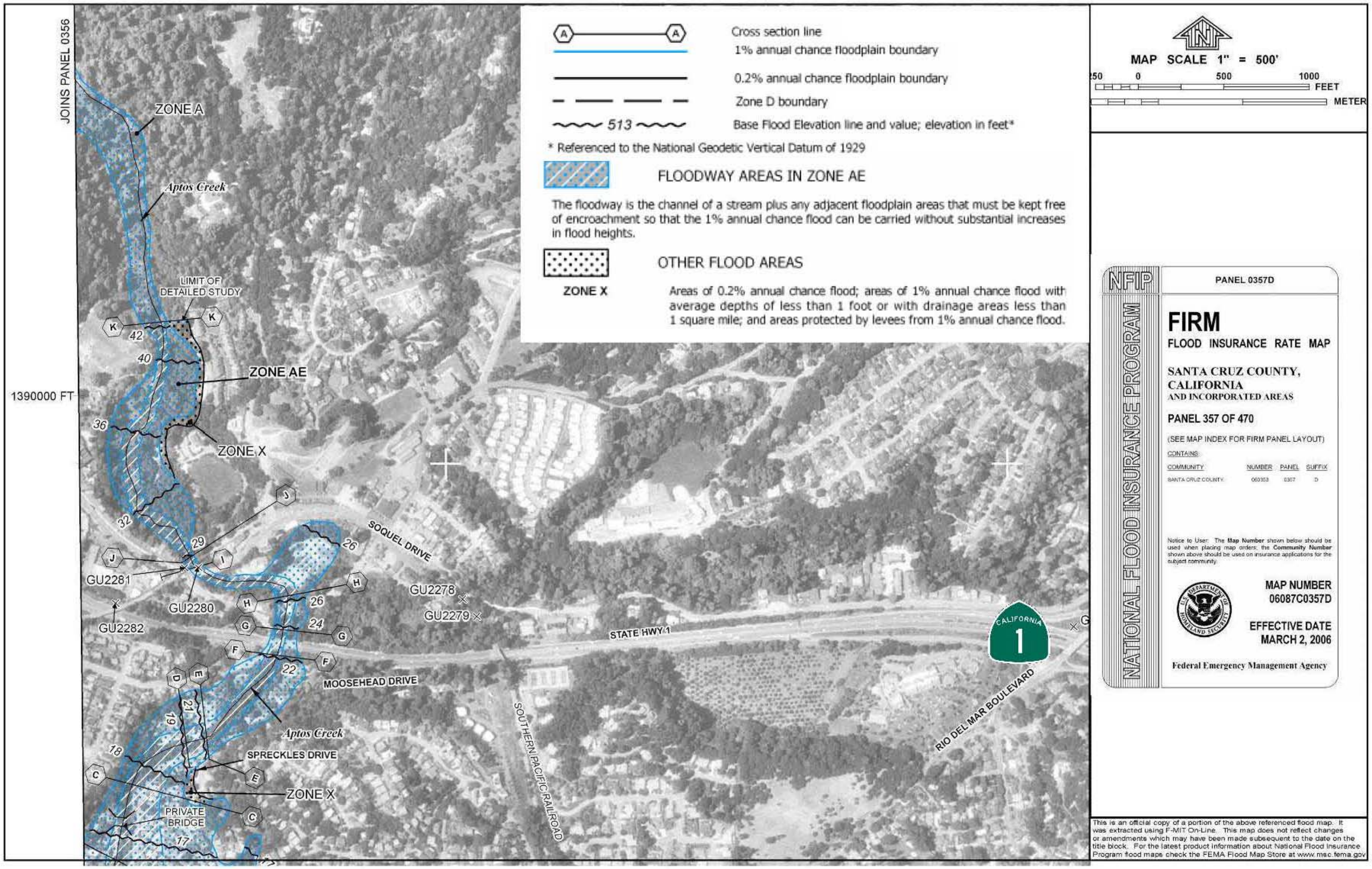

Figure 2.2.1-2: Flood Insurance Rate Map Depicting the Delineated Aptos Creek 100-Year Floodplain

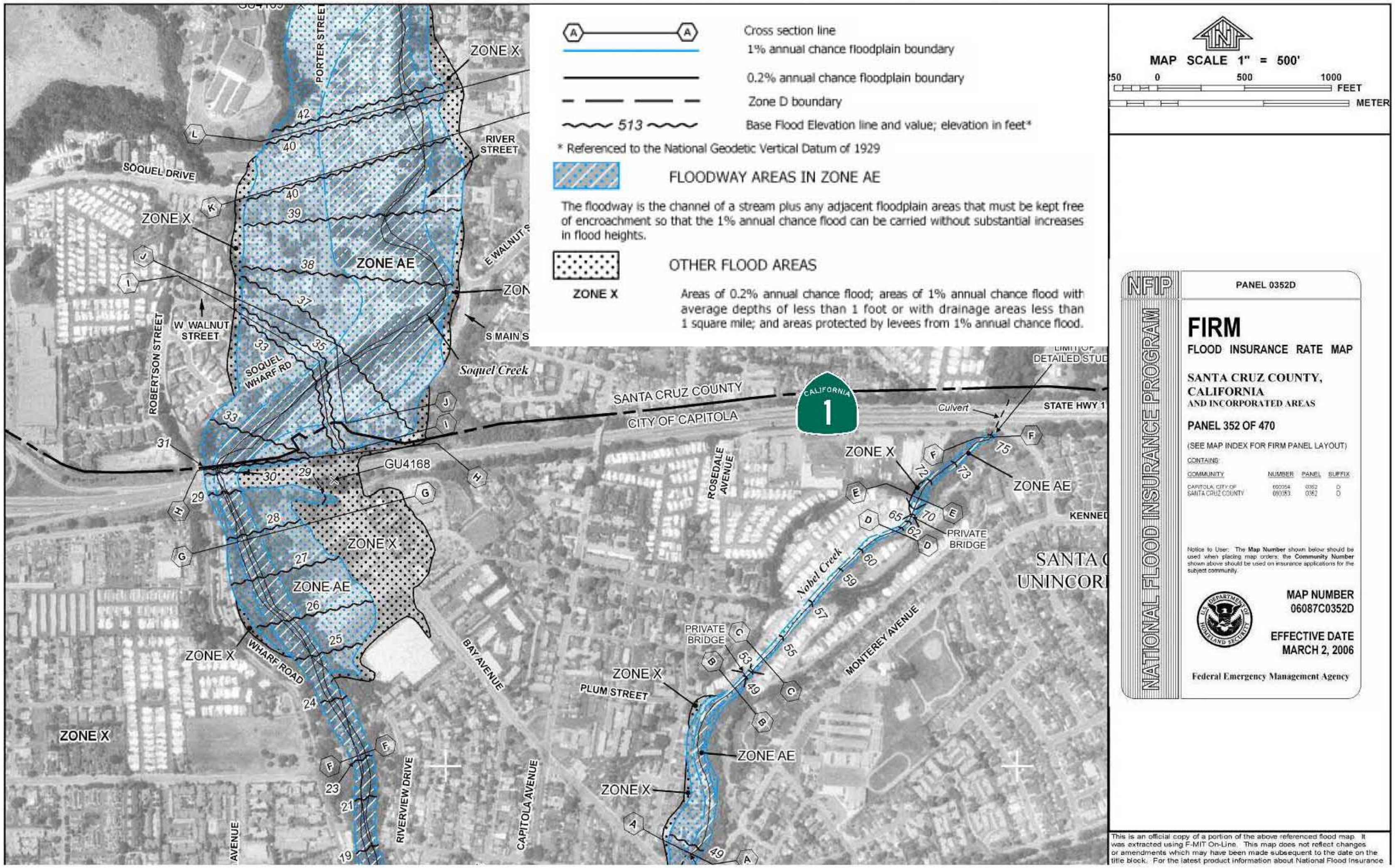

Figure 2.2.1-3: Flood Insurance Rate Map Depicting the Delineated Nobel Creek 100-Year Floodplain (South of Route 1) and the Delineated Soquel Creek 100-Year Floodplain

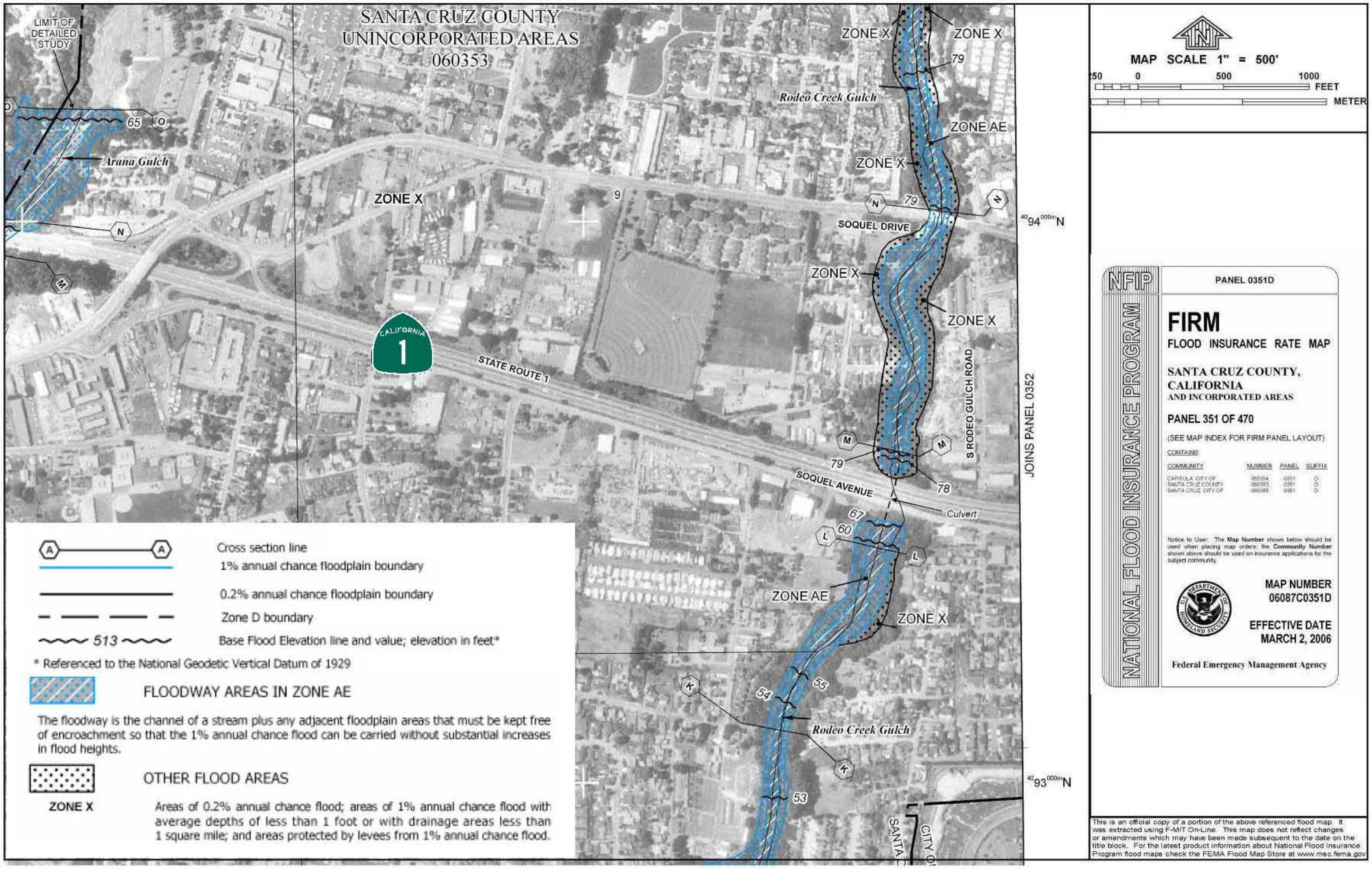

Figure 2.2.1-4: Flood Insurance Rate Map Depicting the Delineated Rodeo Creek Gulch 100-Year Floodplain

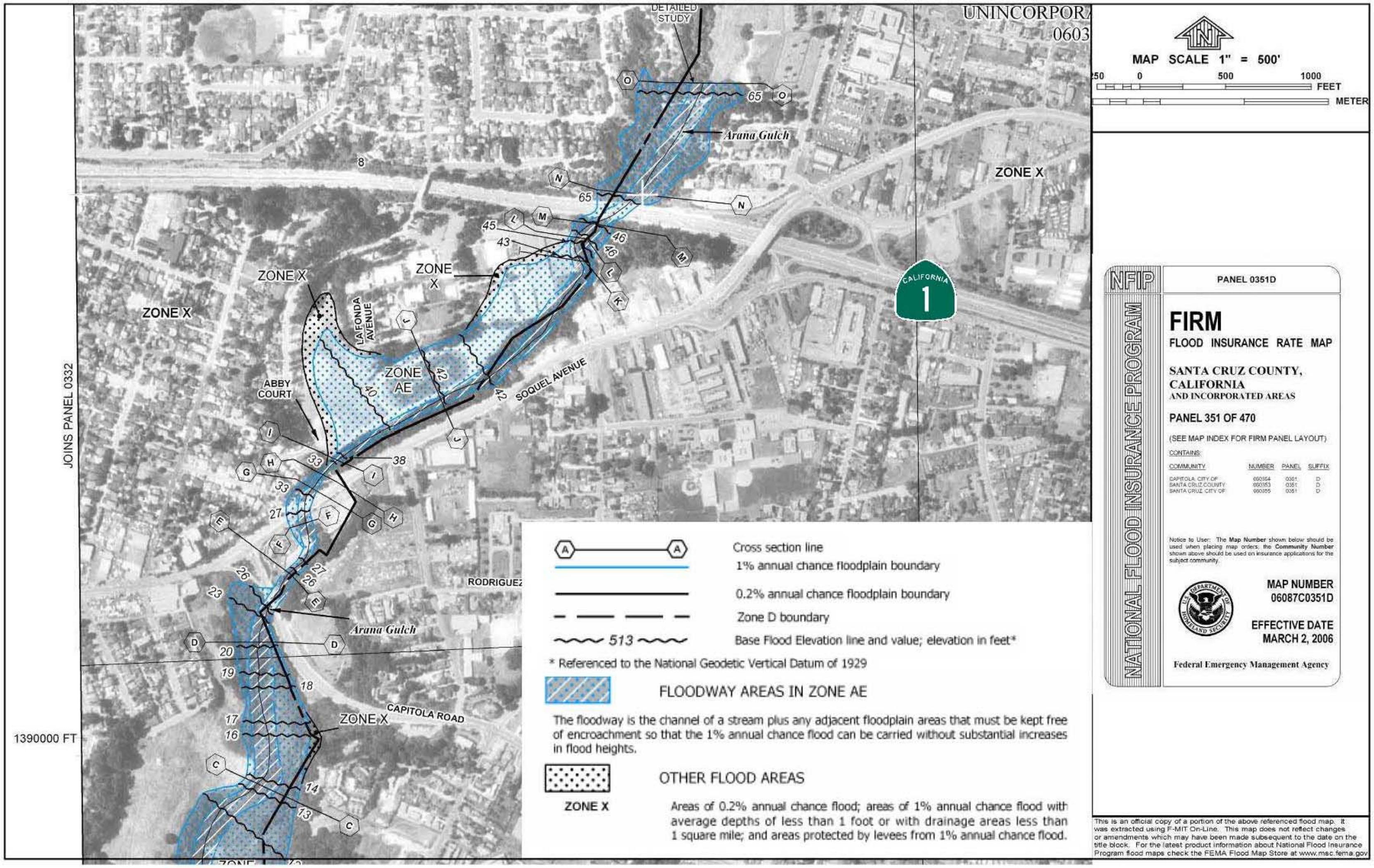

Figure 2.2.1-5: Flood Insurance Rate Map Depicting the Delineated Arana Gulch 100-Year Floodplain

Natural and Beneficial Floodplain Values

Natural and beneficial floodplain values that occur in the Tier I Corridor include fish, wildlife, plants, open space, natural beauty, natural moderation of floods, water quality maintenance, and groundwater recharge. Wetlands and other waters of the U.S. and waters of the State within the floodplain area provide natural and beneficial floodplain values, including the moderation of floods, water quality maintenance and groundwater recharge.

Existing Drainage

The major drainage basins in the project area are the San Lorenzo River, Soquel Creek, Aptos Creek, and Pajaro Valley basins.

The San Lorenzo River basin is located in central Santa Cruz County and covers approximately 137 square miles. It extends approximately 20 miles north from the river mouth into the coastal mountains. At elevations above Santa Cruz, the basin is primarily a resort area. The lower 3 miles of the river flow south into Monterey Bay.

The Soquel Creek watershed, which is located in the northern end of the project limits, drains 42 square miles, with a steep elevation drop of nearly 3,000 feet. Soquel Creek collects the flow from many tributaries, including Rodeo Creek Gulch, Nobel Gulch, Tannery Gulch, and Borregas Creek. Flooding occurs due to fast volume increases during heavy rainfall, additional volumes from joining tributaries, and natural obstacles in the watershed.

The Aptos Creek watershed drains 25 square miles, with an elevation drop of 2,000 feet. The Aptos Creek watershed includes tributaries to Aptos Creek, shown in Figure 2.2.1-2. Like the Soquel Creek watershed, inundation in the Aptos Creek watershed occurs with heavy rain.

The Pajaro Valley is a triangular-shaped drainage basin formed by the western slope of the Santa Cruz Mountains, comprising approximately 112 square miles. Gently sloping plains extend from the foothills to the Pacific Ocean. The mountainous areas are more heavily forested.

Tier II Auxiliary Lane Alternative

Within the Tier II Auxiliary Lane Alternative limits, there is one waterway crossing: the Rodeo Creek Gulch crossing, which is a 106-inch (approximately 9 feet in diameter) concrete arch culvert.

Natural and Beneficial Floodplain Values

Within the Tier II Corridor, no portion of Route 1 is within the 100-year floodplain; however there are areas of 100-year floodplain along Rodeo Creek Gulch on either side of Route 1. Natural and beneficial floodplain values that occur in these areas include fish, wildlife, plants, open space, natural beauty, natural moderation of floods, water quality maintenance, and groundwater recharge.

Existing Drainage

The existing drainage systems along the Route 1 corridor of the Tier II Auxiliary Lane Alternative consist primarily of cross culverts, asphalt concrete dikes with inlets to collect stormwater at shoulders, overside drains, and roadside drainage ditches in the median.

Environmental Consequences

Tier I Corridor HOV Lane Alternative

Long-term impacts from the proposed project could result from floodplain and wetland fill, and potential increases to velocity and volume of downstream flows due to added impervious areas from expanded roadways and structures. These potential impacts and design measures intended to avoid and minimize such impacts are discussed in the following subsections.

Floodplain Encroachments

Portions of the project site are located within the fringe of the 100-year floodplain, with resulting unavoidable impacts to the floodplain associated with the Tier I Corridor HOV Lane Alternative.

Route 1 is proposed to be widened in the floodplain areas at Aptos Creek and Soquel Creek. The widening would occur with the addition of the auxiliary lanes and the widening of the Aptos Creek and Soquel Creek bridges. At the Soquel Creek crossing, the existing bridge would remain as is. The crossing would be widened with the construction of two new bridges that would flank the existing bridge. These two new bridges at the Soquel Creek crossing would provide a new southbound collector/frontage road and a northbound collector/frontage road. Additionally, environmental consequences to the floodplain from the bridge widening at the Aptos Creek Bridge and Soquel Creek Bridge would be from the proposed footings of the widened section of the bridges. Proposed improvements would not encroach onto the floodplains at Nobel Creek and Rodeo Creek Gulch.

Other drainage improvements are proposed that are outside the delineated 100-year base floodplains defined by the Federal Emergency Management Agency.

Route 1 is also proposed to be widened in the floodplain area at Arana Gulch. Under the Tier I Corridor HOV Lane Alternative, the widening would occur with the addition of an HOV lane in each direction of travel. Based on preliminary (pre-final design) calculations, the estimated water surface elevation for the 100-year peak discharge at the cross section immediately upstream of Route 1 would be similar to the existing condition. The HEC-RAS results indicate that the roadway is overtopped in both the existing and proposed conditions, which is consistent with the Flood Insurance Rate Map.

Evaluation of Floodplain Impacts

A “significant encroachment” as defined in 23 CFR 650.105 is a highway encroachment and any direct support of likely base floodplain development that would involve one or more of the following construction or flood-related impacts:

- A significant potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community’s only evacuation route.
- A significant risk to life or property, or
- A significant adverse impact on natural and beneficial floodplain values.

For all five locations where there are defined floodplains, there would be an increase in impervious surface areas from the widened pavement areas for both of the Tier I Corridor Alternatives. Increasing the area of impervious surface would result in increases to the peak amount of stormwater runoff, and it would reduce the amount of pervious surfaces available for infiltration of stormwater runoff into the soil. The proposed project’s design goal would be to maintain preconstruction stormwater flows, which would help to ensure that stormwater runoff from the proposed project would minimize downstream effects.

In general, environmental consequences to the floodplain would differ for the two Tier I Corridor Alternatives depending on the amount and nature of widening.

In comparing the two Tier I Corridor Alternatives, the Tier I Corridor HOV Lane Alternative would increase the roadway runoff more than the Tier I Corridor TSM Alternative because of additional roadway widening for the HOV lanes. Table 2.2.1-2 summarizes the proposed increases in impervious surface areas contributing to the creeks with associated floodplains for the Tier I Corridor HOV Lane Alternative. The increase in area is greater for the Tier I Corridor HOV Lane Alternative than the Tier I Corridor TSM Alternative at each crossing, for a total 38.9-acre increase in impervious area for the Tier I Corridor HOV Lane Alternative (as shown in Table 2.2.1-2) and a total 15.1-acre increase in impervious area for the Tier I Corridor TSM Alternative for the five locations compared to the No Build Alternative (as discussed under the Tier I TSM Alternative below). These increases in impervious area are compared to the overall watershed drainage areas at each crossing.

Table 2.2.1-2: Increased Impervious Areas that Affect Floodplain Areas for the Tier I Corridor HOV Lane Alternative[1,2]

Location	Increased Impervious Area (acres)	Watershed Area (acres)	Increased Area (%)
Aptos Creek	10.56	15,360	0.07
Nobel Creek	5.90	614	0.96
Soquel Creek	13.79	27,520	0.05
Rodeo Creek Gulch	2.39	1,572	0.15
Arana Gulch	6.30	2,239	0.28
Totals	38.94	47,305	0.08

[1] Compared to the No Build Alternative

[2] This table presents only the increases in impervious surfaces that contribute runoff to creeks that affect floodplain areas for the Tier I Corridor HOV Lane Alternative. In Section 2.2.2, Table 2.2.2-3 presents the increases in impervious surfaces for the entire Tier I Corridor, for both Tier I Corridor build alternatives.

Source: Location Hydraulic Study, 2013.

Table 2.2.1-2 shows increase in roadway runoff resulting from the Tier I HOV Alternative would be minimal in comparison to the overall watersheds of the creeks for both of the Tier I Corridor Alternatives (less than 0.96 percent at each crossing). The change in the water surface elevation within the floodplain areas associated with four of the water crossings would not result in overtopping of Route 1. At the Arana Gulch crossing, under existing conditions, the 100-year base flood water surface elevation currently overtops the existing roadway elevation, No change in roadway profile is proposed with the build alternatives, and therefore, based on available data, in the existing condition or under the build alternatives, there may be traffic interruptions of Route 1 at the Arana Gulch Crossing as a result of a 100-year storm. However, traffic can utilize frontage roads and local streets (such as La Fonda Avenue) that are not inundated by the base flood. Preliminary models with the additional runoff due to the Tier I project indicate that the TSM Alternative would result in a slight water surface elevation increase of 0.36 inch (approximately 1 centimeter), and the HOV Alternative would result in a decrease of 0.7 inch (approximately 2 centimeters) in the water surface elevation. Because these receiving waters have very large watersheds, the model showed that resulting changes in the amount of water entering the creeks is so small as to be negligible.

These negligible changes to base floodplain areas would not result in substantial potential for interruption or termination of a transportation facility that is needed for emergency vehicles due to the project's proposed improvements. Therefore, the build alternatives do not have substantial potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community's only evacuation route. In the existing condition, the Bay Avenue/Porter Street interchange encroaches onto the Soquel Creek floodplain through the roadway on- and off-ramps, which are also higher than the floodplain. Proposed improvements at this interchange should be such that the on- and off-ramps remain above the 100-year water surface elevation. It should be noted, however, that at the Aptos Creek and Soquel Creek crossings, properties exist within the floodplain adjacent to the creeks that are at a much lower elevation than the elevation of Route 1. Slight increases to the water surface elevation at these locations may have potential to affect some of these existing properties.

Natural and Beneficial Floodplain Value Impacts

It is anticipated that the proposed project would affect the natural and beneficial floodplain values of wildlife habitat, plants, open space, natural beauty, natural moderation of floods, water quality maintenance, and groundwater recharge at locations in which project elements encroach upon the 100 year floodplain. This occurs at the crossings of Soquel Creek, Aptos Creek, and Arana Gulch within the project limits. These impacts would occur as a result of temporary or permanent loss of natural areas within the base floodplain, including wetland and other waters of the U.S. and/or waters of the State. Impacts to the floodplain would depend on the amount and nature of widening for the two alternatives. In general, impacts to the natural and beneficial floodplain values would be greater for the Tier I Corridor HOV Lane Alternative than the Tier I Corridor TSM Alternative because there would be more widening for the Tier I Corridor HOV Lane Alternative.

Support of Probable Incompatible Floodplain Development

As previously mentioned, portions of the proposed project limits are located in the fringe of the floodplain, and there would be unavoidable impacts to the floodplain associated with the widening for both of the Tier I Corridor Alternatives; however, these impacts are minor because the encroachment is minimal; the added impervious areas would not substantially raise the water surface elevation in the floodplains. In addition, new access to developed or undeveloped lands would not be added; therefore, this proposed project, under both of the Tier I Corridor Alternatives, would not support any incompatible floodplain development. Agency coordination with the Federal Emergency Management Agency and the Santa Cruz County Planning Department regarding potential project impacts to the watershed and floodplain will occur and is described further in Chapter 4. Agency coordination will occur for both Tier I Corridor Alternatives and for the Tier II Auxiliary Lane Alternative.

Tier I Corridor TSM Alternative

Floodplain Encroachments

Portions of the project site are located within the fringe of the 100-year floodplain, with resulting unavoidable impacts to the floodplain associated with the Tier I Corridor TSM Alternative.

Route 1 is proposed to be widened in the floodplain areas at Aptos Creek and Soquel Creek. The widening would occur with the addition of the auxiliary lanes and the widening of the Aptos Creek and Soquel Creek bridges. The impacts to the floodplain from the bridge widening at the Aptos Creek Bridge and Soquel Creek Bridge would be from the proposed footings of the widened section of the bridges. Proposed improvements would not encroach onto the floodplains at Nobel Creek and Rodeo Creek Gulch.

Route 1 is also proposed to be widened in the floodplain area at Arana Gulch. Under the Tier I Corridor TSM Alternative, the widening would occur with the addition of the auxiliary lanes. Under both of the Tier I Corridor Alternatives, impacts to the floodplain at the Arana Gulch crossing would be due to a loss of floodplain storage because of the extended culvert.

Based on preliminary (pre-final design) calculations, the estimated water surface elevation for the 100-year peak discharge at the cross section immediately upstream of Route 1 would be 70.19 feet for the Tier I Corridor TSM Alternative. The Tier I Corridor TSM Alternative would result in a water surface elevation increase of 0.03-feet (0.36 inch). The HEC-RAS results indicate that the roadway is overtopped in both the existing and proposed conditions, which is consistent with the Flood Insurance Rate Map.

Evaluation of Floodplain Impacts

The increase in risk associated with the proposed project is negligible. The Tier I Corridor TSM Alternative has the least impacts to floodplains because the project footprint is not as extensive as the Tier I Corridor HOV Lane Alternative, which involves the widening of outside lanes. The Tier I Corridor TSM Alternative does not include the addition of new through-lanes. The effects to the floodplain would be minimal because storm drainage systems would be upsized to accommodate the increased flow from these roadway improvements. The goals of the proposed project are to reduce congestion, reduce delay, and encourage ridesharing and transit use. The proposed project has considered practicable alternatives to minimize environmental impacts while accomplishing its purpose. Both of the Tier I Corridor Alternatives would maintain the existing roadway alignment and profile to minimize environmental impacts while also minimizing costs and accomplishing the project’s goals.

As described in the environmental consequences for the Tier I HOV Alternative, for all five locations where there are defined floodplains, both Tier I Corridor Alternatives would result in an increase in impervious surface areas from the widened pavement areas.

As noted above, in the Evaluation of Floodplain Impacts for the Tier I Corridor HOV Lane Alternative, the Tier I Corridor HOV Lane Alternative would increase roadway runoff more than the Tier I Corridor TSM Alternative. Table 2.2.1-3 summarizes the Tier I Corridor TSM Alternative’s proposed increases in impervious surface areas contributing to the creeks with associated floodplains. These increases in impervious area are compared to the overall watershed drainage areas at each crossing.

Table 2.2.1-3: Increased Impervious Areas that Affect Floodplain Areas for the Tier I Corridor TSM Alternative[1, 2]

Location	Increased Impervious Area (acres)	Watershed Area (acres)	Increased Area (%)
Aptos Creek	5.32	15,360	0.03
Nobel Creek	1.71	614	0.28
Soquel Creek	2.27	27,520	0.01
Rodeo Creek Gulch	1.35	1,572	0.09
Arana Gulch	4.49	2,239	0.20
Totals	15.14	47,305	0.03

[1] Compared to the No Build Alternative

[2] This table presents only the increases in impervious surfaces that contribute runoff to creeks that affect floodplain areas for the Tier I Corridor TSM Alternative. In Section 2.2.2, Table 2.2.2-3 presents the increases in impervious surfaces for the entire Tier I Corridor, for both Tier I Corridor build alternatives.

Source: Location Hydraulic Study, 2013.

As explained in the environmental consequences for the Tier I HOV Alternative, there would not be substantial potential for interruption or termination of a transportation facility that is needed for emergency vehicles due to the project's proposed improvements for either Tier I Corridor alternative.

Natural and Beneficial Floodplain Value Impacts

It is anticipated that the proposed project would impact the natural and beneficial floodplain values at three locations within the project limits: Aptos Creek, Soquel Creek, and Arana Gulch. Impacts to the floodplain would depend on the amount and nature of widening for the Tier I Corridor Alternatives. These impacts would occur as a result of temporary or permanent loss of natural areas, including wetland and other waters of the U.S. and/or waters of the State. In general, impacts to the natural and beneficial floodplain values would be greater for the Tier I Corridor HOV Lane Alternative than the Tier I Corridor TSM Alternative because there would be more widening for the Tier I Corridor HOV Lane Alternative.

Support of Probable Incompatible Floodplain Development

As previously mentioned, portions of the proposed project limits are located in the fringe of the floodplain, and there would be unavoidable impacts to the floodplain associated with the widening under the Tier I Corridor Alternatives; however, these impacts are minor because the encroachment is minimal; the added impervious areas would not substantially raise the water surface elevation in the floodplains. In addition, new access to developed or undeveloped lands would not be added; therefore, this proposed project, under both of the Tier I Corridor Alternatives, would not support any incompatible floodplain development.

Tier II Auxiliary Lane Alternative

Floodplain Encroachments

The Tier II project does not propose additional fill or change in roadway grade within the base floodplain. However, the widening that is associated with the addition of the auxiliary lanes, and the retaining walls that would be constructed as part of the roadway widening, would increase the amount of impervious surface and result in a corresponding increase in the amount of stormwater runoff flowing to three water bodies: Rodeo Creek Gulch, Arana Gulch, and Soquel Creek. Rodeo Creek Gulch crosses Route 1 within the Tier II Corridor limits; whereas Arana Gulch and Soquel Creek cross Route 1 outside of the Tier II Corridor limits.

Evaluation of Floodplain Impacts

For the Tier II Auxiliary Lane Alternative, the principal features that would impact existing drainage facilities are the widening of the roadway and the new retaining walls. Existing storm drain culverts that cross Route 1 within the Tier II study area would be extended due to proposed widening under the Tier II Auxiliary Lane Alternative.

In general, the Tier II Auxiliary Lane Alternative would not substantially affect the existing drainage patterns and would be designed to accommodate the increased roadway runoff resulting from the proposed roadway widening by implementing outlet protection, velocity dissipation devices, and possible peak-flow attenuation basins. As with the Tier I Corridor Alternatives, the additional flows are not substantial in comparison to the overall watershed of the receiving water bodies. The Tier II Auxiliary Lane Alternative design goal would be to maintain preconstruction stormwater flows by metering or detaining these flows to preconstruction rates prior to discharge to a receiving water body or municipal separate storm sewer system. As with the Tier I Corridor Alternatives, most of the runoff within the Tier II Auxiliary Lane Alternative limits flows south to Monterey Bay and eventually to the Pacific Ocean. Rodeo Creek Gulch, the only cross drainage in the Tier II Corridor, directly conveys flow southward to Monterey Bay. Although Arana Gulch and Soquel Creek do not cross Route 1 within the Tier II Corridor limits, portions of the Tier II Corridor are within the respective watersheds of Arana Gulch and Soquel Creek. These waterways receive stormwater runoff that drains from the Tier II area and convey flows to Monterey Bay.

The Tier II Auxiliary Lane Alternative would add impervious areas, and this addition of new impervious surface would result in an increase in stormwater runoff, which would flow to three streams: Soquel Creek, Rodeo Creek Gulch, and Arana Gulch. Table 2.2.1-4 summarizes these existing watershed areas and the increased impervious areas for the three streams.

Table 2.2.1-4: Increased Impervious Areas that Affect Floodplain Areas for the Tier II Auxiliary Lane Alternative[1]

Location	Increased Impervious Area from Tier II Auxiliary Lane Alternative[2] (acres)	Existing Watershed Area (acres)	Increased Area (%)
Soquel Creek	1.22	27,520	0.005
Rodeo Creek Gulch	1.86	1,572	0.12
Arana Gulch	1.79	2,239	0.08
Totals	4.89	31,331	

[1] The entire Tier II Corridor contributes runoff to creeks that affect floodplain areas for the Tier II Corridor Auxiliary Lanes Alternative; therefore total areas of increased impervious surface presented in this table (which focuses on contributions to floodplain areas) are identical to the total areas of increased impervious surface described in Section 2.2.2 (which focuses on impervious surfaces for the entire Tier II Corridor).

[2] The total acreage of increased impervious surface is slightly greater than the sum of the values shown for each water body, due to rounding.

Source: Location Hydraulic Study, 2013.

The increased impervious areas relative to the overall watersheds are small and would be less than the increased impervious areas resulting from the larger Tier I Corridor Alternatives. The evaluation of the Tier I Corridor Alternatives showed that the increase in impervious surfaces resulting from those alternatives resulted in negligible effects on the receiving water bodies. Since the increase in impervious surfaces resulting from the Tier II Auxiliary Lane Alternative is even smaller, the corresponding increase in stormwater runoff would also be negligible.

Floodplains

The proposed features of the Tier II Auxiliary Lane Alternative that would affect the floodplains would be the widening that is associated with the addition of the auxiliary lanes and the retaining walls that would also be constructed as part of the roadway widening.

Based on available preliminary design information, the improvements proposed for the Tier II Auxiliary Lane Alternative would not result in an encroachment on the floodplains at Soquel Creek, Rodeo Creek Gulch, or Arana Gulch.

As with the Tier I Corridor Alternatives, the 100-year water surface elevation overtops Route 1 at the Arana Gulch crossing in the existing condition. Although the Arana Gulch crossing of Route 1 is outside the Tier II project limits, the effect of the Tier II Auxiliary Lane Alternative on this crossing was evaluated, because stormwater runoff from portions of the Tier II Corridor flows to Arana Gulch. A hydraulic model was prepared for the Tier I Corridor Alternatives, which showed that with an added impervious area of 0.3 percent, there would be negligible environmental consequences to the water surface elevation and extent; therefore, because the added impervious area of 0.08 percent with the Tier II Auxiliary Lane Alternative is less than the added impervious area from the Tier I Corridor Alternatives, the

Tier II Auxiliary Lane Alternative should have negligible environmental consequences to the water surface elevation and extent at Arana Gulch.

At the Arana Gulch crossing, under existing conditions, the 100-year base flood water surface elevation currently overtops the existing roadway elevation, No change in roadway profile is proposed with the Tier II Auxiliary Lane Alternative, and therefore, based on available data, in the existing condition or under the Tier II alternative, there may be traffic interruptions of Route 1 at the Arana Gulch Crossing as a result of a 100-year storm. However, traffic can utilize frontage roads and local streets (such as La Fonda Avenue) that are not inundated by the base flood.

Risk Associated with Implementation of the Action

The level of risk associated with the Tier II Auxiliary Lane Alternative is low. The proposed project is not anticipated to have substantial impacts because the added impervious areas resulting from the proposed project would not substantially increase the flow, nor would the added impervious areas substantially raise the water surface elevations of the base floodplains. The roadway profile would not change. New access to developed or undeveloped lands would not be added; therefore, the Tier II Auxiliary Lane Alternative would not support incompatible floodplain development.

At the Soquel Creek and Rodeo Creek Gulch crossings, the roadway elevations are higher than the 100-year water surface elevations, and an alternate route to the Arana Gulch crossing is available. Preliminary models with the additional runoff due to the Tier I Corridor alternatives, the changes to base floodplain areas are negligible and would not result in substantial potential for interruption or termination of a transportation facility that is needed for emergency vehicles due to the project's proposed improvements. Therefore, since the Tier II build alternative would result in lesser increases of stormwater runoff, it does not have substantial potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community's only evacuation route.

For the Tier I Corridor Alternatives, the drainage systems at Soquel Creek and Rodeo Creek Gulch were assessed to be sufficiently sized to pass the 100-year design discharge. Arana Gulch, however, is overtopped during the 100-year storm and would need drainage design improvements to accommodate the incoming flow. Due to the negligible increase in impervious area resulting from the Tier II Auxiliary Lane Alternative (less than for the Tier I Corridor Alternatives), the drainage systems should still be sufficiently sized to pass the 100-year design discharge.

As with the Tier I Corridor Alternatives, the existing cross culvert systems within the Tier II Auxiliary Lane Alternative limits that are capable of passing the 10-year event and the 100-year event without objectionable backwater and that are in good condition would be extended to accommodate the proposed roadway widening. Additional discharge that would be conveyed downstream would be metered such that preconstruction flows meet post-construction flows.

Natural and Beneficial Floodplain Value Environmental Consequences

The Tier II Auxiliary Lane Alternative would not result in any encroachment into any area of 100-year floodplain and therefore would not affect natural and beneficial floodplain values.

Support of Probable Incompatible Floodplain Development

The Tier II Auxiliary Lane Alternative would not support incompatible floodplain development, and the widening would not encroach on the Rodeo Creek Gulch floodplain. The added impervious areas would not substantially raise the water surface elevation in the floodplains. Furthermore, new access to developed or undeveloped lands would not be added; therefore, the Tier II Auxiliary Lane Alternative would not support incompatible floodplain development.

No Build Alternative

The existing hydrology and floodplain environment would not experience any environmental consequences as a result of the No Build Alternative.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

The avoidance, minimization, and mitigation measures below are applicable to both Tier I Corridor Alternatives and are provided on a conceptual basis. As portions of the Tier I corridor are programmed and become future tiered projects, they will be subject to separate environmental review, and the measures summarized below could be subject to change. Avoidance, minimization, and/or mitigation measures specified for the Tier II Auxiliary Lane Alternative are considered environmental commitments required for implementation.

Project design features would avoid long-term, adverse impacts that could result from floodplain and wetland fill, and potential increases to velocity and volume of downstream flows due to added impervious areas. The design of the bridge widening at Aptos and Soquel creeks and other drainage improvements would minimize the loss of local floodplain storage. Better end treatments, such as wingwalls, would be considered at major culvert crossings where culvert improvements are proposed to improve hydraulics. Undersized culverts at major crossings are listed in Table 2.2.1-5.

Table 2.2.1-5: Undersized Culverts at Major Crossings for the Tier I Corridor Alternatives

Waterway Crossing	Post Mile	Existing Culvert Size	Proposed Action
Arana Gulch	15.25	72 inch (1800 mm) (height) concrete arch culvert	Replacement with larger sizes or parallel systems
Tributary to Arana Gulch	15.68	4-foot by 4-foot reinforced concrete box culvert	Replacement with larger sizes or parallel systems
Tributary to Tannery Gulch	12.25	48-inch reinforced concrete pipe culvert	Replacement with larger sizes or parallel systems
Source: Location Hydraulic Study, 2013			

Drainage design improvements are proposed to accommodate increased peak stormwater runoff from the roadway and are discussed in the *Drainage Report* (WRECO). The proposed project's design goal will be to maintain preconstruction stormwater flows by metering or detaining post construction flows to preconstruction rates prior to discharge to a receiving water body or municipal separate storm sewer system.

The proposed retaining wall at the Soquel Creek crossing and at the north end of the Arana Gulch crossing will be within 100-year base floodplains for the Tier I Corridor HOV Lane Alternative. The proposed retaining wall at the north end of the Arana Gulch crossing will be within 100-year base floodplains for the Tier I Corridor TSM Alternative.

In summary, implementation of restoration and preservation design measures and compliance with the requirements of permit conditions for either Tier I Corridor Alternative will help mitigate potential impacts to natural and beneficial floodplain values, including:

- Better end treatments, such as wingwalls, would be considered at major culvert crossings where culvert improvements are proposed to improve hydraulics.
- Undersized existing culverts would be replaced with larger sizes (or parallel systems) including, but not limited to, culverts at the tributary to Arana Gulch and the tributary to Tannery Gulch.
- Implementation of outlet protection, velocity dissipation devices, and possible peak-flow attenuation basins as needed to maintain preconstruction stormwater flows by metering or detaining postconstruction flows to preconstruction rates prior to discharge to a receiving water body or municipal separate storm sewer system.
- The project proponents would work closely with the Santa Cruz County Planning Department to determine if floodplain map revisions are necessary.

Tier II Auxiliary Lane Alternative

Impacts to natural and beneficial floodplain values are not anticipated, and therefore measures to restore and preserve these areas are not proposed. The following are proposed as impact avoidance measures:

- Better end treatments, such as wingwalls, would be considered at major culvert crossings where culvert improvements are proposed to improve hydraulics.
- Undersized existing culverts would be replaced with larger sizes (or parallel systems).
- Implementation of outlet protection, velocity dissipation devices, and possible peak-flow attenuation basins as needed to maintain preconstruction stormwater flows by metering or detaining postconstruction flows to preconstruction rates prior to discharge to a receiving water body or municipal separate storm sewer system.
- The project proponents would work closely with the Santa Cruz County Planning Department to determine if floodplain map revisions are necessary.

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2.2.2 Water Quality and Stormwater Runoff

Regulatory Setting

Federal Requirements: Clean Water Act

In 1972, Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the United States from any point source unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System permit. Known today as the Clean Water Act, Congress has amended it several times. In the 1987 amendments, Congress directed dischargers of stormwater from municipal and industrial/ construction point sources to comply with the National Pollutant Discharge Elimination System permit scheme. Important Clean Water Act sections are:

- Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity, which may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the act. This is most frequently required in tandem with a Section 404 permit request (see below).
- Section 402 establishes the National Pollutant Discharge Elimination System, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the United States Regional Water Quality Control Boards administer this permitting program in California. Section 402(p) requires permits for discharges of stormwater from industrial/construction and municipal separate storm sewer systems.
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the United States. This permit program is administered by the United States Army Corps of Engineers.

The objective of the Clean Water Act is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

The United States Army Corps of Engineers issues two types of 404 permits: Standard and General Permits. There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of the United States Army Corps of Engineers' Standard permits. For Standard permits, the United States Army Corps of Engineers decision to approve is based on compliance with United States Environmental Protection Agency's Section 404 (b)(1)

Guidelines (United States Environmental Protection Agency *Code of Federal Regulations* 40 Part 230), and whether permit approval is in the public interest. The Section 404(b)(1) Guidelines (Guidelines) were developed by the United States Environmental Protection Agency in conjunction with United States Army Corps of Engineers, and allow the discharge of dredged or fill material into the aquatic system (waters of the United States) only if there is no practicable alternative that would have less adverse effects. The Guidelines state that United States Army Corps of Engineers may not issue a permit if there is a least environmentally damaging practicable alternative to the proposed discharge that would have lesser effects on waters of the United States, and not have any other significant adverse environmental consequences. According to the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the United States. In addition, every permit from the United States Army Corps of Engineers, even if not subject to the Section 404(b)(1) Guidelines, must meet general requirements. See 33 *Code of Federal Regulations* 320.4. A discussion of the least environmentally damaging practicable alternative determination, if any, for the document is included in the Wetlands and Other Waters section.

State Requirements: Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This Act requires a "Report of Waste Discharge" for any discharge of waste (i.e., liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the state. It predates the Clean Water Act and regulates discharges to waters of the State. Waters of the State include more than just waters of the United States, like groundwater and surface waters not considered waters of the United States. Additionally, it prohibits discharges of "waste" as defined, and this definition is broader than the Clean Water Act definition of "pollutant." Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements and may be required even when the discharge is already permitted or exempt under the Clean Water Act.

The State Water Resources Control Board and Regional Water Quality Control Boards are responsible for establishing the water quality standards (i.e., objectives and beneficial uses) required by the Clean Water Act, and regulating discharges to ensure compliance with the water quality standards. Details regarding water quality standards in a project area are contained in the applicable Regional Water Quality Control Board Basin Plan. In California, Regional Boards designate beneficial uses for all water body segments and then set criteria necessary to protect these uses. Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, the State Water Resources Control Board identifies waters failing to meet standards for specific pollutants, which are then state-listed in accordance with Clean Water Act Section 303(d). If a state determines that waters are impaired for one or more constituents and the standards cannot be met through point source or non-point source controls (National Pollutant Discharge Elimination System permits or Waste Discharge Requirements), the Clean Water Act requires the establishment of Total Maximum Daily Loads. Total Maximum Daily Loads specify allowable pollutant loads from all sources (i.e., point, non-point, and natural) for a given watershed.

State Water Resources Control Board and Regional Water Quality Control Boards

The State Water Resources Control Board administers water rights, sets water pollution control policy, and issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, Total Maximum Daily Loads, and National Pollutant Discharge Elimination System permits. Regional Water Quality Control Boards are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

- **National Pollutant Discharge Elimination System Program**

  Municipal Separate Storm Sewer Systems

  Section 402(p) of the Clean Water Act requires the issuance of National Pollutant Discharge Elimination System permits for five categories of stormwater discharges, including Municipal Separate Storm Sewer Systems. The United States Environmental Protection Agency defines a Municipal Separate Storm Sewer System as "any conveyance or system of conveyances (i.e., roads with drainage systems, municipal streets, catch basins, curbs, gutters, ditches, human-made channels, and storm drains) owned or operated by a state, city, town, county, or other public body having jurisdiction over stormwater, that are designed or used for collecting or conveying stormwater." The State Water Resources Control Board has identified Caltrans as an owner/operator of a Municipal Separate Storm Sewer System pursuant to federal regulations. Caltrans' Municipal Separate Storm Sewer System permit covers all Caltrans rights-of-way, properties, facilities, and activities in the state. The State Water Resources Control Board or the Regional Water Quality Control Board issues National Pollutant Discharge Elimination System permits for 5 years, and permit requirements remain active until a new permit has been adopted.

  The Caltrans' Municipal Separate Storm Sewer System permit, under revision at the time of this update, contains three basic requirements:

  1. Caltrans must comply with the requirements of the Construction General Permit (see below);

2. Caltrans must implement a year-round program in all parts of the State to effectively control stormwater and non-stormwater discharges; and
3. Caltrans stormwater discharges must meet water quality standards through implementation of permanent and temporary (construction) Best Management Practices, to the Maximum Extent Practicable, and other measures as the State Water Resources Control Board determines to be necessary to meet the water quality standards.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan to address storm water pollution controls related to Route planning, design, construction, and maintenance activities throughout California. The Storm Water Management Plan assigns responsibilities within Caltrans for implementing stormwater management procedures and practices training, public education and participation, monitoring and research, program evaluation, and reporting activities. The Storm Water Management Plan describes the minimum procedures and practices Caltrans uses to reduce pollutants in stormwater and non-stormwater discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of Best Management Practices. The proposed project will be programmed to follow the guidelines and procedures outlined in the latest Storm Water Management Plan to address stormwater runoff.

<u>Construction General Permit</u>

Construction General Permit (Order No. 2009-009-DWQ), adopted on September 2, 2009, became effective on July 1, 2010. The permit regulates stormwater discharges from construction sites that result in a disturbed soil area of 1-acre or greater, and/or are smaller sites that are part of a larger common plan of development. By law, all stormwater discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least 1-acre must comply with the provisions of the Construction General Permit. Construction activity that results in soil disturbances of less than 1-acre is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the Regional Water Quality Control Board. Operators of regulated construction sites are required to develop stormwater pollution prevention plans; to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the Construction General Permit.

The 2009 Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and they are based on potential erosion and transport to receiving waters. Requirements apply according to the Risk Level determined. For example, a Risk Level 3 (highest risk) project would require compulsory stormwater runoff pH and turbidity monitoring, and before construction and after construction aquatic biological assessments during specified seasonal windows. For all projects subject to the permit, applicants are required to develop and implement an effective Storm Water Pollution Prevention Plan. In accordance with Caltrans' Standard Specifications, a Water Pollution Control Plan is necessary for projects with disturbed soil area less than 1-acre.

Section 401 Permitting

Under Section 401 of the Clean Water Act, any project requiring a federal license or permit that may result in a discharge to a water of the United States must obtain a 401 Certification, which certifies that the project will be in compliance with state water quality standards. The most common federal permits triggering 401 Certification are Clean Water Act Section 404 permits issued by the United States Army Corps of Engineers. The 401 permit certifications are obtained from the appropriate Regional Water Quality Control Board, dependent on the project location, and are required before the United States Army Corps of Engineers issues a 404 permit.

In some cases, the Regional Water Quality Control Board may have specific concerns with discharges associated with a project. As a result, the Regional Water Quality Control Board may issue a set of requirements known as Waste Discharge Requirements under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. Waste Discharge Requirements can be issued to address permanent and temporary discharges of a project.

Regional and Local Requirements

The Soquel Creek Water District is a local government agency that provides water resource management in a service area within the project limits. The City of Santa Cruz Water Department is another local government agency with water resources management and water supply jurisdiction within the project area.

The Soquel Creek Water District and the Santa Cruz Water Department carry out water quality enforcement by adhering to regulations and standards established by the Environmental Protection Agency and the California Department of Public Health. These local government agencies also develop monitoring and testing programs to enforce public health goals for drinking water, which intend to keep contaminants in drinking water at a level below which there is no known or expected risk to health. The Soquel Creek Water District gets its water supply from the Soquel Creek and Aptos Creek Watersheds, and the Santa Cruz Water Department gets its water supply from four local source areas: the North Coast, the San Lorenzo River, Loch Lomond Reservoir, and the Live Oak Wells. Three of the four sources of water supply for the Santa Cruz Water Department are from surface waters that depend on rainfall and runoff. The fourth is from groundwater near Pleasant Point pumped out of the Live Oak Wells.

The City of Santa Cruz has developed a Storm Water Management Plan, and the Santa Cruz County and City of Capitola have developed a joint Storm Water Management Program to fulfill the requirements for the Phase II National Pollutant Discharge Elimination System General Permit for Discharges of Storm Water from Small Municipal Separate Storm Sewer Systems. These are comprehensive programs focused on reducing the discharge of pollutants to the storm drain system, which flows into local creeks and Monterey Bay. The proposed project will have to adhere to any specific requirements of these local agencies for discharges in their respective jurisdictions. These requirements include implementation of construction site stormwater Best Management Practices and installation of postconstruction treatment and potential hydromodification measures.

Affected Environment

The information in this section is derived from the *Water Quality Study Report* (2013), the *Drainage Report* (2013), and the Preliminary Geotechnical Report (2007) prepared for the proposed project.

Tier I Corridor Alternatives

Watersheds and Receiving Waters

The proposed project is within the Central Coast Hydrologic Region under the jurisdiction of the Central Coast Regional Water Quality Control Board. The direct receiving water bodies along the 8.9-mile project corridor are Valencia Channel, Valencia Lagoon, Valencia Creek, Aptos Creek, Ord Gulch, Borregas Creek, Pot Belly Creek, Tannery Gulch, an unnamed tributary to Tannery Gulch, Nobel Creek, Soquel Creek, Soquel Lagoon, Rodeo Creek Gulch, Arana Gulch, the three tributaries to Arana Gulch, and an unnamed Water of the United States at Post Mile 8.89. Thirteen of the major crossings are cross culverts, and the other two are bridges; Valencia Creek runs parallel to, but does not cross, Route 1.

Most of these streams drain small watershed areas and thus have low 100-year peak discharges. Aptos Creek and Soquel Creek are the two largest creeks that cross Route 1. The Soquel Creek watershed, which is located near the northern end of the project, drains approximately 42 square miles, with a steep elevation drop of nearly 3,000 feet. Soquel Creek collects the flow from many tributaries, including Rodeo Creek Gulch, Nobel Gulch, Tannery Gulch, and Borregas Creek.

The Aptos Creek watershed drains approximately 25 square miles, with an elevation drop of approximately 2,000 feet. Similar to the Soquel Creek watershed, inundation in the Aptos Creek watershed occurs with heavy rain. The steep elevation drops and narrow canyons contribute to the increase in rapid runoff volume. Physical barriers in the watershed cause backwater flooding.

Stormwater runoff from Route 1 drains into creek crossings beneath Route 1. It also drains into nearby storm drain systems that ultimately discharge into Monterey Bay and the Pacific Ocean. There are no existing stormwater treatment Best Management Practices along Route 1 within the proposed project limits to treat roadway runoff.

Groundwater

The geotechnical study conducted within the proposed Route 1 project limits based on historic boring data, as-built information, and current topography and geologic information (*Preliminary Geotechnical Report, 2007*). Table 2.2.2-1 indicates the locations and groundwater elevations and provides brief descriptions of sub-soil characteristics and compositions.

Table 2.2.2-1: Project Area Groundwater Locations and Elevations

Bridge/Structure	Subsoil Condition	Groundwater Elevation
San Andreas Road/ Larkin Valley Road Undercrossing	10- to 30-foot-thick surficial deposits, overlain with very dense clayey/silty sand	Not encountered to the elevation of 190 feet
Freedom Boulevard/ Rob Roy Junction Overcrossing	20 feet of loose to dense silty/clayey sand overlain with dense gravelly sand	Encountered at elevation of 129 to 134 feet
Rio Del Mar Boulevard Overcrossing	27 feet of dense to very dense silty sand overlain with dense gravelly sand	Not encountered to the elevation of 100 feet
State Park Drive Overcrossing	25 to 40 feet of loose to dense silty/clayey sand	Not encountered to the elevation of 100 feet
Park Avenue Undercrossing	50 feet of dense to very dense clayey sand overlain with very dense silty sand with cemented layer	Encountered at elevation of 64 to 76 feet
Bay Avenue Undercrossing	15 feet of stiff to very stiff silty/sandy clay overlain with loose to very dense silty/clayey/ gravelly sand	Encountered at elevation of 13 feet
Soquel Creek Bridge	Stiff to very stiff sandy/silty clay embedded with dense to very dense silty/gravelly sand	Encountered at elevation of 8.5 to 16 feet
41st Avenue Overcrossing	25 feet of medium dense to dense silty sand overlain with very dense sand	Encountered at elevation of 64 feet
Morrissey Avenue Overcrossing	Dense to very dense silty sand	Encountered at elevation of 95 feet

Note: The as-built Log of Test Borings for North Aptos UP, Aptos Creek Bridge, Capitola Avenue Overcrossing, Soquel Drive Overcrossing, and La Fonda Avenue Overcrossing were not available.
Source: *Preliminary Geotechnical Report 2007*.

Possible Pollutants Affecting Water Quality

Caltrans has performed many studies to monitor and characterize highway stormwater runoff throughout the State. Commonly found pollutants are total suspended solids, nitrate nitrogen, total Kjeldahl nitrogen, phosphorus, ortho-phosphate, copper, lead, and zinc. Some sources of these pollutants are natural erosion, phosphorus from tree leaves, combustion products from fossil fuels, and the wearing of brake pads (Caltrans Storm Water Management Plan 2003).

Five of the direct receiving water bodies, which are existing waterways within the proposed project's limits, are included on the 2010 Clean Water Act Section 303(d) List. Aptos Creek, Valencia Creek, Soquel Creek, Soquel Lagoon, and Rodeo Creek Gulch do not meet the Regional Water Quality Control Board's general water quality objectives established for all inland surface waters, enclosed bays, and estuaries within the Central Coast Region's Hydrologic Basin. These water quality limited segments are located immediately upstream or downstream of the traversing Route 1 right-of-way. Table 2.2.2-2 identifies the pollutants for which each of these water body segments are listed as impaired, as well as the likely pollutant sources.

Tier II Auxiliary Lane Alternative

Because the Tier II Auxiliary Lane Alternative project area overlaps the Tier I Corridor Alternatives area, the information presented in the Water Quality Study Report is also applicable to the Tier II Auxiliary Lane Alternative, unless otherwise stated below; however, because the Tier II Auxiliary Lane Alternative covers a smaller portion of Route 1, generally only discussions on the area between the 41st Avenue interchange and the Soquel Avenue interchange, or Soquel Creek, Rodeo Creek Gulch, and Arana Gulch are pertinent to the Tier II Auxiliary Lane Alternative.

Table 2.2.2-2: Water Body Segments within the Tier I and/or Tier II Project Limits Listed as Impaired

Water Body	Pollutant/Stressor for which Water Body is Listed as Impaired	Potential Sources of Pollutant/Stressor	Estimated Size of Affected Water Body Segment	Applicable Corridor Project Area
Aptos Creek	Pathogens	Collection System Failure, Natural Sources, Onsite Wastewater Systems (Septic Tanks), Pasture Grazing-Riparian and/or Upland, Urban Runoff/Storm Sewers	8.4 mi	Tier I Corridor
	Sedimentation/ Siltation	Disturbed Sites (Land Development)/ Channel Erosion	8.4 mi	
Soquel Lagoon	Pathogens	Urban Runoff/Storm Sewers, Collection System Failure, Transient Encampments, Onsite Wastewater Systems (Septic Tanks), Pasture Grazing-Riparian and/or Upland,	1.2 ac	Tier I Corridor
	Sedimentation/ Siltation	Construction/ Land Development	1.2 ac	
Valencia Creek	Pathogens	Source Unknown	6.2 mi	Tier I Corridor
	Sedimentation/ Siltation	Agriculture/ Construction/ Land Development	6.2 mi	
Soquel Creek	*Enterococcus*	Collection System Failure, Natural Sources, Transient encampments, Urban Runoff/Storm Sewers	17.9 mi	Tier I and Tier II corridors
	Escherichia coli (*E. coli*)	Collection System Failure, Natural Sources, Onsite Wastewater Systems (Septic Tanks), Transient encampments, Urban Runoff/Storm Sewers	17.9 mi	
	Fecal Coliform	Collection System Failure, Natural Sources, Onsite Wastewater Systems (Septic Tanks), Transient encampments, Urban Runoff/Storm Sewers	17.9 mi	
	Turbidity	Source Unknown	17.9 mi	
Rodeo Creek Gulch	Turbidity	Source Unknown	6.0 mi	Tier I and Tier II corridors
	pH	Source Unknown	6.0 mi	

Source: State Water Resources Control Board, 2010 Clean Water Section 303(d) List of Water Quality Limited Segments Requiring TMDLs, 2010.

Environmental Consequences

The following section presents potential permanent water quality impacts anticipated from the proposed project. The discussions include Caltrans procedures for identifying potential impacts. Short-term water quality impacts that would occur during construction are described in Section 2.4.13.

Tier I Corridor Alternatives

Stormwater

The *Water Quality Study Report* (2013) 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, phosphorus, ortho-phosphate, copper, lead, and zinc. 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.

Stormwater runoff volumes and velocities from the proposed project area are expected to increase with implementation of the proposed project due to the increase in impervious surfaces; therefore, pollutant loading may also be increased. The added impervious area is directly related to the potential permanent water quality impacts. For the Tier I Corridor HOV Lane Alternative, the proposed increase in impervious area is 64 total acres within the 8.9-mile project limits, and for the Tier I Corridor TSM Alternative, the proposed increase in impervious area is 22 total acres.

However, in comparison with the overall watershed of the creeks, the increase in flow due to the proposed increase in impervious surface for the Tier I HOV Lane Corridor Alternative or the Tier I Corridor TSM Alternative would not be substantial. This is demonstrated in Table 2.2.2-3, which shows the increase in impervious surface that would occur within the watersheds of direct receiving waters, along with the increases in impervious surfaces that affect floodplain areas for the Tier I Corridor HOV and TSM Alternatives.

Project design features for the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative would avoid long-term adverse impacts to water quality and stormwater runoff. The proposed project’s design goal is to maintain preconstruction stormwater discharge flows by promoting infiltration and metering or detaining flows to preconstruction rates prior to discharge to a receiving water body or to a municipal separate storm sewer system.

Table 2.2.2-3: Increase in Impervious Areas for Tier I Corridor Alternatives in Comparison to Overall Watershed[1]

Crossing	Increased Impervious Area (acres)		Overall Watershed Area (acres)	Percentage Increase in Overall Watershed Area	
	HOV Lane	TSM		HOV Lane	TSM
Unnamed Water of the United States	0	0	Not available	Not calculated	Not calculated
Valencia Channel	9.19	1.77	Not available	Not calculated	Not calculated
Valencia Creek	3.40	0.44	4,106	0.08	0.01
Aptos Creek	10.56	5.32	15,360	0.07	0.03
Ord Gulch	1.89	1.11	156	1.21	0.71
Pot Belly Creek	0.86	0.61	82	1.05	0.75
Borregas Creek	1.37	0.99	116	1.18	0.85
Tannery Gulch	1.73	0.83	797	0.22	0.10
Unnamed Tributary to Tannery Gulch	1.86	0.49	146	1.28	0.34
Nobel Creek	5.90	1.71	614	0.96	0.28
Soquel Creek	13.79	2.27	27,520	0.05	0.01
Rodeo Creek Gulch	2.39	1.35	1,572	0.15	0.09
Arana Gulch	6.30	4.49	2,239	0.28	0.20
Tributary to Arana Gulch at Sta 175+98	0.38	0.15	71	0.53	0.21
Tributary to Arana Gulch at Sta 177+92	0.70	0.24	113	0.62	0.21
Tributary to Arana Gulch at Sta 183+01	3.00	0.00	Not available	Not calculated	Not calculated

[1] This table presents the increases in impervious surfaces for the entire Tier I Corridor, for both Tier I Corridor build alternatives. In Section 2.2.1, Table 2.2.1-2 presents only the increases in impervious surfaces that contribute runoff to creeks that affect floodplain areas for the Tier I Corridor HOV Lane Alternative, and Table 2.2.1-3 presents only the increases in impervious surfaces that contribute runoff to creeks that affect floodplain areas for the Tier I Corridor TSM Alternative,

Source: Water Quality Study Report, 2013.

By meeting this design goal, permanent, adverse water quality impacts are not expected. The overall design features for water quality impacts are a condition of the Caltrans National Pollutant Discharge Elimination System permit with the State Water Resources Control Board, as well as other regulatory agency requirements. Details for these design features or Best Management Practices would be developed and incorporated into the project design and operations prior to the proposed project opening. With proper implementation of these design features or Best Management Practices, permanent water quality impacts would be avoided or minimized. Therefore, the proposed project would comply with all water quality standards and waste discharge requirements, and the impact to water quality would be minimal.

Groundwater

The proposed impervious surface area required for either Tier I Corridor Alternative may have localized impacts to the flow of groundwater. Existing groundwater recharge areas within the proposed project limits would be slightly affected due to the increase in impervious areas, which decreases the amount of areas available for rainwater to infiltrate into the soil and help recharge the groundwater supply. The Tier I Corridor HOV Lane Alternative would have more potential permanent effects to groundwater than the Tier I Corridor TSM Alternative due to the larger added impervious areas required; however, the impacts would not be substantial 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 substantial impacts to water quality in groundwater wells are anticipated.

Tier II Auxiliary Lane Alternative

Stormwater

Stormwater runoff within the Tier II Auxiliary Lane Alternative project limits drains into Soquel Creek, Rodeo Creek Gulch, and Arana Gulch, and it eventually discharges to Monterey Bay. A larger disturbed soil area has a higher potential for temporary water quality impacts. The Tier II Auxiliary Lane Alternative would have a total disturbed soil area of approximately 18.5 acres.

Highway widening projects increase impervious areas; therefore, they potentially increase the volume and velocity of stormwater flow to downstream receiving water bodies. The Tier II Auxiliary Lane Alternative would increase the impervious area by 4.89 acres. Stormwater runoff volumes and velocities from the proposed project area are expected to increase with implementation of the Tier II Auxiliary Lane Alternative due to the increase in impervious surfaces; however, in comparison with the overall watershed of the creeks, the increase in flow due to the proposed widening of the Route 1 would not be substantial (see Table 2.2.1-4). Project design features for the Tier II Auxiliary Lane Alternative would avoid long-term adverse impacts to water quality and stormwater runoff. The proposed project’s design goal is to maintain preconstruction stormwater discharge flows by promoting infiltration and metering or detaining flows to preconstruction rates prior to discharge to a receiving water body or to a municipal separate storm sewer system. By meeting this design goal, permanent, adverse water quality impacts are not expected. The overall design features for water quality impacts are a condition of the Caltrans National Pollutant Discharge Elimination System permit with the State Water Resources Control Board, as well as other regulatory agency requirements. Details for these design features or best management practices would be developed and incorporated into the project design and operations prior to the proposed project opening. With proper implementation of these design features or best management practices, permanent water quality impacts would be avoided or minimized.

Groundwater

The proposed impervious surface area required for the Tier II Auxiliary Lane Alternative may have localized impacts to the flow of groundwater. Existing groundwater recharge areas within the proposed project limits would be slightly affected due to the increase in impervious areas, which decreases the amount of areas available for infiltration. The impacts would not be substantial in comparison to the overall groundwater area and due to the highly variable nature of the existing groundwater flow paths. The Tier II Auxiliary Lane Alternative is a much smaller project than the Tier I Corridor Alternatives, which are also found to have only slight effect on groundwater recharge. In addition, because groundwater resources in the area do not represent a sole source aquifer, no substantial impacts to water quality in groundwater wells are anticipated.

No Build Alternative

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. Currently, no Treatment Best Management Practices are proposed along Route 1 within the project limits to treat roadway runoff; therefore, the water quality of the receiving water bodies would continue to be affected by highway runoff under the No Build Alternative.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

The avoidance, minimization, and mitigation measures below are applicable to both Tier I Corridor Alternatives on a conceptual basis. As portions of the Tier I corridor are programmed and become future tiered projects, they will be subject to separate environmental review, and the measures summarized below could be subject to change. These avoidance, minimization, and/or mitigation measures will apply to the Tier II Auxiliary Lane Alternative and are considered environmental commitments required for implementation of the Tier II Auxiliary Lane Alternative.

Design features required for the proposed project in compliance with permits and approvals include the following:

- Use of biofiltration devices or infiltration devices as preferred Treatment Best Management Practices and consideration of opportunities for other Treatment Best Management Practice devices, such as media filters, detention devices, wet basins, and multi-chambered treatment trains.
- Permanent erosion control measures shall be applied to all new or exposed slopes.
- Preservation of Existing Vegetation – At all locations, preserving existing vegetation is beneficial. The following general steps shall be taken to preserve existing vegetation during the design phase:

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

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

c) Designer shall provide specification in contract documents that the Contractor would 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.

d) Designer shall, when specifying the removal of vegetation, consider provisions included in the contract documents to minimize impacts (i.e., increased exposure or wind damage) to the adjacent vegetation that will be preserved.

Proper design of the following 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 following control measures must be implemented to stabilize slopes that are created or modified by the project:

  a) Vegetated surfaces

  b) Hard surfaces

Tier II Auxiliary Lane Alternative

Because the Tier I and Tier II projects have overlapping locations, the avoidance, minimization, and/or mitigation measures presented for Tier I Corridor Alternatives are applicable to both projects. Specifically, biofiltration devices are preferred treatment best management practices based on available site information for the Tier II project. In addition, the following specific measures would apply to the Tier II Auxiliary Lane Alternative:

- Incorporate in the design documents, construct and ensure long-term, continuous operation of stormwater treatment measures (biofiltration or infiltration facilities are preferred) to provide treatment of stormwater runoff in accordance with the State Water Resources Control Board's Order No. 99-06 DWQ (the 1999 Caltrans Municipal Stormwater Permit).
- The delineation in the contract documents of vegetation to be retained shall include vegetation below top of bank at Soquel Creek and Rodeo Creek Gulch, to the maximum extent practicable.

- Stormwater treatment facilities incorporated in the project shall be protected from concentrated flows by the incorporation of rock slope protection or other hard material at the inlets to the treatment facilities.

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2.2.3 Geology/Soils/Seismic/Topography

This section evaluates potential impacts to geology and seismic hazards that could result from operation of the Tier I and Tier II projects. Geology and seismic hazard impacts that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are also protected under the California Environmental Quality Act.

This section also discusses geology, soils, and seismic concerns as they relate to public safety and project design. Earthquakes are prime considerations in the design and retrofit of structures. Caltrans' Office of Earthquake Engineering is responsible for assessing the seismic hazard for Caltrans projects. Structures are designed using the Caltrans Seismic Design Criteria. The Seismic Design Criteria provides the minimum seismic requirements for highway bridges designed in California. A bridge's category and classification will determine its seismic performance level and which methods are used for estimating the seismic demands and structural capabilities. For more information, please see the Caltrans Division of Engineering Services, Office of Earthquake Engineering, Seismic Design Criteria.

Affected Environment

The information in this section is summarized from the Preliminary Geotechnical Report (2007).

Tier I Corridor Alternatives

The proposed project is located entirely within the Monterey Bay area of Santa Cruz County. Monterey Bay is underlain by water-bearing unconsolidated alluvium, stream channels, and basin sediments. The area has been cut by a complex series of high-angle thrust and strike slip northwest-trending faults, which has produced the northwest-trending ridge and valley systems. These areas are filled with Pleistocene to Holocene alluvium. The region consists of marine and non-marine sedimentary strata. There are no important natural landmarks or major geologic features in the area.

The underlying native soil units and their drainage and permeability characteristics are shown in Table 2.2.3-1 below. Table 2.2.3-1 shows that the soils in the project area are poorly drained to excessively drained, with loam to sandy loam surface textures. Sedimentary rock is found on most of the creek banks and gulches. Permeability or hydraulic conductivity of the area is moderately high to high, and runoff is very low to high, as shown in Table 2.2.3-1.

Table 2.2.3-1: Underlying Native Soil Units, Drainage Characteristics, and Permeability

Soil Unit	Map Unit Name	Surface Texture	Permeability	Slope (%)	Drainage	Runoff	Erosion Hazard
105	Baywood loamy sand	Loamy sand	High	2-15	Excessively drained	High	High
106	Baywood loamy sand	Loamy sand	High	15-30	Excessively drained	High	High
114	Ben Lomond – Felton	Loamy sand	High	30-50	Well drained	Moderately slow	Moderately low
116	Bonny Doon loam	Loam	Moderately high	5-30	Excessively drained	Slow	Low
124	Danville loam	Loam	High	0-2	Well drained	Slow	Low
129	Elder sandy loam	Sandy loam	Moderately high	0-2	Well drained	Moderately slow	Moderately low
130	Elder sandy loam	Sandy loam	Moderately high	2-9	Well drained	Moderately slow	Moderately low
133	Elkhorn sandy loam	Sandy loam	High	2-9	Well drained	Moderately slow	Moderately low
134	Elkhorn sandy loam	Sandy loam	High	9-15	Well drained	Moderately slow	Moderately low
135	Elkhorn sandy loam	Sandy loam	High	15-30	Well drained	Moderately slow	Moderately low
136	Elkhorn-Pfeiffer complex	Sandy loam	High	30-50	Well drained	Moderately slow	Moderately low
143	Lompico-Felton complex	Loam	High	30-50	Well drained	Moderately slow	Moderately low
161	Pinto loam	Loam	Moderately high	0-2	Moderately well drained	Slow	Low
162	Pinto loam	Loam	Moderately high	2-9	Moderately well drained	Slow	Low
170	Soquel loam	Loam	Moderately high	0-2	Moderately well drained	Moderately slow	Moderately low
171	Soquel loam	Loam	Moderately high	2-9	Moderately well drained	Moderately slow	Moderately low
174	Tierra Watsonville complex	Sandy loam	Moderately high	15-30	Moderately well drained	Very slow	Moderately low
176	Watsonville loam	Loam	Moderately high	2-9	Poorly drained	Very slow	Moderately low
177	Watsonville loam	Loam	Moderately high	9-15	Poorly drained	Very slow	Moderately low
178	Watsonville loam	Loam	Moderately high	15-30	Poorly drained	Very slow	Moderately low
179	Watsonville loam	Loam	Moderately high	30-50	Poorly drained	Very slow	Moderately low
182	Zayante coarse sand	Coarse sand	High	9-15	Excessively drained	High	Low

Source: Preliminary Geotechnical Report, 2007.

Erosion hazard is moderately low to high, but the improved areas within the project corridor that are protected by erosion control measures should have a low erosion potential. Table 2.2.3-1 demonstrates that the study area could be susceptible to erosion if runoff is high and drainage is excessive. The erosion hazard potential decreases as runoff and drainage decreases.

Seismic Activity

The project is located in a seismically active area of California. Many of the faults in the project area are capable of producing earthquakes that may cause strong ground shaking at the bridge locations. The maximum credible earthquake represents the largest magnitude earthquake that could occur on a given fault, based on the current understanding of the regional tectonic structure. The maximum credible earthquake is used to determine the safety evaluation for freeway design. The peak bedrock acceleration is the greatest distance at which the bedrock moves during an earthquake. The maximum credible earthquake for the Zayante-Vergales Fault, which is 2.2 miles away from the project area and is a controlling fault for the project vicinity, is 7.25 on the Richter scale. Another controlling fault for the project vicinity is the San Andreas Fault, which has a maximum credible earthquake of 8.0 on the Richter scale and is 6.25 miles away from the project area. See Table 2.2.3-2 for locations of the fault systems relative to the project site.

Table 2.2.3-2: Locations of the Fault Systems Relative to the Project Site

Fault Name	Estimated Closest Distance to the Middle* of the Project Area (miles)	Maximum Credible Earthquake	Peak Bedrock Acceleration
Zayante-Vergales	2.20	7.25	0.60
San Andreas	6.25	8.00	0.50
Sargent	8.15	6.75	0.30
Monterey Bay Zone	8.15	6.50	0.25
Calaveras-Pacines-San Benito	19.4	7.50	0.20

*Nearest perpendicular distance to the possible bridge location is taken to calculate peak bedrock acceleration.
Source: Preliminary Geotechnical Report, 2007.

The general terrain along the project corridor consists of gentle slopes presenting little or no potential for the formation of slumps, landslides, or earth flows; however, there is some potential for these conditions along the stream banks and terrace margins, defined by the distribution of surficial deposits. Additionally, the hillside slopes several hundred feet to the east and west of the corridor and has minor landslide potential.

Liquefaction

Liquefaction during an earthquake typically occurs in loose, cohesionless, saturated, and granular soils below the groundwater table. Submerged cohesionless sands and silts of low relative density are the type of soils that usually are susceptible to liquefaction. Clays are generally not susceptible to liquefaction. Within the study area, the majority of the submerged cohesionless subsoils are primarily medium dense to very dense. However, loose sands were encountered at some locations, such as the Park Avenue and Bay Avenue undercrossings.

Tier II Auxiliary Lane Alternative

The geology of the Tier II Auxiliary Lane Alternative project area is predominantly composed of marine terrace deposits from the Pleistocene era with small amounts of alluvium from the Pleistocene era and sedimentary rock from the Pliocene era. The primary soil types within the study area include Watsonville loam, which is poorly drained and has moderately high permeability, and Elkhorn sandy loam, which is well drained and has high permeability. Due to these soil conditions, the liquefaction potential for the study area is considered very low. The closest fault to the study area is the Zayante–Vergales Fault, which is 3.5 miles away. The maximum credible earthquake for this fault is 7.25 on the Richter scale.

Environmental Consequences

Tier I Corridor Alternatives

The developed areas within the project corridor are expected to have a low erosion potential. It is anticipated that no new embankments will be required for construction of the Tier I Corridor HOV Lane Alternative or Tier I Corridor TSM Alternative. In addition, the project area is not expected to have any significant amount of expansive soils.

Seismic Activity

The principal seismic hazard in the proposed project area is the potential for moderate to severe ground shaking from earthquakes occurring on one or more regional active faults. The Zayante-Vergales Fault is the controlling fault for this project and is likely to induce strong ground shaking within the project vicinity. The San Andreas Fault system also has displayed considerable activity in the past and is likely to do so in the future.

Based on the available data, liquefaction potential in the project corridor is generally relatively low; however, the potential is very high near the Park Avenue undercrossing and its vicinity (characterized by 8.5 foot level depth to groundwater) and at the Bay Avenue undercrossing (13 foot level depth to groundwater). Because groundwater levels affect soil cohesion and may vary with the passage of time, the levels would be verified during the final design phase for the preferred alternative.

Lateral spreading is a phenomenon associated with liquefaction where lateral movement of a soil embankment occurs along a free face. Impacts of liquefaction on improvements may vary and would depend on the type of structure. There is a possibility that lateral spreading may occur at any of the major creek channel crossings. The consequences could be potential failure of the bridge abutments, exceeding the lateral capacities of the bridge pile supports, and blockage of creek flows with soil deposits.

The project area has relatively low potential for landslides; however, slopes located along the creeks in the project corridor may pose local slump or landslide risk.

Risk to the General Public and Workers

The majority of surface drainage in the project area is well to moderately drained, indicating a moderately low erosion hazard throughout the project area. This means that the project would not expose construction workers, highway users, or structures to potential substantial adverse effects from soil erosion and/or surface drainage. Highway workers and users may be exposed to adverse effects from seismic activity due to the proximity of the Zayante-Vergales Fault. The San Andreas, Sargent, Monterey Bay Zone, and Calaveras-Pacines-San Benito faults also pose a potential danger.

Tier II Auxiliary Lane Alternative

The improved areas within the project corridor are expected to have a low erosion potential. It is anticipated that no new embankments would be required for this alternative. In addition, the Tier II project area is not expected to have any significant amount of expansive soils.

The project area has relatively low potential for landslides. Slopes located along the Rodeo Creek Gulch may pose local slump or landslide risk.

The majority of surface drainage in the project area is well to moderately drained, indicating a moderately low erosion hazard throughout the project area. This means that the project would not expose construction workers, highway users, or structures to potential substantial adverse effects from soil erosion and/or surface drainage. Highway workers and users may be exposed to adverse effects from seismic activity due to the proximity of the Zayante-Vergales Fault. The San Andreas, Sargent, Monterey Bay Zone, and Calaveras-Pacines-San Benito faults also pose a potential danger.

No Build Alternatives

Under the Tier I and Tier II No Build Alternatives, no major improvements would be made to Route 1. Geologic and seismic issues related to construction would not occur.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

The measures discussed below are applicable to the Tier II Auxiliary Lane Alternative and are anticipated to be applicable to future construction projects tiered from either of the Tier I Corridor Alternatives, which would be subject to separate environmental review. The selection of a Tier I Corridor Alternative would not result in actual construction; therefore, no avoidance, minimization, and/or mitigation measures are required at this time.

The proposed Tier II Auxiliary Lane Alternative and all future projects tiered from either of the proposed Tier I Corridor Alternatives would be designed to meet all Caltrans seismic engineering requirements. Caltrans Guidelines for Geotechnical Foundation Investigations and Reports would be used for the site-specific investigations. Specifications for construction would conform to Caltrans Standard Specifications; therefore, the following avoidance measures would be incorporated into project design for this and any future build alternative:

- A site-specific seismic hazard engineering analysis will be conducted during final design, which will include engineering recommendations for retaining walls, expansive soil treatment, cuts and fills, and bridge foundation elements.
- The specific seismic hazard engineering analysis will include design measures to address surface drainage, slope maintenance, and surface protection/erosion control. In addition, the seismic hazard engineering analysis will include design measures to minimize the potential damage from ground shaking, fault rupture, liquefaction, lateral spreading, and slope instability. The following requirements will be incorporated as part of the seismic hazard engineering analysis:
  - Replanting will be incorporated into project plans to protect any new slopes.
  - Permanent erosion control measures, such as infiltration devices, media filters, and detention devices, will be applied to all new and/or exposed slopes. Ditches, berms, dikes, swales, overside drains, flared end sections, and outlet protection/velocity dissipation devices will be designed to handle concentration flows.
  - Slope/surface protection systems with vegetated surfaces and hard surfaces will be employed to minimize erosion.
- To minimize potential damage from ground shaking, structures associated with this project will meet maximum credible earthquake standards, as established by the Caltrans Office of Earthquake Engineering. Caltrans has established Seismic Design Criteria for incorporating seismic loads in the design of structures. Structure design, including bridges, will reflect these design guidelines. Impacts from ground shaking and fault rupture are to be mitigated using appropriate Caltrans design methods, such as the use of stone columns, subexcavation, dynamic compaction, or dewatering methods.

- For foundation design of structures having concentrated loads (e.g., bridges), design will address the additional loads generated by the liquefaction conditions. The most suitable method(s) will be selected based on site-specific subsurface investigations conducted as part of the seismic hazard engineering analysis.
- Site-specific engineering recommendations to minimize impacts from lateral spreading will be incorporated into the final design plans and construction contract documents. Angled piles may be needed to lessen lateral pressures of creek banks to resist lateral spreading.
- Localized movements along creek banks will be controlled by incorporating in the project design appropriate permanent slope protection, including rock riprap or revetment. Structures, such as retaining walls, will be required to mitigate specific conditions. Site-specific engineering recommendations to minimize long-term impacts due to landsliding will be defined based upon field testing during the final design phase and incorporated in the final design.

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2.2.4 Paleontology

This section evaluates potential impacts to paleontological resources that could result from operation of the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative. Impacts to paleontological resources that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

Paleontology is a natural science focused on the study of ancient animal and plant life as it is preserved in the geologic record as fossils.

A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized projects.

- 16 United States Code (USC) 431-433 (the "Antiquities Act") prohibits appropriating, excavating, injuring, or destroying any object of antiquity situated on federal land without the permission of the Secretary of the Department of Government having jurisdiction over the land. Fossils are considered "objects of antiquity" by the Bureau of Land Management, the National Park Service, the Forest Service, and other federal agencies.
- 16 United States Code (USC) 470aaa (the Paleontological Resources Preservation Act) prohibits the excavation, removal, or damage of any paleontological resources located on federal land under the jurisdiction of the Secretaries of the Interior or Agriculture without first obtaining an appropriate permit. The statute establishes criminal and civil penalties for fossil theft and vandalism on federal lands.
- 23 United States Code (USC) 305 authorizes the appropriation and use of federal highway funds for paleontological salvage as necessary by the highway department of any state, in compliance with 16 USC 431-433 above and state law.

Under California law, paleontological resources are protected by the California Environmental Quality Act (CEQA).

Affected Environment

The information in this section is derived from the proposed project's Paleontological Evaluation Report (2008) and Paleontological Evaluation Report – Addendum (2011).

Tier I Corridor Alternatives

Marine and continental sedimentary deposits of Tertiary and Quaternary age are located near urban areas of Santa Cruz, Capitola, Soquel, and Aptos. Potentially fossiliferous rocks include strata ranging in age from Tertiary Miocene (i.e., Santa Margarita Sandstone and Santa Cruz Mudstone) to Holocene alluvial deposits. The Pliocene through Quaternary strata along the project right-of-way (listed from oldest to youngest) are: Pliocene Purisima Formation, Plio-Pleistocene Aromas Sand, Pleistocene terrace deposits, and Quaternary alluvium.

The Pliocene Purisima Formation is the most widespread stratigraphic unit along the Pacific Coast of central California and underlies most of the Santa Cruz-Aptos area. The Pliocene Purisima Formation is almost continuously exposed in sea cliffs up to 100 feet high and is also exposed in deep canyons in the foothills above the urbanized terraces. The basal sandstone of the Purisima Formation has yielded a radiometric date of 6.7±0.5 million years, suggesting a late Miocene age for the lowermost part of the formation. Most of the Purisima appears to be Pliocene in age based on invertebrate and vertebrate fossils.

Rocks and/or sediments of the Purisima Formation have produced fossilized remains of extinct species at various previously recorded fossil sites in the Santa Cruz area. During field surveys on April 10 through 12, 2007, abundant invertebrate fossils, fossil leaves, and trace fossils were found in Purisima Formation sediments at several localities and were observed in project right-of-way exposures. Trace fossils are geologic records of biological activity and may be impressions made in the rocks and/or sediments by an organism; for example, burrows, borings, or footprints. The presence of fossils in the formation indicates a high potential for similar fossil remains to be uncovered by excavation during project construction. The Purisima Formation is considered to have a high sensitivity to impacts resulting from ground disturbances.

Aromas Sand conformably overlies the Purisima Formation. Its age is most likely Pleistocene, although it has also been classified as Plio-Pleistocene. Fossil vertebrates and trace fossils have been previously reported in Aromas Sand. Casts of roots and burrows were discovered in fossil soils during the field surveys. The presence of fossil soils (i.e., paleosols) in the Aromas Sand indicates that scientifically important fossils may be discovered during project construction.

Prominent Pleistocene terrace deposits overlie both the Purisima Formation and Aromas Sand to form extensive coastal deposits in the Santa Cruz-Aptos area. The wave-cut terraces represent ancient shorelines, and the amounts of sediments deposited on these terraces are highly variable, ranging from a few feet to 200 feet thick. The youngest marine terrace, at approximately 100 feet above sea level, is from 90,000 to 120,000 radiocarbon years old.

Pleistocene marine and river terrace deposits in the Santa Cruz-Aptos area have produced marine invertebrates, vertebrates, and microfossils. Fossils were previously reported in published and unpublished geological and paleontological literature from Pleistocene terrace deposits in the vicinity of the project right-of-way. These terrace deposits are judged to have high sensitivity; however, no fossils were observed in terrace deposits during field surveys and they are not common.

Quaternary Alluvium refers to gravel, sand, silt, and clay deposited along the channels of streams and floodplains, such as Soquel, Aptos, and Valencia creeks. During the April 2007 field surveys, there were no indications that this stratigraphic unit contained fossils. Quaternary Alluvium is considered to have low sensitivity for fossils because it has not been known to produce fossils in the past.

Identifiable fossil remains discovered in Pliocene Purisima Formation, Plio-Pleistocene Aromas Sand, and Pleistocene terrace deposits during project construction could represent geographic or temporal range extensions and new taxa or new fossil records for the Santa Cruz-Aptos area and/or for the State of California. The Aromas Sand in particular is judged to have high sensitivity to discover significant fossils due to the previous discovery of fossil vertebrates and trace fossils in the vicinity of the project right-of-way. However, the infrequent occurrence of fossils indicates a low probability of adverse impacts on paleontological resources from ground disturbances in this area. Additional fossil remains could contribute to more accurately determine the age, paleoclimate, and/or depositional environment of the sediments from which they are discovered. Finally, fossil remains recovered during project construction could provide a more comprehensive documentation of the diversity of animal and plant life that once existed in Santa Cruz County, allowing a more accurate reconstruction of the geologic and paleobiologic history of the central California coast and Monterey Bay.

Tier II Auxiliary Lane Alternative

Potentially fossiliferous rocks include strata ranging in age from Miocene (i.e., Santa Margarita Sandstone and Santa Cruz Mudstone) to Holocene alluvial deposits. These strata dip gently toward the southeast away from the uplifted granite and metamorphic rocks composing Ben Lomond Mountain. The older stratigraphic units (i.e., Santa Margarita Sandstone and Santa Cruz Mudstone), as well as the Plio-Pleistocene Aromas Sand, are not exposed within the Tier II Auxiliary Lane Alternative right-of-way; therefore, in all probability, they would not be impacted by excavation occurring during construction. Consequently, these formations are not of concern here. The Pliocene through Quaternary strata that would be affected by excavation during construction are described in the Tier I Affected Environment discussion above and include the Pliocene Purisima Formation, Pleistocene Terrace Deposits, and Quaternary alluvium.

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative There would no impacts to paleontological resources during operation of the Tier I Corridor Alternatives or the Tier II Auxiliary Lane Alternative because excavation is not expected to occur. Impacts could occur during the construction phase of the project, such as the permanent destruction of paleontological resources, and these impacts are discussed in Section 2.4.8 Paleontology.

No Build Alternative

The No Build Alternative would not result in ground-disturbing activities that could affect paleontological resources.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

No impacts to paleontological resources are anticipated during project operations. Measures to mitigate construction-period impacts, including the potential permanent destruction of paleontological resources, are discussed in Section 2.4.8 Paleontology.

2.2.5 Hazardous Waste/Materials

This section evaluates potential human health hazards due to exposure to existing and possible future sources of hazardous materials and wastes that could result from the operation of the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative. Impacts that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Hazardous materials are generally substances that, by their nature and reactivity, have the capacity for causing harm or health hazards during normal exposure or an accidental release or mishap. They are characterized as being toxic, corrosive, flammable, reactive, an irritant, or a strong sensitizer. The term "hazardous substances" encompasses chemicals regulated by U.S. Department of Transportation "hazardous materials" regulations and U.S. Environmental Protection Agency's "hazardous waste" regulations, including emergency response. Hazardous wastes require special handling and disposal because of their potential to damage public health and the environment.

Regulatory Setting

Hazardous materials, including hazardous substances and wastes, are regulated by many state and federal laws. Statutes govern the generation, treatment, storage, and disposal of hazardous materials, substances, and waste, and also the investigation and mitigation of waste releases, air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Comprehensive Environmental Response, Compensation and Liability Act of 1980 and the Resource Conservation and Recovery Act of 1976. The purpose of the Comprehensive Environmental Response, Compensation and Liability Act, often referred to as "Superfund," is to identify and clean up abandoned contaminated sites so that public health and welfare are not compromised. The Resource Conservation and Recovery Act provides "cradle to grave" regulation of hazardous waste generated by operating entities. Other federal laws include:

- Community Environmental Response Facilitation Act of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety and Health Act
- Atomic Energy Act
- Toxic Substances Control Act
- Federal Insecticide, Fungicide, and Rodenticide Act

In addition to the acts listed above, Executive Order 12088, *Federal Compliance with Pollution Control Standards*, mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

California regulates hazardous materials, waste, and substances under the authority of the California Health and Safety Code and is also authorized by the federal government to implement the Resource Conservation and Recovery Act in the state laws that affect hazardous waste handling, storage, transportation, disposal, treatment, reduction, cleanup, and emergency planning. The Porter-Cologne Water Quality Control Act also restricts disposal of wastes and requires cleanup of wastes that are below hazardous waste concentrations but could impact ground and surface water quality. California regulations that address waste management and prevention and cleanup of contamination include Title 22 Division 4.5 Environmental Health Standards for the Management of Hazardous Waste, Title 23 Waters, and Title 27 Environmental Protection.

Worker and public health and safety are key issues when addressing hazardous materials that may affect human health and the environment. Proper management and disposal of hazardous materials is vital if they are encountered, disturbed, or generated during project construction.

Affected Environment

The information in this section is derived from the proposed project’s *Initial Site Assessment*, including the results of site investigations conducted in 2006 and 2007, which were updated in 2010, and an updated environmental database search conducted in January 2013 (ISA, 2014).

Tier I Corridor Alternatives

The Preliminary Initial Site Assessment was conducted in general accordance with the guidelines of the American Society for Testing and Materials Standard E 1527-05, “Standard Practice for Environmental Site Assessments: Phase I Environmental Site Assessment Process.” The scope of the Initial Site Assessment included site reconnaissance; historical research related to use, storage, disposal, or release of hazardous materials or petroleum hydrocarbons; review of environmental databases; and report of findings. Following the Initial Site Assessment, a site investigation covering the proposed project area was conducted and the findings are presented below.

Review of TrackInfo Services Environmental FirstSearch Report

The environmental database search consisted of a review of federal and state regulatory agencies that are responsible for recording incidents of spills, soil and groundwater contamination, and transfer, storage, or disposal facilities that handle hazardous materials.

This database search, conducted by TrackInfo Services, LLC, was prepared in March 2010 and updated in January 2013. The results are shown in Table 2.2.5-1.

Table 2.2.5-1: Summary of Environmental Database Search Results

Database Searched	Number of Individual Sites Listed
Comprehensive Environmental Response, Compensation, and Liability Information System – No Further Remedial Action Planned	1
Resource Conservation Recovery Act – Small Quantity Generators	26
Leaking Underground Storage Tanks	78
Spills, Leaks, Investigations, and Cleanups	1
Underground Storage Tanks	19
Certified Unified Program Agencies Listings	104
Aboveground Storage Tanks	9
Voluntary Cleanup Program	1
Total	**239**

Source: ISA, 2014.

As shown in Table 2.2.5-1, there are 239 individual sites within the search distances of 1 mile from the Tier I and Tier II corridors that have been identified in the environmental databases. These sites are included in the environmental databases because they have a history of hazardous wastes spills, are sites with soil or ground water contamination, or facilities that transfer, store, or dispose of hazardous materials or wastes. A one-mile search distance is intended to identify all sites that may have an effect on the project. Although several sites are listed in multiple databases, there are 239 individual sites.

Of the 239 sites within the 1-mile search radius, 18 were identified as Recognized Environmental Conditions for the Tier I and Tier II project area. A Recognized Environmental Condition means “the presence or likely presence of hazardous substances or petroleum products on a property under conditions that indicate an existing release, a past release, or a material threat of a release of any hazardous substances or petroleum products into structures on the property or into the ground, groundwater, or surface water of the property.”

Only those sites within the Tier II project limits were evaluated for meeting the criteria of a Recognized Environmental Condition. As future Tier II projects are implemented, new environmental database searches will be conducted, new Recognized Environmental Conditions will be determined, and updated ISAs will be developed. However, the following four general Recognized Environmental Conditions identified in the Initial Site Assessment apply to both of the Tier 1 Corridor Alternatives:

- Wooden utility poles along the roadside may be coated with creosote.
- Asbestos-containing materials are suspected to be present in joint compound materials within Route 1 bridges and railroad undercrossing structures.
- Paint used on existing Route 1 interchange structures, bridges and railroad undercrossings, yellow traffic striping, and pavement marking materials may contain lead-based paint or other hazardous materials and may exceed hazardous waste criteria under *California Code of* Regulations Title 22.
- Aerially deposited lead may be present along the shoulders and median of Route 1.

Review of Historical Aerial Photographs

Compilation of historical aerial photographs of the project area from 1931 to 2001 was performed for the *Initial Site Assessment* (ISA, 2014). Approximately 35 aerial photographs encompassing the project area were examined.

Based on a review of these historical aerial photographs, it appears that the project area and vicinity was largely agricultural in historical times, with residential and commercial uses dating from 1931 to the present.

The increase in commercial and residential development in surrounding areas from 1931 to present is similar to the increase in commercial and residential development in the project area and immediate vicinity.

Site Reconnaissance

Site reconnaissance was performed in November 2006 and again in April 2010. Site reconnaissance confirmed the presence of surrounding land uses that by their nature could be sources of hazardous wastes. These land uses include gas stations, a dry-cleaning facility, commercial storage yards, commercial maintenance/construction yards, railroad tracks, aboveground storage tank sites, a U.S. Post Office, a California Highway Patrol station, Pacific Gas and Electric substations, and auto repair facilities.

Tier II Auxiliary Lane Alternative

Database Results

The general Recognized Environmental Conditions listed above for the Tier I Corridor Alternatives also apply to the Tier II Auxiliary Lane Alternative. In addition, the following 14 Recognized Environmental Conditions apply to the Tier II Auxiliary Lane Alternative:

- The ARCO station, located at 2407 Porter Street in Soquel, released gasoline that contaminated groundwater. The case was closed in 1997. The term “case closed” in these instances means the site was cleaned up of all hazardous materials, and no further remedial action is necessary. This site is adjacent to the project footprint.

- Redtree Properties, located at 1650 Commercial Way in Santa Cruz, discharged gasoline, and only soil was contaminated. The case was closed in 1988. This site is located adjacent to the project footprint.
- Chevron Station 9-2231, located at 1524 Commercial Way in Santa Cruz, discharged gasoline and contaminated soil and groundwater. The case was closed in 1995. This site is located adjacent to the project footprint.
- Service Station No. 88, located at 2700 41st Avenue in Soquel, discharged gasoline and contaminated soil and groundwater. The case was closed in 2002. This site is adjacent to the project footprint.
- The former Exxon 7-0281 facility, located at 2501 Main Street in Soquel, discharged gasoline and contaminated soil and groundwater. The case was closed in 2011. This site is adjacent to the project footprint.
- The former Exxon 7-3604 facility (also listed as Pit Stop Service, Inc.), located at 836 Bay Avenue in Capitola, discharged gasoline and contaminated soil and groundwater. Groundwater monitoring continues. This site is located adjacent to the project footprint to the south.
- Redtree Properties, located at 819 Bay Avenue in Capitola, discharged gasoline and contaminated soil and groundwater. Groundwater monitoring continues. This site is located adjacent to the project footprint to the south.
- Unocal Station No. 6193, located at 1500 Soquel Drive in Santa Cruz, discharged gasoline and diesel and contaminated soil and groundwater. Groundwater monitoring continues. This site is located adjacent to the project footprint to the north.
- The BP 11240 facility, located at 2178 41st Avenue in Capitola, discharged gasoline and contaminated soil and groundwater. Groundwater monitoring continues. This site is located adjacent to the project footprint to the south.
- San Lorenzo Lumber Company, located at 2435 41st Avenue in Santa Cruz, discharged gasoline, and only soil was contaminated. The case was closed in 1991. This site is located adjacent to the project footprint.
- Tosco Service Station 30757 (also listed as Union Oil Service Station No. 4902), located at 2255 41st Avenue in Santa Cruz, discharged gasoline, waste oil, motor oil, lubricating oil, and hydraulic fluid. Only soil was contaminated. The case was closed in 2004. This site is located adjacent to the project footprint.
- Krafts Body Shop (also listed as Santa Cruz Distribution Facility), located at 6100 Soquel Avenue in Santa Cruz, discharged diesel, and only soil was contaminated. The case was closed in 1991. This site is located adjacent to the project footprint.

- The Chevron Station, located at 5998 Soquel Avenue in Santa Cruz, discharged gasoline, and only soil was contaminated. The case was closed in 1985. This site is located adjacent to the project footprint.
- The Pacific Bell facility, located at 7070 Soquel Avenue in Santa Cruz, discharged gasoline and contaminated soil and groundwater. The case was closed in 2001. This site is located adjacent to the project footprint.

Historical Aerial Photographs and Topographic Map Reviews

No Recognized Environmental Conditions were identified as a result of reviewing topographic maps and aerial photographs of the project location.

Site Reconnaissance

Site reconnaissance of the project location was conducted in November 2006 and April 2010. The site reconnaissance confirmed the presence of the database results listed above.

Environmental Consequences

Tier I Corridor Alternatives

The most prevalent potential environmental risks under the Tier I Corridor Alternatives are associated with four general Recognized Environmental Conditions: asbestos-containing material, lead-based paint coatings, creosote, and aerially deposited lead, described above in the Affected Environment section.

Although detailed information regarding construction of the Tier I alternatives is not yet available and will be considered during environmental review of future Tier II projects, construction of the Tier I Corridor alternatives would involve excavation activities within the project limits and therefore has the potential to disturb soils adjacent to paved areas within the project limits. Soils in these areas may contain aerially deposited lead generated by motor vehicle exhaust. Existing or acquired structures may have joint compound materials made of asbestos-containing materials. They may also contain lead-based paint or other hazardous materials and may exceed hazardous water criteria under *California Code of Regulations* Title 22 and require disposal in a Class I disposal site. These Recognized Environmental Conditions have the potential to result in the accidental release of hazardous waste and/or hazardous materials during construction of the project. Soil sampling would be conducted during the design phase of future tiered projects under either of the Tier I Corridor Alternatives to determine the presence and concentration of aerially deposited lead in soils along and within the median of Route 1. Construction phase avoidance, minimization and/or mitigation measures are identified in Section 2.4.10 Tier II Corridor Auxiliary Lane Alternative.

Tier II Auxiliary Lane Alternative

Ten of the Recognized Environmental Conditions sites described in the Affected Environment section sites are identified as "case closed", meaning that these site have been cleaned up of all hazardous materials, and no further remedial action is necessary. Four of the sites continue to be considered open cases, and therefore during project construction, there is a potential for an accidental release of hazardous waste and/or hazardous materials identified at sites that are considered open cases (described above in the Affected Environment section), which may potentially affect the area of project construction. Mitigation measures to address this potential impact are required and are identified in Section 2.4.10.

No Build Alternative.

There would be no construction or operational impacts associated with hazardous materials under the No Build Alternatives for the Tier I and Tier II projects.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

Long-term operational impacts were not identified, and therefore no avoidance, minimization and/or mitigation measures related to project operations are required. Avoidance, minimization and/or mitigation measures for temporary impacts that may occur during project construction are provided in Section 2.4.10.

Tier II Auxiliary Lane Alternative

Following selection of the preferred alternative, and prior to the acquisition of properties required for construction of the Tier II Auxiliary Lane Alternative, coordination with regulatory agencies and property owners would be conducted to determine the presence of hazardous substances, soil and groundwater contaminants, and the status of any applicable site assessments and monitoring activities.

Remediation monitoring would be conducted at the following Recognized Environmental Conditions sites. These sites are adjacent to the project area and would not be acquired for the project. All other sites require no remedial action.

- Former Exxon 7-3604 facility (also listed as Pit Stop Service, Inc.), located at 836 Bay Avenue in Capitola;
- Redtree Properties, located at 819 Bay Avenue in Capitola;
- Unocal Station No. 6193, located at 1500 Soquel Drive in Santa Cruz; and
- BP 11240 facility, located at 2178 41st Avenue in Capitola.

In addition, the following measures will be implemented prior to construction for the Tier II Auxiliary Lane Alternative and are anticipated to be required for future tiered construction projects under either of the Tier I Corridor Alternatives:

1. During the final design phase, an asbestos-containing materials investigation will be performed by an inspector certified in accordance with Asbestos Hazardous Emergency Response Act under Toxic Substance Control Act Title II and by California Occupational Safety and Health Administration under State of California rules and regulations (California Code of Regulations, Section 1529). Residential and commercial structures being acquired should be tested for asbestos-containing materials and lead-based paint prior to demolition. Asbestos-containing materials will be abated by using a contractor certified to perform such work. Asbestos-containing materials that may be disturbed during construction activities will be managed according to California Occupational Safety and Health Administration regulations (Title 8, *California Code of Regulations*, Section 1529). The contractor will be required to be certified to perform this work and will comply with all applicable local and state requirements for the removal and disposal of such materials, thus mitigating the impacts.
2. Those sites meeting the definition of a Recognized Environmental Condition will require soil and groundwater sampling for petroleum products and heavy metals, as applicable, along the sites' borders with the project area during the design phase. Final design specifications will require the proper management, removal and disposal of wooden utility poles along the roadside containing creosote.
3. Soil sampling will be conducted for aerially deposited lead in areas along the shoulders and median of Route 1. In addition to testing for the presence of aerially deposited lead, the contractor would be required to manage all excavated soils in accordance with all pertinent laws and regulations.
4. Soil and groundwater sampling will be conducted within the project area for petroleum products.
5. During the final design phase, surveys for lead-based paint will be conducted to plan for demolition of existing structures within the right-of-way. Lead-based paint will be abated by using a contractor certified to perform such work.
6. During the final design phase, a work plan for investigation of aerially deposited lead will be prepared for characterizing the extent of aerially deposited lead, and investigative sampling work will be performed according to the approved Worker Health and Safety Plan.

All measures listed above will be completed during the design phase of the project. Please see Section 2.4.9 Hazardous Wastes/Materials for measures to be implemented in the event that hazardous wastes/materials are encountered during construction.

2.2.6 Air Quality

This section evaluates potential impacts to air quality that could result from the operation of the Tier I and Tier II project alternatives. Impacts to air quality that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

The Federal Clean Air Act, as amended, is the primary federal law that governs air quality while the California Clean Air Act is its companion state law. These laws, and related regulations by the United States Environmental Protection Agency and the California Air Resources Board, set standards for the quantity of pollutants in the air. At the federal level, these standards are called National Ambient Air Quality Standards. National Ambient Air Quality Standards and state ambient air quality standards have been established for six transportation-related criteria pollutants that have been linked to potential health concerns: carbon monoxide, nitrogen dioxide, ozone, and particulate matter, which is broken down for regulatory purposes into particles of 10 micrometers or smaller [PM_{10}] and particles of 2.5 micrometers and smaller [$PM_{2.5}$]), and sulfur dioxide. In addition, national and state standards exist for lead, and state standards exist for visibility-reducing particles, sulfates, hydrogen sulfide, and vinyl chloride. The National Ambient Air Quality Standards and state standards are set at levels that protect public health with a margin of safety, and are subject to periodic review and revision. Both state and federal regulatory schemes also cover toxic air contaminants (air toxics); some criteria pollutants are also air toxics or may include certain air toxics within their general definition.

Federal air quality standards and regulations provide the basic scheme for project-level air quality analysis under the National Environmental Policy Act. In addition to this environmental analysis, a parallel “Conformity” requirement under the Federal Clean Air Act also applies.

Conformity

The conformity requirement is based on Federal Clean Air Act Section 176(c), which prohibits the United States Department of Transportation and other federal agencies from funding, authorizing, or approving plans, programs or projects that do not conform to State Implementation Plan for attaining the National Ambient Air Quality Standards. “Transportation Conformity” applies to highway and transit projects and takes place on two levels: the regional—or, planning and programming level—and the project level. The proposed project must conform at both levels to be approved.

Conformity requirements apply only in nonattainment and “maintenance” (former nonattainment) areas for the National Ambient Air Quality Standards, and only for the specific National Ambient Air Quality Standards that are or were violated. United States Environmental Protection Agency regulations at 40 *Code of Federal Regulations* 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for National Ambient Air Quality Standards and do not apply at all for state standards regardless of the status of the area.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the National Ambient Air Quality Standards for carbon monoxide, nitrogen dioxide, ozone, particulate matter (PM_{10} and $PM_{2.5}$), and in some areas (although not in California), sulfur dioxide. California has attainment or maintenance areas for all of these transportation-related “criteria pollutants” except sulfur dioxide, and also has a nonattainment area for lead; however, lead is not currently required by the Federal Clean Air Act to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of Regional Transportation Plans and Federal Transportation Improvement Programs that include all transportation projects planned for a region over a period of at least 20 years (for the Regional Transportation Plan), and 4 years (for the Federal Transportation Improvement Program). Regional Transportation Plan and Federal Transportation Improvement Program conformity uses travel demand and emission models to determine whether or not the implementation of those projects would conform to emission budgets or other tests at various analysis years showing that requirements of the Clean Air Act and the State Implementation Plan are met. If the conformity analysis is successful, the Metropolitan Planning Organization, Federal Highway Administration, and Federal Transit Administration, make the determinations that the Regional Transportation Plan and Federal Transportation Improvement Program are in conformity with the State Implementation Plan for achieving the goals of the Clean Air Act. Otherwise, the projects in the Regional Transportation Plan and/or Federal Transportation Improvement Program must be modified until conformity is attained. If the design concept, scope, and “open-to-traffic” schedule of a proposed transportation project are the same as described in the Regional Transportation Plan and the Transportation Improvement Program, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Conformity analysis at the project level includes verification that the project is included in the regional conformity analysis and a “hot spot” analysis if an area is “nonattainment” or “maintenance” for carbon monoxide and/or particulate matter (PM_{10} or $PM_{2.5}$). A region is “nonattainment” if one or more of the monitoring stations in the region measures a violation of the relevant standard, and the United States Environmental Protection Agency officially designates the area nonattainment. Areas that were previously designated as nonattainment areas but subsequently meet the standard may be officially redesignated to attainment by the United States Environmental Protection Agency, and are then called “maintenance” areas. “Hot spot” analysis is essentially the same, for technical purposes, as carbon monoxide or particulate matter analysis performed for National Environmental Policy Act purposes. Conformity does include some specific procedural and documentation standards for projects that require a “hot spot” analysis. In general, projects must not cause the "hot spot” related standard to be violated, and must not cause any increase in the number and severity of violations in nonattainment areas. If a known carbon monoxide or particulate matter violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

Carbon Monoxide. Carbon monoxide is a public health concern because it combines readily with hemoglobin in human blood, reducing the amount of oxygen transported in the bloodstream. Effects on humans range from slight headaches to nausea to death. State and federal carbon monoxide standards have been set for both 1-hour and 8-hour averaging times. The state 1-hour standard is 20 parts per million by volume, and the federal 1-hour standard is 35 parts per million. Both the state and federal standard is 9 parts per million for the 8-hour averaging period. Motor vehicles are the predominant source of carbon monoxide emissions in most areas. High levels develop primarily during winter when periods of light wind combine with ground-level temperature inversions. These conditions result in reduced dispersion of the carbon monoxide in vehicle emissions. In addition, motor vehicles emit more carbon monoxide in cool temperatures than in warm temperatures.

Ozone. Ozone is not directly emitted into the air but is formed by a photochemical reaction in the atmosphere. Ozone precursors, which include oxides of nitrogen and reactive organic gases, react in the atmosphere in the presence of sunlight to form ozone. State and federal standards for ozone have been set for a 1-hour and an 8-hour averaging time. The state requires that ozone concentration not exceed 0.09 part per million produced in a given area in 1 hour. The federal 1-hour ozone standard is 0.12 part per million, but it does not apply in California. The federal 8-hour ozone standard is 0.075 part per million, and the state standard is 0.07 part per million.

Particulate Matter (PM_{10} and $PM_{2.5}$). Particulate matter emissions are generated by a wide variety of sources, including agricultural activities, industrial emissions, dust suspended by vehicular traffic and construction equipment, and secondary aerosols formed by reactions in the atmosphere. The National Ambient Air Quality Standards for particulate matter applies to two classes of particulate: $PM_{2.5}$ and PM_{10}. The state PM_{10} standards are 50 micrograms per cubic meter as a 24-hour average and 20 micrograms per cubic meter as an annual arithmetic mean. There is no separate federal standard for annual PM_{10}. The federal PM_{10} standard is 150 micrograms per cubic meter as a 24-hour average. The state standard for $PM_{2.5}$ is 12 micrograms per cubic meter as an annual arithmetic mean. There is no separate state standard for 24 hour $PM_{2.5}$. The federal annual standard for $PM_{2.5}$ is 15 micrograms per cubic meter, and the 24 hour standard is 35 micrograms per cubic meter.

Nitrogen Dioxide. Nitrogen dioxide belongs to a family of highly reactive gases called nitrogen oxides. These gases form when fuel is burned at high temperatures and come principally from motor vehicle exhaust and stationary sources such as electric utilities and industrial boilers. A suffocating, brownish gas, nitrogen dioxide is a strong oxidizing agent that reacts in air to form corrosive nitric acid, as well as toxic organic nitrates. It also plays a major role in the atmospheric reactions that produce ground-level ozone (or smog). The state standard annual arithmetic mean is 0.03 part per million, and the state 1-hour standard is 0.18 part per million. The Environmental Protection Agency's health-based annual national air quality standard for nitrogen dioxide is 0.053 part per million. A 1-hour standard of 0.1 part per million went into effect January 22, 2010.

Sulfur Dioxide. Sulfur dioxide belongs to the family of sulfur oxide gases. These gases are formed when fuel containing sulfur (mainly coal and oil) is burned, and during metal smelting and other industrial processes. The state 24-hour standard is 0.04 part per million, and the state 1-hour standard is 0.25 part per million. The Environmental Protection Agency's health-based national air quality standard for sulfur dioxide is 75 parts per billion (measured over 1 hour).

Lead. Lead is a metal found naturally in the environment, as well as in manufactured products. The major sources of lead emissions have historically been motor vehicles and industrial sources. Due to the phase out of leaded gasoline, metal processing is the major source of lead emissions to the air today. The highest levels of lead in air are generally found near lead smelters. Other stationary sources are waste incinerators, utilities, and lead-acid battery manufacturers. The state 30-day average is 1.5 micrograms per cubic meter. The federal calendar quarter standard is 1.5 micrograms per cubic meter, and the 3-month rolling average standard is 0.15 microgram per cubic meter.

California-only Pollutants.

Visibility Reducing Particles. Visibility reducing particles are those that obstruct the range of visibility. The 8-hour standard extinction coefficient is 0.23 per kilometer visibility of 10 miles or more (0.07 per kilometer visibility of 30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent.

Sulfates. Sulfates are pungent solids formed primarily by the combustion of sulfur-containing fossil fuels, especially coal and oil. Considered major air pollutants, sulfates may impact human health and damage vegetation. The 24-hour standard is 25 micrograms per cubic meter using the ion chromatography method.

Hydrogen Sulfide. Hydrogen sulfide is a colorless, flammable, poisonous compound having a characteristic rotten-egg odor. It is used in industrial processes and may be emitted into the air. The 1-hour standard is 0.03 part per million (42 micrograms per cubic meter) as determined by ultraviolet fluorescence.

Vinyl Chloride. Vinyl chloride (chloroethene), a chlorinated hydrocarbon, is a colorless gas with a mild, sweet odor. Most vinyl chloride is used to make polyvinyl chloride plastic and vinyl products. Vinyl chloride has been detected near landfills, sewage plants, and hazardous waste sites, due to microbial breakdown of chlorinated solvents. The 24-hour standard is 0.01 part per million (26 micrograms per cubic meter) as determined by gas chromatography.

Toxic Air Pollutants

Mobile Source Air Toxics. These toxics are a subset of the 188 air toxics defined in the Clean Air Act. They are now federally regulated under 40 *Code of Federal Regulations* 1502.22 by the United States Environmental Protection Agency. Mobile source air toxics are 21 compounds emitted from highway vehicles and non-road equipment. The main toxics, called priority mobile source air toxics, are diesel particulate matter, benzene, 1-3 butadiene, acrolein, naphthalene, formaldehyde, and polycyclic organic matter. The Federal Highway Administration issued interim guidance in 2006 and an update to the guidance on September 30, 2009, for analysis in National Environmental Policy Act documents. There are no existing ambient air standards for the priority mobile source air toxics. Currently, the available technical tools do not enable predictions of the project-specific health impacts, so only a qualitative analysis is conducted.

Affected Environment

The information in this section is derived from the *Air Quality Study Report* (2013) prepared for this project.

The project area is within the North Central Coast Air Basin, which is an area of more than 5,100 square miles comprising Monterey, Santa Cruz, and San Benito counties. The factors affecting local air quality within the basin include meteorological and topographical conditions. Atmospheric conditions, such as wind speed, wind direction, and air temperature gradients, interact with the physical features of the landscape to determine the movement and dispersal of air pollutants.

In the fall, surface winds become weak, and the marine layer grows shallow, dissipating completely on some days. Air flow is occasionally reversed in a weak offshore movement, and the relatively stationary air mass allows pollutants to build up over a period of a few days. During this season, north or east winds develop to transport pollutants from either the San Francisco Bay Area or the Central Valley into the North Central Coast Air Basin.

During the winter, the Pacific High migrates southward and has less influence on the air basin. Air frequently flows in a southeasterly direction out of the Salinas and San Benito valleys, especially during night and morning hours. Northwest winds are most dominant in winter, but easterly flow is more frequent. The general absence of deep, persistent inversions and the occasional storm systems usually result in overall good air quality in winter and early spring.

In Santa Cruz County, coastal mountains exert strong influence on atmospheric circulation and result in generally good air quality. Small inland valleys, such as Scotts Valley with low mountains on two sides, have poorer circulation and more air pollutants than the areas of Santa Cruz on the coastal plain.

The annual average temperature in the project area is approximately 56.9 degrees Fahrenheit. The area experiences an average winter temperature of approximately 50.4 degrees Fahrenheit and an average summer temperature of approximately 62.5 degrees Fahrenheit. The semi-permanent high-pressure cell in the eastern Pacific is the basic controlling factor in the climate of the North Central Coast Air Basin. In the summer, the high-pressure cell is dominant and causes persistent west and northwest winds over the entire California coast. Air descends, forming a stable temperature inversion of hot air over a cool coastal layer of air. Onshore air currents pass over cool ocean waters to bring fog and relatively cool air into the coastal valleys. The warmer air above acts as a lid to inhibit vertical air movement. The northwest-southeast orientation of mountainous ridges tends to restrict and channel the summer onshore air currents. Surface heating in the interior portion of the Salinas and San Benito valleys creates weak low pressure, which intensifies the onshore air flow during the afternoon and evening. Annual average wind speed in the project area is approximately 4.1 miles per hour.

Total precipitation in the proposed project area averages approximately 29.3 inches annually. Precipitation occurs mostly during the winter and relatively infrequently during the summer. The amount of precipitation can vary greatly from one season to another. Precipitation averages approximately 16.8 inches during the winter, approximately 7 inches during the spring, approximately 5.1 inches during the fall, and less than 1 inch during the summer.

The Monterey Bay Unified Air Pollution Control District monitors air quality conditions at various locations throughout the North Central Coast Air Basin. The Santa Cruz-Soquel Monitoring Station is located approximately 3 miles southwest of the project corridor at 2544 Soquel Avenue in the city of Santa Cruz. Historical data from the Santa Cruz-Soquel Monitoring Station were used to characterize baseline conditions in the vicinity of the project area for ozone, $PM_{2.5}$, and PM_{10}. The nearest monitoring station to the project site for carbon monoxide, nitrogen dioxide, and sulfur dioxide is the Davenport Monitoring Station. The Davenport Monitoring Station is located approximately 15 miles west of the project corridor at Marine View and Center Avenue in the city of Davenport.

A summary of the data recorded in the project vicinity during the 2006 to 2011 period is shown in Table 2.2.6-1. The California Ambient Air Quality Standards and National Ambient Air Quality Standards for the criteria pollutants are also shown in the table. The criteria pollutants ozone, carbon monoxide, nitrogen dioxide, sulfur dioxide, $PM_{2.5}$, and PM_{10} did not exceed the standards during the 2006 through 2011 period.

Table 2.2.6-1: 2006-–2011 Ambient Air Quality Data in Project Vicinity

Pollutant	Pollutant Concentrations and Days Exceeding Standards (Federal and State)	2006	2007	2008	2009	2010	2011
Ozone[1]	Maximum 1-hour Concentration (ppm)	0.07	0.07	0.09	0.07	0.08	0.07
	Days > 0.09 ppm (State 1-hour standard)	0	0	0	0	0	0
	Days>0.12 ppm (Federal 1-hour standard	0	0	0	0	0	0
Carbon Monoxide[2]	Maximum 8-hour concentration (ppm)	0.8	1.0	1.3	5.2	0.6	*
	Days > 9.0 ppm (State 8-hour standard)	0	0	0	0	0	*
	Days > 9 ppm (Federal 8-hour standard)	0	0	0	0	0	*
Nitrogen Dioxide[2]	Maximum 1-hour Concentration (ppm)	0.03	0.03	0.03	0.02	0.03	*
	Days > 0.18 ppm (State 1-hour standard)	0	0	0	0	0	*
	Days > 0.10 ppm (Federal 1-hour standard)	0	0	0	0	0	*
PM_{10}[1]	Maximum 24-hour concentration ($\mu g/m^3$)	37	34	45	36	31	22
	Days > 50 $\mu g/m^3$ (State 24-hour standard)	0	0	0	0	0	0
	Days > 150 $\mu g/m^3$ (Federal 24-hour standard)	0	0	0	0	0	0
$PM_{2.5}$[1]	Annual Arithmetic Mean ($\mu g/m^3$)	6.8	6.3	6.8	5.7	*	
	Exceed State Standard (12 $\mu g/m^3$)	No	No	No	No		
	Exceed Federal Standard (15.0 $\mu g/m^3$)	No	No	No	No		
Sulfur Dioxide[2]	Maximum 24-hour Concentration (ppm)	0.01	<0.01	<0.01	0.01	<0.01	*
	Days > 0.04 ppm (State 24-hour standard)	0	0	0	0	0	*
	Days>0.075 ppm (Federal 24-hour-standard)	0	0	0	0	0	*

[1] Data obtained from the Santa Cruz-Soquel Monitoring Station.
[2] Data obtained from the Davenport Monitoring Station.
ppm – parts per million; $\mu g/m^3$ – micrograms per cubic meter
Source: CARB, Historical Data by Year, 2012; * Insufficient data.

The sensitive receptors or people most likely to be affected by air pollution, as identified by the California Air Resources Board, include children under 14, the elderly over 65, athletes, and people with cardiovascular and chronic respiratory diseases. Locations that may contain a high concentration of these sensitive population groups are called sensitive receptors and include residential areas, hospitals, child-care facilities, elder-care facilities, elementary schools, athletic facilities, playgrounds, and parks. Sensitive receptors that were identified in and near the project corridor include residential units, schools, a college, two tennis clubs, and a state beach.

The state and federal air quality attainment status for the North Central Coast Air Basin is shown in Table 2.2.6-2.

Table 2.2.6-2: State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State [8] Standard	Federal [8] Standard	Principal Health and Atmospheric Effects	Typical Sources	Project Area Attainment Status
Ozone (O_3) [2]	1 hour 8 hours	0.09 ppm 0.070 ppm	--- [4] 0.075 ppm (4th highest in 3 years)	High concentrations irritate lungs. Long-term exposure may cause lung tissue damage and cancer. Long-term exposure damages plant materials and reduces crop productivity. Precursor organic compounds include many known toxic air contaminants. Biogenic VOC may also contribute.	Low-altitude ozone is almost entirely formed from reactive organic gases/volatile organic compounds (ROG or VOC) and nitrogen oxides (NOx) in the presence of sunlight and heat. Common precursor emitters include motor vehicles and other internal combustion engines, solvent evaporation, boilers, furnaces, and industrial processes.	Federal: Attainment State: Nonattainment (both 1 hour and 8 hour)
Carbon Monoxide (CO)	1 hour 8 hours 8 hours (Lake Tahoe)	20 ppm 9.0 ppm [1] 6 ppm	35 ppm 9 ppm ---	CO interferes with the transfer of oxygen to the blood and deprives sensitive tissues of oxygen. CO also is a minor precursor for photochemical ozone. Colorless, odorless.	Combustion sources, especially gasoline-powered engines and motor vehicles. CO is the traditional signature pollutant for on-road mobile sources at the local and neighborhood scale.	Federal: Attainment (both 1 hr and 8 hr) State: Attainment (both 1 hr and 8 hr)
Respirable Particulate Matter (PM_{10}) [2]	24 hours Annual	50 μg/m^3 20 μg/m^3	150 μg/m^3 --- [2] (expected number of days above standard < or equal to 1)	Irritates eyes and respiratory tract. Decreases lung capacity. Associated with increased cancer and mortality. Contributes to haze and reduced visibility. Includes some toxic air contaminants. Many toxic & other aerosol and solid compounds are part of PM_{10}.	Dust- and fume-producing industrial and agricultural operations; combustion smoke & vehicle exhaust; atmospheric chemical reactions; construction and other dust-producing activities; unpaved road dust and re-entrained paved road dust; natural sources.	Federal: Attainment State: Nonattainment (both 1 hr and 8 hr)

Table 2.2.6-2: State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State [8] Standard	Federal [8] Standard	Principal Health and Atmospheric Effects	Typical Sources	Project Area Attainment Status
Fine Particulate Matter ($PM_{2.5}$) [2]	24 hours Annual 24 hours (conformity process [5]) Secondary Standard (annual; also for conformity process [5])	--- 12 μg/m³ --- ---	35 μg/m³ 12.0 μg/m³ 65 μg/m³ 12 μg/m³ (98th percentile over 3 years)	Increases respiratory disease, lung damage, cancer, and premature death. Reduces visibility and produces surface soiling. Most diesel exhaust particulate matter – a toxic air contaminant – is in the $PM_{2.5}$ size range. Many toxic & other aerosol and solid compounds are part of $PM_{2.5}$.	Combustion including motor vehicles, other mobile sources, and industrial activities; residential and agricultural burning; also formed through atmospheric chemical and photochemical reactions involving other pollutants including NOx, sulfur oxides (SOx), ammonia, and ROG.	Federal: Attainment (Annual and 24 hr) State: Attainment
Nitrogen Dioxide (NO_2)	1 hour Annual	0.18 ppm 0.030 ppm	0.100 ppm [6] (98th percentile over 3 years) 0.053 ppm	Irritating to eyes and respiratory tract. Colors atmosphere reddish-brown. Contributes to acid rain & nitrate contamination of stormwater. Part of the "NOx" group of ozone precursors.	Motor vehicles and other mobile or portable engines, especially diesel; refineries; industrial operations.	Federal: Attainment (1 hr and annual) State: Attainment (1 hr and annual)
Sulfur Dioxide (SO_2)	1 hour 3 hours 24 hours	0.25 ppm --- 0.04 ppm	0.075 ppm [7] (99th percentile over 3 years) 0.5 ppm [9]	Irritates respiratory tract; injures lung tissue. Can yellow plant leaves. Destructive to marble, iron, steel. Contributes to acid rain. Limits visibility.	Fuel combustion (especially coal and high-sulfur oil), chemical plants, sulfur recovery plants, metal processing; some natural sources like active volcanoes. Limited contribution possible from heavy-duty diesel vehicles if ultra-low sulfur fuel not used.	Federal: Attainment (1 hr) State: Attainment (24 hour and 1 hr)
Lead (Pb) [3]	Monthly Rolling 3-month average	1.5 μg/m³ ---	--- 0.15 μg/m³ [11]	Disturbs gastrointestinal system. Causes anemia, kidney disease, and neuromuscular and neurological dysfunction. Also a toxic air contaminant and water pollutant.	Lead-based industrial processes like battery production and smelters. Lead paint, leaded gasoline. Aerially deposited lead from older gasoline use may exist in soils along major roads.	Federal: Attainment State: Attainment

Table 2.2.6-2: State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State [8] Standard	Federal [8] Standard	Principal Health and Atmospheric Effects	Typical Sources	Project Area Attainment Status
Sulfate	24 hours	25 μg/m^3	---	Premature mortality and respiratory effects. Contributes to acid rain. Some toxic air contaminants attach to sulfate aerosol particles.	Industrial processes, refineries and oil fields, mines, natural sources like volcanic areas, salt-covered dry lakes, and large sulfide rock areas.	Federal: n/a State: Attainment
Hydrogen Sulfide (H_2S)	1 hour	0.03 ppm	---	Colorless, flammable, poisonous. Respiratory irritant. Neurological damage and premature death. Headache, nausea. Strong odor.	Industrial processes such as: refineries and oil fields, asphalt plants, livestock operations, sewage treatment plants, and mines. Some natural sources like volcanic areas and hot springs.	Federal: n/a State: Attainment
Visibility Reducing Particles (VRP)	8 hours	Visibility of 10 miles or more (Tahoe: 30 miles) at relative humidity less than 70%	---	Reduces visibility. Produces haze. NOTE: not directly related to the Regional Haze program under the Federal Clean Air Act, which is oriented primarily toward visibility issues in National Parks and other “Class I” areas. However, some issues and measurement methods are similar.	See particulate matter above. May be related more to aerosols than to solid particles.	Federal: n/a State: Attainment
Vinyl Chloride[3]	24 hours	0.01 ppm	---	Neurological effects, liver damage, cancer. Also considered a toxic air contaminant.	Industrial processes	Federal: n/a State: Attainment

Environmental Consequences

Regional Air Quality Conformity

The project is located in an attainment/unclassified area for all current National Ambient Air Quality Standards. Therefore, conformity requirements do not apply.

The proposed project is in the Metropolitan Transportation Plan/Sustainable Communities Strategy, which was found to conform to the State Implementation Plan for achieving the goals of the Clean Air Act requirements related to the National Ambient Air Quality Standards by the Association of Monterey Bay Area Governments on June 11, 2014. The project is also included in the Association of Monterey Bay Area Governments financially constrained 2014 Metropolitan Transportation Improvement Program, which was also found to conform by the Federal Highway Administration and the Federal Transportation Administration on December 15, 2014. The project is described as “Highway 1 HOV Lanes (In the City of Santa Cruz, on Route 1 between Morrissey and San Andreas and Larkin Valley Road. Add HOV lanes, pedestrian overcrossings, and operational improvements).” The design concept and scope of the proposed project is consistent with the project description in the 2014 Metropolitan Transportation Plan, 2014 Metropolitan Transportation Improvement Program, and the assumptions used in the Association of Monterey Bay Area Governments regional emissions analysis.

Project-Level Conformity

Under Clean Air Act requirements, areas are designated as either attainment or nonattainment for each criterion pollutant based on whether the National Ambient Air Quality Standards have been achieved. Areas are designated as nonattainment for a pollutant if air quality data show that a federal standard for the pollutant was violated at least once during the previous three calendar years. Under the Clean Air Act, the Santa Cruz County portion of the North Central Coast Air Basin is designated as an attainment area under federal standards for all criteria pollutants, which is reflected in Table 2.2.6-2.

Project-Level Operational Emissions

Project-level operational emissions were quantified based on the vehicle miles traveled calculated for the proposed project using transportation models. Automobile emissions were quantified using light-duty emission factors obtained from the California Air Resources Board EMFAC2011 Motor Vehicle Emissions Inventory Model.

Vehicles generally have lower emissions rates in free-flow conditions compared to stop-and-go conditions; however, as shown below, peak-hour and annual emissions would increase for certain pollutants within the various scenarios and analysis years. The EMFAC2011 model cannot directly estimate the impacts of changes in acceleration and deceleration patterns. Instead, the emission factors were developed for average speeds. The result is a "U-shape" relationship between emission factors and vehicle speeds, which varies by pollutant. For example, emission factors for particulate matter may decrease with speeds up to 35 miles per hour but increase above 35 miles per hour. The emission rate of nitrogen oxides increases per mile with speeds between 42 and 52 miles per hour, while emission rate of carbon monoxide decreases per mile with speeds between 42 and 52 miles per hour. As a result, increasing vehicle speeds from 35 miles per hour to a free-flow speed of 65 miles per hour would potentially increase emissions of carbon monoxide, particulate matter ($PM_{2.5}$) and nitrogen oxides. This is evident in the modeling results shown in Table 2.2.6-3. In addition, increasing vehicle speeds allows more vehicles to travel the project alignment during the peak-hour period, resulting in higher mass emissions.

Table 2.2.6-3 presents emissions for the Tier I Alternatives for the year 2035 as well as baseline conditions. The baseline conditions values are based on traffic volumes and emission factors in 2003, at the time that the Notice of Preparation for the proposed project was published. This is consistent with the 2010 decision by the California Court of Appeal (6^{th} District) in Sunnyvale West Neighborhood Association v. City of Sunnyvale City Council, which clarified that California Environmental Quality Act analyses of future traffic and traffic-related impacts must be compared against a baseline of existing conditions when the Notice of Preparation is published.

Tier I Corridor HOV Lane Alternative

A regional emissions analysis was completed based on AM and PM peak-hour traffic volumes and speeds. The proposed project is designed to decrease congestion and increase vehicle speeds during the heavily congested peak hours. The HOV lanes will not greatly affect freeway speeds and flow during uncongested time periods; therefore, the peak-hour analysis is an accurate representation of how the proposed project will change regional emissions. Project-level peak-hour emissions are presented in Table 2.2.6-3. The Tier I Corridor HOV Lane Alternative would generally reduce peak-hour emissions when compared to baseline conditions. In comparison to the No-Build Alternative, in 2035, the Tier I Corridor HOV Lane Alternative would result in peak-period reductions in three criteria pollutants, and minor increases in three criteria pollutant emissions.

Table 2.2.6-3: Peak-Hour Emissions – Tier I Corridor HOV Lane Alternative

Scenario	Corridor Emissions (Pounds per AM and PM Peak Hours)					
	Carbon Monoxide	Reactive Organic Gas	Nitrogen Oxides	Sulfur Oxides	PM_{10}	$PM_{2.5}$
Baseline Condition*	2,128	100	357	1.9	18	8.9
2035						
No Build	312	17	46	1.9	12	6.8
HOV	330	13	55	1.7	5.9	8.8
HOV versus Baseline	(1,798)	(87)	(303)	(0.2)	(12)	(0.1)
HOV versus No Build	18	(4)	9	(0.2)	(6.4)	2.0

* Baseline Condition is based on 2003 traffic volumes and emission factors.
Note: Parenthesis indicates a negative number.
Note: Emissions based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); Emission factors obtained from EMFAC2011.
Note: Due to rounding, the numbers presented may not add up precisely to the totals provided.
Source: Air Quality Study Report, 2013.

Annual emissions are presented in Table 2.2.6-4. When comparing the Tier I Corridor HOV Lane Alternative annual emissions to baseline conditions, in 2035, mobile source emissions would substantially decrease. Annual emissions in 2035 would realize a minor decrease when comparing the Tier I Corridor HOV Lane Alternative to the No Build Alternative. This difference in emissions between the No Build and the Tier I Corridor HOV Lane Alternative is primarily related to volume. In 2035, the general purpose lanes would become more congested, while the HOV lane operates at higher speeds, which leads to an improvement in emissions. While 2035 peak period emissions for certain pollutants would show a minor increase when compared to the No Build Alternative, all 2035 annual emissions under the Tier I Corridor HOV Lane Alternative would be less than the No Build Alternative. Both peak-period and annual emissions under the Tier I Corridor HOV Lane Alternative would be less than the baseline (2003) emissions.

Because local monitoring data show that the study area has not exceeded ambient air quality standards since 2006, it is unlikely that the standards would be exceeded in the future when total emissions are lower. Therefore, the Tier I Corridor HOV Lane Alternative would not result in an adverse impact related to annual project-level emissions.

**Table 2.2.6-4: Annual Emissions –
Tier I Corridor HOV Lane Alternative**

Scenario	Corridor Annual Emissions (Tons per Year)					
	CO	ROG	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Baseline Condition*	38,600	1,694	7,340	34	297	146
2035						
No Build	3,901	190	691	21	85	103
HOV Lane	2,448	108	440	13	45	68
HOV versus Baseline	(36,153)	(1,587)	(6,900)	(21)	(251)	(78)
HOV versus No Build	(1,453)	(83)	(251)	(8)	(40)	(35)

* Baseline Condition is based on 2003 traffic volumes and emission factors.
CO – carbon monoxide; ROG – reactive organic gas; NO_X – nitrogen oxide; SO_X – sulfur oxide; PM_{10} – particulate matter less than 10 microns in diameter; $PM_{2.5}$ – particulate matter less than 2.5 microns in diameter.
Note: Parenthesis indicates a negative number.
Note: Due to rounding, the numbers presented may not add up precisely to the totals provided.
Source: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); Emission factors obtained from EMFAC2011.

Tier I Corridor TSM Alternative

Project-level peak-hour emissions are presented in Table 2.2.6-5. When compared to baseline (2003) conditions, in 2035, the Tier I Corridor TSM Alternative would reduce peak-hour emissions for all pollutants except sulfur oxides. When compared with the No Build Alternative, in 2035, the TSM Alternative would show minor increases in all criteria pollutants. Although emissions for certain pollutants would increase when compared to the No Build Alternative, all emissions under the Tier I Corridor TSM Lane Alternative would be similar and, in some cases, would be substantially less than baseline emissions. Because local monitoring has shown that the study area has not recently exceeded ambient air quality standards, it is unlikely that the standards would be exceeded in the future when total emissions are lower. Therefore, the Tier I Corridor TSM Lane Alternative would not result in an adverse impact related to annual project-level emissions.

Table 2.2.6-5: Peak-Hour Emissions – Tier I Corridor TSM Alternative

Scenario	Corridor Peak-Hour Emissions (Pounds per AM and PM Peak Hours)					
	CO	ROG	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Baseline Condition*	2,128	100	357	1.9	18.1	8.9
2035						
No Build	312	17	46	1.9	12.3	6.8
TSM	359	18	56	2.0	15.5	8.4
TSM versus Baseline	(1,769)	(81)	(302)	0.1	(2.5)	(0.6)
TSM versus No Build	47	1	10	0.2	3.2	1.5

* Baseline Condition is based on 2003 traffic volumes and emission factors.
CO – carbon monoxide; ROG – reactive organic gas; NO_X – nitrogen oxide; SO_X – sulfur oxide; PM_{10} – particulate matter less than 10 microns in diameter; $PM_{2.5}$ – particulate matter less than 2.5 microns in diameter.
Note: Parenthesis indicates a negative number.
Note: Due to rounding, the numbers presented may not add up precisely to the totals provided.
Source: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); emission factors obtained from EMFAC2011.

Annual emissions are presented in Table 2.2.6-6. When compared to baseline conditions, the Tier I Corridor TSM Alternative would reduce or have a minor effect on mobile source emissions in 2035. When compared to the No Build Alternative, the Tier I Corridor TSM Alternative results in increases in annual emissions. These emissions increases in certain pollutants are due to emission rates increasing as vehicles approach free-flow speed.

No ambient air quality standards have been exceeded in the study area since 2006, as indicated in Table 2.2.6-1. Although emissions for certain pollutants would increase when compared to the No Build Alternative, all emissions under the Tier I Corridor TSM Lane Alternative would be similar and, in some cases, would be substantially less than baseline emissions. Because the study area has not recently exceeded ambient air quality standards, it is unlikely that the standards would be exceeded in the future when total emissions are lower. Therefore, the Tier I Corridor TSM Lane Alternative would not result in an adverse impact related to annual project-level emissions.

Tier I No Build Alternative

The No Build Alternative assumes no major construction on Route 1 through the project limits other than currently planned and programmed improvements and continued routine

Table 2.2.6-6: Annual Emissions – Tier I Corridor TSM Alternative

Scenario	Corridor Annual Emissions (Tons per Year)					
	CO	ROG	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Baseline Condition*	38,600	1,694	7,340	34	297	146
2035						
No Build	3,901	190	691	21	85	103
TSM	4,997	235	908	26	114	135
TSM versus Baseline	(33,604)	(1,459)	(6,432)	(8)	(183)	(11)
TSM versus No Build	1,096	45	217	5	28	32

* Baseline Condition is based on 2003 traffic volumes and emission factors.
CO – carbon monoxide; ROG – reactive organic gas; NO_X – nitrogen oxide; SO_X – sulfur oxide; PM_{10} – particulate matter less than 10 microns in diameter; $PM_{2.5}$ – particulate matter less than 2.5 microns in diameter.
Note: Parenthesis indicates a negative number.
Note: Due to rounding, the numbers presented may not add up precisely to the totals provided.
Source: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); emission factors obtained from EMFAC2011.

maintenance. Other programmed improvements would undergo individual environmental review with project and construction emissions analyzed, as necessary.

No Build Alternative peak-hour and annual emissions compared to baseline emission are shown in Tables 2.2.6-7 and 2.2.6-8. Table 2.2.6-7 presents projected peak hour emissions, and Table 2.2.6-8 presents projected annual emissions. As shown in Table 2.2.6-7, in 2035, the No Build Alternative would result in the same amount of peak hour emissions for sulfur oxides (SOx) as under baseline conditions and would result in fewer peak hour emissions than baseline conditions for all other pollutants.

Table 2.2.6-7: Peak-Hour Emissions – Tier I Corridor No Build Alternative

Scenario	Corridor Peak-Hour Emissions (Pounds per Hours)					
	CO	ROG	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Baseline Condition*	2,128	100	357	1.9	18.1	8.9
2035						
No Build	312	17	46	1.9	12.3	6.8
No Build versus Baseline	(1,816)	(83)	(311)	0	(5.8)	(2.1)

* Baseline Condition is based on 2003 traffic volumes and emission factors.
CO – carbon monoxide; ROG – reactive organic gas; NO_X – nitrogen oxide; SO_X – sulfur oxide; PM_{10} – particulate matter less than 10 microns in diameter; $PM_{2.5}$ – particulate matter less than 2.5 microns in diameter.
Note: Parenthesis indicates a negative number.
Source: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); emission factors obtained from EMFAC2011.

**Table 2.2.6-8: Annual Emissions –
Tier I Corridor No Build Alternative**

Scenario	Corridor Annual Emissions (Tons per Year)					
	CO	ROG	NO_X	SO_X	PM_{10}	$PM_{2.5}$
Baseline Condition*	38,600	1,694	7,340	34	297	146
2035						
No Build	3,901	190	691	21	85	103
No Build versus Baseline	(34,699)	(1,504)	(6,649)	(13)	(212)	(43)

* Baseline Condition is based on 2003 traffic volumes and emission factors.
CO – carbon monoxide; ROG – reactive organic gas; NO_X – nitrogen oxide; SO_X – sulfur oxide; PM_{10} – particulate matter less than 10 microns in diameter; $PM_{2.5}$ – particulate matter less than 2.5 microns in diameter.
Note: Parenthesis indicates a negative number.
Note: Due to rounding, the numbers presented may not add up precisely to the totals provided.
Source: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); Emission factors obtained from EMFAC2011.

As shown in Table 2.2.6-8, the No Build Alternative would result in fewer annual emissions than baseline conditions for all pollutants evaluated for 2035. These predicted reductions in mobile source emission rates are due to improvements in engine efficiency. Because the No Build Alternative would result in the emission of fewer pollutants (or, for peak hour emissions, the same level of sulfur oxide) as occurs under baseline conditions, the No Build Alternative would not result in an adverse impact related to project-level emissions.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative would reduce congestion and improve vehicle speeds during peak traffic periods on Route 1 within the Tier II Corridor (41st Avenue to Soquel Avenue). The Tier II Auxiliary Lane Alternative improvements were included in the air quality analysis of the Tier I Corridor HOV Lane Alternative shown above, based on a traffic operations analysis conducted in 2010 that prioritized the Tier II Auxiliary Lane Alternative for funding and construction, independent of the preferred alternative that is selected for the Tier I corridor. The prioritization of the Tier II Auxiliary Lane Alternative was due to its potential to relieve congestion and at the same time minimize traffic “hot spots” along the corridor. Table 2.1.5-1 (in Section 2.1.5, Traffic) shows that, under baseline conditions, the average travel speeds in the northbound direction are 30 miles per hour in the morning and 39 miles per hour in the evening. In the southbound direction, they are 60 miles per hour in the morning and 26 miles per hour in the evening. As described in Section 2.1.5, the Tier II Auxiliary Lane Alternative would improve traffic operations along the northbound corridor in the AM peak hour; slightly worsen traffic operations along the southbound corridor in the PM peak hour, but improve vehicle and person throughputs; negligibly improve the Highway 1 corridor operations in the non-peak directions of travel (southbound in the AM peak hour and northbound in the PM peak hour); and eliminate the existing bottleneck between the Soquel Avenue and 41st Avenue interchanges in the northbound direction.

As previously discussed, the relationship between emissions factors and speeds varies for each pollutant. As evident in the EMFAC2011 model, the emission rate of nitrogen oxides increases per mile with speeds between 42 and 52 miles per hour, while emission rate of carbon monoxide decreases per mile with speeds between 42 and 52 miles per hour, and particulate matter may decrease with speeds up to 35 miles per hour but may increase above 35 miles per hour. As a result, increasing vehicle speeds from the range of 26 to 39 miles per hour to the range of 42 to 52 miles per hour would potentially reduce carbon monoxide emissions, although it could result in increases of nitrogen oxides and particulate matter. Further increases to a free-flow speed of 65 miles per hour would potentially increase emissions of carbon monoxide according to EMFAC2011. These examples are based on speeds that were used in the air quality analysis. As noted previously, the EMFAC2011 model cannot directly estimate the impacts of changes in acceleration and deceleration patterns; however, reductions in congestion reduce the amount of acceleration/deceleration associated with stop-and-go traffic conditions, which offers air quality benefits that are not quantified in the model.

Project-Level Analysis

Projects located in areas that are designated as in nonattainment of federal standards for carbon monoxide or particulate matter less than 10 microns in diameter (PM_{10}) must conduct a hot-spot analysis to demonstrate that the transportation project meets federal Clean Air Act conformity requirements to support state and local air quality goals with respect to potential localized air quality impacts. As shown in Table 2.2.6-2, the project area is in attainment of the federal carbon monoxide and PM_{10} standards. Therefore, a quantitative hot-spot analysis is not required for these pollutants.

Localized Concentrations

As discussed above, carbon monoxide and particulate matter hot-spot analyses are not required to demonstrate project-level conformity for the Tier I Corridor build alternatives or the Tier II Auxiliary Lane Alternative; however, based on Caltrans guidance, a carbon monoxide hot-spot analysis was completed for the Tier I Corridor Alternatives using methodology provided in the Transportation Project-Level Carbon Monoxide Protocol (University of California Davis, December 1997). The Environmental Protection Agency CAL3QHC micro-scale dispersion model was used to calculate carbon monoxide concentrations. A worst-case representative sample of intersections was chosen based on low level of service and high traffic volumes.

Tier I Corridor HOV Lane Alternative

The project would be implemented in phases, as discussed in Section 1.8. Carbon monoxide concentrations at the analyzed intersections for this alternative are shown in Table 2.2.6-9. One-hour carbon monoxide concentrations under the Tier I Corridor HOV Lane Alternative would be approximately 1 part per million in 2035. Eight-hour carbon monoxide concentrations under project conditions would be approximately 0.6 part per million in 2035. Carbon monoxide concentrations would not exceed the federal 1- and 8-hour standards of 35 and 9 parts per million, respectively. In addition, the state 1- and 8-hour standards of 20 and 9 parts per million, respectively, would not be exceeded. Therefore, the Tier I Corridor HOV Lane Alternative would not result in an adverse impact related to carbon monoxide hot spots.

Table 2.2.6-9: Carbon Monoxide Concentrations – Tier I Corridor HOV Lane Alternative

Roadway Segment	1-Hour (ppm)	8-Hour (ppm)
2035		
41st Avenue & Route 1 southbound ramps – AM	1	0.5
Soquel Drive & Soquel Avenue & Route 1 southbound ramps – AM	1	0.5
Soquel Drive & Paul Sweet Road & Route 1 northbound ramps – PM	1	0.6
Park Avenue & Kennedy Drive – PM peak hour	1	0.4
Soquel Drive & Soquel Avenue & Route 1 southbound ramps – PM	1	0.5

Note: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); emission factors obtained from EMFAC2011.
Source: Air Quality Study Report, 2013.

Tier I Corridor TSM Alternative

In this section, the year 2003 is discussed as a baseline comparison. The project would be implemented in phases, as discussed in Section 1.8. Carbon monoxide concentrations for the Tier I Corridor TSM Alternative are shown in Table 2.2.6-10. One-hour carbon monoxide concentrations under the Tier I Corridor TSM Alternative would be approximately 1 part per million in 2035. Eight-hour carbon monoxide concentrations under project conditions would be approximately 0.5 part per million in 2035. Carbon monoxide concentrations would not exceed the federal 1- and 8-hour standards of 35 and 9 parts per million, respectively. In addition, the state 1- and 8-hour standards of 20 and 9 parts per million, respectively, would not be exceeded; therefore, the Tier I Corridor TSM Alternative would not result in an adverse impact related to carbon monoxide hot spots.

**Table 2.2.6-10: Carbon Monoxide Concentrations –
Tier I Corridor TSM Alternative**

Roadway Segment	1-Hour (ppm)	8-Hour (ppm)
2035		
Morrissey Boulevard & Rooney Street – AM	<1	0.2
Northbound ramps & Rooney Street – AM	<1	0.2
Porter Street & Main Street – AM	<1	0.3
Rio Del Mar Boulevard & Soquel Drive – AM	<1	0.3
State Park Drive & northbound ramps – PM	1	0.5
Note: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); emission factors obtained from EMFAC2011. Source: Air Quality Study Report, 2013.		

Tier II Auxiliary Lane Alternative

The intersection volumes for the Tier II Auxiliary Lane Alternative would be similar to the volumes for the Tier I Corridor Alternatives. As discussed above, carbon monoxide concentrations for the Tier I Corridor Alternatives were well below the state and federal standards. Similarly, it is reasonable to assume that Tier II Auxiliary Lane Alternative carbon monoxide concentrations would be 83 to 94 percent below the standards; therefore, the Tier II Auxiliary Lane Alternative would not result in an adverse impact related to carbon monoxide concentrations.

No Build Alternative

The No Build Alternative assumes no major construction on Route 1 through the Tier I and II project limits other than currently planned and programmed improvements and continued routine maintenance. The No Build Alternative is not expected to result in an adverse impact related to carbon monoxide hot spots.

PM_{10} and $PM_{2.5}$

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

Particulate matter hot-spot analyses are required to demonstrate that a transportation project meets federal Clean Air Act conformity requirements to support state and local air quality goals with respect to potential localized air quality impacts. As shown in Table 2.2.6-2, the North Central Coast Air Basin is designated as in attainment for all federal criteria pollutant standards. Transportation conformity does not apply to the proposed project, and hot-spot analyses are not required for the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative.

Mobile Source Air Toxics

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

The Federal Highway Administration in its Interim Guidance issued on September 30, 2009 (Interim Guidance on Mobile Source Air Toxics Analysis in National Environmental Policy Act Documents), recommends a range of options appropriate for addressing and documenting the mobile source air toxics issue in National Environmental Policy Act documents. Based on Federal Highway Administration guidance, the Tier I and Tier II build alternatives have low potential for mobile source air toxic effects because design year annual average daily traffic will not exceed 140,000 vehicles. Therefore, a qualitative mobile source air toxic analysis was completed.

For the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative, the amount of mobile source air toxics emitted would be proportional to the vehicle miles and vehicle hours traveled, with consideration for variables such as fleet mix. The Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative would not generate new countywide trips, and vehicles that would travel on the roadway network would travel on Route 1. Because the estimated countywide vehicle miles traveled under both Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative would be the same, there would be no appreciable difference in overall mobile source air toxic emissions.

The additional travel lanes under the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative would have the effect of moving some traffic closer to homes, schools, and businesses, which may increase ambient concentrations of mobile source air toxics in localized areas along the project corridor. The localized level of mobile source air toxics emitted from the Tier I build alternatives and Tier II Auxiliary Lane Alternative could be higher than from the No Build Alternative. Additionally, peak hour emissions for both Tier I build alternatives would be higher for some criteria pollutants than under the No Build Alternative, although annual emissions for the HOV Lane Alternative would be lower for all criteria pollutants than the No Build. Localized and peak-period increases would likely be offset by the increases in travel speeds and reduction in traffic congestion, which are associated with lower mobile source air toxic emissions.

The United States Environmental Protection Agency’s vehicle and fuel regulations, coupled with fleet turnover will, over time, produce substantial emissions reductions that, in almost all cases, will result in lower future mobile source air toxic levels regionwide than there are today.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

No adverse operational impacts were identified, and no avoidance, minimization, and/or mitigation measures are required. Construction impacts and avoidance, minimization, and/or mitigation measures are discussed in Section 2.4.4.

2.2.7 Noise

This section evaluates potential noise impacts that could result from the operation of the Tier I and Tier II projects. Cumulative impacts are discussed in Section 2.5.

Regulatory Setting

The National Environmental Policy Act and the California Environmental Quality Act provide the broad basis for analyzing and abating highway traffic noise effects. The intent of these laws is to promote the general welfare and to foster a healthy environment. The requirements for noise analysis and consideration of noise abatement and/or mitigation, however, differ between the National Environmental Policy Act and the California Environmental Quality Act.

California Environmental Quality Act

The California Environmental Quality Act requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under the California Environmental Quality Act, then the California Environmental Quality Act dictates that mitigation measures must be incorporated into the project unless such measures are not feasible. The rest of this section will focus on the National Environmental Policy Act 23 *Code of Federal Regulations* 772 noise analysis; see Sections 3.1 and 3.2.1 of this document for further information on noise analysis under the California Environmental Quality Act.

National Environmental Policy Act and 23 Code of Federal Regulations 772

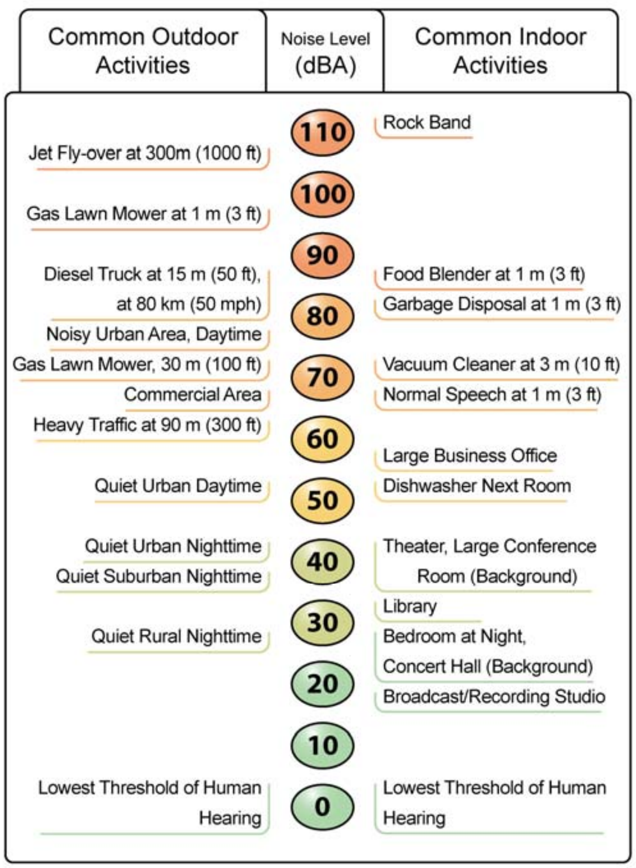
For highway transportation projects with the Federal Highway Administration involvement, the federal-Aid Highway Act of 1970 and the associated implementing regulations (23 *Code of Federal Regulations* 772) govern the analysis and abatement of traffic noise impacts. The regulations require that potential noise impacts in areas of frequent human use be identified during the planning and design of a highway project. The regulations contain noise abatement criteria that are used to determine when a noise impact would occur. The noise abatement criteria differ depending on the type of land use under analysis. For example, the noise abatement criteria for residences (67 A-weighted decibels [dBA]) is lower than the noise abatement criteria for commercial areas (72 dBA). Table 2.2.7-1 lists the noise abatement criteria for use in the National Environmental Policy Act and 23 *Code of Federal Regulations* 772 analysis, and Figure 2.2.7-1 shows the noise levels of typical activities.

Table 2.2.7-1: Activity Categories and Noise Abatement Criteria

Activity Category	Noise Abatement Criteria, A-weighted Noise Level (dBA), $L_{eq}(h)$*	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 Exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	--	Undeveloped lands.
E	52 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

*A-weighted decibels (dBA) are adjusted to approximate the way humans perceive sound. $L_{eq}(h)$ is the steady A-weighted level that is equivalent to the same amount of energy as that contained in the actual time-varying levels over 1 hour.
Source: Caltrans Traffic Noise Analysis Protocol, 2006.

Figure 2.2.7-1: Typical Noise Levels



In accordance with Caltrans' *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects,* August 2006, a noise impact occurs when the future noise level with the project results in a substantial increase in noise level (defined as a 12-decibel or more increase) or when the future noise level with the project approaches or exceeds the noise abatement criteria. Approaching the noise abatement criteria is defined as coming within 1 decibel of the noise abatement criteria. If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications.

The Caltrans Traffic Noise Analysis Protocol sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 5-decibel reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include acceptance by residents, the cost per benefited residence, the absolute noise level, build versus existing noise, environmental impacts of abatement, public and local agencies input, and newly constructed development versus development pre-dating 1978.

Affected Environment

The information in this section is derived from the *Noise Study Report for the Santa Cruz Route 1 Project* (2013) and the *Draft Project Report for Operational Improvements on Route 1 in Santa Cruz County between 41st Avenue Overcrossing and Soquel Avenue/Drive Overcrossing* (2015).

Tier I Corridor Alternatives

Residential land uses predominate most of the Route 1 project corridor, with some commercial and industrial property, primarily in the unincorporated areas. The frequent outdoor use areas that may be affected by the project include single- and multi-family residences, a few schools, churches, hotels/motels, and a wilderness park. Maps showing the location of noise-sensitive receptors and proposed locations for barriers are provided in Appendix K.

Noise measurements were conducted at 46 locations within the project limits in April and May of 2004, September 2006, and May 2010. The measurements are primarily for evaluating the existing noise environment and calibrating the noise prediction model. Short-term measurements were conducted at 37 sites for duration of 20 minutes each, and long-term measurements were conducted at nine locations for at least 23 hours between 2004 and 2010, with one additional measurement conducted in 2013.

Of the 46 noise measurement locations, calibration measurements were conducted at 17 locations from April 2004 to May 2010. During the calibration measurements, traffic volumes on Route 1 were concurrently recorded. Overall, modeled noise levels at calibration locations during the 2004 and 2006 measurement periods were higher than measured noise levels. Deviations appeared to be occurring at calibration locations due to densely vegetated areas, heavy tree zones with height over 16 feet, and topographic complexities in study areas.

Tier II Auxiliary Lane Alternative

Land uses along Route 1 between 41st Avenue and Soquel Drive adjacent to the highway are predominantly commercial with pockets of residences. Good Sheppard School and a convalescent hospital are also located within the study area.

One long-term and four short-term noise measurements were conducted in January 2013 within the Tier II Auxiliary Lane Alternative project limits. These measurements were primarily for calibrating the traffic noise model for the Tier II project, and they were not used in the Tier I corridor study. Measured versus modeled levels for the 2013 measurements were closer to each other than the previous sets of noise measurements mainly as a result of using more accurate topographical Tier II information for the modeling.

Environmental Consequences

The long-term noise effects of the Tier I and Tier II project alternatives are discussed in this section.

The Tier I and Tier II projects are defined as Type 1 by Title 23, Part 772 of the Code of Federal Regulations (23 CFR 772); therefore, a full noise assessment is required. Type 1 projects are defined as projects that involve construction of a highway at a new location or the physical alteration of an existing highway that significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes. Future (2035) noise levels were modeled for the Tier I Corridor build alternatives, the Tier II Auxiliary Lane Alternative, and the No Build Alternative.

To assess noise impacts, “noise sensitive receptors,” such as residences, schools, and parks, are identified, and baseline measurements or readings of existing noise levels are conducted at these locations, which are referred to as receivers. After existing noise levels are obtained, future noise impacts are modeled to predict the noise levels that would occur under the proposed project alternatives. Because traffic noise is loudest under moderately heavy, but free-flow traffic conditions, future traffic noise levels are modeled using traffic volumes and speeds that occur under those conditions.

A noise impact occurs when there is a substantial noise increase (when the predicted noise levels with the project exceed existing noise levels by12 dBA) or/and the future traffic noise level with the project approaches or exceeds the noise abatement criteria for the Activity Category of the property. See Table 2.2.7-1 for a description of the Activity Categories.

If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications.

The Caltrans Traffic Noise Analysis Protocol sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 5-decibel (dB) reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include acceptance by residents, the cost per benefited residence, the absolute noise level, build versus existing noise, environmental impacts of abatement, public and local agencies' input, and newly constructed development versus development dating before 1978.

Plan drawings included in Appendix K show receivers representing frequent outdoor use areas and soundwalls that have been identified as feasible to address the impacts of the Tier I Corridor build alternatives. Whether soundwalls identified as feasible from an engineering perspective also meet the criteria of being reasonable from a cost perspective will be determined as part of the noise abatement decision reports prepared for the future Tier II projects based on the cost allowances current at that time. If the cost of the wall is less than the cost allowance and no other technical issues prevent construction of the soundwall, then the soundwall would likely be considered reasonable and would be proposed for construction. The soundwall designation numbers are shown in bold text on the alignment drawings (see Appendix K).

The noise analysis for the Tier II Auxiliary Lane Alternative identified soundwalls that are considered feasible; however, the Noise Abatement Decision Report prepared for the Tier II Auxiliary Lane Alternative found that none of the feasible soundwalls are considered reasonable. The Tier I and Tier II projects would result in noise impacts that require the consideration of noise abatement. Long-term and short-term noise measurements have been conducted at the acoustically representative sites in the project area. The short-term measurements were conducted at various hours of the day during free-flowing traffic conditions. As allowed by Caltrans' Technical Noise Supplement, short-term measurements were not necessarily conducted during the worst noise hour. Therefore, the short-term measured levels must be converted to equivalent worst-hour noise levels. This is done by evaluating the relationship between the worst-hour noise level and the noise level during other hours of the day using results of the nearby long-term noise measurements.

Traffic counts were taken during the noise measurements to calibrate the model. Future noise was modeled for design year 2035, based on the results of traffic modeling for design year 2035. Noise modeling results for each alternative were analyzed to determine whether future noise with the project would approach (within 1 dBA) or exceed the Noise Abatement Criteria. The results of this analysis are presented in Appendix K, Tables 1 through 3, and are described below.

The preliminary noise abatement features presented in this report are based on preliminary project alignments and profiles, which may be subject to change. As such, the physical characteristics of noise abatement described herein also may be subject to change. If pertinent factors change substantially during the final project design, the preliminary noise abatement decision may be changed or eliminated from the final project.

Tier I Corridor Alternatives

A volume of 1,800 vehicles per hour per lane was utilized in modeling Route 1 mainline traffic volume and 1,500 vehicles per hour was utilized in modeling Route 1 HOV lane traffic volume. Year 2035 ramp traffic volumes were compared to the volume of 1,000 vehicles per hour per lane, and the lesser of the two volumes were used in modeling ramp traffic. The results of the modeling are shown in Appendix K, Tables 1 and 2.

The Route 1/17 Merge Lanes Project construction was completed in 2009, and the soundwalls for this project were built in the area north of Route 1 near La Fonda Avenue. Construction of the soundwalls for the Highway 1 Soquel/Morrissey Auxiliary Lanes Project was completed in December 2013. These soundwalls were included in the traffic noise impact analysis for the Tier I Corridor Alternatives. Due to the benefit of these soundwalls, Tier I Corridor Alternative noise levels at areas represented by Receivers R166 through R170 would be lower than the existing noise levels, which were established for this analysis before construction of these soundwalls.

An assessment of the feasibility of noise abatement for the Tier I Corridor Alternatives is presented below. As future Tier II projects are programmed, they will be subject to separate environmental reviews, including updated noise analyses. As a result of those analyses, some of the projected future noise levels and attenuation recommendations provided below could change. In addition, those analyses will evaluate the reasonableness of feasible soundwalls based on cost and technical issues in accordance with the Caltrans Traffic Noise Analysis Protocol.

Receptors R1 through R6 represent single-family residences on the southbound side of Route 1, west of San Andreas Road. Receptor locations are shown on Sheets 1 and 2 in Appendix K. Under either of the corridor build alternatives, noise abatement would not be warranted for these homes because traffic noise levels at these receptors would not approach or exceed the noise abatement criterion for residential uses (67 decibels).

Receptors R7 through R13 represent single-family residences south of Bonita Drive on the southbound side of the highway, east of the Freedom Boulevard interchange.

HOV Lane Alternative: Traffic noise levels would approach or exceed the noise abatement criterion at Receptors R7 and R9 through R13. Although no abatement is warranted at Receptor R8 because the noise level would not approach or exceed the criterion, Receptor R8 would receive a 2- to 5-decibel noise reduction from a soundwall constructed for adjacent receptors, depending on the height of the barrier selected. Although traffic noise would exceed the criterion at Receptors R11 and R13, these homes are located at much higher elevations than Route 1; therefore, Soundwall S59 would not provide the required minimum 5-decibel noise reduction for these residences, and it would not be feasible to abate traffic noise for these receptors. It would be feasible to abate traffic noise at impacted Receptors R7, R9, R10, and R12 with Soundwall S59 ranging from 8 to 10 feet high for 1,804 feet along the right-of-way. However, because the future peak-hour traffic noise level for the frequent outdoor use area at one single-family residence represented by Receptor R11 would be 75 dBA, this residence would be considered severely impacted. A severe noise impact is considered to occur when predicted exterior noise levels equal or exceed 75 dBA-L_{eq}(h)[1] or are 30 decibels or more above existing noise levels. In these instances, noise abatement measures must be considered. Because Soundwall S59 would not adequately reduce noise levels, it was determined to be infeasible for this soundwall to address noise impacts at the residence represented by Receptor R11. Consideration of acoustic treatment to the building, such as sound insulation materials and double-paned windows, would still be required for this residence.

TSM Alternative: Noise levels at these receptors would not approach or exceed the noise abatement criterion; therefore, noise abatement is not warranted for these homes.

Receptor R14 represents the outdoor use area of Christ Lutheran Church, which is on the northbound side of the highway and just east of Soquel Drive and Freedom Boulevard. This receptor is shown on Sheet 3 in Appendix K. A soundwall is not warranted because the traffic noise level under either corridor build alternative would not approach or exceed the noise abatement criterion.

Receptors R15 through R22 represent single-family residences and several houses used as commercial offices on the southbound side of Route 1, just west of Freedom Boulevard.

HOV Lane Alternative: Traffic noise levels would approach or exceed the noise abatement criterion at Receptors R16 through R22. No abatement is warranted at Receptor R15 because the noise level would not approach or exceed the criterion. Although traffic noise would exceed the noise abatement criterion at Receptors R21 and R22, these homes are at much higher elevations than Route 1, and Soundwall S71 would not provide the required minimum 5-decibel noise reduction for these residences. It would be feasible to abate traffic noise at

[1] Leq(h) is the energy average of A-weighted sound levels occurring during a one-hour period.

Receptors R16 through R20 with Soundwall S71 ranging from 14 to 16 feet high for 3,271 feet along the right-of-way and shoulder.

TSM Alternative: Traffic noise levels would approach or exceed the noise abatement criterion at Receptors R17, R18, and R20 through R22. No abatement is warranted at Receptors R15, R16, R18A, and R19 because the traffic noise levels would not approach or exceed the noise abatement criterion. Although traffic noise would exceed the criterion at Receptors R21 and R22, these homes are at much higher elevations than Route 1; it would not be feasible to reduce traffic noise by 5 decibels. It would be feasible to abate traffic noise at Receptors R17 through R20 with Soundwall S71 ranging from 14 to 16 feet high for 2,739 feet along the right-of-way and shoulder.

Receptors R24 through R34 represent single- and multi-family residences on the northbound side of Route 1 to the west of Freedom Boulevard. Although traffic noise levels under either build corridor alternative would exceed the noise abatement criterion at Receptor R27, this residence is at a much higher elevation than Route 1, and Soundwall S68 would not provide the required minimum 5-dB noise reduction for this residence; therefore, it would not be feasible to abate traffic noise (or block the line-of-sight) by constructing a soundwall on the right-of-way.

HOV Lane Alternative: Traffic noise levels would approach or exceed the noise abatement criterion at Receptors R26 through R33. No abatement is warranted at Receptors R24, R25, and R34 because the traffic noise level would not approach or exceed the noise abatement criterion. It would be feasible to abate traffic noise at Receptors R25, R26, and R28 through R33 with Soundwall S68 ranging from 10 to 16 feet high for 2,624 feet along the right-of-way and edge of shoulder.

TSM Alternative: Traffic noise levels would approach or exceed the noise abatement criterion at Receptors R25 through R27 and R29 through R33. No abatement is warranted at Receptors R24, R28, and R34 because the traffic noise level would not approach or exceed the noise abatement criterion. It would be feasible to abate traffic noise at Receptors R25, R26, and R29 through R33 with Soundwall S68 ranging from 10 to 16 feet high for 2,622 feet along the right-of-way and edge of shoulder.

Receptors R35, R35A, and R36 represent single-family residences on the northbound side of Route 1, south of Monroe Avenue and east of Rio Del Mar Boulevard, and along Soquel Drive. Traffic noise levels under either corridor build alternative would exceed the noise abatement criterion at these receptors. These receptors are shown on Sheet 5 in Appendix K.

HOV Lane Alternative: Although traffic noise would exceed the criterion at Receptors R35 and R35A, these homes are at a much higher elevation than Route 1; Soundwall S74 would not provide the required minimum 5-decibel noise reduction for these residences, and it would not be feasible to block the line-of-sight with a soundwall to abate traffic noise. It would be feasible to abate traffic noise at Receptor R36 with a 14-foot-high soundwall for 493 feet along the shoulder. However, because the future peak-hour traffic noise level for the frequent outdoor use area at one single-family residence represented by Receptor R35 would be 75 dBA, this residence would be considered severely impacted. As noted above, in the discussion of Receptors R7 through R13, in instances of severe noise impact, noise abatement measures must be considered. Because Soundwall S74 would not adequately reduce noise levels, it was determined to be infeasible. Consideration of acoustic treatment to the building, such as sound insulation materials and double-paned windows, would still be required for this residence.

<u>TSM Alternative</u>: Although traffic noise would exceed the criterion at Receptor R35, this home is at a much higher elevation than Route 1, and it would not be feasible to block the line-of-sight with a soundwall to abate traffic noise; however, it would be feasible to abate traffic noise at Receptor R36 with 14-foot-high Soundwall S74 for 493 feet along the shoulder. The Noise Study Report (2013) did not identify an impact for Receptor 35A under the TSM Alternative.

Receptors R37 and R38 represent single-family residences and the Rio Del Mar Club on the southbound side of Route 1, just east of the south Santa Cruz Branch Line bridge. Because traffic noise levels at Receptor R37 would not approach or exceed the noise abatement criterion for residential uses, a soundwall is not warranted for homes represented by this receptor. Under both the HOV Lane Alternative and the TSM Alternative, the traffic noise level would approach or exceed the noise abatement criterion at frequent outdoor use areas of the Rio Del Mar Club, represented by Receptor R38. It would be feasible to abate traffic noise at Receptor R38 with 10-foot-high Soundwall S85 for 377 feet (376 feet under the TSM Alternative) along the right-of-way. Soundwall S85 is shown on Sheet 6 in Appendix K.

Receptors R39 and R39A represent single-family residences on the northbound side of Route 1, west of Rio Del Mar Boulevard. Traffic noise levels at these receptors would not approach or exceed the noise abatement criterion under either corridor build alternative. A soundwall is not warranted for these homes. Receptors R39 and R39A are shown on Sheets 5 and 6, respectively, in Appendix K.

Receptors R40, R40A, and R41 represent single- and multi-family residences on the northbound side of Route 1, just east of the south Aptos Santa Cruz Branch Line crossing. Traffic noise levels under either Tier I corridor build alternative would exceed the noise abatement criterion at these receptors. These receptors are shown in Appendix K, Sheet 7.

<u>HOV Lane Alternative</u>: The future peak-hour noise levels for the frequent outdoor use area at one single-family residence represented by Receiver R40 would exceed the criterion of 67 dBA; however, Soundwall S86 would not provide the required minimum 5-decibel noise

reduction for this residence. Because of its high elevation relative to Route 1, the residence would have a clear view to the highway over the soundwall; therefore, the barrier becomes ineffective in reducing traffic noise. It would be feasible to abate traffic noise at receptors R40A and R41 with Soundwall S86 ranging from 8 to 10 feet high for 561 feet along the right-of-way. Soundwall S86 is shown on Sheet 6 in Appendix K. In addition, the future peak-hour noise levels for the frequent outdoor use areas at Receivers R40A and R41 would exceed 75 dBA; therefore, these residences would be considered severely impacted. Soundwall S86 would provide the 5-decibel reduction for these severely impacted receivers to meet the feasibility criterion. If Soundwall S86 is determined to be unreasonable, providing the soundwall or building acoustic treatments would still be required for these severely impacted residences.

<u>TSM Alternative</u>: It would be feasible to abate traffic noise with Soundwall S86 ranging from 8 to 16 feet high for 907 feet along the right-of-way. Soundwall S86 is shown on Sheet 6 in Appendix K.

Receptors R42 through R45 represent two single-family and nine multi-family residences on the southbound side of Route 1 and just west of the south Santa Cruz Branch Line Railroad bridge. Predicted future traffic noise levels at Receptor R43 for either build alternative would not approach or exceed the noise abatement criterion, and no abatement would be warranted; however, Receptor R43 would incidentally receive a 5- to 8-decibel (4- to 6-decibel under the TSM Alternative) noise reduction from Soundwall S87 constructed to abate traffic noise at Receptors 42 and 44. The noise reduction at Receptor 43 would depend on the height of the soundwall selected. The predicted future traffic noise levels would exceed the noise abatement criterion at Receptors R42 and R44. These receptors, along with Soundwall S87, are shown on Sheet 6 in Appendix K for both build alternatives.

<u>HOV Lane Alternative</u>: The future peak-hour noise levels for the frequent outdoor use areas at two single-family residences represented by Receiver R45 would exceed the criterion of 67 dBA; however, extending Soundwall S87 would not provide the required minimum 5-decibel noise reduction for these residences. Because of their high elevations relative to Route 1, these residences would have a clear view over the soundwall to the highway; therefore, the barrier would be ineffective in reducing traffic noise. Traffic noise abatement would be feasible at Receptors R42 through R44 with 14-foot-high Soundwall S87 for 378 feet along the right-of-way. The future peak-hour noise levels for the frequent outdoor use areas Receivers R42 would exceed 75 dBA; therefore, these residences would be considered severely impacted. Soundwall S87 would provide the 5-decibel reduction for these severely impacted receivers to meet the feasibility criterion. If Soundwall S87 is determined to be unreasonable, providing the soundwall or building acoustic treatments would still be required for these severely impacted residences.

TSM Alternative: Traffic noise abatement would be feasible at Receptors R42, R44, and R45 with Soundwall S87 ranging from 14 to 16 feet high for 517 feet along the right-of-way.

Receptors R45A through R47 represent single-family residences and undeveloped land on the southbound side of Route 1 and southeast of Aptos Creek as shown on Sheet 7 in Appendix K. Under Caltrans noise abatement criteria, no noise abatement is warranted for undeveloped land. The frequent outdoor use area of a single-family residence represented by Receiver R46 would experience a predicted peak-hour noise of 75 dBA; however, extending Soundwall S89 (discussed under Receptors R48 through R50) would not provide the required minimum 5-decibel noise reduction for this residence. Because of the residence's high elevation relative to Route 1, it would have a clear view to the highway; therefore, a barrier would be ineffective in reducing traffic noise. Because Soundwall S89 does not provide feasible noise mitigation, building acoustic treatment would be required for the single-family residence represented by Receptor R46. Under the TSM Alternative, Receptor R45A would receive a 5-decibel noise reduction from Soundwall S87, described under Receptors R42 through R45.

Receptors R48 and R50 represent single-family, multi-family residences, and undeveloped land lots on the southbound side of Route 1 at Aptos Creek. Predicted future noise levels would approach or exceed the noise abatement criterion for residential uses at homes represented by Receptor R49. No abatement is warranted at the homes represented by Receptor R50 because the noise level at this location would not approach or exceed the noise abatement criterion. However, it would be feasible to abate noise at Receptor R49 through R50 with 10-foot-high Soundwall S89 for 489 feet along the edge of the roadway shoulder. The undeveloped land lots would be protected because Soundwall S89 would be extended to the east to protect Receptor R49. Soundwall S89 is shown on Sheet 7 in Appendix K.

Receptors R51 to R54 represent single- and multi-family residences on the southbound side of Route 1 and just east of the north Aptos Santa Cruz Branch Line Railroad bridge.

HOV Lane Alternative: Traffic noise levels would approach or exceed the noise abatement criterion at Receptors R52 through R53A. No abatement is warranted at the homes represented by Receptors R51 and R54 because the noise level at these locations would not approach or exceed the noise abatement criterion. It would be feasible to abate traffic noise at Receptors R52 through R53A with 10-foot-high Soundwall S93 for 568 feet along the right-of-way. Soundwall S93 is shown on Sheet 7 in Appendix K. The future peak-hour noise levels for the frequent outdoor use areas at Receiver R52 would exceed 75 dBA; therefore, these residences would be considered severely impacted. Soundwall S93 would provide the 5-decibel reduction for this severely impacted receiver to meet the feasibility criterion. If Soundwall S93 is determined to be unreasonable, providing the soundwall or building acoustic treatments would still be required for these severely impacted residences.

TSM Alternative: Traffic noise levels would approach or exceed the noise abatement criterion at Receptors R52 and R54. No abatement is warranted at the homes represented by Receptors R51 and R53 because the noise level at these locations would not approach or exceed the noise abatement criterion. It is not feasible to abate noise at the homes represented by Receptor R54 because the soundwall cannot be extended through the railroad crossing. It would be feasible to abate noise at Receptor R52 with 8-foot-high Soundwall S93 for 568 feet along the right-of-way. Soundwall S93 is shown on Sheet 7 in Appendix K.

Receptors R55 to R59 represent single-family residences on the southbound side of Route 1 and on the south side of the Santa Cruz Branch Line tracks east of State Park Drive, as shown on Sheets 7 and 8 in Appendix K. No abatement is warranted at Receptors R56 through R59 because the noise level would not approach or exceed the noise abatement criterion for residential uses. Under the TSM Alternative, the traffic noise level would approach the noise abatement criterion at homes represented by Receptor R55, but traffic noise reduction is not feasible because a soundwall cannot be extended through the railroad crossing. The noise level at Receptor R55 under the HOV Lane Alternative would not warrant abatement.

Receptors R62 through R65 represent single- and multi-family residences on the northbound side of Route 1 from Aptos Creek to the north Aptos Santa Cruz Branch Line Railroad crossing. Traffic noise levels under either of the Tier I Corridor Alternatives would exceed the noise abatement criterion at these receptors.

HOV Lane Alternative: Noise abatement would be feasible for Receptors R63 through R65 with Soundwall S90 ranging in height from 8 to 12 feet and extending 673 feet along the right-of-way and roadway shoulder. No feasible traffic noise abatement could be provided to Receptor R62, even with the maximum soundwall height of 16 feet, because a soundwall would not provide the required minimum 5- decibel noise reduction for these residences. Due to the high elevations of the residences represented by Receptor R62 relative to Route 1, a barrier would not be effective in reducing traffic noise. Soundwall S90 is shown on Sheet 7 in Appendix K. The future peak-hour noise level for the frequent outdoor use areas at Receivers R64 and R65 would exceed 75 dBA; therefore, these residences would be considered severely impacted. Soundwall S90 would provide the 5-decibel reduction for these severely impacted receivers to meet the feasibility criterion. If Soundwall S90 is determined to be unreasonable, providing the soundwall or building acoustic treatments would still be required for these severely impacted residences.

TSM Alternative: Feasible traffic noise abatement could be provided to Receptors R62 through R65 with Soundwall S90 ranging in height from 8 to 14 feet and extending 1,922 feet along the right-of-way and roadway shoulder. The acoustically feasible Soundwall S90 is shown on Sheet 7 in Appendix K.

Receptors R66 through R80 represent single- and multi-family residences and a frontage unit on the southbound side of Route 1 between State Park Drive and Park Avenue.

HOV Lane Alternative: The traffic noise level would approach or exceed the noise abatement criterion at Receptors R66 through R73 and R75 through R78A. No noise abatement is warranted for the traffic noise levels at Receptors R74, R79, and R80. Noise abatement would be feasible for Receptors R66 through R73 with Soundwall S103 ranging in height from 12 to 14 feet and extending 2,789 feet along the right-of-way and roadway shoulder. Receptor R74 would incidentally receive some traffic noise reduction from the soundwall. Soundwall S103 is shown on Sheets 8 and 9 in Appendix K. The future peak-hour noise levels for the frequent outdoor use areas at Receivers R68 and R72 would exceed 75 dBA; therefore, these residences would be considered severely impacted. Soundwall S103 would provide the 5-decibel reduction for these severely impacted receivers to meet the feasibility criterion. If Soundwall S103 is determined to be unreasonable, providing the soundwall or building acoustic treatments would still be required for these severely impacted residences.

Feasible traffic noise abatement would be provided to Receptors R76 through R78A with 10-foot-high Soundwall S115 extending 3,347 feet along the right-of-way and roadway shoulder; feasible abatement could not be provided to Receptor R75 even with the maximum soundwall height of 16 feet. Soundwall S115 is shown on Sheets 10 and 11 in Appendix K. The future peak-hour noise levels for the frequent outdoor use areas represented by Receiver R78A would exceed 75 dBA; therefore, these units would be considered severely impacted. Soundwall S115 would provide the 5-decibel reduction for this severely impacted receiver to meet the feasibility criterion. If Soundwall S115 is determined to be unreasonable, providing a portion of this soundwall from Station 115+00 to 121+00 (Post Mile 11.56 to 11.93) would still be required for these severely impacted frontage units.

TSM Alternative: The traffic noise level would approach or exceed the noise abatement criterion at all receptors except Receptors R74, R75, R79, and R80; therefore, no traffic noise abatement is warranted at Receptors R74, R75, R79, and R80. Feasible traffic noise abatement would be provided at the other receptors by Soundwall S111 ranging in height from 8 to 14 feet and extending 7,014 feet along the right-of-way. Receptors R74 and R75 would incidentally receive some traffic noise reduction from the soundwall. Soundwall S111 is shown on Sheets 10 and 11 in Appendix K.

Receptors R81 and R82 represent the Best Western Seacliff Inn, which is on the northbound side of Route 1, just west of the State Park Drive interchange. Traffic noise levels would not approach or exceed the noise abatement criterion at the outdoor pool area represented by Receptor R82 under either of the Tier I Corridor Alternatives; however, the noise level would exceed the noise abatement criterion at the outdoor seating areas of several motel rooms represented by Receptor R81. A 5-decibel traffic noise reduction would be achieved with

12-foot-high Soundwall S100 extending 728 feet along the right-of-way. Soundwall S100 is shown on Sheets 8 and 9 in Appendix K.

Receptor R83 represents the Resurrection Catholic Church, which is on the northbound side of Route 1, east of Mar Vista Drive. No abatement is warranted for this location because the traffic noise levels under either Tier I Corridor Alternative would not approach or exceed the noise abatement criterion. This receptor is shown on Sheet 9 in Appendix K.

Receptors R84 through R101 represent the Seacliff Mobile Home Park, multi- and single-family residences, and Cabrillo College, all of which are on the northbound side of Route 1 between State Park Drive and Park Avenue.

<u>HOV Lane Alternative</u>: The predicted future traffic noise level would approach or exceed the noise abatement criterion at Receptors R87 through R91. No abatement is warranted at the mobile homes represented by Receptors R84 through R86 because the traffic noise levels would not approach or exceed the criterion. Receptors R89A and R91 were used for modeling purposes and does not represent any outdoor use areas. Feasible traffic noise abatement would be provided for Receptors R85 through R89 and R90 by Soundwall S106, which would range from 8 to 16 feet high for a length of 1,148 feet along the right-of-way and shoulder. Soundwall S106 is shown on Sheet 9 in Appendix K. The future peak-hour noise level for the frequent outdoor use area at Receiver R89 would exceed 75 dBA; therefore, this residence would be considered severely impacted. Soundwall S106 would provide the 5-decible reduction for this severely impacted receiver to meet the feasibility criterion. If Soundwall S106 is determined to be unreasonable, providing the soundwall or building acoustic treatment would still be required for this severely impacted residence. Feasible traffic noise abatement for impacted Receptors R92 through R101 would be provided by Soundwall S118, which would range from 10 to 16 feet high for a length of 4,577 feet. Soundwall S118 is shown on Sheets 10 through 12 in Appendix K. The future peak-hour noise levels for the frequent outdoor use areas represented by Receivers R93, R98, and R101 would exceed 75 dBA; therefore, these residences and frontage units would be considered severely impacted. Soundwall S118 would provide the 5-decibel reduction for these severely impacted receivers to meet the feasibility criterion. If Soundwall S118 is determined to be unreasonable, providing three separate portions of this soundwall from Station 108+30 to 110+00 (Post Mile 11.14 to 11.25), Station 114+80 to Station 116+75 (Post Mile 11.55 to 11.67), and Station 119+50 to 122+20 (Post Mile 11.84 to 12.00) or building acoustic treatments would still be required for these severely impacted residences and the school building.

<u>TSM Alternative</u>: Predicted future traffic noise levels would approach or exceed the noise abatement criterion at Receptors R88 through R101. No abatement is warranted at the mobile homes represented by Receptors R84 through R86, or at the multi-family residences at Receptor R87 because traffic noise levels would not approach or exceed the criterion. Feasible traffic noise

abatement for Receptors R88 through R101 would be provided by Soundwalls S106 and S118, which would range in height from 8 to 14 feet with a total combined length of 5,604 feet along the right-of-way and shoulder. Soundwalls S106 and S118 are shown on Sheets 9 through 12 in Appendix K.

Receptor R102 represents multi-family residences on the northbound side of Route 1, just east of Cabrillo College Drive. Noise levels under either of the Tier I Corridor Alternatives would exceed the noise abatement criterion at these residences.

<u>HOV Lane Alternative</u>: Traffic noise abatement for Receptor R102 could be provided by 12-foot-high Soundwall S122 extending 397 feet along the shoulder of the highway; however, Soundwall S122 would be required to work as a system with Soundwall S118 to provide feasible abatement to Receptor R102. Soundwall S122 is shown on Sheets 11 and 12 in Appendix K. The future peak-hour noise levels for the frequent outdoor use areas represented by Receiver R102 would exceed 75 dBA; therefore, these residences would be considered severely impacted. Soundwall S122 and part of Soundwall 118 would provide the 5-decibel reduction for this severely impacted receiver to meet the feasibility criterion. If Soundwall S122 or S118 are determined to be unreasonable, providing Soundwall 122 and part of Soundwall S118 from Station 121+00 to 122+20 (Post Mile 11.93 to 12.00), or building acoustic treatments would still be required for these severely impacted residences.

<u>TSM Alternative</u>: Feasible traffic noise abatement would be provided to Receptor R102 with 8-foot-high Soundwall S122 extending 397 feet along the shoulder of the highway; however, Soundwall S122 would be required to work as a system with Soundwall S118 to provide feasible abatement to Receptor R102. Soundwall S122 is shown on Sheet 12 in Appendix K.

Receptors R103 through R105 represent multi-family residences and a community pool at Capitola Knolls on the southbound side of Route 1 between Park Avenue and Callas Lane. Traffic noise levels under either Tier I Corridor Alternative would exceed the noise abatement criterion at these receptors. Noise abatement would be feasible at Receptors R103 through R105 with 8-foot-high Soundwall S125 extending 853 feet (852 feet under the TSM Alternative) along the highway right-of-way and private property. Soundwall S125 is shown on Sheet 12 in Appendix K.

Receptors R106 through R108 represent multi-family residences at Capitola Knolls on the southbound side of Route 1, just east of Kennedy Drive. Traffic noise levels under either Tier I Corridor Alternative would exceed the noise abatement criterion at these receptors.

<u>HOV Lane Alternative</u>: Traffic noise abatement would be feasible at the multi-family residences at Receptors R106 and R107 with 8- to 10-foot-high Soundwall S129 extending 735 feet along the highway right-of-way and private property. Soundwall S129 is shown on Sheet 12 in Appendix K. The future peak-hour noise level for the frequent outdoor use areas represented by Receiver R108 would exceed 75 dBA; therefore, these residences would be

considered severely impacted. Soundwall S129 would provide the 5-decibel reduction for this severely impacted receiver to meet the feasibility criterion. If Soundwall S129 is determined to be unreasonable, providing the soundwall or building acoustic treatments would still be required for these severely impacted residences.

<u>TSM Alternative</u>: Traffic noise abatement would be feasible at the multi-family residences at Receptors R106 and R107 with 8-foot-high Soundwall S129 extending 735 feet along the highway right-of-way. Although a 5-decibel noise reduction would not be achieved at the multi-family residences at Receptor R108, they would still receive some traffic noise reduction from the soundwall. Soundwall S129 is shown on Sheet 12 in Appendix K.

Receptor R109 represents multi-family residences on the southbound side of Route 1, just east of Nobel Creek. Because the noise level under either Tier I Corridor Alternative at this receptor would not approach or exceed the noise abatement criterion, a soundwall is not warranted for these homes. This receptor is shown on Sheet 13 in Appendix K.

Receptors R110 and R111 represent a single-family residence and mobile homes on the southbound side of Route 1. These receptors are shown on Sheet 13 in Appendix K.

<u>HOV Lane Alternative</u>: Traffic noise levels would approach or exceed the noise abatement criterion at these receptors. Feasible traffic noise abatement would only be able to be provided to Receptor R110 with 12-foot-high Soundwall S133 extending a length of 600 feet along the roadway shoulder. The future peak-hour noise levels at four mobile homes represented by Receiver R111 would exceed the noise abatement criterion of 67 dBA; however, Soundwall S133 would not provide the required minimum 5-decibel noise reduction for these residences. Because these residences are partially protected by an existing building, a barrier would not be effective in reducing traffic noise.

<u>TSM Alternative</u>: The future predicted traffic noise level would approach or exceed the noise abatement criterion at Receptor R110. Noise abatement would not be warranted at Receptor R111 because the traffic noise level would not approach the criterion. Traffic noise abatement would be feasible at Receptor R110 with 12-foot-high Soundwall S133 extending a length of 399 feet along the right-of-way.

Receptors R112 through R114 represent multi-family residences on the southbound side of Route 1, east of Capitola Avenue. These receptors are shown on Sheet 13 in Appendix K. Future predicted traffic noise levels would approach or exceed the noise abatement criterion at Receptors R112 through R114 under the HOV Lane Alternative and at Receptors R113 and R114 under the TSM Alternative. An existing soundwall already protects these residences from highway noise. Further noise abatement is not feasible because replacing the existing soundwall with a higher one would not provide an additional 5-decibel reduction of traffic noise levels.

Receptors R115 through R118 represent multi-family residences and the Capitola Inn on the southbound side of Route 1 just west of Capitola Avenue, as shown on Sheets 13 and 14 in

Appendix K. The future predicted traffic noise level under either Tier I Corridor Alternative at Receptor R115 would not approach or exceed the noise abatement criterion; however, the predicted future traffic noise levels at Receptors R116 through R118 would exceed the noise abatement criteria. An existing soundwall protects these receptors from highway noise. Further abatement would not be feasible because replacing the existing soundwall with a higher one would not provide an additional 5-decibel reduction of traffic noise levels.

Receptors R119 through R121 represent single-family residences, a school, and a church on the northbound side of Route 1 just east of Park Avenue.

<u>HOV Lane Alternative</u>: Traffic noise levels would approach or exceed the noise abatement criterion at Receptors R119 and R120. Feasible traffic noise abatement would be provided with 10-foot-high Soundwall S124 extending at a length of 906 feet along the right-of-way. Although Receptor R121 is not impacted by traffic noise levels, Soundwall S124 would provide some reduction of traffic noise. Soundwall S124 is shown on Sheet 12 in Appendix K.

<u>TSM Alternative</u>: Predicted future peak-hour traffic noise levels would approach or exceed the noise abatement criterion at Receptor R119. Traffic noise abatement would be feasible at Receptor R119 with Soundwall S124 8 feet in height and extending 906 feet along the right-of-way. This soundwall would also provide some reduction of traffic noise levels to six frontage units (the outdoor areas) of a church represented by Receptor R120; however, raising Soundwall S124 to 10 feet in height along the entire length would add these six frontage units to the total number of benefited frequent outdoor use areas.

Receptors R122 through R125 represent single- and multi-family residences on the northbound side of Route 1 between Monterey Avenue and Pepperwood Way.

<u>HOV Lane Alternative</u>: Predicted future peak-hour traffic noise levels would approach or exceed the noise abatement criterion at these receptors. Noise abatement of traffic noise would be feasible with Soundwall S128 ranging in height from 10 to 14 feet and extending 1,654 feet in length along the shoulder of the highway. The acoustically feasible Soundwall S128 is shown on Sheets 12 and 13 in Appendix K. Soundwall S128 would only provide noise abatement to the nine mobile homes represented by Receiver R125 if the east end portion of Soundwall S132 from Post Miles 12.52 to 12.58 was also constructed. However, if Soundwall S128 is determined to be unreasonable, then the west end portion of Soundwall 128 from Station 128+50 to 130+75 (Post Miles 12.40 to 12.54) and the east end portion of Soundwall 132 from Station 130+54 to 131+50 (Post Miles 12.52 to 12.58) should be considered as a soundwall system for reasonableness analysis for the frequent outdoor use areas of the nine mobile homes represented by Receiver R125.

<u>TSM Alternative</u>: Traffic noise levels during the future peak noise hour would approach or exceed the noise abatement criterion at Receptors R123 through R125. Noise abatement is not

warranted at Receptor R122 because the traffic noise level does not approach the criterion. Feasible traffic noise abatement at Receptors R123 through R125 would be provided with Soundwall S128 ranging in height from 10 to 14 feet and extending 1,392 feet in length along the shoulder of the highway. Soundwall S128 would only provide noise abatement to the nine mobile homes represented by Receiver R125 if the east end portion of Soundwall S132 from Post Miles 12.52 to 12.58 was also constructed. However, if Soundwall S128 is determined to be unreasonable, then the west end portion of Soundwall 128 from Station 128+50 to 130+75 (Post Miles 12.40 to 12.54) and the east end portion of Soundwall 132 from Station 130+54 to 131+50 (Post Miles 12.52 to 12.58) should be considered as a soundwall system for reasonableness analysis for the frequent outdoor use areas of the nine mobile homes represented by Receiver R125.

Receptors R126 through R129 represent single- and multi-family residences on the northbound side of Route 1 between Pepperwood Way and Rosedale Avenue and are shown on Sheet 13 in Appendix K. Predicted future noise levels under either Tier I Corridor Alternative would exceed the noise abatement criterion at these receptors.

<u>HOV Lane Alternative</u>: Noise abatement of future predicted peak-hour traffic noise levels would be feasible with Soundwall S132 ranging in height from 10 to 12 feet and extending 1,151 feet in length along the highway right-of-way. Soundwall S132 would only provide noise abatement to the nine single-family residences and one mobile home represented by Receiver R126 if the west end portion of Soundwall 128 from Station 128+50 to 131+75 (Post Miles 12.40 to 12.60) was also constructed. Soundwall S132 is shown on Sheet 13 in Appendix K. The future peak-hour noise levels for two single-family residences represented by Receiver R127 would exceed 75 dBA; therefore, these residences would be considered severely impacted. Soundwall S132 would provide the 5-decibel reduction for this severely impacted receiver to meet the feasibility criterion. If Soundwall S132 is determined to be unreasonable, providing the soundwall or building acoustic treatments would still be required for these severely impacted residences.

<u>TSM Alternative</u>: Feasible noise abatement of future predicted peak-hour traffic noise levels for impacted Receptors R126 through R129 would be provided by Soundwall S132 ranging in height from 10 to 12 feet and extending 1,160 feet along the highway right-of-way. Soundwall S132 is shown on Sheet 13 in Appendix K.

Receptors R130 through R132 represent single-family residences on the northbound side of Route 1 just east of Capitola Avenue, as shown on Sheet 13 in Appendix K. Traffic noise levels under either Tier I Corridor Alternative would exceed the noise abatement criterion. Under the HOV Lane Alternative, noise abatement would be feasible with 10-foot-high Soundwall S136 extending 663 feet along the highway right-of-way. The future peak-hour noise levels at three single-family residences represented by Receiver R131 would exceed 75 dBA; therefore, these residences would be considered severely impacted. Soundwall S136 would provide the 5-decibel reduction for this severely impacted receiver to meet the feasibility criterion. If Soundwall S136 is determined to be unreasonable, providing the soundwall or building acoustic treatments would still be required for these severely impacted residences. Under the TSM Alternative, existing and newly constructed/under construction soundwalls at this location already provide substantial noise reduction for receptors located behind the soundwalls. Raising the soundwall to 16 feet would not provide the additional 5-decibel reduction; therefore, noise abatement for these receptors would not be feasible.

Receptors R133 through R136 represent single- and multi-family residences on the northbound side of Route 1 between Capitola Avenue and south Main Street. These receptors are shown on Sheets 13 and 14 in Appendix K. Traffic noise levels under either of the Tier I Corridor Alternatives would not approach or exceed the noise abatement criterion at Receptors R133, R134, and R136; therefore, a soundwall is not warranted for these homes. Although the noise level at the residences represented by Receptor R135 would exceed the noise abatement criterion, Soundwall S136 would not provide the required minimum 5-decibel noise reduction for these residences. Because these residences are either protected or partially protected by an existing soundwall, a barrier would not be effective in reducing traffic noise.

Receptor R137 represents the Riverview Condominiums on the southbound side of Route 1 just east of Robertson Street. This receptor is shown on Sheet 14 in Appendix K. The traffic noise level would approach the noise abatement criterion. This receptor is approximately 16 feet below the edge of Route 1 and receives some shielding from the edge of the roadway. In addition, the vertical span of the proposed southbound 41st Avenue to Bay Avenue connector road would block the noise pathway to this receptor.

<u>HOV Lane Alternative</u>: A soundwall would not achieve the minimum 5-decibel traffic noise reduction; therefore, abatement is not feasible for this location.

<u>TSM Alternative</u>: Traffic noise abatement would be feasible with 10-foot-high Soundwall S143 extending 501 feet along the shoulder of the highway.

Receptors R138 through R140, shown on Sheet 14 in Appendix K, represent single-family residences on the northbound side of Route 1, southeast of Soquel Wharf Road. Traffic noise levels under either Tier I Corridor Alternative would not exceed or approach the noise abatement criterion; therefore, a soundwall would not be warranted.

Receptor 141 represents a single-family residence on the northbound side of Route 1 to the west of Robertson Street. The traffic noise level would exceed the noise abatement criterion. This receptor is shown on Sheet 15 in Appendix K.

<u>HOV Lane Alternative</u>: Noise abatement would be feasible with 16-foot-high Soundwall S144 extending 151 feet along the right-of-way.

TSM Alternative: Noise abatement would be feasible with 12-foot-high Soundwall S144 extending 246 feet along the shoulder and right-of-way.

Receptors 142 and 143 represent single- and multi-family residences on the northbound side of Route 1 to the east of 41st Avenue. The traffic noise level at Receptor R142 would not approach or exceed the noise abatement criterion, and no abatement would be warranted. The traffic noise level at Receptor R143 would exceed the noise abatement criterion. Noise abatement would be feasible with 8-foot-high Soundwall S146 extending 289 feet (293 under the TSM Alternative) in length along the right-of-way.

Receptors R144 and R145 represent single-family residences on the southbound side of Route 1, west of South Rodeo Gulch Road, which are shown on Sheet 16 in Appendix K. Under the HOV Lane Alternative, future peak-hour noise levels for the frequent outdoor use areas at one single-family residence represented by Receiver R144 would exceed the noise abatement criterion of 67 dBA; however, a soundwall along the right-of-way would not provide the required minimum 5-decibel noise reduction for this residence. Because this residence is protected by an existing large commercial building, a barrier would not be effective in reducing traffic noise. At R145 (and R44 under the TSM Alternative), predicted future traffic noise levels would not approach or exceed the noise abatement criterion under either Tier I Corridor Alternative; therefore, a soundwall is not warranted.

Receptor 146A represents single-family residences on the northbound side of Route 1, west of 41st Avenue, which is shown on Sheet 15 in Appendix K. Predicted future traffic noise levels at this receptor would exceed the noise abatement criterion for the HOV Lane Alternative but would not for the TSM Alternative; therefore, a soundwall is not warranted for the TSM Alternative.

HOV Lane Alternative: Noise abatement would be feasible with 16-foot-high Soundwall S150 extending 709 feet along the shoulder of the roadway.

Receptors R146 through R148 represent single-family residences and the Good Shepherd School on the northbound side of Route 1 to the west of Rodeo Gulch. Traffic noise levels would exceed the noise abatement criterion. These receptors are shown on Sheet 16 in Appendix K.

HOV Lane Alternative: Abatement of traffic noise would be feasible with two soundwalls: 14-foot-high Soundwall S154 along the shoulder with a slightly overlapping a second Soundwall S158 ranging from 10 to 14 feet in height along the right-of-way. Together, these soundwalls would extend a total of 1,328 feet. The future peak-hour noise level for the frequent outdoor use area at three single-family residences and two frontage units of Good Shepard Catholic School represented by Receptor R147 would exceed 75 dBA; therefore, this residence would be considered severely impacted. Soundwall S158 would provide the 5-decibel reduction for this severely impacted receiver to meet the feasibility criterion. If

Soundwall S158 is determined to be unreasonable, providing the soundwall or building acoustic treatments would still be required for this severely impacted residence.

TSM Alternative: Abatement of traffic noise would be feasible with two soundwalls, 10-foot-high Soundwall S154 along the shoulder and slightly overlapping a second Soundwall S158 ranging from 10 to 12 feet in height along the right-of-way. Together, these soundwalls would extend a total of 1,346 feet. The future peak-hour noise level for the frequent outdoor use area at one single-family residence represented by Receptor R147 would exceed 75 A-weighted decibels, this residence would be considered severely impacted. If Soundwall S158 is determined to be unreasonable, providing the soundwall or building acoustic treatments would still be required for this severely impacted residence. This area has been analyzed using more up-to-date information under the Tier II Auxiliary Lane Alternative.

Receptors R149 through R151 represent single-family residences and a convalescent hospital (Pleasant Care Rehabilitation and Nursing Center) on the northbound side of Route 1, east of the Soquel Drive interchange. Predicted future traffic noise levels at the frequent outdoor use area of the convalescent hospital at Receptor R151 would not approach or exceed the noise abatement criterion under either Tier I Corridor Alternative, and no abatement would be warranted. These receptors are shown on Sheets 17 and 18 in Appendix K. Predicted future traffic noise levels at the single-family residences at Receptors R149 and R150 would exceed the noise abatement criterion under both alternatives. A 5-decibel reduction in traffic noise would be achieved at the residences with 12-foot-high Soundwall S165 extending 656 feet along the right-of-way. The future peak-hour noise level for the frequent outdoor use area at one single-family residence represented by Receptor R149 would exceed 75 A-weighted decibels, therefore, this residence would be considered severely impacted. Soundwall S165 would provide the 5-decibel reduction for this severely impacted receiver to meet the feasibility criterion. If Soundwall S165 is determined to be unreasonable, providing the soundwall or building acoustic treatment would still be required for this severely impacted residence.

This area has been analyzed using updated information for the Tier II Auxiliary Lane Alternative.

Receptors R153 through R156 represent single- and multi-family residences and a school (Harbor High School) on the southbound side of Route 1 between Soquel Avenue and La Fonda Avenue. These receptors are shown on Sheets 18 and 19 in Appendix K.

HOV Lane Alternative: The traffic noise level at Receptor R156 would not approach or exceed the noise abatement criterion, and no traffic noise abatement would be warranted for this location. The traffic noise levels at Receptors R153, R154 (Harbor High School), and R155 would exceed the noise abatement criterion. A 5-decibel reduction in traffic noise would be achieved with Soundwall S173 14 feet in height and extending 1,519 feet along the right-of-way and shoulder of the highway.

<u>TSM Alternative</u>: Traffic noise levels at Receptor R153, R154 and R156 (Harbor High School) from traffic lanes would not approach or exceed the noise abatement criterion and would warrant no noise abatement. The traffic noise level at Receptor R155 would exceed the noise abatement criterion. A 5-decibel reduction of traffic noise would be achieved with 12-foot-high Soundwall S173 extending 433 feet along the right-of-way.

Receptor R157 represents a single-family residence on the southbound side of Route 1, just west of La Fonda Avenue. This receptor is shown on Sheet 19 in Appendix K. The predicted future traffic noise level under either Tier I Corridor Alternative would exceed the noise abatement criterion, and it would be more than 75 A-weighted decibels, which is considered severely impacted. Noise attenuation in the form of acoustic treatment to the building shell has been provided as part of the Route 1/17 Merge Lanes Project.

Receptors R158 and R158B represent two single-family residences and four frontage units (the outdoor areas) of Santa Cruz Adult School on the southbound side of Route 1. Traffic noise levels would exceed the noise abatement criterion at these receptors. These receptors are shown on Sheet 19 in Appendix K.

<u>HOV Lane Alternative</u>: Feasible traffic noise abatement could be provided with Soundwall S177, 12 feet in height and extending 853 feet in length along the shoulder.

<u>TSM Alternative</u>: Traffic noise abatement would be feasible for two single-family residences with Soundwall S177 12 feet in height and extending 372 feet along the right-of-way.

Receptors R159 through R164 represent single-family residences and a church (Santa Cruz Community Church) on the southbound side of Route 1 between La Fonda Avenue and Morrissey Boulevard. These receptors are shown on Sheets 19 and 20 in Appendix K.

Traffic noise levels from the future predicted peak noise hour would exceed the noise abatement criterion at Receptors R159 and R160. An existing soundwall built as part of the Route 1/17 Merge Lanes Project currently provides traffic noise abatement at Receptors R159 through R164. This soundwall would be 12 feet in height located along the shoulder and right-of-way of the highway. Increasing the height of this soundwall would not provide the required minimum 5-decibel noise reduction; therefore, no new soundwall is identified for this area.

Receptors R165A and R165 represent multi- and single-family residences on the northbound side of Route 1, east of the Soquel Drive interchange. Noise levels would exceed the noise abatement criterion at these receptors.

<u>HOV Lane Alternative</u>: Abatement of predicted future traffic noise would be feasible with Soundwall S170 12 feet in height and extending 656 feet along the shoulder and right-of-way.

TSM Alternative: Traffic noise abatement would be feasible with Soundwall S170 ranging from 12 to 14 feet in height and extend 832 feet along the ramp shoulder.

Receptors R166 through R168 represent single-family residences on the northbound side of Route 1 between Arana Gulch and La Fonda Avenue. Noise levels at these locations would exceed the noise abatement criterion under either Tier I Corridor Alternative. No noise abatement is practical at Receptor R166 because of the complex topography and a soundwall would not provide the required minimum 5-dB noise reduction. A soundwall providing feasible traffic noise abatement for impacted Receptors R167 and R168 was constructed as part of the Highway 1 Soquel/Morrissey Auxiliary Lanes Project; therefore, no additional abatement is needed for this area.

Receptors R169 and R170 represent single-family residences on the northbound side of Route 1 between La Fonda Avenue and Morrissey Boulevard. Noise levels would exceed the noise abatement criterion under either Tier I Corridor Alternative. A soundwall providing feasible traffic noise abatement for impacted Receptors R167 and R168 was constructed as part of the Highway 1 Soquel/Morrissey Auxiliary Lanes Project; therefore, no additional abatement is needed for this area. Sheet 19 in Appendix K shows the location of these receptors.

Receptors R171 through R176A represent single-family residences on the northbound side of Route 1 between La Fonda Avenue and Pacheco Avenue. Noise levels would approach or exceed the noise abatement criterion under either Tier I Corridor Alternative. Noise abatement would be feasible with a soundwall ranging from 10 to 12 feet high and extending 2,009 feet along the right-of-way. This soundwall was built as part of the Highway 1 Soquel/Morrissey Auxiliary Lanes Project. Portions of the soundwall could be replaced in kind to its existing height, and portions would be made taller.

Receptors R178 through R182 represent single-family residences on the southbound side of Route 1 between Morrissey Boulevard and Dellview Avenue. Noise levels would not approach or exceed the noise abatement criterion under either of the Tier I build alternatives.

Receptors R183 through R187 represent single-family residences on the northbound side of Route 1 between Pacheco Avenue and Branciforte Avenue.

HOV Lane Alternative: Future peak-hour noise levels for the frequent outdoor use areas at 26 single-family residences represented by Receivers R183 through R187 would exceed the noise abatement criterion of 67 dBA; however, these receivers are protected by an existing soundwall, and increasing the height of this soundwall would not provide the required minimum 5-decibel noise reduction.

TSM Alternative: Noise levels would approach or exceed the noise abatement criterion at Receptor R184. Noise abatement is not warranted at Receptor R183 or R185 through R187 because the noise level does not approach or exceed the criterion. Noise abatement at Receptor R184 would not be feasible because an existing or newly constructed/under construction soundwall at this location already provides substantial noise reduction for receptors located behind the soundwalls. Raising this soundwall to 16 feet would not provide the additional 5-decibel reduction; therefore, it would not be feasible.

Tier II Auxiliary Lane Alternative

Traffic volumes for the Tier II Auxiliary Lane Alternative were the same as the Tier I Corridor TSM Alternative conditions. A higher level of accuracy of the computer modeling in the Tier II traffic noise impact analysis was the result of newer, more detailed topographic information and availability of updated project engineering details.

Receivers representing frequent outdoor use areas and soundwalls that would be considered feasible and reasonable are shown on the plan drawings in Appendix K. If the cost of the soundwall is less than the cost allowance, then the soundwall would likely be considered reasonable and incorporated into the project. See the Regulatory Setting section for more information on the criteria for reasonableness and feasibility.

Receptors R144, R145, and R146A represent single-family residences on the northbound side of Route 1, west of 41st Avenue, which is shown on Sheet 15 in Appendix K. Predicted future traffic noise levels at these receptors would not exceed the noise abatement criterion for the Tier II Auxiliary Lane Alternative; therefore, a soundwall is not needed.

Receptors R146 through R148 represent single-family residences and the Good Shepherd School on the northbound side of Route 1 to the west of Rodeo Gulch. Noise levels would exceed the noise abatement criterion at frequent outdoor use areas of three single-family residences. Noise abatement would be feasible with 14-foot-high Soundwall S154 along the northbound shoulder and slightly overlapping a second Soundwall S158 ranging from 10 to 12 feet high along the right-of-way. Together, these soundwalls would extend 1,145 feet. The total cost allowance ranges from $55,000 for a wall height of 8 feet to $285,000 for a height of 16 feet, and the current estimated construction cost of these soundwalls ranges from $368,000 for an 8-foot wall to $735,000 for a 16-foot wall. These soundwalls are not considered reasonable and are not recommended for inclusion in the Tier II Auxiliary Lane Alternative.

However, the residence represented by Receptor R147 is predicted to be exposed to a traffic noise level of 75 A-weighted decibels; therefore, it is considered to be severely impacted. Where severe impacts are identified, unusual and extraordinary abatement must be considered. Although Soundwall S158 has been determined to be unreasonable based on cost, noise abatement, such as a soundwall shorter in length or acoustic treatment of the building shell, must be considered in this instance.

Receptors R149 through R151 represent single-family residences and a convalescent hospital (Pleasant Care Rehabilitation and Nursing Center) on the northbound side of Route 1, east of the Soquel Drive interchange. Predicted future traffic noise levels at the frequent outdoor use area of the convalescent hospital at Receptor R151 would not approach or exceed the noise abatement criterion under the Tier II Auxiliary Lane Alternative, and no abatement would be warranted. Predicted future noise levels at the single-family residences at Receptors R149 and R150 would exceed the noise abatement criterion under the Tier II Auxiliary Lane Alternative. A 5-decibel reduction in traffic noise would be achieved at the residences with 12-foot-high Soundwall S165 extending 178 feet along the right-of-way. The cost allowance is $94,000. The current estimated construction cost of the soundwall is $314,000. This soundwall is not considered reasonable and is not recommended for inclusion in the Tier II Auxiliary Lane Alternative.

Avoidance, Minimization, and/or Noise Abatement

Tier I Corridor Alternatives

The selection of a Tier I Corridor Alternative would not result in actual construction and commitments to providing the soundwalls described above. As projects in the Tier I corridor are prioritized and programmed for funding, they will be subject to separate environmental review and additional noise analysis if warranted. Based on the impacts that have been identified in this section, the avoidance, minimization, and mitigation measures shown below are provided on a conceptual basis. These measures are subject to revision based on the changes in the setting, project design, or regulatory requirements in place when future, tiered projects undergo environmental review.

Based on the studies completed to date, Caltrans and the Federal Highway Administration identified soundwalls that meet the criteria for feasibility. The reasonableness of these soundwalls will analyzed during Tier II environmental review as future Tier II projects proceed to implementation. There are 20 recommended soundwalls under the HOV Lane Alternative and 15 under the TSM Alternative, including two soundwalls that were constructed as part of the Highway 1 Soquel/Morrissey Auxiliary Lanes Project. Tables 2.2.7-2 and 2.2.7-3 present lists of soundwalls that meet the feasibility requirement.

Tier II Auxiliary Lane Alternative

Soundwalls are not recommended for the Tier II Auxiliary Lane Alternative because they do not meet the reasonableness criteria; however, noise abatement in the form of a short soundwall or building acoustical treatment will be considered for one house where the future predicted traffic noise level is higher than 75 A-weighted decibels. Table 2.2.7-4 presents a list of soundwalls that met the feasibility requirement for the Tier II Auxiliary Lane Alternative; however, the Noise Abatement Decision Report prepared for this project found that these soundwalls do not meet the reasonableness criteria.

Table 2.2.7-2: Feasible Noise Barriers
(Reasonableness to be Determined for Future Tier II Projects)
Tier I Corridor HOV Lane Alternative

Barrier	Benefited Receivers	Land Uses Represented by Receivers	Sheet(s) in Appendix K
S59	R7, R9 – R10, R12	7 single-family residences along Bonita Dr.	2, 3
S68	R25, R26, R28 – R33	6 single-family & 21 multi-family residences along Soquel Dr.	3, 4
S71	R16 – R20	27 single-family residences along Bonita Dr.	3 – 5
S74	R36	1 single-family residence along Soquel Dr.	4, 5
S85	R38	4 frontage units of Rio del Mar Club	6
S86	R40A, R41	1 single-family and 10 multi-family residences	6, 7
S87	R42-R44	1 single-family and 9 multi-family residences	6, 7
S89	R48, R49, R50	2 single-family and 2 multi-family residences and 3 undeveloped land lots	7
S90	R63 – R65	2 single-family and 5 multi-family residences	7
S93	R52 – R53A	13 multi-family residences of Loma Del Mar and Seacliff Garden Apartments	7, 8
S100	R81	12 units of the Best Western Seaclliff Inn Motel	8, 9
S103	R66 – R73	52 multi-family and 11 single-family residences and 1 frontage unit along McGregory Drive	8 -10
S115	R76 – R78A	34 frontage units for New Brighton State Beach	10, 11
S106	R85 – R89,R90	14 multi-family residences, 13 mobile homes, and one single-family residence	9
S118	R92 – R101	9 multi-family and 5 single-family residences, and 23 frontage units (1 college, 1 school, 1 church, and 1 park)	10 – 12
S122	R102	6 multi-family residences	11, 12
S124	R119, R120	1 frontage unit of a Montessori school and 6 frontage units of Mt. Calvary Lutheran Church and School	12
S125	R103 – R105	14 multi-family residential units and the community pool of Capitola Knolls Apartments	12
S129	R106 – R108	8 multi-family residences of Capitola Knolls Apartments	12
S128	R122 – R125	3 single-family residences and 9 mobile homes	12, 13
S132	R126 – R129	9 single-family residences and 1 mobile home	13
S133	R110	1 single-family residence	13
S136	R130 – R132	8 single-family residences	13
S144	R141	1 single-family residence	14, 15
S146	R143	4 multi-family residences	15
S150	R146A	3 single-family residences	15
S154 & S158	R146 – R148	3 single-family residences and 2 frontage units of Good Shepherd Catholic School	16
S165	R149 – R150	2 single-family residences	17, 18
S170	R165A	1 single-family and 5 multi-family residences	18
S173	R153 – R155	1 single-family residence, 3 multi-family residences and 4 frontage units of Harbor High School	18, 19
S177	R158, R158A	2 single-family residences, 4 frontage units of Santa Cruz Adult School	19

Table 2.2.7-3: Feasible Noise Barriers
(Reasonableness to be Determined for Future Tier II Projects)
Tier I Corridor TSM Alternative

Barrier	Benefited Receivers	Land Uses Represented by Receivers	Sheet(s) in Appendix K
S68	R25, R26, R29 – R33	3 single-family and 21 multi-family residences along Soquel Dr.	3, 4
S71	R17, R18, R20	20 single-family residences along Bonita Dr.	3 – 5
S74	R36	1 single-family residence along Soquel Dr.	4, 5
S85	R38	4 frontage units of Rio del Mar Club	6
S86	R40 – R41	2 single-family and 10 multi-family residences	6, 7
S87	R42, R44-R45A	3 single-family and 9 multi-family residences	6, 7
S89	R49	2 single-family and 2 multi-family residences	7
S90	R62 – R65	4 single-family and 5 multi-family residences	7
S93	R52	4 multi-family residences	7, 8
S100	R81	12 units of the Best Western Seaclliff Inn Motel	8, 9
S106	R87 – R91	1 single-family and 14 multi-family residences, and 6 mobile homes	9
S111	R66 – R73, R75 – R78A	11 single-family and 56 multi-family residences, and 35 frontage units (Wilderness Park and a pool)	8 –12
S118	R93 – R101	9 multi-family and 6 single-family residences, and 23 frontage units	10 – 12
S122	R102	6 multi-family residence	11, 12
S124	R119	1 frontage unit of a Montessori school and 6 frontage units of Mt. Calvary Lutheran Church and School	12
S125	R103 – R105	14 multi-family residential units and the community pool of Capitola Knolls Apartments	12
S129	R106 – R107	12 multi-family residences	12
S128	R123 – R125	2 single-family residences and 9 mobile homes	12, 13
S132	R126 – R129	9 single-family residences and 1 mobile home	13
S133	R110	1 single-family residence	13
S143	R137	3 multi-family residences	14
S144	R141	1 single-family residence	14, 15
S146	R143	4 multi-family residences	15
S154 & S158	R146 – R148	3 single-family residences and 2 frontage units of Good Shepherd Catholic School	16
S165	R149 – R150	2 single-family residences	17, 18
S170	R165A, R165	3 single-family and 5 multi-family residences	18
S173	R155	1 single-family residence	18, 19
S177	R158	2 single-family residences	19

Table 2.2.7-4: Summary of Noise Barrier Key Information – Tier II Auxiliary Lane Alternative

Barrier	Height Evaluated (feet)	Acoustically Feasible?	Number of Benefited Receivers	Total Reasonable Allowance	Estimated Construction Cost	Cost Less than Allowance?
S154 & S158	8	Yes	1	$55,000	$368,000	No
	10	Yes	1	$55,000	$459,000	No
	12	Yes	2	$114,000	$551,000	No
	14	Yes	5	$285,000	$643,000	No
	16	Yes	5	$285,000	$735,000	No
S165	8	Yes	1	$45,000	$210,000	No
	10	Yes	2	$90,000	$262,000	No
	12	Yes	2	$94,000	$314,000	No
	14	Yes	2	$94,000	$367,000	No
	16	Yes	2	$94,000	$419,000	No

2.2.8 Energy

This section evaluates potential energy impacts that could result from operation of the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative. Energy impacts that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

The National Environmental Policy Act (42 United States Code Part 4332) requires the identification of all potentially significant impacts to the environment, including energy impacts.

The California Environmental Quality Act Guidelines, Appendix F, Energy Conservation, state that an Environmental Impact Report is required to include a discussion of the potential energy impacts of proposed projects, with particular emphasis on avoiding or reducing inefficient, wasteful, and unnecessary consumption of energy.

Affected Environment

The information in this section is derived from the proposed project's *Technical Memorandum on Energy Impacts* (2011).

Route 1, within the Tier I and Tier II project limits, is heavily traveled and congested in the northbound direction in the morning and southbound direction during the evening commute. The level of service in both directions during these peak periods is Level of Service F, reflecting congested, stop-and-go conditions. Recurrent congestion contributes to inefficient energy consumption as vehicles use extra fuel while idling and accelerating in stop-and-go traffic or moving at slow speeds.

Environmental Consequences

Tier I Corridor Alternatives

Because the effect of the proposed project in the context of the countywide travel model is too small to demonstrate energy impacts, in accordance with Caltrans' Standard Environmental Reference Guidelines, a qualitative energy analysis was conducted for the Tier I Corridor Alternatives and is reported in the *Technical Memorandum on Energy Impacts* (2011).

Tier I Corridor HOV Lane Alternative

The Tier I Corridor HOV Lane Alternative would improve average travel speeds and reduce average travel times during both morning and evening peak hours compared to the No Build Alternative. When compared to the No Build Alternative, the Tier I Corridor HOV Lane Alternative would reduce delay by 89 percent (northbound) and 88 percent (southbound) during the morning peak hour, and it would reduce delay by 84 percent (northbound) and 82 percent (southbound) during the afternoon peak hour (Traffic Operations Report, 2012). Freeway operational improvements also would reduce the number of vehicles taking circuitous routes using local streets to avoid freeway bottlenecks. Improved operations are likely to reduce vehicle energy use, whether in the form of petroleum fuels or alternative energy sources. For these reasons, the HOV Lane Alternative is anticipated to have a beneficial effect on energy use compared to the No Build Alternative.

The Tier I Corridor HOV Lane Alternative would offer dedicated peak-hour capacity and nearly free-flow conditions to transit and carpool vehicles compared to stop-and-go conditions under the No Build Alternative. Transit travel times would be reduced, and transit schedule reliability would be improved. A transit market study conducted for this project shows that these improvements would act as incentives for commuters to take advantage of restored or increased local and express bus services. Shifting single-occupant automobile commuters into carpools and transit also would mean energy savings. This information is based on the Traffic Market Analysis prepared for this project (2008).

In sum, improvements in traffic operations under the Tier I Corridor HOV Lane Alternative would reduce operating energy use, whether in the form of petroleum fuels or alternative sources, compared to higher fuel consumption under the No Build Alternative. Construction of proposed pedestrian and bicycle overcrossings would also reduce some vehicle trips, although this trip reduction would not have measurable energy effects.

When balancing energy used during construction and operation against energy saved by relieving congestion and other transportation efficiencies, the Tier I Corridor HOV Lane Alternative is anticipated to have a slightly beneficial effect on direct energy use compared to the No Build Alternative.

Tier I Corridor TSM Alternative

The Tier I Corridor TSM Alternative would have a minimal effect in reducing energy consumption. Auxiliary lanes and ramp metering alone would improve operational conditions, but the overall travel benefits would be much less than under the Tier I Corridor HOV Lane Alternative, which also includes auxiliary lanes and ramp metering. When compared to the No Build Alternative, the Tier I Corridor TSM Lane Alternative would reduce delay by 54 percent (northbound) and 89 percent (southbound) during the morning peak hour, and it would reduce delay by 24 percent (northbound) and would increase delay by 2 percent (southbound) direction during the afternoon peak hour (Traffic Operations Report, 2012). Construction of proposed pedestrian and bicycle overcrossings would also reduce some vehicle trips, although this trip reduction would not have measurable energy effects. The transit market study conducted for this project shows that while the TSM Alternative would improve conditions for transit, transit ridership would not increase enough over the No Build Alternative to affect energy consumption. When balancing energy used during construction and operation against energy saved by relieving congestion and other transportation efficiencies, the TSM Alternative would not have substantial energy impacts or substantially affect energy consumption.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative would have a minimal effect in reducing energy consumption because improvements proposed under this alternative would not entirely relieve traffic congestion. Construction of the Chanticleer Avenue pedestrian/bicycle overcrossing may also reduce some vehicle trips, although this trip reduction would not have measurable energy effects. When balancing energy used during construction and operation against energy saved by relieving congestion and other transportation efficiencies, the Tier II Auxiliary Lane Alternative would not have substantial energy impacts or substantially affect energy consumption.

No Build Alternative

The No Build Alternative under the Tier I and Tier II alternatives would not offer any energy benefits.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

Because the effect of the project alternatives on energy consumption would be either neutral or beneficial compared to the No Build Alternative, no minimization or mitigation measures are proposed for the Tier II Auxiliary Lane Alternative or are anticipated under either of the Tier I Corridor Alternatives.

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2.3 Biological Environment

This section evaluates potential impacts to biological resources that would result from operation of the Tier I and Tier II project alternatives. Impacts that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

This Biological Environment section is divided into the following subsections: Natural Communities, Wetlands and Other Waters, Plant Species, Animal Species, Threatened and Endangered Species, Nesting Birds, and Invasive Species. Potential impacts are discussed for the entire Tier I project area and for the currently proposed Tier II project. Mitigation and avoidance measures for sensitive plant and animal species are identified under the Plant and Animal Species subsections, and additional measures are described in Section 2.4.10, Construction Impacts. Species with a federal status of threatened or endangered are discussed in detail in the Threatened and Endangered Species subsection.

2.3.1 Natural Communities

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. This section also includes information on wildlife corridors and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value. Habitat areas that have been designated as critical habitat under the Federal Endangered Species Act are discussed below in the Threatened and Endangered Species section (Section 2.3.5). Wetlands and other waters are discussed in Section 2.3.2.

Affected Environment

The information in this section is summarized from the Natural Environment Study (2015) prepared for the proposed project.

Tier I Corridor Alternatives Biological Resources

Habitat types present within the biological study area (Figure 2.3.1-1) include riverine/freshwater marsh, riparian forest, coast live oak woodland, eucalyptus woodland, mixed conifer woodland, coastal scrub, annual grassland, landscaped/developed areas, and ruderal/disturbed vegetation, as described below.

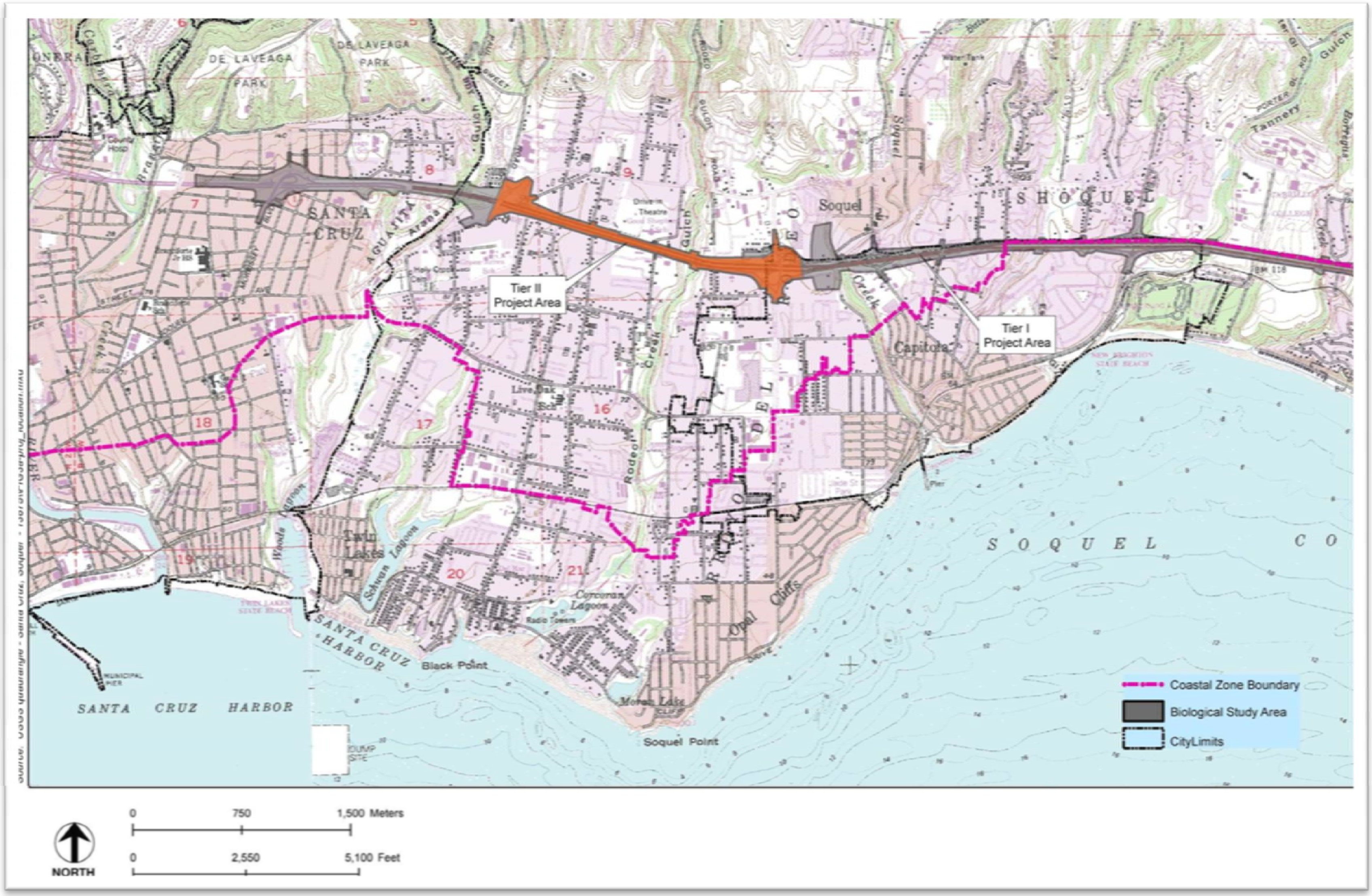

Figure 2.3.1-1: Biological Study Area (1 of 2)

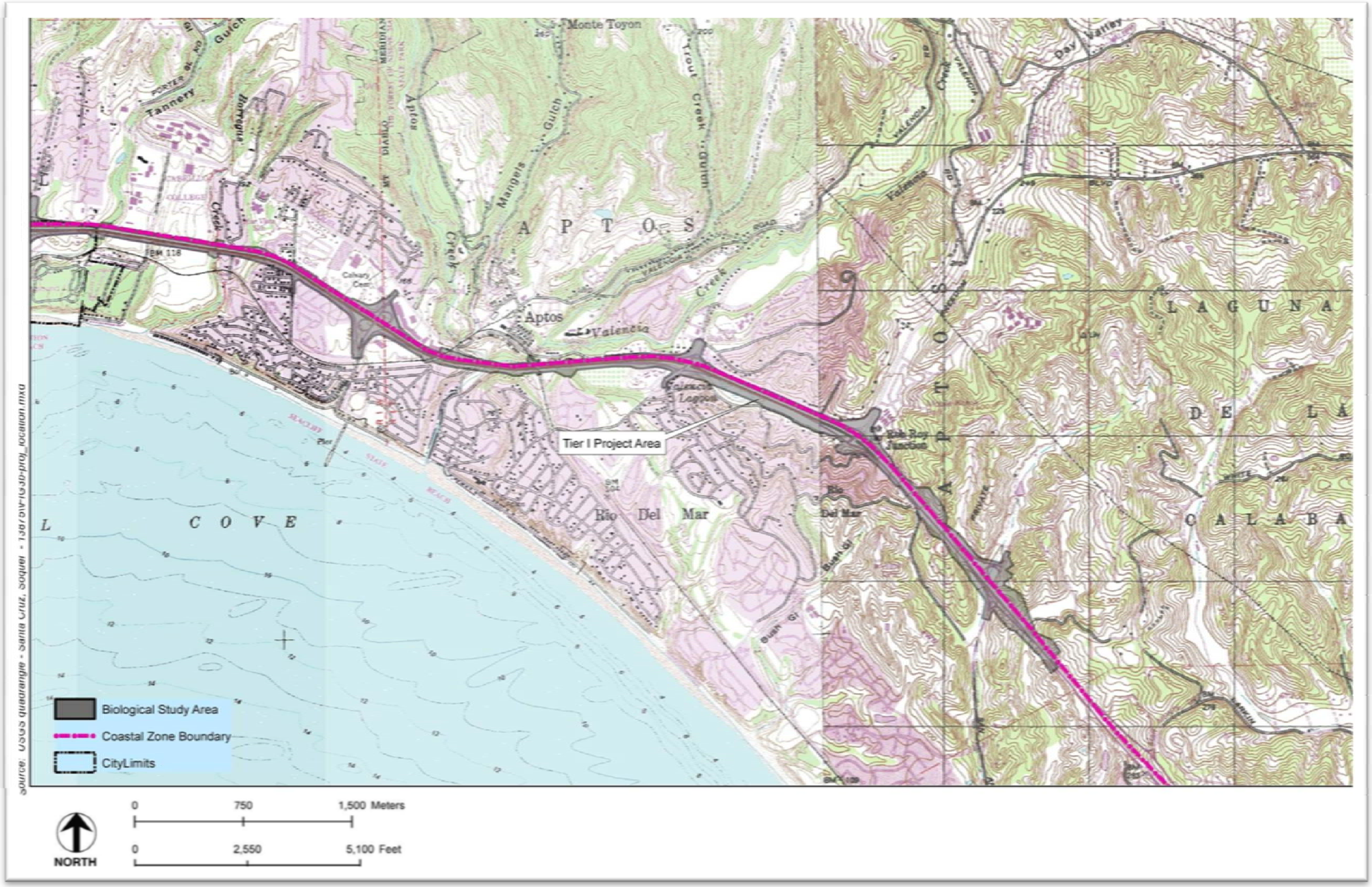

Figure 2.3.1-1: Biological Study Area (2 of 2)

Riverine/Freshwater Marsh

Riverine habitat is present in the streambed of each of the creeks and drainages that traverse or parallel the biological study area. Freshwater marsh was observed in several of the streams and drainages that cross or parallel the biological study area. Approximately 9.56 acres of riverine and freshwater marsh habitat are present within the biological study area.

Several species of fish have potential to occur within large, well-developed riverine habitats of the biological study area, specifically in Valencia, Aptos, and Soquel creeks. These include federally endangered speckled dace, three-spine stickleback, Pacific lamprey, tidewater goby and the federally threatened central California coast steelhead.

Other wildlife species with potential for occurrence within riverine habitats of the biological study area include Pacific treefrog, western toad, the federally threatened California red-legged frog, foothill yellow-legged frog, and western pond turtle. Marsh and shore birds such as red-winged blackbird, tri-colored blackbird, American coot, great blue heron, great egret, snowy egret, and mallard duck often utilize riverine and associated freshwater marsh habitat for nesting or foraging.

Riparian Forest

Riparian forest habitat typically occurs within the riparian corridor adjacent to stream channels with seasonally variable depths to the water table. Riparian forest is typically dense and provides a contiguous upper canopy of larger tree species, with an herbaceous understory layer. Approximately 18.44 acres of riparian forest habitat are present in the many creeks and drainages within the biological study area. This habitat is extensive within the Valencia, Aptos, and Soquel creek corridors. A variety of amphibian and reptile species have potential to occur in riparian forest, especially those parts that closely border riverine and freshwater marsh communities. Vertebrate species observed or expected to occur in or frequent riparian forest habitats include gopher snake, common garter snake, western fence lizard, Virginia opossum, striped skunk, raccoon, California quail, American goldfinch, black phoebe, as well as numerous other birds. Riparian forest areas provide important nesting, roosting, and foraging habitat for a variety of migratory songbirds and various raptor species.

Riparian Corridors and Wetlands and Other Waters

Riparian corridors are considered sensitive and important habitats by various regulatory agencies. Within the biological study area, riparian corridor areas include the riverine, freshwater marsh, and riparian forest habitats described above. The diversity of wildlife species occurring within riparian corridors is typically very high and these habitats are sensitive to disturbance. Riparian vegetation provides important roosting and foraging habitat for many migratory bird species. Riparian vegetation regulates water temperatures and provides, directly or indirectly, food sources for aquatic organisms. Riparian habitats serve as migratory corridors for wildlife, and as such, are important in linking noncontiguous or fragmented wildlife habitats. Riparian corridor areas present within the biological study area fall under the jurisdiction of the California Department of Fish and Wildlife. Riparian areas within the coastal zone also fall under the jurisdiction of Local Coastal Plans approved by the California Coastal Commission. More information regarding wetlands and other waters is provided in Section 2.3.2.

Coast Live Oak Woodland

Coast live oak woodland communities are dominated by the evergreen coast live oak (*Quercus agrifolia*). Approximately 26.77 acres of coast live oak woodland habitat are present along upper creek banks and roadsides in the biological study area. Individual oak trees also are present in many other habitat types within the biological study area, both as ornamental plantings and as naturally occurring trees. Oak woodland typically supports a wide diversity of wildlife. Characteristic mammals expected to occur within coast live oak woodland habitats of the project site include western gray squirrel, blacktail deer, raccoon, striped skunk, dusky-footed wood rat, gray fox, coyote, Virginia opossum, and California ground squirrel. Various birds that occur within these habitats include plain titmouse, mourning dove, acorn woodpecker, Stellar’s jay, western bluebird, red-tailed hawk, Cooper’s hawk, golden eagle, great-horned owl, and common barn-owl. Reptiles that may occur within this habitat type include gopher snake, western fence lizard, and common king snake.

Eucalyptus Woodland

Eucalyptus woodlands are the result of escaped and naturalized eucalyptus trees (typically blue gum eucalyptus), or abandoned eucalyptus plantations. Approximately 1.53 acres of eucalyptus woodland are present along the south side of Route 1 at San Andreas Road, on the north side of Route 1 at Nobel Creek, and throughout the corridor. The eucalyptus woodland areas within the biological study area are composed of blue gum eucalyptus (*Eucalyptus globulus*) and exhibit very little understory vegetation. This habitat type has the potential to provide nesting habitat for raptors and migratory birds, as well as overwintering habitat for monarch butterfly. Some foraging habitat for common wildlife species is present, but habitat values of eucalyptus woodland areas are generally low.

Mixed Conifer Woodland

Approximately 9.30 acres of mixed conifer woodland habitat are present within and adjacent to the biological study area. This habitat type consists of California redwood (*Sequoia sempervirens*) trees, Monterey pine (*Pinus radiata*), and Monterey cypress (*Cupressus macrocarpus),* primarily in planted or ornamental stands. These tree species are found in planted windrows along roadways and in freeway interchange areas. Areas of mixed conifer woodland provide habitat features such as nesting and roosting sites, food, and dispersal corridors for a variety of wildlife species. Wildlife species present in conifer woodland are expected to be similar to those found in oak woodland habitats, with an increased presence of raptor species. There is a large non-native stand of Monterey pine, mixed with other conifer species, on an undisturbed hillside on the south side of Route 1, east of Aptos Creek.

Coastal Scrub

Coastal scrub communities typically occur in pockets in the outer and inner southern coastal ranges and in scattered areas along the immediate coast. Approximately 13.54 acres of coastal scrub habitat are located in the southern portion of the corridor from roughly San Andreas Road to Freedom Boulevard, with a small disturbed area along the north side of Route 1 east of La Fonda Avenue and west of Arana Gulch. The coastal scrub habitat observed was fairly sparse and mixed with annual grassland.

Common plant species include coyote brush, California sagebrush, sticky monkeyflower, poison oak, and black sage. Mammals expected to occur in or frequent the areas of coastal scrub habitat present in the biological study area, based on either direct observations or the presence of “sign,” include brush rabbit, various mice, Botta’s pocket gopher, California ground squirrel, and raccoon. Bird species that are expected to occur include American crow, mourning dove, California thrasher, and scrub jay. Common lizards such as western fence lizard are also expected to occur within coastal scrub habitats of the area.

Annual Grassland

Annual grassland is a common plant community regionally and statewide and is typically found on ridges, hill slopes, and on valley floors. The approximately 12.29 acres of annual grassland present within the biological study area are largely limited to the area near the San Andreas Road interchange. Small areas of annual grassland habitat intergrade with landscaping and other upland habitats along Route 1 and border many of the riparian corridors adjacent to the biological study area. The annual grassland areas within the biological study area are dominated by non-native species of common grasses, with a mixture of annual and perennial native and introduced forbs. Species observed directly, or by sign, within the annual grassland habitat include Botta’s pocket gopher, California ground squirrel, black-tailed deer, western fence lizard, California quail, and mourning dove. Raptors, such as red-tailed hawk, Cooper’s hawk, white-tailed kite, and American kestrel, often utilize annual grassland areas for foraging purposes, while species such as western meadowlark often use grassland areas for nesting.

Landscaped/Developed

Landscaped/developed habitat is the dominant condition throughout the project corridor. Approximately 152.15 acres of landscaped/developed habitat were mapped within the biological study area. This habitat type consists of ornamental plantings in association with residential and commercial developments, and roadside landscaping, and it does not typically provide suitable habitat for wildlife or native plants. Nesting birds may potentially forage and/or nest in landscaped trees.

Ruderal/Disturbed

Ruderal/disturbed vegetation occurs in areas that have been altered by construction, landscaping, or other land-clearing types of activities and is dominated by non-native plant species. Approximately 17.18 acres of ruderal/disturbed vegetation within the biological study area occur primarily in association with highway median strips, road shoulders, and disturbed areas. Characteristic weedy species present include turkey mullein, telegraph weed, summer mustard and various other annual grasses, Animal species expected to occur in this habitat type within the biological study area include various species of mice and Botta's pocket gopher, which may attract and be preyed upon by various species of raptors.

Tier II Auxiliary Lane Alternative Biological Resources

Riverine/Freshwater Marsh

Two hydrological features — Rodeo Creek Gulch and the ditch adjacent to the Soquel Drive-In — comprise all riverine and freshwater marsh habitat within the Tier II Auxiliary Lane Alternative project limits. Combined, these two aquatic locales measure approximately 0.36 acre in total area.

Riparian Forest

In addition to riverine features, Rodeo Creek Gulch also sustains riparian gallery forest. Riparian forest forms above the ordinary high water mark, is typically dense, and provides a contiguous upper canopy of larger tree species growing above an herbaceous understory layer. Approximately 1.07 acres of this habitat exist within the project area, entirely at Rodeo Creek Gulch.

Coast Live Oak Woodland

One small area of Coast Live Oak woodlands habitat exists within the project area, where the eastern edge of Rodeo Creek Gulch adjoins the right-of-way. Approximately 0.15 acre of oak woodland is present in the Tier II Auxiliary Lane Alternative project area.

Eucalyptus Woodland

The Tier II Auxiliary Lane Alternative segment of Route 1 contains no eucalyptus woodlands.

Mixed Conifer Woodland

The Tier II Auxiliary Lane Alternative segment of Route 1 contains no mixed conifer woodlands.

Coastal Scrub

No coastal scrub biotic community occurs within the Tier II Auxiliary Lane Alternative segment of Route 1.

Annual Grassland

The Tier II Auxiliary Lane Alternative segment of Route 1 contains no habitat where annual grasslands occur.

Landscaped/Developed

Horticultural vegetation in landscaped/developed habitat dominates throughout the project corridor. Approximately 27.2 acres of landscaped/developed habitat were mapped within the Tier II Auxiliary Lane Alternative project area.

Ruderal/Disturbed

Approximately 0.37 acre of ruderal/disturbed vegetation within the biological study area occurs in the Tier II Auxiliary Lane Alternative project area, primarily in association with road shoulders and disturbed areas.

Environmental Consequences

Tier I Corridor Alternatives

A combination of both permanent and temporary effects on natural communities that would result, respectively, from each of the Tier I Corridor Alternatives is shown in Table 2.3.1-1.

Table 2.3.1-1: Impacts to Natural Communities – Tier I Corridor Alternatives

Affected Natural Communities	HOV Lane Alternative: Permanent and Temporary Impacts (acres)	TSM Alternative Permanent and Temporary Impacts (acres)
Riverine/Freshwater Marsh	1.08	0.30
Riparian Forest	8.88	4.58
Coast Live Oak Woodland	9.45	4.89
Eucalyptus Woodland	1.02	0.28
Mixed Conifer Woodland	6.08	2.03
Coastal Scrub	2.76	0.87
Annual Grassland	4.53	0.58
Landscaped/Developed	104.67	43.64
Ruderal/Disturbed	13.31	3.61
Source: Natural Environment Study 2015.		

Tier II Auxiliary Lane Alternative

Implementation of the Tier II Auxiliary Lane Alternative would affect five natural communities. Measured by acreage, permanent and temporary effects that would result appear in Table 2.3.1-2.

Table 2.3.1-2: Impacts to Natural Communities – Tier II Auxiliary Lane Alternative

Affected Natural Communities	Tier II Auxiliary Lane Alternative (in acres)	
	Permanent	Temporary
Riverine/Freshwater Marsh	0.02	0.06
Riparian Forest	0.13	0.09
Coast Live Oak Woodland	0.001	0.12
Eucalyptus Woodland	not present	not present
Mixed Conifer Woodland	not present	not present
Coastal Scrub	not present	not present
Annual Grassland	not present	not present
Landscaped/Developed	5.55	5.22
Ruderal/Disturbed	0.19	0.07
Source: Natural Environment Study 2015.		

No Build Alternative

There would be no impact on the habitats discussed above from the No Build Alternative.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

The selection of a Tier I Corridor Alternative would not result in actual construction. No project actions requiring permits or approvals from any state, federal, or local agency are required at this time. As portions of the Tier I corridor are programmed as Tier II projects, they will be subject to separate environmental review. Based on the impacts that have been identified in this section, the avoidance, minimization, and mitigation measures shown below for the Tier II Auxiliary Lane Alternative are anticipated to be implemented for future projects under either of the Tier I Corridor Alternatives. These measures are subject to revision based on the changes in the setting, project design, or regulatory requirements in place when future tiered projects undergo environmental review. Compensatory mitigation for Tier I Corridor Alternatives impacts will include in-kind, on-site and/or off-site replacement of vegetation. At a minimum, restoration and/or enhancement efforts shall achieve a 75 percent success ratio at the end of a 5-year period, and require no further maintenance for survival.

Tier II Auxiliary Lane Alternative General Measures. The following general measures are requirements common to all biological resources for which impacts are identified in Section 2.3 and 2.4 and address impacts for all Tier I and Tier II build alternatives:

1. A qualified biological monitor(s) will ensure compliance with mitigation measures within the project environmental documents. Monitoring shall occur throughout the length of construction or as directed by the regulatory agencies. Full-time monitoring shall occur during vegetation removal, water diversion, and temporary erosion control installation. Monitoring may be reduced to part time once construction activities are under way and the potential for additional impacts are reduced.
2. During project activities, the biological monitor(s) shall coordinate with federal, state, and local agencies and the construction contractor to ensure that construction schedules comply with biological mitigation requirements.
3. Prior to project implementation, the project site shall be clearly flagged or fenced so that the contractor is aware of the limits of allowable site access and disturbance. Areas within the designated project site that do not require regular access shall be clearly flagged as off-limit areas to avoid unnecessary damage to sensitive habitats or existing vegetation within the project site.
4. Prior to project implementation, a project Erosion Control Plan shall be prepared.
5. During project activities, erosion control measures shall be implemented. Silt fencing, fiber rolls, and barriers (e.g., hay bales) shall be installed between the project site and adjacent wetlands and other waters. At a minimum, silt fencing shall be checked and maintained daily throughout the construction period. The contractor shall also apply adequate dust control techniques, such as site watering, during construction.
6. To control erosion during and after project implementation, standard Caltrans Best Management Practices shall be implemented.
7. During project activities, work occurring within stream channels shall be conducted during the dry season if possible (April 15 – October 15). If in-stream work is necessary, a Diversion and Dewatering Plan shall be prepared and implemented.
8. Before work begins, a Hazardous Materials Response Plan shall be prepared and shall be implemented during construction to allow a prompt and effective response to any accidental spills. All workers shall be informed of the importance of preventing spills and of the appropriate measures to take if a spill occurs.
9. During project activities, only within a designated staging area and at least 20 meters from wetlands, other waters, or other aquatic areas. This staging area shall conform to best management practices applicable to attaining zero discharge of stormwater runoff. At a minimum, all equipment and vehicles shall be checked and maintained on a daily basis to ensure proper operation and avoid potential leaks or spills.
10. During project activities, all project-related hazardous materials spills within the project site shall be cleaned up immediately. Spill prevention and clean-up materials shall be onsite at all times during construction.

11. The biological monitor(s) shall ensure that the spread or introduction of invasive exotic plant species will be avoided to the maximum extent possible. When practicable, invasive exotic plants in the project site will be removed and properly disposed.
12. During construction, trash shall be contained, removed from the worksite, and disposed of regularly. Following construction, all trash and construction debris shall be removed from work areas.
13. During project activities, no pets shall be allowed on the construction site.

Specific Measures. The following impact avoidance and minimization measures will be required for construction of the Tier II Auxiliary Lane Alternative and are anticipated to apply to future tiered projects under the Tier I Corridor Alternatives. These measures are intended to avoid, minimize, and mitigate permanent and temporary (during construction), adverse effects to all natural communities present, including riparian habitats and associated oak woodland areas.

Riparian Forest. In addition to general measures 1 through 12 described above, the following measures are specific to riparian forest:

1. Impacts to riparian vegetation will be offset by replacement planting on-site using a 3:1 ratio for each individual riparian tree removed that is greater than 6 inches diameter at breast height (defined as 4.5 feet above the ground, on the uphill side of the tree), and for all riparian habitat acreage that is lost. It should be noted that regulatory agencies may require a higher ratio for replacement planting.
2. Compensatory mitigation for Tier II Auxiliary Lane Alternative impacts shall include in-kind, on-site replacement of riparian vegetation. Regulatory agencies may require a higher ratio for compensatory mitigation. At a minimum, both Tier I and Tier II restoration and/or enhancement efforts shall achieve a 75 percent success rate at the end of a 5-year period and require no further maintenance for survival. All mitigation activities will be conducted within the affected watershed. The compensatory mitigation will be implemented immediately following project completion. Compensatory mitigation plantings shall be monitored quarterly. Any required maintenance shall also occur quarterly. Maintenance activities include weeding, debris removal, replanting (if necessary), repair of any vandalism, fertilizing, and/or pest control. Maintenance activities will be dictated by the results of the quarterly monitoring effort. Quarterly reports and annual monitoring reports shall be submitted to Caltrans, the Regional Transportation Commission, and the affected regulatory agencies. The annual monitoring report submitted at Year 5 shall serve as a final completion report if the mitigation is successful.

Coast Live Oak Woodland. In addition to general measures 1 through 12 described above, the following measures are specific to coast live oak woodland:

1. All coast live oak woodland and individual oaks that are not planned for removal shall be delineated on the project plans and provided protective fencing at a distance no less than the dripline of the affected tree canopy. Project equipment shall not be permitted to enter the coast live oak dripline canopy at any time during the project.
2. During project activities, erosion control measures shall be implemented. Silt fencing, fiber rolls, and barriers (e.g., hay bales) shall be installed between the project site and adjacent coast live oak woodlands. At a minimum, silt fencing shall be checked and maintained daily throughout the construction period. The contractor shall also apply adequate dust control techniques, such as site watering, during construction.
3. During project activities, the cleaning and refueling of equipment and vehicles shall occur only within a designated staging area and at least 20 meters (~66 feet) from coast live oak woodlands. This staging area shall conform to Best Management Practices applicable to attaining zero discharge of stormwater runoff. At a minimum, all equipment and vehicles shall be checked and maintained daily to ensure proper operation and avoid potential leaks or spills.
4. Any coast live oak tree that is removed as part of Tier I or Tier II activities shall be replaced at a 10:1 ratio. Oak tree replacement efforts shall achieve 75 percent success at the end of a 5-year period and require no further maintenance for survival. These replacement plantings shall be located on site and shall be closely associated with existing coast live oak woodland habitat to provide continuity with the existing coast live oak woodland habitat. The compensatory mitigation will be implemented immediately following project completion. Compensatory mitigation plantings shall be monitored quarterly. Any required maintenance shall also occur quarterly. Maintenance activities include weeding, debris removal, replanting (if necessary), repair of any vandalism, fertilizing, and/or pest control. Maintenance activities will be dictated by the results of the quarterly monitoring effort. Quarterly reports and annual monitoring reports and a final completion report will be submitted to Caltrans, the Regional Transportation Commission, and the affected regulatory agencies. The annual monitoring report submitted at Year 5 shall serve as a final completion report if the mitigation is successful.

2.3.2 Wetlands and Other Waters

This section evaluates potential impacts to wetlands and other waters that could result from operation of the Tier I and Tier II project alternatives. Impacts that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

Wetlands and other waters are protected under many laws and regulations. At the federal level, the Federal Water Pollution Control Act, more commonly referred to as the Clean Water Act (33 United States Code 1344), is the primary law regulating wetlands and surface waters. One purpose of the Clean Water Act is to regulate the discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the Clean Water Act, a three-parameter approach is used that includes the presence of hydrophytic (i.e., water-loving) vegetation, wetland hydrology, and hydric soils (i.e., soils formed during saturation/ inundation). All three parameters must be present, under normal circumstances, for an area to be designated as a jurisdictional wetland under the Clean Water Act.

Section 404 of the Clean Water Act establishes a regulatory program that provides that discharge of dredged or fill material cannot be permitted if a practicable alternative exists that is less damaging to the aquatic environment or if the nation's waters would be significantly degraded. The Section 404 permit program is run by the U.S. Army Corps of Engineers with oversight by the U.S. Environmental Protection Agency.

The U.S. Army Corps of Engineers issues two types of 404 permits: Standard and General permits.

There are two types of General permits: Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of the U.S. Army Corps of Engineers' Standard permits. For Standard permits, the U.S. Army Corps of Engineers decision to approve is based on compliance with the U.S. Environmental Protection Agency's Section 404(b)(1) Guidelines (U.S. Environmental Protection Agency 40 *Code of Federal Regulations* Part 230), and whether permit approval is in the public interest. The 404(b)(1) Guidelines were developed by the U.S. Environmental Protection Agency in conjunction with the U.S. Army Corps of Engineers and allow the discharge of dredged or fill material into the aquatic system (i.e., waters of the United States) only if there is no practicable alternative that would have less adverse effects. The Guidelines state that the U.S. Army Corps of Engineers may not issue a permit if there is a least environmentally damaging practicable alternative to the proposed discharge that would have lesser effects on waters of the United States and not have any other significant adverse environmental consequences.

The Executive Order for the Protection of Wetlands (EO 11990) also regulates the activities of federal agencies with regard to wetlands. Essentially, this Executive Order states that a federal agency, such as the Federal Highway Administration, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds that: (1) there is no practicable alternative to the construction and (2) the proposed project includes all practicable measures to minimize harm.

At the state level, wetlands and waters are regulated primarily by the California Department of Fish and Wildlife[1], the State Water Resources Control Board, and the Regional Water Quality Control Boards. In certain circumstances, the Coastal Commission (or Bay Conservation and Development Commission or the Tahoe Regional Planning Agency) may also be involved. Sections 1600-1607 of the California Fish and Game Code require any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed or bank of a river, stream, or lake to notify the California Department of Fish and Wildlife before beginning construction. If the California Department of Fish and Wildlife determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. The California Department of Fish and Wildlife jurisdictional limits are usually defined by the tops of the stream or lake banks, or the outer edge of riparian vegetation, whichever is wider. Wetlands under jurisdiction of the U.S. Army Corps of Engineers may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the California Department of Fish and Wildlife.

The Regional Water Quality Control Boards were established under the Porter-Cologne Water Quality Control Act to oversee water quality. The Regional Water Quality Control Board also issues water quality certifications for impacts to wetlands and waters in compliance with Section 401 of the Clean Water Act. Please see Section 2.2.2, Water Quality, for additional details.

Affected Environment

The information in this section is summarized from Appendix D, Wetland Assessment, contained in the Natural Environment Study (2015) prepared for the proposed project.

[1] Effective on January 1, 2013, the California Department of Fish and Game was renamed the California Department of Fish and Wildlife. The name of the statutory code administered by the California Department of Fish and Wildlife remains the Fish and Game Code.

Tier I Corridor Alternatives

An assessment and delineation of potential jurisdictional wetlands and other waters of the United States within the Tier I biological study area was conducted from September 30 through October 3, 2003. A supplemental wetland examination was conducted over portions of Route 1 on February 21 and 22, 2007, to reflect changes within the biological study area. Another supplemental site visit was conducted on November 6, 2013, to determine if the jurisdictional boundaries have increased or decreased since 2007. Field observations concluded that the jurisdictional features are less than (approximately 0.5 acre) those formally delineated in 2003 and 2007. One of the primary reasons for the observed reduction in jurisdictional boundaries was due to the removal of willow habitat associated with a recent housing development on Rosemarie Court. Because the total area of jurisdictional habitat was concluded to be less than the area mapped in 2003 and 2007, a formal delineation was not conducted at this time to determine the exact area. Therefore, for the purposes of this analysis, the calculations of the impact areas are based on the 2003 and 2007 delineations and are considered to be conservative at this time. Due to the anticipated time frames for the implementation of future Tier II projects, updated wetland delineations will have to be conducted for each future Tier II project. Therefore, the conservatively high estimates provided for the Tier I Corridor Alternatives will be modified by updated information that will provide the basis for specific amounts of mitigation to be included in future Tier II environmental documents.

Delineation followed the routine onsite wetland determination methodology described in the 1987 U.S. Army Corps of Engineers Wetlands Delineation Manual (Environmental Laboratory, 1987). Potential wetland areas within the coastal zone were also evaluated using the California Coastal Commission one-parameter wetland definition, consistent with Local Coastal Plans, in addition to the U.S. Army Corps of Engineers three-parameter methodology for delineating wetlands. The total area of wetlands within the Tier I biological study area is shown below in Table 2.3.2-1. Some jurisdictional areas overlap and therefore the totals of the jurisdictional areas of the respective agencies are not additive.

Freshwater marsh wetland and/or riverine habitat identified as U.S. Army Corps of Engineers jurisdictional wetlands was observed within the following streams and drainages of the biological study area: Valencia Channel, Valencia Lagoon, Aptos Creek, Ord Gulch, Borregas Creek, Pot Belly Creek, Tannery Gulch, Nobel Creek, Soquel Creek, Rodeo Creek Gulch, and Arana Gulch and its tributary. As shown in maps in Appendix M, a number of these areas are also Local Coastal Plan/California Coastal Commission wetlands.

U.S. Army Corps of Engineers other waters and Local Coastal Plan/California Coastal Commission wetlands are present in roadside ditches that are tributary to Valencia Creek and Ord Gulch, at Monterey Avenue, and near the Soquel drive-in theater.

Table 2.3.2-1: Jurisdictional Areas in the Tier I Biological Study Area

Jurisdictional Area	Acres
U.S. Army Corps of Engineers Jurisdictional Areas	
U.S. Army Corps of Engineers Wetlands	9.01
U.S. Army Corps of Engineers Other Waters	0.85
Total of Wetlands and Other Waters of the US	9.86
Other Jurisdictional Areas	
Jurisdiction of Local Coastal Plan approved by the California Coastal Commission[1]	15.48
California Department of Fish and Wildlife jurisdiction[2]	28.19
1 Local Coastal Plan jurisdiction includes U.S. Army Corps of Engineers (USACE) areas. 2 CDFW jurisdiction includes USACE areas.	

Tier II Auxiliary Lane Alternative

Within the Tier II Auxiliary Lane Alternative project area, there are areas of freshwater marsh/riverine habitat associated with Rodeo Creek Gulch that are mapped as U.S. Army Corps of Engineers jurisdictional wetlands, and the ditch adjacent to the Soquel Drive-In is mapped as U.S. Army Corps of Engineers other waters. Both of these areas are also under the jurisdiction of the California Department of Fish and Wildlife. The total area of wetlands within the Tier II biological study area is shown below in Table 2.3.2-2. Because the jurisdictions of the U.S. Army Corps of Engineers and the California Department of Fish and Wildlife overlap, the amounts shown in the table are not additive.

Table 2.3.2-2: Jurisdictional Areas in the Tier II Biological Study Area

Jurisdictional Area	Acres
U.S. Army Corps of Engineers	
U.S. Army Corps of Engineers Wetlands	0.0
U.S. Army Corps of Engineers Other Waters (ditch adjacent to the Soquel Drive-In)	0.13
U.S. Army Corps of Engineers: Total of Wetlands and Other Waters of the United States	0.13
Other Jurisdiction	
California Department of Fish and Wildlife jurisdiction* (Rodeo Creek Gulch & ditch adjacent to the Soquel Drive-In)	1.04
* CDFW jurisdiction includes USACE areas Tier II is not within the Coastal Zone	

Rodeo Creek Gulch: Adjacent to Route 1, Rodeo Creek Gulch consists of a broad, slightly incised channel in an urban setting. Rodeo Creek Gulch is a blue-line stream that receives runoff from a medium-sized urban watershed area. The creek flows under Route 1 and Soquel Avenue through a 106-inch concrete arch culvert. Channel areas upstream and downstream of the culvert were dry during the field assessment, with the exception of a small stagnant pool at the southern end of the culvert. The broad, flat natural channel area south of Route 1 exhibited a central flat, sandy low-flow channel, surrounded by low-lying, regularly inundated floodplain areas consisting of sand or loamy soils that were densely covered with riparian vegetation. Wetland boundaries extend across the floodplain to a width of between 100 to 200 feet within the creek corridor. Creek banks above the wetland floodplain area were dominated by annual grassland, coast live oak, and poison oak. Dense willow canopy is present on both sides of Route 1, within and adjacent to the Tier II Auxiliary Lane Alternative project area.

Ditch Adjacent to the Soquel Drive-In: The ditch adjacent to the Soquel Drive-In is on the north side of the right-of-way immediately adjacent to the drive-in. The ditch consists of a linear depression approximately 308 feet long, 5 to 25 feet wide, and approximately 3 feet deep. The ditch receives runoff from the paved drive-in and from Route 1, and directs flows into two culverts leading south under the highway. Water from this area likely reaches Rodeo Creek Gulch by way of the storm drain system.

Environmental Consequences

Tier I Corridor Alternatives

The Tier I Corridor Alternatives have the potential to cause permanent and temporary impacts to U.S. Army Corps of Engineers, California Department of Fish and Wildlife, and Local Coastal Plan/California Coastal Commission jurisdictional areas associated with the creeks and drainages that cross, or are adjacent to, Route 1. It is not possible to avoid impacts to wetlands and other waters entirely because the highway already crosses these nine water courses, but the Project Development Team took various measures during preliminary design to avoid or reduce such impacts, as noted for natural communities. Impacts are summarized in Table 2.3.2-3 and discussed in the following paragraphs.

Tier I Corridor HOV Lane Alternative

Permanent and temporary impacts to jurisdictional areas from the Tier I Corridor HOV Lane Alternative are shown above in Table 2.3.2-3. Permanent impacts would result from changes in bank configuration, loss of riparian habitat associated with road widening and culvert extensions, realignment of existing roadways, and construction of new road sections. Temporary impacts would result from stream diversion installation and removal, streambed disturbance during culvert removal and replacement, removal and reconstruction of roadside ditches, vegetation removal, and road construction.

Table 2.3.2-3 Tier I Corridor Alternatives
Potential Impacts to Wetlands and Other Waters of the United States

Jurisdictional Area	Permanent (acres)	Temporary (acres)
HOV Lane Alternative		
U.S. Army Corps of Engineers Wetlands	0.78	0.22
U.S. Army Corps of Engineers Other Waters	0.15	0.10
Jurisdiction of Local Coastal Plan approved by Coastal Commission [1]	3.22	0.46
California Department of Fish and Wildlife jurisdiction[2]	8.98	1.41
TSM Alternative		
U.S. Army Corps of Engineers Wetlands	0.23	0.03
U.S. Army Corps of Engineers Other Waters	0.10	0.02
Jurisdiction of Local Coastal Plan approved by Coastal Commission[1]	2.20	0.33
California Department of Fish and Wildlife jurisdiction[2]	3.58	0.95

[1] Local Coastal Plan/California Coastal Commission jurisdiction includes U.S. Army Corps of Engineers areas.
[2] California Department of Fish and Wildlife jurisdiction includes U.S. Army Corps of Engineers areas.

Tier I Corridor TSM Alternative

Permanent and temporary impacts to jurisdictional areas from the Tier I Corridor TSM Alternative are also shown above in Table 2.3.2-3. Both the permanent and temporary impacts of this alternative would result from similar activities and elements as described for the Tier I Corridor HOV Lane Alternative.

Impacts to Wetland Functions and Values

Project impacts to the functions and values of wetlands/waters would be minor given the very small amounts to be filled under either alternative. The proposed project would not permanently affect the stability of these wetlands/waters areas, decrease their value as habitat, or reduce their flood control capacity.

Tier II Auxiliary Lane Alternative

Road widening, retaining wall, and soundwall construction may require the placement of pilings, abutments, or other supports, or fill placement that could permanently impact jurisdictional waters. Potential impacts to streamside vegetation could result from grading, excavation, materials placement, temporary dewatering, hazardous material spills, and increased erosion and sedimentation. Water quality degradation could result from concrete spills, fuel spills, or excessive project-related sedimentation, which could adversely impact wetland habitats or other waters.

The Tier II Auxiliary Lane Alternative impacts to jurisdictional areas are summarized in Table 2.3.2-4 and discussed below.

**Table 2.3.2-4: Tier II Auxiliary Lane Alternative
Potential Impacts to Wetlands and Other Waters of the United States**

Jurisdictional Area	Permanent (acres)	Temporary (acres)
U.S. Army Corps of Engineers Wetlands	0.0	0.0
U.S. Army Corps of Engineers Other Waters (ditch adjacent to the Soquel Drive-In)	0.02	0.06
California Department of Fish and Wildlife jurisdiction* (Rodeo Creek Gulch and ditch adjacent to the Soquel Drive-In)	0.15	0.15
* California Department of Fish and Wildlife jurisdiction includes U.S. Army Corps of Engineers areas.		

Rodeo Creek Gulch

Proposed permanent and temporary impact areas at Rodeo Creek Gulch consist of roadway widening and retaining wall construction on existing road berm areas directly above and draining into the channel of Rodeo Creek Gulch. No work is proposed within the active channel area (U.S. Army Corps of Engineers jurisdiction) of Rodeo Creek Gulch itself. The gulch through which the creek flows contains riparian forest canopy, and all jurisdictional impacts would consist of loss of riparian trees and riparian canopy area (California Department of Fish and Wildlife jurisdiction).

Ditch Adjacent to the Soquel Drive-In

Proposed permanent and temporary impact areas at the ditch adjacent to the Soquel Drive-In consist of roadway widening and retaining wall construction that would encroach into the active channel of this seasonal roadside ditch. This area contains defined bed and bank structure, and it directs runoff to Rodeo Creek Gulch. Jurisdictional impacts at the ditch adjacent to the Soquel Drive-In would consist of loss of bed and bank/other waters habitat (California Department of Fish and Wildlife and U.S. Army Corps of Engineers jurisdiction).

No Build Alternative

The No Build Alternative would have no impact on wetlands and other waters.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

Requirements Specific to the Tier I Corridor Alternatives. The selection of a Tier I Corridor Alternative would not result in actual construction. No project actions requiring permits or approvals from any state, federal, or local agency are required at this time. As portions of the Tier I corridor are programmed as Tier II projects, they will be subject to separate environmental review. Compensatory mitigation for Tier I Corridor Alternatives impacts shall include in-kind, on-site and/or off-site replacement of vegetation. Affected wetlands shall be mitigated at a 1:1 restoration ratio for temporary impacts and at a 3:1 enhancement ratio for permanent impacts to wetlands and other waters. Regulatory agencies may require a higher ratio for compensatory mitigation. The compensatory mitigation requirements for the Tier II Auxiliary Lane Alternative's impacts to wetlands and other waters of the United States, other than the requirement to mitigate onsite and the definitive identification of mitigation ratios, shall apply to the Tier I Corridor Alternatives. Based on the impacts that have been identified in this section, the avoidance, minimization, and mitigation measures specified for the Tier II Auxiliary Lane Alternative are anticipated to be implemented for future projects under either of the Tier I Corridor Alternatives. These measures are subject to revision based on the changes in the setting, project design, or regulatory requirements in place when future tiered projects undergo environmental review.

Tier II Auxiliary Lane Alternative

Avoidance and minimization measures included in Section 2.3.1 for natural communities also apply to jurisdictional wetlands and waters impacts. Implementation of these measures will provide compensatory mitigation for impacts to jurisdictional habitats through replacement of wetland/riparian vegetation within the Tier II project area, creation of suitable conditions for the establishment of wetland/riparian plant species along stream corridors, and providing for the long-term persistence of those conditions.

Possible temporary effects caused by the Tier I Corridor Alternatives and those caused by the Tier II Auxiliary Lane Alternative differ only in the acreage possibly disturbed. The following environmental commitments will be implemented where wetlands, stream courses, and other aquatic habitat exists in close proximity to aquatic resources that the Tier II Auxiliary Lane Alternative and future tiered projects under either of the Tier I Corridor Alternatives might affect.

1. During project activities, work occurring within stream channels shall be conducted during the dry season (April 15 – October 15), if possible. If in-stream work will be necessary, a Diversion and Dewatering Plan shall be prepared and implemented.
2. During project activities, the cleaning and refueling of equipment and vehicles shall occur only within a designated staging area at least 20 meters (~66 feet) from wetlands, other waters, or other aquatic areas. This staging area shall conform to Best Management Practices applicable to attaining zero discharge of stormwater runoff. At a minimum, all equipment and vehicles shall be checked and maintained daily to ensure proper operation and avoid potential leaks or spills.
3. Affected wetlands shall be mitigated at a 1:1 restoration ratio for temporary impacts and a 3:1 enhancement ratio for permanent impacts to wetlands and other waters. Compensatory mitigation for Tier II Auxiliary Lane Alternative impacts shall include in-kind, on-site replacement of vegetation.

4. At a minimum, compensatory mitigation restoration and/or enhancement efforts shall achieve a 75 percent success ratio at the end of a 5-year period and require no further maintenance for survival. All mitigation activities will be conducted within the affected watershed, if feasible. The compensatory mitigation will be implemented immediately following project completion. Compensatory mitigation plantings shall be monitored quarterly. Any required maintenance shall also occur quarterly. Maintenance activities will include weeding, debris removal, replanting (if necessary), repair of any vandalism, fertilizing, and/or pest control. Maintenance activities will be dictated by the results of the quarterly monitoring effort. Quarterly reports and annual monitoring reports shall be submitted to Caltrans, the Regional Transportation Commission, and the affected regulatory agencies. The annual monitoring report submitted at Year 5 shall serve as a final completion report if the mitigation is successful.

2.3.3 Plant Species

This section evaluates potential impacts to plant species that could result from operation of the Tier I and Tier II project alternatives. Impacts to these species that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

The U.S. Fish and Wildlife Service and California Department of Fish and Wildlife have regulatory responsibility for the protection of special-status plant species. “Special-status” species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the Federal Endangered Species Act and/or the California Endangered Species Act. Please see the Threatened and Endangered Species, Section 2.3.5, in this document for detailed information regarding these species.

This section of the document discusses all the other special-status plant species, including California Department of Fish and Wildlife species of special concern, U.S. Fish and Wildlife Service candidate species, and California Native Plant Society rare and endangered plants.

The regulatory requirements for the Federal Endangered Species Act can be found at 16 United States Code Section 1531, *et seq.* See also 50 *Code of Federal Regulations* Part 402. The regulatory requirements for the California Endangered Species Act can be found at California Fish and Game Code, Section 2050, *et seq.* Department projects are also subject to the Native Plant Protection Act, found at Fish and Game Code, Section 1900-1913, and the California Environmental Quality Act, California Public Resources Code, Sections 2100-21177.

In addition, certain plants are listed as rare or endangered by the California Native Plant Society but have no designated status. The California Department of Fish and Wildlife has authority during the environmental review process to review potential constraints to rare plant species and require mitigation to reduce the level of significance. The California Environmental Quality Act Guidelines, Section 15065 ("Mandatory Findings of Significance"), requires that a reduction in numbers of a rare or endangered species be considered a significant effect. California Environmental Quality Act Guidelines Section 15380 ("Rare or endangered species") provides for assessment of unlisted species as rare or endangered under the California Environmental Quality Act if the species can be shown to meet the criteria for listing. Unlisted plant species on the California Native Plant Society Lists 1A, 1B, and 2 are typically considered under the California Environmental Quality Act.

Affected Environment

The information in this section is summarized from the Natural Environment Study (2015) prepared for the proposed project.

Tier I Corridor Alternatives

An updated species list was obtained from the U.S. Fish and Wildlife Service on October 20, 2014, and the California Natural Diversity Database and California Native Plant Society Lists were consulted to identify special-status plant species that may occur in the project vicinity. Based on the presence of suitable habitat, 25 special-status plant species have potential to be present within the biological study area, as described in Table 2.3.3-1. Latin names for these plant species are provided in the table and are not subsequently repeated in the text.

Table 2.3.3-1: Special-Status Plant Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
bent-flowered fiddleneck	*Amsinckia lunaris*	– / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 5.1 miles north of the Morrissey Boulevard/Route 1 interchange. Floristic surveys should be conducted to confirm absence/presence.

Table 2.3.3-1: Special-Status Plant Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
Anderson's manzanita	*Arctostaphylos andersonii*	– / – / 1B.2	Several individuals observed within the biological study area. Nearest known occurrences are approximately 3.1 miles west of the Morrissey Boulevard/Route 1 interchange and 2.1 miles north of the State Park Drive/Rout 1 intersection. Species is unlikely to be adversely affected, but floristic surveys should be conducted during the flowering period prior to start of construction to confirm presence/ absence.
Pajaro manzanita	*Arctostaphylos pajaroensis*	– / – / 1B.1	Several individuals observed within the biological study area. Nearest known occurrence is approximately 1.5 miles east of the San Andreas Road/Route 1 interchange. Species is unlikely to be affected, but floristic surveys should be conducted to confirm absence/presence.
marsh sandwort*	*Arenaria paludicola*	FE / SE / 1B.1	Not known to occur within the biological study area. Nearest known occurrence is approximately 3.1 miles northwest of the Morrissey Boulevard/Route 1 interchange. Species is unlikely to be adversely affected, but floristic surveys should be conducted to confirm absence/presence.
swamp harebell	*Campanula californica*	– / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 3.1 miles northwest of the Morrissey Boulevard/Route 1 interchange. Floristic surveys may be needed to confirm absence/presence.
bristly sedge	*Carex comosa*	– / – / 2.1	Not known to occur within the biological study area. Nearest known occurrences are approximately 4.8 miles north of the interchange of the State Park Drive/Route 1 interchange. Floristic surveys may be needed to confirm absence/presence.
deceiving sedge	*Carex saliniformis*	– / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 3.2 miles northwest of the Morrissey Boulevard/Route 1 interchange. Floristic surveys may be needed to confirm absence/presence.

Table 2.3.3-1: Special-Status Plant Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
Monterey spineflower*	*Chorizanthe pungens var. pungens*	FT, CH / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 1.48 miles southeast of the San Andreas Road/Route 1 interchange. The biological study area is located outside of critical habitat for the species. Floristic surveys should be conducted to confirm absence/presence.
robust spineflower*	*Chorizanthe robusta var. robusta*	FE, CH / – / 1B.1	Three occurrences in the vicinity of the biological study area: (1) approximately 0.39 mile northwest of the 41st Avenue/Route 1 interchange; (2) approximately 0.62 mile northeast of the interchange of Freedom Boulevard/ Route 1; and (3) approximately 1.97 miles south of the San Andreas Road/Route 1 interchange. The biological study area is located outside of critical habitat for the species. Floristic surveys should be conducted to confirm absence/presence.
San Francisco collinsia	*Collinsia multicolor*	– / – /1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 16 miles northwest of the Morrissey Boulevard/Route 1 interchange. Floristic surveys should be conducted to confirm absence/presence.
seaside bird's-beak*	*Cordylanthus rigidus* ssp. *littoralis*	– /SE/1B.1	Not known to occur within the biological study area. Nearest known occurrence is approximately 17 miles southeast of the Porter Street/Route 1 interchange. Species is unlikely to be affected by project, but floristic surveys should be conducted to confirm presence/absence.
Ben Lomond buckwheat	*Eriogonum nudum var. decurrens*	– / – / 1B.1	Not known to occur within the biological study area. Nearest known occurrence is approximately 4.1 miles northwest of the Morrissey Boulevard/Route 1 interchange. Floristic surveys should be conducted to confirm absence/presence.
Santa Cruz tarplant*	*Holocarpha macradenia*	FT, CH / SE / 1B.1	Several documented occurrences within 1.5 miles of biological study area. The biological study area is located 0.25 mile north of critical habitat for the species, but critical habitat is not likely to be affected. Species could be affected. Floristic surveys should be conducted to confirm absence/presence.

Table 2.3.3-1: Special-Status Plant Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
arcuate bush mallow	*Malacothamnus arcuatus*	– / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 9.5 miles north of the San Andreas Road/Route 1 interchange. Floristic surveys should be conducted to confirm absence/presence.
Hall's bush mallow	*Malacothamnus hallii*	– / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 14.3 miles east of the San Andreas Road/Route 1 interchange. Floristic surveys should be conducted to confirm absence/presence.
marsh microseris	*Microseris paludosa*	– / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 1.67 miles northwest of the Morrissey Boulevard/Route 1 interchange. Floristic surveys should be conducted to confirm absence/presence.
Dudley's lousewort	*Pedicularis dudleyi*	– / SR / 1B.2	Species is possibly extirpated in the area and is unlikely to be affected by the project. Floristic surveys should be conducted to confirm absence/presence.
Monterey pine	*Pinus radiata*	– / – / 1B.1	One area within the biological study area appears to contain a large population of Monterey pines, mixed with other conifer species along a large undisturbed hillside located on the south side of Route 1, east of Aptos Creek. These trees are not identified as a native stand. Non-native stands of planted Monterey pines could be affected by the project, but these stands are not considered sensitive. No further survey efforts are required.
Choris' popcorn flower	*Plagiobothrys chorisianus var. chorisianus*	– / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 4.5 miles northwest of the Morrissey Boulevard/Route 1 interchange. Floristic surveys should be conducted to confirm absence/presence.
San Francisco popcorn flower*	*Plagiobothrys diffuses*	– / SE / 1B.1	Not known to occur within the biological study area. Nearest known occurrence is approximately 1.18 miles north of the Park Avenue/Route 1 interchange. Floristic surveys should be conducted to confirm absence/presence.

Table 2.3.3-1: Special-Status Plant Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
pine rose	*Rosa pinetorum*	– / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 9.4 miles southeast of the San Andreas Road/Route 1 interchange. Floristic surveys should be conducted to confirm absence/presence.
chaparral ragwort	*Senecio aphanactis*	– / – / 2.2	Not known to occur within the biological study area. Nearest occurrence is approximately 7.9 miles northwest of the Morrissey Boulevard/Route 1 interchange. Species is unlikely to be affected by project, but floristic surveys should be conducted to confirm presence/absence.
maple-leaved checkerbloom	*Sidalcea malachroides*	– / – / 4.2	Not known to occur within the biological study area. Nearest occurrence is approximately 0.7 mile southwest of the Morrissey Boulevard/Route 1 interchange. Floristic surveys should be conducted to confirm presence/absence.
Santa Cruz microseris	*Stebbinsoseris decipiens*	– / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence within biological study area is approximately 13.5 miles northwest of the interchange of Morrissey Boulevard/Route 1. Floristic surveys should be conducted to confirm absence/presence.
saline clover	*Trifolium depauperatum* var. *hydrophilum*	– / – / 1B.2	Not known to occur within the biological study area. Nearest known occurrence is approximately 10.5 miles southeast of the San Andreas Road/Route 1 interchange. Floristic surveys should be conducted to confirm absence/presence.

Table 2.3.3-1: Special-Status Plant Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
* Indicates a federal or state endangered or threatened species discussed in Section 2.3.5. Federal: FE = Federal Endangered FT = Federal Threatened FC =Federal Candidate Species CH = Federally Designated Critical Habitat State: SE = State Endangered ST = State Threatened SR = State Rare SC = State Candidate Species California Native Plant Society: List 1B = rare, threatened, or endangered in California and elsewhere. List 2 = rare, threatened, or endangered in California, but more common elsewhere. List 4 = limited distribution (Watch List). Threat Code: .1 = Seriously endangered in California (over 80% of occurrences threatened/high degree and immediacy of threat) .2 = Fairly endangered in California (20%–80% occurrences threatened) .3 = Not very endangered in California (<20% of occurrences threatened or no current threats known) Habitat: Presence/Absence Absent [A] means no further work needed. Present [P] means general habitat is present and species may be present.			

Focused surveys for rare plants within the biological study area were conducted on May 30 and 31, 2003, and during September and October 2003. Supplementary plant surveys were conducted from February 21 to 23, 2007, in areas added to the biological study area.

Three special-status plant species were observed within the biological study area during the field surveys: Anderson's manzanita, Pajaro manzanita, and Monterey pine. Mature Anderson's manzanita and Pajaro manzanita were observed growing southeast of the interchange of Route 1 and San Andreas Road. One area on the south side of Route 1, east of Aptos Creek, appears to contain a large non-native stand of Monterey pines mixed with other conifer species. No native stands of Monterey pines were observed within the biological study area. None of these special-status plant species is federally or state listed as threatened or endangered or is a candidate for such listing.

No other special-status plant species were observed within the biological study area, and none are expected to be present; however, potential for special-status plants to exist within the biological study area cannot be ruled out completely. Several years would pass before the proposed project is constructed and conditions may change; therefore, there is some potential that some special-status plant species could be detected within the biological study area with a later survey effort. Nevertheless, and pending consultations with the resource agencies, occurrences of special-status plant species within the biological study area would be considered rare to unlikely, given the disturbance associated with potential habitat throughout the majority of the project area.

Tier II Auxiliary Lane Alternative

None of the special-status plant species listed in Table 2.3.3-1 was observed within the Tier II Auxiliary Lane Alternative project area, and additional occurrences would be considered rare to unlikely given the disturbance associated with potential habitat throughout most of the project area.

Environmental Consequences

Tier I Corridor Alternatives

Heavy equipment operation, worker foot traffic, and other disturbance of vegetated areas could lead to injury or mortality of special-status plant species. Loss of suitable habitat could reduce the amount of habitat that could be colonized by special-status plant species in the future. Temporary and permanent impacts for the Tier I Corridor Alternatives cannot be quantified at this time, and will not be able to be quantified until the project design is finalized and the appropriate floristic surveys of the biological study area are conducted to confirm presence or absence of special-status plant species.

Although some individual Anderson's manzanita, Pajaro manzanita, and Monterey pine were identified within the Biological Study Area, impacts to these species are unlikely. The areas in which these species were observed are well outside the area of direct project impact within the biological study area, and these areas are very unlikely to be affected by project-related activities. Because no special-status plants were observed within the area of direct project impact and the likelihood of their occurrence is small, no impacts on special-status plants from either of the Tier I Corridor Alternatives are anticipated; however, due to the long project timeframe, and despite the primarily urban or disturbed conditions present, there is a potential that other special-status species could become established before project construction. Additional floristic surveys will be required prior to the start of project construction to determine the presence or absence of special status plant species.
Table 2.3.3-1 lists the plant species for which floristic surveys are anticipated to be required.

Additional discussion on consultation requirements for the following four federally listed plant species is provided in Section 2.3.5, Threatened and Endangered Species: marsh sandwort, Monterey spineflower, robust spineflower, and Santa Cruz tarplant.

Tier II Auxiliary Lane Alternative

No special-status plant species or suitable habitat has been observed in the Tier II project area during past botanical surveys. Based on the biological study, special-status species are unlikely to occur within the Tier II project area. However, due to the timeframes involved in processing the environmental documents, special-status species could become established within the project footprint prior to the completion of the final environmental document. As a result, updated floristic surveys will be conducted prior to approval of the final EIR/EA to confirm presence or absence of special-status plant species. If special-status species are discovered during the surveys, the mitigation measures identified in the Avoidance, Minimization, and/or Mitigation section for the Tier II Auxiliary Lane Alternative will be implemented. The floristic surveys will accommodate the flowering/identification period for each of the special-status plant species in Table 2.3.3-1 that have suitable habitat present within the study area. Any areas with special-status plant species shall be mapped and their population numbers estimated.

No Build Alternative

There would be no impact on plant species resulting from the No Build Alternative.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

The selection of a Tier I Corridor Alternative would not result in actual construction. No project actions requiring permits or approvals from any state, federal, or local agency are required at this time. As portions of the Tier I corridor are programmed as Tier II projects, they will be subject to separate environmental review. As future Tier II projects are advanced to the environmental review phase, floristic surveys will be conducted and documented in each future Tier II environmental document. Based on the impacts that have been identified in this section, the avoidance, minimization, and mitigation measures specified for the Tier II Auxiliary Lane Alternative are anticipated to be implemented for future projects under either of the Tier I Corridor Alternatives. These measures are subject to revision based on changes in the setting, project design, or regulatory requirements in place when future tiered projects undergo environmental review.

Tier II Auxiliary Lane Alternative

If special-status plant species are identified during surveys conducted prior to the release of the Tier I/Tier II Final environmental document, the following measures shall be implemented:

1. If areas with special-status plant species cannot be avoided, impacts to special-status plant species will be mitigated by implementing the following measures, which are provided on a conceptual basis for the Tier I Corridor Alternatives and will be considered mitigation commitments for the Tier II Auxiliary Lane Alternative for any impacts to special-status plant species that may be identified in future botanical surveys: (a) replace species within the project ROW through installation of plantings/seed material; and/or (b) retain topsoil and duff material from the project

site, or mitigation bank within the known geographic range of the species, for redistribution on the site following construction. A minimum replacement ratio of 2:1 shall be provided. Planting materials and methods, short- and long-term maintenance requirements, success criteria, and monitoring and reporting methodology shall be implemented so that within 5 years, perennial species replacement plantings shall have a 75 percent survivability goal. For annual species, seeding of the targeted special-status species shall achieve 15 percent relative cover within 5 years. The percent cover shall be determined using a recognized methodology, selected by the project biologist in coordination with the appropriate resource agencies; however, the Daubenmire or point intercept methods as described by Sampling Vegetation Attributes (Natural Resources Conservation Service 1996) are recommended. Compensatory mitigation plantings shall be monitored quarterly. Any required maintenance shall also occur quarterly. Maintenance activities will include weeding, debris removal, replanting (if necessary), repair of any vandalism, fertilizing, and/or pest control. Maintenance activities will be dictated by the results of the quarterly monitoring effort. Quarterly reports and annual monitoring reports shall be submitted to Caltrans, the Regional Transportation Commission, and the affected regulatory agencies. The annual monitoring report submitted at Year 5 shall serve as a final completion report if the mitigation is successful.

2. An environmental training program shall be developed to educate construction personnel about special-status plant species with potential to be encountered during construction, and the avoidance and minimization measures being employed to prevent or reduce impacts to these species.
3. If federally listed plant species are determined to occur within the biological study area and cannot be avoided, the project must obtain incidental take authorization from the U.S. Fish and Wildlife Service through a Federal Endangered Species Act Section 7 Biological Opinion and Incidental Take Statement.
4. If feasible, avoid disturbance in areas with special-status plant species. Areas with special-status plant species to be avoided shall be marked on project plans and marked in the field with flagging and/or brightly colored fencing to facilitate plant recognition and avoidance.
5. If plant species listed by the state as endangered or threatened are found to occur within the biological study area and cannot be avoided, the project must obtain incidental take authorization from the California Department of Fish and Wildlife through a California Endangered Species Act Section 2081 Incidental Take Permit. Species that are considered State Rare by the California Department of Fish and Wildlife must be completely avoided because the Department currently does not have a legal mechanism to allow for "take."

6. Under California Code of Regulations Section, Title 14, Section 786.9, the take of plants listed as rare by the California Native Plant Society may be authorized by the California Department of Fish and Wildlife using the same procedures and under the same conditions as incidental take permits, voluntary local programs, natural community conservation plans, safe harbor agreements, and scientific/educational/management permits. During the California Environmental Quality Act (CEQA) project analysis, the California Department of Fish and Wildlife may require implementation of specific mitigation measures for impacts to rare plants found within the biological study area.
7. If the biological monitor(s) or the agency-approved biologist(s) determines that impacts to special-status plant species exceed the levels that are authorized by the affected regulatory agency, he/she will immediately notify the resident engineer (the engineer that is directly overseeing construction activities). The resident engineer will resolve the situation immediately by stopping the actions that are causing the problem and notifying the appropriate resource agency as soon as is reasonably possible. No work will resume until the issue is resolved.

2.3.4 Animal Species

This section evaluates potential impacts to animal species that could result from operation of the Tier I and Tier II project alternatives. Impacts to these species that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

The U.S. Fish and Wildlife Service and California Department of Fish and Wildlife share regulatory responsibility for the protection of special-status animal species. “Special-status” species are selected for protection because they are rare and/or subject to population and habitat declines. Special-status is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the Federal Endangered Species Act and/or the California Endangered Species Act. Section 2.3.5, Threatened and Endangered Species, provides detailed discussion for these species occurring within the project biological study area.

Regulatory Setting

Many state and federal laws regulate impacts to wildlife. The U.S. Fish and Wildlife Service, the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service, and the California Department of Fish and Wildlife are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with animals not listed or proposed for listing under the federal or state Endangered Species Act. Species listed or proposed for listing as threatened or endangered are discussed in Section

2.3.5 below. All other special-status animal species are discussed here, including California Department of Fish and Wildlife fully protected species and species of special concern, and United Fish and Wildlife Service or National Oceanic and Atmospheric Administration's National Marine Fisheries Service candidate species.

Federal laws and regulations pertaining to wildlife include the following:

- National Environmental Policy Act
- Migratory Bird Treaty Act
- Fish and Wildlife Coordination Act

State laws and regulations pertaining to wildlife include the following:

- California Environmental Quality Act
- Sections 1600 – 1603 of the California Fish and Game Code
- Section 4150 and 4152 of the California Fish and Game Code

Affected Environment

The information in this section is summarized from the Natural Environment Study (2015) prepared for the proposed project.

Tier I Corridor Alternatives

An updated species list was obtained from the U.S. Fish and Wildlife Service and the California Natural Diversity Database, and other data sources were consulted to identify special-status animal species that may occur within the biological study area. Based on this research, 21 species have potential to occur within the biological study area, as shown in Table 2.3.4-1. Latin names for all species are provided in the table and not subsequently repeated within the text.

In addition, the biological study area for the Tier I alternatives contains critical habitat for two species: tidewater goby and central California coast steelhead. Critical habitat for tidewater goby occurs in Aptos Creek, within the limits of the town of Aptos, 4.1 miles east of Corcoran Lagoon and in Monterey Bay. This critical habitat area was occupied by tidewater gobies at the time of listing, is currently occupied, and is likely a source population for this region. Critical habitat for central California coast steelhead occurs in Arana Gulch and in Aptos and Soquel creeks, as well as tributaries to Aptos and Soquel creeks.

Common animal species that may occur within the habitat types identified in the biological study area are described in Section 2.3.1, under Affected Environment.

Table 2.3.4-1: Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
Invertebrates			
monarch butterfly	*Danaus plexippus*	– / – / SA	Nine documented roosting occurrences within 2 miles of the biological study area. Two of these documented roosting occurrences are near vicinity of the biological study area: (1) east boundary of New Brighton State Beach west of New Brighton Road; and (2) Borregas Creek (Gulch), east rim of canyon wall, near Maple and Cedar streets. Suitable habitat for the species exists, but no monarch butterflies or roosts observed. Species could be affected by the project.
California linderiella	*Linderiella occidentalis*	– / – / SA	Documented as occurring within the biological study area, specifically in Valencia Lagoon, between Bonita Drive and Route 1. Not observed during field surveys, and no other suitable habitat exists in the biological study area. Species would not be affected due to the avoidance of construction in aquatic areas of Valencia Lagoon.
Fish			
tidewater goby*	*Eucyclogobius newberryi*	FE, PCH / – / CSC	Two documented occurrences within the biological study area, the nearest occurrences in Soquel Creek at Route 1; and in Aptos Creek at Route 1. Aptos Creek occurs within proposed critical habitat for the species. Other occurrences include Rodeo Creek Gulch, approximately 0.6 mile south of Route 1 bridge, and Woods Lagoon, approximately 0.7 mile downstream of Route 1. Species could be affected by the project.
steelhead - central California coast Distinct Population Segments *	*Oncorhynchus mykiss*	FT, CH / –/ CSC	Three documented occurrences within the biological study area: in Arana Gulch, Aptos Creek and tributaries, and Soquel Creek and tributaries; steelhead were observed in Aptos, Valencia, and Soquel creeks during field surveys. Arana Gulch, Aptos Creek, and Soquel Creek and tributaries occur within the critical habitat unit defined as Big Basin Hydrologic Unit 3304. Species could be affected by the project.

Table 2.3.4-1: Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
Amphibians and Reptiles			
California tiger salamander (Central California DPS)*	*Ambystoma californiense*	FT, CH / – / ST	Not known to occur within the biological study area, and nearest known occurrence is approximately 3.5 miles southeast of the biological study area at Ellicott Pond. The biological study area is located outside critical habitat for the species. Marginal habitat occurs within the biological study area, but no known nearby breeding populations. Species could be affected by the project. A site assessment may be required by the U.S. Fish and Wildlife Service.
Santa Cruz long-toed salamander*	*Ambystoma macrodactylum croceum*	FE/SE, FP / –	Species known to occupy Valencia Lagoon, adjacent to Route 1, between Rio Del Mar and Freedom boulevards. Other occurrences near the biological study area are 0.8 mile east, 0.5 mile southwest, and 1.2 miles northeast of the San Andreas Road/Route 1 interchange. Species could be affected by the project.
California red-legged frog*	*Rana aurora draytonii*	FT, CH / – / CSC	Not known to occur within the biological study area, and nearest known occurrence is approximately 2 miles southeast of the San Andreas Road/Route 1 interchange. The biological study area is located outside of critical habitat for the species. Suitable aquatic habitat for the species within the biological study area. Species could be affected by the project.
foothill yellow-legged frog	*Rana boylii*	– / – / CSC	Not known to occur within the biological study area. Nearest known occurrence is on Soquel Creek, approximately 0.16 mile from the Porter Road/Route 1 interchange. Suitable aquatic habitat for the species within the biological study area. Focused surveys conducted, and species was not observed. Species could be affected by the project.
western pond turtle	*Clemmys marmorata pallida*	– / – / CSC	Not known to occur within the biological study area. Nearest occurrence is approximately 5.8 miles east of the biological study area. Suitable aquatic habitat for the species within the biological study area, but species was not observed. Species could be affected by the project.

Table 2.3.4-1: Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
Birds			
Cooper's hawk	*Accipiter cooperii*	– / – / CSC	Not known to occur within the biological study area. Nearest occurrence is approximately 0.75 mile east of Henry Cowell Redwoods State Park. Suitable habitat for the species is within the biological study area. Species not observed, but it could be affected by the project.
tricolored blackbird*	*Agelaius tricolor*	– /SE– / –	Not known to occur within the biological study area, but nests at Neary's Lagoon in Santa Cruz. Suitable nesting habitat for the species is in biological study area. Species not observed, but it could be affected by the project.
great blue heron	*Ardea herodias*	MBTA/– /–	Not known to occur within the biological study area. Nearest known occurrence is approximately 1 mile south of the Morrissey Boulevard/Route 1 interchange. No suitable nesting habitat occurs within the biological study area. Species may occur as an infrequent forager within the biological study area, but is unlikely to be affected by the project.
short-eared owl	*Asio flammeus*	– / – / CSC	Not known to occur within the biological study area. Nearest occurrence is approximately 10.75 miles south of the San Andreas Road/Route 1 interchange. Marginal habitat within the biological study area, but species not observed. Species could be affected by the project.
burrowing owl	*Athene cunicularia*	– / – / CSC	Not known to occur within the biological study area. Nearest known occurrence is approximately 3.5 miles west of the Morrissey Boulevard/Route 1 interchange. Annual grassland west of Freedom Boulevard and outside of the biological study area provide marginal habitat for the species. Species could be affected by the project.
white-tailed kite*	*Elanus leucurus*	– / FP / –	Not known to occur within the biological study area. Nearest known nesting occurrence is approximately 3 miles northwest of the Morrissey Boulevard/ Route 1 interchange. Small areas of nesting and foraging habitat located from west of Freedom Boulevard to western boundary of the biological study area. Any potential impacts to species would be avoided.

Table 2.3.4-1: Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
least Bell's vireo*	*Vireo bellii pusillus*	FE, CH / SE /-	Not known to occur within the biological study area. Listed by the U.S. Fish and Wildlife Service as occurring in Santa Cruz County. Marginal riparian nesting habitat occurs within the biological study area. The biological study area is located outside critical habitat for the species. Species unlikely to be affected by the project.
Other nesting migratory birds	Class Aves	MBTA / CA Fish and Game Code Section 3503	Not observed within the biological study area but expected to occur. Suitable nesting habitat occurs within the biological study area. Numerous nesting bird species could be affected by the project if trees must be removed.
Mammals			
pallid bat	*Antrozous pallidus*	– / – / CSC	The nearest known occurrence is from Soquel Creek within the biological study area. Marginal bat roosting habitat is present in trees within the biological study area. Bat species could be affected by the project.
hoary bat	*Lasiurus cinereus*	– / – / CSC	The nearest known occurrence is from Soquel Creek within the biological study area. Marginal bat roosting habitat is present in trees within the biological study area. Bat species could be affected by the project.
roosting bats	Order Chiroptera	– / – / several CSC and SA	Not observed within the biological study area but expected to occur. Marginal roosting habitat occurs within the biological study area. Various bat species could be affected by the project if trees and anthropogenic habitats must be removed, but avoidance and minimization measures will avoid impacts.
American badger	*Taxidea taxus*	– / – / CSC	Not known to occur within the biological study area. Nearest known occurrence is approximately 2.5 miles west of the Morrissey Boulevard/Route 1 interchange at University of California Santa Cruz. Marginal grassland habitat for the species toward the southern end of the biological study area. The species could be affected by the project.

Table 2.3.4-1: Special-Status Wildlife Species with Potential to Occur in the Project Vicinity

Common Name	Scientific Name	Code	Summary of Findings
* Indicates a federal or state endangered or threatened species discussed in Section 2.3.5. Status Codes: Federal: FE = Federal Endangered FT = Federal Threatened FC =Federal Candidate Species MBTA = Protected by Federal Migratory Bird Treaty Act State: SE = State Endangered ST = State Threatened FP = Fully Protected California Department of Fish and Wildlife: CSC = California Special Concern species CA Fish and Game Code Section 3503 = Protected by Section 3503 of California Department of Fish and Game code SA = California Natural Diversity Database Special Animal Habitat: Presence/Absence Absent [A] means no further work needed. Present [P] means general habitat is present and species may be present.			

Tier II Auxiliary Lane Alternative

Of the special-status animal species listed in Table 2.3.4-1, the following species could be present in or adjacent to the Tier II project area: California red-legged frog, tidewater goby, foothill yellow-legged frog, western pond turtle, various bird species protected under the Migratory Bird Treaty Act, and various species of special-status bat. Rodeo Creek Gulch provides potential habitat for California red-legged frog and tidewater goby; the ditch adjacent to the Soquel Drive-In could provide seasonal habitat for California red-legged frog. Although the foothill yellow-legged frog was not identified during focused surveys for California red-legged frog within the biological study area, both this species and the western pond turtle could occur in Rodeo Creek Gulch and the ditch adjacent to the Soquel Drive-in. The riparian forest habitat associated with Rodeo Creek Gulch also provides potential nesting habitat for a variety of bird species protected under the Migratory Bird Treaty Act, as well as potential roosting habitat for various species of bat. No critical habitat is present in the Tier II project area.

Although small mammal burrows are present within the Tier II Auxiliary Lane Alternative, no suitable annual grassland habitat for burrowing owl is present within this area.

No suitable habitat for the American badger occurs within the Tier II Auxiliary Lane Alternative project area.

Common animal species that may occur within the habitat types identified in the biological study area for the Tier II alternative are described in Section 2.3.1, under Affected Environment.

Environmental Consequences

Potential impacts to species that are formally listed or proposed for listing as endangered or threatened under the Federal Endangered Species Act and/or the California Endangered Species Act are discussed in greater detail in Section 2.3.5, Threatened and Endangered Species.

Tier I Corridor HOV Lane Alternative

The Tier I Corridor HOV Lane Alternative has the potential to affect the following special-status species, as described below: foothill yellow-legged frog, California red-legged frog, Santa Cruz long-toed salamander, California tiger salamander, western pond turtle, tidewater goby, central California coast steelhead, monarch butterfly, California linderiella, Cooper's hawk, tricolored blackbird, great blue heron, short-eared owl, burrowing owl, white-tailed kite, least Bell's vireo, pallid bat, hoary bat, roosting bats, American badger, and nesting birds protected under the Migratory Bird Treaty Act. Although the Santa Cruz long-toed salamander is known to inhabit Valencia Lagoon adjacent to Route 1 and within the biological study area, the project design would avoid the lagoon and potential impacts to these salamanders, as discussed in greater detail in Section 2.3.5.

The Tier I Corridor HOV Lane Alternative would permanently affect riverine/freshwater marsh areas and riparian forest. Placement of retaining walls, bridge supports, or other highway-related facilities in aquatic or riparian areas or dewatering in these areas would potentially affect habitat for special-status species and could result in direct take. Such activities could affect foothill yellow-legged frog, California red-legged frog, and western pond turtle if these species were present in the project vicinity during construction. Construction leading to placement of fill for bridges or other structures within the wetted portion of streams could result in the permanent loss of habitat for tidewater goby and steelhead, as discussed in Section 2.3.5. It is not possible to avoid these areas entirely because the existing Route 1 crosses nine streams and watercourses, some of which meander longitudinally along the roadway. Avoidance measures were applied during preliminary design, as described in Section 2.3.1. As discussed in Section 2.3.5, Threatened and Endangered Species, no project-related impacts would occur in Valencia Lagoon that would result in loss of available habitat for California linderiella (no linderiella were observed within the biological study area).

The Tier I Corridor HOV Lane Alternative would affect 1.02 acres of eucalyptus woodland and 6.08 acres of mixed conifer woodland. Removal of eucalyptus and mixed conifer woodland or other suitable roosting trees during monarch butterfly winter roosting season could impact potential winter roosting habitat, and it could directly impact monarch butterflies if they were found to be utilizing eucalyptus trees or mixed conifer woodland habitat onsite as winter roosts, which could result in stress, injury, or mortality to butterflies.

Indirect impacts could result from the reduction of potential winter roosting habitat, which would require monarch butterflies to find alternative roosting sites. No roosting monarchs were observed during the studies, however, and the potential for these impacts is considered low. Preconstruction surveys are proposed to verify that monarchs are not using the area.

The Tier I Corridor HOV Lane Alternative would permanently affect 4.53 acres of annual grassland. Construction in grassland habitat within the biological study area could result in direct impacts to small mammal burrows. If these burrows were occupied by burrowing owls or contained badger dens, grading and other clearing activities associated with construction could entomb animals, resulting in injury or mortality. No burrowing owls or badgers were observed to be using grassland areas within the biological study area during field surveys, and the potential for such impacts is considered low.

Although no bat species were observed within the biological study area during field surveys, the proposed project has the potential to impact bat species that may use existing highway structures or trees within the biological study area as roosting habitat. Removing structures or vegetation with roosting bats could lead to direct impacts to bat species. However, temporary and permanent impacts for the Tier I Corridor Alternatives cannot be quantified at this time, and will not be able to be quantified until focused surveys within the biological study area are conducted to confirm presence or absence of roosting bat species. These surveys will be conducted prior to the circulation of environmental documents for future Tier II projects.

No special-status bird species or active nests were observed during surveys of the biological study area, but California Natural Diversity Database records and the presence of marginally suitable habitat in or near the biological study area suggest that various bird species could occur within the project vicinity. The removal of vegetation and/or the removal of nests could directly impact bird nests and any eggs or young residing in nests. All nesting birds are protected under the Migratory Bird Treaty Act of 1918. Impacts and related avoidance, minimization, and mitigation measures for nesting birds are discussed in Section 2.3.6.

Tier I Corridor TSM Alternative

The Tier I Corridor TSM Alternative has the potential to impact the same special-status animal species as described above for the Tier I Corridor HOV Lane Alternative, although the project footprint and scope of construction for this alternative is reduced and thus less habitat for special-status species would be affected under the Tier I Corridor TSM Alternative. The Tier I Corridor TSM Alternative would affect 0.28 acre of eucalyptus woodland and 2.03 acres of mixed conifer woodland. The Tier I Corridor TSM Alternative would cause permanent removal of 0.58 acre of grassland community.

Potential impacts and avoidance/mitigation measures for threatened and endangered species are discussed in Section 2.3.5, while nesting birds are discussed in Section 2.3.6.

Tier II Auxiliary Lane Alternative

There is a potential for direct impact and loss of available habitat for California red-legged frog as a result of constructing the Tier II Auxiliary Lane Alternative. Areas under the jurisdiction of the California Department of Fish and Wildlife could provide suitable habitat for California red-legged frog. As shown in Table 2.3.2-4 (Section 2.3.2 above), the Tier II Auxiliary Lane Alternative would have 0.15 acre of temporary impacts and 0.15 acre of permanent impacts to areas under California Department of Fish and Wildlife jurisdiction. These areas also provide potential habitat for the foothill yellow-legged frog and the western pond turtle.

Areas under the jurisdiction of the U.S. Army Corps of Engineers could provide suitable habitat for the tidewater goby. As shown in Table 2.3.2-4 (Section 2.3.2 above), the Tier II Auxiliary Lane Alternative would have 0.06 acre of temporary impacts and 0.02 acre of permanent impacts to areas under California Department of Fish and Wildlife jurisdiction. In addition, there is a potential for direct impact to tidewater goby if dewatering/diversion occurs in Rodeo Creek Gulch during construction of the Tier II Auxiliary Lane Alternative; however, the Tier II Auxiliary Lane Alternative would not directly affect tidewater goby critical habitat.

The Tier II Auxiliary Lane Alternative also has the potential to impact nesting birds. The Tier II Auxiliary Lane Alternative would include retaining walls designed to span Rodeo Creek Gulch, which are anticipated to impact areas of riparian forest under the jurisdiction of California Department of Fish and Wildlife; however, the walls would not result in fill of freshwater marsh/riverine that provides habitat for tidewater goby. Potential impacts to these species are discussed in greater detail in Section 2.3.5, Threatened and Endangered Species, along with avoidance, minimization, and mitigation measures. Impacts and related avoidance, minimization, and mitigation measures for nesting birds are discussed in Section 2.3.6. The Tier II Auxiliary Lane Alternative would not remove structures that could provide suitable roosting habitat for bats; however, Tier II activities would result in impacts to vegetation that could provide suitable roosting habitat for bat species. The Tier II activities could affect bat species that might use trees as roosting habitat. Removing vegetation with roosting bats could directly affect bat species. Bats can be sensitive to noise disturbance; indirect effects could also result from noise and disturbance associated with construction, which could alter roosting behaviors. Prior to circulation of the final environmental document, focused surveys within the Tier II Auxiliary Lane Alternative project area will be conducted to confirm the presence or absence of roosting bat species.

No Build Alternative

No direct impact on animal species would result from the No Build Alternative.

Avoidance, Minimization, and/or Mitigation Measures

Preconstruction authorizations will be required from regulatory agencies, including U.S. Army Corps of Engineers, Regional Water Quality Control Board, California Department of Fish and Wildlife, U.S. Fish and Wildlife Service, and National Marine Fisheries Service.

As discussed in Section 2.3.5 consultation with the U.S. Fish and Wildlife Service, National Marine Fisheries Service, and California Department of Fish and Wildlife may be necessary for potential impacts to federally listed species. State incidental take authorization cannot be granted for the Fully Protected white-tailed kite. Several other special-status animal species could be affected by the proposed project, including Monarch butterfly, foothill yellow-legged frog, western pond turtle, Cooper's hawk, short-eared owl, burrowing owl, other nesting migratory birds, roosting bats, and American badger. The Monterey pines in the biological study area do not comprise a recognized natural stand, and no special mitigation for this species will be required beyond restoration of mixed conifer habitat.

Tier I Corridor Alternatives

The selection of a Tier I Corridor Alternative would not result in actual construction. No project actions requiring permits or approvals from any state, federal, or local agency are required at this time. As portions of the Tier I corridor are programmed as Tier II projects, they will be subject to separate environmental review.

The measures identified in Section 2.3.1 for natural communities will avoid or minimize temporary effects on special-status species habitats. Species-specific measures are identified in the following subsections.

Monarch Butterfly

1. A pre-construction survey will be conducted to identify non-native eucalyptus trees or other tree species that provide suitable roosting habitat for the monarch butterfly. The removal of such trees shall be offset with the planting of native tree species, such as Monterey pine or Monterey cypress, which are used by monarch butterfly for overwintering. Any lost overwintering habitat would be replaced at a 1:1 ratio and would be monitored for success in accordance with the criteria outlined in Section 2.3.3, Avoidance, Minimization, and/or Mitigation Measures. Additional mitigation may be directed by regulatory agencies during the permitting phase.
2. If feasible, avoid eucalyptus tree removal or other disturbance of eucalyptus habitat from November 1 to March 1 to avoid potential impacts to winter-roosting monarch butterflies. If construction activities are scheduled and could impact suitable monarch butterfly overwintering habitat between November 1 and March 1, a qualified biologist shall conduct preconstruction surveys for overwintering monarch butterflies in appropriate habitat. Overwintering monarch butterfly surveys shall consist of a pre-construction survey prior to eucalyptus tree removal, with weekly surveys continuing

thereafter until March 1. If no roosts are observed within the project site, construction will be allowed to proceed. If active roosts are observed, tree removal activities shall be delayed and an appropriate setback for other construction-related activities shall be maintained until monarch butterflies have migrated from the site. All tree removal shall be monitored and documented by the biological monitor(s) regardless of time of year.

Foothill Yellow-legged Frog

The avoidance and minimization measures for California red-legged frog will also apply to the foothill yellow-legged frog. In addition, the following mitigation measure specifically applies to foothill yellow-legged frog:

1. If project-related construction will impact aquatic areas and if regulatory agency approval allows, qualified biologists shall conduct a pre-construction survey for foothill yellow-legged frog in aquatic areas where construction will occur. The qualified biologists shall capture and relocate any foothill yellow-legged frog (if present) or other sensitive aquatic species to suitable habitat outside the area of impact. A letter of permission from California Department of Fish and Wildlife will be obtained to relocate foothill yellow-legged frog and other California Special Concern species from work areas encountered during construction within the biological study area, as necessary.

Western Pond Turtle

The avoidance and minimization measures for California red-legged frog will also apply to the foothill western pond turtle. In addition, the following mitigation measure specifically applies to western pond turtle:

1. If project-related construction will impact aquatic areas and if regulatory agency approval allows, qualified biologists shall conduct a preconstruction survey for western pond turtle in aquatic areas where construction will occur. The qualified biologists shall capture and relocate any western pond turtle (if present) or other sensitive aquatic species to suitable habitat outside the area of impact. A letter of permission from California Department of Fish and Wildlife will be obtained to relocate western pond turtle and other California Special Concern species encountered during construction from work areas.

Cooper's Hawk and Short-eared Owl

The following impact avoidance and minimization measures will be required for construction of the Tier II Auxiliary Lane Alternative and would also apply to future tiered projects under the Tier I Corridor Alternatives. Specifically, these measures apply to these bird species and all other birds protected by the Migratory Bird Treaty Act and California Fish and Game Code.

1. If feasible, tree removal shall be scheduled to occur in the fall and winter (between September 1 and February 15), outside of the typical nesting season.
2. If vegetation removal is proposed to occur during the typical bird-nesting season (February 16 to August 31), a nesting bird survey of the area of disturbance shall be conducted by qualified biologists no more than 2 weeks prior to construction to determine the presence/absence of nesting birds within the project area.
3. If evidence of migratory bird nesting that may be impacted by construction activities is discovered, or when birds are injured or killed as a result of construction activities, the contractor shall immediately notify the engineer or biological monitor. A 500-foot radius of the nest shall be designated an environmentally sensitive area for nesting raptors, and a 250-foot radius shall be designated an environmentally sensitive area for other nesting avian species, unless otherwise directed by the U.S. Fish and Wildlife Service or California Department of Fish and Wildlife. Nests, eggs, or young of birds covered by the Migratory Bird Treaty Act and the California Fish and Game Code would not be moved or disturbed until the end of the nesting season or until the young fledge, whichever is later, nor would adult birds be killed, injured, or harassed at any time. The environmentally sensitive area designation shall remain in place until such time that qualified biologist considers that the nest is no longer active. Written notification shall be provided to Caltrans, the Regional Transportation Commission, and the resource agencies by the qualified biologist.
4. If white tailed kite is identified within the biological study area at any time during the proposed project, the biological monitor shall thoroughly document the species activity and ensure that immediate project activities avoid any impacts to the species. If there is a potential for take, the California Department of Fish and Wildlife shall be contacted immediately to ensure that take is avoided throughout the duration of project activities.
5. Vegetation removal in potential nesting habitats shall be monitored and documented by the biological monitor(s) regardless of time of year.

Burrowing Owl

1. If construction activities are proposed to occur within annual grassland habitat, coordination with California Department of Fish and Wildlife shall occur regarding protocol surveys, mitigation guidance, and authorization to passively relocate burrowing owls, if necessary.
2. If California Department of Fish and Wildlife requires protocol surveys, those surveys shall be conducted as outlined in the protocol Burrowing Owl Survey Protocol and Mitigation Guidelines (California Burrowing Owl Consortium, 1993) and California Department of Fish and Wildlife Staff Report on Burrowing Owl

Mitigation (California Department of Fish and Wildlife, 2012), or the most recent guidelines, prior to project approvals.

3. If protocol surveys confirm occupied burrowing owl habitat, mitigation actions shall be taken prior to the burrowing owl breeding season, as outlined in California Burrowing Owl Consortium (1993) and California Department of Fish and Wildlife (2012).
4. As required by the burrowing owl protocol, if burrowing owls are discovered in the biological study area, a burrowing owl monitoring plan shall be prepared. Prior to implementation, the Plan shall be reviewed and approved by California Department of Fish and Wildlife.

Roosting Bats

1. A qualified biologist shall conduct surveys for bat species that could be utilizing existing structures or trees as roosting habitat. If bats are identified as utilizing areas within the biological study area for day or night roosting, the qualified biologist shall identify the species of bat present. The biologist(s) conducting the preconstruction surveys shall also identify the nature of the bat utilization of the bridge (i.e., maternity roost, day roost, night roost).
2. If bat species are identified as roosting in areas that will be impacted, a plan to exclude bat species from impact areas shall be prepared. This plan shall discuss methods of eliminating bat access to the identified roosting habitat prior to construction so that bats cannot return to and occupy the roost. The appropriate timing for exclusion implementation shall be determined when the species is identified as occurring within the project site. Roost areas shall be surveyed by a qualified biologist prior to implementing exclusion methods to ensure that no bats are trapped within. Exclusion methods may include, but are not limited to, wire mesh, spray foam, or fabric placement. The plan shall be submitted to the appropriate regulatory agency for approval.
3. Demolition of existing structures and vegetation removal shall occur outside of the bat maternity roosting season, typically during the spring and summer months.
4. If bats cannot be excluded from bat roosts, work activities shall be avoided within 100 feet of active maternity roosts until bat pups have been weaned and are deemed independent by a qualified biologist. Regulatory agencies shall be contacted for additional guidance if roosting bats are observed within the biological study area during construction.
5. A qualified biologist shall be present periodically during construction activities to monitor bat populations that may be utilizing the bridge and to ensure that all practicable measures are employed to avoid incidental disturbance to special-status

bat species. Monitoring will be timed to occur during key construction events (e.g., removal of existing structures or trees with roosting habitat).

6. If the proposed project permanently affects a major roost location, compensatory mitigation would be required. Compensatory mitigation shall include replacement of suitable habitat that follows the guidance included within *California Bat Mitigation Techniques, Solutions, and Effectiveness* prepared for Caltrans (H.T. Harvey 2004).

American Badger

1. Prior to construction, if annual grassland habitat will be impacted, qualified biologists shall conduct surveys for American badger dens in annual grassland habitat. If American badger dens are discovered, California Department of Fish and Wildlife shall be contacted immediately. Dens must either be avoided, or badgers trapped and relocated. If badgers are to be relocated, a letter of permission must be acquired from California Department of Fish and Wildlife.

Tier II Auxiliary Lane Alternative

See avoidance, minimization, and mitigation measures for California red-legged frog and tidewater goby listed in Section 2.3.5, Threatened and Endangered Species. Also required for this alternative are the aforementioned avoidance, minimization, and mitigation measures for bird species protected under the Migratory Bird Treaty Act listed under Section 2.3.4, Cooper’s hawk and short-eared owl, and the measures identified for the foothill yellow-legged frog, western pond turtle, and roosting bats.

2.3.5 Threatened and Endangered Species

This section evaluates potential impacts to threatened and endangered species that could result from implementation of the Tier I and Tier II project alternatives. Impacts to these species that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

The primary federal law protecting threatened and endangered species is the Federal Endangered Species Act: 16 United States Code Section 1531, *et seq.* See also 50 *Code of Federal Regulations* Part 402. This act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as the Federal Highway Administration, are required to consult with the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration’s National Marine Fisheries Service to ensure that they are not undertaking, funding, permitting, or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 may include a Biological Opinion with an Incidental Take statement, a Letter of Concurrence and/or documentation of a no effect finding. Section 3 of the Federal Endangered Species Act defines take as “harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect, or any attempt at such conduct.” If federally listed species are determined to occur within the biological study area and cannot be avoided, the project applicant will need to acquire incidental take authorization from the U.S. Fish and Wildlife Service through a Federal Endangered Species Act Section 7 Biological Opinion and Incidental Take Statement.

California has enacted a similar law at the state level, the California Endangered Species Act, California Fish and Game Code Section 2050, *et seq.* The California Endangered Species Act emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate planning to offset project-caused losses of listed species populations and their essential habitats. The California Department of Fish and Wildlife is the agency responsible for implementing the California Endangered Species Act. Section 2081 of the Fish and Game Code prohibits “take” of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as “hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill.” The California Endangered Species Act allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by the California Department of Fish and Wildlife. For species listed under both the Federal Endangered Species Act and California Endangered Species Act requiring a Biological Opinion under Section 7 of the Federal Endangered Species Act, the California Department of Fish and Wildlife may also authorize impacts to California Endangered Species Act species by issuing a Consistency Determination under Section 2080.1 of the Fish and Game Code. If state listed plant species are determined to occur within the biological study area and cannot be avoided, the project applicant will need to acquire incidental take authorization from California Department of Fish and Wildlife through a California Endangered Species Act Section 2081 Incidental Take Permit. State Rare plants with potential for occurrence within the biological study area are not included in the California Endangered Species Act, and must be completely avoided since the California Department of Fish and Wildlife does not have a legal mechanism to allow for “take.”

Another federal law, the Magnuson-Stevens Fishery Conservation and Management Act of 1976, was established to conserve and manage fishery resources found off the coast, as well as anadromous species and Continental Shelf fishery resources of the United States, by exercising (A) sovereign rights for the purposes of exploring, exploiting, conserving, and managing all fish within the exclusive economic zone established by Presidential Proclamation 5030, dated March 10, 1983, and (B) exclusive fishery management authority beyond the exclusive economic zone over such anadromous species, Continental Shelf fishery resources, and fishery resources in special areas.

Affected Environment

The information in this section is summarized from the Natural Environment Study (2015) prepared for the proposed project.

Tier I Corridor Alternatives

Species lists were obtained from the U.S. Fish and Wildlife Service, and the California Natural Diversity Database was consulted to identify threatened, endangered, and candidate species that may occur within the biological study area. Field surveys were conducted from May 30 to October 3, 2003, with supplemental site visits/surveys on February 21 and 22, 2007. Focused California red-legged frog surveys were conducted from September 30 to October 2, 2003, under the 1996 U.S. Fish and Wildlife Service guidance/protocol (U.S. Fish and Wildlife Service, 1996), prior to publication of the revised guidance/protocol in 2005 (U.S. Fish and Wildlife Service, 2005). California red-legged frog surveys also concentrated on the presence/absence of foothill yellow-legged frog, western pond turtle, and other special-status aquatic species. Based on this research, the following threatened or endangered wildlife and plant species have potential to occur within the project biological study area:

Tidewater Goby

There are two documented occurrences within the biological study area of tidewater goby, a federally listed endangered species and state species of special concern: in Soquel Creek and in Aptos Creek at Route 1. The species was not observed during the field surveys; however, no netting or other sampling/focused surveys were conducted for tidewater goby. The next nearest occurrences for the species are in Rodeo Creek Gulch south of the biological study area, approximately 0.6 mile south of the Route 1 bridge. A portion of Aptos Creek within the biological study area is part of a proposed tidewater goby critical habitat unit . This unit occurs within the limits of the town of Aptos, 4.1 miles east of Corcoran Lagoon and in Monterey Bay.

Central California Coast Steelhead

There are three documented occurrences of central California coast (Distinct Population Segment) steelhead within the biological study area: in Arana Gulch, in Aptos Creek and its tributaries, and in Soquel Creek and its tributaries. A federally listed threatened species and state species of special concern, the Central California Coast Distinct Population Segment of steelhead was observed in these three creeks during the field surveys. The drainages within the Biological Study Area occur within the central California coast steelhead critical habitat unit.

Santa Cruz Long-Toed Salamander

Santa Cruz long-toed salamander is a federally and state listed endangered species and is recognized as a State of California fully protected species. They are known to inhabit and breed at Valencia Lagoon, which is along the southbound side of Route 1 in the southern reach of the proposed project between Freedom and Rio Del Mar boulevards. The species summers in upland areas that contain vegetation/leaf litter/burrows (either Coastal Scrub or developed/landscaped habitats as mapped within the biological study area) adjacent to the lagoon.

Because of the sensitivity of the Santa Cruz long-toed salamander, the Project Development Team took steps to avoid impacts to the species in the preliminary design. Inferred presence for Santa Cruz long-toed salamander in Valencia Lagoon and Channel was requested and approved by Federal Highway Administration in November 25, 2003. A field review of the lagoon and channel was conducted with staff of California Department of Fish and Game on December 2, 2003. Valencia Lagoon and the associated Valencia Channel were delineated early in the studies and identified on the topographic mapping for avoidance by the project engineers.

California Tiger Salamander

California tiger salamander is a federal and state threatened species. There is no critical habitat for the species designated within the biological study area. There is no known California tiger salamander population in or near the biological study area, and none were observed during reconnaissance surveys. The nearest occurrence of California tiger salamander is from Ellicott pond, approximately 3.5 miles southeast of the biological study area. It is unlikely that the California tiger salamander is located within the project biological study area and would be impacted by the project. The basis for this determination is that it is unexpected that California tiger salamander use Valencia Lagoon or other aquatic areas within the biological study area; however, these areas may provide marginal habitat for the salamander and protocol surveys may be required prior to construction for confirmation.

California Red-Legged Frog

California red-legged frog is federally listed as threatened and is designated by California Department of Fish and Wildlife as a state species of special concern. There is no critical habitat for the species designated within the biological study area. The nearest known California red-legged frog occurrence is approximately 2 miles southeast of the San Andreas Road/Route 1 interchange, 0.8 mile northwest of Ellicott Pond. There are no other California Natural Diversity Database records for California red-legged frog in this area (California Natural Diversity Database, 2007).

Focused California red-legged frog surveys were conducted in suitable habitat within the project area from September 30 to October 2, 2003, under the 1997 U.S. Fish and Wildlife

Service guidance/protocol (USFWS, 1996). No California red-legged frogs were observed during this survey effort. Detailed discussion of the California red-legged frog survey effort is provided in the California Red-legged Frog Survey Report in the Natural Environment Study (2015). While there are no other California Natural Diversity Database records for California red-legged frog between University of California, Santa Cruz and Ellicott Pond (CNDDB, 2007), presence of California red-legged frog has been inferred in the biological study area by Caltrans.

Although no California red-legged frogs were observed during the surveys, there is suitable habitat of sufficient quality within the biological study area; therefore, it is not reasonable to rule out their presence entirely within the project vicinity. Documentation was provided to Federal Highway Administration to infer presence for California red-legged frogs, and Federal Highway Administration concurred with this determination in January 2007. Areas that could contain California red-legged frogs were identified on the topographic mapping early in the studies so that the project alternatives could be designed to reduce impacts on the habitat.

White-Tailed Kite

The white-tailed kite is recognized as a State of California Fully Protected species. Its Fully Protected status means no take authorization can be granted by the State of California for the species, other than for scientific purposes; therefore, take must be completely avoided. White-tailed kite is not known to occur within the biological study area. None were observed during surveys of the biological study area. The nearest occurrence is approximately 3 miles northwest of the Morrissey Boulevard/Route 1 interchange.

Tricolored Blackbird

The tricolored blackbird is a state endangered species. It is common locally and throughout California, particularly in the Central Valley. It breeds near fresh water, preferably in emergent wetlands. It forages in grasslands and croplands. Tricolored blackbirds usually nest in dense cattails or bulrushes. They also nest in thickets of willows, blackberry, wild rose, and tall forbs.

Least Bell's Vireo

The least Bell's vireo is a federal and state endangered species. No critical habitat for the species has been designated within the biological study area, there are no California Natural Diversity Database records for the species, and no least Bell's vireos were observed within the biological study area during reconnaissance surveys; therefore, no protocol surveys were conducted. Habitat within the biological study area is considered marginal because, rather than low-growing, dense riparian scrub, the riparian corridors of the biological study area feature mainly a riparian forest overstory composition. The species was included for consideration because it appears on the U.S. Fish and Wildlife Service federally listed species list for Santa Cruz County (U.S. Fish and Wildlife Service, 2007).

Marsh Sandwort

Marsh Sandwort is a federal and state endangered species. Marsh Sandwort is not known to occur within the biological study area. The nearest known occurrence is approximately 3.1 miles northwest of the Morrissey Boulevard/Route 1 interchange.

Monterey Spineflower

Monterey spineflower is a federal threatened species. It is not known to occur within the biological study area. The nearest known occurrence is approximately 1.48 miles southeast of the San Andreas Road/Route 1 interchange. The biological study area is located outside of critical habitat for the species.

Robust Spineflower

The robust spineflower is a federal endangered species. Occurrences of robust spineflower in the vicinity of the biological study area include (1) approximately 0.39 mile northwest of the 41st Avenue/Route 1 interchange; (2) approximately 0.62 mile northeast of the Freedom Boulevard/Route 1 interchange; and (3) approximately 1.97 miles south of the San Andreas Road/Route 1 interchange. The biological study area is located outside of critical habitat for the species.

Seaside Bird's Beak

The seaside bird's beak is a state endangered species. It is not known to occur within the biological study area. The nearest known occurrence is approximately 17 miles southeast of the Porter Street /Route 1 interchange.

San Francisco Popcorn Flower

The San Francisco popcorn flower is a state endangered species. It is not known to occur within the biological study area. The nearest known occurrence is approximately 1.18 miles north of the Park Avenue/Route 1 interchange.

Santa Cruz Tarplant

The Santa Cruz tarplant is a federal endangered species. There are several documented occurrences within 1.5 miles of the biological study area. The biological study area is located 0.25 mile north of critical habitat for the species.

Tier II Auxiliary Lane Alternative

Based on the research described in the introductory paragraph for the Tier I Corridor build alternatives above, the following threatened or endangered wildlife and plant species could occur within the project biological study area: tidewater goby and California red-legged frog.

Environmental Consequences

Tier I Corridor Alternatives

Tidewater Goby

The Tier I Corridor Alternatives have the potential to temporarily and permanently affect waters of the United States, as reported in Section 2.3.2, Wetlands and Other Waters. Construction leading to the placement of fill for bridges or other structures within the wetted portions of Arana Creek and its tributaries, Soquel Creek, Rodeo Creek Gulch, or Aptos Creek could result in the permanent loss of tidewater goby habitat. There could be indirect impacts from temporary dewatering/diversion that would disrupt normal flows, temporarily and perhaps permanently affecting the structure of the streambed substrate, which could affect tidewater goby microhabitats. Permanent impacts are likely to be minimal.

The Tier I Corridor Alternatives may result in temporary and/or permanent impacts to proposed tidewater goby critical habitat in Aptos Creek, which may offer shade and microhabitat temperature regulation in the channel. With the implementation of avoidance, minimization, and/or mitigation measures, impacts to riparian vegetation would be minimized and would be temporary in nature as overhanging vegetation would be restored and fish refugia maintained. Construction impacts, dewatering/diversion, and streambank erosion could result in the introduction of silt/sedimentation into Aptos Creek, which could have detrimental effects on downstream water quality and habitat for tidewater goby. Implementation of the proposed avoidance and minimization measures and best management practices would avoid permanent impacts and would result in no adverse modification to tidewater goby critical habitat. Therefore, the Tier I Corridor Alternatives may affect, but are not likely to adversely affect, proposed tidewater goby critical habitat.

Dewatering/diversion and construction in aquatic areas inhabited by tidewater goby could result in direct impacts to the species in the form of injury or mortality. Dewatering/diversion could result in individual tidewater gobies stranded in dewatered areas, which could result in mortality if animals are not detected and safely captured and relocated promptly.

The Tier I Corridor Alternatives may affect, but are not likely to adversely affect, tidewater goby. It is not expected that tidewater goby would occupy the upstream reaches of the drainages within the biological study area, which are upstream from its preferred brackish lagoon habitat. Consultation in the form of a Biological Assessment with the U.S. Fish and Wildlife Service would be conducted to identify recommended minimization and mitigation measures as project development proceeds.

Central California Coast Steelhead

The proposed project may result in temporary and/or permanent impacts on central California coast steelhead critical habitat. The project may affect vegetation along Arana Gulch, Aptos Creek, and Soquel Creek and tributaries, which may offer shade and microhabitat temperature regulation in the channel. With the implementation of avoidance, minimization, and/or mitigation measures, impacts to riparian vegetation would be minimized and would be temporary because overhanging vegetation would be restored and fish refugia would be maintained. Construction impacts, dewatering/diversion, and streambank erosion would temporarily result in “loss of service” of steelhead habitat and could result in the introduction of silt/sedimentation into Aptos Creek, which could have detrimental effects on downstream water quality and habitat for steelhead. Implementation of the proposed avoidance and minimization measures and best management practices would avoid permanent impacts and would result in no adverse modification to steelhead critical habitat; therefore, the Tier I project may affect, but is not likely to adversely affect, central California coast steelhead critical habitat.

Both alternatives may affect, and are likely to adversely affect, steelhead. The basis for this determination is that steelhead are known to inhabit streams within the Biological Study Area, and there would be potential for take of the species during construction and dewatering/ diversion activities. Potential project-related impacts to steelhead are expected to be similar to those described above for the tidewater goby. Dewatering/diversion that would disrupt normal flows could result in indirect impacts that could affect the structure of the streambed substrate. This could be particularly detrimental to steelhead, which uses streambed gravels and cobbles for spawning and rearing of young. Impacts would likely be temporary. Formal consultation with National Oceanic and Atmospheric Administration Fisheries is anticipated regarding impacts to central California coast Distinct Population Segment steelhead once a preferred corridor alternative is identified and project development proceeds. It is anticipated that National Oceanic and Atmospheric Administration Fisheries will return a Biological Opinion containing recommended minimization and mitigation measures and including an incidental take permit.

California Tiger Salamander

The project may affect, but is not likely to adversely affect, the California tiger salamander. Construction in or near Valencia Lagoon, as well as dewatering activities, could directly affect California tiger salamanders if they inhabit areas in or near the lagoon. Such activities could result in injury or death to individual salamanders if they are found to be breeding in the lagoon. Temporary loss of aquatic habitat for California tiger salamander could result if the Valencia Lagoon must be dewatered for construction. Project-related construction in Valencia Lagoon could result in the placement of permanent structures that would displace aquatic habitat, resulting in loss of available habitat for the species. Consultation with the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife would be required for future tiered projects under either Tier I Corridor Alternative and is anticipated to be informal consultation in the form of a Biological Assessment and Concurrence in Finding. The basis for this determination is that it is unexpected that California tiger salamander use Valencia Lagoon or other aquatic areas within the biological study area; however, these areas may provide marginal habitat for the salamander and protocol surveys may be required prior to construction for confirmation. Santa Cruz Long-Toed Salamander.

The Tier I Corridor Alternatives may affect, and is likely to adversely affect, the Santa Cruz long-toed salamander. Similar to the potential impacts to the California tiger salamander, construction in Valencia Lagoon or dewatering activities could directly affect the Santa Cruz long-toed salamander, which could result in injury or death to individual salamanders if they are found to be breeding in the lagoon. Highway widening would occur primarily on the north side of the right-of-way in this reach of the proposed project; aquatic areas and all grassland areas associated with the lagoon and channel would be avoided. Minor lane/shoulder widening along the southbound lanes adjacent to the lagoon/channel would be limited to impervious gravel areas identified during the field surveys. Construction work would not affect summering Santa Cruz long-toed salamander. It is proposed to designate Valencia Lagoon and Valencia Channel as an environmentally sensitive area to avoid any impacts to these areas from construction activities. Grading or other earthwork in adjacent uplands could affect burrows and could result in injured or entombed animals that are estivating. Temporary loss of aquatic habitat for Santa Cruz long-toed salamander could result if the Valencia Lagoon must be dewatered for construction. Project-related construction in Valencia Lagoon could result in the placement of permanent structures that would displace aquatic habitat, resulting in loss of available habitat for the species. In addition, individuals could inhabit the uplands between the lagoon and Route 1, where Caltrans proposes shoulder improvements for the proposed project. Individuals could therefore be subjected to injury or mortality as a result of ground-disturbing activities along the Route 1 road shoulder. Protocol surveys for the species have not been conducted to verify the presence or absence within the biological study area. Additional surveys for the Santa Cruz long-toed salamander may be required prior to construction near Valencia Lagoon. Consultation with the U.S. Fish and Wildlife Service would be required, for which a Biological Assessment will be prepared, resulting in a Concurrence in Finding. California Red-Legged Frog.

Both alternatives have potential to affect wetlands and riverine/freshwater marsh and riparian forest areas. Placement of retaining walls, bridge supports, or other highway-related facilities in aquatic or riparian areas or dewatering in these areas could affect habitat for California red-legged frog or result in incidental take if frogs were present in the project vicinity during construction. It is not possible to avoid these areas entirely because the existing Route 1 crosses nine streams and watercourses, some of which meander longitudinally along the roadway. Avoidance and minimization measures were applied during preliminary design, as described in Section 2.3.1. The proposed project may affect, but is not likely to adversely affect, California red-legged frogs. Formal consultation with the U.S. Fish and Wildlife

Service is anticipated regarding impacts to California red-legged frog once a preferred alternative is identified and project development proceeds.

White-Tailed Kite and Tricolored Blackbird

The removal of vegetation and/or the removal of nests could directly impact white-tailed kite and tricolored blackbird nests and any eggs or young residing in nests. As birds can be sensitive to noise disturbance, indirect impacts could also result from noise and disturbance associated with construction, which could alter perching, foraging, and/or nesting behaviors. Because of the fully protected status of the white-tailed kite, and state-listing of the tricolored blackbird, all impacts will be avoided.

Least Bell's Vireo

The Tier I Corridor Alternative is not anticipated to affect the least Bell's vireo. Riparian habitat in the Tier I Corridor Alternatives project area is unsuitable and there are no known nesting records in or near the biological study area.

Marsh Sandwort

Marsh sandwort is not known to occur within the biological study area, and this species is unlikely to be affected by future tiered projects under either Tier I Corridor Alternative.

Monterey Spineflower

Monterey spineflower is not known to occur within the biological study area, and the biological study area is located outside critical habitat for the species. Nonetheless, it is assumed this species could be affected by future tiered projects under either Tier I Corridor Alternative because potentially suitable habitat is present, although it is unlikely it would be adversely affected.

Robust Spineflower

Robust spineflower is known to have occurrences within the biological study area, although the biological study area is located outside of critical habitat for the species. It is assumed this species could be affected by future tiered projects under either Tier I Corridor Alternative because potentially suitable habitat is present, although it is unlikely it would be adversely affected.

Seaside Bird's Beak

The seaside bird's beak is not known to have occurrences within the biological study area. This species is unlikely to be affected by future tiered projects under either Tier I Corridor Alternative.

San Francisco Popcorn Flower

San Francisco popcorn flower is not known to have occurrences within the biological study area. Potentially suitable habitat is present, although it is unlikely it would be adversely affected.

Santa Cruz Tarplant

Santa Cruz tarplant is not known to occur within the biological study area, and the biological study area is located outside of critical habitat for the species. There are several documented occurrences within 1.5 miles of the biological study area. It is assumed this species could be affected by future tiered projects under either Tier I Corridor Alternative because potentially suitable habitat is present, although it is unlikely it would be adversely affected.

Tier II Auxiliary Lane Alternative

California Red-Legged Frog

Construction or dewatering activities in aquatic habitats within the biological study area could result in direct impacts to California red-legged frog, which could result in injury or death to individual California red-legged frogs if they are found to be breeding in these areas or summering in adjacent uplands. Temporary loss of 1.5 acre of California red-legged frog habitat could result from dewatering/diversion of aquatic areas required for construction. Project-related construction could result in the placement of permanent structures that would permanently displace 0.15 acre of aquatic habitat for the species.

The proposed project may affect, but is not likely to adversely affect, California red-legged frog. Although no California red-legged frogs were observed during the protocol survey effort or other reconnaissance surveys within the biological study area and there are no nearby California Natural Diversity Database records, Caltrans has indicated that there is suitable habitat for the species within the project limits and presence should be inferred.

Tidewater Goby

Dewatering/diversion and construction in aquatic areas inhabited by tidewater goby could result in direct impacts to the species in the form of injury or mortality. There could be a temporary impact to tidewater goby habitat from dewatering/diversion, and individual tidewater gobies could be stranded in dewatered areas, which could result in their mortality if they are not detected and safely captured and promptly relocated. Construction leading to the placement of fill within the wetted portions of streams could result in the permanent loss of tidewater goby habitat. There could be indirect impacts as well. The act of dewatering/diversion and its eventual dismantling and restoration of normal flows is likely to temporarily and perhaps permanently affect the structure of the streambed substrate, which could affect tidewater goby microhabitats. Permanent impacts of 0.02 acre of habitat loss and temporary impacts of 0.06 acre of habitat loss are anticipated.

The project may affect, but is not likely to adversely affect, tidewater goby. The basis for this determination is that it is not expected that tidewater goby would occupy the seasonally dry section of Rodeo Creek Gulch within the biological study area, which is well upstream from its preferred brackish lagoon habitat. In addition, construction would be timed to occur during the driest portion of the year. Potential adverse effects to the tidewater goby resulting from construction activities occurring when flow is in the creek can also be avoided or minimized as described in the following subsection.

The Tier II Auxiliary Lane Alternative project would not affect tidewater goby critical habitat.

No Build Alternative

The No Build Alternative would have no impact on threatened and endangered species.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

The selection of a Tier I Corridor Alternative would not result in actual construction. No project actions requiring permits or approvals from any state, federal, or local agency are required at this time. As components of the Tier I corridor are programmed as Tier II projects, they will be subject to separate environmental review. The measures described below are subject to revision based on the changes in the setting, project design, or regulatory requirements in place when future tiered projects undergo environmental review.

Consultation with the U.S. Fish and Wildlife Service or National Marine Fisheries Service in the form of a Biological Assessment and Biological Opinion under Section 7 of the Federal Endangered Species Act will be required for the following animal species in association with either Tier I Corridor Alternative as project development proceeds: tidewater goby, central California coast steelhead, California tiger salamander, Santa Cruz long-toed salamander, and California red-legged frog. Consultation with California Department of Fish and Wildlife under Section 2081 of the Fish and Game Code will also be required for Santa Cruz long-toed salamander. In addition, coordination with California Department of Fish and Wildlife will occur to ensure avoidance of take for the Fully Protected white-tailed kite.

Consultation with the U.S. Fish and Wildlife Service in the form of a Biological Assessment and Biological Opinion under Section 7 of the Federal Endangered Species Act will be required for the following plant species in association with either Tier I Corridor Alternative as project development proceeds: marsh sandwort, Monterey spineflower, robust spineflower, and Santa Cruz tarplant. Consultation with California Department of Fish and Wildlife under Section 2081 of the Fish and Game Code will also be required for marsh sandwort, seaside bird’s beak, San Francisco popcorn flower, and Santa Cruz tarplant.

The Project Development Team has taken measures to avoid impacts to sensitive habitat areas and, specifically, Valencia Lagoon and Channel, through project design, as described in Section 2.3.1. It is anticipated that the following additional measures would be implemented as part of future tiered projects to minimize and mitigate impacts to threatened and endangered species:

Tidewater Goby Avoidance and Minimization Efforts

Implementation of the following measures will serve to avoid or minimize impacts to tidewater goby. In addition, loss of any freshwater marsh vegetation will be replaced as detailed in previously mentioned avoidance and minimization measures in Section 2.3.1, and mitigation measures in Section 2.3.2 as directed by regulatory agencies.

1. If in-stream work is proposed to occur in Arana Gulch or its tributaries, and Soquel Creek, Aptos Creek, or Rodeo Gulch, incidental take authorization from the U.S. Fish and Wildlife Service through a Federal Endangered Species Act Section 7 Biological Opinion and Incidental Take Statement shall be acquired, if deemed necessary by the U.S. Fish and Wildlife Service. Formal consultation with the U.S. Fish and Wildlife Service may be necessary if a Section 404 permit is issued.
2. A component including a description of tidewater goby, its ecology, and the need for conservation of the species will be integrated into the worker environmental training program.
3. Prior to construction, if areas within Soquel Creek, Aptos Creek, or Rodeo Gulch must be dewatered or diverted prior to project implementation, a U.S. Fish and Wildlife Service-approved biologist shall conduct a pre-construction survey for tidewater goby and use seining, dip-nets, or other approved methods to capture and relocate tidewater goby from the areas to be dewatered to areas with suitable habitat outside the area of proposed disturbance.
4. If dewatering/stream diversion is necessary, a Diversion and Dewatering Plan shall be prepared and implemented to allow for passage of aquatic species through the site during construction. At a minimum, the form and function of all pumps used during the dewatering activities shall be checked twice daily by the biological monitor(s) to ensure a dry work environment and minimize adverse effects to aquatic species and habitats.
5. During project activities, if pumps are incorporated to assist in temporarily dewatering the site, intakes shall be completely screened with no larger than 0.2-inch wire mesh to prevent tidewater goby and other sensitive aquatic species from entering the pump system. Pumps shall release the additional water to a settling basin allowing the suspended sediment to settle out prior to re-entering the stream(s) outside the isolated area.
6. During dewatering/diversion activities, or if tidal fluctuations breach a formerly dewatered and isolated project site, the U.S. Fish and Wildlife Service-approved biological monitor(s) or other U.S. Fish and Wildlife Service-approved biologist(s) shall supervise site dewatering and relocate tidewater goby and other stranded aquatic species.

7. If it is determined by the biological monitor(s) or the U.S. Fish and Wildlife Service-approved biologist(s) that impacts to tidewater goby have the potential to exceed the levels authorized by the U.S. Fish and Wildlife Service, they will immediately notify the resident engineer (the engineer that is directly overseeing construction activities). The resident engineer will either resolve the situation immediately by stopping the actions that are causing the problem and notifying the appropriate resource agency as soon as is reasonably possible. No work will resume until the issue is resolved. Following construction, temporary impacts to streamside vegetation used as sheltering areas or streambed sandbars, gravels, and cobbles used by fish species will be restored to their pre-construction conditions, at a minimum.
8. Following construction, temporary impacts to streamside vegetation used as sheltering areas or streambed sandbars, gravels, and cobbles used by fish species will be restored to their pre-construction conditions, at a minimum.

The following measures would avoid or minimize impacts to tidewater goby critical habitat:

1. If in-stream work is proposed to occur in coastal drainages, an incidental take authorization from the U.S. Fish and Wildlife Service through a Federal Endangered Species Act Section 7 Biological Opinion and Incidental Take Statement shall be acquired, if determined necessary by the U.S. Fish and Wildlife Service.
2. Any construction activities within the banks of Aptos Creek shall take place between June 15 and October 31, when the surface water within Aptos Creek is likely to be at its seasonal minimum.
3. If dewatering/stream diversion is necessary within Soquel Creek, Aptos Creek, or Rodeo Creek Gulch, a U.S. Fish and Wildlife Service-approved biologist will conduct a preconstruction survey for tidewater goby and, using seining, dip-nets, or other approved methods, capture and relocate tidewater goby from the areas to be dewatered to areas with suitable habitat outside the area of proposed disturbance.
4. If dewatering/stream diversion is necessary, a Diversion and Dewatering Plan shall be prepared and implemented.
5. If dewatering/stream diversion is necessary, flow will be maintained through the work area via pipes or culverts to allow for fish passage.
6. At a minimum, the form and function of all pumps used during the dewatering activities shall be checked twice daily by the biological monitor(s) to ensure a dry work environment and minimize adverse effects to aquatic species and habitats.
7. During project activities, if pumps are incorporated to assist in temporarily dewatering/diverting stream flow from the site, intakes shall be completely screened with no larger than 0.2-inch wire mesh to prevent tidewater goby and other aquatic vertebrate species from entering the pump system. Pumps will release the additional

water to a settling basin to allow the suspended sediment to settle out before the pumped water is released to the drainage.

8. During project activities, if tidal fluctuations breach any dewatered/diverted project sites, a U.S. Fish and Wildlife Service-approved biologist shall supervise site dewatering and relocate all aquatic species.
9. Upon project completion, all material used for dewatering/diversion shall be removed from the creek corridor under the supervision of the biological monitor(s) or U.S. Fish and Wildlife Service-approved biologist.

Central California Coast Steelhead Avoidance and Minimization Efforts

Implementation of the following measures will serve to avoid or minimize impacts to Central California Coast steelhead:

1. If in-stream work is proposed to occur in coastal streams, incidental take authorization from National Oceanic and Atmospheric Administration Fisheries shall be acquired through a Federal Endangered Species Act Section 7 Biological Opinion and Incidental Take Statement. Formal consultation with National Oceanic and Atmospheric Administration Fisheries may be necessary if a Section 404 permit is issued.
2. The worker environmental training program will include a component that describes the central California coast steelhead, its ecology, and the need for conservation of the species.
3. If dewatering/stream diversion is necessary, a Diversion and Dewatering Plan shall be prepared and implemented to allow for passage of aquatic species through the site during construction. At a minimum, the form and function of all pumps used during the dewatering activities shall be checked twice daily by the biological monitor(s) to ensure a dry work environment and minimize adverse effects to aquatic species and habitats.
4. During project activities, if pumps are incorporated to assist in temporarily dewatering the site, intakes shall be completely screened with no larger than 0.2-inch wire mesh to prevent steelhead and other sensitive aquatic species from entering the pump system. Pumps will release the additional water to a settling basin to allow the suspended sediment to settle out before the water re-enters the stream(s) outside the isolated area.
5. During dewatering/diversion activities, or if tidal fluctuations breach a formerly dewatered and isolated project site, a National Oceanic and Atmospheric Administration Fisheries-approved biological monitor(s) or other National Oceanic and Atmospheric Administration Fisheries-approved biologist(s) shall supervise site dewatering and relocate steelhead and other stranded aquatic species.

6. If the biological monitor(s) or the National Oceanic and Atmospheric Administration Fisheries-approved biologist(s) determines that impacts to steelhead could exceed the levels authorized by National Oceanic and Atmospheric Administration Fisheries, he will immediately notify the resident engineer (the engineer that is directly overseeing and construction activities). The resident engineer will resolve the situation immediately by stopping the actions that are causing the problem and notifying the appropriate resource agency as soon as is reasonably possible. No work will resume until the issue is resolved.
7. Following construction, temporary impacts to streamside vegetation used as sheltering areas or streambed sandbars, gravels, and cobbles used by fish species will be restored to their pre-construction conditions, at a minimum.

In addition, the following measure will be implemented for the protection of central California coast steelhead critical habitat:

1. If in-stream work is proposed in coastal streams, incidental take authorization from National Oceanic and Atmospheric Administration Fisheries through a Federal Endangered Species Act Section 7 Biological Opinion and Incidental Take Statement shall be acquired, if determined necessary by National Oceanic and Atmospheric Administration Fisheries. Formal consultation between the U.S. Army Corps of Engineers (USACE) and National Oceanic and Atmospheric Administration Fisheries may be necessary if a Section 404 permit is issued.

California Red-Legged Frog Avoidance and Minimization Efforts

Although California red-legged frog has not been observed in the biological study area during project-related surveys, suitable habitat is present, and California red-legged frog presence within the biological study area is inferred. The proposed project has the potential to impact California red-legged frogs and suitable habitat. Mitigation measures associated with project construction are recommended to avoid, minimize, and compensate for any potential impacts resulting from the proposed project. These measures are also effective for other aquatic species, such as the Foothill yellow-legged frog.. The following measures are provided by the Programmatic Biological Opinion for Projects Funded or Approved under the Federal Aid Program, 8-8-10-F-58 (USFWS 2011):

1. Only U.S. Fish and Wildlife Service-approved biologists will participate in activities associated with the capture, handling, and monitoring of California red-legged frogs.
2. Ground disturbance will not begin until written approval is received from the U.S. Fish and Wildlife Service that the biologist is qualified to conduct the work.
3. A U.S. Fish and Wildlife Service-approved biologist will survey the project area 48 hours before the onset of work activities. If any life stage of the California red-legged frog is found and these individuals are likely to be killed or injured by work

activities, the approved biologist will be allowed sufficient time to move them from the site before work activities begin. The U.S. Fish and Wildlife Service-approved biologist will relocate the California red-legged frogs the shortest distance possible to a location that contains suitable habitat and that will not be affected by the activities associated with the proposed project. To the extent practicable, the relocation site should be in the same drainage. Coordination with the U.S. Fish and Wildlife Service shall occur with regard to the relocation site prior to the capture of any California red-legged frogs.

4. Before any construction activities begin, a U.S. Fish and Wildlife Service-approved biologist will conduct a training session for all construction personnel. At a minimum, the training will include a description of the California red-legged frog and its habitat, the specific measures to be implemented to conserve the California red-legged frog during the project, and all project boundary limits. Brochures, books, and briefings may be used in the training session, provided that a qualified person is on hand to answer questions.
5. A U.S. Fish and Wildlife Service-approved biologist will be present at the worksite until all California red-legged frogs have been removed, workers have been instructed, and disturbance of the habitat has been completed. After this time, the state or local sponsoring agency will designate a person to monitor onsite compliance with all minimization measures. The U.S. Fish and Wildlife Service-approved biologist will ensure that this monitor receives the training outlined above in measure 4 and in the identification of California red-legged frogs. If the monitor or the U.S. Fish and Wildlife Service-approved biologist recommends that work be stopped because California red-legged frogs would be affected to a degree that exceeds the levels anticipated by the Federal Highway Administration and the U.S. Fish and Wildlife Service during the review of the proposed action, they will immediately notify the resident engineer (the engineer that is directly overseeing construction activities). The resident engineer will resolve the situation by stopping the actions that are causing the problem and notifying the U.S. Fish and Wildlife Service as soon as is reasonably possible. No work will resume until the issue is resolved.
6. During project activities, all trash that may attract predators will be properly contained, removed from the work site, and disposed of regularly. Following construction, all trash and construction debris will be removed from work areas.
7. All refueling, maintenance, and staging of equipment and vehicles will occur at least 60 feet from the riparian habitat or water bodies and not in a location from which a spill would drain directly toward aquatic habitat. The monitor will ensure that habitat is not contaminated during such operations. Before work begins, the Federal Highway Administration will ensure that a plan is in place for prompt and effective response to

any accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take if a spill occurs.

8. Habitat contours will be returned to their original configuration at the end of the project activities. This measure will be implemented in all areas disturbed by activities associated with the project, unless the U.S. Fish and Wildlife Service and the Federal Highway Administration determine that it is not feasible or that modification of the original contours would not benefit the California red-legged frog.
9. The number of access routes, size of staging areas, and the total area of activity will be limited to the minimum necessary to achieve the project goal. Environmentally sensitive areas will be established to confine access routes and construction areas to the minimum area necessary to complete construction and minimize the impact to California red-legged frog habitat; this goal includes locating access routes and construction areas outside of wetlands and riparian areas to the maximum extent practicable.
10. Federal Highway Administration will attempt to schedule work activities for times of the year when impacts to the California red-legged frog would be minimal. For example, work that would affect large pools that may support breeding would be avoided, to the maximum degree practicable, during the breeding season (November through May). Isolated pools that are important to maintain California red-legged frogs through the driest portions of the year would be avoided, to the maximum degree practicable, during the late summer and early fall. Habitat assessments, surveys, and informal consultation between the Federal Highway Administration and the U.S. Fish and Wildlife Service during project planning shall assist in scheduling work activities to avoid sensitive habitats during key times of year.
11. To control sedimentation during and after project implementation, the Federal Highway Administration and the sponsoring agency will implement Best Management Practices outlined in any authorizations or permits issued under the authorities of the Clean Water Act that it receives for the specific project. If Best Management Practices are ineffective, the Federal Highway Administration will attempt to remedy the situation immediately, in consultation with U.S. Fish and Wildlife Service.
12. If a work site is to be temporarily dewatered by pumping, intakes will be completely screened with wire mesh no larger than 0.2 inch to prevent California red-legged frogs from entering the pump system. Water will be released or pumped downstream at an appropriate rate to maintain downstream flows during construction. The methods and materials used in any dewatering will be determined by the Federal Highway Administration in consultation with the U.S. Fish and Wildlife Service on a site-specific basis. Upon completion of construction activities, any diversions or

barriers to flow will be removed in a manner that would allow flow to resume with the least disturbance to the substrate. Alteration of the streambed will be minimized to the maximum extent possible; any imported material will be removed from the streambed upon completion of the project.

13. Unless approved by the U.S. Fish and Wildlife Service, water will not be impounded in a manner that may attract California red-legged frogs.
14. A U.S. Fish and Wildlife Service-approved biologist will permanently remove any individuals of exotic species, such as bullfrogs (*Rana catesbeiana*), crayfish, and centrarchid fishes from the project area, to the maximum extent possible. The U.S. Fish and Wildlife Service-approved biologist will be responsible for ensuring that his or her activities are in compliance with the California Fish and Game Code.
15. If FHWA demonstrates that disturbed areas have been restored to conditions that allow them to function as habitat for the California red-legged frog, these areas will not be included in the amount of total habitat permanently disturbed.
16. To ensure that diseases are not conveyed between work sites by the U.S. Fish and Wildlife Service-approved biologist, the fieldwork code of practice developed by the Declining Amphibian Populations Task Force will be followed at all time.
17. Project sites will be revegetated with an assemblage of native riparian, wetlands, and upland vegetation suitable for the area. Locally collected plant materials will be used to the extent practicable. Invasive, exotic plants will be controlled to the maximum extent practicable. These measures will be implemented in all areas disturbed by activities associated with the project unless the U.S. Fish and Wildlife Service and FHWA determine that it is not feasible or practical.
18. FHWA will not use herbicides as the primary method used to control invasive, exotic plants. However, if FHWA determines the use of herbicides is the only feasible method for controlling invasive plants at a specific project site, it will implement the following additional protective measures for the CRLF:
    a. FHWA will not use herbicides during the breeding season for the California red-legged frog.
    b. FHWA will conduct surveys for the California red-legged frog immediately prior to the start of any herbicide use. If found, these frogs will be relocated to suitable habitat far enough from the project area that no direct contract with herbicides would occur.
    c. Giant reed and other invasive plants will be cut and hauled out by hand and the stems will be painted with glyphosate or glyphosate-based products, such as Aquamaster or Rodeo.

d. Licensed and experienced FHWA staff or a licensed and experienced contractor will use a hand-held sprayer for foliar application of Aquamaster or Rodeo where large monoculture stands occur at an individual project site.
e. All precautions will be taken to ensure that no herbicide is applied to native vegetation.
f. Herbicides will not be applied on or near open water surfaces (no closer than 60 feet from open water).
g. Foliar applications of herbicide will not occur when wind speeds are in excess of 3 miles per hour.
h. No herbicides will be applied within 24 hours of forecasted rain.
i. Application of all herbicides will be done by a qualified FHWA staff or contractors to ensure that overspray is minimized, that all application is made in accordance with label recommendations, and with implementation of all required and reasonable safety measures. A safe dye will be added to the mixture to visually denote treated sites. Application of herbicides will be consistent with the U.S. Environmental Protection Agency's Office of Pesticide Programs, Endangered Species Protection Program county bulletins.
j. All herbicides, fuels, lubricants, and equipment will be stored, poured, or refilled at least 60 feet from riparian habitat or water bodies in a location where a spill would not drain directly toward aquatic habitat. FHWA will ensure that contamination of habitat does not occur during such operations. Prior to the onset of work, FHWA will ensure that a plan is in place for a prompt and effective response to accidental spills. All workers will be informed of the importance of preventing spills and of the appropriate measures to take should a spill occur.

19. Upon completion of any project for which this programmatic consultation is used, FHWA will ensure that a Project Completion Report is completed and provided to the Ventura Fish and Wildlife Office. FHWA should include recommended modification of the protective measures if alternative measures would facilitate compliance with the provisions of this consultation. In addition, FHWA will reinitiate formal consultation in the event any of the following thresholds are reached as a result of projects conducted under the provisions of this consultation:

    FHWA will reinitiate consultation when, as a result of projects conducted under the provisions of this consultation:

    a. Ten adults or juvenile California red-legged frogs have been killed or injured in a given year (for this and all other standards, an egg mass is considered to be one California red-legged frog);
    b. Fifty California red-legged frogs have been killed or injured in total;

c. Twenty acres of critical habitat for the California red-legged frog that include the primary constituent elements of aquatic breeding and non-breeding aquatic habitat and upland and dispersal habitat have been permanently lost in any given year;
d. One hundred acres of critical habitat for the California red-legged frog that include the primary constituent elements of aquatic breeding and non-breeding aquatic habitat and upland and dispersal habitat have been permanently lost in total;
e. One hundred acres of critical habitat for the California red-legged frog that include the primary constituent elements of aquatic breeding and non-breeding aquatic habitat and upland and dispersal habitat have been temporarily disturbed in any given year; or
f. Five hundred acres of critical habitat for the California red-legged frog that include the primary constituent elements of aquatic breeding and non-breeding aquatic habitat and upland and dispersal habitat have been temporarily disturbed in total.

Santa Cruz Long-toed Salamander and California Tiger Salamander Avoidance and Minimization Efforts

1. If construction in Valencia Lagoon cannot be avoided, U.S. Fish and Wildlife Service and California Department of Fish and Wildlife shall be consulted to determine if protocol surveys are necessary for California tiger salamander and Santa Cruz long-toed salamander.
2. If protocol California tiger salamander surveys are necessary, a qualified biologist shall conduct protocol surveys in accordance with the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife Interim Guidelines on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander (USFWS and CDFG, 2003) to determine the potential for the federally listed California tiger salamander within the proposed project site.
3. If protocol Santa Cruz long-toed salamander surveys are necessary, a qualified biologist shall conduct protocol surveys in accordance with the Sampling Procedures for Determining Presence or Absence of the Santa Cruz Long-toed Salamander (*Ambystoma macrodactylum croceum*) (Brode, 1993) or subsequent approved methodologies to determine the potential for the Santa Cruz long-toed salamander within the project site.
4. If California tiger salamander is found to occur within the biological study area during protocol surveys, incidental take authorization from the U.S. Fish and Wildlife Service shall be acquired through a Federal Endangered Species Act Section 7 Biological Opinion and Incidental Take Statement. Authorization from the California

Department of Fish and Wildlife will also be necessary through a Section 2081 Incidental Take Permit.

5. If Santa Cruz long-toed salamander is determined to occur within the biological study area during protocol surveys, coordination with the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife shall occur to ensure avoidance of take for this State of California Fully Protected species.
6. If a Federal Endangered Species Act Section 7 Biological Opinion and Incidental Take Statement are issued for the project, a U.S. Fish and Wildlife Service-approved biological monitor shall be retained to ensure compliance with all mitigation measures included in these documents. Monitoring shall occur at a frequency deemed appropriate by the U.S. Fish and Wildlife Service. The biologist will also need to be approved by the California Department of Fish and Wildlife to ensure compliance with all measures included within the 2081 Incidental Take Permit.
7. If the California tiger salamander or the Santa Cruz long-toed salamander is found to occur within the project area, the worker environmental training program will include a component that describes the California tiger salamander and the Santa Cruz long-toed salamander, its ecology, and the need for conservation of the species.
8. If project-related construction will impact aquatic areas of Valencia Lagoon and if regulatory agency approval allows, agency-approved biologists shall employ dip-netting to capture and relocate any California tiger salamander larvae or adults (if present) or other sensitive aquatic species to suitable habitat outside the area of impact. This relocation activity shall be timed to occur prior to construction in Valencia Lagoon, if possible. Any other California tiger salamander observed during the course of construction will be relocated as necessary in the same manner as described above.
9. If project-related construction will impact aquatic areas of Valencia Lagoon and if regulatory agency approval allows, coordinate with the U.S. Fish and Wildlife Service and California Department of Fish and Wildlife to determine an appropriate capture and relocation program for Santa Cruz long-toed salamander.
10. If the biological monitor(s) or the agency-approved biologist(s) determines that the California tiger salamander would be affected to a degree that exceeds the levels authorized California Department of Fish and Wildlife and the U.S. Fish and Wildlife Service, he will immediately notify the resident engineer (the engineer that is directly overseeing construction activities). The resident engineer will resolve the situation immediately by stopping the actions that are causing the problem and notifying the appropriate resource agency as soon as is reasonably possible. No work will resume until the issue is resolved.

11. Compensatory mitigation for loss of habitat shall be negotiated with resource agencies, but mitigation ratios of 2:1 for permanent impacts and 0.75:1 for temporary impacts are recommended.

White-Tailed Kite and Tricolored Blackbird Avoidance and Minimization Efforts

The measures included in Section 2.3.4 for Cooper's hawk and short-eared owl would avoid or minimize impacts to the white-tailed kite and tricolored blackbird. No additional avoidance or minimization measures are necessary.

Marsh Sandwort, Monterey Spineflower, Robust Spineflower, Seaside Bird's Beak, San Francisco Popcorn Flower, and Santa Cruz Tarplant Avoidance and Minimization Efforts

The measures included in Section 2.3.3 for special-status plant species would avoid or minimize impacts to marsh sandwort, Monterey spineflower, robust spineflower, seaside bird's beak, San Francisco popcorn flower, and Santa Cruz tarplant.

Tier II Auxiliary Lane Alternative

The impact avoidance, minimization, and mitigation measures described above for California red-legged frog and tidewater goby, identified for the Tier I Corridor Alternatives, would be required measures for construction of the Tier II Auxiliary Lane Alternative. On-site mitigation for, and on-site replacement of, freshwater marsh and riparian vegetation per the project compensatory mitigation for wetlands and riparian habitat (described in Section 2.3.2) will also mitigate any impacts to California red-legged frog and its habitat; this mitigation will be on-site within the affected area. Impacted habitat areas will be fully restored and surrounding areas that are not impacted will be enhanced. Compensatory mitigation of impacted freshwater marsh habitat described in Section 2.3.2 will mitigate impacts to tidewater goby and its habitat because compensatory mitigation will occur on-site. Specifically, any impacts to Rodeo Gulch would be mitigated directly on-site. No additional compensatory mitigation is proposed for the tidewater goby. No additional compensatory mitigation is proposed for the Tier II Auxiliary Lane Alternative's impact to California red-legged frog and tidewater goby.

Consultation with the U.S. Fish and Wildlife Service in the form of a Biological Assessment and Biological Opinion under Section 7 of the Federal Endangered Species Act will be required for tidewater goby and California red-legged frog in association with the Tier II Auxiliary Lane Alternative. After consultation with the U.S. Fish and Wildlife Service, additional avoidance, minimization, and mitigation measures required by the Service in the Biological Assessment and Biological Opinion will be included.

2.3.6 Nesting Birds

Affected Environment

The information in this section is summarized from the Natural Environment Study (2015) prepared for the proposed project.

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

Cooper's hawk, tricolored blackbird, and short-eared owl could nest within artificial structures, riparian trees, landscape trees, and other vegetation within the Tier I and Tier II project areas. The Cooper's hawk is considered a California species of special concern by the California Department of Fish and Wildlife. It is a fairly large accipiter hawk that ranges throughout the U.S. and is widely distributed throughout California, although its numbers are declining. This species nests and forages in and near deciduous riparian areas.

The tricolored blackbird is a state endangered species. It is common locally and throughout California, particularly in the Central Valley. It breeds near fresh water, preferably in emergent wetlands. It forages in grasslands and croplands. Tricolored blackbirds usually nest in dense cattails or bulrushes. They also nest in thickets of willows, blackberry, wild rose, and tall forbs.

The short-eared owl is also considered a California species of special concern by the California Department of Fish and Wildlife. The short-eared owl is usually found in open areas with few trees, such as annual and perennial grasslands, prairies, dunes, meadows, irrigated lands, and saline and fresh emergent wetlands.

Numerous other nesting migratory bird species protected by the Migratory Bird Treaty Act and California Fish and Game Code Section 3503 could also nest within artificial structures, riparian trees, landscape trees, and other vegetation within the Tier I and Tier II project areas.

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

No special-status bird species or active nests of any migratory birds were observed during surveys of the biological study area; however, suitable habitat is present for several special-status bird species. The removal of vegetation could affect nesting birds and their habitat.

Temporary impacts would occur during construction and are described in Section 2.4.10, Construction Impacts.

No Build Alternative

The No Build Alternative would have no impact on nesting birds.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

The selection of a Tier I Corridor Alternative would not result in actual construction. No project actions requiring permits or approvals from any state, federal, or local agency are required at this time. As portions of the Tier I corridor are programmed as Tier II projects, they will be subject to separate environmental review. Based on the impacts that have been identified in this section, the avoidance, minimization, and mitigation measures specified for the Tier II Auxiliary Lane Alternative are anticipated to be implemented for future projects under either of the Tier I Corridor Alternatives. These measures are subject to revision based on changes in the setting, project design, or regulatory requirements in place when future tiered projects undergo environmental review.

Tier II Auxiliary Lane Alternative

Avoidance measures are required for all bird species protected by the Migratory Bird Treaty Act and California Fish and Game Code. There are no formal survey protocols for most of these bird species, but California Department of Fish and Wildlife typically requires preconstruction nesting bird surveys and avoidance of impacts to active bird nests. Replacement of riparian vegetation and other trees, as required by regulatory agencies, will mitigate permanent impacts to nesting birds and their habitat.

The measures included in Section 2.3.4 for Cooper's hawk and short-eared owl would avoid or minimize impacts to nesting birds. No additional avoidance or minimization measures are necessary. Implementation of these measures will avoid or minimize impacts to nesting birds during construction of the Tier II Auxiliary Lane Alternative and are anticipated to be required measures as part of future tiered projects under either of the Tier I Corridor Alternatives.

2.3.7 Invasive Species

This section evaluates potential impacts to invasive species that could result from operation of the Tier I and Tier II projects. Impacts to these species that could occur during project construction are discussed in Section 2.4, and cumulative impacts are discussed in Section 2.5.

Regulatory Setting

On February 3, 1999, President Clinton signed Executive Order 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." Federal Highway Administration guidance issued August 10, 1999, directs the use of the State's invasive species list, currently maintained by the California Invasive Species Council to define the invasive species that must be considered as part of the National Environmental Policy Act analysis for a proposed project.

Affected Environment

The information in this section is summarized from the Natural Environment Study (2015) prepared for the proposed project.

Tier I Corridor Alternatives

Nine exotic, invasive plant species identified by the California Invasive Plant Council were observed within the biological study area. Five of these species are included on the California Invasive Plant Council's A-1 List of Most Invasive Wildland Pest Plants; Widespread: French broom *(Genista monspessulana),* cape ivy *(Delairea odorata),* pampas grass, blue gum eucalyptus, and sweet fennel *(Foeniculum vulgare).* List A-1 species have been documented as aggressive invaders that displace native species and disrupt natural habitats.

Four invasive species observed within the biological study area are included on List B-Wildland Pest Plants of Lesser Invasiveness: English ivy, greater periwinkle *(Vinca major),* Italian thistle *(Carduus pycnocephalus),* and poison hemlock *(Conium maculatum).* List B includes invasive pest plants that spread less rapidly and cause a lesser degree of habitat disruption than List A plants.

Arana Gulch and surrounding areas contained French broom, English ivy, and periwinkle. Soquel Creek and surrounding areas contained French broom, English ivy, and pampas grass. The Tannery Gulch area contained English ivy, cape ivy, and blue gum. Ord Gulch contained English ivy and blue gum. Nobel Creek contained blue gum eucalyptus. The Valencia Channel area contained English ivy, poison hemlock, and Italian thistle. Scattered occurrences of sweet fennel, blue gum, and Italian thistle are present in many other areas of the biological study area in clusters too small to map.

Tier II Auxiliary Lane Alternative

No occurrences of invasive plant species were observed within the Rodeo Creek Gulch portion of the Tier II project area. Several occurrences of English ivy, a List B species, are present within the ditch adjacent to the Soquel Drive-In.

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

Because the biological study area contains mainly existing disturbed developed areas that would remain disturbed by development of the interchange improvements after construction, the introduction and spread of invasive species into these areas is not a major concern.

Project activities would include construction of the access road, bridge construction, bridge demolition, and site reconstruction. Implementation of these project elements would require removing existing vegetation that contains invasive plant species and replacing soil that contains seeds of invasive plant species. Disturbance of the soil containing invasive species seeds could facilitate the spread of invasive species in the study area. The Tier II Auxiliary Lane Alternative would also involve installation of landscape materials in reconstructed areas. Many potentially invasive plant species are available in the nursery trade market. Installation of these materials could result in the inadvertent introduction of invasive species. Avoidance, minimization, and mitigation measures are proposed to help ensure that invasives are not spread to sensitive areas within the project vicinity.

No Build Alternative

Under the No Build Alternative, the existing conditions would continue. There would be no new impacts relative to invasive species.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

The selection of a Tier I Corridor Alternative would not result in actual construction. No project actions requiring permits or approvals from any state, federal, or local agency are required at this time. As portions of the Tier I corridor are programmed as Tier II projects, they will be subject to separate environmental review. Based on the impacts that have been identified in this section, the avoidance, minimization, and mitigation measures specified for the Tier II Auxiliary Lane Alternative are anticipated to be implemented for future projects under either of the Tier I Corridor Alternatives. These measures are subject to revision based on changes in the setting, project design, or regulatory requirements in place when future tiered projects undergo environmental review.

Tier II Auxiliary Lane Alternative

In compliance with the Executive Order on Invasive Species, EO 13112, and guidance from the Federal Highway Administration, the landscaping and erosion control included in the project will not use species listed as invasive. In areas of particular sensitivity, extra precautions will be taken if invasive species are found in or next to the construction areas. These include the inspection and cleaning of construction equipment and eradication strategies to be implemented should an invasion occur. Invasive species would not be used in any landscaping for the proposed project, and operation of neither of the Tier I Corridor Alternatives nor the Tier II Auxiliary Lane Alternative would introduce or spread invasive species.

To prevent or minimize any introduction or spread of invasive species in the project area, impact avoidance and minimization measures would be required for construction of the

Tier II Auxiliary Lane Alternative. These measures would also apply to future tiered projects under the Tier I Corridor Alternatives. The following methods will be incorporated into the construction specifications:

1. To avoid the spread of invasive species, the contractor will stockpile topsoil and redeposit the stockpiled soil on the slopes after construction of the new bridge is complete, or it will transport all topsoil to a certified landfill for disposal.
2. During construction, the project will make all reasonable efforts to limit the use of imported soils for fill. Soils currently existing on site should be used for fill material. If imported fill material must be used, the imported material must be obtained from a source that is known to be free of invasive plant species; or the material must consist of purchased clean material such as crushed aggregate, sorted rock, or similar.
3. The landscape and restoration planting plans must emphasize the use of native species expected to occur in the area. Project plans must avoid the use of plant species that the California Invasive Plant Council, California Exotic Pest Plant Council, California Department of Fish and Wildlife, or other resource organizations consider to be invasive or potentially invasive. Prior to grading, all project landscape and restoration plans shall be verified to ensure that the plans do not include the use of any species considered invasive by the California Invasive Plant Council, California Exotic Pest Plant Council, California Department of Fish and Wildlife.

2.4 Construction Phase Impacts

Tier I Corridor Alternatives

Adoption of a Tier I Corridor Alternative will not result in any construction; therefore, construction staging, schedule, hours, staging locations, and measures to protect resources are unknown at this time. If a Tier I Corridor Alternative is adopted, subsequent tiered projects with identified construction plans would be subject to separate environmental review and those environmental documents would examine construction phase impacts and propose measures to avoid, minimize, or mitigate impacts to specific resources.

The Tier I Corridor TSM Alternative would have similar but substantially fewer impacts in comparison with the Tier I Corridor HOV Lane Alternative due to the smaller overall project footprint and the need for less interchange and highway mainline work. It is likely that much of the detailed construction phase information and measures provided in Section 2.4.1 for the Tier II Auxiliary Lane Alternative would be applicable to other future tiered projects within the project corridor.

Tier II Auxiliary Lane Alternative

It is anticipated that the Tier II Auxiliary Lane Alternative would be constructed with minimum disruption to the traveling public or surrounding communities. Most construction work would be limited to highway mainline modifications, modifications to the Soquel Avenue/Drive interchange ramps, and construction of the Chanticleer Avenue pedestrian/bicycle overcrossing. The following describes the anticipated construction staging plan for the Tier II Auxiliary Lane Alternative.

Construction Schedule

It is anticipated that project construction of the Tier II Auxiliary Lane Alternative would take approximately 18 to 24 months. If this alternative is built in phases, the northbound auxiliary lane would be built first, and its construction would require approximately 12 to 15 months. Construction of the northbound auxiliary lane would be followed by construction of the southbound auxiliary lane, which would take approximately 6 to 9 months. Lastly, the pedestrian overcrossing would be constructed, which would take approximately 6 to 9 months. The total duration of construction activities would be longer if construction occurs in phases, because each phase would involve construction mobilization and closeout activities. However, the scale of the impacts of construction activities that would occur during each phase would be lesser than would occur if the project is built at one time.

Construction Hours

Most of the construction work for the Tier II Auxiliary Lane Alternative would be done during daylight hours, but there would be some work during night-time hours to permit temporary closures for tasks that could interfere with mainline traffic or create safety hazards. Examples of these tasks include placing and removing temporary construction barriers, erecting falsework, striping operations, traffic control setup, installation of a storm drain crossing, and asphalt pavement overlay. Any required lane closures would be limited to night-time hours.

Staging Locations

At this time, it appears that no staging areas outside of the existing roadway right-of-way would be required. The anticipated staging areas available include areas within the construction limits, primarily near the existing interchanges.

2.4.1 Traffic and Transportation/Pedestrian and Bicycle Facilities

Environmental Consequences

Potential circulation impacts from project operation are discussed in Section 2.1.5.

Tier I Corridor Alternatives

It is anticipated that future tiered projects under either of the Tier I Corridor Alternatives may require temporary closure of existing bicycle, transit, or pedestrian facilities at times, and may require temporary rerouting of transit service due to interchange work and ramp closures. Increased congestion on Route 1 and on local streets would occur during construction due to short-term lane closures, detours, and as a result of signage stipulating reduced speeds through construction zones. Reduced operating speeds would affect private automobiles and buses that travel the Route 1 corridor.

Impacts to traffic and transportation circulation would result from the following likely scenarios for phased construction of either of the Tier I project alternatives:

a) It is currently anticipated that both of the existing two lanes of traffic would remain open in both directions during daytime construction. Striping operations, traffic control set-up, installation of a storm drain crossing, asphalt pavement overlay, placing and removing temporary construction barriers, and short-term overcrossing falsework erection would occur at night using lane and mainline closures, as allowed on the closure charts that would be developed during the design phase. Ramp closures are expected during striping operations. During the first stage of construction, the two through lanes would be shifted toward the median barrier in both directions, and Type K concrete railing would be installed along the edge of the traveled way around the construction zone. During Stage 1, roadway widening and retaining wall construction would occur, as would clearing and grubbing.

b) During the second stage of construction, traffic would be shifted away from the median barrier onto the newly widened Route 1 to allow for construction of the center overcrossing pier and the concrete median barrier, shoulder, and roadway section. Type K railing would be installed around the median work zone, but none would be required to the outside. Erection of overcrossing falsework requiring a lane closure would occur at night.

c) At the end of Stage 2, the landscaping work would require shoulder closure.

d) The final asphalt pavement overlay would require a nighttime mainline closure.

Tier II Auxiliary Lane Alternative

Circulation impacts during construction of the Tier II Auxiliary Lane Alternative would be similar to the impacts described above for the Tier I Corridor Alternatives, except construction of the Tier II Auxiliary Lane Alternative is not anticipated to require closure of existing bicycle, transit, or pedestrian facilities, and it is not anticipated to result in rerouting of transit service. Temporary traffic impacts on Route 1 and adjacent streets would occur during construction due to short-term lane closures, detours, and as a result of signage stipulating reduced speeds through construction zones. Reduced operating speeds would affect private automobiles and buses that travel the Route 1 corridor.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

1. A Transportation Management Plan would be developed and implemented as part of the project construction planning phase for future tiered projects under either of the Tier I Corridor Alternatives, as described above. The Transportation Management Plan would address potential impacts to circulation of all modes (transit, bicycles, pedestrians, and private vehicles).
2. The Transportation Management Plan would include a public outreach program to communicate any such closures and detours as described below under Section 2.4.4, Community Impacts.
3. Temporary ramp closures would be limited to hours where traffic volumes show closure is acceptable.
4. Roadway and/or pedestrian access to all occupied residents and businesses and respective parking lots would be maintained during project construction.
5. In the event of temporary obstruction of pedestrian walkways or bicycle paths, the Transportation Management Plan would identify nearby alternate routes, including pedestrian routes that meet Americans with Disabilities Act requirements, as appropriate.
6. The Transportation Management Plan will include an evaluation of potential impacts as a result of diverting traffic to alternate routes. The Traffic Management Plan would include measures to minimize, avoid and/or mitigate impacts to alternate routes, such

as agreements with local agencies to provide enhanced infrastructure on arterial roads or intersections to deal with detoured traffic. The Traffic Management Plan may also provide for contracting with local agencies for traffic personnel, especially for special event traffic through or near the construction zone.

7. Coordination with Transit and private shuttle services to plan for any rerouting.

Tier II Auxiliary Lane Alternative

1. Implementation of a Transportation Management Plan that addresses circulation for transit, bicycles, pedestrians, and private vehicles.
2. The Transportation Management Plan would include a public outreach program to communicate any such closures and detours as described below under Section 2.4.4, Community Impacts.
3. Lane and ramp closure charts would be included in the final Transportation Management Plan and in the project specifications.
4. In the event of temporary obstruction of any pedestrian walkways or bicycle paths, the Transportation Management Plan would identify nearby alternate routes, including pedestrian routes that meet Americans with Disabilities Act requirements, as appropriate.
5. The Transportation Management Plan will include an evaluation of potential impacts as a result of diverting traffic to alternate routes. The Traffic Management Plan would include measures to minimize, avoid and/or mitigate impacts to alternate routes, such as agreements with local agencies to provide enhanced infrastructure on arterial roads or intersections to deal with detoured traffic. The Traffic Management Plan may also provide for contracting with local agencies for traffic personnel, especially for special event traffic through or near the construction zone.
6. Coordination with Transit and private shuttle services to plan for any rerouting.
7. To minimize disruption to the traveling public during construction of the Tier II Auxiliary Lane Alternative, a comprehensive strategy would be developed to minimize disruption, and assure the safe movement of vehicles through and around the construction site.

2.4.2 Utilities and Emergency Services

Existing utilities and emergency services for the Tier I and Tier II project areas are described in Section 2.1.4, Utilities and Emergency Services.

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

It is anticipated that most utility relocation work would be performed in advance of the highway work. Caltrans and RTC would coordinate with all utility providers during the design phase of the project so that effective design treatments and construction procedures are incorporated to avoid adverse impacts to existing utilities during construction and to ensure that work is in accordance with the appropriate requirements and criteria. Design, construction, and inspection of utilities relocated for the project would be done in accordance with Caltrans requirements.

Nonetheless, the potential exists for construction activities to encounter unexpected utilities within the area of roadway improvements. In addition, utility relocations may require short-term, limited interruptions of service. Any short-term, limited service interruptions of known utilities would be scheduled well in advance and appropriate notification provided to users. It is expected that local communities would not be adversely affected by temporary service interruptions during construction.

Emergency services could also be affected by construction activities: detours and closures of roads and ramps could delay emergency vehicle access.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

Implementation of the Transportation Management Plan in compliance with Caltrans and local policies would involve planning with emergency service providers throughout the project construction to avoid emergency service delays. The following impact avoidance and minimization measures would be required for construction of the Tier II Auxiliary Lane Alternative and would apply to future tiered projects under the Tier I Corridor Alternatives:

1. Coordination with utility providers would be initiated during the preliminary engineering phase of the project and would continue through final design and construction.
2. Caltrans and RTC would coordinate with the affected service provider in each instance to ensure that work is in accordance with the appropriate requirements and criteria.
3. Design, construction, and inspection of utilities relocated for the project would be done in accordance with Caltrans requirements.
4. If unexpected underground utilities are encountered, the construction contractor will coordinate with the utility provider to develop plans to address the utility conflict, protect the utility if needed, and limit service interruptions.
5. A public outreach plan implemented in conjunction with project construction and the Transportation Management Plan will involve communication with the affected

communities to plan any utility interruptions and keep the public informed of construction activities.

6. Caltrans and RTC will coordinate with emergency service providers and through the public information program to avoid emergency service delays by ensuring that all providers are aware well in advance of road closures or detours.

2.4.3 Community Impacts

Section 2.1.3 describes permanent community impacts that could result. Impacts to the community during construction are described below.

Environmental Consequences

Tier I Corridor Alternatives

During project construction, temporary lane closures on Route 1 are likely to occur, and adjacent streets could experience episodes of increased congestion as a result of construction. Roadway obstruction from construction activities may limit the use of some properties located within the project vicinity. This impact would be localized and temporary. A Transportation Management Plan would be developed to assist the remaining local businesses in continuing operation during the construction period. The Transportation Management Plan would identify and provide alternate traffic detour routes, pedestrian routes, and residential and commercial access routes to be used during the construction period.

There would be no disconnection of the communities within the project area during the construction period. Community members would still be able to utilize various community services and facilities during the construction period with some degree of inconvenience due to construction equipment obstruction and temporary partial lane closures. With a continuing public outreach program to keep the area residents and businesses informed of the project construction schedule, there would be no adverse impacts pertaining to community connection and cohesion within the project area.

Construction impacts, including noise and fugitive dust from construction activities and short-term roadway closures requiring alternative traffic routing, would have greater effects on residents of the immediate project area than upon other Route 1 users. These effects would be experienced by ethnic minority and low-income individuals only to the extent that these populations are concentrated in the immediate project area. However, these effects would not fall disproportionately on ethnic minority and low-income individuals because all residents of the immediate project area would experience the same effects. There is no way to construct the corridor improvements without these temporary effects.

Temporary construction easements would also be required during construction. Temporary easements would be acquired from land surrounding the project area and could include land from residences and businesses. These impacts are temporary; the land would be returned to the residence and/or business following completion of construction.

Construction phase impacts would be mitigated by adhering to Caltrans's standard specifications for noise control and dust abatement and/or construction Best Management Practices for noise and fugitive dust control. Detour routes would be planned in coordination with Caltrans and the traffic departments of the County and City of Santa Cruz and the City of Capitola and would be noticed to emergency service providers, transit operators, and Route 1 users in advance. With these measures in place, there would be no disproportionate adverse effects on minority and low-income residents.

The Tier 1 Corridor HOV Lane Alternative would create temporary construction-related employment, which is considered a beneficial impact.

Impacts during construction would be similar to those described for the Tier 1 Corridor HOV Lane Alternative, but they may last a shorter amount of time because of the larger scope of project construction anticipated for the Tier I Corridor HOV Lane Alternative.

Tier II Auxiliary Lane Alternative

Impacts during construction would be similar to those described for the Tier 1 Corridor Alternatives, but they would last a shorter amount of time because of the smaller scope of project construction for the Tier II Auxiliary Lane Alternative.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

The following standard impact minimization measures would be implemented during construction of the Tier II Auxiliary Lane Alternative and are also expected to be implemented under future tiered projects part of either Tier I Corridor Alternative:

1. The Transportation Management Plan described in Section 2.4.1 Avoidance, Minimization and/or Mitigation Measures will include traffic rerouting, a detour plan, and public information procedures will be developed during the design phase with participation from local agencies, transit and shuttle services, local communities, business associations, and affected drivers. Early and well-publicized announcements and other public information measures will be implemented prior to and during construction to minimize confusion, inconvenience, and traffic congestion.
2. As part of the Transportation Management Plan, construction planning will minimize nighttime construction in residential areas and minimize daytime construction impacts on commercial areas.
3. During the construction phase of the project, some parking restrictions may be required on a temporary basis. A public outreach program would be implemented throughout the construction period to keep the public informed of the construction

schedule and scheduled parking and roadway closures, including detour routes and if available, alternative parking.

4. The acquisition of temporary construction easements shall conform to the requirements of the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended.

2.4.4 Air Quality

Potential permanent air quality impacts from project operation are discussed in Section 2.2.6.

Regulatory Setting

Fugitive Dust

According to the Environmental Protection Agency, construction activities for large development projects are estimated to add approximately 1.2 tons of fugitive dust per acre of soil disturbed per month of activity. If water or other soil stabilizers are used to control dust, then emissions can be reduced by up to 50 percent. Caltrans' Standard Specifications (Section 10) pertaining to dust minimization requirements requires use of water or dust palliative compounds and will reduce potential fugitive dust emissions during construction.

Naturally Occurring Asbestos

Santa Cruz County is not listed as a county containing serpentine and ultramafic rock (Governor's Office of Planning and Research, October 26, 2000); therefore, the impact from naturally occurring asbestos during project construction would be minimal to none. If structures that may contain asbestos are to be demolished, then the contractor would have to comply with the Rules and Regulations of the Monterey Bay Unified Air Pollution Control District.

Affected Environment

Air quality impacts could occur through the release of pollutants such as carbon monoxide, nitrogen oxides, volatile organic compounds, particulate matter (PM_{10} and $PM_{2.5}$), and toxic air contaminants present in emissions from operation of construction equipment. The particulate matter emissions also occur from fugitive dust release during grading, excavation, and various other earth-moving activities. The construction emissions analysis provided in the following section is derived from the project *Air Quality Study Report* (2013).

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

During construction of the Tier II Auxiliary Lane Alternative and future tiered projects under either of the Tier I Corridor Alternatives, short-term degradation of air quality may occur due to the release of particulate emissions (i.e., airborne dust) generated by excavation, grading, hauling, and various other activities related to construction. Emissions from construction equipment are also anticipated and would include carbon monoxide, nitrogen oxides, volatile organic compounds, directly emitted particulate matter (PM_{10} and $PM_{2.5}$), and toxic air contaminants such as diesel exhaust particulate matter. Ozone is a regional pollutant that is derived from nitrogen oxides and volatile organic compounds in the presence of sunlight and heat.

Site preparation and roadway construction would involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. Construction-related effects on air quality from most highway projects are greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate PM_{10}, $PM_{2.5}$, and small amounts of carbon monoxide, sulfur dioxide, nitrogen oxides, and volatile organic compounds. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Heavy trucks and construction equipment powered by gasoline and diesel engines would generate carbon monoxide, sulfur dioxide, nitrogen oxides, volatile organic compounds, and some soot particulate (PM_{10} and $PM_{2.5}$) in exhaust emissions. If construction activities were to increase traffic congestion in the area, carbon monoxide and other emissions from traffic would increase slightly while those vehicles are delayed. These emissions would be temporary and limited to the immediate area surrounding the construction site.

Sulfur dioxide is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Off-road diesel fuel meeting federal standards can contain up to 5,000 parts per million of sulfur, whereas on-road diesel is restricted to less than 15 parts per million of sulfur; however, under California law and Air Resources Board regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel, so sulfur dioxide-related issues due to diesel exhaust will be minimal. Some phases of construction, particularly asphalt paving, would result in short-term odors in the immediate area of each paving sites. Such odors would be quickly dispersed below detectable thresholds as distance from the site increases.

Tier I Corridor Alternatives

Under the Tier I Corridor Alternatives, construction activity would generate criteria pollutant emissions, toxic air contaminant emissions, and odors; however, construction activity for each project segment would likely be completed in less than 5 years, and the quantification of emissions is not required per Environmental Protection Agency and Caltrans. As previously explained, subsequent Tier II projects would be subject to separate environmental review; daily construction emissions estimates would be provided at that time.

Assumptions used for the construction calculations are as follows:

- 8.9-mile corridor length
- 8-year construction period
- A maximum of 7 acres of land disturbed per day
- A maximum of 1,000 cubic yards per day of soil to be imported
- A maximum of 1,000 cubic yards per day of soil to be exported

Table 2.4-1 shows the estimated daily emissions associated with each construction phase. Construction emissions would be temporary and not result in any long-term impacts. Therefore, the Tier I Corridor HOV Lane Alternative would not result in an adverse impact related to construction emissions.

Table 2.4-1: Daily Construction Emissions – Tier I Corridor Alternatives

Construction Phase	Pounds per Day				
	Volatile Organic Compound	Nitrous Oxide	Carbon Monoxide	$PM_{2.5}$	PM_{10}
Grubbing/Land Clearing	13	93	53	19	75
Grading/Excavation	12	132	60	19	75
Drainage/Utilities	7	47	40	17	73
Paving	5	32	39	1	2
Total Emissions (Tons)	**10**	**94**	**53**	**17**	**67**
Average Emissions (Tons per Year)	**1.3**	**12**	**6.6**	**2.1**	**8.4**
Source: Sacramento Metropolitan Air Quality Management District, Road Construction Emissions Model.					

Tier II Auxiliary Lane Alternative

Table 2.4-2 shows the estimated daily construction emissions. Assumptions used for the construction calculations are as follows:

- 1.4-mile corridor length
- 2-year construction period
- A maximum of 8.5 acres of land disturbed per day
- A maximum of 2,000 cubic yards per day of soil to be imported
- A maximum of 2,000 cubic yards per day of soil to be exported

Construction emissions would be temporary and not result in any long-term impacts; therefore, the Tier II Auxiliary Lane Alternative would not result in an adverse impact related to construction emissions.

Construction activity may generate a temporary increase in mobile source air toxics emissions. Construction emissions would be temporary and not result in any long-term impacts; therefore, the Tier II Auxiliary Lane Alternative would not result in an adverse impact related to construction mobile source air toxics.

Table 2.4-2: Daily Construction Emissions – Tier II Auxiliary Lane Alternative

Construction Phase	Pounds per Day				
	Volatile Organic Compound	Nitrous Oxide	Carbon Monoxide	$PM_{2.5}$	PM_{10}
Grubbing/Land Clearing	7	73	30	21	88
Grading/Excavation	9	139	42	22	90
Drainage/Utilities	5	43	21	20	87
Paving	4	32	23	2	2
Total Emissions (Tons)	**2**	**23**	**8**	**5**	**20**
Average Emissions (Tons per Year)	**1.0**	**12**	**4.0**	**2.5**	**10**
Source: Sacramento Metropolitan Air Quality Management District, Road Construction Emissions Model.					

Avoidance, Minimization, and/or Mitigation Measures

Construction impacts would not be adverse, and no mitigation measures are required; however, the following standard Caltrans construction emission minimization measures shall be used to control emissions for the Tier I and Tier II project alternatives:

1. The construction contractor shall comply with Caltrans' Standard Specifications Section 7-1.01F and Section 10 of Caltrans' Standard Specifications (2006).
    a. Section 7, "Legal Relations and Responsibility," addresses the contractor's responsibility on many items of concern, such as air pollution; protection of lakes, streams, reservoirs, and other water bodies; use of pesticides; safety; sanitation; convenience of the public; and damage or injury to any person or property as a result of any construction operation. Section 7-1.01F specifically requires compliance by the contractor with all applicable laws and regulations related to air quality, including air pollution control district and air quality management district regulations and local ordinances.
    b. Section 10 is directed at controlling dust. If dust palliative materials other than water are to be used, material specifications are contained in Section 18.

2. The construction contractor shall apply water or dust palliative to the site and equipment as frequently as necessary to control fugitive dust emissions.
3. The construction contractor shall spread soil binder on any unpaved roads used for construction purposes and on all project construction parking areas.
4. The construction contractor shall wash off trucks as they leave the right-of-way as necessary to control fugitive dust emissions.
5. The construction contractor shall properly tune and maintain construction equipment and vehicles.
6. The construction contractor shall use low-sulfur fuel in all construction equipment as provided in California Code of Regulations Title 17, Section 93114.
7. The construction contractor shall develop a dust control plan documenting sprinkling, temporary paving, speed limits, and expedited revegetation of disturbed slopes as needed to minimize construction impacts to existing communities.
8. The construction contractor shall locate equipment and materials storage sites as far away from residential and park uses as practical. Construction areas shall be kept clean and orderly.
9. The construction contractor shall establish Environmentally Sensitive Areas for sensitive air receptors within which construction activities involving extended idling of diesel equipment would be prohibited, to the extent that is feasible.
10. The construction contractor shall use track-out reduction measures, such as gravel pads, at project access points to minimize dust and mud deposits on roads affected by construction traffic.
11. The construction contractor shall cover all transported loads of soils and wet materials prior to transport or provide adequate freeboard (space from the top of the material to the top of the truck) to reduce PM_{10} and deposition of particulate matter during transportation.
12. The construction contractor shall remove dust and mud that are deposited on paved, public roads due to construction activity and traffic to decrease particulate matter.
13. The construction contractor shall route and schedule construction traffic to avoid peak travel times as much as possible to reduce congestion and related air quality impacts caused by idling vehicles along local roads.
14. The construction contractor shall install mulch or plant vegetation as soon as practical after grading to reduce windblown particulate in the area.
15. According to Caltrans Standard Specification Provisions, idling time for lane closure during construction is restricted to 10 minutes in each direction.
16. The construction contractor must comply with Monterey Bay Unified Air Pollution Control District rules, ordinances, and regulations in regards to air quality restrictions.

2.4.5 Noise

Potential noise and vibration impacts from project operation are discussed in Section 2.2.7.

Regulatory Setting

Construction noise sound control shall conform to the provisions in Section 14-8.02 “Noise Control” of Caltrans’ 2010 Standard Specifications and Standard Special Provisions. The requirements state that construction noise levels generated during construction shall comply with applicable local, state, and federal regulations and that all equipment shall be fitted with adequate mufflers according to the manufacturers’ specifications. Temporary construction noise impacts would be unavoidable at areas located immediately adjacent to the proposed project alignment.

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

During the construction phases of the Tier II Auxiliary Lane Alternative and future Tier II projects stemming from either of the Tier I Corridor Alternatives, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction. Table 2.4-3 summarizes noise levels produced by construction equipment commonly used on roadway construction projects. As indicated, equipment involved in construction is expected to generate noise levels ranging from 80 to 89 A-weighted decibels at a distance of 50 feet. Noise produced by construction equipment would be reduced over distance at a rate of approximately 6 decibels per doubling of distance. No adverse noise impacts from construction are anticipated because construction would be conducted in accordance with Caltrans’ Standard Specifications and would be short-term, intermittent, and dominated by local traffic noise.

Table 2.4-3: Construction Equipment Noise

Equipment	Maximum Noise Level at 50 feet, A-weighted decibels
Auger Drill Rig	86
Backhoe	75
Compactor	76
Concrete Pump	81
Crane	85
Dozer	85
Excavator	83
Front End Loader	74
Grader	75
Heavy Duty Dump Trucks	77

Equipment	Maximum Noise Level at 50 feet, A-weighted decibels
Vibratory Roller	78
Pavement Breaker	88
Pile Driver, Impact	101
Pile Driver, Vibratory	96
Source: Noise Study Report, 2013.	

Avoidance, Minimization, and Compensation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

Implementing the following standard measures during construction of the Tier II Auxiliary Lane Alternative and future tiered projects under either of the Tier I Corridor Alternatives would minimize temporary construction noise impacts:

1. Construction activities shall comply with Section 14-8.02 “Noise Control” of Caltrans’ 2010 Standard Specifications and Standard Special Provisions.
2. All internal combustion engines must be equipped with the manufacturer-recommended muffler. Do not exceed a maximum sound level (L_{max}) of 86 decibels (A-weighted) at 50 feet from the job site activities from 9 p.m. to 6 a.m.
3. As directed by the resident engineer, the contractor shall implement appropriate additional noise abatement measures including, but not limited to, changing the location of stationary construction equipment, turning off idling equipment, rescheduling construction activity, notifying adjacent residents in advance of construction work, or installing acoustic barriers around stationary construction noise sources.

2.4.6 Geology/Soils/Seismic/Topography

Regulatory Setting

The existing geology, soils, seismic, and topography conditions are described in Section 2.2.3, Geology/Soils/Seismic/Topography, along with potential, permanent impacts.

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

The improved areas within the project corridor are expected to produce a low erosion potential. It is anticipated that no new embankments will be required for the Tier I Corridor Alternatives. In addition, the project area is not expected to have any substantial amount of expansive soils. The project area has relatively low potential for landslides. Slopes located along the creeks in the project corridor may pose local slump or landslide risk.

Risk to the General Public and Workers

The proposed project does not pose risks to the general public or construction workers. The project would not expose construction workers, highway users, or structures to potential substantial adverse effects from soil erosion and/or surface drainage. The general public may be exposed to adverse effects from seismic activity due to the proximity of the Zayante-Vergales Fault. The San Andreas, Sargent, Monterey Bay Zone, and Calaveras-Pacines-San Benito faults also pose a potential danger to the general public and highway workers.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

The measure recommended below for the Tier II Auxiliary Lane Alternative applies conceptually to the Tier I Corridor Alternatives. Similar avoidance and minimization measures described below, based on project-specific conditions, would be incorporated into construction of any future tiered projects under either of the Tier I Corridor Alternatives.

Tier II Auxiliary Lane Alternative

The proposed project would meet all seismic engineering requirements under the Tier II Auxiliary Lane Alternative; therefore, no mitigation is required. As a standard practice, a site-specific seismic hazard engineering analysis would address seismic safety and erosion control, and it would inform the project construction plan and construction Worker Health and Safety Plan. The following Construction Best Management Practices related to shoring and slope stability will be implemented:

1. Open excavations will be shored, taking into consideration surcharge loads from nearby structures and examination of the potential for lateral movement of the excavation walls.
2. Heavy construction equipment, building materials, excavated soil, and vehicle traffic shall be kept away from the edge of excavations, generally a distance equal to or greater than the depth of the excavation.
3. During wet weather, storm runoff shall be directed from entering excavation areas as feasible.
4. Sidewalks, slabs, pavement, and utilities adjacent to proposed excavations shall be adequately supported during construction.

2.4.7 Cultural Resources

Potential permanent impacts to cultural resources are discussed in Section 2.1.7.

Environmental Consequences – Archaeological Resources

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

As described in Section 2.1.7, Cultural Resources, a systematic and thorough program of subsurface investigation has been conducted in addition to secondary research to identify buried cultural resources. As a result of these efforts, it is not anticipated that construction activities under the Tier II Auxiliary Lane Alternative or future tiered projects under the Tier I Corridor Alternatives would disturb any unknown buried cultural resources. In the unlikely event that buried cultural resources are inadvertently discovered during any ground-disturbing activities, Caltrans and Federal Highway Administration would comply with 36 *Code of Federal Regulations* 800.13 (b)(3), and if applicable, (c), as stipulated in the 2004 Section 106 Programmatic Agreement for Federal-aid Highway Programs in California regarding post-review discoveries.

Environmental Consequences – Historic Architectural Impacts

No construction-phase adverse impacts to historic architectural resources are anticipated under the Tier I Corridor Alternatives or the Tier II Auxiliary Lane Alternative because there are no National Register of Historic Places-listed or eligible for listing historic architectural resources located in the project's Area of Potential Effects that could be affected by construction activities.

Avoidance, Minimization, and/or Mitigation Measures

Potential impacts to archaeological resources resulting from construction activities under both the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative will be mitigated by implementing the following impact avoidance and minimization measures during or prior to project construction:

1. If human remains are inadvertently discovered, disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner will be contacted. Pursuant to Public Resources Code Section 5097.98, if the remains are thought to be Native American, then the coroner will notify the Native American Heritage Commission, who will then notify the Most Likely Descendent. At this time, the person who discovered the remains will contact Caltrans District 5's Office of Cultural Resources so that they may work with the Most Likely Descendent on the respectful treatment and disposition of the remains. Further provisions of Public Resources Code 5097.98 will be followed as applicable.
2. In the unlikely event that buried cultural resources are inadvertently discovered during any ground-disturbing activities, Caltrans and Federal Highway Administration would comply with 36 *Code of Federal Regulations* 800.13 (b)(3), and if applicable, (c), as stipulated in the 2004 Section 106 Programmatic Agreement

for Federal-aid Highway Programs in California regarding post-review discoveries. All earth-moving activity within and around the immediate discovery area would be diverted until a qualified archaeologist could assess the nature and significance of the find.

2.4.8 Paleontology

The existing paleontological conditions are described in Section 2.2.4, Paleontology, along with potential permanent impacts to paleontological resources.

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

Paleontological resources could be adversely affected by ground disturbance and earth moving associated with project construction. The project would involve three distinct construction elements: shallow excavations of 3 to 5 feet for median and outside roadway widening; deeper excavations for roadway widening/retaining walls in cut sections; and construction of drainage structures and deeper excavations to place new foundations for widened/replaced bridge structures, new pedestrian/bicycle overcrossings, retaining walls, and sound walls. All three elements have the potential to disturb geologic formations and affect associated fossils. Sensitivities would be similar for both corridor alternatives, because both traverse the same geologic units. The Tier I Corridor HOV Lane Alternative would be expected to have a greater potential for adverse impacts because it would involve more roadway widening and bridge structures than the Tier I Corridor TSM Alternative.

Although fossils are not known to directly underlie the proposed project right-of-way, numerous fossil localities have been reported in published scientific literature and museum archival record searches around Route 1 in the general project vicinity. The presence of fossils in the Pliocene Purisima Formation, Plio-Pleistocene Aromas Sand, and Pleistocene terrace deposits suggests that there is a potential for additional similar fossil remains to be uncovered by excavations during project construction. Under Caltrans and Society of Vertebrate Paleontology criteria, all of these units have a high sensitivity for producing additional paleontological resources. Identifiable fossil remains recovered from any of these stratigraphic units during project construction could be scientifically important.

The planned clearing, grading, and deeper excavation along the Tier II Auxiliary Lane Alternative right-of-way could result in adverse impacts to paleontological resources. In addition, construction of supporting facilities, such as temporary construction offices, laydown areas, and parking areas, would have potential to cause adverse impacts on paleontological resources, if they will involve new ground disturbance. Thus, any project-related ground disturbance could have adverse impacts on paleontological resources.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

The avoidance, minimization, and/or mitigation measures proposed for Tier II apply conceptually to the Tier I Corridor Alternatives.

Tier II Auxiliary Lane Alternative

If paleontological resources are discovered during project construction, a Paleontological Mitigation Plan will be completed. The plan will include requirements, performance standards, and methods described below. This mitigation measure would reduce potential adverse impacts to highly sensitive stratigraphic units during project construction:

1. **Assessment Before Construction Starts:** This may include a field survey to delimit the specific boundaries of sensitive areas and pre-excavation meetings with contractors and developers. In some cases it may be necessary to conduct field surveys and/or a salvage program prior to grading to prevent damage to known resources and to avoid delays to construction schedules. Such a program may involve surface collection and/or quarry excavations. A review of the initial assessment and proposed mitigation program by the Lead Agency before operations begin will confirm the adequacy of the proposed program.
2. **Adequate Monitoring:** An excavation project will retain a qualified project paleontologist. In areas of known high potential, the project paleontologist shall designate a paleontologic monitor to be present during 100 percent of the earth-moving activities. If, after 50 percent of the grading is completed, it can be demonstrated that the level of monitoring should be reduced, the project paleontologist shall so amend the mitigation program. Paleontologists who monitor excavations must be qualified and experienced in salvaging fossils and authorized to divert equipment temporarily while removing fossils. They shall be properly equipped with tools and supplies to allow rapid removal of specimens. Provision shall be made for additional assistants to monitor or help in removing large or abundant fossils to reduce potential delays to excavation schedules. If many pieces of heavy equipment are in use simultaneously but at diverse locations, each location shall be individually monitored.
3. **Macrofossil Salvage:** Many specimens recovered from paleontological excavations are easily visible to the eye and large enough to be easily recognized and removed. Some may be fragile and require hardening before moving. Others may require encasing within a plaster jacket for later preparation and conservation in a laboratory. Occasionally specimens encompass all or much of a skeleton and will require moving either as a whole or in blocks for eventual preparation. Such specimens require time to excavate and strengthen before removal and the patience and understanding of the

contractor to recover the specimens properly. It is thus important that the contractors and developers are fully aware of the importance and fragility of fossils for their recovery to be undertaken with the optimum chances of successful extraction. The monitor must be empowered to temporarily halt or redirect the excavation equipment away from the fossils to be salvaged.

4. **Microfossil Salvage:** Many vertebrate fossils (e.g., small mammal, bird, reptile, or fish remains) are too small to be visible within the sedimentary matrix. Fine-grained sedimentary horizons and paleosols most often contain such fossils. They are recovered through concentration by screen washing. If the sediments are fossiliferous, bulk samples are taken for later processing to recover any fossils. An adequate sample comprises 12 cubic meters (6,000 lbs or 2,500 kg) of matrix for each site horizon or paleosol, or as determined by the supervising paleontologist. The uniqueness of the recovered fossils may dictate salvage of larger amounts. To avoid construction delays, samples of matrix shall be removed from the site and processed elsewhere.
5. **Preservation of Samples:** Oriented samples must be preserved for paleomagnetic analysis. Samples of fine matrices shall be obtained and stored for pollen analysis. Other matrix samples shall be retained with the samples for potential analysis by later workers, for clast source analysis, as a witness to the source rock unit and possibly for procedures that are not yet envisioned.
6. **Preparation:** Recovered specimens are prepared for identification (not exhibition) and stabilized. Sedimentary matrix with microfossils is screen washed and sorted to identify the contained fossils. Removal of excess matrix during the preparation process reduces storage space.
7. **Identification:** Specimens are identified by competent qualified specialists to a point of maximum specificity. Ideally, identification is of individual specimens to element, genus, and species. Batch identification and batch numbering (e.g., “mammals, 75 specimens”) shall be avoided.
8. **Analysis:** Specimens shall be analyzed by stratigraphic occurrence, and by size, taxa, or taphonomic conditions. This results in a faunal list, a stratigraphic distribution of taxa, or evolutionary, ecological, or depositional deductions.
9. **Storage:** Adequate storage in a recognized repository institution for the recovered specimens is an essential goal of the program. Specimens will be cataloged and a complete list will be prepared of specimens introduced into the collections of a repository by the curator of the museum or university. Adequate storage includes curation of individual specimens into the collections of a recognized, nonprofit paleontologic specimen repository with a permanent curator, such as a museum or a university. A complete set of field notes, geologic maps, and stratigraphic sections

accompany the fossil collections. Specimens are stored in a fashion that allows retrieval of specific, individual specimens by researchers in the future.

10. **Site Protection:** In exceptional instances the process of construction may reveal a fossil occurrence of such importance that salvage or removal is unacceptable to all concerned parties. In such cases, the design concept may be modified to protect and exhibit the occurrence with the project's design, e.g., as an exhibit in a basement mall. Under such circumstances, the site may be declared and dedicated as a protected resource of public value. Associated fragments recovered from such a site will be placed in an approved institutional repository.
11. **Final Report:** A report is prepared by the project paleontologist including a summary of the field and laboratory methods, site geology and stratigraphy, faunal list, and a brief statement of the significance and relationship of the site to similar fossil localities. A complete set of field notes, geological maps, stratigraphic sections, and a list of identified specimens accompany the report. The report is finalized only after all aspects of the program are completed. The Final Report together with its accompanying documents constitute the goals of a mitigation project. Full copies of the Final Report are deposited with the Lead Agency and the repository institution.
12. **Compliance:** The Lead Agency assures compliance with measures to protect fossil resources from the beginning of the project by:
    a. requesting an assessment and program for impact mitigation that includes salvage and protection during the initial planning phases;
    b. by arranging for recovered specimens to be housed in an institutional paleontologic repository; and
    c. by requiring the Final Report.

The supervising paleontologist is responsible for:

1. the assessment and development of the program for impact mitigation during initial planning phases;
2. the repository agreement;
3. the adequacy and execution of the mitigation measures; and
4. the Final Report.

Acceptance of the Final Report for the project by the Lead Agency signifies completion of the program of mitigation for the project. Review of the Final Report by a vertebrate paleontologist designated by the Lead Agency will establish the effectiveness of the program and adequacy of the report. Inadequate performances in either field comprise noncompliance, and may result in the Lead Agency removing the paleontologist from its list of qualified consultants.

2.4.9 Hazardous Waste/Materials

Potential permanent impacts from hazardous materials are discussed in Section 2.2.5.

Environmental Consequences

Tier I Corridor Alternatives

Two principal types of hazardous wastes or materials may cause impacts during construction: hazardous materials used during the construction process, and hazardous wastes that may be generated during construction. Section 2.2.5, Hazardous Waste/Materials, discusses the potential for encountering pre-existing hazardous wastes within the project area and identifies appropriate mitigation measures.

Some of the existing overpasses for roadways and railroad within the project area appear to have been constructed in the 1950s; therefore, they could be a potential source for asbestos-containing materials and lead-based paint. Within the proposed right-of-way of both corridor alternatives, there are buildings and structures that may also contain asbestos-containing materials and lead-based paint.

Quality of groundwater in the project area would be determined through additional consultation with the Regional Water Quality Control Board and detailed research of studies of nearby hazardous wastes sites where groundwater has been impacted.

The degree of hazard associated with these impacts on human or environmental receptors would depend upon the chemical properties, concentrations, or volumes of contaminants; the nature and duration of construction activities; and contaminant migration pathways. The largest potential exposure risk is to the construction workers.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative is expected to result in similar environmental impacts as identified above for the Tier I Corridor Alternatives, except that there are no known quality issues associated with groundwater in the Tier II Auxiliary Lane Alternative as neither identified recognized environmental condition was documented to affect groundwater.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

The following measures will be implemented during the construction phase for the Tier II Auxiliary Lane Alternative and are anticipated to be required for future tiered construction projects under either of the Tier I Corridor Alternatives:

1. The construction contractor will prepare a Worker Health and Safety Plan for use during construction. The Worker Health and Safety Plan will address any hazardous materials handling during construction activities pursuant to Title 8 of the California

Code of Regulations regarding workers' safety and the use of protective equipment during excavation, moving, or handling of contaminated soil or water. The Worker Health and Safety Plan will establish measures to avoid or minimize potential worker and public exposure to airborne contaminant migration by incorporating dust suppression techniques in construction procedures. The plan will also address avoidance and minimization of worker and environmental exposure to contaminant migration via surface water runoff pathways by implementation of comprehensive measure to control drainage from excavations. In addition, the Worker Health and Safety Plan will address handling, storage, and disposal of any hazardous materials used in the construction process. Because construction workers are in the closest proximity to potential hazards, a plan that avoids impacts to construction workers will provide adequate protection for surrounding residents, workers, and the traveling public.

2. Advanced consultation with representatives of the Soquel Creek Water District, Santa Cruz Environmental Health Department, and Central Coast Regional Water Quality Control Board will be carried out if any dewatering is to be performed during project construction activities. This consultation will be helpful in determining the degree of water treatment and water disposal options during dewatering activities, as well as groundwater investigation/sampling requirements prior to dewatering activities.
3. Paint exceeding hazardous waste criteria under *California Code of Regulations* Title 22 will require disposal in a Class I disposal site. Paint used for lane striping of the existing roadway will be tested for lead-based paint prior to removal to determine proper disposal methods.
4. Wooden poles within the project footprint would be properly managed if removed and disposed of.
5. If soil, groundwater or other environmental medium with suspected contamination is encountered unexpectedly during construction activities (e.g., identified by odor or visual staining, or if any underground storage tanks, abandoned drums or other hazardous materials or wastes are encountered), work shall cease in the vicinity of the suspect material, the area shall be secured as necessary, and all appropriate measures shall be taken to protect human health and the environment. Appropriate measures shall include notification of regulatory agency(ies) and compliance with the various regulatory agencies' laws, regulations and policies.
6. Soil generated by construction activities shall be stockpiled onsite in a secure and safe manner. All contaminated soils determined to be hazardous or non-hazardous waste shall be adequately profiled (sampled and analyzed) prior to acceptable reuse or disposal at an appropriate off-site facility. Specific sampling and handling and transport procedures for reuse or disposal shall be in accordance with applicable

local, state and federal agencies laws, in particular, the Regional Water Quality Control Board, the Department of Toxic Substances Control, and County of Santa Cruz Environmental Health Services. Groundwater pumped from the subsurface shall be contained onsite in a secure and safe manner, prior to treatment and disposal, to ensure environmental and health issues are resolved pursuant to applicable local, state and federal laws, regulations and policies. Material from structures that are removed or modified by the project will be handled and disposed of in accordance with all local, state, and federal requirements.

2.4.10 Biological Resources

Affected Environment

This section focuses on the impacts to biological resources in that project vicinity that could result during the project construction phase under each build alternative. Potential impacts and associated impact avoidance, minimization, and mitigation measures that would result from implementation and operation of the proposed project are described in Section 2.3, Biological Environment.

Environmental Consequences

Natural Communities

Permanent, adverse effects on natural communities would result from constructing either of the Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative as described in Section 2.3.1.

Wetlands and Other Waters of the United States

Tier I Corridor Alternatives

As described in Section 2.3.2, the Tier I Corridor HOV Lane Alternative has the potential to temporarily affect 0.22 acre of United States Army Corps of Engineers wetlands, 0.10 acre of United States Army Corps of Engineers other waters of the United States, 0.46 acre of California Coastal Commission jurisdictional areas, and 1.41 acres of California Department of Fish and Wildlife jurisdictional areas during construction.

The Tier I Corridor TSM Alternative has the potential to temporarily affect 0.03 acre of United States Army Corps of Engineers wetlands, 0.02 acre of United States Army Corps of Engineers other waters of the United States, 0.33 acre of California Coastal Commission jurisdictional areas, and 0.95 acre of California Department of Fish and Wildlife jurisdictional areas during construction.

Tier II Auxiliary Lane Alternative

Construction of the Tier II Auxiliary Lane Alternative would not disturb United States Army Corps of Engineers jurisdictional wetlands in Rodeo Creek Gulch; however, temporary impacts would likely affect 0.06 acre of other waters of the United States and 0.15 acre of California Department of Fish and Wildlife jurisdictional areas during construction.

Plant Species

Tier I Corridor Alternatives

Three special-status plant species were observed within the Biological Study Area during the field surveys: Anderson’s manzanita, Pajaro manzanita, and Monterey pine. However, the area in which Anderson’s manzanita and Pajaro manzanita were observed is well outside the area of direct project impact within the Biological Study Area, and this area is very unlikely to be affected by project-related activities. The observed Monterey pines are not a native population and are not considered sensitive. Due to the long project timeframe, and despite the primarily urban or disturbed conditions present, other special-status species could become established before project construction. Additional surveys to determine the presence or absence of special status plant species will be required as part of the technical studies to be prepared for additional Tier II projects.

Tier II Auxiliary Lane Alternative

None of the special-status plant species listed in Table 2.3.3-1 was observed within the Tier II Auxiliary Lane Alternative project area, and additional occurrences would be considered rare to unlikely given the disturbance associated with potential habitat throughout most of the project area; therefore, the proposed Tier II Auxiliary Lane Alternative is not likely to adversely affect any special-status plants. However, due to the long project timeframe, and despite the primarily urban or disturbed conditions present, there is a potential that other special-status species could become established before project construction. Additional surveys to determine the presence or absence of special status plant species will be conducted prior to the preparation of the final Environmental Impact Report/Environmental Assessment.

Animal Species

Tier I Corridor Alternatives

The Tier I Corridor HOV Lane Alternative could affect the following special-status species: foothill yellow-legged frog, California red-legged frog, Santa Cruz long-toed salamander, California tiger salamander, western pond turtle, tidewater goby, central California coast steelhead, monarch butterfly, California linderiella, Cooper’s hawk, tricolored blackbird, great blue heron, short-eared owl, burrowing owl, white-tailed kite, least Bell’s vireo, pallid bat, hoary bat, roosting bats, badger, and nesting birds.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative has the potential to affect the California red-legged frog and tidewater goby, discussed further in the Threatened and Endangered Species section below. The Tier II Auxiliary Lane Alternative could also affect nesting birds, foothill yellow-legged frog, western pond turtle, and roosting bats.

Threatened and Endangered Species

Tier I Corridor Alternatives

The Tier I Corridor HOV Lane Alternative could affect the following threatened and endangered species: tidewater goby, central California coast steelhead, California tiger salamander, Santa Cruz long-toed salamander, California red-legged frog, white-tailed kite, least Bell's vireo, marsh sandwort, Monterey spineflower, robust spineflower, seaside bird's beak, San Francisco popcorn flower, and Santa Cruz tarplant.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative could affect the following threatened and endangered species: California red-legged frog and the tidewater goby. Construction activities have the potential to encroach upon suitable habitat, interrupt passage, or result in direct take of California red-legged frog and tidewater goby.

Nesting Birds

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

The removal of vegetation and/or the removal of nests could directly affect nests and any eggs or young residing in nests of birds protected under the Migratory Bird Treaty Act. Because birds can be sensitive to noise disturbance, indirect impacts could also result from noise and disturbance associated with construction, which could alter perching, foraging, and/or nesting behaviors.

Avoidance, Minimization, and/or Mitigation Measures

General Measures

General avoidance, minimization, and/or mitigation measures are identified in Section 2.3.1, Avoidance, Minimization, and/or Mitigation Measures.

Natural Communities

The measures described in Section 2.3.1, Avoidance, Minimization, and/or Mitigation Measures, will address construction phase impacts to natural communities for the Tier II Auxiliary Lane Alternative and are anticipated to apply to future tiered projects under either of the Tier I Corridor Alternatives.

Wetlands and Other Waters

The measures described in Section 2.3.2, Avoidance, Minimization, and/or Mitigation Measures, will address construction phase impacts to wetlands and other waters for the Tier II Auxiliary Lane Alternative and are anticipated to apply to future tiered projects under either of the Tier I Corridor Alternatives.

Special-Status Plant Species

The measures described in Section 2.3.3, Avoidance, Minimization, and/or Mitigation Measures, will address construction phase impacts to special-status plant species for the Tier II Auxiliary Lane Alternative and are anticipated to apply to future tiered projects under either of the Tier I Corridor Alternatives.

Special-Status Wildlife Species

The measures described in Section 2.3.4, Avoidance, Minimization, and/or Mitigation Measures, will address construction phase impacts to special-status wildlife species for the future tiered projects under either of the Tier I Corridor Alternatives.

Tier II Auxiliary Lane Alternative

The measures described in Section 2.3.4, Avoidance, Minimization, and/or Mitigation Measures, will address construction phase impacts to special-status wildlife species for the Tier II Auxiliary Lane Alternative.

Threatened and Endangered Species

Tier I Corridor Alternatives

The measures outlined in Section 2.3.1, Avoidance, Minimization, and/or Mitigation Measures, will avoid or minimize temporary effects on threatened and endangered species habitats. The measures described in Section 2.3.5, Avoidance, Minimization, and/or Mitigation Measures, include species-specific measures for protection of threatened and endangered species, including tidewater goby, central California coast steelhead, California red-legged frog, Santa Cruz long-toed salamander, and California tiger salamander. These measures would apply to future tiered projects under the Tier I Corridor Alternatives.

Tier II Auxiliary Lane Alternative

The measures outlined in Section 2.3.1, Avoidance, Minimization, and/or Mitigation Measures, will avoid or minimize temporary effects on threatened and endangered species habitats. The measures described in Section 2.3.5, Avoidance, Minimization, and/or Mitigation Measures, that are specific to the protection of tidewater goby and California red-legged frog will apply to the Tier II Auxiliary Lane Alternative.

Nesting Birds

The measures described in Section 2.3.6, Avoidance, Minimization, and/or Mitigation Measures, will address construction phase impacts to nesting birds for the Tier II Auxiliary Lane Alternative and are anticipated to apply to future tiered projects under either of the Tier I Corridor Alternatives.

Invasive Species

The measures described in Section 2.3.7, Avoidance, Minimization, and/or Mitigation Measures, will address construction phase impacts to invasive species for the Tier II Auxiliary Lane Alternative and are anticipated to apply to future tiered projects under either of the Tier I Corridor Alternatives.

2.4.11 Visual/Aesthetics

Regulatory Setting

The existing conditions and permanent impacts are described in Section 2.1.6, Visual/Aesthetics.

Environmental Consequences

Tier I Corridor Alternatives

Short-term impacts of the Tier I Corridor Alternatives include the visual presence of construction equipment, temporary roadside barriers, and construction signage. As part of the work, much of the existing mature vegetation within the right-of-way will be removed. Some vegetation would be replanted as part of the project mitigation where suitable land exists per Caltrans setback requirements. New plantings can be expected to become established in their new location within a 1- to 3-year time frame. During this time, new top growth to the leaves and branches will be less while the plants put on more root growth. After establishment, the new plantings should start to achieve their standard growth rates for their species. The new tree plantings will take decades to achieve a mature size, depending on the individual species.

The removal of vegetation within the corridor would negatively affect views for travelers on the highway, as well as community members adjacent to the corridor, if mitigation measures are not employed. Vegetation within the existing interchanges and along the outside edges of the highway will likely be removed by construction activities under both of the Tier I Corridor Alternatives. In some instances, there will not be adequate space for new plantings, while other locations will have reduced landscape areas.

For the Tier I Corridor HOV Lane Alternative, approximately 109 acres of vegetated area will be disturbed by construction activities. Most noticeable will be the removal of mature vegetation and skyline trees. Of the area cleared, a total of approximately 65 acres would be available for replanting. Impacts to the existing landscaping under the Tier I Corridor TSM

Alternative would total approximately 61 acres of disturbed landscaping, with approximately 23 acres of that available for replanting.

Tier II Auxiliary Lane Alternative

Approximately 9.3 acres of existing vegetation within the highway corridor would be removed by construction activities. Of these, approximately 3 acres are available for replanting; however, it could be many years before the vegetation would reach the size of the existing.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives

The adoption of a Tier I Corridor Alternative would not result in roadway construction. The avoidance, minimization, and mitigation measures shown below for the Tier II Auxiliary Lane Alternative could potentially apply to the Tier I Corridor Alternatives based on the preceding impact analysis. The project impacts and resulting avoidance, minimization, and mitigation measures will be revisited after a Tier I Corridor Alternative is selected and segments of the corridor become Tier II construction-level projects, subject to separate environmental review.

Tier II Auxiliary Lane Alternative

Of the avoidance and minimization measures outlined in the Visual Impact Assessment (Section 7.2, Tier II Visual Mitigation), the following apply to the construction phase of the Tier II Auxiliary Lane Alternative. See the full report for a more in-depth description of the anticipated effort involved with the various measures.

1. The project will be designed to protect as much existing vegetation as feasible, especially eucalyptus and other skyline trees.
2. Disturbed areas will be revegetated to the greatest extent feasible.
3. The landscaping and revegetation for the project will include a 3-year plant establishment period to ensure adequate revegetation of the areas affected by the project.

2.4.12 Hydrology and Floodplain

Regulatory Setting

The existing conditions and permanent impacts are described in Section 2.2.1, Hydrology and Floodplain.

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

Construction activities under the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative could result in temporary changes in water volume or flow and increased siltation, sedimentation, erosion, and water turbidity from bankside activities and construction access.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

The following standard impact avoidance and minimization measures would be implemented during construction of the Tier II Auxiliary Lane Alternative and are also expected to be implemented under future tiered projects as part of either of the Tier I Corridor Alternatives:

1. Preparation and implementation of a Storm Water Pollution Prevention Plan during project construction that identifies all onsite drainage facilities, placement of appropriate stormwater and non-stormwater pollution controls, erosion and sediment control, spill response and containment plans, inspection scheduling, maintenance, and training of construction personnel.

2.4.13 Water Quality and Stormwater Runoff

Regulatory Setting

The existing conditions and permanent impacts are described in Section 2.2.2, Water Quality and Stormwater Runoff.

Environmental Consequences

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

Stormwater

During construction of the Tier II Auxiliary Lane Alternative and future tiered projects under either of the Tier I Corridor Alternatives, there is a 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 Best Management Practices are not properly implemented.

Generally, as the Disturbed Soil Areas increase, the potential for temporary water quality impacts also increases. The Tier I Corridor TSM Alternative has an estimated total Disturbed Soil Area of 101acres, considering the comprehensive project footprint, and the Tier I Corridor HOV Lane Alternative similarly has an estimate of 250 acres of Disturbed Soil Area. Based on these preliminary calculated areas, the Tier I Corridor HOV Lane Alternative would have potentially more water quality impacts during construction than the Tier I Corridor TSM Alternative. Fueling or maintenance of construction vehicles will occur within the project site during construction; therefore, there is a 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.

Groundwater

Construction of the Tier II Auxiliary Lane Alternative and future tiered projects under either of the Tier I Corridor Alternatives would not involve substantial excavations that would affect groundwater resources. Excavation work would mostly consist of roadbed construction for the new auxiliary or HOV lanes. New footings are proposed for the widening or reconstruction of bridges, and dewatering may be needed for improvements in perennial creeks or at locations with high groundwater. Based on United States Geological Survey Topography Maps, there are four perennial streams: Soquel Creek, Rodeo Creek Gulch, Aptos Creek, and Valencia Creek.

Water Resources

During construction of the Tier II Auxiliary Lane Alternative and future tiered projects under either of the Tier I Corridor Alternatives, there is a potential for temporary water quality impacts to jurisdictional biotic/aquatic (wetland) areas and waters of the United States or state. Potential temporary impacts can occur to United States Army Corps of Engineers, California Department of Fish and Wildlife, or California Coastal Commission jurisdictional biotic/aquatic (wetland) areas associated with creeks and drainages that cross or are adjacent to the project area by changing the water's chemical and biological compositions. These temporary impacts can result from temporary stream diversion installation and removal, streambed disturbance during culvert removal and replacement, vegetation removal, and road construction (Morro Group Inc., 2004). The Tier I Corridor HOV Lane Alternative would have potentially more water quality impacts during construction than the Tier I Corridor TSM Alternative due to the proposed larger area of impacts. The Tier II Auxiliary Lane Alternative would have fewer impacts due to the smaller area of impact and fewer local waterways. Temporary water quality impacts due to grading activities will be addressed with Construction Site Best Management Practices.

Avoidance, Minimization, and/or Mitigation Measures

Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative

The following standard impact minimization measures would be implemented during construction of the Tier II Auxiliary Lane Alternative and are also expected to be implemented under future tiered projects as part of either of the Tier I Corridor Alternatives.

1. The Caltrans National Pollutant Discharge Elimination System Permit and Construction General Permit require Best Management Practices to be incorporated into the project contract documents to reduce the discharge of pollutants, stormwater impacts and water quality degradation during construction.

2. The United States Army Corps of Engineers, National Oceanic and Atmospheric Administration Fisheries Service, United States Fish and Wildlife Service, California Department of Fish and Wildlife, and Regional Water Quality Control Board may require additional measures to avoid, minimize, or compensate for impacts to waterways during construction as part of their permit approval processes.

Temporary impacts to water quality would be minimized by implementing standard Best Management Practices as recommended in the Caltrans Statewide Storm Water Management Plan, which would include the following elements:

1. Minimum construction control measures, such as limiting access routes, stabilization of devegetated areas, and using sediment controls and filtration.
2. Erosion and sediment control, including soil stabilization, measures to prevent a net increase in sediment load in stormwater, and controls to reduce tracking sediment onto roads and erosion.
3. Non-stormwater management will include provisions to reduce and control discharges other than stormwater.
4. Post-construction stormwater management will include measures for ongoing (permanent) protection for water resources.
5. Waste management and disposal will address equipment maintenance waste, used oil and batteries, etc. All waste must be disposed of as required by state and federal law.
6. Maintenance, inspection and repair, and monitoring measures require an ongoing program to ensure that all controls are in place and operating as designed.
7. RTC will prepare and submit an annual report on the construction project to the Regional Water Quality Control Board, which must certify compliance with the Storm Water Pollution Prevention Plan.

2.4.14 No Build Alternative

The No Build Alternative assumes that there would be no major construction on Route 1 through the project limits other than the improvements currently planned, programmed improvements, and continued routine maintenance (described in Section 1.5.4). These projects would be subject to individual environmental review, and construction impacts would be analyzed, as necessary; therefore, the No Build Alternative would not result in an adverse impact related to construction.

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2.5 Cumulative Impacts

2.5.1 Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of the proposed project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, and disruption of migration corridors, changes in water quality, and introduction or promotion of predators. They can also contribute to potential community impacts identified for the project, such as changes in community character, traffic patterns, housing availability, and employment.

The California Environmental Quality Act Guidelines, Section 15130, describes when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts, under the California Environmental Quality Act, can be found in Section 15355 of the California Environmental Quality Act Guidelines. A definition of cumulative impacts, under the National Environmental Policy Act, can be found in 40 *Code of Federal Regulations* Section 1508.7 of the Council on Environmental Quality Regulations

2.5.2 Approach and Methodology

The Tier I corridor analysis presented in Chapter 2 identifies the range of environmental impacts that would result from implementation of either of the Tier I Corridor Alternatives within the entire 8.9-mile corridor at a program level. If one of the Tier I Corridor Alternatives is selected, the project would be constructed in phases as funding is made available. The analysis of Tier I Corridor Alternatives cumulative impacts presents a ‘snapshot’ of information currently available at the corridor level. Because the Tier I corridor improvements would be constructed over a multi-year time frame, potential cumulative impacts, as well as other resource impacts, could change over time. As projects are programmed as Tier II construction-level projects, they will be subject to separate environmental review, including the consideration of cumulative impacts.

The discussion of the Tier II Auxiliary Lane Alternative is provided at the project level because implementation is expected to occur in the near future.

In a cumulative impacts analysis, the identification of "past, present, and reasonably foreseeable future actions can utilize either the "list approach" or the "projection approach." The list approach identifies specific projects in the vicinity, typically provided by a local planning department. The "projection approach" or adopted plan approach relies on current general plans, transportation plans, or other planning documents, which by definition account for cumulative growth in a defined area.

For this analysis, the "projection" approach was utilized for the assessment of cumulative traffic and air quality impacts. As an example, the Monterey Air Year 2030 Association of Monterey Bay Area Governments Regional Travel Demand Model was used to project future build and no build conditions and is based on planned regional growth, as contained in adopted general plans. The model also accounts for planned growth in adjacent areas. For all other resource areas discussed, the "list approach" is used and takes into consideration those projects in Table 2.5-1.

Cumulative impact analysis was undertaken by following guidance in the Caltrans Standard Environmental Reference and the Federal Highway Administration Interim Guidance: Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process (2003). As specified in the aforementioned guidance, if the proposed project would not result in a direct or indirect impact to a resource, it would not contribute to a cumulative impact on that resource.

2.5.3 Affected Environment

Past, present, and reasonably foreseeable projects considered for this cumulative impact analysis are listed in Table 2.5-1. These include infrastructure projects in or adjacent to the project corridor, as well as private developments within the Tier I Corridor project vicinity. Of the projects listed in Table 2.5-1, the following are active projects located within the Tier II Auxiliary Lane Alternative vicinity and that could have overlapping construction periods with the Tier II Auxiliary Lane Alternative project:

- Nigh Property (5940 Soquel Avenue)
- The Farm Neighborhood Park and Community Center
- Intelligent Transportation System on Route 1

Table 2.5-1: Projects Considered for Cumulative Impacts

Project	Description	Status / Construction Dates
Active and Planned Projects		
St. Stephen's Senior Housing	Development of up of 40 units of affordable housing for seniors, located on vacant lands on the site of St. Stephen's Church off of Soquel Avenue.	Permit application pending.
Hyatt Place Hotel	A development for a 111-room hotel property to be constructed at 407 Broadway, Santa Cruz, CA 95060, approximately 1 mile from Route 1.	Pending permit application.
Erlach Site on Cunnison Lane—MidPen Housing Project	Development of a 102-unit affordable housing project at 3250 – 3420 Cunnison Lane, Soquel, CA 95073, approximately 0.35 mile from Route 1.	Permit approved - project on hold.
Nigh Property, Soquel*	A proposed 100-unit residential development to be constructed at 5940 Soquel Avenue, Soquel, CA 95073, approximately 0.33-mile from Route 1.	Permit application pending.
The Farm Neighborhood Park and Community Center*	A development of a 2-story community center, 39 units of housing, 0.75 mile of meandering pathways, a skate feature, 1/2 basketball court, children's play structures, a bocce ball court, nature interpretive signage, a pedestrian bridge, a dog enclosure, community and heritage gardens, oak woodland habitat restoration, turf and picnic areas, landscaping, a restroom, and parking areas. Located at 3120 Cunnison Lane, Soquel, CA 95073, approximately 0.5 mile from Route 1.	Permit application has been submitted.
Pacific Station	The current conceptual plan is for a 5-story, mixed-use, transit-oriented development with the expanded Metro center on the ground floor, along with limited commercial uses; parking on the second floor; and affordable housing with limited office space on the remaining 3 floors, approximately 1 mile from Route 1.	In planning phase.
Heart of Soquel - Soquel Creek Linear Park and Parking Improvements	A potential development of community facility projects, such as pedestrian and vehicular safety and circulation improvements, environmental enhancement, and facility improvements for potential event hosting activities located at Soquel Drive and Porter Street, Soquel, CA 95073, approximately 0.32 mile from Route 1.	Unknown
Metrobase	A development that would consolidate all of METRO's Operations, Administration, Fueling, Maintenance, and ParaCruz facilities in the Harvey West area of Santa Cruz, to be constructed near the end of State Highway 9, at the intersection of River Street and Route 1.	Under construction
Rio Del Mar Boulevard Improvements	Improvements of roadways and roadsides on Rio del Mar Boulevard from Esplanade to Route 1, which includes the addition of bike lanes, transit turnouts, left-turn pockets, merge lanes, and intersection improvements. Roadwork includes major rehabilitation and maintenance of road and roadsides.	Under construction.

Table 2.5-1: Projects Considered for Cumulative Impacts

Project	Description	Status / Construction Dates
Deploy Intelligent Transportation System on Route 1*	Deployment of Intelligent Transportation System technologies on Route 1, which would include closed-circuit television cameras, vehicle detection devices, and signage.	Under construction.
Route 1 San Lorenzo Bridge Widening	Widen the Route 1 San Lorenzo River Bridge to improve flow from Route 17 through the Junction of 1/9.	Planning phase
Route 1/9 Intersection Improvements	Intersection of Route 1 and Highway 9, City of Santa Cruz	Planning phase
Route 1/Harkins Slough Road Interchange	Route 1 at Harkins Slough Road, City of Watsonville	Planning phase
Bicycle and Pedestrian (Class I)	Construction on Route 1 at Morrissey Boulevard	Under construction
Santa Cruz Branch Line	RTC recently acquired the 31-mile freight rail corridor between Davenport and the Watsonville/Pajaro Junction to be developed into a transit, bike, and pedestrian corridor.	Planning and feasibility studies underway.
Recent, Past Projects		
Canterbury Park – Aptos	A development of 19 new 2-, 3-, and 4-bedroom townhomes located at Canterbury Drive and Sea Ridge Road. The townhomes are priced to be affordable to moderate-income families.	Completed 2013
Aptos Blue	Development of a 40-unit complex for low-income individuals. Located on part of the original Aptos Ranch.	Completed 2013.
350 Ocean Street	A mixed-use project including 82 residential condominiums, 8,900 square feet of retail commercial space, and a 7,500-square foot gymnasium and spa, located at 350 Ocean Street, Santa Cruz, CA 95060, approximately 0.98 mile from Route 1.	Completed 2014.
Highway 1 Soquel/ Morrissey Auxiliary Lanes Project	Construction of auxiliary lanes between the Soquel Avenue–Soquel Drive and Morrissey Boulevard interchanges. Also includes replacement of the Route 1/La Fonda Avenue overcrossing.	Completed 2013.
Silvercrest Apartments Rehabilitation – Capitola	Rehabilitation of the existing structure, which includes 96 units for seniors, located at 750 Bay Avenue.	Completed 2013.
Redwood Commons*	A development of 36 single-room occupancy residential units to be constructed at 1606 Soquel Avenue, Santa Cruz, CA 95062, approximately 0.47 mile from Route 1.	Completed 2012.
Tannery Arts Center	The project, which is located approximately 0.3 mile from Route 1, includes three phases: • The Tannery Artist Lofts, 100 units of affordable housing for artists (completed) • The Digital Media and Creative Arts Center, which	In operation.

Table 2.5-1: Projects Considered for Cumulative Impacts

Project	Description	Status / Construction Dates
	includes the rehabilitation of the historic buildings on the property to be used as studio space for artists (under construction) • The Performing Arts Center (fundraising stage)	
National Marine Fisheries Visitor Center	The visitor center provides the Marine Sanctuary Program and the State of California with a marine education facility just steps from the Pacific Ocean, approximately 1 mile from Route 1.	In operation. Completed 2012.

Source: Santa Cruz County Redevelopment Agency, September 2011; City of Santa Cruz Planning and Community Development Department, February 2008, March 2011, March 2013, August 2014. City of Santa Cruz Economic Development Department, March 2013, August 2014.

* Project located within the Tier II Study Area.

The following sources were consulted to identify all projects to be considered in cumulative impact analysis:

- Governor's Office of Planning and Research Office database of environmental documents, *available at* http://www.ceqanet.ca.gov/
- Caltrans District 5, Project Information page, *available at* http://www.dot.ca.gov/dist05/projects/#scr
- 2010 Santa Cruz County Regional Transportation Plan, *available at* http://sccrtc.org/funding-planning/long-range-plans/past-rtps/
- RTC's Web site, *available at* http://www.sccrtc.org
- The City of Santa Cruz Web site, Planning and Community Development page, *available at* http://www.ci.santa-cruz.ca.us/pl
- The City of Santa Cruz Web site, Economic Development Department page, *available at* http://www.cityofsantacruz.com/index.aspx?page=452
- Santa Cruz County Redevelopment Agency Web site, *available at* http://sccounty01.co.santa-cruz.ca.us/red/currentprojects.html
- Santa Cruz County Department of Public Works Web site, *available at* http://www.dpw.co.santa-cruz.ca.us/roaddesign.htm
- City of Santa Cruz, Department of Public Works Web site, *available at* http://www.cityofsantacruz.com/index.aspx?page=96
- Santa Cruz Metropolitan Transit District Web site, *available at* http://www.scmtd.com/

2.5.4 Environmental Consequences

The following environmental resource areas would not be substantially affected by the proposed Tier I and II projects; therefore, they would not be subject to cumulative impacts based on consideration of the nature of the proposed project, the project setting, the impact analysis findings presented in Chapter 2, and the characteristics of other past, present, and reasonably foreseeable projects within the project vicinity. These environmental areas include:

- Land Use – As discussed in Section 2.1.1, the Tier I and Tier II projects would result in conversion of some commercial and residential property to transportation use due to sliver right-of-way acquisitions from commercial properties paralleling the highway and highway interchanges. In the case of the Tier I Corridor HOV Lane Alternative, there would be approximately 12 business displacements and eight residential displacements. This land use conversion represents a relatively minor change in land use relative to the entire area and would not alter land use patterns and would not occur in an area with a shortage of commercial or residential property. In consideration of other past, present, and foreseeable projects, this land use conversion impact remains unsubstantial and would not contribute to cumulatively considerable land use impacts.
- Growth – As discussed in Section 2.1.2, the Tier I Corridor Alternatives, encompassing the Tier II Auxiliary Lane Alternative, would not stimulate unplanned residential or commercial growth. Project-related growth is not reasonably foreseeable for the Route 1 corridor, and cumulative growth impacts would not result from project implementation.
- Utilities/Emergency Services – As discussed in Section 2.1.4, construction of the Tier I and Tier II projects would involve utility relocations; however, these would be handled through standard practice that minimizes service disruptions. Operation of the Tier I and Tier II projects would not affect utility demand and service. Emergency services would benefit from operation of both the Tier I and Tier II projects. The Tier I and Tier II projects would not contribute to cumulatively considerable impacts.
- Energy – As discussed in Section 2.2.8, the Tier I and Tier II projects would have a neutral or beneficial effect on energy consumption that would not be cumulatively considerable.
- Cultural Resources –The Tier I and Tier II Corridor Alternatives would not adversely affect historic resources within the architectural Area of Potential Effects, and implementation of mitigation measures presented in Section 2.1.7 would avoid or minimize potential impacts to unevaluated archaeological sites; therefore, the project would not result in substantial impacts that would be cumulatively considerable.
- Geology/Soils/Seismic/Topography – The proposed Tier I and Tier II projects are located in a seismically active area of California with the potential for strong ground shaking during a major earthquake. Like all active and planned projects, the proposed Tier I and Tier II projects would be designed to meet current seismic safety standards, allowing them to withstand the maximum credible earthquake; therefore, there would be no cumulative impacts related to geologic or seismicity. .

- Hazardous Materials – The Recognized Environmental Conditions identified in Section 2.2.5 would involve localized impacts that would be avoided or mitigated under the proposed Tier II Auxiliary Lane Alternative and future projects under the Tier I Corridor Alternatives. No cumulative impacts due to the release of hazardous materials or other environmental risks are anticipated.
- Air Quality – The Tier I and Tier II corridor projects would result in a beneficial effect for most criteria pollutants, and small increases in several criteria pollutants; however, these are not considered substantial. The project would not result in cumulatively considerable impacts to regional emissions.

The environmental resource areas discussed in the following subsections could have the potential to cause cumulative impacts based on consideration of the nature of the proposed project, the project setting, and the impact analysis findings presented in Chapter 2. The characteristics of other past, present, and reasonably foreseeable projects within the project vicinity are considered, as presented below.

Paleontology

For paleontology, the Resource Study Area encompasses the project footprint within the project limits. The proposed Tier I and Tier II projects are located in areas where there is high potential for paleontological resources. If the project were to encounter paleontological resources during construction, the potential cumulative effect could be high, particularly because many past construction projects in the area have not included mitigation for impacts to paleontological resources. However, with the mitigation described in Section 2.4.8, the impacts would be reduced and would not add to the cumulative effect of the proposed Tier II Auxiliary Lane Alternative and future construction projects. Because of the mitigation measures proposed for this project, there would be no substantial cumulatively considerable impacts to paleontological resources.

Hydrology and Floodplain

Portions of the Tier I and Tier II project footprints are located within the 100-year floodplain. The Resource Study Area is defined as those project locations within the floodplain. Mitigation conceptually identified for the Tier I Corridor Alternatives, and required mitigation measures identified for the Tier II Auxiliary Lane Alternative would result in a negligible increased risk associated with the probability of flooding attributable to an encroachment for the Tier II Auxiliary Lane Alternative and for the Tier I Corridor Alternatives.

The Tier I Corridor Alternatives would not pose a substantial risk by increasing impervious surface area in the Highway 1 corridor. The increase in roadway runoff would be minimal under each alternative in comparison to the overall watersheds (i.e., less than 0.89 percent) at each crossing; therefore, there would be a minor change in the water surface elevation to the five identified floodplain areas due to the widening proposed for both of the Tier I Corridor Alternatives. Floodplain effects due to past, active, and planned projects in combination with the proposed Tier I and Tier II Corridor Alternatives would not result in cumulatively considerable impacts to floodplains and hydrology.

Water Quality and Storm Runoff

The Resource Study Area for water quality is defined as the wastersheds located within the project area. The proposed Tier I Corridor Alternatives and the Tier II Auxiliary Lane Alternative would increase impervious areas; therefore, they would potentially increase the volume and velocity of stormwater flow to downstream receiving water bodies. Pollutant loading can also be increased with increased impervious area and velocity of storm flows.

At present, there are no existing treatment Best Management Practices along Highway 1 within the Tier I project limits to treat roadway runoff; the Tier I and Tier II Corridor Alternatives would incorporate treatment Best Management Practices and would be designed to maintain preconstruction stormwater discharge flows, which would avoid substantial, adverse effects on water quality. The adjacent Highway 1 – Soquel/Morrissey Auxiliary Lanes Project, completed December 2013, includes the measures described above. Therefore, implementation of the Highway 1 Soquel/ Morrissey Auxiliary Lanes Project in concert with the Tier II Auxiliary Lane Alternative and subsequent Tier II projects would cumulatively benefit water quality and storm runoff in watersheds traversed by Highway 1.

Traffic

For traffic, the Resource Study Area was defined as the area within the project limits, as well as the surrounding area where the project would result in measurable changes in traffic patterns. Thus, the Resource Study Area includes the freeway segments, arterial streets, and intersections identified in Section 2.1.5, Figure 2.1.5-2.

Past development has resulted in increased traffic on Route 1 and in the project area as a whole, and although anticipated development is projected to be moderate, future increases in traffic are projected to occur. Traffic forecasts that were prepared for year 2035 for this project take into account traffic from future developments that were included in the approved general plans for the cities of Santa Cruz and Capitola, and for Santa Cruz County. The forecasts also account for planned growth within Association of Monterey Bay Area Governments planning boundaries and include planned improvements to the transportation network.

As described in Section 2.1.5, the facilities to be constructed by selection of the Tier I and Tier II build alternatives would improve traffic operations and improve travel times.

Implementation of the Tier I and Tier II build projects would not result in an adverse cumulative traffic impact because the project's overall traffic effect would be beneficial.

Biology

For biological resources, the Resource Study Area encompasses the project footprint and those adjacent lands where an indirect effect could occur. Historically, development in the Santa Cruz area has resulted in a substantial loss of valuable ecological habitats, including: wetlands, oak woodlands, riparian, and aquatic habitat. The loss of these and other habitats has directly affected many plant and animal species, resulting in direct threats to the continued existence of many species.

All of these factors led to the enactment of various statutes, regulations, and policies whose goals are to halt, and in many cases reverse, this trend. These include the Federal Endangered Species Act, the California Endangered Species Act, the Clean Water Act, the Porter-Cologne Water Quality Control Act, the National Environmental Policy Act, and the California Environmental Quality Act. These statutes require private and public projects to include measures that avoid and/or fully mitigate for impacts to sensitive habitats and the special-status species that are found within them.

In the case of the proposed Tier I and Tier II build alternatives, although they would result in impacts to various habitats and special-status animal species, any contribution to cumulative impacts is anticipated to be minimal because impacts to these resources will be addressed by the mitigation, minimization, and avoidance measures identified in Section 2.3, Biological Environment. Specifically, all loss of sensitive habitats and impact to special-status species resulting from the proposed highway improvements would be fully mitigated by the creation of replacement habitats and measures to protect subject species.

Noise

For noise, the Resource Study Area was defined as the project corridor and immediately adjacent land uses. As discussed in Section 2.2.7, the primary source of noise in the project area is traffic on Route 1.The roadway widening that would occur under the Tier I and Tier II build alternatives would result in increased noise levels at some locations adjacent to Route 1 due to moving vehicular traffic closer to residences and businesses. Table 2.5-1 includes foreseeable projects, given that the closest project is located 0.3 mile from the project corridor, a cumulative noise impact associated with the Tier I and Tier II build alternatives is not anticipated. As previously discussed, future Tier II projects will undergo separate environmental review, including consideration on noise impacts

Visual Resources

For visual impacts, the Resource Study Area is the entire project corridor and the project limits of the adjoining Highway 1 Soquel/Morrissey Auxiliary Lanes Project to the west. Key viewpoints were chosen to help evaluate the project's visual impact as experienced by viewers at various locations in the vicinity of Route 1. These viewpoints are representative of the visual environment experienced by a cross section of drivers and residents viewing the roadway adjacent from the project. As discussed in Section 2.1.6, changes to the visual setting due to the proposed project would occur.

Both of the Tier I Corridor Alternatives have the potential to result in substantial impacts to the Route 1 Corridor, due to the loss of vegetation, removal of mature trees, and the addition of walls and other hardscape elements. Those past, present, and other foreseeable projects, in combination with the proposed Tier I Corridor Alternatives, could eventually affect the official Scenic Highway designation for the portion of Route 1 within the resource study area, as well as the scenic character of the immediate area. The aforementioned visual changes that would occur if either of the Tier I build alternatives were fully implemented would introduce features that, although not currently present within the project corridor, in combination with the visual changes that occurred from the Highway 1 Soquel/Morrissey Auxiliary Lanes Project, would result in a cumulative impact characteristic of other highways. The Tier II Auxiliary Lane Alternative would introduce substantial visual changes to a portion of the corridor as an individual project, thereby contributing to the cumulative visual impact on the Route 1 corridor.

No Build Alternative

The No Build Alternative assumes that, other than the improvements currently planned, programmed improvements, and continued routine maintenance (described in Section 1.4.4), no major construction would take place on Route 1 through the project limits. These projects would be subject to individual environmental review, and cumulative impacts would be analyzed, as necessary; therefore, the No Build Alternative would not result cumulative impacts for any of the environmental resource areas discussed above.

2.5.5 Avoidance, Minimization and Mitigation Measures

Tier I Corridor Alternatives

The build alternatives would result in cumulative impacts to visual resources and aesthetics within the project area. Because implementation of either of the Tier I corridor alternatives would occur over a period of years, the avoidance, minimization, and/or mitigation measures outlined in Chapter 2 are conceptual, based on existing conditions and current regulatory practices. These measures are intended to address the impacts of vegetation removal and the introduction of new hardscape elements. As portions of the corridor are programmed, they will become Tier II projects, each subject to separate environmental review, including the consideration of cumulative impacts. Future project level documents will revisit this issue taking into account past, present, and reasonably foreseeable projects in an updated analysis.

As cumulative impacts are identified, the project can also pursue opportunities to coordinate avoidance, minimization, and mitigation measures with other project proponents whose undertakings contribute to the identified cumulative impacts.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alternative would contribute to a cumulative impact on visual resources within the project area. Project level measures to avoid, minimize, and/or mitigate visual impacts are identified in Section 2.1.6 of this document to address the loss of vegetation and the introduction of hardscape elements within the Tier II project area. The implementation of these measures would avoid, minimize, and/or mitigate the project's contribution to a cumulative impact on visual resources within the project area.

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Chapter 3 California Environmental Quality Act Evaluation

3.1 Determining Significance under the California Environmental Quality Act

The proposed project is a joint project by Caltrans and the Federal Highway Administration and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act and the National Environmental Policy Act. Caltrans is the lead agency under the California Environmental Quality Act, and the Federal Highway Administration is the lead agency under the National Environmental Policy Act.

One of the primary differences between the National Environmental Policy Act and the California Environmental Quality Act is the way significance is determined. Under the National Environmental Policy Act, significance is used to determine whether an Environmental Impact Statement, or some lower level of documentation, will be required. The National Environmental Policy Act requires that an Environmental Impact Statement be prepared when the proposed federal action (project) *as a whole* has the potential to "significantly affect the quality of the human environment." The determination of significance is based on context and intensity. Some impacts determined to be significant under the California Environmental Quality Act may not be of sufficient magnitude to be determined significant under the National Environmental Policy Act. Under the National Environmental Policy Act, once a decision is made regarding the need for an Environmental Impact Statement, it is the magnitude of the impact that is evaluated, and no judgment of its individual significance is deemed important for the text. The National Environmental Policy Act does not require that a determination of significant impacts be stated in the environmental documents.

The California Environmental Quality Act, on the other hand, does require Caltrans to identify each "significant effect on the environment" resulting from the project and ways to mitigate each significant effect. If the project may have a significant effect on any environmental resource, then an Environmental Impact Report must be prepared. Each and every significant effect on the environment must be disclosed in the Environmental Impact Report and mitigated, if feasible. In addition, the California Environmental Quality Act Guidelines list a number of mandatory findings of significance, which also require the preparation of an Environmental Impact Report. There are no types of actions under the National Environmental Policy Act that parallel the findings of mandatory significance of the California Environmental Quality Act. This chapter discusses the effects of this project and the California Environmental Quality Act significance.

Different standards are applied for analysis of certain impacts. For example, when determining whether a noise impact is significant under the California Environmental Quality Act, the baseline noise level is compared with the build noise level. The California Environmental Quality Act noise analysis is completely independent of the noise analysis in Chapter 2, which is based on regulations pursuant to the National Environmental Policy Act, in 23 Code of Federal Regulations (CFR) 772, which requires a noise analysis that is centered on noise abatement criteria. Under the California Environmental Quality Act, the assessment entails looking at the setting of the noise impact and then how large or perceptible any noise increase would be in the given area. Key considerations include: the uniqueness of the setting, the sensitive nature of the noise receptors, the magnitude of the noise increase, the number of residences affected, and the absolute noise level. As explained in Section 3.2.1, the proposed alternatives would have less than significant noise impacts under the California Environmental Quality Act.

This project has been prepared as a combined Tier I /Tier II Draft Environmental Impact Report/Environmental Assessment. The Tier I portion of the document analyzes at the master plan level (Public Resources Code, Section 21157-21157.6) two alternatives for improvements within an 8.5-mile segment of Route 1 in Santa Cruz County and a No Build Alternative. The Tier II portion analyzes at the project level a build alternative and a No Build Alternative for a specific project within the Tier I corridor. This chapter examines the California Environmental Quality Act significance of both the Tier I and Tier II projects.

3.2 Discussion of Significant Impacts

This section identifies impacts of the proposed project that would be considered potentially significant under the California Environmental Quality Act before proposed mitigation measures are applied. The California Environmental Quality Act Environmental Significance Checklist (see Appendix A) identifies the human, physical, and biological environmental resources that may be affected by the proposed project and evaluates whether these impacts would be potentially significant, less than significant impact with mitigation applied, less than significant impact, or no impact. Evaluations are based upon the California Environmental Quality Act significance criteria as applied to the results of the technical studies performed in support of this environmental document. Impacts are presented separately for the proposed Tier I and Tier II projects.

3.2.1 No Effects of the Proposed Project

As described in the beginning of Chapter 2, as part of the scoping and environmental analysis conducted for the project, the following environmental issues were considered, but no impacts were identified. Consequently, there is no further discussion regarding these issues in this document for either the Tier I or Tier II projects:

- Farmlands
- Timberlands
- Wild and Scenic Rivers
- Parks and Recreation
- Community Impacts – Economics
- Land Use and Planning (Section 2.1.1, Land Use)
- Population and Housing (Section 2.1.2, Growth)

3.2.2 Less than Significant Effects of the Proposed Project

Tier I Corridor Alternatives

Under the California Environmental Quality Act, the Tier I Corridor Alternatives (TSM and HOV Lane Alternatives) would both have a less than significant effect on the following resources and issues:

- Air Quality (Section 2.2.6, Air Quality)
- Geology and Soils (Section 2.2.3, Geology/Soils/Seismic/Topography)
- Hydrology and Water Quality (Section 2.2.1, Hydrology and Floodplain and Section 2.2.2, Water Quality and Stormwater Runoff)
- Noise (Section 2.2.7, Noise)

  The determination of a less than significant noise effect with the project is based on the *Noise Study Report for the Santa Cruz Route 1 Project* (2013). Appendix F of the report compares the design year (2035) noise levels with and without the project, the difference between the design year noise levels and the existing/baseline condition, and the difference between the design year noise levels for build alternatives and the design year noise levels for the No-Build Alternative. The traffic noise increases as a result of the project, including the Tier I HOV Alternative and the Tier I TSM Alternative, range from 0 to 10 A-weighted decibels (dBA) and, as shown in Appendix F of the Noise Study Report, there are high baseline levels (in the 65 to 75 dBA range, and higher) throughout the Route 1 project corridor. A 3 dBA increase between existing noise levels and the build alternatives would be barely perceptible to the human ear, and a 12 dBA increase can be considered a substantial noise increase. None of the noise sensitive land uses in the Route 1 project corridor are projected to experience project-related noise increases above 10 dBA.

- Public Services (Section 2.1.4, Utilities and Emergency Services and Section 2.1.3, Community Impacts)
- Transportation/Traffic (Section 2.1.5)
- Utility and Service Systems (Section 2.1.4, Utilities and Emergency Services)

Tier II Auxiliary Lane Alternative

Under the California Environmental Quality Act, the Tier II Auxiliary Lane Alternative would have a less than significant effect on the following resources and issues:

- Air Quality (Section 2.2.6, Air Quality)
- Geology and Soils (Section 2.2.3, Geology/Soils/Seismic/Topography)
- Hydrology and Water Quality (Section 2.2.1, Hydrology and Floodplain and Section 2.2.2, Water Quality and Stormwater Runoff)
- Noise (Section 2.2.7, Noise)

  The determination of a less than significant noise effect with the project is based on the *Noise Study Report for the Santa Cruz Route 1 Project* (2013). Appendix F of the report compares the design year (2035) noise levels, with and without the project, the difference between the design year noise levels and the existing/baseline condition, and the difference between the design year noise levels with and without the project. The traffic noise increases as a result of the Tier II Auxiliary Lane Alternative range from 0 to 8 dBA and, as shown in Appendix F of the Noise Study Report, there are high baseline levels (in the 65 to 70 dBA range, and higher) within the Tier II project limits. A 3-dBA increase between existing noise levels and the build alternative would be barely perceptible to the human ear, and a 12-dBA increase can be considered a substantial noise increase. None of the noise sensitive land uses within the Tier II project limits are projected to experience project-related noise increases above 8 dBA.
- Public Services (Section 2.1.4, Utilities and Emergency Services and Section 2.1.3, Community Impacts)
- Transportation/Traffic (Section 2.1.5)
- Utility and Service Systems (Section 2.1.4, Utilities and Emergency Services)

3.2.3 Significant Environmental Effects of the Proposed Project

Tier I Corridor Alternatives

Under the Tier I Corridor Alternatives, the following potential impacts could rise to the level of significance before mitigation is added:

- Biological Resources/Threatened and Endangered Species – Twenty (20) special-status wildlife species and 34 plant species have the potential to occur within the Biological Study Area. Habitat areas could be temporarily disturbed during construction activities for any of the alternatives. Construction noise and movements of workers could disturb bird nesting or bat roosting. Temporary dewatering/diversion of streams could interrupt passage for fish and amphibians. Removal of mature trees could affect monarch butterfly roosting or bird nesting. Disruption of highway structures could disturb bat roosting. Construction activities for the Tier I Corridor Alternatives have the potential to encroach upon suitable habitat, interrupt passage, or result in direct take of the following threatened and endangered species: California red-legged frog, tidewater goby, Central California Coast steelhead, Santa Cruz long-toed salamander, white-tailed kite, and tricolored blackbird.

Additionally, the Tier I Corridor Alternatives would result in permanent and temporary impacts to wetlands and other waters, which would be considered significant impacts under the California Environmental Quality Act. See Section 2.3.2, Wetlands and Other Waters and Section 2.4.10, Construction Phase Impacts for a description of the impacts.

The aforementioned impacts to biological resources are potentially significant under the California Environmental Quality Act and are described in Section 2.3.1, Natural Communities; Section 2.3.2, Wetlands and Other Waters; Section 2.3.3, Plant Species; Section 2.3.4, Animal Species; Section 2.3.5, Threatened and Endangered Species; and Section 2.3.6, Invasive Species.

- Cultural Resources (Archaeology) – The Tier I Corridor Alternatives may adversely affect portions of the three unevaluated archaeological sites and their potential buried archaeological deposits within the archaeological Area of Potential Effects, which is considered a potentially significant impact under the California Environmental Quality Act. See Section 2.1.7, Cultural Resources for a description of the impacts.

  In addition, potential impacts to unidentified, buried archaeological resources within the Route 1 corridor could occur during project construction, which could result in potentially significant impacts under the California Environmental Quality Act. Measures listed in Section 2.4.7 address the potential discovery of cultural materials and human remains during earthwork.

- Paleontology – The presence of fossils in the Pliocene Purisima Formation, Plio-Pleistocene Aromas Sand, and Pleistocene terrace deposits suggests a high potential for additional similar fossil remains to be uncovered by excavations during project construction. Identifiable fossil remains recovered from any of these stratigraphic units during project construction could be scientifically important and significant, and there is a potential for significant impacts to paleontological resources. Discussion is provided in Section 2.4.8, Paleontology.
- Hazardous Waste/Materials – There is potential for asbestos-containing materials and lead-based paint coatings in structures that would be demolished (including Route 1 bridges, railroad crossings, and commercial or residential structures), and lead-based paint may be present in highway paint striping. Aerially deposited lead may be present in soil areas along the shoulders and median of Route 1, and wooden utility poles within the project footprint that may require removal or relocation may be coated with creosote. In addition, the potential for presence of petroleum projects and heavy metals in soil and groundwater

is identified within the project footprint, associated with several sites meeting the definition of a Recognized Environmental Condition. Impacts from the aforementioned hazardous materials risks are potentially significant under the California Environmental Quality Act and are discussed in Section 2.2.5, Hazardous Waste/Materials and Section 2.4.9, Construction Phase Impacts.

Tier II Auxiliary Lane Alternative

Under the Tier II Auxiliary Lane Alternative, the following potential impacts could rise to the level of significance before mitigation is added:

- Wetlands and Other Waters – The proposed Tier II Auxiliary Lane Alternative would result in permanent and temporary impacts to wetlands and other waters at Rodeo Creek Gulch and at the ditch adjacent to the Soquel Drive-In, which would be considered significant impacts under the California Environmental Quality Act. See Section 2.3.2, Wetlands and Other Waters, and Section 2.4.10, Construction Phase Impacts, for a description of these impacts.
- Threatened and Endangered Species – Construction or dewatering activities in aquatic habitats within the biological study area could result in direct impacts to California red-legged frog and tidewater goby, which could result in injury or death to individuals. Temporary and permanent loss of habitat for each species would also occur. These impacts to threatened and endangered species are potentially significant under the California Environmental Quality Act and are discussed in Section 2.3.5, Threatened and Endangered Species, and Section 2.4.10, Construction Phase Impacts.
- Cultural Resources (Archaeology) – Potential impacts to unidentified, buried archaeological resources could occur during project construction, which could result in potentially significant impacts under the California Environmental Quality Act. Measures listed in Section 2.4.7 address the discovery of cultural materials and human remains during earthwork.
- Paleontology – Impacts to unidentified paleontological resources could occur during project construction, which could result in potentially significant impacts under the California Environmental Quality Act. Potential impacts are discussed in Section 2.4.8, Paleontology.
- Hazardous Waste/Materials – There is potential for asbestos-containing materials and lead-based paint coatings in structures that would be demolished to accommodate the proposed Chanticleer pedestrian overcrossing, and lead-based paint may be present in highway paint striping. Aerially deposited lead may be present in soil areas along the shoulders and median of Route 1, and wooden utility poles within the project footprint that may require removal or relocation may be coated with creosote. In addition, the potential for presence of petroleum projects in soil and groundwater is identified within

the project footprint. Remediation monitoring would be also have to be conducted at the following Recognized Environmental Conditions sites. These sites are adjacent to the project area and would not be acquired for the project.

- Former Exxon 7-3604 facility (also listed as Pit Stop Service, Inc.), located at 836 Bay Avenue in Capitola;
- Redtree Properties, located at 819 Bay Avenue in Capitola;
- Unocal Station No. 6193, located at 1500 Soquel Drive in Santa Cruz; and
- BP 11240 facility, located at 2178 41st Avenue in Capitola.

Impacts from the aforementioned hazardous materials risks are potentially significant under the California Environmental Quality Act, and mitigation measures listed in Section 2.2.5, Hazardous Waste/Materials and Section 2.4.9, Construction Phase Impacts are required.

- Aesthetics/Visual – Route 1 is listed within the State Scenic Highways system as eligible for listing, but it has not been officially designated by the state, although it has been by Santa Cruz County. The proposed Tier II Auxiliary Lane Alternative would create visual changes as a result of highway widening, removal of mature trees and other vegetation, and construction of the Chanticleer pedestrian overcrossing. For the Tier II project, these visual changes would be limited to the Capitola-Soquel Landscape Unit. These changes could result in potentially significant impacts under the California Environmental Quality Act. Potential impacts are discussed in Section 2.1.6, Visual/ Aesthetics, and Section 2.4.11, Construction Phase Impacts. Under the California Environmental Quality Act, the aforementioned impacts would be mitigated to a less than significant level with incorporation of mitigation measures, as described in Section 3.3.

3.2.4 Unavoidable Significant Environmental Effects

Tier I Corridor Alternatives

- Aesthetics/Visual – Route 1 is listed within the State Scenic Highways system as eligible for listing, but it has not been officially designated by the state, although it has been by Santa Cruz County. The proposed Tier I Corridor Alternatives would create significant visual changes within the 8.9-mile-long corridor as a result of highway widening, construction of retaining and soundwalls, removal of mature trees and other vegetation, and construction of new roadway structures. Viewer groups are expected to be sensitive to these changes, and these impacts are considered potentially significant per California Environmental Quality Act significance thresholds as described in Section 2.1.6, Visual/Aesthetics, and Section 2.4.11, Construction Phase Impacts.

The proposed Tier I Corridor Alternatives will result in unavoidable and significant effects, even with implementation of the mitigation measures described in Section 3.3.

Tier II Auxiliary Lane Alternative

There are no unavoidable significant environmental effects associated with this alternative.

California Environmental Quality Act Mandatory Findings of Significance

Tier I Corridor Alternatives

A California Environmental Quality Act Mandatory Findings of Significance is provided for the Tier I Corridor Alternatives. If a corridor alternative is selected, the successive projects when implemented will cause a direct change in the physical environment due to the substantial degradation of the existing visual quality of the corridor and its surroundings and for the potential to threaten the scenic highway eligibility of the affected portion of the facility.

Tier II Auxiliary Lane Alternative

The Tier II Auxiliary Lane Alterative has no significant impacts; therefore, Mandatory Findings of Significance do not apply.

3.2.5 Climate Change under the Calfornia Environmental Quality Act

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gas emissions, particularly those generated from the production and use of fossil fuels.

While climate change has been a concern for several decades, the establishment of the Intergovernmental Panel on Climate Change by the United Nations and World Meteorological Organization in 1988, has led to increased efforts devoted to greenhouse gas emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of greenhouse gases generated by human activity, including carbon dioxide, methane, nitrous oxide, tetrafluoromethane, hexafluoroethane, sulfur hexafluoride, HFC-23 (fluoroform), HFC-134a (s, s, s, 2-tetrafluoroethane), and HFC-152a (difluoroethane).

In the United States, the main source of greenhouse gas emissions is electricity generation, followed by transportation. In California, however, transportation sources (including passenger cars, light-duty trucks, other trucks, buses, and motorcycles) make up the largest source of greenhouse gas emitting sources. The dominant greenhouse gas emitted is carbon dioxide, mostly from fossil fuel combustion.

There are typically two terms used when discussing the impacts of climate change: "Greenhouse Gas Mitigation" and “Adaptation”. "Greenhouse Gas Mitigation" is a term for reducing greenhouse gas emissions to reduce or "mitigate" the impacts of climate change. “Adaptation" refers to the effort of planning for and adapting to impacts resulting from climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels[1]).

There are four primary strategies for reducing greenhouse gas emissions from transportation sources: (1) improving the transportation system and operational efficiencies, (2) reducing travel activity, (3) transitioning to lower greenhouse gas emitting fuels, and (4) improving vehicle technologies/efficiency. To be most effective, all four strategies should be pursued cooperatively.

Regulatory Setting

This section outlines state and federal efforts to comprehensively reduce greenhouse gas emissions from transportation sources.

State

With the passage of several pieces of legislation including State Senate and Assembly bills and Executive Orders, California launched an innovative and proactive approach to dealing with greenhouse gas emissions and climate change.

Assembly Bill 1493, Pavley. Vehicular Emissions: Greenhouse Gases, 2002: This bill requires the California Air Resources Board to develop and implement regulations to reduce automobile and light truck greenhouse gas emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year.
Executive Order S-3-05 (June 1, 2005): The goal of this Executive Order is to reduce California’s greenhouse gas emissions to: (1) year 2000 levels by 2010, (2) year 1990 levels by the 2020, and (3) 80 percent below the year 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32.

Assembly Bill 32, Núñez and Pavley, The Global Warming Solutions Act of 2006: Assembly Bill 32 sets the same overall greenhouse gas emissions reduction goals as outlined in Executive Order S-3-05, while further mandating that the California Air Resources Board create a scoping plan and implement rules to achieve “real, quantifiable, cost-effective reductions of greenhouse gases.”

Executive Order S-20-06 (October 18, 2006): This order establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency and state agencies with regard to climate change.

Executive Order S-01-07 (January 18, 2007): This order set forth the low carbon fuel standard for California. Under this Executive Order, the carbon intensity of California’s transportation fuels is to be reduced by at least 10 percent by the year 2020.

[1] http://climatechange.transportation.org/ghg_mitigation/

Senate Bill 97 Chapter 185, 2007, Greenhouse Gas Emissions: Required the Governor's Office of Planning and Research to develop recommended amendments to the California Environmental Quality Act Guidelines for addressing greenhouse gas emissions. The amendments became effective on March 18, 2010.

Senate Bill 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires the California Air Resources Board to set regional emissions reduction targets from passenger vehicles. The Metropolitan Planning Organization for each region must then develop a "Sustainable Communities Strategy" that integrates transportation, land use, and housing policies to plan for the achievement of the emissions target for their region.

Senate Bill 391Chapter 585, 2009 California Transportation Plan: This bill requires the State's long-range transportation plan to meet California's climate change goals under Assembly Bill 32.

Federal

Although climate change and greenhouse gas reduction is a concern at the federal level, currently there are no regulations or legislation that have been enacted specifically addressing greenhouse gas emissions reductions and climate change at the project level. Neither the United States Environmental Protection Agency nor the Federal Highway Administration has promulgated explicit guidance or methodology to conduct project-level greenhouse gas analysis[2]. Federal Highway Administration supports the approach that climate change considerations should be integrated throughout the transportation decision-making process, from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will assist in decision-making and improve efficiency at the program level and will inform the analysis and stewardship needs of project-level decision-making. Climate change considerations can be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

The four strategies outlined by the Federal Highway Administration to lessen climate change impacts correlate with efforts that the state is undertaking to deal with transportation and climate change; the strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and a reduction in travel activity.

Climate change and its associated effects are being addressed through various efforts at the federal level to improve fuel economy and energy efficiency, such as the "National Clean

[2] To date, no national standards have been established regarding mobile source GHGs, nor has U.S. EPA established any ambient standards, criteria or thresholds for GHGs resulting from mobile sources.

Car Program" and Executive Order 13514 – *Federal Leadership in Environmental, Energy and Economic Performance*.

Executive Order 13514 (October 5, 2009): This order is focused on reducing greenhouse gases internally in federal agency missions, programs, and operations, but it also directs federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

The United States Environmental Protection Agency's authority to regulate greenhouse gas emissions stems from the U.S. Supreme Court decision in *Massachusetts v. EPA* (2007). The Supreme Court ruled that greenhouse gas meet the definition of air pollutants under the existing Clean Air Act and must be regulated if these gases could be reasonably anticipated to endanger public health or welfare. Responding to the Court's ruling, the United States Environmental Protection Agency finalized an endangerment finding in December 2009. Based on scientific evidence, it found that six greenhouse gases constitute a threat to public health and welfare. Thus, it is the Supreme Court's interpretation of the existing Act and the Environmental Protection Agency's assessment of the scientific evidence that form the basis for the Environmental Protection Agency's regulatory actions. The United States Environmental Protection Agency in conjunction with the National Highway Traffic Safety Administration issued the first of a series of greenhouse emission standards for new cars and light-duty vehicles in April 2010.[3]

The United States Environmental Protection Agency and the National Highway Traffic Safety Administration are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced greenhouse gas emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever greenhouse gas regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle greenhouse regulations.

The final combined standards that made up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards implemented by this program are expected to reduce greenhouse gas emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016).

On August 28, 2012, the United States Environmental Protection Agency and National Highway Traffic Safety Administration issued a joint Final Rulemaking to extend the National Program for fuel economy standards to model year 2017 through 2025 passenger vehicles. Over the lifetime of the model year 2017-2025 standards this program is projected

[3] http://www.c2es.org/federal/executive/epa/greenhouse-gas-regulation-faq

to save approximately four billion barrels of oil and two billion metric tons of greenhouse gas emissions.

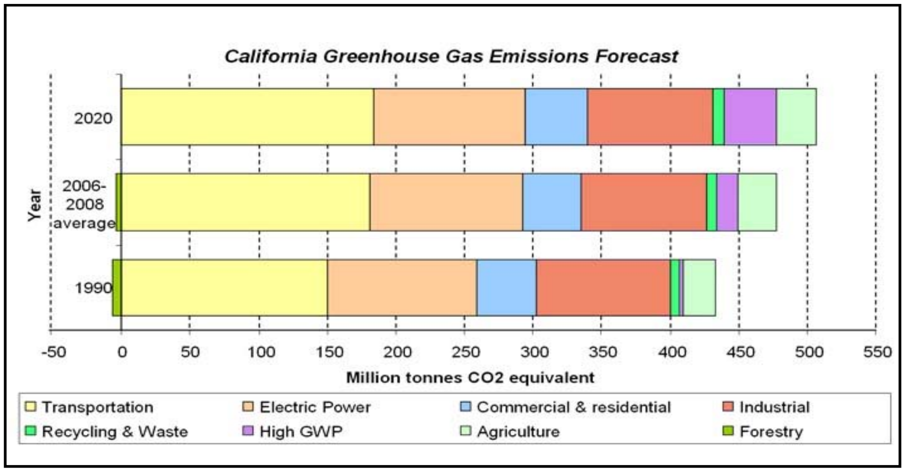
The complementary United States Environmental Protection Agency and National Highway Traffic Safety Administration standards that make up the Heavy-Duty National Program apply to combination tractors (semi trucks), heavy-duty pickup trucks and vans, and vocational vehicles (including buses and refuse or utility trucks). Together, these standards will cut greenhouse gas emissions and domestic oil use significantly. This program responds to President Barack Obama's 2010 request to jointly establish greenhouse gas emissions and fuel efficiency standards for the medium- and heavy-duty highway vehicle sector. The agencies estimate that the combined standards will reduce carbon dioxide emissions by about 270 million metric tons and save about 530 million barrels of oil over the life of model year 2014 to 2018 heavy duty vehicles.

Project Analysis

An individual project does not generate enough greenhouse gas emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may contribute to a potential impact through its *incremental* change in emissions when combined with the contributions of all other sources of greenhouse gas[4]. In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (California Environmental Quality Act Guidelines Sections 15064(h)(1) and 15130). To make this determination, the incremental impacts of the project must be compared with the effects of past, current, and probable future projects. To gather sufficient information on a global scale of all past, current, and future projects to make this determination is a difficult, if not impossible, task.

The Assembly Bill 32 Scoping Plan mandated by Assembly Bill 32 contains the main strategies California will use to reduce greenhouse gas emissions. As part of its supporting documentation for the Draft Scoping Plan, the California Air Resources Board released the greenhouse gas inventory for California (forecast last updated: October 28, 2010) (Figure 3-1). The forecast is an estimate of the emissions expected to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. The base year used for forecasting emissions is the average of statewide emissions in the greenhouse gas inventory for 2006, 2007, and 2008.

[4] This approach is supported by the AEP: *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), as well as the South Coast Air Quality Management District (Chapter 6: The CEQA Guide, April 2011) and the US Forest Service (Climate Change Considerations in Project Level NEPA Analysis, July 13, 2009).



Source: http://www.arb.ca.gov/cc/inventory/data/forecast.htm

Figure 3-1: California Greenhouse Gas Inventory Forecast

Caltrans and its parent agency, the Transportation Agency, have taken an active role in addressing greenhouse gas emission reduction and climate change. Recognizing that 98 percent of California's greenhouse gas emissions are from the burning of fossil fuels and 40 percent of all human-made greenhouse gas emissions are from transportation, Caltrans has created and is implementing the Climate Action Program at Caltrans that was published in December 2006.

One of the main strategies in the Caltrans's Climate Action Program to reduce greenhouse gas emissions is to make California's transportation system more efficient. As shown below, the highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (zero to 25 miles per hour) and speeds over 55 miles per hour; the most severe emissions occur from zero to 25 miles per hour (see Figure 3-2). To the extent that a project relieves congestion by enhancing operations and improving travel times in high-congestion travel corridors, greenhouse gas emissions, particularly carbon dioxide, may be reduced. The purpose of the proposed project is to relieve congestion and improve operational efficiency on improve Route 1 in Santa Cruz from approximately 0.4 mile south of the San Andreas/ Larkin Valley Road interchange to 0.4 mile north of the Morrissey Boulevard interchange.

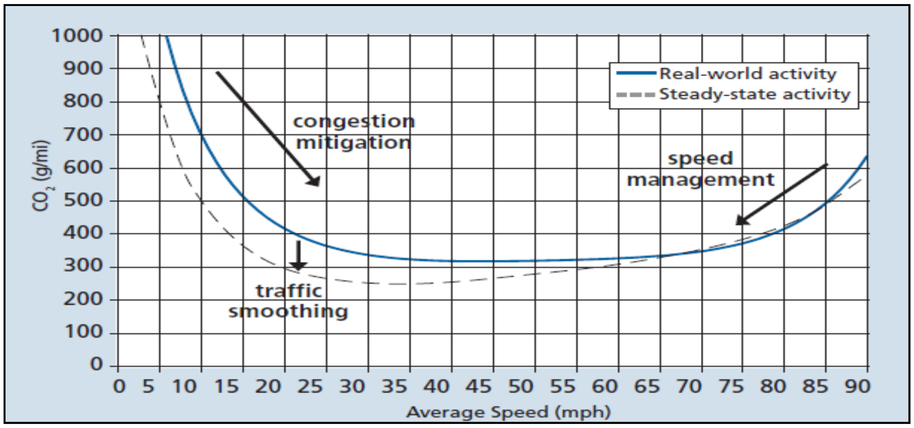


Figure 3-2: Possible Effect of Traffic Operation Strategies in Reducing On-Road Carbon Dioxide Emission

Tier I Corridor Alternatives

Peak-hour greenhouse gas emissions are presented in Table 3-1. The proposed project is designed to decrease congestion and increase vehicle speeds during the heavily congested peak hours. The HOV lanes will not greatly affect freeway speeds and flow during uncongested time periods; therefore, the peak-hour analysis is an accurate representation of how the Tier I Corridor Alternatives will change regional greenhouse gas emissions per day.

Table 3-1: Estimated Carbon Dioxide Emissions by Tier I Alternative – AM and PM Hours Emissions

Alternative	2015 (Metric Tons per AM and PM Peak Hours)	2035 (Metric Tons per AM and PM Peak Hours)
Existing	59	59
No Build	68	87
HOV Lane	69	71
TSM	64	94
Source: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); Emission factors obtained from EMFAC2011.		

The Association of Monterey Bay Area Governments presented a regional greenhouse gas emissions inventory in the 2010 Monterey Bay Area Metropolitan Transportation Plan Draft Supplemental Environmental Impact Report. It is anticipated that regional 2015 greenhouse gas emissions would be 6,195 metric tons per day and 2035 greenhouse gas emissions would be 6,615 metric tons per day. The incremental increase in 2015 daily greenhouse gas emissions as a result of the Tier I Corridor HOV Lane Alternative would be approximately 0.02 percent and the incremental decrease in 2035 emissions would be approximately 0.24 percent. The incremental decrease in 2015 daily greenhouse gas emissions as a result of the Tier I Corridor TSM Alternative would be approximately 0.06 percent and the incremental increase in 2035 emissions would be approximately 0.35 percent.

Annual greenhouse gas emissions are presented in Table 3-2. The Association of Monterey Bay Area Governments did not present annual emissions in the Metropolitan Transportation Plan Draft Supplemental Environmental Impact Report. It is likely that annual emissions would follow the same trends as the peak-hour analysis provided above and that the various alternatives would affect regional greenhouse gas emissions by a maximum of 0.35 percent.

Table 3-2: Estimated Carbon Dioxide Emissions by Tier I Alternative – Annual Emissions

Alternative	2015 (Metric Tons per Year)	2035 (Metric Tons per Year)
Existing	380	380
No Build	397	380
HOV Lane	428	492
TSM	418	477
Source: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); Emission factors obtained from EMFAC2011.		

The greenhouse gas estimations are not necessarily an accurate reflection of what the true carbon dioxide emissions will be because carbon dioxide emissions are dependent on other factors that are not part of the EMFAC2011 methodology, such as the fuel mix (EMFAC model emission rates are only for direct engine-out carbon dioxide emissions, not full fuel cycle; fuel cycle emission rates can vary dramatically depending on the amount of additives like ethanol and the source of the fuel components), rate of acceleration, and the aerodynamics and efficiency of the vehicles.

Tier II Alternatives

Peak-hour greenhouse gas emissions for the Tier II Auxiliary Lane Alternative are presented in Table 3-3. Peak-hour greenhouse gas emissions for the Tier II Auxiliary Lane Alternative would increase from existing conditions but would decrease by approximately one metric ton per year. Based on the Metropolitan Transportation Plan Draft Supplemental Environmental Impact Report, the Tier II Auxiliary Lane Alternative would affect regional greenhouse gas emissions by approximately 0.02 percent.

Table 3-3: Estimated Carbon Dioxide Emissions by Tier II Alternative – AM and PM Hours Emissions

Alternative	2015 (Metric Tons per AM and PM Peak Hours)
Existing	59
No Build	68
Auxiliary Lane	67
Source: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); Emission factors obtained from EMFAC2011.	

Annual greenhouse gas emissions are presented in Table 3-4. The Association of Monterey Bay Area Governments did not present annual emissions in the Metropolitan Transportation Plan Draft Supplemental Environmental Impact Report. It is likely that annual emissions would follow the same trends as the peak-hour analysis provided above and that the various alternatives would affect regional greenhouse gas emissions by a maximum of 0.02 percent.

Table 3-4: Estimated Carbon Dioxide Emissions by Tier II Alternative – Annual Emissions

Alternative	2015 (Metric Tons per Year)
Existing	380
No Build	395
Auxiliary Lane	400
Source: Based on vehicle miles traveled and speeds obtained from the Traffic Operations Report (2012); Emission factors obtained from EMFAC2011.	

Construction Emissions

Tier I Corridor Alternatives

Greenhouse gas emissions for transportation projects can be divided into those produced during construction and those produced during operations. Construction greenhouse gas emissions include emissions produced as a result of material processing, emissions produced by onsite construction equipment and emissions arising from traffic delays due to construction. These emissions will be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the greenhouse gas emissions produced during construction will be lessened to some degree by longer intervals between maintenance and rehabilitation events. Construction activity would generate approximately 14,467 metric tons per year of greenhouse gas emissions for the Tier I Corridor Alternatives.

Tier II Alternatives

Construction greenhouse gas emissions would be similar to that described for the Tier I Corridor Alternatives. Construction activity would generate approximately 2,903 metric tons of greenhouse gas emissions for the Tier II Alternatives.

Greenhouse Gas Reduction Strategies.

Assembly Bill 32 Compliance

Caltrans continues to be actively involved on the Governor’s Climate Action Team as the California Air Resources Board works to implement Executive Order S-3-05 and Executive

Order S-01-07 and help achieve the targets set forth in Assembly Bill 32. Many of the strategies Caltrans is using to help meet the targets in Assembly Bill 32 come from then-Governor Arnold Schwarzenegger's Strategic Growth Plan for California. The Strategic Growth Plan targeted a significant decrease in traffic congestion below 2008 levels and a corresponding reduction in greenhouse gas emissions, while accommodating growth in population and the economy. The Strategic Growth Plan relies on a complete systems approach to attain carbon dioxide reduction goals: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements as shown in Figure 3-3 The Mobility Pyramid.

Figure 3-3: Mobility Pyramid

Caltrans is supporting efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies: job/housing proximity, developing transit-oriented communities, and high-density housing along transit corridors. Caltrans works closely with local jurisdictions on planning activities but does not have local land use planning authority.

Caltrans also assists efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks; Caltrans is doing this by supporting on-going research efforts at universities, by supporting legislative efforts to increase fuel economy, and by participating on the Climate Action Team. It is important to note, however, that control of fuel economy standards is held by the United States Environmental Protection Agency and California Air Resources Board.

Caltrans is also working towards enhancing the state's transportation planning process to respond to future challenges. Similar to requirements for regional transportation plans under Senate Bill 375 (Steinberg 2008), Senate Bill 391(Liu 2009) requires the state's long-range transportation plan to meet California's climate change goals under Assembly Bill 32.

The California Transportation Plan is a statewide, long-range transportation plan to meet our future mobility needs and reduce greenhouse gas emissions. The California Transportation Plan defines performance-based goals, policies, and strategies to achieve our collective vision for California's future, statewide, integrated, multimodal transportation system.

The purpose of the California Transportation Plan is to provide a common policy framework that will guide transportation investments and decisions by all levels of government, the private sector, and other transportation stakeholders. Through this policy framework, the California Transportation Plan 2040 will identify the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the state's transportation needs.

Table 3-5 summarizes Caltrans and statewide efforts that it is implementing to reduce greenhouse gas emissions. More detailed information about each strategy is included in the Climate Action Program at Caltrans (December 2006).

Caltrans Director's Policy 30 Climate Change (June 22, 2012): is intended to establish a Department policy that will ensure coordinated efforts to incorporate climate change into Departmental decisions and activities.

Caltrans Activities to Address Climate Change (April 2013)[5] provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce greenhouse gas emissions resulting from agency operations.

[5] http://www.dot.ca.gov/hq/tpp/offices/orip/climate_change/projects_and_studies.shtml

Table 3-5: Climate Change Strategies

Strategy	Program	Partnership		Method/ Process	Estimated Carbon Dioxide Savings (million metric tons)	
		Lead	Agency		2010	2020
Smart Land Use	Intergovernmental Review	Caltrans	Local Governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies and other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	0.975	7.8
Operational Improvements and Intelligent Transportation System Deployment	Strategic Growth Plan	Caltrans	Regions	State Intelligent Transportation System; Congestion Management Plan	0.07	2.17
Mainstream Energy and Greenhouse Gas into Plans and Projects	Office of Policy Analysis and Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational and Information Program	Office of Policy Analysis and Research	Interdepartmental, California Environmental Protection Agency, California Air Resources Board, California Energy Commission		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening and Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	0.0045	0.0065 0.45 .0225
Nonvehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	0.117	.34
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5% limestone cement mix 25% fly ash cement mix >50% fly ash/ slag mix	1.2 0.36	4.2 3.6
Goods Movement	Office of Goods Movement	California Environmental Protection Agency; California Air Resources Board; Business, Transportation, and Housing Agency; Metropolitan Planning Agencies		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					2.72	18.18

Source: Caltrans.

The following measures will reduce the greenhouse gas emissions and potential climate change impacts from the proposed project:

1. Caltrans and the California Highway Patrol are working with regional agencies to implement intelligent transportation systems to help manage the efficiency of the existing highway system. Intelligent transportation systems are commonly referred to as electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.
2. RTC provides ridesharing services and park-and-ride facilities to help manage the growth in demand for highway capacity.
3. According to Caltrans Standard Specification Provisions, idling time for lane closure during construction is restricted to 10 minutes in each direction.
4. The construction contractor must comply with Monterey Bay Unified Air Pollution Control District rules, ordinances, and regulations in regards to air quality restrictions.

Adaptation Strategies

Adaptation Strategies refer to how Caltrans and others can plan for the effects of climate change on the state’s transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, storm surges and intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damaging roadbeds by longer periods of intense heat; increasing storm damage from flooding and erosion; and inundation from rising sea levels. These effects will vary by location and may, in the most extreme cases, require that a facility be relocated or redesigned. There may also be economic and strategic ramifications as a result of these types of impacts to the transportation infrastructure.

At the federal level, the Climate Change Adaptation Task Force, co-chaired by the Council on Environmental Quality, the Office of Science and Technology Policy, and the National Oceanic and Atmospheric Administration, released its interagency report on October 28, 2011[6], outlining the federal government's progress in expanding and strengthening the Nation's capacity to better understand, prepare for, and respond to extreme events and other climate change impacts. The report provides an update on actions in key areas of federal adaptation, including: building resilience in local communities, safeguarding critical natural resources such as freshwater, and providing accessible climate information and tools to help decision-makers manage climate risks.

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[6] http://www.whitehouse.gov/administration/eop/ceq/initiatives/adaptation

Climate change adaption must also involve the natural environment as well. Efforts are underway on a statewide level to develop strategies to cope with impacts to habitat and biodiversity through planning and conservation. The results of these efforts will help California agencies plan and implement mitigation strategies for programs and projects.

On November 14, 2008, former Governor Arnold Schwarzenegger signed Executive Order S-13-08, which directed many state agencies to address California's vulnerability to sea level rise caused by climate change. This Executive Order set in motion several agencies and actions to address the concern of sea level rise.

In addition to addressing projected sea level rise, the California Natural Resources Agency was directed to coordinate with local, regional, state, and federal public and private entities to develop. The California Climate Adaptation Strategy (Dec 2009)[7], which summarizes the best known science on climate change impacts to California, assesses California's vulnerability to the identified impacts, and then outlines solutions that can be implemented within and across state agencies to promote resiliency.

The strategy outline is in direct response to Executive Order S-13-08 that specifically asked the California Natural Resources Agency to identify how state agencies can respond to rising temperatures, changing precipitation patterns, sea level rise, and extreme natural events. Numerous other state agencies were involved in the creation of the Adaptation Strategy document, including the California Environmental Protection Agency; Business, Transportation and Housing; Health and Human Services; and the Department of Agriculture. The document is broken down into strategies for different sectors that include: Public Health; Biodiversity and Habitat; Ocean and Coastal Resources; Water Management; Agriculture; Forestry; and Transportation and Energy Infrastructure. As data continues to be developed and collected, the state's adaptation strategy will be updated to reflect current findings.

The California Natural Resources Agency was to prepare a Sea Level Rise Assessment Report[8] to recommend how California should plan for future sea level rise. The report was released in June 2012 and included:

- Relative sea level rise projections for California, Oregon and Washington taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge and land subsidence rates.

[7] http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF

[8] *Sea Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future* (2012) is available at: http://www.nap.edu/catalog.php?record_id=13389.

- The range of uncertainty in selected sea level rise projections.
- A synthesis of existing information on projected sea level rise impacts to state infrastructure (such as roads, public facilities and beaches), natural areas, and coastal and marine ecosystems.
- A discussion of future research needs regarding sea level rise.

In 2010, interim guidance was released by The Coastal Ocean Climate Action Team as well as Caltrans as a method to initiate action and discussion of potential risks to the states infrastructure due to projected sea level rise. Subsequently, the Coastal Ocean Climate Action Team updated the Sea Level Rise guidance to include information presented in the National Academies Study.

All state agencies that are planning to construct projects in areas vulnerable to future sea level rise are directed to consider a range of sea level rise scenarios for the years 2050 and 2100 to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise. Sea level rise estimates should also be used in conjunction with information on local uplift and subsidence, coastal erosion rates, predicted higher high water levels, storm surge and storm wave data

All projects that have filed a Notice of Preparation as of the date of the Executive Order S-13-08, and/or are programmed for construction funding through 2013, or are routine maintenance projects may, but are not required to, consider these planning guidelines. The Santa Cruz Route 1 Project filed a Notice of Preparation prior to Executive Order S-13-08.

As previously discussed, the project is not a routine maintenance project. This analysis is required to discuss the effects of climate change on the project area and facility, such as increased erosion due to storms or flooding, inundation due to higher sea levels, long periods of intense heat, and other factors that may affect the facility during the life of the proposed project. The potential for sea level rise to affect the project was considered, in accordance with Caltrans' Guidance on Incorporating Sea Level Rise, by considering the following three questions with regard to the project:

1. Is the project located on the coast or in an area vulnerable to sea level rise?
2. Will the project be impacted by the stated sea level rise?
3. Is the design life of the project beyond year 2030?

The Tier I Corridor Alternatives are partially located in the coastal zone (see Figure 2.1.1-2: Coastal Zone Boundary), and the Tier II Auxiliary Lane Alternative is located outside the coastal zone. Using the sea level rise projections in Table 2 of the Guidance on Incorporating Sea Level Rise, the Tier I and Tier II projects would not be potentially affected by an increase in sea level. The high sea level rise projection for the year 2100 indicates an increase in water surface elevation of 55 inches. Table 4 in the Location Hydraulic Study Report shows that, for four out of the five floodplains associated with the project, the roadway elevations are higher than the 100-year base floodplain water surface elevations by 13.1 to 36.1 feet. At Arana Gulch, the 100-year water surface elevation already overtops the roadway in the existing conditions; however, the water surface elevation at the Route 1 crossing of Arana Gulch (water surface elevation of approximately 70 feet under existing conditions and under the proposed alternatives) is controlled by watershed runoff, not by backwater from the ocean. Therefore, an increase in sea level rise would not affect the Tier I or Tier II projects at the floodplains associated with creek crossings.

Overall, the Tier I and Tier II projects would not be potentially affected by an increase in sea level rise. The design life of both projects is beyond the year 2030.

In conclusion, the Tier I Corridor Alternatives are partially located in the coastal zone and their design life is beyond 2030. However, these alternatives would not potentially be affected by sea level rise.

Executive Order S-13-08 also directed the Business, Transportation, and Housing Agency to prepare a report to assess the vulnerability of transportation systems to sea level rise affecting safety, maintenance, and operational improvements of the system, and economy of the state. Caltrans continues to work on assessing the transportation system vulnerability to climate change, including the effect of sea level rise.

Currently, Caltrans is working to assess which transportation facilities are at greatest risk from climate change effects; however, without statewide planning scenarios for relative sea level rise and other climate change effects, Caltrans has not been able to determine what change, if any, may be made to its design standards for its transportation facilities. Once statewide planning scenarios become available, Caltrans will be able to review its current design standards to determine what changes, if any, may be warranted to protect the transportation system from sea level rise.

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. Caltrans is an active participant in the efforts being conducted in response to Executive Order S-13-08 and is mobilizing to be able to respond to the National Academy of Science Sea Level Rise Assessment Report.

3.3 Mitigation Measures for Significant Impacts under the California Environmental Quality Act

Environmental resources for which implementation of mitigation measures is required to reduce impacts to less than significant under the California Environmental Quality Act are summarized below. Separate summaries are provided for the Tier I Corridor Alternatives and Tier II Auxiliary Lane Alternative.

Tier I Corridor Alternatives

- Biological Resources – Mitigation measures required for both Tier I Corridor Alternatives to address potentially significant impacts to biological resources are listed in Section 2.3.1, Natural Communities; Section 2.3.2, Wetlands and Other Waters; Section 2.3.3, Plant Species; Section 2.3.4, Animal Species; Section 2.3.5, Threatened and Endangered Species; Section 2.3.6,Nesting Birds; and Section 2.3.7, Invasive Species.
- Cultural Resources (Archaeology) – Mitigation measures required for both Tier I Corridor Alternatives to address potentially significant impacts to archaeological resources are listed in Section 2.1.7, Cultural Resources and Section 2.4.7, Construction Phase Impacts.
- Paleontological Resources – Mitigation measures required to address potentially significant impacts to unidentified, buried paleontological resources are listed in Section 2.4.8, Construction Phase Impacts.
- Hazardous Waste/Materials – Mitigation measures required for both Tier I Corridor Alternatives are listed in Section 2.2.5, Hazardous Waste/Materials and Section 2.4.9, Construction Phase Impacts.
- Aesthetics/Visual – The Tier I Corridor Alternatives are being considered at the planning level only and may be phased over time. Because it is not known when the projects would go forward, the mitigation measures described for the Tier I Corridor Alternatives, listed in Section 2.1.6, Visual/Aesthetics and Section 2.4.11, Construction Phase Impacts, would also apply to any future Tier II projects, pending further environmental reviews for those projects.

Tier II Auxiliary Lane Alternative

- Biological Resources – Mitigation measures required to address potentially significant impacts to wetlands and other waters and threatened and endangered species that could occur under the Tier II Auxiliary Lane Alternative are listed in Section 2.3.1, Natural Communities; Section 2.3.2, Wetlands and Other Waters; and Section 2.3.5, Threatened and Endangered Species. Cultural Resources (Archaeology) – Mitigation measures required to address potentially significant impacts to unidentified, buried archaeological resources that could occur under the Tier II Auxiliary Lane Alternative are listed in Section 2.4.7, Construction Phase Impacts.
- Paleontological Resources – Mitigation measures required to address potentially significant impacts to unidentified, buried paleontological resources that could occur under the Tier II Auxiliary Lane Alternative are listed in Section 2.4.8, Construction Phase Impacts.

- Hazardous Waste/Materials – Mitigation measures for the Tier II Auxiliary Lane Alternative are required to reduce impacts from hazardous materials to less than significant and are described in Section 2.2.5, Hazardous Waste/Materials and Section 2.4.9, Construction Phase Impacts.
- Aesthetics/Visual – The Tier II Auxiliary Lane Alternative requires implementation of mitigation measures to reduce potentially significant visual impacts that could result; these are described in Section 2.1.6, Visual/Aesthetics and Section 2.4.11, Construction Phase Impacts.

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Chapter 4 Comments and Coordination

Early and continuing coordination with the general public and public agencies is an essential part of the environmental process. It helps planners determine the necessary scope of environmental documentation and the level of analysis required, and to identify potential impacts and avoidance, minimization and/or mitigation measures, and related environmental requirements. Agency consultation and public participation for this project have been accomplished through a variety of formal and informal methods, including Project Development Team meetings; interagency coordination meetings; formal letter requests for information and coordination; meetings with public and resource agency staff; distribution of flyers, newsletters, and public notices with project information and updates; and public meetings. A public hearing also will be conducted during the public review period for this document. This chapter summarizes the results of Caltrans' efforts to fully identify, address, and resolve project-related issues through early and continuing coordination.

4.1 Early Public and Agency Consultation (Scoping Process)

Early public and agency consultation was performed through the distribution of a Notice of Preparation, stakeholder interviews, and public information meetings to present the project purpose and need, funding, scheduling, project alternatives, and potential impacts, and obtain public and agency input regarding these matters or any additional issues that should be addressed.

4.1.1 Notice of Preparation

On March 29, 2004, a Notice of Preparation to prepare a Draft Environmental Impact Report/ Environmental Assessment was sent to all appropriate local, state, and federal agencies and other interested parties and is included in Appendix L (Note: The National Environmental Policy Act document is not an Environmental Impact Statement; no Notice of Intent to prepare an Environmental Impact Statement was published in the *Federal Register*). A Notice of Preparation is the California Environmental Quality Act Notice that an Environmental Impact Report will be prepared for the project. Appropriate agencies are those that would potentially provide a project permit or approval, or that have jurisdiction for areas or resources that might be affected by the proposed project. The Notice of Preparation was distributed to California State agencies through the Office of Planning and Research. The Notice of Preparation was sent separately to federal and local agencies.

The following agencies responded to the Notice of Preparation:

- Aptos/La Selva Fire Protection District
- Monterey Bay Unified Air Pollution Control District

- Santa Cruz County Sanitation District
- Association of Monterey Bay Area Governments
- Office of Planning and Research, State Clearinghouse
- U.S. Army Corps of Engineers
- California Coastal Commission
- Santa Cruz Consolidated Emergency Communication Center
- U.S. Fish and Wildlife Services
- County of Santa Cruz Planning Department
- Santa Cruz County Fire Chiefs' Association
- University of California, Santa Cruz
- Federal Emergency Management Agency

4.1.2 Stakeholder Interviews

As part of the initial public outreach effort and prior to any public informational meetings, RTC conducted one-on-one stakeholder interviews in January 2004 with local community leaders, businesses, environmental advocates, and other interested groups in the project area. This included representatives of the cities of Aptos, Capitola, Live Oak, Santa Cruz, Scotts Valley, and Soquel, as well as Santa Cruz County. The interview presented stakeholders with a series of questions to assess their general knowledge of the project and enable them to comment on what they viewed as key project issues, benefits, and concerns. Interviews were conducted by phone and generally lasted between 30 minutes and 1 hour.

The goal of the interviews was to identify and discuss project concerns, anticipated impacts, questions, and interest in the Santa Cruz Highway 1 HOV Lane Project with local community leaders and representatives. Key issues identified during the interviews included potential project benefits to commute times and congestion, potential environmental impacts, project alternatives and funding, and public outreach/participation.

4.1.3 Community Open House and Scoping Meetings

Two Community Open House (Project Scoping) Meetings were offered for the general public on April 26 and 29, 2004. The April 26 meeting was held at the Best Western Seacliff Inn in Aptos from 6:00 p.m. to 8:30 p.m. The April 29 meeting was held at the Simpkins Family Swim Center in Santa Cruz from 6:00 p.m. to 8:30 p.m. Holding two meetings at different locations provided better corridor coverage than a single meeting and enabled community members to attend the meeting that was closer to their home or work location. Attendees included property owners, residents, businesses, community groups, elected officials, and local, state, and federal agencies. A total of 156 people attended both meetings; 26 comment cards were received during and immediately following the meeting and approximately 225 verbal comments were recorded. A court reporter was not present at the meetings.

Both of the meetings addressed project development, purpose, need, and alternatives. Display boards with project information, maps, schedules, costs, and preliminary alternatives were presented at the meetings. A PowerPoint presentation, which summarized the project and current activities, was also provided. Attendees were given the opportunity to ask questions and provide comments to project staff on a one-on-one basis during the Open House portion of the meetings. Following the Open House and presentations, participants were divided into smaller groups where each group assembled its own list of key issues and concerns. Each group then reported its results back to the full assembly.

Comment cards also were distributed for participants to complete at the meeting. Follow-up comments by e-mail or letter were also requested. Key issues identified during the meeting included traffic congestion; pedestrian and bicycle access; noise impacts and mitigation; visual impacts and mitigation; air quality impacts; environmental impacts; viable alternatives; land use and property value impacts; and project funding.

4.2 Other Public Agency Consultation and Coordination

This section covers project organization, which involves a variety of public agencies, and the status of agency consultations required by various environmental laws. Many federal, state, regional, and local agencies were consulted, either as part of the early public and agency consultation process or in conjunction with environmental laws. See Chapter 6, Distribution List, for a detailed list of agencies noted for distribution of this environmental document. Section 4.5, Chronology of Coordination, provides a chronology of meetings, workshops, and hearings that reflect ongoing public agency consultation and coordination.

4.2.1 Project Organization and Related Agency Coordination

The Federal Highway Administration, Caltrans, and RTC are cooperating in preparing the environmental studies and environmental document for the Santa Cruz Route 1 Tier I and Tier II Environmental Impact Report/Environmental Assessment. The Federal Highway Administration is the lead agency under the National Environmental Policy Act, Caltrans is the lead agency under the California Environmental Quality Act, and RTC is the local agency sponsor.

Project Development Team

The Project Development Team comprises RTC and Caltrans and Federal Highway Administration staff; representatives of the Association of Monterey Bay Area Governments, the County of Santa Cruz, Cities of Santa Cruz, Watsonville, Capitola, and Scotts Valley; and members of the project consultant team. The Project Development Team meets periodically to provide technical and policy guidance throughout development of the project.

Santa Cruz County Regional Transportation Commission

RTC is the local agency sponsor for the Santa Cruz Route 1 Tier I and Tier II Environmental Impact Report/Environmental Assessment. RTC is responsible for delivering a full range of safe, convenient, reliable, and efficient transportation choices for the community. With a focus on long-term sustainability, RTC plans, funds, and implements transportation projects and services. RTC has 12 voting members, including all five members of the Santa Cruz County Board of Supervisors; one member from each of the cities of Capitola, Santa Cruz, Scotts Valley, and Watsonville; and three appointed members from the Santa Cruz Metropolitan Transit District (Metro) Board of Directors; Caltrans participates with a non-voting member. The Commission meets monthly to set priorities for transportation capital improvements; pursue and allocate transportation funding; adopt transportation policies; plan for future transportation projects; and inform the public about transportation resources and transportation systems management.

RTC has taken formal actions to adopt the preliminary project purpose and need statement (on January 8, 2004) and identify the initial alternatives to be considered for evaluation in the environmental document (on January 20, 2005). It also hears public testimony on a range of issues related to the project. Staff and the consultant team debrief RTC on a quarterly basis to report on project progress, including the status of preliminary design, alternatives development, environmental studies, public outreach, and the project schedule.

Highway 1 Construction Authority

The Highway 1 Construction Authority was established in January 2004 through a Joint Powers Agreement between the cities of Capitola, Scotts Valley, and Watsonville; Santa Cruz County; and the Santa Cruz Metropolitan Transit District. The Highway 1 Construction Authority was created as a single-purpose agency to take the lead role in Highway 1 project implementation. The Highway 1 Construction Authority suspended meetings in 2008 and directed that RTC retain management of the project. If funds are secured for project design and construction, the Highway 1 Construction Authority may resurrect its role to manage implementation of the project.

Transportation Funding Task Force

The Transportation Funding Task Force was a broad-based committee with 77 members representing community groups, business interest, environmental groups, seniors and disabled individuals, transportation partners, medical interests, safety groups, neighborhoods, schools, visitors, agriculture, and minorities. The Transportation Funding Task Force was charged with developing a package of transportation projects and funding that had a wide base of support throughout the community. The Transportation Funding Task Force met throughout 2006 and 2007, including community workshops held in various locations throughout the county, to craft a draft plan for presentation to RTC. In November 2007, the

Transportation Funding Task Force adopted a Mobility Plan calling for a ½-cent transportation sales tax for a 35-year period to increase mobility and decrease greenhouse gas emissions. RTC received the Mobility Plan; however, plans to advance a sales tax initiative were put on hold in early 2008 due to the projected downturn in the economy at that time. The Transportation Funding Task Force has ended its work and no longer meets.

4.2.2 Consultations under Endangered Species Acts

Consultation with the U.S. Fish and Wildlife Service and the National Oceanic and Atmospheric Administration Fisheries Service under the Federal Endangered Species Act §7 and with the California Department of Fish and Wildlife under the California Endangered Species Act is required if the project would likely adversely affect threatened, endangered, or candidate biological species.

Pursuant to the Federal Endangered Species Act § 7, consultation with the U.S. Fish and Wildlife Service may be necessary for potential impacts of the Tier I Corridor alternatives to the following federally listed species: marsh sandwort, Monterey spineflower, robust spineflower, Santa Cruz tarplant, tidewater goby, California tiger salamander, Santa Cruz long-toed salamander, California red-legged frog, and least Bell's vireo. Consultation with the National Oceanic and Atmospheric Administration (NOAA) Fisheries may be necessary for potential impacts to central California coast steelhead. Section 7 consultation with the U.S. Fish and Wildlife Service will be conducted as portions of the selected Tier I alternative are advanced to Tier II environmental review. For the Tier II Auxiliary Lane Alternative, Section 7 consultation will be completed prior to the approval of the Final Environmental Impact Report/Environmental Assessment for potential impacts of this alternative to tidewater goby and California red-legged frog.

Informal consultation with the U.S. Fish and Wildlife Service was initiated in 2003. On July 14, 2003, a letter was sent to the U.S. Fish and Wildlife Service, requesting a species list. Caltrans also requested a field visit and a meeting with the U.S. Fish and Wildlife Service. Since 2003, consultation has been ongoing. Meetings and phone calls have been held to determine the presence/absence of species in certain locations, and potential mitigation. Updated lists of species relevant to the Biological Study Area have also been obtained from the U.S. Fish and Wildlife Service, most recently on October 20, 2014.

Biological Assessments will be required for future Tier II projects as they are advanced to environmental review. A Biological Assessment is currently required for the Tier II Auxiliary Lane Alternative and will be submitted to the U.S. Fish and Wildlife Service and the NOAA Fisheries during a consultation process to determine if a federal Biological Opinion and Incidental Take Statement would be required for the proposed project.

A Section 2081 Incidental Take Permit from the California Department of Fish and Wildlife to comply with the California Endangered Species Act may be necessary for potential impacts to marsh sandwort, Santa Cruz tarplant, San Francisco popcorn flower, and least Bell's vireo. Incidental take cannot be authorized for Santa Cruz long-toed salamander or white-tailed kite due to their Fully Protected status. Permission to relocate the several California Species of Special Concern that may be encountered during construction may also be required, in the form of a letter of permission from the California Department of Fish and Wildlife.

4.2.3 Consultations Pursuant to Section 106 of the National Historic Preservation Act

Consultations Regarding Archaeological and Historical Resources

Surveys were conducted within the Area of Potential Effects for archaeological and architectural resources that are listed on, or eligible for, the National Register of Historic Places and/or the California Register of Historic Resources, or that have historic significance locally.

Letters on behalf of the project sponsor were sent to organizations and agencies with a known interest in historic period resources within the general project area. The following entities were contacted: Santa Cruz County Historic Resources Commission, Santa Cruz Historic Preservation Commission, Santa Cruz Historical Society, Scotts Valley Historical Society, Pajaro Valley Historical Association, Aptos History Museum, Capitola Historical Museum, and the Museum of Art and History. Only one letter was received in return. The City of Santa Cruz provided copies of the City's historic resources inventories, as well as a historic context report completed for the City.

A Preliminary Archaeological Survey Report, a Historic Resources Evaluation Report, and a Preliminary Historic Properties Survey Report were prepared and submitted to the Office of Historic Preservation on December 13, 2010. On March 17, 2011, the State Historic Preservation Officer concurred in the eligibility findings; a copy of the State Historic Preservation Officer's letter is provided in Appendix J, Agency Correspondence.

The State Historic Preservation Officer concurred with the determination that 78 architectural history properties and 3 archaeological properties within the Area of Potential Effects are not eligible for the National Register. Three archaeological sites remain unevaluated for their National Register eligibility. Caltrans and the Federal Highway Administration have determined the necessity of delaying Phase II testing on these three sites until the final preferred alternative is selected to avoid unnecessary impacts to site portions that would not otherwise be disturbed during project construction. Following identification of a preferred alternative, subsurface investigations will be conducted in coordination with the State Historic Preservation Office and Native American contacts to determine whether the portion of the sites within the direct impact areas meet the criteria for National Register eligibility. As such, a supplemental Historic Properties Survey Report will be submitted based on the findings. If the preferred alternative would result in effects on an eligible property, a Finding of Effects will be prepared and submitted to the Office of Historic Preservation for concurrence. In the unlikely event that adverse effects are anticipated, a Memorandum of Agreement, setting forth conditions and measures for avoiding harm to the resources, will be prepared for execution by Federal Highway Administration, Caltrans, the Advisory Council on Historic Preservation, and State Historic Preservation Officer. These investigations and consultations will form the basis for avoidance and mitigation measures to minimize harm to resources during project construction. State Historic Preservation Officer concurrence in the eligibility determinations and effect findings and execution of the Memorandum of Agreement by all agencies will conclude consultations under the Historic Preservation Act.

Tribal Coordination

The Native American Heritage Commission was contacted to perform a Sacred Lands file search. Contacts provided by the Native American Heritage Commission were requested to share information, express concerns, and make recommendations regarding this project. Native American consultation was conducted during 2005 over the course of several quarterly meetings with the Muwekma Ohlone Indian Tribe. The draft Archaeological Survey Report was submitted for review by the Muwekma Ohlone Indian Tribe during 2005. No ongoing concerns have been expressed.

Consultation with the Native American representatives of the Ohlone groups is continuing. Once a preferred alternative is identified, interested Native American individuals will be offered the opportunity to attend a site tour and will be able to fill out a form if they are interested in monitoring during archaeological Phase II testing. Within 15 working days following completion of any test excavations, representatives of the Ohlone community will be provided with copies of Native American monitoring logs and a preliminary letter report describing the initial test findings. All interested parties will receive and be able to comment on the draft test report, and the final report will be provided to those individuals who request a copy.

4.2.4 Consultations under Other Laws

California Coastal Commission

The project corridor from San Andreas/Larkin Valley Road to Morrissey Boulevard is located in the Central Coast District (California Coastal Commission Web page, http://www.coastal.ca.gov/address.html) of the Coastal Zone, where the California Coastal Commission retains permanent coastal permit jurisdiction over proposed development. The California Coastal Commission has designated three Critical Coastal Areas near the proposed project area, which include the San Lorenzo River Critical Coastal Area, the Soquel Lagoon Critical Coastal Area, and the Aptos Creek Critical Coastal Area. On January 16, 2007, and March 19, 2008, Caltrans, RTC, and consultants met with the California Coastal Commission to discuss the project and coastal zone resources. Consultation with the California Coastal Commission is ongoing pursuant to obtaining the required Coastal Development Permit (Santa Cruz County) and federal coastal consistency determination (California Coastal Commission).

Federal Emergency Management Agency and Santa Cruz County Planning Department

Gregor Blackburn, Senior Natural Hazards Program Specialist with the Federal Emergency Management Agency, and Jessica DeGrassi, Resource Planner for the Santa Cruz County Planning Department, were contacted to discuss proposed project impacts to the watershed and floodplain. Due to the encroachment on the regulatory floodways, the Santa Cruz County Planning Department will review project documentation after selection of the preferred alternative to determine if floodplain map revisions are necessary. The Location Hydraulic Study will also be reviewed by the Federal Emergency Management Agency and the Santa Cruz County Planning Department during public circulation of the Draft Environmental Impact Report/Environmental Assessment to evaluate impacts to the affected watershed and floodplains, and identify required permits. It is not anticipated that a floodplain map revision is necessary. Upon identification of the final design alternative, necessary permits will be obtained.

4.3 Ongoing Public Participation

Caltrans and RTC prepared a Public Involvement Plan on March 25, 2004, that created a public outreach approach for the Santa Cruz HOV Project, as it was known at that time. The public involvement plan defines outreach objectives; identifies key interested parties and issues; and sets forth an approach that will ensure timely and effective dissemination of information, promote two-way communication between lead agencies and the community, fulfill California Environmental Quality Act and National Environmental Policy Act public involvement requirements, and ensure comprehensive documentation of public input. Methods identified to encourage public participation include the scoping meetings, other public information meetings, focused workshops, development of a project Web page, newsletters and press releases, and public hearings to obtain public comments on the draft environmental document.

4.3.1 Public Information Meetings

Three Public Information Open House Meetings were conducted on September 20, 26, and 27, 2006, from 5:00 p.m. to 8:00 p.m. The purpose of these meetings was to update the community on the ongoing studies; obtain their input on the proposed project, refinement of alternatives and environmental issues; and clarify the relationship between the proposed project and other related projects in the vicinity. The September 20 meeting was held at the Best Western Seacliff Inn in Aptos. The September 26 meeting was conducted at Watsonville High School in Watsonville. The September 27 meeting was held at Senior Citizens Opportunities, Inc. in Santa Cruz. Multiple meetings were designed to provide better corridor coverage and convenience to prospective attendees.

The public information meetings were announced through an informational flyer that was mailed to 10,000 property owners, residents, and businesses within 500 feet of the project area, and to approximately 2,000 special interest groups, agencies, and elected officials. A display ad was also used to invite participation and was placed in the *Santa Cruz Sentinel, Register Pajaronian, Good Times, Metro Santa Cruz, Aptos Times, Mid-County Post*, and *Scotts Valley Banner/Valley Post*. In most cases, the ad ran twice in each newspaper. RTC also translated it into Spanish for placement in *La Ganga*. In addition to the direct mailer and display ad, sandwich boards promoting the two meetings were strategically placed along the corridor, often near on ramps to Highway 1; people on RTC's e-mail distribution list received notification electronically. Personalized invitations were also mailed to elected officials. Attendees included property owners, residents, businesses, community groups, elected officials, and local, state, and federal agencies. Based on the meeting sign-up sheets, a total of approximately 130 people attended all three meetings.

Display boards with the project description/map, schedule, alternatives, project purpose and need, environmental review process, updated traffic information, cost and funding, and the right-of-way acquisition process were available for viewing. Attendees could ask questions and provide comments to project staff on a one-on-one basis. Comment sheets were distributed for participants to complete at the meeting. Follow-up comments by e-mail or letter were also requested. Key issues identified during the meeting included project need; design and operation; traffic congestion and circulation; right-of-way acquisition; noise impacts and mitigation; visual impacts and mitigation; air quality impacts; potential flooding due to project construction; environmental impacts; viable project alternatives; project scheduling and funding; land use and property value impacts; public outreach and participation opportunities; and project relationship to other transportation projects.

4.3.2 Bicycle/Pedestrian Meetings

Meetings were held on May 19 and May 24, 2005, to enable the community to participate in determining the appropriate location of three proposed pedestrian/bicycle crossings of

Highway 1. Attendees included property and business owners, residents, community groups, elected officials, and state and local agency representatives. Information provided at the meetings included overall project development and design alternatives, as well as alternative locations being considered for the pedestrian/bicycle overcrossings. Key issues identified during the meetings included accessibility needs, transportation connections, traffic movements, safety, environmental impact concerns, and design alternatives. Locations were identified for the new bicycle and pedestrian crossings at Mar Vista Drive, Chanticleer Avenue, and Trevethan Avenue, which have been incorporated into the project alternatives. In recent actions, on February 13, 2012, and March 11, 2013, RTC presented the Chanticleer Avenue bicycle/pedestrian overcrossing plans to the RTC Bicycle Committee.

4.3.3 Coordination with Union Pacific Railroad

On October 12, 2012, RTC acquired right-of-way from the Union Pacific Railroad for the stretch of rail line that extends from Davenport to Santa Cruz, known as the Santa Cruz County Branch line. The facility will be used to provide commuter and recreational user rail service between those points. Prior to the acquisition of right-of-way, the project team engaged in extensive coordination with the previous owner, the Union Pacific Railroad, to identify those aspects of the project that would affect services during construction.

4.3.4 Newsletters

RTC issued the first project newsletter on April 15, 2005. It presented the preliminary project alternatives, project schedule, and briefly described the environmental studies that were planned to be conducted. The newsletter was directly mailed to property owners, residents, businesses, community groups, elected officials, and local, state, and federal agencies. RTC issued another newsletter in summer 2007, updating the community on the progress of the studies. RTC plans to issue a third newsletter just prior to the circulation of the Draft Environmental Document, anticipated in 2015, that will describe the alternatives evaluated in the Tier I/II DEIR/EA and summarize the range of studies conducted and the schedule of public hearings to be held on the Tier I/II DEIR/EA. RTC may issue a fourth newsletter, following the release of the Final Environmental Document, to notify interested parties of the identification of the preferred alternative, the outcome of the studies, and the next steps to implement the project.

4.3.5 Press Releases

Several project press releases and public service announcements have been issued by Caltrans and RTC for publication in local newspapers and community newsletters, and airing on community-access broadcast media. Press releases were issued on March 31, 2003, April 19, 2004, and April 21, 2004, prior to the Community Open House/Scoping Meetings in April 2004. These press releases included project information, purpose and need, scheduling, funding, current activities, and public meeting times and locations. In addition to the press releases, a letter was sent to local elected officials on April 5, 2004, providing project and upcoming meeting information.

Press releases were also issued to local newspapers, radio stations, and local TV stations on September 14 and 22, 2006, prior to the Public Information Open House Meetings held in September 2006. On September 13, 2006, a letter was sent to local, state, and federal elected officials, providing project and open house meeting information.

A similar public notification and community outreach effort will be undertaken with release of the Tier I/II DEIR/EA. RTC is planning on conducting three public Open Houses/ Public Hearings geographically spread across the county in recognition of the importance of this project to the mobility needs of the community.

4.3.6 Project Web Site

RTC maintains a Santa Cruz Highway 1 HOV Lane Project Web site at http://www.sccrtc.org/projects/streets-highways/1hov/. The Web site offers updated information and graphics on the project purpose and need, alternatives, ongoing studies, emerging issues, and schedule. Information on upcoming project events, such as community information meetings or upcoming public hearings, is posted on the Web site. Members of the community may use the Web site to contact RTC with issues or concerns about the project.

4.3.7 Public Hearings

The Tier I/II DEIR/EA will be circulated for review to elected officials, and federal, state, and local agencies and other interested parties as shown in Chapter 6, Distribution List. A Notice of Availability will be provided through the Office of Planning and Research (State Clearinghouse). It is anticipated that at least one public meeting will be held within the project corridor during the public circulation phase. Advance notice of the date, time, and locations of the meeting will be provided through direct mail notification, publication of notices in newspapers of general circulation, and press releases and public service announcements to local media and community newspapers and newsletters. A summary of the proceedings of the public meeting, along with written responses to all of the comments received at the meeting and other written comments provided during the public comment period, will be included in the Final Environmental Document.

4.4 Comments and Response to Comments

Comments on the Route 1 Tier I and Tier II Environmental Impact Report/Environmental Assessment will be solicited from public agencies, interested parties, and the public at large as described in the previous subsection. Written responses to all substantive comments received at the public hearings and in writing during the public comment period will be published in the Final Environmental Document.

4.5 Chronology of Coordination

Table 4-1 presents a chronology of coordination meetings held to date as part of the proposed project.

Table 4-1: Chronology of Coordination Meetings September 2008 – Present

Meeting Date	Focus	Meeting Objective
4/3/2008	Project Progress Report	Brief RTC on the progress of the project.
9/4/2008	Project Progress Report	Brief RTC on the progress of the project.
9/9/2008	Speaker's Bureau Presentation to the Freedom Rotary Club, Pajaro Valley	Present project, including project overview, description of project alternatives, information on environmental analysis, and a question and answer session.
9/18/2008	Speaker's Bureau Presentation to the Santa Cruz County Business Council	Present project, including project overview, description of project alternatives, information on environmental analysis, and a question and answer session.
9/26/2008	Presentation to the Santa Cruz Metropolitan Transit District (Metro)	Present project, including project overview, description of project alternatives, findings of the *Transit Market Analysis*, and a question and answer session.
10/1/2008	Presentation to Santa Cruz Sentinel Newspaper Editors and Reporters	Present project, including project overview, description of project alternatives, information on environmental analysis, and a question and answer session.
10/20/2008	Presentation to California Highway Patrol, Santa Cruz Area Commander and Patrol Supervisor	Present project, including project overview, description of project alternatives, information on design elements including California Highway Patrol enforcement areas on freeway ramps and the mainline, proposed interchange design, and a question and answer session.
10/24/2008	Follow up to presentation to the Santa Cruz Metropolitan Transit District (Metro) on 9/26/2008	Respond to questions regarding operational restrictions of the proposed Santa Cruz Highway 1 HOV Lane Project and the *Transit Marketing Analysis.*
10/28/2008	Presentation to the Santa Cruz City Council	Present project, including project overview, description of project alternatives, information on environmental studies and the *Transit Market Analysis*, and a question and answer session.
11/6/2008	Project Progress Report	Brief RTC on the progress of the project.
1/8/2009	Project Progress Report	Brief RTC on the progress of the project.
5/7/2009	Project Progress Report	Brief RTC on the progress of the project.

Table 4-1: Chronology of Coordination Meetings
September 2008 – Present

Meeting Date	Focus	Meeting Objective
5/18/2009	Presentation to RTC's Bicycle Advisory Committee	Provide an overview of the project with a focus on the methodology and conclusions of the *Bike Lane Feasibility Study.*
6/30/2009	Presentation to Santa Cruz County Supervisor and Staff	Present overview of the project with a focus on the proposed design alternatives for the Soquel Avenue interchange, and the 41st Avenue and Bay Avenue/ Porter Street couplet design options.
7/7/2009	Presentation to Capitola Mayor, City Manager, Public Works Director, and Community Development Director	Present overview of the project with a focus on the proposed design alternatives for the 41st Avenue and Bay Avenue/Porter Street couplet.
7/9/2009	Presentation to Santa Cruz County Public Works, Community Development & Planning, and the Redevelopment Directors and Staff	Present overview of the project with a focus on the proposed design alternatives for the 41st Avenue and Bay Avenue/Porter Street couplet, and the Soquel Avenue interchange.
7/13/2009	Presentation to City of Santa Cruz Public Works and Community Development Directors and Staff	Present overview of the project with a focus on the proposed design alternatives for the Morrissey Boulevard interchange.
9/3/2009	Project Progress Report	Brief RTC on the progress of the project.
11/5/2009	Project Progress Report	Brief RTC on the progress of the project.
3/4/2010	Presentation to the Monterey Bay Chapter of the American Society of Civil Engineers	Present overview of the project, including description of project alternatives and performance measures, and proposed work in the development of the Sustainable Access Rating System.
3/24/2010	Presentation to the Monterey Bay Chapter of the American Public Works Association	Present overview of the project, including description of project alternatives and performance measures, and proposed work in the development of the Sustainable Access Rating System.
4/1/2010	Project Progress Report	Brief RTC on the progress of the project.
4/12/2010	Presentation to Santa Cruz County Supervisor and Director of Public Works Agency and Staff	Present overview of the project with a focus on the proposed design alternatives for the State Park Drive, Rio del Mar Boulevard, and Freedom Boulevard interchanges.
4/12/2010	Presentation to Santa Cruz County Supervisor and Director of Public Works Agency and Staff	Present overview of the project with a focus on the proposed design alternatives for the Soquel Avenue interchange.
4/12/2010	Presentation to Santa Cruz County Supervisor and Director of Public Works Agency and Staff	Present overview of the project with a focus on the proposed design alternatives for the Morrissey Boulevard interchange.
5/3/2010	Presentation to the City of Santa Cruz Mayor, Deputy City Manager, and Directors of the Public Works and Community Development Agency	Present overview of the project with a focus on the proposed design alternatives for the Morrissey Boulevard interchange.

Table 4-1: Chronology of Coordination Meetings September 2008 – Present

Meeting Date	Focus	Meeting Objective
5/4/2010	Presentation to the City of Capitola Mayor, City Manager, and Directors of the Public Works and Community Development Agency	Present overview of the project with a focus on the proposed design alternatives for the 41st Avenue and Bay Avenue/Porter Street couplet, and Park Avenue interchanges.
6/9/2010	Presentation to Santa Cruz County Supervisor and Director of Public Works Agency and Staff	Present overview of the project with a focus on the proposed design alternatives for the 41st Avenue and Bay Avenue/Porter Street couplet interchange.
6/15/2010	Presentation to the Santa Cruz Chamber of Commerce	Present overview of the project, including description of project alternatives and performance measures, and proposed work in the development of the Sustainable Access Rating System.
6/23/2010	Presentation to Santa Cruz County Administrators and Directors of Public Works and Redevelopment Agency and Staff	Present overview of the project with a focus on the proposed design alternatives for the Soquel Avenue interchange.
6/28/2010	Presentation to Santa Cruz County Administrators and Directors of Public Works and Redevelopment Agency and Staff	Present overview of the project with a focus on the proposed design alternatives from the 41st Avenue and Bay Avenue/Porter Street couplet interchanges and subsequent interchanges down the corridor to the south.
8/5/2010	Project Progress Report	Brief RTC on the progress of the project.
1/13/2011	Project Progress Report	Brief RTC on the progress of the project.
1/19/2011	Presentation to the Action Pajaro Valley - Growth Management Committee	Present project, including project overview, description of project alternatives, information on environmental studies and the *Transit Market Analysis*, development of the Sustainable Access Rating System, and a question and answer session.
2/13/12	Presentation at meeting of the Regional Transportation Commission's Bicycle Committee	Information on the proposed pedestrian overcrossing was presented and discussed with the committee.
3/11/13	Presentation at meeting of the Regional Transportation Commission's Bicycle Committee	Information on the proposed pedestrian overcrossing was presented and discussed with the committee.

Chapter 5 List of Preparers

Oversight Staff

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Chapter 6 Distribution List

The following agencies, organizations, and individuals received printed or electronic copies of this document. Organizations, businesses, and individuals on the project mailing list, which included additional addresses, were notified of the availability of this document and of public meetings as described in Chapter 4.

Federal Agencies

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State Agencies

Office of Planning and Research
State Clearinghouse
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California Transportation Commission
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Terry Corwin
Executive Director
Land Trust of Santa Cruz County
617 Water Street
Santa Cruz, California 95060

Cesar Lara
Executive Director
Monterey Bay Central Labor Council
931 E. Market Street
Salinas, California 93905

Debbie Bulger
Mission Pedestrian
1711 Mission Street
Santa Cruz, California 95060

Arana Gulch Watershed Alliance
345 Lake Ave, Ste E
Santa Cruz, California 95062

Federal Elected Officials

The Honorable Barbara Boxer
United States Senator, State of California
1700 Montgomery Street, Suite 240
San Francisco, California 94111

The Honorable Dianne Feinstein
United States Senator, State of California
One Post Street, Suite 2450
San Francisco, California 94104

The Honorable Anna G. Eshoo
United States Representative, 18th District
698 Emerson Street
Palo Alto, California 94301

The Honorable Sam Farr
United States Representative, 20th District
701 Ocean Street, Room 318C
Santa Cruz, CA 95060

State Elected Officials

The Honorable Bill Monning
Member of the Senate, 17th District
701 Ocean St. Suite 318A
Santa Cruz, CA 95060

The Honorable Mark Stone
Member of the Assembly, 29th District
701 Ocean Street, Room 318-B
Santa Cruz, California 95060

Local Elected Officials

John Leopold, District 1
Santa Cruz County Board of Supervisors
701 Ocean Street, Room 500
Santa Cruz, California 95060

Zach Friend, District 2
Santa Cruz County Board of Supervisors
701 Ocean Street, Room 500
Santa Cruz, California 95060

Neal Coonerty, District 3
Santa Cruz County Board of Supervisors
701 Ocean Street, Room 500
Santa Cruz, California 95060

Greg Caput, District 4
Santa Cruz County Board of Supervisors
701 Ocean Street, Room 500
Santa Cruz, California 95060

Bruce McPherson, District 5
Santa Cruz County Board of Supervisors
701 Ocean Street, Room 500
Santa Cruz, California 95060

Mayor Don Lane
Santa Cruz City Council
809 Center Street, Room 10
Santa Cruz, California 95060

Cynthia Chase
Santa Cruz City Council
809 Center Street, Room 10
Santa Cruz, California 95060

Pamela Comstock
Santa Cruz City Council
809 Center Street, Room 10
Santa Cruz, California 95060

Richelle Noroyan
Santa Cruz City Council
809 Center Street, Room 10
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Vice Mayor Cynthia Mathews
Santa Cruz City Council
809 Center Street, Room 10
Santa Cruz, California 95060

Micah Posner
Santa Cruz City Council
809 Center Street, Room 10
Santa Cruz, California 95060

David Terrazas
Santa Cruz City Council
809 Center Street, Room 10
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Mayor Dennis Norton
Capitola City Council
420 Capitola Avenue
Capitola, CA 95010

Vice Mayor Ed Bottorff
Capitola City Council
420 Capitola Avenue
Capitola, CA 95010

Stephanie Harlan
Capitola City Council
420 Capitola Avenue
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Michael Termini
Capitola City Council
420 Capitola Avenue
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Jacques Bertrand
Capitola City Council
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Christine McBroom
Capitola City Treasurer
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Mayor Dr. Nancy A. Bilicich
Watsonville City Council
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Watsonville, CA 95076

Mayor Pro Tempore Felipe Hernandez
Watsonville City Council
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Jimmy Dutra
Watsonville City Council
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Watsonville City Council
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Trina Coffman-Gomez
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Mayor Dene Bustichi
Scotts Valley City Council
1 Civic Center Drive
Scotts Valley, CA 95066

Vice Mayor Donna Lind
Scotts Valley City Council
1 Civic Center Drive
Scotts Valley, CA 95066

Stephany Aguilar
Scotts Valley City Council
1 Civic Center Drive
Scotts Valley, CA 95066

Randy Johnson
Scotts Valley City Council
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Jim Reed
Scotts Valley City Council
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