SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project

ALAMEDA COUNTY, CALIFORNIA
DISTRICT 4 – ALA – 84 (PM 17.9/22.9)
DISTRICT 4 – ALA – 680 (PM 10.3/15.3)
EA 04-297630/EFIS 0415000040

Draft Environmental Impact Report/ Environmental Assessment

Prepared by the State of California, Department of Transportation and the Alameda County Transportation Commission

The environmental review, consultation, and any other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 U.S.C. 327 and the Memorandum of Understanding dated December 23, 2016 and executed by FHWA and Caltrans.

Caltrans

October 2017

General Information about This Document

What's in this document:

The California Department of Transportation (Caltrans), as assigned by the Federal Highway Administration (FHWA), has prepared this Environmental Impact Report/Environmental Assessment (EIR/EA), which examines the potential environmental impacts of the proposed project located in Alameda County, California. Caltrans is the lead agency under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). The document tells you why the project is being proposed, what alternatives we have considered for the project, how the existing environment could be affected by the project, the potential impacts of each of the alternatives, and the proposed avoidance, minimization, and/or mitigation measures.

What you should do:

- Please read this EIR/EA.
- Additional copies of this EIR/EA and related technical studies are available for review at the Caltrans District 4 Office, 111 Grand Avenue, Oakland, CA 94612; Livermore Public Library, Civic Center, 1188 South Livermore Avenue, Livermore, CA 94550; Rincon Branch Library, 725 Rincon Avenue, Livermore, CA 94551; and Pleasanton Library, 400 Old Bernal Avenue, Pleasanton, CA 94566. This document may be downloaded at the following website: www.dot.ca.gov/d4/84expresswayproject.
- Attend the public meetings:

Wednesday, November 15, 2017 6 to 8 PM Robert Livermore Community Center, Larkspur Room 4444 East Ave Livermore, CA 94550	Thursday, November 16, 2017 6 to 8 PM Sunol Glen Elementary School, Auditorium 11601 Main St Sunol, CA 94586	Tuesday, November 21, 2017 6 to 8 PM Amador Recreation Center 4455 Black Ave Pleasanton, CA 94566

- We'd like to hear what you think. If you have comments about the proposed project, please attend the public meeting and/or send your written comments to Caltrans by the deadline.
    - Send comments via postal mail to:
      Department of Transportation, District 4 Attn: Brian Gassner,
      P.O. Box 23660 MS 8B, Oakland, CA 94623-0660
    - Send comments via email to: 84expresswayproject@dot.ca.gov.
- Be sure to send comments by the deadline: December 18, 2017.

What happens next:

After comments are received from the public and reviewing agencies, Caltrans, as assigned by FHWA, 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 obtained, Caltrans could design and construct all or part of the project.

Alternative Formats:

For individuals with sensory disabilities, this document can be made 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: Brian Gassner, P.O. Box 23660 MS 8B, Oakland, CA, 94623-0660, 510-286-6025 (Voice), e-mail brian.gassner@dot.ca.gov, or use the California Relay Service, 800-735-2929 (TTY), 800-735-2929 (Voice) or 711.

SCH: 2016052033
04-ALA-84 PM 17.9/22.9,
04-ALA-680 PM 10.3/15.3
EA No. 04-297630
EFIS 0415000040

Widen SR 84 from 0.1 mile east of I-680 to 0.1 mile south of Ruby Hill Drive and Improve the SR 84/I-680 Interchange in Alameda County, California (Post Miles SR 84 17.9/22.9, I-680 10.3/15.3).

Draft Environmental Impact Report/Environmental Assessment

Submitted Pursuant to: (State) Division 13, California Public Resources Code
(Federal) 42 USC 4332(2)(C), 49 USC 303, and/or 23 USC 138

THE STATE OF CALIFORNIA
Department of Transportation

Cooperating Agencies: U.S. Army Corps of Engineers, U.S. Fish and Wildlife Service, Federal Highway Administration, California Department of Fish and Wildlife, San Francisco Bay Regional Water Quality Control Board, State Historic Preservation Officer
Responsible Agencies: Alameda County Transportation Commission, California Transportation Commission

10-23-17
Date of Approval

Bijan Sartipi
District Director
California Department of Transportation
NEPA and CEQA Lead Agency

The following persons may be contacted for more information about this document:

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510-286-6025

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Summary

The California Department of Transportation (Caltrans), in cooperation with the Alameda County Transportation Commission (Alameda CTC), proposes to widen and conform State Route (SR) 84 to expressway standards between south of Ruby Hill Drive and the Interstate 680 (I-680) interchange. The project would also improve SR 84/I-680 interchange ramps and extend the existing southbound I-680 High Occupancy Vehicle/express lane[1] (HOV/express lane) northward by approximately 2 miles, to approximately 0.8 mile north of Koopman Road. Figure 1.1-1 shows the location of the project improvements, which would extend from post mile (PM) 17.9 to 22.9 on SR 84 and PM 10.3 to 15.3 on I-680, in Pleasanton, Sunol, and unincorporated Alameda County.

Caltrans, as assigned by the Federal Highway Administration (FHWA), is the lead agency under the National Environmental Policy Act (NEPA). Caltrans is also the lead agency under the California Environmental Quality Act (CEQA).

The purpose of the project is to alleviate existing and projected traffic congestion and improve traffic circulation between SR 84 and I-680, and in the vicinity of the SR 84/I-680 interchange; improve safety for motorists and cyclists on this segment of SR 84; and complete the statutory designation of this segment of SR 84 as an expressway facility. An expressway is a type of highway where access is typically limited to controlled locations such as intersections. The project is needed because high transportation demand leads to congestion and reduced vehicle speeds on SR 84 in the project area. During the afternoon/evening peak commute period, congestion on northbound SR 84 also contributes to a bottleneck at the weaving area on northbound I-680 between the Calaveras Road/SR 84 on-ramp and northbound SR 84 off-ramp. Motorists use local roadways and the I-580/I-680 interchange to avoid the limited capacity and congestion along SR 84, which further congests these routes.

NEPA Assignment

California participated in the "Surface Transportation Project Delivery Pilot Program" (Pilot Program) pursuant to 23 USC 327, for more than five years, beginning July 1, 2007, and ending September 30, 2012. MAP-21 (P.L. 112-141), signed by President Obama on July 6, 2012, amended 23 USC 327 to establish a permanent Surface Transportation Project Delivery Program. As a result, Caltrans entered into a Memorandum of Understanding pursuant to 23 USC 327 (NEPA Assignment MOU) with FHWA. The NEPA Assignment MOU became effective October 1, 2012, and was renewed on December 23, 2016 for a term of five years. In summary, Caltrans continues to assume FHWA responsibilities under NEPA and other federal environmental laws in the same manner as was assigned under the Pilot Program, with minor changes. With NEPA Assignment, FHWA assigned and Caltrans assumed all of the United States Department of Transportation (USDOT) Secretary's responsibilities under NEPA. This assignment includes projects on the State Highway System and Local Assistance Projects off of the State Highway System within the State of California, except for certain categorical

[1] The HOV/express lane is a specially designated freeway lane that is free for vehicles with two or more occupants, motorcycles, and certain alternative fuel vehicles, but also gives single-occupant vehicles the option to pay a toll to use the lane.

exclusions that FHWA assigned to Caltrans under the 23 USC 326 CE Assignment MOU, projects excluded by definition, and specific project exclusions.

About This Environmental Document

The proposed project is a joint project by Caltrans and Alameda CTC, and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both CEQA and NEPA. Caltrans is the lead agency under NEPA. Caltrans is the lead agency under CEQA. In addition, FHWA's responsibility for environmental review, consultation, and any other actions required by applicable Federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 United States Code Section 327 (23 USC 327) and the Memorandum of Understanding dated December 23, 2016 and executed by FHWA and Caltrans.

Some impacts determined to be significant under CEQA may not lead to a determination of significance under NEPA. Because NEPA is concerned with the significance of the project as a whole, often a "lower level" document is prepared for NEPA. 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. Caltrans 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 CEQA, and Caltrans will decide whether to issue a Finding of No Significant Impact (FONSI) or require an Environmental Impact Statement (EIS) for compliance with NEPA. 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.

Proposed Action

This section describes the proposed action and the design alternatives that were developed to meet the previously identified project purpose and need, while avoiding or minimizing environmental impacts. The alternatives are the Build Alternative and the No Build Alternative.

Other alternatives were considered but eliminated as none were deemed viable because of physical constraints and feasibility, or because they did not meet the project's purpose and need. These alternatives are discussed in Section 1.4.7. Caltrans and Alameda CTC are continuing to evaluate additional design refinements that may reduce the project footprint and minimize environmental effects.

Build Alternative

The Build Alternative would include the following modifications to SR 84, I-680, and the SR 84/I-680 interchange.

State Route 84

The proposed project would widen SR 84 from two to four lanes (two in each direction) and overlay and restripe the roadway. The proposed roadway would have 12-foot-wide travel lanes

and 10-foot-wide shoulders. A Class II bikeway[2] would be provided in each direction. Concrete barriers would be placed in the median to enhance user safety.

As part of conforming SR 84 to expressway standards, access would be limited to controlled intersections to improve traffic flow and safety. The project would consolidate existing vehicle access openings to private driveways and rural roads at new frontage roads. The proposed frontage roads would connect to a new signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road. The new intersection and frontage roads would provide access to Little Valley Road on the north side of SR 84 and private driveways and rural roads on the south side of SR 84.

SR 84/I-680 Interchange and Auxiliary Lanes

At the SR 84/I-680 interchange, the project would make the following modifications:

- Construct an approximately 1,000-foot-long auxiliary lane[3] on southbound I-680 to the south of Calaveras Road/Paloma Way, and realign the on-ramp from Paloma Way to southbound I-680.
- Reconstruct the existing two-lane off-ramp from northbound I-680 to northbound SR 84, and extend the existing northbound I-680 auxiliary lane by approximately 1,500 feet from south of Calaveras Road to the northbound I-680/northbound SR 84 split.
- Remove the existing on-ramp from Calaveras Road to northbound I-680, construct a new flyover ramp from Calaveras Road to northbound I-680, and construct a new slip on-ramp from Calaveras Road to northbound SR 84.
- Realign the southbound SR 84 to northbound I-680 connector to merge with the northbound on-ramp to I-680 from Calaveras Road.
- Add an HOV preferential lane to the existing two-lane southbound SR 84 to southbound I-680 on-ramp, making the on-ramp a total of three lanes.

A new Class I bikeway[4] would be provided through the interchange area to connect the southbound SR 84 Class II bikeway with Paloma Way. The bikeway will primarily serve westbound bicycle travel. A new Class II bikeway would be provided along the northbound I-680 on-ramp from Calaveras Road to connect with the northbound SR 84 Class II bikeway.

Interstate 680

On southbound I-680, the project would extend the existing HOV/express lane northward from its current entry point at approximately Calaveras Road to approximately 0.8 mile north of Koopman Road, a distance of approximately 2 miles. The pavement in the center median of southbound I-680 would be widened to accommodate the HOV/express lane. Approximately six overhead signs (including variable toll message signs [VTMS] with pricing information) and toll readers for FasTrak transponders would be installed in the median of I-680. The

[2] A Class II bikeway (bike lane) provides a striped lane for one-way bike travel (Caltrans 2016a).
[3] An auxiliary lane is a lane used for weaving, truck climbing, speed change, or other purposes supplementary to through movement (Caltrans 2015a).
[4] A Class I bikeway (bike path) provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians, with crossflow by motorists minimized (Caltrans 2016a).

northernmost overhead sign would be approximately 1.8 miles north of Koopman Road (at PM 14.2). Proposed project activities between the northernmost overhead sign and the I-680/Sunol Boulevard interchange would be limited to the placement of temporary construction signage.

No Build Alternative

The No Build Alternative proposes no modifications to SR 84, I-680, or the SR 84/I-680 interchange other than routine maintenance and rehabilitation and currently planned and programmed projects. The existing configuration of SR 84, I-680, and the SR 84/I-680 interchange would remain the same.

Project Impacts

Table S-1 summarizes the effects of the Build Alternative in comparison with the No Build Alternative. The proposed avoidance, minimization, and/or mitigation measures to reduce the effects of the Build Alternative are also presented. This environmental document evaluates the potential effects of the Build Alternative. A complete description of potential effects and recommended measures is provided in the specific sections in Chapter 2.

Coordination with Public and Other Agencies

Caltrans filed a Notice of Preparation for an Environmental Impact Report/ Environmental Assessment (EIR/EA) with the State Clearinghouse on May 12, 2016. The filing of the Notice of Preparation began a 30-day scoping period that extended through June 13, 2016. In May 2016, during the 30-day scoping period, three public scoping meetings were held near the project area. Additional information about public scoping for the proposed project is provided in Section 4.1.

Consultation and coordination with public agencies is described in Section 4.2.

Table S-1: Summary of Impacts and Avoidance, Minimization, and/or Mitigation Measures

Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	Build Alternative	
Existing and Future Land Use	None.	The Build Alternative would convert the existing land uses along the frontages of some properties to transportation use.	None.
Consistency with State, Regional and Local Plans and Programs	The No Build Alternative would be inconsistent with some provisions of Plan Bay Area 2040, Alameda County Transportation Expenditure Plan, California Transportation Plan 2040, East County Area Plan, and Pleasanton and Livermore general plans.	By removing oak trees, the Build Alternative would be inconsistent with an East Alameda County Conservation Strategy goal to protect oak woodlands.	None.
Parks and Recreation Facilities	None.	Public access to the privately owned Sunol Paintball Outdoor Park would be temporarily affected during project construction, and permanently modified by the project.	None.
Growth	None.	The Build Alternative would increase capacity and change existing property access but would not change overall land use or provide access to additional parcels.	None.
Farmlands	None.	The Build Alternative would require the permanent partial property acquisitions of approximately 17 acres of grazing land. The Build Alternative would require partial permanent property acquisitions, temporary construction easements (TCEs), and utility easements from six parcels under Williamson Act contracts. The Build Alternative would not require changes to the Williamson Act contracts.	None.

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Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	Build Alternative	
Community Character and Cohesion	None.	The Build Alternative would eliminate direct driveway or rural road access to SR 84 for some properties and provide new frontage roads that connect with SR 84 at a new signalized intersection. Local residents could experience temporary access impacts from the construction closures and detours. Property access would be maintained throughout project construction, although single-night closures may be needed for paving new driveway/road connections and switching traffic.	**TR-1**. During the final design phase for the Build Alternative, a Transportation Management Plan (TMP) will be prepared in accordance with Caltrans requirements and guidelines to minimize the construction-related delays and inconvenience for travelers in the project area. The TMP will address the potential traffic impacts as they relate to staged construction, detours, and other traffic handling concerns associated with construction of the proposed project.
Relocations and Real Property Acquisition	None.	The Build Alternative would result in partial property acquisitions, TCEs, maintenance easements, and utility easements. The Build Alternative would not require any full property acquisitions and would not relocate any residences or businesses.	None.
Utilities/ Emergency Services	None.	The Build Alternative would require relocation of some Pacific Gas and Electric (PG&E) overhead electrical distribution lines and American Telephone and Telegraph (AT&T) aerial telephone lines, which may result in temporary interruptions in service. During project construction, temporary lane closures on SR 84 and full closures of SR 84/I-680 interchange ramps and the Koopman Road and Calaveras Road/Paloma Way undercrossings of I-680 would be required, which could result in short-term, temporary impacts to emergency service providers.	**TR-1** (see above)

Table S-1: Summary of Impacts and Avoidance, Minimization, and/or Mitigation Measures

Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	**Build Alternative**	
Traffic and Transportation/ Pedestrian and Bicycle Facilities	With the No Build Alternative, travel times would be longer and travel speeds would be slower in both 2025 and 2045. In 2025, 6 intersections in the traffic study area would operate at Level of Service (LOS) F during the AM or PM peak period. In 2045, 9 intersections would operate at LOS F.	In 2025 and 2045, the Build Alternative would reduce travel times and increase travel speeds compared to No Build. In 2025, all intersections in the traffic study area would operate at LOS E or better in the AM and PM peak periods. In 2045, all but two intersections would operate at LOS E or better in the AM and PM peak periods. Construction-related closures and detours could result in temporary, short-term disruption to motorists, bicyclists, and pedestrians during project construction.	**TR-1** (see above)
Visual/ Aesthetics	None.	The Build Alternative would result in moderate to low visual impacts to highway users and highway neighbors, with the exception of one residence on SR 84 that would experience moderate-high visual impacts due to the close proximity of project features. New lighting, variable toll message signs (VTMS), and other illuminated signs would have low to moderate light and glare impacts.	**VIS-1**. Any roadside vegetation and irrigation systems that are damaged or removed during project construction would be replaced according to Caltrans policy and highway landscaping standards. **VIS-2**. When trenching for utilities, avoid trenching within drip lines of trees and screening shrubs. Directional drilling that would avoid damaging root systems of established plant material shall be used, when reasonable. Trees and screening shrubs shall be protected from damage during construction. **VIS-3**. Add trees and irrigation within Caltrans right-of-way where necessary to screen residential views of proposed express lane signs and lights. **VIS-4**. Attach all electronic toll readers to sign gantries. **VIS-5**. Incorporate aesthetic features to lessen visual impacts as illustrated in Figures 2.1.10-3, 2.1.10-7, and 2.1.10-9.

Table S-1: Summary of Impacts and Avoidance, Minimization, and/or Mitigation Measures

Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	Build Alternative	
Cultural Resources	None.	Three cultural resources identified within the Area of Potential Effects are considered eligible for inclusion in the National Register of Historic Places. Construction of the Build Alternative has the potential to affect cultural resources.	**CUL-1**. During project construction, implement the monitoring protocols, discovery procedures, chain of command, and treatment and analysis protocols set forth in the Post-Review Discovery and Monitoring Plan. **CUL-2**. If cultural materials are discovered during construction, all earth-moving activity within and around the immediate discovery area will be diverted until a qualified archaeologist can assess the nature and significance of the find. **CUL-3**. If human remains are discovered, further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner contacted. If the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission (NAHC), which will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact the Branch Chief of Cultural Resources, Archaeology.
Hydrology and Floodplain	None.	The Build Alternative would increase the impervious area within the project limits and include roadway widening partially into a floodplain area. The amount of added impervious area below the base flood elevation is minimal.	None.

Table S-1: Summary of Impacts and Avoidance, Minimization, and/or Mitigation Measures

Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	**Build Alternative**	
Water Quality and Storm Water Runoff	The No Build Alternative could have permanent water quality impacts due to continuing congestion and deposition of particulates from exhaust and heavy metals from braking.	Build Alternative construction could have temporary impacts to water quality and storm water runoff from increased erosion and subsequent transport of sediment to surface waters. Spills and fluid leaks from construction vehicles, equipment, or materials may also occur during construction. The proposed roadway widening and ramp modifications would result in the fill or removal of existing ditches, modification or relocation of existing longitudinal drainage structures, extension or relocation of existing cross culverts, and construction of new drainage structures. The added impervious area has the potential to result in hydromodification impacts, including increased bed and bank erosion, loss of habitat, increased sediment transport and deposition, and increased flooding as well as reduction of runoff recharging localized aquifers and regional groundwater volumes.	**WQ-1**. Potential temporary impacts to water quality can be avoided or minimized by implementing standard BMPs recommended for a particular construction activity. This would reduce construction-related impacts to water quality. BMPs are listed in Table 2.2.2-2. **WQ-2**. The Caltrans MS4 permit stipulates that permanent measures that control pollutant discharges must be considered and implemented for all new or reconstructed facilities. In addition, the permit also stipulates that an operation and maintenance program be implemented for permanent control measures, including both design pollution prevention BMPs and treatment BMPs. BMPs listed in Section 2.2.2.4 will be considered to reduce long-term impacts to water quality.
Geology/Soils/ Seismicity/ Topography	The No Build Alternative would be subject to the same geologic, soils, and seismic hazards as the Build Alternative.	The Build Alternative could be exposed to strong earthquake shaking, landslides, and seiche. Liquefaction could damage project structures and the roadway. The project area also contains expansive soils and soils with the potential for settlement and moderate to very severe erosion. Construction of the Build Alternative has the potential to encounter groundwater.	**GEO-1**. Project elements will be designed and constructed to meet seismic design requirements for ground shaking and ground motions, as determined for the project vicinity and site conditions. **GEO-2**. Additional geotechnical subsurface and design investigations will be performed during the final project design and engineering phase including site-specific evaluation of subsurface conditions at the locations of proposed bridge footings and retaining walls, as well as investigations for earthquake-induced liquefaction, soil expansion, compaction settlement, landslide, seiche, erosion, scour and construction dewatering.

Table S-1: Summary of Impacts and Avoidance, Minimization, and/or Mitigation Measures

Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	Build Alternative	
Paleontology	None.	Construction of the Build Alternative would encounter geologic units that are known to contain paleontological resources.	**PAL-1**. Implementation of the measures listed in Section 2.2.4.4 (update and finalize the Paleontological Mitigation Plan once project design is nearly complete, and require paleontological monitoring during construction) would avoid potential impacts to sensitive paleontological resources, if present.
Hazardous Waste/ Materials	None.	Construction and maintenance of the Build Alternative are expected to involve the routine transport, use, and disposal of hazardous materials (e.g., fuels, paints, and lubricants), and could result in the potential disturbance of hazardous materials in soil, groundwater, and building materials.	**HAZ-1**. During the final project design phase, a Preliminary Site Investigation (PSI) will be performed in accordance with current Caltrans guidance to investigate hazardous materials concerns related to soil, groundwater, and building materials within the project limits, as identified in the project Initial Site Assessment (ISA). All environmental investigations for the project will be provided to project contractors, so the findings may be incorporated into their Health and Safety and Hazard Communication Programs.
Air Quality	None.	Construction of the Build Alternative would generate emissions of criteria air pollutants and precursors that could potentially affect air quality.	Caltrans' Special Provisions and Standard Specifications will include the requirement to minimize or eliminate dust during project construction through the application of dust palliatives (water, dust suppressant, or dust binder).
Noise	None.	The Build Alternative would increase future noise levels by up to 4 decibels (dB) over the No Build Alternative. A noise impact would occur at two locations. A traffic noise abatement evaluation following Caltrans procedures did not identify any sound walls that were both feasible (provide a minimum 5 dBA) and reasonable (meet a 7 dBA design goal and other criteria). Construction noise would be temporary and limited in duration. Homes closest to the major areas of road construction work on SR 84 could experience a daytime noise level increase of up to 14 dBA.	**NOI-1**. Standard Caltrans measures that are used for all projects include that construction noise shall not exceed a maximum sound level of 86 dBA at 50 feet from job site activities between the hours of 9:00 PM to 6:00 AM. Measures listed in Section 2.2.7.4 will also be implemented to minimize or reduce the potential for noise impacts from project construction.

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Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	Build Alternative	
Energy	The No Build Alternative would have higher total annual energy use at the regional level than the Build Alternative in 2025 and 2045 because circuitous travel along local roadways and less efficient use of existing highways would result in higher vehicle miles traveled (VMT).	In the project subarea, the total annual energy use for the Build Alternative is expected to increase compared to the No Build Alternative in 2025 and 2045 due to increased vehicle fuel consumption (from increased VMT), project construction, and manufacturing and maintenance of vehicles using the project area. In the project region, the total annual energy use would decrease compared to the No Build Alternative in 2025 and 2045, primarily due to the regional decrease in vehicle fuel consumption, maintenance, and manufacturing related to the reduction in regional VMT. The regional energy benefits would offset the localized increase in energy consumption within the project subarea.	The measures listed in Section 3.2.1.4 will be implemented to reduce greenhouse gas (GHG) emissions and potential climate change impacts from the project, including using energy-efficient lighting, keeping construction engines properly tuned, and limiting idling of construction vehicles.

Table S-1: Summary of Impacts and Avoidance, Minimization, and/or Mitigation Measures

Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	Build Alternative	
Natural Communities	None.	The Build Alternative would result in temporary and permanent impacts to grasslands, forest and woodland, scrubland, and wetland communities. A total of 343 trees may be permanently removed and 786 trees temporarily affected from project activities. Wildlife connectivity across SR 84 would be maintained but nighttime work is expected to temporarily impact diurnal wildlife activities.	**BIO-1**. The measures listed in Section 2.3.1.3 would be implemented as part of construction to minimize and/or avoid impacts to sensitive vegetation communities, species, and habitat as well as to common biological resources. **BIO-2**. Compensatory mitigation for temporary impacts to sensitive vegetation communities or natural communities of concern will be provided through the on-site restoration of habitat and monitoring for success as well as off-site like-habitat preserved through the purchase of mitigation bank credits. **BIO-3**. Post-construction measures will include revegetation of temporarily impacted areas by the planting of trees where appropriate in coordination with the California Department of Fish and Wildlife (CDFW). Additional details for the protection of trees are found in Section 2.3.1.3. **BIO-4**. Tree removal will be mitigated through planting at a 3:1 ratio on-site and off-site for all native species within riparian areas, and for coast live oaks and valley oaks in oak woodlands (including uplands). For other tree species removed in upland areas, Caltrans will provide tree replacement on-site at a minimum 1:1 ratio in the space available. Replanted areas will be monitored for success for up to 10 years. **BIO-5**. Light, glare, and construction noise and vibration impacts will be addressed through the measures listed in Section 2.3.1.3.

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Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	Build Alternative	
Wetlands and Other Waters of the United States	None.	The Build Alternative would permanently impact 0.18 acre of jurisdictional wetlands and 0.04 acre of other waters of the U.S., and temporarily impact 0.18 acre of jurisdictional wetlands and 0.02 acre of other waters of the U.S. The Build Alternative would permanently impact up 782 feet and temporarily impact up to 429 feet of culverted waters of the U.S. In addition, 0.19 acres of potentially State jurisdictional riparian scrub and forest (which are not also U.S. jurisdictional waters) along Vallecitos Creek may be temporarily impacted. Project activities have the potential to result in approximately 4,054 linear feet of temporary impacts and 21,919 linear feet of permanent impacts to non-jurisdictional storm water features. The Build Alternative would not affect functions and values associated with freshwater marsh, seasonal wetlands, and intermittent and ephemeral channels.	**BIO-6**. The General Construction Permit will require the Contractor to submit a storm water pollution prevention plan (SWPPP). The contractor will also comply with the standards/objectives noted in Section 2.3.2.4. **BIO-7**. Permanent impacts to United States Army Corps of Engineers (USACE) jurisdictional wetlands will be mitigated at a minimum 3:1 ratio, and temporary impacts at a minimum 1:1 ratio. Storm water features that are waters of the State will be replaced on-site at a minimum 1:1 ratio. Impacts to riparian habitat will be mitigated through a combination of on-site enhancement of existing habitat and restoration of land within riparian corridors, through the planting of native riparian tree, shrub, and forb species.
Plant Species	None.	The Build Alternative would result in the permanent loss of grassland habitat that could support big tarplant, round-leaved filaree, Congdon's tarplant, and California alkali grass.	**BIO-1** and **BIO-6** (see above) **BIO-8**. Prior to the commencement of construction activities, a qualified biologist shall conduct appropriately timed surveys for big tarplant, round-leaved filaree, Congdon's tarplant, and California alkali grass and botanical inventories during March through May and July through September. If listed plant species are discovered within the construction area, protective measures will be established as described in Section 2.3.3.4.
Animal Species	None.	The Build Alternative has the potential to affect habitat for multiple special-status animal species including western pond turtle, grasshopper sparrow, loggerhead shrike,	**BIO-1, BIO-5,** and **BIO-6** (see above) *Western Pond Turtles:* **BIO-9.** Before any construction activities begin, an approved

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Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	Build Alternative	
		California yellow warbler, western burrowing owl, San Francisco dusky-footed woodrat, American badger, nesting raptors, migratory birds, and "high priority" bats. The Build Alternative could create a barrier to animal movement; however, project design features would reduce the potential for habitat fragmentation. The Build Alternative also has the potential to affect nesting raptors, migratory birds, and special-status and "high priority" bats through the disturbance of nests, foraging habitat, or roosting sites.	biologist(s) shall conduct a training session for all construction personnel. In addition, an approved biologist(s) shall survey the work site no more than 48 hours before the onset of activities for signs of western pond turtles. If western pond turtles or their nesting sites are found, the biologist shall contact CDFW to determine whether relocation and/or exclusion buffers and nest enclosures are appropriate. *Special-Status Bird Species, Migratory Birds, and Nesting Raptors*: **BIO-1** (see above) and Migratory Bird Special Contract Provisions will be adhered to. **BIO-10**. Preconstruction surveys for migratory birds, raptors, other special-status bird species, and appropriate nesting habitat will be conducted within 50 feet of the construction area no more than three days prior to ground disturbing activities. If preconstruction surveys indicate the presence of any migratory bird nests where activities will directly result in bird injury or death, a buffer zone of 50 feet will be placed around the nest. In the event that an active nest is found during construction, all construction activities within a 50-foot radius will be stopped until an approved biologist(s) has evaluated the nest and erected the appropriate buffer around it. If an active raptor or special-status species nest is found, an appropriate buffer area will be established in coordination with CDFW. A biological monitor will be present during the raptor nesting season. **BIO-11**. Appropriate avoidance, minimization, or protection measures shall be determined in consultation with the CDFW in the event an active burrow is located in an area subject to disturbance or as described in Section 2.3.4.4.

Table S-1: Summary of Impacts and Avoidance, Minimization, and/or Mitigation Measures

Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	Build Alternative	
			BIO-12. Focused species surveys will be conducted to determine the presence of tule elk in the project area, prior to the start of construction. **BIO-13**. To avoid or minimize potential impacts on San Francisco dusky-footed woodrat, Caltrans will implement the measures listed in Section 2.3.4.4. **BIO-14**. The measures listed in Section 2.3.4.4 will be implemented to avoid and minimize potential impacts to the American badger. **BIO-15**. Focused preconstruction surveys will be conducted for all areas that provide suitable bat roosting habitat. Sensitive habitat areas and roost sites will be avoided to the maximum extent practicable as described in Section 2.3.4.4. A biological monitor will be present during the trimming or removal of trees/snags. If occupied sites are observed in the biological study area (BSA), Caltrans will provide an appropriate buffer between any occupied roost and construction activities and report occurrence to CDFW. Measures relating to nighttime work include **BIO-5** and the measures listed in Section 2.3.4.4.

Table S-1: Summary of Impacts and Avoidance, Minimization, and/or Mitigation Measures

Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	**Build Alternative**	
Threatened and Endangered Species	None.	The Build Alternative "may affect, and is likely to adversely affect" California tiger salamander, California red-legged frog, and Alameda whipsnake. The Build Alternative "may affect, but is not likely to adversely affect" vernal pool fairy shrimp and San Joaquin kit fox.	**BIO-1** and **BIO-6** (see above) **BIO-16**. The avoidance and minimization measures listed in Section 2.3.5.4 are proposed to avoid impacts to California tiger salamander, California red-legged frog, and Alameda whipsnake. **BIO-17**. Caltrans proposes mitigation for California tiger salamander and California red-legged frog through on-site restoration of all temporarily impacted areas and off-site compensation for permanent impact areas at a 3:1 ratio. Caltrans proposes to purchase 116.25 acres of habitat from an approved mitigation bank, and includes 0.45 acre of mitigation for impacts to potential breeding habitat. **BIO-18**. Caltrans proposes to purchase 50.01 acres of habitat from an approved mitigation bank to compensate for permanent impacts to Alameda whipsnake.
Invasive Species	None.	Project construction has the potential to inadvertently spread noxious weeds.	**BIO-19**. The landscaping and erosion control included as part of the project will not use species listed as invasive. Extra precautions will be taken if invasive species are found in or next to the construction areas such as inspection and cleaning of construction equipment and eradication strategies.
Cumulative Impacts	None.	With the implementation of avoidance, minimization, and/or mitigation measures, the Build Alternative would not contribute to a cumulatively considerable effect.	None.

Table S-1: Summary of Impacts and Avoidance, Minimization, and/or Mitigation Measures

Affected Resource	Potential Impact		Avoidance, Minimization, and/or Mitigation Measures
	No Build Alternative	**Build Alternative**	
Climate Change (CEQA)	The No Build Alternative would have higher carbon dioxide emissions in 2025 and 2045 than the Build Alternative.	Carbon dioxide emissions from the Build Alternative would be lower than those emitted under the No Build Alternative in both 2025 and 2045. The Build Alternative has the potential to temporarily increase greenhouse gas emissions during construction.	**GHG-1.** Measures to reduce greenhouse gas (GHG) emissions and potential climate change impacts from the project include using energy-efficient lighting, keeping construction engines properly tuned, limiting idling of construction vehicles, and improving bicycle/pedestrian infrastructure. Measure TR-1 will minimize delays and idling.

Permits and Approvals Needed

Table S-2 shows the permits, reviews, and approvals that would be required for project construction.

Table S-2: Permits and Approvals Needed

Agency	Permit/Approval	Status
U.S. Army Corps of Engineers (USACE)	Concurrence on delineation of waters of the U.S., and Section 404 permit for placement of fill within waters of the U.S.	● The Jurisdictional Delineation was submitted to USACE for concurrence on March 17, 2017. ● Permit application will be submitted during the project design phase.
U.S. Fish and Wildlife Service (USFWS)	Section 7 consultation for threatened and endangered species	● A Biological Assessment was submitted to the USFWS on July 26, 2017.
Federal Highway Administration (FHWA)	Concurrence with project's conformity to Clean Air Act and other requirements	● Air quality studies will be submitted for FHWA concurrence after public review of this EIR/EA.
California Department of Fish and Wildlife (CDFW)	Section 1602 Lake and Streambed Alteration Permit and Incidental Take Permit	● Permit applications will be submitted during the project design phase.
San Francisco Bay Regional Water Quality Control Board (RWQCB)	Waste discharge requirements under the Porter-Cologne Water Quality Control Act; National Pollutant Discharge Elimination System (NPDES) approval for work greater than one acre	● A joint "Application for 401 Water Quality Certification" and/or "Report of Waste Discharge" will be submitted during the project design phase. ● An NPDES permit application will be submitted during the project design phase. ● A Notice of Intent and Storm Water Pollution Prevention Plan will be prepared/submitted prior to construction.
State Historic Preservation Officer (SHPO)	Concurrence on findings with respect to historic resources and Section 106 requirements	● SHPO concurred with Caltrans' eligibility determinations on October 5, 2017.

Table of Contents

Figures

Tables

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Chapter 1 Proposed Project

1.1 Introduction

The California Department of Transportation (Caltrans), in cooperation with the Alameda County Transportation Commission (Alameda CTC), proposes to widen and conform State Route (SR) 84 to expressway standards between south of Ruby Hill Drive and the Interstate 680 (I-680) interchange. An expressway is a type of highway where access is typically limited to controlled locations such as intersections. The project would also improve SR 84/I-680 interchange ramps and extend the existing southbound I-680 High Occupancy Vehicle/express lane[5] (HOV/express lane) northward by approximately 2 miles, to approximately 0.8 mile north of Koopman Road. Figure 1.1-1 shows the location of the project improvements, which would extend from post mile (PM) 17.9 to 22.9 on SR 84 and PM 10.3 to 15.3 on I-680, in Pleasanton, Sunol, and unincorporated Alameda County.

The project is included in the Metropolitan Transportation Commission's (MTC's) Bay Area Regional Transportation Plan (RTP), *Plan Bay Area 2040* (Association of Bay Area Governments [ABAG] and MTC [2017a]; RTP ID No. 17-01-0029). The project is in the 2017 Transportation Improvement Program (TIP), which was adopted by the MTC on September 28, 2016 (MTC 2016a; TIP ID No. ALA150001). The Federal Highway Administration (FHWA) and Federal Transit Administration (FTA) approved the 2017 TIP on December 16, 2016. The project is also included in the 2014 Alameda County Transportation Expenditure Plan (Alameda CTC 2014).

Caltrans, as assigned by the FHWA, is the lead agency under the National Environmental Policy Act (NEPA). Caltrans is the lead agency under the California Environmental Quality Act (CEQA).

1.2 Background

1.2.1 Location and Route Description

SR 84 follows a discontinuous route that consists of two segments. One segment extends east to west from Livermore to Fremont in Alameda County, crosses San Francisco Bay via the Dumbarton Bridge, and continues from Menlo Park to San Gregorio in San Mateo County. The other segment extends south to north from Rio Vista to the I-80 interchange in Sacramento. In eastern Alameda County, SR 84 provides local access for the cities of Pleasanton and Livermore and the community of Sunol, as well as an alternative east-west link between the Central Valley and the San Francisco Bay Area via the I-580 and I-680 corridors.

In the project area, SR 84 has one to two lanes in each direction and is also known as Vallecitos Road. The posted speed limit ranges from 50 to 55 miles per hour (mph). SR 84 provides direct connection to private driveways and rural roads including Vallecitos Lane, East Vallecitos Road, Little Valley Road, and Vallecitos Atomic Laboratory Road.

[5] The HOV/express lane is a specially designated freeway lane that is free for vehicles with two or more occupants, motorcycles, and certain alternative fuel vehicles, but also gives single-occupant vehicles the option to pay a toll to use the lane

Figure 1.1-1: Project Location

I-680 extends from the I-280/United States Highway 101 (US 101) interchange in San Jose in the south to the I-80/SR 12 interchange in Fairfield in the north. I-680 is a major north-south transportation corridor between Santa Clara and Alameda counties. In the project area, I-680 typically has three general purpose lanes in each direction. The posted speed limit is 65 mph.

1.2.2 History

The proposed project is the final in a series of three projects evaluated in the Caltrans 2003 Project Study Report/Project Development Support (PSR/PDS) for SR 84 between I-580 and I-680 along with other related projects (discussed below) to improve SR 84 as a regional connection. The 2003 PSR/PDS was prepared on request by the Tri-Valley Transportation Council (composed of the County of Alameda, the County of Contra Costa, the City of Livermore, the City of Pleasanton, the City of San Ramon, the City of Dublin, and the Town of Danville) to address the following needs:

- Identify alternative alignments for SR 84 between I-680 and Isabel Avenue/Jack London Boulevard, consistent with the alignment adopted by the California Highway Commission (predecessor of the current California Transportation Commission) in 1960. In 2003, the SR 84 highway designation was transferred from a previous route through downtown Livermore streets to Isabel Avenue.

- Widen SR 84 to accommodate future commuter and commercial traffic from continued population growth in the Tri-Valley region (Dublin, Livermore, and Pleasanton) and the Central Valley.

- Reduce regional traffic diverting from SR 84, I-680, and I-580 to the City of Pleasanton local streets that roughly parallel SR 84 to travel between I-580 and I-680.

- Widen and realign SR 84 through a winding, hilly segment known as Pigeon Pass to improve safety and traffic operations (Caltrans 2003a).

Due to the magnitude of the proposed improvements along the SR 84 corridor, the 2003 PSR/PDS proposed undertaking individual projects with independent utility and logical termini over a long period as necessary to provide a safe and efficient facility. The individual projects were defined based on their ability to provide transportation benefits independent of other corridor improvements, with consideration of funding constraints, environmental factors, and the time needed to complete corridor-wide improvements.

Two projects have been developed and implemented to date. Just east and outside of the proposed project area, SR 84 was widened and conformed to expressway standards between Jack London Boulevard and Concannon Boulevard (PM 25.5 to 27.1; EA 29761; completed in 2014) and between Concannon Boulevard and Ruby Hill Drive (PM 22.9 to 27.3; EA 29762; under construction, to be completed in 2018). On the eastern side of and within the proposed project area, the Pigeon Pass Project (PM 20.7 to 23.0; EA 17240) completed in 2012 realigned and widened SR 84, provided truck climbing lanes, installed safety features such as metal beam guard railing, relocated and consolidated driveways, and constructed undercrossing access for local property owners.

Separate projects on SR 84 included in the 1986 Alameda County Measure B sales tax program created a new I-580/Isabel Avenue interchange (completed in 2011) and extended Isabel Avenue from Airway Boulevard to the Arroyo del Valle Bridge (completed in 2001). These projects were also defined based on their ability to provide transportation benefits independent of other corridor improvements. Together, the two PSR/PDS projects and the two 1986 Measure B projects provide a continuous expressway facility on SR 84 between I-580 and Pigeon Pass, generally addressing the objectives of the 2003 PSR/PDS except in the segment of SR 84 between Pigeon Pass and I-680. The proposed project would provide the final expressway segment to improve SR 84 as a regional connection between I-580 and I-680.

In 2010, an HOV/express lane opened on a 14-mile stretch of southbound I-680 from south of the SR 84 interchange to SR 237 in Milpitas. An HOV/express lane is also planned on northbound I-680 from SR 237 to north of the SR 84 interchange, a distance of approximately 15 miles. The first phase of the northbound HOV/express lane would be constructed in 2017–2018 and would extend from south of Auto Mall Parkway to north of SR 84. Future phases have not yet been programmed.

In 2014, Alameda County voters passed the Measure BB sales tax, which would provide funding for the widening and conforming SR 84 to expressway standards and improvements to the SR 84/I-680 interchange.

1.3 Purpose and Need

1.3.1 Project Purpose

The purpose of the project is to:

- Alleviate existing and projected traffic congestion to improve SR 84 as a regional connection between I-680 and I-580, consistent with other local and regional planning and programmed projects;
- Improve traffic circulation between SR 84 and I-680, and in the vicinity of the SR 84/I-680 interchange;
- Improve safety for motorists and cyclists on this segment of SR 84; and
- Complete the statutory designation of this segment of SR 84 as an expressway facility.

1.3.2 Project Need

The following describes the existing traffic operations on SR 84 and the adjacent portion of I-680 and projected future traffic growth.

1.3.2.1 Capacity, Transportation Demand, and Safety

Capacity and Transportation Demand

State Route 84

SR 84 is a major regional roadway that connects I-680 to I-580 and the cities of Livermore and Pleasanton. SR 84 serves traffic from Livermore, Pleasanton, and I-580 with destinations in

southwestern Alameda County and Silicon Valley. SR 84 is an Officially Designated State Scenic Highway from SR 238 to I-680 (PM 10.8 to 17.9) in Alameda County. The primary traffic movements between SR 84 and I-680 are southbound SR 84[6] to southbound I-680 during the morning peak commute period of 5:00 to 10:00 AM, and northbound I-680 to northbound SR 84 in the afternoon/evening peak commute period of 3:00 to 8:00 PM (Fehr and Peers 2017). These movements are consistent with data showing that Santa Clara County is the third most common work destination in the Bay Area for Alameda County residents, after Alameda and San Francisco Counties (Alameda CTC 2015a). This origin-destination pattern is expected to continue through 2035 as forecasted in MTC's Transportation 2035 Plan for the San Francisco Bay Area (MTC 2008).

SR 84 has one to two lanes in each direction within the project area. High transportation demand leads to congestion and reduced vehicle speeds for approximately 9 hours each weekday. On southbound SR 84, traffic demand exceeds the capacity of the single-lane section between the west side of Pigeon Pass and the I-680 interchange, resulting in congestion from approximately 5:30 AM to 9:00 AM. On northbound SR 84, traffic demand exceeds the capacity of the single-lane section between east of the I-680 interchange and Little Valley Road, resulting in congestion from approximately 3:00 PM to 7:30 PM (Fehr and Peers 2017).

During the afternoon/evening peak commute period, congestion on northbound SR 84 also contributes to a bottleneck at the weaving area on northbound I-680 between the Calaveras Road/SR 84 on-ramp and northbound SR 84 off-ramp (Fehr and Peers 2017). In this weaving area, traffic entering northbound I-680 from Calaveras Road must cross, or weave, to the left through northbound I-680 traffic weaving to the right to head toward northbound SR 84.

At the I-680/SR 84 interchange, a two-lane connector provides access from southbound SR 84 to both southbound I-680 and the continuation of southbound SR 84 toward Sunol and the Dumbarton Bridge. The southbound I-680 connector has ramp metering during peak periods. During the morning peak commute period, vehicles on southbound SR 84 have been observed to avoid traffic backups at the southbound I-680 ramp meter by taking the SR 84/Sunol/Dumbarton Bridge exit and making an illegal through-movement (or a left and then a U-turn on Calaveras Road) to enter southbound I-680 at the on-ramp from SR 84/Paloma Way.

Motorists use local roadways and the I-580/I-680 interchange to avoid the limited capacity and congestion along SR 84, which further congests these routes (Fehr and Peers 2017).

Interstate 680

I-680 is a major north-south transportation corridor connecting Silicon Valley and the surrounding South Bay with the Tri-Valley area and eastern Contra Costa County. I-680 is an Officially Designated State Scenic Highway from SR 238 to Bernal Avenue (PM R6.4 to R16.8) in Alameda County and from the Alameda County line to SR 24 in Contra Costa County. In 2016, MTC ranked the northbound I-680 commute over the Sunol Grade—from

[6] SR 84 is officially designated as a northbound-southbound route; however, it is signed as eastbound and westbound SR 84 in the project area. For purposes of this report, all descriptions of travel movements on SR 84 will correspond to north (for east) and south (for west). All other references to east, west, north, and south will generally correspond to actual compass bearings. In other words, except for descriptions of travel movements SR 84, all other directions are in relation to the north arrow shown in the report figures.

Mission Boulevard in Fremont to Calaveras Road—as the seventh of the ten worst commutes in the Bay Area (MTC 2016b).

In the SR 84 interchange vicinity, I-680 contains three general purpose lanes (with no vehicle type or occupancy restrictions) in each direction. Southbound I-680 has an HOV/express lane that extends from south of the SR 84 interchange to SR 237 in Milpitas. Construction of an HOV/express lane on northbound I-680 from SR 237 to north of the SR 84 interchange is anticipated in 2017–2018.

The general purpose lanes of southbound I-680 are congested from approximately 6:00 AM to 9:45 AM, and traffic demand exceeds capacity where vehicles from the Sunol Boulevard on-ramp merge onto the freeway, approximately 3.4 miles north of the SR 84/I-680 interchange. On northbound I-680, the general purpose lanes are congested from approximately 3:30 PM to 7:30 PM, and traffic demand exceeds capacity where vehicles from the Andrade Road on-ramp merge onto the freeway, approximately 1.3 miles south of the SR 84 interchange (Fehr and Peers 2017).

In the southbound HOV/express lane, the average weekday travel speed from 7:00 AM to 10 AM is 70 mph, compared with 60 mph in the general purpose lanes. The average hourly traffic volume in the HOV/express lane during that period is 1,237 vehicles per hour (vph) (Alameda CTC 2015b). The capacity of an HOV lane is typically considered to be 1,650 vph, which is the threshold of operation needed to provide HOVs with reliable travel time savings.[7]

Safety

Collision data from the Traffic Accident Surveillance and Analysis System (TASAS) were evaluated for SR 84, I-680, and the SR 84/I-680 interchange ramps between post miles (PM) 17.900 and PM R23.101 for SR 84, and PM R9.000 and PM R16.001 for I-680. Collision information is provided for the most recent complete three years of data: January 2011 through December 2013.

Table 1.3.2-1 summarizes the TASAS collision data as it relates the data to the statewide averages for similar facilities. The table shows the 39 queried segments of SR 84, I-680, and the SR 84/I-680 interchange ramps. The locations where the collision rates exceeded the statewide average are shown in bold text, and collision rates are expressed as accidents per million vehicle miles traveled for mainline segments and accidents per million vehicles for ramps.

[7] Title 23, Section 166(d)(2) of the United States Code (USC) set a minimum average operating speed of 45 mph for HOV lanes with a speed limit of 50 mph or higher, which generally corresponds to Level of Service (LOS) C or D and a target threshold of approximately 1,650 vph per HOV lane. LOS D operating conditions in the HOV lane are only allowed with written approval of Caltrans (California Streets and Highways Code Section 149.6[b]).

Table 1.3.2-1: Collision History for State Route 84 and Interstate 680

Facility	Number of Collisions			Collision Rate (accidents/million vehicle miles)					
				Actual			State Average		
	Total	Fatal	Fatal + Injury	Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury	Total
State Route 84 Mainline – Undivided Sections (Bi-directional)									
SR 84 PM 17.000 to PM 17.986	2	0	1	0.000	**1.54**	**3.08**	0.032	0.74	1.47
SR 84 PM T18.540 to PM R19.675	13	1	8	**0.038**	0.31	0.49	0.021	0.39	0.85
SR 84 PM 20.027 to PM 21.108	16	0	5	0.000	0.17	0.52	0.025	0.54	1.15
SR 84 PM 22.967 to PM 22.987	0	0	0	0.000	0.00	0.00	0.026	0.56	1.45
SR 84 PM 23.204 to PM 23.249	0	0	0	0.000	0.00	0.00	0.016	0.56	1.32
SR 84 PM 23.258 to PM R24.971	14	0	8	0.000	0.36	0.63	0.022	0.52	1.24
State Route 84 Mainline – Divided Sections (Directional)									
NB SR 84 PM R17.987 to PM T18.539	9	0	1	0.000	0.12	**1.11**	0.021	0.26	0.59
NB SR 84 PM R19.676 to PM 20.026	12	0	3	0.000	**0.60**	**2.38**	0.022	0.44	0.95
NB SR 84 PM R21.109 to PM R23.133	6	0	2	0.000	0.07	0.21	0.012	0.57	1.33
NB SR 84 PM 22.988 to PM 23.203	3	0	2	0.000	**0.69**	0.69	0.012	0.58	1.37
NB SR 84 PM 23.25 to PM 23.527	2	0	2	0.000	0.54	0.54	0.018	0.55	1.29
NB SR 84 PM R24.972 to PM R25.300	4	0	0	0.000	0.00	1.09	0.028	0.49	1.16
SB SR 84 PM R17.987 to PM T18.539	3	0	1	0.000	0.12	0.37	0.021	0.26	0.59
SB SR 84 PM R19.676 to PM 20.026	8	0	0	0.000	0.00	**1.59**	0.022	0.44	0.95
SB SR 84 PM R21.109 to PM R23.133	18	0	8	0.000	0.25	0.58	0.012	0.57	1.33
SB SR 84 PM 22.988 to PM 23.203	2	0	1	0.000	0.34	0.69	0.012	0.58	1.37
SB SR 84 PM 23.25 to PM 23.527	0	0	0	0.000	0.00	0.00	0.018	0.55	1.29
SB SR 84 PM R24.972 to PM R25.300	2	0	1	0.000	0.27	0.55	0.028	0.49	1.16
Interstate 680 Mainline (Directional)									
NB I-680 PM R9.000 to PM R16.000	160	1	63	0.002	0.14	0.36	0.006	0.24	0.70
SB I-680 PM R9.000 to PM R16.000	237	0	75	0.000	0.17	0.53	0.006	0.24	0.70
Interstate 680/Andrade Road Interchange Ramps									
NB I-680 Off-ramp to Andrade Road (PM R9.551)	1	0	0	0.000	0.00	0.73	0.007	0.34	1.04
SB I-680 on-ramp from Andrade Road (PM R9.571)	0	0	0	0.000	0.00	0.00	0.004	0.17	0.53

Table 1.3.2-1: Collision History for State Route 84 and Interstate 680

Facility	Number of Collisions			Collision Rate (accidents/million vehicle miles)					
				Actual			State Average		
	Total	Fatal	Fatal + Injury	Fatal	Fatal + Injury	Total	Fatal	Fatal + Injury	Total
NB I-680 on-ramp from Andrade Road (PM R9.841)	1	0	0	0.000	0.00	0.46	0.004	0.17	0.53
SB I-680 off-ramp to Andrade Road (PM R9.861)	0	0	0	0.000	0.00	0.00	0.007	0.34	1.04
Interstate 680/State Route 84/Calaveras Road Interchange Ramps									
NB I-680 off-ramp to Calaveras Road (SR 84) (PM R10.841)	0	0	0	0.000	0.00	0.00	0.014	0.36	0.90
SB I-680 on-ramp from Paloma Way (SR 84) (PM R10.881)	0	0	0	0.000	0.00	0.00	0.002	0.09	0.33
NB I-680 on-ramp from Calaveras Road (SR 84) (PM R10.971)	1	0	0	0.000	0.00	0.27	0.005	0.14	0.44
SB SR 84 to SB I-680 connector (PM R11.621)	1	0	1	0.000	0.06	0.06	0.004	0.17	0.51
SB I-680/SB SR 84 off-ramp to Paloma Way (SR 84) (PM R11.758)	5	0	4	0.000	**2.21**	**2.77**	0.008	0.14	0.40
NB I-680 to NB SR 84 connector (PM R11.761)	4	0	0	0.000	0.00	0.25	0.003	0.08	0.25
SB I-680 off-ramp to Paloma Way (SR 84) (PM R11.981)	0	0	0	0.000	0.00	0.00	0.003	0.08	0.25
SB SR 84 to northbound I-680 connector (PM R12.021)	0	0	0	0.000	0.00	0.00	0.002	0.10	0.29
SB SR 84 off-ramp to Paloma Way (SR 84) (PM R18.021)	0	0	0	0.000	0.00	0.00	0.003	0.08	0.25
Interstate 680/Koopman Road (Sunol) Interchange Ramps									
NB I-680 on-ramp from Koopman Road (PM R12.611)	0	0	0	0.000	0.00	0.00	0.002	0.22	0.63
SB I-680 off-ramp to Koopman Road (PM R12.711)	4	0	1	0.000	**0.38**	**1.50**	0.003	0.35	1.01
Interstate 680/Sunol Boulevard Interchange Ramps									
NB I-680 off-ramp to Sunol Boulevard (PM R15.151)	7	0	2	0.000	**0.37**	**1.28**	0.003	0.35	1.10
SB I-680 on-ramp from Sunol Boulevard (PM R15.251)	8	0	7	0.000	**1.40**	**1.59**	0.003	0.24	0.72
SB I-680 off-ramp to Sunol Boulevard (PM R15.461)	2	0	1	0.000	0.28	0.55	0.003	0.35	1.10
NB I-680 on-ramp from Sunol Boulevard (PM R15.481)	2	0	2	0.000	**0.56**	0.56	0.002	0.22	0.63

Source: Caltrans District 4 TASAS data between 1/1/2011 and 12/31/2013.
Notes:
Bold denotes locations that exceed the statewide average.
NB = northbound; SB = southbound

There were 114 total collisions in the 5.2-mile mainline of SR 84 from PM 17.900 to PM R23.101, including one fatal collision and 43 fatal plus injury collisions. Wet pavement accounted for some of the collisions. Also, many of the collisions were single-vehicle collisions.

During the same period, I-680 mainline had a total of 397 collisions in the 7-mile segment between PM R9.000 and PM R16.000, including one fatal collision and 138 fatal plus injury collisions. The various ramps associated with the SR 84/I-680 interchange (from Paloma Way/Calaveras Road in the south to Koopman Road in the north) had a total of 30 collisions, 15 of which were fatal plus injury collisions.

The types of collisions that occurred in the 39 segments were: rear end, hit object, sideswipe, broadside, "other," and overturn. In addition, SR 84 experienced a few head-on collisions. The primary collision factors were speeding, improper turning, alcohol influenced, following too closely, failure to yield, factor other than the driver, and other violations. For some of the collisions, the collision factors were unknown or not stated.

Collision rates within the 39 segments queried were generally below the statewide average. Many of the collisions experienced were rear-end collisions, which is indicative of congestion along the corridor. However, on SR 84 from PM T18.540 to PM R19.675 (the SR 84/I-680 interchange to 470 feet west of Little Valley Road), the fatal collision rate was higher than the statewide average. Eight segments had a fatal plus injury collision rate higher than the statewide average (three on SR 84 and five on the interchange ramps). Eight segments had a total collision rate higher than the statewide average (four on SR 84 and four on the interchange ramps). The southbound I-680/southbound SR 84 off-ramp to Paloma Way (PM R11.758), in the location of the weaving conflict area described in Section 1.3.2.1, had approximately five times higher fatal plus injury and total collision rates than the statewide average.

Several adjacent segments of SR 84 and the SR 84/I-680 interchange area have collision rates that are higher than the statewide average. In general, these segments represent SR 84 (Paloma Way/Calaveras Road) between approximately 0.5 mile west of Pleasanton-Sunol Road and the northbound I-680 on-ramp (both directions); the northbound I-680 to northbound SR 84 on-ramp; SR 84 between the SR 84/I-680 interchange and approximately 500 feet east of Vallecitos Atomic Laboratory Road (both directions); the southbound I-680/SR 84 off-ramp to Paloma Way; and the southbound I-680 off-ramp to Koopman Road.

The proposed project is anticipated to reduce collision rates in the project area by improving congestion and implementing specific geometric and safety improvements. All geometric improvements on SR 84 would meet a 55 mile-per-hour design speed. A concrete safety barrier would be provided on the undivided sections of SR 84, and lighting would be added to the proposed signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road and other connection points to SR 84. The proposed improvements at the SR 84/I-680 interchange would eliminate the weaving conflict between traffic entering northbound I-680 from Calaveras Road and exiting northbound I-680 to northbound SR 84.

At SR 84 PM T18.540 to PM R19.675 (SR 84/I-680 interchange to 470 feet west of Little Valley Road), which had a higher fatal collision rate than the statewide average, the project would convert SR 84 from a two-lane conventional highway to a four-lane divided median expressway, and provide standard lane widths, shoulders, and sight distance, which is expected

to reduce the higher-than-average collision rates. At PM R19.676 to PM 20.026 in both northbound and southbound directions (465 feet west of Little Valley Road to 500 feet east of Vallecitos Road at Atomic Laboratory), the project would add frontage roads to provide access for the adjacent private properties to the proposed signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road. At NB SR 84 PM R17.987 to PM T18.539 (Calaveras Road/NB I-680 on-ramp to NB SR 84 on-ramp), a barrier would be constructed to separate Calaveras Road and the northbound I-680 on-ramp for safer connections to northbound SR 84. At the southbound I-680/southbound SR 84 off-ramp to Paloma Way (PM R11.758), the right turn at the ramp terminus would be converted from a free right to a stop control, which is expected to reduce the turning speeds and increase the weaving length available by approximately 240 feet, and in doing so is estimated to reduce the higher-than-average collision rates.

1.3.2.2 Roadway Deficiencies

The existing configuration of SR 84 limits the flow of traffic through the two-lane sections and on northbound I-680 between the Calaveras Road/SR 84 on-ramp and northbound SR 84 off-ramp as described above. In addition, the two-lane section between the SR 84/I-680 interchange and Vallecitos Atomic Laboratory Road has 8-foot outside shoulders with no median. In vicinity of Vallecitos Creek, outside shoulders are 2 feet with nonstandard width 11-foot lanes. SR 84 follows a curvilinear alignment with short tangents.

Direct access openings to private driveways are present along SR 84. The route lacks an adequate number of maintenance vehicle pullouts, and the existing three- and four-lane sections between Vallecitos Atomic Laboratory Road and Ruby Hill Drive lack a median barrier. Fixed objects such as trees and utility poles are present within the clear recovery zone (CRZ) along SR 84. The CRZ is an area clear of fixed objects adjacent to the traveled way to provide a clear recovery zone for vehicles that leave the traveled way.

Southbound I-680 between the Calaveras Road undercrossing and the Alameda Creek Bridge lacks a standard inside shoulder and lane widths. At the SR 84/I-680 interchange, the existing ramp geometry creates a traffic weave on northbound I-680 between the Calaveras Road/SR 84 on-ramp and northbound SR 84 off-ramp. Traffic entering northbound I-680 from Calaveras Road must weave to the left through northbound I-680 traffic weaving to the right to head toward northbound SR 84. The existing northbound I-680 to northbound SR 84 connector is single lane, which contributes to the bottleneck at the weave. The two-lane connector from southbound SR 84 to southbound I-680 lacks an HOV preferential lane and auxiliary lane[8] on southbound I-680.

No designated bicycle or pedestrian facilities exist on SR 84 in the project limits or through the SR 84/I-680/Calaveras Road interchange. The SR 84 portion of the project area is identified as a proposed Class III bicycle route in the Alameda Countywide Bicycle Master Plan (Alameda CTC 2012b).

[8] An auxiliary lane is a lane used for weaving, truck climbing, speed change, or other purposes supplementary to through movement (Department 2015).

Bicyclists traveling northbound on SR 84 are required to enter and exit I-680 and travel on the shoulder through the interchange. Bicyclists traveling on southbound SR 84 are required to ride through the interchange where they must cross high-speed on- and off-ramps.

Pedestrian volumes along SR 84 are very low due to the rural nature of the SR 84 corridor. Wide shoulders are provided along SR 84 that could be used by pedestrians walking along SR 84; however, the high traffic volumes and high traffic speeds generally discourage pedestrians from walking along SR 84. Pedestrians are also prohibited from traversing the SR 84/I-680/Calaveras Road interchange, which results in a discontinuity in the pedestrian access network.

1.3.2.3 Legislation

California Streets and Highways Code Section 149.5 allows for permanent implementation of a value pricing program within any two corridors in the Alameda County HOV lane system. The program allows for the entry and use of the HOV lanes by single occupant vehicles (SOVs) for a toll. Existing and future phases of the HOV/express lanes on I-680 are described in Section 1.2.2. HOV/express lanes opened on I-580 between Hacienda Drive and Greenville Road (eastbound) and between Greenville Road and San Ramon Road/Foothill Road (westbound) in early 2016. Future HOV/express lanes are planned in both directions of I-680 from I-80 in Solano County to SR 237 in Santa Clara County (MTC 2016c). The enabling legislation stipulates that revenue collected from the HOV/express lanes will support transportation improvements and transit projects within the corridor.

1.3.3 Independent Utility and Logical Termini

FHWA regulations (23 Code of Federal Regulations [CFR] 771.111 [f]) require that the action evaluated:

1. Connect logical termini and be of sufficient length to address environmental matters on a broad scope.
2. Have independent utility or independent significance (be usable and require a reasonable expenditure even if no additional transportation improvements in the area are made).
3. Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

Logical termini are defined as (1) rational end points for a transportation improvement, and (2) rational end points for a review of the environmental impacts. Independent utility, or independent significance, is defined as being a usable and reasonable expenditure even if no additional transportation improvements in the area are made.

Logical Termini

The project limits were chosen based on the traffic analysis and the range of project alternatives and design options that could address the purpose and need. The post mile limits on SR 84 generally extend from the western limit of the SR 84 Expressway Widening Project (from Jack London Boulevard and Ruby Hill Drive; southern segment currently under construction) to the east and the I-680 interchange ramps to the west. This area fully encompasses the single-lane

segments of SR 84 that cause congestion as well as the ramp connections between SR 84 and I-680, including those where vehicles divert to Paloma Way and Calaveras Road to avoid backups at the southbound I-680 ramp meter. The termini also encompass the area needed to complete the widening of SR 84 between I-580 and I-680.

The project as proposed in the 2003 PSR/PDS included recommendations for ramp metering and HOV preferential lanes on the southbound SR 84 connector ramps to northbound and southbound I-680, as well as HOV preferential lanes on southbound SR 84 beginning approximately 1 mile east of the I-680 interchange. No improvements were proposed on I-680. Preliminary traffic and design studies beginning in 2015 identified the following modifications on I-680 that could improve weaving/merging conflicts and minimize the effects of additional traffic demand between I-680 and SR 84:

1. A new auxiliary lane on southbound I-680 and new southbound HOV on-ramp preferential lane to help accommodate additional vehicles entering from southbound SR 84 in the AM peak period.

2. An extension of the existing southbound HOV/express lane northward from its current entry point at approximately Calaveras Road to approximately 0.8 mile north of the Koopman Road undercrossing. This would allow traffic on I-680 to enter the HOV/express lane upstream of the SR 84/I-680 interchange and avoid weaving with vehicles that are merging onto southbound I-680 from SR 84.

3. A longer northbound I-680 auxiliary lane and a new ramp from Paloma Way/Calaveras Boulevard on the east side of I-680 to northbound I-680 and a slip on-ramp to northbound SR 84. This would eliminate weaving between the on-ramp at Paloma Way/Calaveras Boulevard and the SR 84/I-680 interchange and help to accommodate traffic demand from northbound I-680 to northbound SR 84.

These components have been included in the proposed project as well as other modifications to improve the SR 84/I-680 interchange connector ramps, discussed further in Section 1.4.2. The project limits represent logical termini because they encompass not only the areas of congestion on SR 84 but the adjacent segments of I-680 where effects from the improvements on SR 84 (potential weaving/merging conflicts and additional traffic demand between I-680 and SR 84) are expected to occur. Together with the project modifications on SR 84, the proposed components at the SR 84/I-680 interchange and on I-680 allow for complete evaluation of environmental impacts, including those related to traffic, from the project.

Independent Utility

As described in Section 1.2.2, the proposed project is the last in a series of separately funded and constructed projects along the entire length of SR 84 from the I-580/Isabel Avenue interchange to the western extent of Pigeon Pass. The project includes modifications on adjacent segments of I-680 to provide incremental improvements in vehicle storage and weaving/merging to address effects from the SR 84 improvements.

Future HOV/express lanes are planned in both directions of I-680 from I-80 in Solano County to SR 237 in Santa Clara County (MTC 2016b), as noted in Section 1.3.2.3. The northward

extension of the existing southbound HOV/express lane would not restrict consideration of alternatives for future HOV/express lanes projects on I-680.

There are currently no plans to add general purpose lanes to I-680 within the project limits as part of this project. The cost and potential environmental impacts of adding lanes would represent a substantially greater expenditure of public funds than the proposed modifications on I-680. No subsequent improvements in the area would be needed to meet this project's purpose and need.

Accordingly, the proposed project is a usable and reasonable expenditure, even if no additional transportation improvements in the area are made. The project has independent utility as it would not require any future improvements on SR 84 or I-680 to meet the purpose and need.

1.4 Project Description

This section describes the proposed project and the project alternatives that were developed to meet the identified purpose and need of the project, while avoiding or minimizing environmental impacts. The alternatives are the Build Alternative and the No Build Alternative.

The proposed project would widen and conform SR 84 to expressway standards between south of Ruby Hill Drive and the I-680 interchange. The project would also improve SR 84/I-680 interchange ramps and extend the existing HOV/express lane on southbound I-680 northward to approximately 0.8 mile north of Koopman Road, north of the SR 84/I-680 interchange.

The purpose of the project is to alleviate existing and projected traffic congestion and improve traffic circulation between SR 84 and I-680, and in the vicinity of the SR 84/I-680 interchange; improve safety for motorists and cyclists on this segment of SR 84; and complete the statutory designation of this segment of SR 84 as an expressway facility.

The following sections describe the proposed project components by area/location. Section 1.4.4 provides details about project construction. The proposed project is shown in Figure 1.4-1.

1.4.1 SR 84

The proposed project would widen SR 84 from two to four lanes (two in each direction) and overlay and restripe the roadway. The proposed roadway would have 12-foot-wide travel lanes and 10-foot-wide shoulders. A Class II bikeway[9] would be provided in each direction. Concrete barriers would be placed in the median to enhance user safety. Shoulder rumble strips would be placed between the travel lanes and the shoulders/Class II bikeways.

As part of conforming SR 84 to expressway standards, access would be limited to controlled intersections to improve traffic flow and safety. The project would consolidate existing vehicle access openings to private driveways and rural roads at new frontage roads. The proposed frontage roads would connect to a new signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road. The new intersection and frontage roads would provide access to Little Valley Road on the north side of SR 84 and private driveways and rural roads on the south side of SR 84.

[9] A Class II bikeway (bike lane) provides a striped lane for one-way bike travel (Caltrans 2016a).

1.4.2 SR 84/I-680 Interchange and Auxiliary Lanes

At the SR 84/I-680 interchange, the project would make the following modifications:

- Construct an approximately 1,000-foot-long auxiliary lane on southbound I-680 to the south of Calaveras Road/Paloma Way, and realign the on-ramp from Paloma Way to southbound I-680.
- Reconstruct the existing two-lane off-ramp from northbound I-680 to northbound SR 84, and extend the existing northbound I-680 auxiliary lane by approximately 1,500 feet from south of Calaveras Road to the northbound I-680/northbound SR 84 split.
- Remove the existing on-ramp from Calaveras Road to northbound I-680, construct a new flyover ramp from Calaveras Road to northbound I-680, and construct a new slip on-ramp from Calaveras Road to northbound SR 84.
- Realign the southbound SR 84 to northbound I-680 connector to merge with the northbound on-ramp to I-680 from Calaveras Road.
- Add an HOV preferential lane to the existing two-lane southbound SR 84 to southbound I-680 on-ramp, making the on-ramp a total of three lanes.

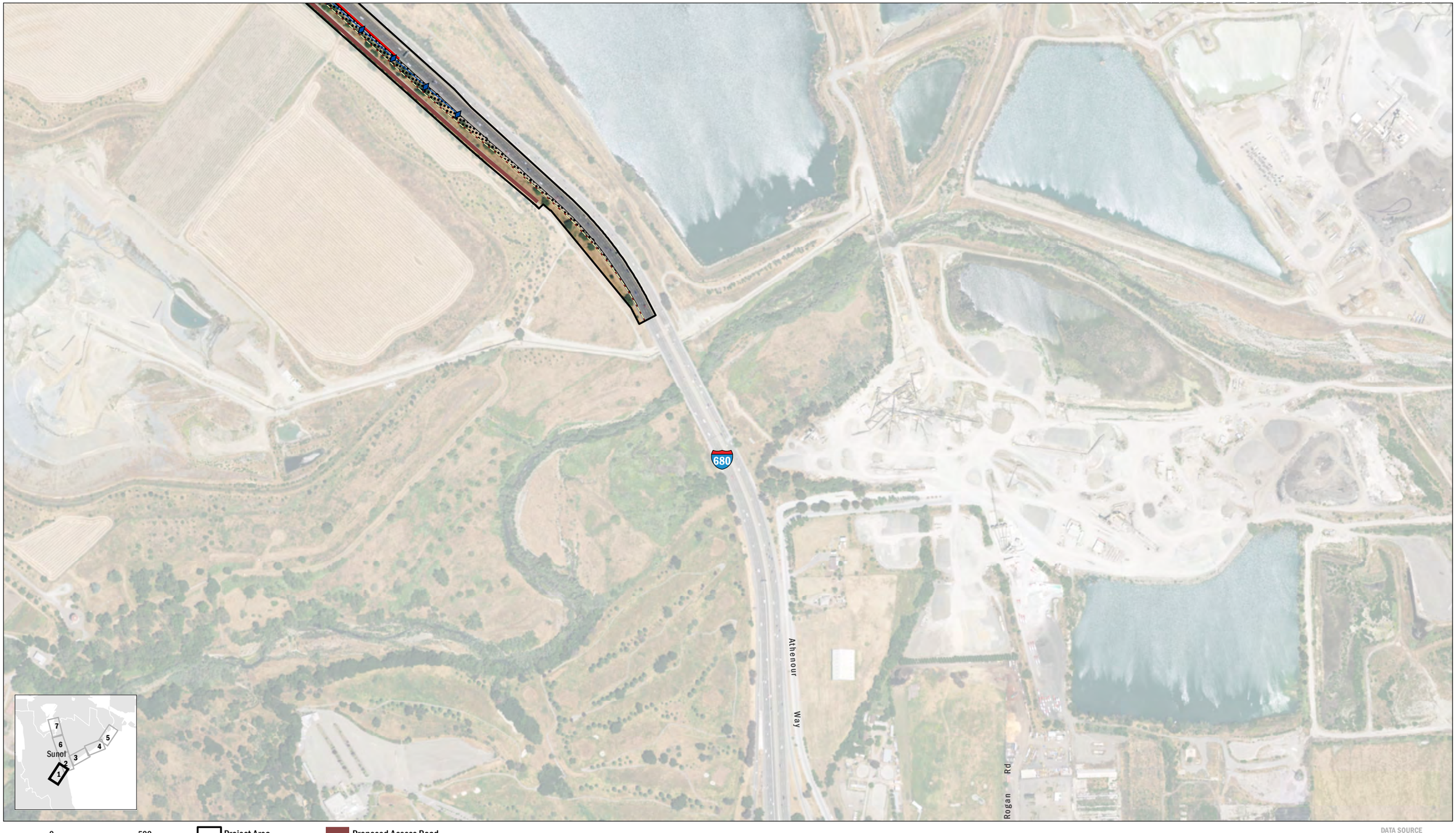
A new Class I bikeway[10] would be provided through the interchange area to connect the southbound SR 84 Class II bikeway with Paloma Way. The bikeway will primarily serve westbound bicycle travel. A new Class II bikeway would be provided along the northbound I-680 on-ramp from Calaveras Road to connect with the northbound SR 84 Class II bikeway.

1.4.3 I-680

On southbound I-680, the project would extend the existing HOV/express lane northward from its current entry point at approximately Calaveras Road to approximately 0.8 mile north of Koopman Road, a distance of approximately 2 miles. The pavement in the center median of southbound I-680 would be widened to accommodate the HOV/express lane. Approximately six overhead signs (including variable toll message signs [VTMS] with pricing information) and toll readers for FasTrak transponders would be installed in the median of I-680. The northernmost overhead sign would be approximately 1.8 miles north of Koopman Road (at PM 14.2). Proposed project activities between the northernmost overhead sign and the I-680/Sunol Boulevard interchange would be limited to the placement of temporary construction signage.

Pursuant to California Streets and Highways Code Section 149.5, the Sunol Smart Carpool Lane Joint Powers Authority (Sunol JPA) will operate the new southbound I-680 HOV/express lane segment. For regional consistency, the HOV/express lane will include a continuous access type, allowing vehicles to access HOV/express lane from adjacent mixed-flow (general purpose) lane throughout the limits of the facility. All eligible lane users, including HOV/HOV Eligible vehicles as authorized by the Federal and State statutes and toll-paying SOVs will be able to access the HOV/express lane. Subject to approval by the HOV Lane Committee, composed of Caltrans, MTC, and California Highway Patrol (CHP) staff,

[10] A Class I bikeway (bike path) provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians, with crossflow by motorists minimized (Department 2016a).



0 500 Feet

1 inch = 500 feet

1:6,000

Project Area

Concrete Barrier

Metal Beam Guard Rail

Proposed Access Road

Proposed Auxiliary Lane

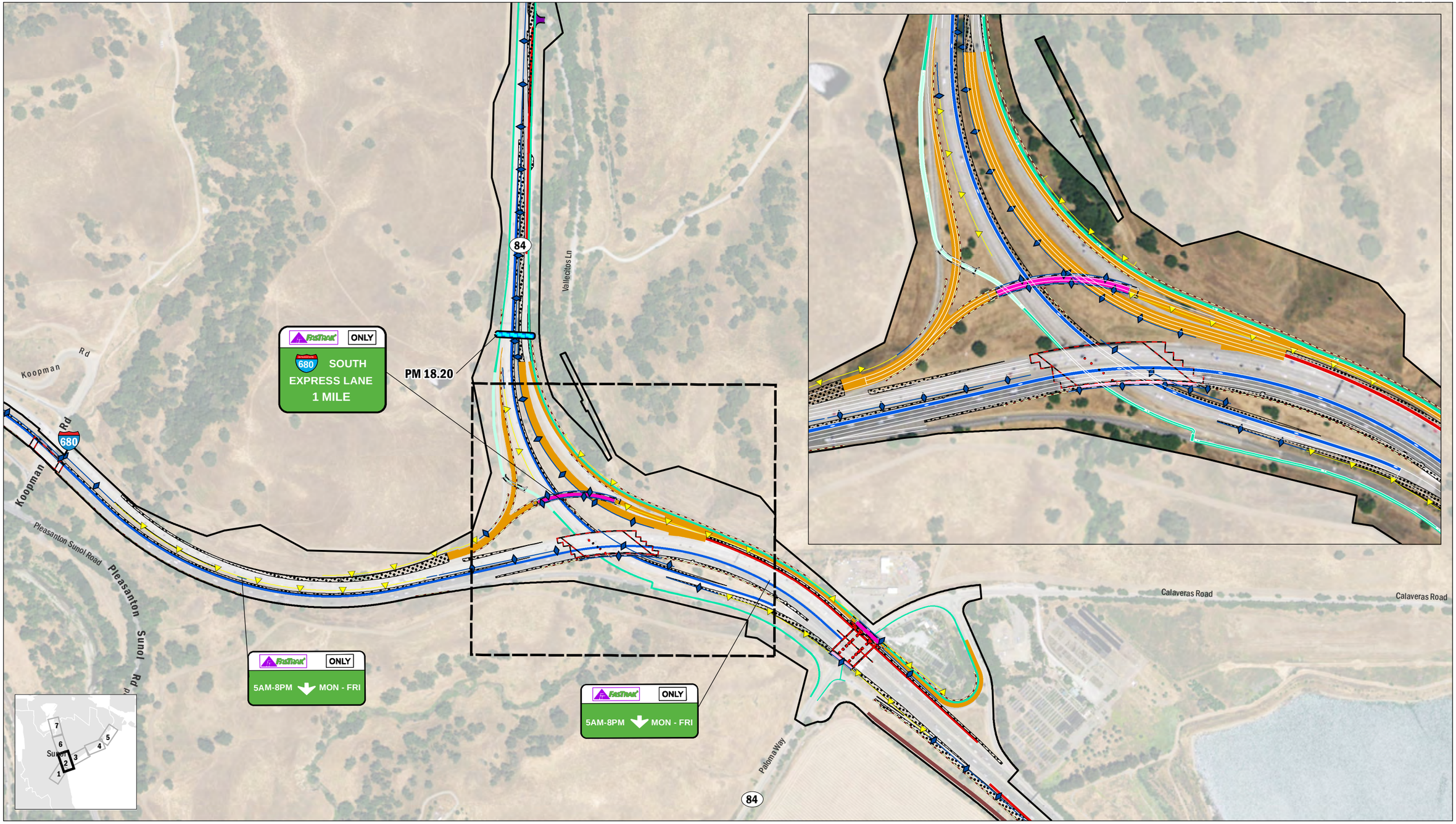
Proposed Pavement Widening

DATA SOURCE
ESRI, 2016

MAP PREPARED BY:
AECOM Otto Alvarez, 9/28/2017

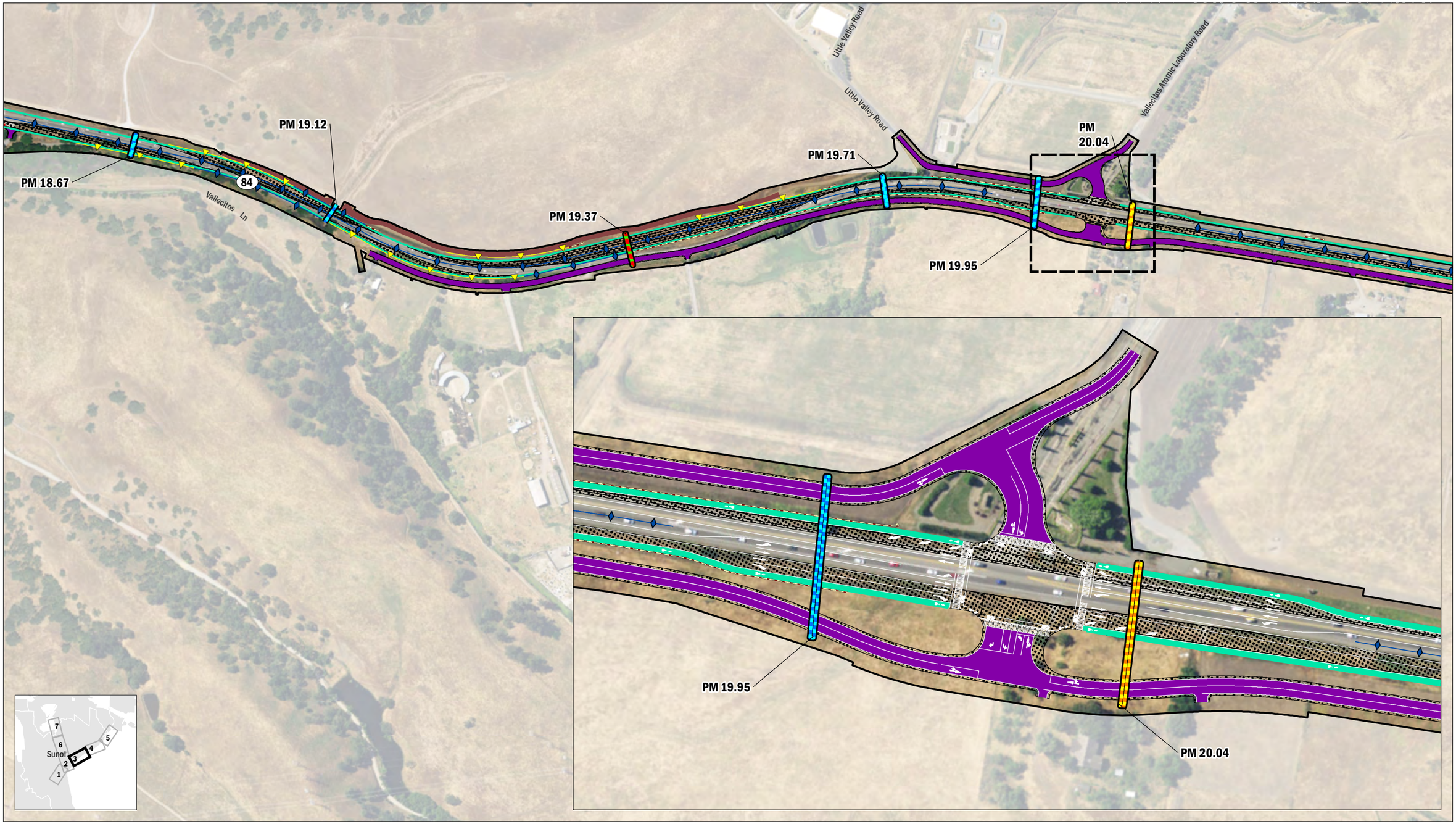
SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 1.4-1
Project Layout
Page 1 of 7



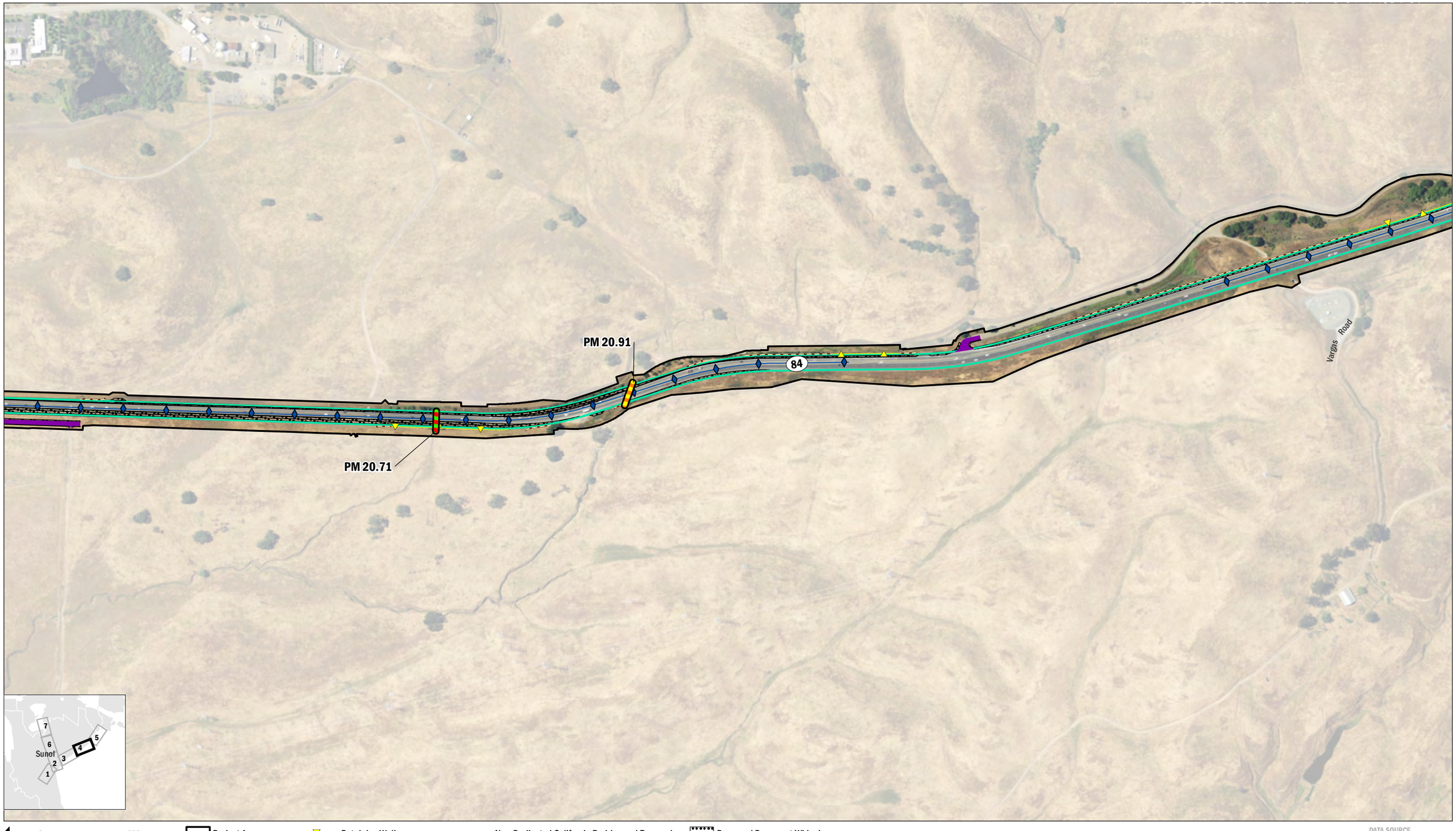
SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 1.4-1
Project Layout
Page 2 of 7



SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 1.4-1
Project Layout
Page 3 of 7



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1 inch = 500 feet
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Project Area
Concrete Barrier
Metal Beam Guard Rail
Retaining Wall
Culvert Locations
New Dual Purpose Box Culvert
New Dedicated California Red-Legged Frog and California Tiger Salamander Crossing Structure
Proposed Class II Bikeway
Proposed Frontage Road
Proposed Pavement Widening

DATA SOURCE
ESRI, 2016

MAP PREPARED BY:
AECOM Otto Alvarez, 9/28/2017

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 1.4-1
Project Layout
Page 4 of 7

0 500 Feet

1 inch = 500 feet

1:6,000

- Project Area
- Concrete Barrier
- Metal Beam Guard Rail
- Retaining Wall
- Proposed Class II Bikeway
- Proposed Pavement Widening

DATA SOURCE
ESRI, 2016

MAP PREPARED BY:
AECOM Otto Alvarez, 9/28/2017

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 1.4-1
Project Layout
Page 5 of 7

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 1.4-1
Project Layout
Page 6 of 7

DATA SOURCE
ESRI, 2016

MAP PREPARED BY:
AECOM Otto Alvarez, 9/28/2017

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 1.4-1
Project Layout
Page 7 of 7

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Sunol JPA may operate the HOV/express lane from 5:00 a.m. to 8:00 p.m., Mondays through Fridays. Within these hours of operation, the HOV/express lane usage will be as follows:

- HOV/HOV eligible vehicles will use the HOV/express lane for free.
- SOVs can choose to use the HOV/express lane for a toll.

The toll rate for SOVs would vary depending on the level of traffic congestion and distance traveled. Tolls for express lanes are dynamic, meaning they change periodically based on real-time traffic volumes. During periods of lower traffic congestion, the toll would be lower. The lower toll rates encourage more SOVs to pay the toll to use the additional capacity of the HOV/express lane. During the hours of operation when there is more traffic congestion, the toll to access the express lane would be higher. The higher toll rates discourage more SOVs from using the HOV/express lane, which frees up lane capacity. By raising or lowering the toll in response to the level of demand, this dynamic pricing effectively manages the volume of traffic in the HOV/express lane, ensuring that traffic flows smoothly.[11]

Outside of the hours of operation, the lane will be operated as a general purpose lane, open to all users for no toll.

1.4.4 Project Construction

The following activities and components are anticipated as part of project construction. Project construction would take approximately three years, tentatively anticipated to begin in 2021 and end in 2023.

Construction Closures and Detours

Construction would take place during the daytime with periodic nighttime closures. Property access would be maintained throughout project construction, except for single-night closures that may be needed for paving and switching access to private driveways. Single-night closures of the northbound I-680 to northbound SR 84 off-ramp and the southbound SR 84 to northbound and southbound I-680 ramps would be required to set up and remove falsework (two closures in each location). During the ramp closures, traffic would be detoured to the I-680/Sunol Boulevard interchange and Stanley Boulevard for destinations in Pleasanton and Livermore. Temporary daytime and/or nighttime closures at the Koopman Road and Calaveras Road/Paloma Way undercrossings of I-680 would also be needed to set up and remove falsework for bridge widenings in those locations. The closures would be timed so that either Calaveras Road/Paloma Way or Koopman Road would remain open and available as a detour route. Full closures of SR 84 or I-680 are not anticipated; however, temporary lane closures would be needed for pavement overlay, striping, and installation of temporary barriers (Type K, also known as K-rail) along construction areas.

Right-of-Way Requirements

Partial property acquisitions are anticipated to be needed along the frontages of residential and institutional land uses on both sides of SR 84, and at residential, institutional, and commercial

[11] Currently, within the southbound I-680 express lanes, the minimum toll during the morning commute (heavy traffic volumes) is $1. When fewer vehicles are using the lane, the toll is lower, a minimum of 30 cents. The toll will range from 30 cents to a maximum of $7.50.

land uses along I-680 near the SR 84 interchange. Retaining walls and concrete barriers have been incorporated into the project design to minimize right-of-way impacts to surrounding properties.

Throughout the project area, temporary construction easements (TCEs) would be needed for construction access and staging, and for relocation of private access roads and firebreaks outside of the State right-of-way.

The project footprint includes all potential property acquisition, including TCEs, and utility and maintenance easement locations. Additional information regarding property impacts is provided in Section 2.1.7.

Structures

A new flyover ramp would be constructed at the SR 84/I-680 interchange to connect Calaveras Road with northbound I-680. The flyover would be 25 to 30 feet above existing grade.

The Calaveras Road Separation (33-0351L) bridge where southbound I-680 crosses over Paloma Way would be widened toward the outside (west) shoulder to accommodate the proposed southbound auxiliary lane. The Scott's Corner Separation (33-0352) bridge over the I-680 southbound on-ramp connector from SR 84 would be widened toward the outside (west) shoulder to accommodate pavement widening for the new HOV preferential lane, and a new bridge would be constructed over Calaveras Road for the new northbound ramp connection between Calaveras Road and I-680. Finally, the Koopman Road Undercrossing (33-0386L) bridge on southbound I-680 would be widened toward the median (east) to accommodate pavement widening for the HOV/express lane extension.

No bridge structures are currently proposed on SR 84.

Table 1.4.4-1 lists the details of the proposed structures.

Table 1.4.4-1: Proposed Structures

Bridge Name & No.	Spans	Width (feet-inches)	Length (feet-inches	Comments
Calaveras Road Undercrossing (New Structure) Bridge No.: To be determined	3	28'-7"	146'-0"	New structure east of existing Calaveras Road UC
Calaveras Road Separation 680/84 (Widen) Bridge No. 33-0351L	3	17'-10 1/4" varies to 23'-0 1/2"	146'-0"	I-680 southbound widening along the western edge
Scott's Corner Separation (Widen) Bridge No. 33-0352L	3	12'-0"	347'-9"	I-680 southbound widening along the western edge
Calaveras Road to I-680 Connector (New Structure) Bridge No.: To be determined	2	30'-10"	421'-0"	New connector
Koopman Road Undercrossing (Widen) Bridge No. 33-0386L	3	13'-2"	155'-0"	I-680 southbound widening along the eastern edge

Retaining Walls, Barriers, and Sound Walls

Retaining walls would be constructed on the north and south sides of SR 84, west of Little Valley Road and east of Vallecitos Atomic Laboratory Road. Retaining walls would also be constructed on both the west and east sides of I-680 near Calaveras Road and the SR 84/I-680 interchange, and in the median (east side) of southbound I-680 where the pavement would be widened to accommodate the HOV/express lane extension. The proposed locations, dimensions, and types of retaining walls are listed in Table 1.4.4-2.

Table 1.4.4-2: Proposed Retaining Walls (RWs)

Wall No.	Location	Station Line	Fill or Cut	Approximate Length (feet-inches)	Wall Type	Approximate Maximum Height (feet-inches)
RW-1	NB I-680	R2	Fill	430’	Mechanically Stabilized Earth (MSE) Wall	20’-0”
RW-2	SB I-680	I-680	Fill	550’	MSE Wall	14’-2”
RW-3	NB I-680	R2	Fill	350’	MSE Wall	21’-8”
RW-4	SB I-680	R3	Fill	680’	MSE Wall	16’-8”
RW-5	NB I-680	R2	Fill	840’	MSE Wall	31’-8”
RW-6	SR 84 to SR I-680 connector	R3	Fill	525’	MSE Wall	22'-6"
RW-7	SR 84 to NB I-680 ramp	R2	Cut	873’	Soldier Pile Wall with Timber Lagging	20'-0"
RW-8	I-680 median	I-680	Cut	1796’	Retaining Wall Type 7B (Modified)	6’-0”
RW-9	EB SR 84	SR 84	Fill	645’	Retaining Wall Type 1 (Modified)	14’-0”
RW-10	WB SR 84	SR 84	Cut	668’	Retaining Wall Type 7B (Modified)	20'-0"
RW-11	WB SR 84	SR 84	Cut	672’-6”	Retaining Wall Type 7B (Modified)	20'-0"
RW-12	EB SR 84	SR 84	Fill	625’	MSE Wall	17'-2"
RW-13	EB SR 84	SR 84	Cut	350’-9”	Retaining Wall Type 7B (Modified)	16’-0”
RW-14	WB SR 84	SR 84	Fill	289’	Retaining Wall Type 5 (Modified)	10'-0'
RW-15	EB SR 84	R5	Fill	395’	MSE Wall	39’-2”
RW-16	WB SR 84	SR 84	Cut	696’-3”	Retaining Wall Type 7B (Modified)	20'-0"
RW-17	EB SR 84	SR 84	Fill	1147’	Retaining Wall Type 1 (Modified)	14’-0”
RW-18	WB SR 84	SR 84	Fill	355’	Retaining Wall Type 5 (Modified)	10’-0”

Concrete safety barriers would be constructed in the median of SR 84 throughout most of the project limits except at the proposed Little Valley Road/Vallecitos Atomic Laboratory Road intersection. The barriers would have openings to allow wildlife to cross SR 84. Existing concrete barriers on I-680 would be maintained, and new barriers would be provided on ramps and in the median of southbound I-680 in the HOV/express lane extension area.

Metal beam guard rails would be installed along shoulders, ramps, and areas with new overhead signs.

No sound walls currently exist within the project area, and none are proposed.

HOV/Express Lane

Overhead signs and toll antenna gantries would be installed on I-680 and would be mounted on new cantilever structures supported on cast-in-drilled-hole or driven piles in the median. The tops of the overhead signs and toll antennas would be approximately 34 feet in height. The proposed signs would be generally the same size and type as the existing HOV/express lane signs on southbound I-680 south of the SR 84/I-680 interchange. Figure 1.4-2 shows existing HOV/express lane signs and toll antenna gantries in the project vicinity, and illustrates the general size, height, and mounting locations of these features in a highway corridor.

Smaller signs would also be installed on the concrete median barrier at approximately 0.25-mile to 0.5-mile intervals in the vicinity of the HOV/express lane. The signs would have approximate dimensions of 3.5 by 2.5 feet to 7 by 10 feet. The signs would display the HOV/express lane operating rules (e.g., hours of operation, person-per-vehicle requirements, etc.) and guidance information about access points (i.e., distance and directional arrow).

Highway lighting would be installed on mast-arm standards in the median of I-680 as well as on overhead signs and toll structures, as shown in the top photo in Figure 1.4-2. The maximum height of the lighting would be 35 to 40 feet. The actual spacing and number of lights in the project corridor will be determined during detailed project design in coordination with the Caltrans Department of Traffic Safety.

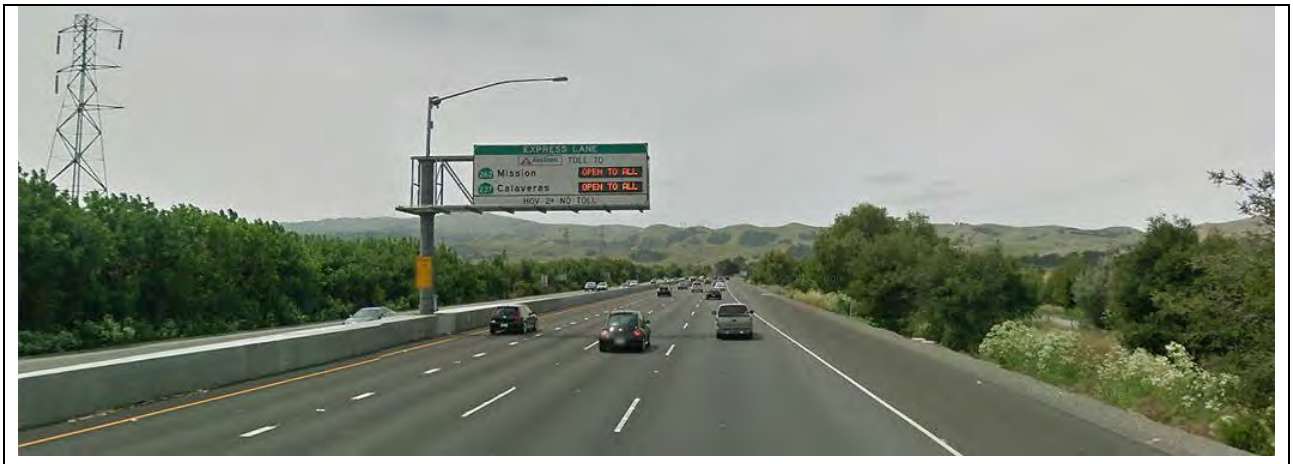
Some Traffic Operations Systems (TOS) equipment such as traffic monitoring stations, closed circuit televisions, electrical cabinets, and controllers would be installed along the outside edge of pavement within the existing right-of-way. Maintenance vehicle pullouts would be installed in the I-680 shoulder areas to allow access to the TOS equipment. The specific locations of these features would be developed during final project design; however, all features would be accommodated within the project footprint.

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

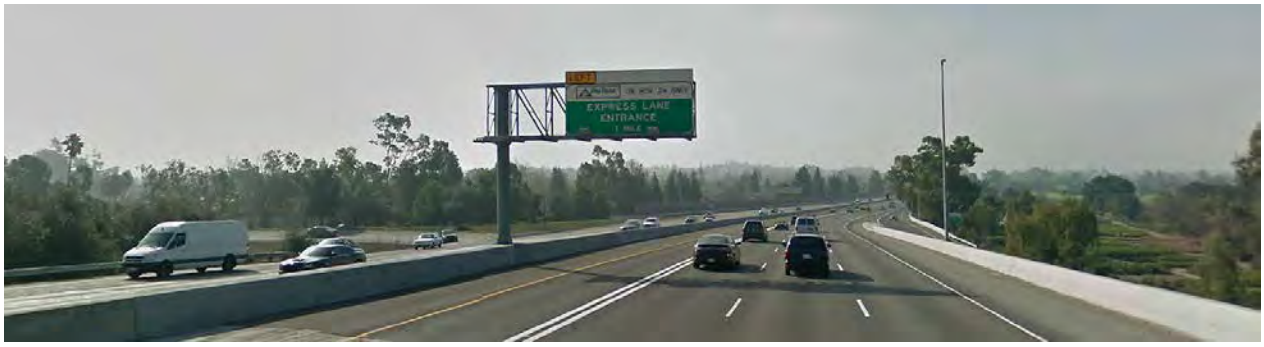
CHP enforcement zones would be detailed during project design.

Safety Features

To provide improved roadway visibility, the project would provide additional highway lighting, enhanced signage, median barriers, and pavement delineation. Highway lighting would be included at driveways, intersections, on-ramp and lane merges and exit ramps, and would also be added on the I-680 express lane entrances and toll zone boundaries, locations on the highway where visibility is restricted by barriers, locations where drivers may experience headlight glare, and locations where concentrations of nighttime accidents are known to have occurred. Highway lighting would be installed on mast-arm standards as well as on overhead signs and toll structures, as shown in Figure 1.4-2. The tops of the light posts would be a maximum of approximately 40 feet in height. The additional lighting would be downward cast, per Caltrans requirements, which prevents the illumination of areas outside of the highway right-of-way, and energy efficient. Type 60G concrete barriers would be used to prevent headlight glare at necessary locations.



Above: Existing Variable Toll Message Sign (VTMS) on southbound I-680.



Above: Existing static HOV/express lane sign on southbound I-680.

Above: Existing toll antenna gantries on westbound I-580.

Figure 1.4-2: HOV/Express Lane Signs and Toll Antenna Gantries

Utilities and Drainage

Utility investigations have identified the location and extent of existing service lines within the project area. The project would require relocating some aboveground utilities to outside of the right-of-way, and within the project footprint. The relocation of utilities would result in localized construction impacts and could result in temporary service interruptions. The affected utilities identified in the preliminary investigations include Pacific Gas and Electric Company (PG&E) overhead electric and underground gas, American Telephone and Telegraph (AT&T) telecommunications, and private water wells and tanks. Final verification and any necessary supplemental environmental approvals triggered by project changes would be performed during the project's design phase.

The existing drainage systems within the project limits consist of roadside ditches, cross culverts, longitudinal culverts, asphalt concrete dikes, and concrete curbs with inlets to collect storm water at shoulders. Vallecitos Creek and its tributaries cross SR 84 and I-680 through underground culverts. A section of Vallecitos Creek also roughly parallels SR 84 and Vallecitos Lane in an earthen channel.

The project would widen SR 84 and construct a concrete barrier along the southern roadway shoulder directly adjacent to the open section of Vallecitos Creek. Erosion control measures such as soldier piles would be implemented to prevent creek scour from undermining the concrete barrier foundation. Potential erosion control measures are included in the project footprint. Specific measures will be determined during the detailed design phase.

Storm Water Treatment

The project would result in 37.77 acres of added and reworked impervious area. Storm water treatment to fully offset the increase in added and reworked impervious area is proposed through the construction of permanent treatment Best Management Practices (BMPs) that consist of approximately 27 biofiltration swales (bioswales) and one bioretention vault. The bioswales/bioretention vault would be designed and constructed to promote infiltration by compost-amending the existing soil or through the placement of an engineered soil mix; an underdrain system would be considered if further drawdown is necessary. The bioretention vault (an Austin vault sand filter) is proposed because infiltration and biofiltration device locations have been identified and maximized. The project would treat 100 percent of the increase in added and reworked impervious area.

Specifications regarding storm water treatment will be provided during the detailed design phase.

Drainage Ditches

The project area includes storm water features consisting of upland manmade drainage ditches, roadside ditches, concrete lined V-ditches, and some culverts that do not connect wetlands or waters of the United States. These storm water features exist in several locations along the shoulders of SR 84 and I-680 and total approximately 55,167 linear feet in the biological study area.

Drainage ditches that would be affected by the proposed project would be replaced in kind within the project footprint, with priority for providing unlined ditches wherever possible.

These features would be separate from any treatment areas for roadway runoff and from features preliminarily identified as wetlands or other waters of the United States.

The design of the reconstructed storm water features will be refined during the detailed project design phase.

Wildlife Movement

The project proposes features to maintain wildlife connectivity across SR 84 and reduce wildlife-vehicle collisions. Existing culverts would be enlarged and additional culverts would be constructed to help wildlife to cross under SR 84. Directional fencing would be included to guide wildlife into and out of the culverts, and openings in the right-of-way fence would be provided to allow wildlife to safely move between the culverts and areas outside of the SR 84 corridor. In addition, new culverts are proposed to allow access between habitat to the north and south of SR 84 for California tiger salamander (*Ambystoma californiense*) and California red-legged frog (*Rana draytonii*). These dedicated amphibian crossing structures would not be used to convey drainage. The locations of the new amphibian crossings structures were selected based on their proximity to ponds with known or potential special-status amphibian populations, as well as their connectivity to preserved lands. In order to preserve connectivity between habitats, the culverts would be located along existing drainages that may be used as aquatic migration corridors for amphibians traveling between breeding ponds or to upland habitat.

Table 1.4.4-3 lists the proposed wildlife crossing structure locations and details of the modified and new culverts, and proposed crossing locations and types are shown in Figure 1.4-1. The final culvert locations, dimensions, and configurations will be determined in accordance with FHWA wildlife crossing structure guidelines (FHWA and Central Federal Land Highway Division 2011), coordination with Caltrans, existing site conditions, and engineering feasibility.

Table 1.4.4-3: Proposed Wildlife Crossing Structure Locations

Post Mile	Current Dimensions (feet)				Proposed Modification Dimensions (feet)		
	Pipe Diameter	Width	Height	Length	Width	Height	Length
18.20	3			NA	3	4	187
18.67	1.5	--	--	86.3	3	4	118
19.12	1.5	--	--	57.3	10[a]	4	131
19.71	--	4	6	75.5	3	4	164
19.95	2.5			NA	3	4	262
New Dual Purpose Box Culvert							
19.37	--	--	--	--	3	4	171
20.71	--	--	--	--	3[a]	4[a]	120[a]
New Dedicated California Red-Legged Frog and California Tiger Salamander Crossing Structures							
20.04	--	--	--	--	--[b]	--[b]	232
20.91	--	--	--	--	--[b]	--[b]	113

Notes:

NA = Not available

a. To be confirmed through drainage analysis.

b. The width and height of the California red-legged frog and California tiger salamander crossing structures would be determined during final design.

As noted above, the proposed concrete safety barriers in the median of SR 84 would also have openings to allow wildlife to cross SR 84. The barriers would have 9-inch-tall openings along the bottoms (Type S) and/or openings between barrier ends to accommodate deer and other medium to large mammals (Type M). The spacing between Type M barrier ends would be 2 feet. The frequency and number of openings between Type M barrier ends would be determined during the detailed design phase.

Ramp Metering

The project would convert the existing two-lane ramp meter at the southbound SR 84 to southbound I-680 connector ramp to a three-lane ramp meter with an HOV preferential lane. Ramp metering is not proposed at other ramp locations.

Design Exceptions

Caltrans establishes and supports the consistent application of highway design standards to ensure optimal safety for the traveling public and those who work to construct, operate, and maintain the State Highway System. Design exceptions are necessary when the proposed design deviates from the standard design features presented in the *Caltrans Highway Design Manual.*

The Build Alternative would implement design exceptions to minimize environmental impacts. Four mandatory and six advisory design standards would require design exceptions at one or more locations in the project corridor. The design standards, locations, and reasons for the design exceptions are listed in Table 1.4.4-4.

Table 1.4.4-4: Design Exceptions

Design Standard	Locations	Reason for Design Exception
Mandatory Standards		
Superelevation[1] rate (standard varies based on curve radii and design speed)	Eastern end of project area on SR 84 at Ruby Hill Drive	Maintain the existing 6% instead of the 10% standard to avoid an environmental mitigation area adjacent to northbound SR 84 near Ruby Hill Drive. No accidents have been documented at this location that are attributed to the superelevation rate.
	Proposed Calaveras Road to northbound I-680 flyover ramp	Provide a 10% slope instead of 10.8% standard for ease of bridge construction and to avoid the Sheep Camp Creek facility in the northeast interchange quadrant. The facility is a bioregional habitat restoration program site established by the San Francisco Public Utilities Commission (SFPUC). SFPUC plans to establish a conservation easement on part of the property.
	Connection to northbound I-680 from proposed Calaveras Road to northbound I-680 flyover ramp	Same as above; in addition, achieve on-ramp conform with northbound I-680 and the on-ramp connection from southbound SR 84.
Inside shoulder width (10 feet)	Northbound I-680 from southern project limit to the I-680/SR 84 separation	Maintain the existing 5-to-10-foot inside shoulder to minimize widening at the Calaveras Road undercrossing as it would not meet vertical clearance with Calaveras Road, would avoid relocation of approximately six PG&E electrical transmission towers east of I-680, and would avoid construction schedule conflicts with the I-680 Northbound HOV/Express Lanes Project.

Design Standard	Locations	Reason for Design Exception
Inside median width (22 feet)	I-680 south of the I-680/SR 84 separation	Maintain the existing 15-to-18-foot median for the same reasons listed above.
	SR 84 from PM 19.0 to 19.22, north of Vallecitos Lane	Provide a median width of 12 feet to minimize impacts to Vallecitos Creek, wetlands/waters, and the SFPUC Sheep Camp Creek facility.
	SR 84 from PM 20.7 to 23.0 (Pigeon Pass area)	Maintain the existing 16-foot median to minimize impacts to established biological mitigation areas, cut and fill slopes, a gabion-faced reinforced embankment, two undercrossings, and a frontage road system.
Interchange spacing (standard varies based on setting but minimum is 1 mile)	Between SR 84/I-680 interchange and I-680/ Koopman Road interchange	Maintain existing spacing of 0.5 mile to avoid right-of-way impacts to adjacent properties, environmental impacts, and utility impacts from constructing a new Koopman Road interchange 0.5 mile to the north. Eliminating the Koopman Road interchange would further degrade operations and affect the direct route for traffic from Sunol Road to northbound I-680.
Advisory Standards		
Superelevation transition	Calaveras Road on-ramp to northbound SR 84	The standard design would require shifting other interchange ramps eastward and have additional impacts on the SFPUC Sheep Camp Creek facility as well as undeveloped land adjacent to the Calaveras Road on-ramp to northbound SR 84.
Superelevation runoff (2/3 of superelevation runoff should be on the tangent and 1/3 within the curve)	SR 84/I-680 interchange vicinity	The standard design would require increasing the size of proposed retaining wall, and result in additional impacts to the SFPUC Sheep Camp Creek facility and an undeveloped high cut slope adjacent to the interchange.
Reversing curves – transition length (the connecting tangents should be long enough to accommodate the standard superelevation runoff)	Between the Calaveras Road to northbound I-680 flyover ramp and southbound SR 84 connector to northbound I-680	Lengthening the area between the curves would have additional impacts on the SFPUC Sheep Camp Creek facility.
Access opening spacing (not spaced closer than 1/2 mile to an adjacent public road intersection or private access wider than 30 feet)	Private access on south side of SR 84 0.24 mile west of Ruby Hill Drive	Maintain existing spacing to avoid impacts to wetlands/waters and the potential need for substantial retaining walls.
Side slopes 4:1 (horizontal to vertical) or flatter	Multiple locations	The standard design would require higher and longer retaining walls; additional right-of-way acquisition; and/or impacts to the Scott's Corner Separation bridge, wetlands/waters, cut and fill slopes, and frontage roads.
Outer separation – rural areas (40 feet from edge of traveled way to edge of traveled way)	Proposed Little Valley Road/Vallecitos Atomic Laboratory Road intersection	Provide separation of 29 feet between the intersection and the proposed frontage road north of SR 84 to avoid impacts to wetlands south of SR 84 and monitoring wells and sewage facilities on the GE-Hitachi property north of SR 84.
Single-lane ramp widening for passing (if ramp is more than 1,000 feet long, an additional lane should be provided)	Calaveras Road off-ramp to northbound I-680, Calaveras Road off-ramp to northbound SR 84, Paloma Way single-lane on-ramp to southbound I-680	Maintain existing ramp widths to avoid the need for additional right-of-way, new or higher retaining walls, impacts to wetlands/waters and trees, and utility relocations.

1. Superelevation is the vertical distance between the heights of inner and outer edges of highway pavement.

Caltrans approved the exceptions to mandatory design standards on June 20, 2017, and the exceptions to advisory design standards on June 9, 2017.

1.4.4.1 Traffic Systems Management (TSM) and Traffic Demand Management (TDM) Alternatives

TSM strategies increase the efficiency of existing facilities by accommodating a greater number of vehicle trips without increasing the number of through lanes. Examples of TSM strategies include: ramp metering, auxiliary lanes, turning lanes, reversible lanes, and traffic signal coordination. TSM encourages transit use and ridesharing. TSM also encourages bicycle and pedestrian improvements as elements of an urban transportation system.

TSM strategies are already in use in the project area, such as ramp metering at the southbound SR 84 to southbound I-680 connector ramp, an auxiliary lane on northbound I-680 between Calaveras Road to the northbound I-680/northbound SR 84 split, and an HOV/express lane on southbound I-680 from approximately Calaveras Road to SR 237 in Milpitas. Despite these measures, the existing configuration of SR 84 limits the flow of traffic through the two-lane sections and on northbound I-680 between the Calaveras Road/SR 84 on-ramp and northbound SR 84 off-ramp. Although TSM measures alone could not satisfy the purpose and need of the project, the Build Alternative would include the following additional TSM components:

- Conversion of the existing two-lane ramp meter at the southbound SR 84 to southbound I-680 connector ramp to a three-lane ramp meter with an HOV preferential lane.
- Construction of an approximately 1,000-foot-long auxiliary lane on southbound I-680 to the south of Calaveras Road/Paloma Way.
- Extension of the existing northbound I-680 auxiliary lane by approximately 1,500 feet from south of Calaveras Road to the northbound I-680/northbound SR 84 split.
- Extension of the existing southbound I-680 HOV/express lane northward from its current entry point at approximately Calaveras Road to approximately 0.8 mile north of the Koopman Road undercrossing, a total distance of approximately 2 miles.
- Construction of a new Class I bikeway through the interchange area to connect the southbound SR 84 Class II bikeway with Paloma Way.
- Construction of new Class II bikeways on both sides of SR 84 in the project limits and a new Class II bikeway along the northbound I-680 on-ramp from Calaveras Road to connect with the proposed northbound SR 84 Class II bikeway.

TDM focuses on regional means of reducing the number of vehicle trips and vehicle miles traveled (VMT) as well as increasing vehicle occupancy. The extension of the southbound I-680 HOV/express lane would help to facilitate transit use and ridesharing. In addition, the vehicle detection systems for monitoring traffic speed and density to maintain acceptable LOS in the extended HOV/express lane would benefit transit and other HOVs. The proposed bikeways would facilitate nonmotorized travel by providing a new bicycle link across I-680.

1.4.4.2 Estimated Project Cost and Funding

The current preliminary total cost estimate, including the support cost for the project, is approximately $185 million. The cost details are shown in Table 1.4.4-5.

Table 1.4.4-5: Estimated Project Cost

Cost Category	Estimated Cost (2017 dollars)
Roadway	$79,600,000
Structures	$44,200,000
Right-of-Way and Utility Relocation	$18,900,000
Total Capital Cost (2017)	**$142,600,000**
Total Escalated Capital Cost (2022)	**$168,700,000**
Support Cost (2017; for Design, Right-of-Way, and Construction)	$42,300,000
Support Cost (2022; for Design, Right-of-Way, and Construction)	$46,000,000
Total Project Cost (2017)	$185,000,000
Total Project Cost (2022)	$214,000,000

Notes: Total project cost estimate is for remaining costs associated with the project. Amounts have been rounded to the nearest hundred thousand and may not add up to the totals shown.

The estimated total project funding is $220 million. Currently $135.9 million is programmed from Alameda County local tax measures and development fees. Additional sources needed to fully fund the project are yet to be determined and could include combination of state, local, and federal funding.

1.4.5 No Build Alternative

The No Build Alternative proposes no modifications to SR 84, I-680, or the SR 84/I-680 interchange other than routine maintenance and rehabilitation and currently planned and programmed projects. The existing configuration of SR 84, I-680, and the SR 84/I-680 interchange would remain the same. The No Build Alternative would not alleviate current and future traffic or improve circulation in the project area, and conditions would continue to degrade with increased future traffic demand, as described in Section 1.3.2.1.

1.4.6 Final Decision Making Process

After the public circulation period, all comments will be considered, and Caltrans will select a preferred alternative and make the final determination of the project's effect on the environment.

Under CEQA, Caltrans will certify that the project complies with CEQA, 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 project approval. Caltrans will then file a Notice of Determination with the State Clearinghouse that will identify whether the project will have significant impacts, if mitigation measures were included as conditions of project approval, that findings were made, and that a Statement of Overriding Considerations was adopted.

Similarly, if Caltrans, as assigned by FHWA, determines the NEPA action does not significantly impact the environment, Caltrans will issue a Finding of No Significant Impact (FONSI). If it is determined that the project is likely to have a significant effect on the environment, an Environmental Impact Statement (EIS) will be prepared.

1.4.7 Alternatives Considered but Eliminated from Further Discussion

The following alternatives were considered and analyzed during the project initiation phase and early stages of the project approval and environmental document (PA&ED) phase. Other than specific components of alternatives that were incorporated into previous projects or the proposed Build Alternative, these alternatives were ultimately rejected and withdrawn from further study for the reasons described below.

1.4.7.1 PSR-PDS Alternatives

PSR-PDS Alternative 2A

Alternative 2A was one of the two build alternatives considered in the approved 2003 PSR-PDS (Caltrans 2003a). The PSR-PDS studied alternative alignments and phasing options for SR 84 between I-680 and Isabel Avenue/Jack London Boulevard, as described in Section 1.2.2. Alternative 2A proposed widening SR 84 to four lanes on SR 84 from I-680 to Vineyard Avenue,[12] and six lanes from Vineyard Avenue to Jack London Boulevard. A Class III bikeway[13] was proposed from I-680 to Vineyard Avenue.

Four alignment options were considered through the Pigeon Pass area:

- Option A – realigning SR 84 south of the existing roadway
- Option B – realigning SR 84 north of the existing roadway
- Option C – realigning SR 84 south of the existing roadway and maintaining the existing roadway for local access only
- Option D – widening SR 84 with minor modifications to the existing alignment as necessary to meet expressway standards.

Alternative 2A was eliminated from further study because the traffic projections and analysis indicated that four lanes along SR 84 (Isabel Avenue) from Vineyard Avenue to Stanley Avenue (outside of the current project area) would be adequate to handle the projected traffic volumes in this section of the corridor. Therefore, the 2003 PSR-PDS determined that widening from four lanes to six lanes in this segment was not cost effective.

PSR-PDS Alternative 2B

Alternative 2B was the viable build alternative recommended for further study in the 2003 PSR-PDS. Its proposed design generally matched the design of Alternative 2A. However, this alternative proposed six lanes from Stanley Boulevard to Jack London Boulevard, a shorter distance than the six-lane segment proposed from Vineyard Avenue to Jack London Boulevard with Alternative 2A.[14] Alternative 2B also included the four Pigeon Pass alignment options listed for Alternative 2A. Alternative 2B was found to address the projected traffic forecasts along the SR 84 corridor and improve safety through the Pigeon Pass area. This alternative was

[12] Vineyard Avenue is approximately 1.2 miles north of the current northern project limit to the south of Ruby Hill Drive.
[13] A Class III bikeway (bike route) is a facility shared with motor vehicles on the street, and is established by placing bike route signs along roadways (Caltrans 2016).
[14] Stanley Boulevard is approximately 2.6 miles north of the northern project limit on SR 84.

generally incorporated into the separate projects described in Section 1.2.2 that widened and conformed SR 84 to expressway standards between Jack London Boulevard and Ruby Hill Drive (EA 29761 and EA 29762) and realigned SR 84 through the Pigeon Pass area (EA 17240). For the Pigeon Pass area, the project ultimately constructed an alignment similar to Option C.

PSR-PDS Interim Alternatives

In addition to Alternatives 2A and 2B, the PSR-PDS analyzed three interim project alternatives to determine how improvements could be phased to accommodate traffic volumes through 2015, due to the high construction costs of the overall project.

Interim Project Alternative 3 – Four Lanes from I-680 to I-580

Interim Project Alternative 3 proposed the same alignment and options as Alternatives 2A and 2B, except it included only four lanes between I-680 and I-580. The alignment was generally incorporated into the previous projects described in Section 1.2.2, although a six-lane segment was ultimately included between Concannon Boulevard and Jack London Boulevard to accommodate projected future traffic.

Interim Project Alternative 4 – Three-Lane Variants from I-680 to Vallecitos Road

Interim Project Alternative 4 would conform SR 84 to expressway standards from I-680 to Pigeon Pass, similar to Alternatives 2A and 2B, but included three lanes between I-680 and the Vallecitos Road/Isabel Avenue intersection. The three-lane variants of Interim Project Alternative 4 from I-680 to Vallecitos Road that the PSR-PDS analyzed were:

- Alternative 4A – 1 northbound and 2 southbound lanes
- Alternative 4B – 1 southbound and 2 northbound lanes
- Alternative 4C – 2 lanes plus a reversible lane

The traffic forecasts and operations analysis indicated that a minimum of a four-lane roadway section along SR 84 from I-680 to Isabel Avenue was required to accommodate the projected 2025 traffic volumes along the corridor between I-680 and Vallecitos Road. The 2003 PSR-PDS determined that Interim Project Alternatives 4A and 4B could support a phased construction of the ultimate improvements to accommodate traffic demand through 2015. However, neither alternative was ultimately carried forward. The PSR-PDS recommended prioritizing the SR 84 improvements from Jack London Boulevard to Ruby Hill Drive and through Pigeon Pass, which were subsequently defined as separate projects as described in Section 1.2.2.

The “pop-up” delineators (movable posts that act as a barrier between lanes) or movable barriers needed to implement the reversible lane for Alternative 4C were determined to have extremely high construction, operation, and maintenance costs. Additional concerns included the time it would take to install the reversible barriers, potential public safety issues, and access to existing driveways and emergency vehicles. Interim Project Alternative 4C was eliminated from further consideration because it would not meet the purpose and need of the project.

Interim Alternative 5 – Four Lanes from Ruby Hills Drive to I-580

Interim Project Alternative 5 proposed widening SR 84 to four lanes from Ruby Hill Drive to I-580 and maintaining the existing two lanes from I-680 to Ruby Hill Drive. As noted for Interim Project Alternative 3, the alignment from I-580 to Ruby Hill Drive was generally incorporated into the previous projects described in Section 1.2.2, although a six-lane segment was ultimately included between Concannon Boulevard and Jack London Boulevard to accommodate projected future traffic.

1.4.7.2 PA&ED Alternatives

SR 84/I-680 Interchange Alternatives

The preliminary traffic analysis for the PSR-PDS indicated that in 2025, there would be a backup of approximately 1 mile on southbound 84 approaching southbound I-680. Therefore, Caltrans Traffic Operations staff recommended potential solutions to reduce backups and delays at the I-680/SR 84 interchange. The preliminary analysis recommended providing four lanes on SR 84 both west and east of the I-680 interchange, constructing ramp meters and HOV bypass lanes at the southbound SR 84 connector ramps to northbound and southbound I-680, and constructing HOV bypass lanes on southbound SR 84 beginning approximately 1 mile east of the I-680 interchange.

The following discussion describes the interchange alternatives considered to incorporate the recommendations from the PSR-PDS and Traffic Operations Analysis Report (TOAR) prepared during PA&ED.

Interchange Alternative 1 – Tight Diamond On-Ramp from Calaveras Road to Northbound I-680/Northbound SR 84

Interchange Alternative 1 would construct a tight diamond[15] on-ramp from Calaveras Road to northbound I-680 and northbound SR 84 directly adjacent to the east side of I-680. The on-ramp would eliminate the existing weaving issue discussed in Section 1.3.2.1 by separating traffic entering I-680 via Calaveras Road from other northbound traffic on I-680. Calaveras Road in the vicinity of Interchange Alternative 1 lacks adequate space to accommodate vehicles waiting to turn left onto the ramp, which would increase traffic congestion in the eastbound through-lane on Calaveras Road and potentially lead to collisions from vehicles attempting to pass queued left-turning vehicles. In addition, the design would include nonstandard grades and nonstandard corner stopping sight distance, which could pose additional safety concerns. As Interchange Alternative 1 would not fully address the project purpose of improving safety and congestion in the project area, it was eliminated from further consideration.

[15] A tight diamond ramp is a type of road junction where the freeway crosses over a minor road, and the interchange resembles a diamond shape. The freeway would be depressed or elevated and the cross street would retain a straight profile. A tight diamond on-ramp is a compact diamond interchange where physical, geometric, or right-of-way restrictions do not allow a more spread interchange (Caltrans 2001).

Interchange Alternative 2 – Realign Northbound I-680 to Northbound SR 84 Connector to South of Calaveras Road

Interchange Alternative 2 would create a new northbound I-680 to northbound SR 84 connector to the east of I-680 that would begin south of Calaveras Road. The connector structure would cross over the existing loop on-ramp to northbound I-680 from Calaveras Road, which would remain in place. Traffic entering northbound I-680 from Calaveras Road would be able to merge onto northbound SR 84, but delineators would be used to keep through traffic on northbound I-680 from merging to the right toward northbound SR 84. This alternative would also address the existing weaving issue discussed in Section 1.3.2.1 by separating traffic entering I-680 via Calaveras Road from northbound traffic on I-680 headed toward northbound SR 84. However, Interchange Alternative 2 would fail to meet the required vertical clearance between the Calaveras Road loop on-ramp and the proposed connector structure, require the full acquisition of two properties, and potentially present collision risks from the delineators on northbound I-680. As Interchange Alternative 2 would not fully address the project purpose of improving safety and would have greater right-of-way impacts than the Build Alternative, it was eliminated from further consideration.

Interchange Alternative 3 – Realign Northbound I-680 to Northbound SR 84 Connector to South of Calaveras Road

Interchange Alternative 3 is similar to Alternative 2, except that the new northbound I-680 to northbound SR 84 connector would pass to the east of the existing loop on-ramp to northbound I-680 from Calaveras Road, instead of crossing over it. This alternative would avoid the full acquisition of two properties but would have additional right-of-way impacts to a PG&E substation. The eastward shift and longer length of the connector would require extensive excavation into adjacent slopes, potentially result in additional visual and biological impacts, and have higher construction costs compared with the Build Alternative. In addition, the delineators on northbound I-680 would potentially present collision risks. As Interchange Alternative 3 would not fully address the project purpose of improving safety and would have greater right-of-way impacts than the Build Alternative, it was eliminated from further consideration.

Interchange Alternative 4 – Two-Lane Connector from Northbound I-680 to Northbound SR 84

Interchange Alternative 4 proposed providing a two-lane connector from northbound I-680 to northbound SR 84. This alternative would provide more vehicle capacity for the connector than the existing connection, which is one lane adjacent to I-680, two lanes on the connector, and one lane adjacent to SR 84. However, it would not address the existing weaving issue discussed in Section 1.3.2.1. As Interchange Alternative 4 would not fully address the project purpose of improving traffic circulation, it was eliminated from further consideration.

Interchange Alternative 5 – Spread Diamond On-Ramp from Calaveras Road to Northbound I-680 and Northbound SR 84

Interchange Alternative 5 proposed a spread diamond on-ramp[16] from Calaveras Road that would connect directly to the northbound SR 84 connector. As an option, a flyover ramp could be constructed to connect the on-ramp with northbound I-680. As with Interchange Alternative 1, Calaveras Road lacks adequate space to accommodate vehicles waiting to turn left onto the ramp, which would increase traffic congestion in the eastbound through-lane on Calaveras Road and potentially lead to collisions from vehicles attempting to pass queued left-turning vehicles. Similar to Interchange Alternative 3, the eastward shift of the connector would require extensive excavation into adjacent slopes as well as high retaining walls, potentially resulting in additional visual and biological impacts. Finally, without the optional flyover ramp, Interchange Alternative 5 would not address the existing weaving issue discussed in Section 1.3.2.1. As Interchange Alternative 5 would not fully address the project purpose of improving safety and congestion in the project area, it was eliminated from further consideration.

Interchange Alternative 6 – Spread Diamond Off- and On-ramps from Calaveras Road to Northbound I-680 and Northbound SR 84

Interchange Alternative 6 would construct a new northbound I-680 off-ramp and northbound SR 84 on-ramp connecting with Calaveras Road to the east of I-680. This alternative would address the existing weaving issue discussed in Section 1.3.2.1 by separating traffic entering I-680 via Calaveras Road from northbound traffic on I-680 headed toward northbound SR 84. The new ramps would require the full acquisition of two properties and require extensive excavation into adjacent slopes as well as high retaining walls, potentially resulting in additional visual and biological impacts. As Interchange Alternative 6 would have greater right-of-way impacts than the Build Alternative, it was eliminated from further consideration.

Reversible Traffic Lanes

California Assembly Bill (AB) 2542 (2016; effective January 1, 2017) requires that, prior to the approval of a capacity-increasing project or major street or highway lane realignment project by the California Transportation Commission, Caltrans or a regional transportation planning agency must demonstrate that reversible lanes were considered for the project. Reversible lanes add peak-direction capacity to a two-direction roadway and decrease congestion by using the available capacity from the direction of traffic that is not experiencing peak period congestion. In addition, these lanes provide a cost benefit in cases where increasing the capacity is especially expensive, particularly on bridges and in dense urban areas. With the implementation of reversible lanes, roads may be adjusted ranging from a one-way road to having a middle lane that operates in the peak direction. Changeable signs and/or arrows are used to indicate the adjustment at specified times of day, or when volume exceeds the capacity of the roadway (Texas A&M University Transportation Institute 2017).

In addition to the consideration and ultimate rejection of Interim Project Alternative 4C in the 2003 PSR-PDS, reversible traffic lanes on SR 84 and I-680 were considered for the proposed project.

[16] Similar to a tight diamond on-ramp, the spread diamond on-ramp includes a depressed or elevated freeway crossing over a minor road. The ramp terminals are spread in order to achieve maximum sight distance and minimum slope for the crossing of the roadways (flatter ramp grades; Caltrans 2001).

A reversible lane alternative on SR 84 would provide a total of three lanes within the project limits, compared to four lanes with the Build Alternative. Preliminary traffic analysis shows that in the projected opening year of 2025, a reversible lane on SR 84 would improve operations by creating more capacity through a second lane in the southbound direction during the AM peak period, and then in the northbound direction during the PM peak period. However, in the design year of 2045, southbound SR 84 would experience congestion at the Pigeon Pass lane reduction for approximately three hours (3:30 PM to 6:30 PM) with the No Build condition. Addressing this congestion would require the use of a second southbound lane during the PM peak period as well as a second northbound lane that would be normally be used for northbound PM peak period traffic. As a reversible lane would not improve traffic congestion through 2045, it would not meet the purpose and need of the project.

In addition, traffic forecasts indicate that the single-lane northbound I-680 off-ramp to northbound SR 84 would need to be widened to two lanes by 2025. The two lanes would connect with the two northbound lanes on SR 84 heading toward Pigeon Pass. It would not be possible to reverse one of the off-ramp lanes during non-peak times. Rather, the two off-ramp lanes would need to extend through the interchange influence area (approximately 4,000 to 5,000 feet) where the lane could then become reversible. Finally, a reversible lane along SR 84 would need to accommodate the new signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road, complicating both geometric considerations and intersection operations.

The I-680 corridor would also present constraints for implementing reversible lanes. The traffic analysis shows that for the 2025 No Build scenario, the bottleneck along southbound I-680 between Sunol Boulevard and Koopman Road is expected to be active in both the AM peak period and PM peak period, requiring the capacity of all southbound lanes during both peak periods. Also, the grade difference of approximately 10 feet between northbound and southbound I-680 between Koopman Road and SR 84 would make a reversible lane infeasible.

Calaveras Road to Koopman Road Detour Alternative

The Build Alternative includes removing the existing on-ramp from Calaveras Road to northbound I-680, constructing a new flyover ramp from Calaveras Road to northbound I-680, and constructing a new slip on-ramp from Calaveras Road to northbound SR 84. The modifications would address the existing bottleneck at the weaving area on northbound I-680 between the Calaveras Road/SR 84 on-ramp and northbound SR 84 off-ramp by providing separate access for those travel movements.

In the event that funding cannot be identified for these proposed modifications, the PDT evaluated whether they could be constructed as a later phase than the rest of the proposed project components. As an interim phase, the PDT considered closing the northbound I-680 on-ramp from Calaveras Road and providing a detour route to northbound I-680 to improve traffic operations and safety by eliminating weaving conflicts from motorists entering northbound I-680 at Calaveras Road. The detour would route drivers to northbound I-680 via Paloma Way, Pleasanton-Sunol Road, and Koopman Road.

The proposed detour route has existing shoulders of approximately 2 feet on each side. To adhere to Alameda County standards for this type of roadway, approximately 10 feet of

widening would be required on each side. A curve near Paloma Way would have to be realigned, which would require a new retaining wall and cut slopes. Preliminary traffic studies indicate that an additional left-turn lane would be needed from Paloma Way to Pleasanton-Sunol Road, which would require widening the roadway bridge over Arroyo de la Laguna (Bridge No. 33-0043).

The detour route would have the potential to substantially increase traffic on Paloma Way, Pleasanton-Sunol Road, and Koopman Road, which could affect emergency response access from the CalFire station on Pleasanton-Sunol Road. The modifications needed to conform the detour route to Alameda County and Caltrans standards would also result in additional environmental impacts, including to archaeological and biological resources, and additional mitigation costs. In addition, the local community could have safety concerns about fast-moving freeway-bound vehicles in the vicinity of the Sunol Glen Elementary School property, which is just east of Paloma Way/Pleasanton-Sunol Road intersection.

The cost of the implementing the Calaveras Road to Koopman Road Detour Alternative was estimated at $7 million more than the Build Alternative with the new Calaveras Road to northbound I-680 flyover ramp and Calaveras Road to northbound SR 84 slip on-ramp. As the Calaveras Road to Koopman Road Detour Alternative would not fully address the project purpose of improving safety on SR 84 and would result in additional environmental impacts and higher construction costs compared to the Build Alternative, it was eliminated from further consideration.

Vallecitos Creek Avoidance Options

The project area along SR 84 is directly adjacent to a bioregional habitat restoration program site established by the San Francisco Public Utilities Commission (SFPUC) as part of its Water System Improvement Program. The site, known as the Sheep Camp Creek facility, is bordered by SR 84 on the south, Little Valley Road and the Little Valley community on the east, I-680 and Koopman Road on the west, and open space on the north. In addition to providing habitat for special-status species, the facility allows for cattle grazing to reduce fuel loads and fire risk.

SFPUC is currently preparing a Habitat Conservation Plan (HCP) for the Alameda Creek watershed, which would include the Sheep Camp Creek facility. SFPUC also plans to establish a conservation easement on part of the property. The southern perimeter of the Sheep Camp Creek facility along the north side of SR 84 contains a firebreak/access road and an ephemeral drainage that SFPUC restored as mitigation for other projects. In meetings with the project team in 2016, SFPUC staff noted that the proposed project work along SR 84 would need to accommodate a firebreak/access road and avoid or minimize impacts on the ephemeral drainage.

Vallecitos Creek, a potentially jurisdictional wetland, is directly south of SR 84, across from the Sheep Camp Creek facility. Three options were considered for the project alignment through this area.

Vallecitos Creek Option 1

At the beginning of the PA&ED phase, the project was designed to avoid encroachment into the Sheep Camp Creek facility and potential impacts on habitat and conservation easement lands. Instead, Vallecitos Creek Option 1 would shift the widened roadway of SR 84 to the

south, requiring a section of Vallecitos Creek to be realigned or placed into a culvert. Option 1 would result in approximately 0.40 acre of permanent impacts and 0.01 acre of temporary impacts to the creek. Although Option 1 would be generally consistent with the project's purpose and need, routing SR 84 through a jurisdictional wetland would likely be unacceptable to one or more of the agencies from which project approvals or permits would be necessary. In addition, in early discussions with SFPUC, it was determined that Option 1 would not avoid the Sheep Camp Creek facility because it would require realigning a section of the firebreak/access road to the north and potentially affect the ephemeral drainage.

Two other options were developed to minimize impacts to Vallecitos Creek: Option 2, a bridge over Vallecitos Creek; and Option 3, a northward shift of SR 84 with reduced median width.

Vallecitos Creek Option 2

Like Option 1, Option 2 would shift the widened roadway of SR 84 to the south to minimize encroachment into the Sheep Camp Creek facility. However, instead of realigning or culverting Vallecitos Creek, Option 2 would construct two bridge sections to convey the eastbound lanes of SR 84 over the creek. Option 2 would reduce permanent structural impacts to jurisdictional waters compared to Option 1 (0.01 acre with Option 2, and 0.40 acre with Option 1); however, the bridge sections would result in 0.34 acre of permanent shading impacts, and the temporary construction impacts would be greater than with Option 1 (0.34 acre with Option 2, and 0.01 acre with Option 1). In addition, this option would also require realigning a section of the firebreak/access road and potentially affect the ephemeral drainage at the Sheep Camp Creek facility. Finally, the construction cost of Option 2 was estimated to be $10 million to $17 million higher than Option 1. As Option 2 would not effectively minimize impacts to jurisdictional waters compared with Option 1, and would also have a substantially higher cost, it was not advanced for further consideration.

Vallecitos Creek Option 3

To avoid Vallecitos Creek and minimize impacts to the Sheep Camp Creek facility, the project team developed an alignment of SR 84 that would be slightly to the north of the Option 1 alignment. Option 3 would also have a less-than-standard median width of 22 feet (compared with the typical expressway standard of 65 feet) between PM 19.0 and PM 19.22. The project team also worked with SFPUC staff to accommodate the relocated firebreak/access road in the Option 3 alignment and avoid impacts to the ephemeral drainage on the Sheep Camp Creek facility. Option 3 would result in less than 0.01 acre of temporary and permanent impacts to wetlands, compared with 0.40 acre of permanent impacts and 0.01 acre of temporary impacts with Option 1. The cost of Option 3 would be approximately $2 million higher than Option 1. As Option 3 would effectively minimize impacts to jurisdictional waters compared with Option 1, it was advanced for further consideration as part of the proposed Build Alternative.

SR 84 Alignment Variations

The following variations in the proposed project alignment along SR 84 were considered and rejected as described below.

SR 84 Alignment Variation 1: Additional Right-of-Way from General Electric-Hitachi

Variation 1 would be similar to the Build Alternative except along the frontage of the General Electric (GE)-Hitachi Vallecitos Nuclear Center property, where the widened SR 84 would be shifted approximately 50 feet north of the proposed Build Alternative alignment. With Variation 1, the proposed frontage roads that provide access to Little Valley Road on the north side of SR 84 and private driveways and rural roads on the south side of SR 84 would also be shifted to the north, along with the proposed new signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road.

The northerly shift of the project alignment would require less right-of-way from property owners to the south of SR 84. However, to accommodate the shift, Variation 1 would require additional right-of-way from the GE-Hitachi property, an additional retaining wall, and the relocation of a dirt emergency access road, a gas line, monitoring wells, a PG&E transmission tower, and the wastewater treatment plant near Little Valley Road. Variation 1 would also require additional right-of-way from the SFPUC Sheep Camp Creek facility. The relocation of the transmission tower and wastewater treatment plant and the need for an extra retaining wall would result in additional environmental impacts and higher remediation and/or mitigation costs than the Build Alternative. For those reasons, Variation 1 was eliminated from further consideration even though it would generally meet the purpose and need of the project.

SR 84 Alignment Variation 2: Additional Right-of-Way from Properties South of SR 84

Variation 2 would be similar to the Build Alternative except the widened SR 84 would be shifted approximately 40 feet south of the proposed Build Alternative alignment. With Variation 2, the proposed frontage roads that provide access to Little Valley Road on the north side of SR 84 and private driveways and rural roads on the south side of SR 84 would also be shifted to the south, along with the proposed new signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road.

The shift would avoid the additional environmental impacts and higher remediation and/or mitigation costs of Variation 1. However, Variation 2 was rejected because of the substantial right-of-way acquisition it would require from properties south of SR 84. Moreover, the proposed frontage road south of SR 84 would affect a potentially jurisdictional wetland that is avoided by the Build Alternative.

SR 84 Alignment Variation 3: Minimizing Wetland Impacts

Variation 3 was developed to minimize impacts on potentially jurisdictional wetlands, waters of the U.S., and culverts by shifting the widened SR 84 northward into SFPUC's Sheep Camp Creek facility, discussed above in "Vallecitos Creek Avoidance Options." The proposed frontage roads on the south side of SR 84 would avoid potentially jurisdictional wetlands, waters of the U.S., and culverts on the south side of SR 84. However, Variation 3 would require additional right-of-way acquisition from SFPUC, result in permanent impacts to the ephemeral drainage that SFPUC restored as mitigation for other projects, and potentially affect future conservation easement lands. Construction of the widened SR 84 on this property would also require more extensive grading and/or large retaining walls. For these reasons, and due to reduction in wetland impacts from Vallecitos Creek Option 3 (which was incorporated into the Build Alternative), Variation 3 was rejected.

1.4.8 Permits and Approvals Needed

Table 1.4.8-1 shows the permits, reviews, and approvals that would be required for project construction.

Table 1.4.8-1: Permits and Approvals Needed

Agency	Permit/Approval	Status
U.S. Army Corps of Engineers (USACE)	Concurrence on delineation of waters of the U.S., and Section 404 permit for placement of fill within waters of the U.S.	● The Jurisdictional Delineation was submitted to USACE for concurrence on March 17, 2017. ● Permit application will be submitted during the project design phase.
U.S. Fish and Wildlife Service (USFWS)	Section 7 consultation for threatened and endangered species	● A Biological Assessment was submitted to the USFWS on July 26, 2017.
Federal Highway Administration (FHWA)	Concurrence with project's conformity to Clean Air Act and other requirements	● Air quality studies will be submitted for FHWA concurrence after public review of this EIR/EA.
California Department of Fish and Wildlife (CDFW)	Section 1602 Lake and Streambed Alteration Permit and Incidental Take Permit	● Permit applications will be submitted during the project design phase.
San Francisco Bay Regional Water Quality Control Board (RWQCB)	Waste discharge requirements under the Porter-Cologne Water Quality Control Act; National Pollutant Discharge Elimination System (NPDES) approval for work greater than one acre	● A joint "Application for 401 Water Quality Certification" and/or "Report of Waste Discharge" will be submitted during the project design phase. ● An NPDES permit application will be submitted during the project design phase. ● A Notice of Intent and Storm Water Pollution Prevention Plan will be prepared/submitted prior to construction.
State Historic Preservation Officer (SHPO)	Concurrence on findings with respect to historic resources and Section 106 requirements	● SHPO concurred with Caltrans' eligibility determinations on October 5, 2017.

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

This chapter addresses the environmental impacts of the proposed project. The environmental resource discussions presented in this chapter are based on the technical studies cited at the beginning of each discussion and listed in Appendix F. An evaluation of the proposed project consistent with CEQA checklist criteria is provided in Chapter 3. Avoidance, minimization, and/or mitigation measures are discussed in the following sections and summarized in Appendix D.

For the proposed project, the CEQA baseline is 2015, the year when environmental studies commenced. The air quality and noise studies began in 2016 and used the 2015 baseline year traffic data for existing conditions.

The NEPA baseline for comparing environmental impacts is the No Build Alternative.

As part of the scoping and environmental analysis carried out for the project, the following environmental issues were considered but no adverse impacts were identified. As a result, there is no further discussion about these issues in this document.

Coastal Zone

The proposed project is not located within the coastal zone or Bay Conservation and Development Commission jurisdiction, therefore, no coastal zones would be affected by the proposed project.

Wild and Scenic Rivers

No wild and scenic rivers are located in or adjacent to the project area; therefore, wild and scenic rivers would not be affected by the proposed project.

Timberlands

No timberlands exist in or adjacent to the project area; therefore, timberlands would not be affected by the proposed project.

Environmental Justice

The project area and its surroundings do not meet the criteria for being identified as an environmental justice community. No minority or low-income populations that would be adversely affected by the proposed project have been identified as determined above. Therefore, this project is not subject to the provisions of Executive Order (EO) 12898.

2.1 Human Environment

2.1.1 Existing and Future Land Use

2.1.1.1 Affected Environment

The following discussion is from the *Community Impact Assessment* completed for the proposed project in March 2017 (AECOM and Vernazza Wolfe 2017). The community impact study area includes unincorporated Alameda County, Sunol (a Census Designated Place [CDP] in unincorporated Alameda County), Little Valley (a specific plan area in unincorporated Alameda County), Happy Valley (a specific plan area in Pleasanton), and the urban growth boundaries of the cities of Pleasanton and Livermore.

The project area is located entirely in Alameda County. The easternmost extent of the project area on SR 84 is in unincorporated Alameda County, but the nearest parcel on the north side of SR 84 is located in Pleasanton and the nearest parcel on the south side of SR 84 is located in Livermore. The northernmost extent of the project area on I-680 is in the City of Pleasanton; however, the proposed extension of the existing HOV/express lane is limited to unincorporated Alameda County. Sunol CDP in unincorporated Alameda County also overlaps the project area. Therefore, this section includes a description of unincorporated Alameda County (including Sunol) as well as the cities of Pleasanton and Livermore.

Existing Land Use

Existing land use types adjacent to the project area in unincorporated Alameda County include large parcel agricultural, resource management, water management, mixed use, and rural density residential (maximum 1 unit per 5 acres) (Alameda County Planning Department 2002), as shown in Figure 2.1.1-1. The parcels within the project area are zoned for agricultural uses (including grazing), planned development (allowing for agricultural uses and products, wholesale, and retail nursery), and manufacturing (specifically, the GE-Hitachi Vallecitos Nuclear Center on SR 84) (Alameda County Community Development Agency 2016).

The City of Pleasanton designates land uses for a 75-square-mile (48,000-acre) area, including lands outside of its urban growth boundary (UGB) that are within the jurisdictional authority of Alameda County (City of Pleasanton 2015a, Section 1, Introduction). For purposes of this project and to maintain consistency with the land use designations for unincorporated Alameda County, Pleasanton's jurisdiction is considered to coincide with its UGB. Land uses adjacent to the project area along I-680 between Happy Valley Road and Sunol Boulevard include retail/highway/service commercial/business and professional offices, and residential low density. At the easternmost end of the project on SR 84, adjacent to the Ruby Hill development, land use is also residential low density (City of Pleasanton 2012) and zoned as residential.

The City of Livermore also designates land uses for a 24-square mile (16,000-acre) area, including lands outside of its UGB that are within the jurisdictional authority of Alameda County. For purposes of this report and to maintain consistency with the land use designations for unincorporated Alameda County, Livermore's jurisdiction is considered to coincide with its UGB. Livermore is east of the northern project limit on SR 84, and adjacent land uses are developed single family residential and open space agriculture (City of Livermore 2014a). The

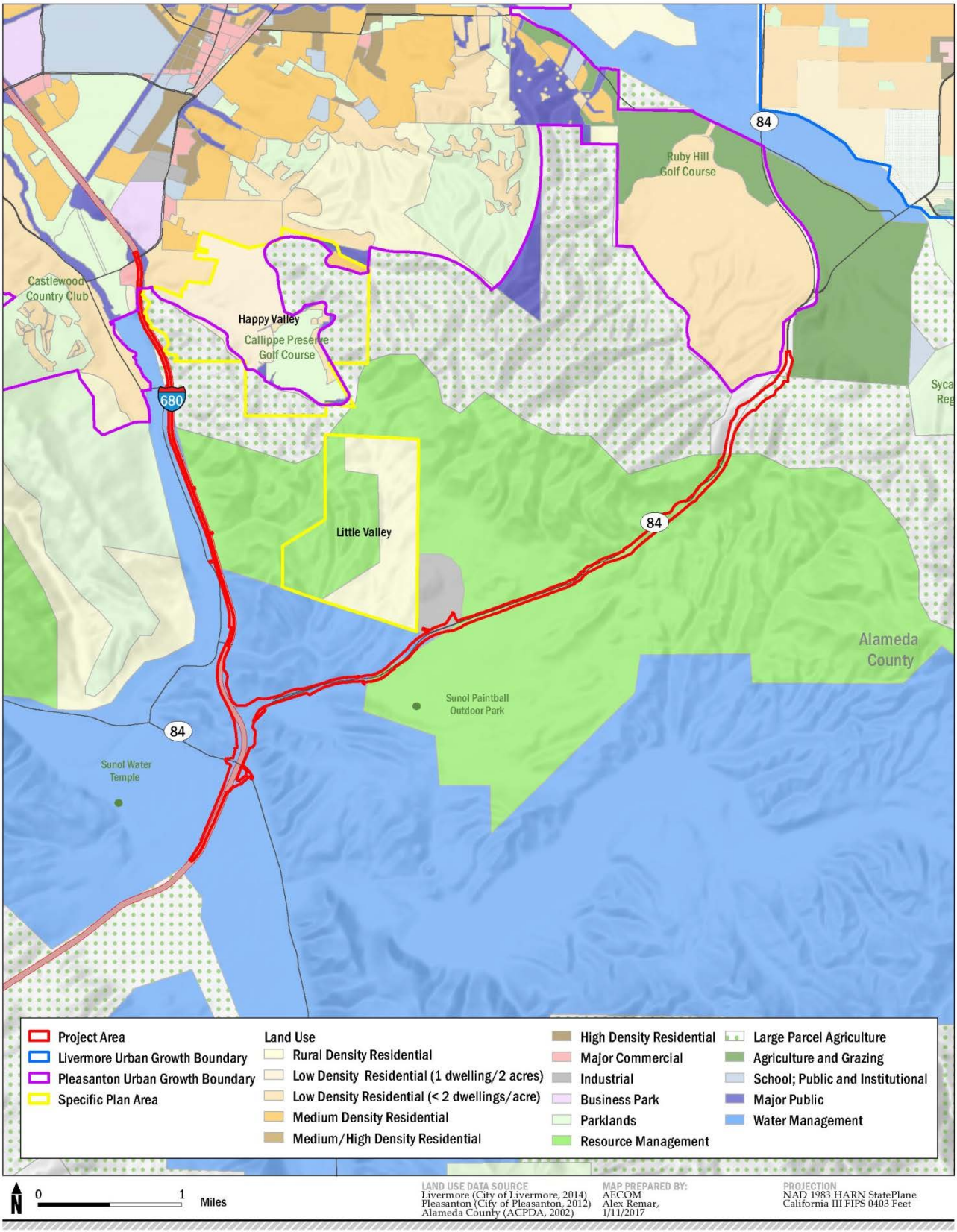


Figure 2.1.1-1 Land Use

area is zoned as planned development/agriculture and is used primarily for vineyards (City of Livermore 2014b). Several parcels in this area are under conservation easements with the Tri-Valley Conservancy, which require the land to be used for agriculture in the future (discussed in more detail in Section 2.1.5.2).

Development Trends in the Project Vicinity

In November 2000, Alameda County voters approved Measure D, which revised the UGB in the East County to reserve less land for urban growth and more land for agriculture and open space, required new housing to be located primarily within existing cities, modified land use restrictions applicable to rural areas, and required a county-wide vote on changes to these policies. As a result, most intensive development in the project area and community impact study area is restricted to areas within the UGBs of Pleasanton and Livermore. The majority of the project area is outside of the UGBs for Pleasanton (City of Pleasanton 2012) and Livermore (City of Livermore 2013).

The City of Pleasanton encourages orderly growth and development of the city together with the preservation of open space (City of Pleasanton 2015a). The Pleasanton General Plan designated a future East Pleasanton Specific Plan area for the easternmost portion of Pleasanton north of Stanley Boulevard, approximately 3.4 miles north-northwest of the proposed project area. The 1,110-acre plan area is part of the larger Livermore-Amador Valley Quarry Area Reclamation Plan lands, nearly all of which had been mined for aggregate in the past (City of Pleasanton 2015b). In June 2015, planning efforts for the East Pleasanton Specific Plan were halted due to concerns about the drought, traffic impacts, school capacity, and growth. Any future decision to restart the East Pleasanton Specific Plan process would occur as part of regular City Council priority-setting meetings (City of Pleasanton 2015c).

The City of Livermore also limits development only on those properties immediately adjacent to established urban areas in accordance with the UGB. The City's objective is to locate new development to create a consolidated pattern of urbanization, maximizing the existing public services and facilities. It also encourages the use of planned developments where possible to preserve open space and increase the variety of housing types (City of Livermore 2013).

Future Land Use

Future planned developments in or within 1 mile of the project area are described in Table 2.1.1-1. Planned residential development near the project area is limited to low density rural development.

Table 2.1.1-1: Current and Proposed Planned Developments within 1 Mile of the Project Area

Project Proponent/Name	Description	Status	Location (Approximate Distance from Project Area)
City of Pleasanton/Lund Ranch II	Planned unit development on 195 acres with 43 homes designated for Rural Density (1 dwelling per 5 acres), with approximately 161 acres of open space.	Approved January 2016; site map under review	1500 Lund Ranch Road (1 mile east)
City of Pleasanton/Dutra Enterprises	Planned unit development on 11.65 acres, with 5 residential lots and 1 open space lot.	Planned unit development designation approved; no development application submitted	1053 Happy Valley Road, Pleasanton (0.5 mile east)
City of Livermore/ Kaushik Joshi Rumaani Holdings, LLC	Winery, wellness center, bed & breakfast, and single-family residence	Application submitted January 2017; under review; anticipated to require conditional use permit	203 Vallecitos Road, Livermore (1 mile east)

Sources: Alameda County Public Works Agency 2016a; Alameda County Public Works Agency 2016b; City of Pleasanton 2017; City of Livermore 2017.

2.1.1.2 Environmental Consequences

No Build Alternative

The No Build Alternative would not conflict with existing land uses or preclude the proposed projects listed in Table 2.1.1-1.

Build Alternative

The proposed project would convert the existing land uses along the frontages of some properties to transportation use. Potential property acquisitions are described in detail in Section 2.1.7. No full parcels would be acquired for the proposed project, and the partial acquisitions would not affect the existing land uses of the rest of the properties. Therefore, project construction would not result in major changes to the land use or zoning of any parcels in the project area.

The predominant land uses in the project area are large parcel agriculture, resource management, water management, and rural density residential. These land uses are designated by the East County Area Plan and other plans described in more detail in Section 2.1.2.1. The project would not affect any parcels with Tri-Valley Conservancy easements. Operation of the proposed project is not anticipated to cause changes to the land uses of any properties that are outside of the project area but within the community impact study area or its surroundings.

The project would not provide access to new parcels, although it would change property access for several parcels along SR 84. Property access changes are further discussed in Section 2.1.7. The project would serve existing and planned land uses in the area and would not conflict with or preclude the development of any of the projects listed in Table 2.1.1-1.

2.1.1.3 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation is required.

2.1.2 Consistency with State, Regional and Local Plans and Programs

2.1.2.1 Affected Environment

The following discussion is from the *Community Impact Assessment* completed for the proposed project in March 2017 (AECOM and Vernazza Wolfe 2017).

There are several community, regional, and transportation plans that include the project area. The following types of plans were considered and are discussed below:

- Transportation plans/programs
- Regional growth plans
- General plans and related plans
- Habitat conservation plans
- Other planning influences

Transportation Plans/Programs

This project is included in *Plan Bay Area 2040*, the RTP for the nine-county San Francisco Bay Area (ABAG and MTC 2017a; RTP ID 17-01-0029). The RTP lists projects of local and regional importance based on factors such as local support and need, ridership, and potential cost and funding. These factors provide direction on how anticipated federal, state, and local transportation funds will be spent in the Bay Area during the next 24 years. *Plan Bay Area 2040* is a limited and focused update that builds upon the growth pattern and strategies developed in the original Plan Bay Area (ABAG and MTC 2013a) but with updated planning assumptions that incorporate key economic, demographic, and financial trends from the last four years (ABAG and MTC 2017a).

In addition to including the proposed project, *Plan Bay Area 2040* includes the continued development of a Regional Express Lane Network. Express lanes are a way to take advantage of available capacity in underutilized carpool lanes and to improve traffic management and reliability on well-utilized carpool lanes. With toll revenue, express lanes can offer enhanced enforcement to catch cheaters, access control to manage merging and weaving, and more cameras and sensors to quickly identify and respond to incidents. Express lane toll revenue would first fund the operations and maintenance of the lanes. The Regional Express Lane Network will leverage revenues generated from tolls paid by single-occupant vehicles to improve the existing system's efficiency while providing alternatives to driving (ABAG and MTC 2017). *Plan Bay Area 2040* contains several performance targets that were intended to be met on a region-wide basis and were "crafted to focus on desirable regional outcomes that did not preordain a specific land use pattern, transportation mode or investment strategy to reach that goal" (ABAG and MTC 2013a). The following goals and performance targets also relate to the project.

> Goal/Outcome: Healthy and Safe Communities. Reduce by 50 percent the number of injuries and fatalities from all collisions (including bike and pedestrian).

> Goal/Outcome: Open Space and Agricultural Preservation. Direct all non-agricultural development within the urban footprint (existing urban development and urban growth boundaries).

The project is also included in Alameda CTC's 2012 *Alameda Countywide Transportation Plan* and 2014 *Alameda County Transportation Expenditure Plan* (Alameda CTC 2012a, 2014a). The *Alameda Countywide Transportation Plan* sets goals for the County's transportation system to be multimodal; accessible, affordable, and equitable for people of all ages, incomes, abilities and geographies; integrated with land use patterns and local decision-making; connected across the county, within and across the network of streets, highways and transit, bicycle and pedestrian routes; reliable and efficient; cost effective; well maintained; safe; and supportive of a healthy and clean environment. The plan also identifies the need to continue to develop policies to encourage revenue generation from HOV/express lanes (Alameda CTC 2012a).

The 2014 *Alameda County Transportation Expenditure Plan* (Alameda CTC 2014) identifies projects to be funded by tax proceeds from 2014 Alameda County Measure BB, which raised the existing Measure B half-cent transportation sales tax by a half-cent and extended it through April 1, 2045. The plan identifies improvements at the SR 84/I-680 interchange and the widening of SR 84 as needed to support safety, connectivity, and efficiency.

The *California Transportation Plan 2040* outlines goals and recommendations to achieve a vision for a safe, sustainable, universally accessible, and globally competitive transportation system that provides reliable and efficient mobility for people, goods, services, and information, while meeting the State's greenhouse gas (GHG) emission reduction goals and preserving the character of California's communities (Caltrans 2016b). The *California Transportation Plan 2040* does not include goals for specific roadways.

Regional Growth Plans

Plan Bay Area 2040 (ABAG and MTC 2017a) also functions as a regional growth plan for the nine-county San Francisco Bay Area. *Plan Bay Area* designates priority development areas (PDAs), which are areas within existing communities that have been identified and approved by a local city or county for future growth because of proximity to transit, jobs, shopping, and other services. Promoting compact development within PDAs is intended to take development pressure off the region's open space and agricultural lands (ABAG and MTC 2012).

No PDAs have been designated in the project area. Three proposed PDAs have been designated in portions of Livermore and Pleasanton within 5 miles of the project area:

- The Hacienda Business Park PDA in Pleasanton is a 733-acre area located south of I-580 and east of Hopyard Road in Pleasanton, approximately 3 miles from the northern project limit on I-680. The PDA includes residential, retail, institutional, and public land uses in the vicinity of Dublin-Pleasanton Bay Area Rapid Transit (BART). Other transit that serves the PDA includes Wheels, County Connection (Contra Costa), Modesto Area Express (MAX), San Joaquin Regional Transit District, Tri-Delta Transit, and Amtrak (ABAG 2016).

- The Downtown Livermore PDA consists of 272 acres located near the geographic center of the City of Livermore. The PDA is Livermore's historic downtown area, located approximately 1.5 miles south of I-580 and 3 miles north-northeast of the northern project

limit on SR 84. The PDA includes the Livermore Altamont Commuter Express (ACE) train station and Livermore-Amador Valley Transit Authority bus depot (ABAG 2016).

- The Isabel Avenue/BART Station Planning Area in Livermore is a 982-acre area that straddles I-580 in the vicinity of the SR 84 (Isabel Avenue) interchange, approximately 4 miles north of the northern project limit on SR 84. The PDA would encompass a proposed BART extension from the existing Dublin-Pleasanton BART station to a new station at the I-580/Isabel Avenue interchange. The PDA is envisioned as a transit-oriented, neighborhood-scale community with a mix of housing types close to transit, multi-use trail connections, and an existing and expanding employment center (ABAG 2016).

General Plans and Community Plans

The following planning documents address the study area.

Alameda County

East County Area Plan. The East County Area Plan (adopted in 1994; most recently updated in 2002) covers 418 square miles of eastern Alameda County, from the Pleasanton/Dublin ridgeline on the west to the San Joaquin County line on the east and from the Contra Costa County line on the north to the Santa Clara County line on the south. The plan area entirely encompasses the proposed project area and applies to all unincorporated areas of the county that do not fall within the general plan boundaries of Dublin, Livermore, Pleasanton, and a portion of Hayward. In November 2000, Alameda County voters approved the Save Agriculture and Open Space Lands Initiative (Measure D; effective December 22, 2000), which resulted in a number of changes to the East County Area Plan, including adjustment of the UGB to protect more land from development. Measure D is discussed further below under "Other Planning Influences."

The East County Area Plan contains the following goals and policies that relate to the project (Alameda County Planning Department 2002):

> *Urban and Rural Development*
>
> *Goal: To achieve a balanced subregion featuring compact communities, a diverse economic base, affordable housing, and a full complement of public facilities and amenities.*
>
> Policy 13: The County shall not provide nor authorize public facilities or other infrastructure in excess of that needed for permissible development consistent with the Initiative. This policy shall not bar 1) new, expanded or replacement infrastructure necessary to create adequate service for the East County, 2) maintenance, repair or improvements of public facilities which do not increase capacity, and 3) infrastructure such as pipelines, canals, and power transmission lines which have no excessive growth-inducing effect on the East County area and have permit conditions to ensure that no service can be provided beyond that consistent with development allowed by the Initiative [Measure D].
>
> *Agriculture*
>
> *Goal: To maximize long-term productivity of East County's agricultural resources.*
>
> Policy 71: The County shall conserve prime soils (Class I and Class II, as defined by the United States Department of Agriculture Soil Conservation Service Land Capability Classification) and Farmland of Statewide Importance and Unique Farmland (as defined by the California

Department of Conservation Farmland Mapping and Monitoring Program) outside the Urban Growth Boundary.

Policy 85: The County shall utilize provisions of the Williamson Act and other appropriate economic incentives to support agricultural uses.

Policy 86: The County shall not approve cancellation of Williamson Act contracts within or outside the County Urban Growth Boundary except where findings can be made in accordance with state law, and the cancellation is consistent with the Initiative. In no case shall contracts outside the Urban Growth Boundary be canceled for purposes inconsistent with agricultural or public facility uses. Prior to canceling any contract inside the County Urban Growth Boundary, the Board of Supervisors shall specifically find that there is insufficient non-contract land available within the Boundary to satisfy state-mandated housing requirements. In making this finding, the County shall consider land that can be made available through reuse and rezoning of non-contract land.

General Transportation

Goal: To create and maintain a balanced, multi-modal transportation system that provides for the efficient and safe movement of people, goods, and services.

Policy 176: The County shall allow development and expansion of transportation facilities (e.g., streets and highways, public transit, bicycle and pedestrian paths, airports, etc.) in appropriate locations inside and outside the Urban Growth Boundary consistent with the policies and Land Use Diagram of the *East County Area Plan*.

Transportation Demand Management

Goal: To reduce East County traffic congestion.

Policy 183: The County shall seek to minimize traffic congestion levels throughout the East County street and highway system.

Policy 184: The County shall seek to minimize the total number of Average Daily Traffic trips throughout East County.

Policy 188: The County shall promote the use of transit, ridesharing, bicycling, and walking, through land use planning as well as transportation funding decisions.

Policy 192: The County shall work with Caltrans to improve the interstate and state highway systems and the County road system according to the street classifications shown on the East County Area Plan Transportation Diagram, consistent with Policy 177.[17]

Policy 211: The County shall create and maintain a safe, convenient, and effective bicycle system that maximizes bicycle use.

Little Valley Specific Plan. The Little Valley Specific Plan (Alameda County Community Development Agency 1997) was created to allow for a planned development designation for a

[17] Policy 177: The County shall assign priority in funding decisions to arterial and transit improvements that would improve local circulation, and to improvements that would facilitate movement of commercial goods. Improvements that would expand the capacity of the Altamont Pass and Vasco Road gateways leading into the planning area from San Joaquin and Contra Costa Counties would be inconsistent with the policies of this plan. This policy shall not preclude the County from supporting or approving any rail projects or improvements required for roadway safety (Alameda County Planning Department 2002).

310-acre area bordered by SR 84 to the south and the GE-Hitachi Vallecitos Nuclear Center to the west. The Little Valley Specific Plan area is directly north of the project area. The plan established a minimum parcel size of 2 acres with one dwelling unit per each full 4.5 acres. Approximately 30 residences and one commercial horse stable are within the plan area, all accessed via Little Valley Road.

The Little Valley Specific Plan does not include explicit transportation goals for SR 84 or other roads outside of the plan area. One of the General Goals listed in the plan is to permit rural residential development that is consistent with provision of adequate access to and circulation within the plan area.

City of Pleasanton

Pleasanton General Plan. The Pleasanton General Plan covers a 75-square mile (48,000-acre) area and designates land uses for the entire Planning Area, including lands outside of its UGB that are within the jurisdictional authority of Alameda County. The Pleasanton General Plan states that the city supports the widening of SR 84 from two to four lanes between I-680 and I-580 and the improvement will alleviate cut-through traffic in Pleasanton and congestion on I-580. The General Plan also identifies the need to provide a southbound auxiliary lane from SR 84 to southbound I-680 (City of Pleasanton 2015a, Circulation Element).

The Pleasanton General Plan contains similar transportation goals and policies to those of the East County Area Plan, including the promotion of bicycling. The following specifically addresses the project area:

> Policy 9: Work with other local jurisdictions and regional agencies such as … the Alameda County Transportation Improvement Authority[18] to plan and coordinate transportation improvements.
>
> Program 9.2: Support State and regional efforts to improve SR 84 including the widening to four lanes between Pigeon Pass and I-680.

Happy Valley Specific Plan. The City of Pleasanton also prepared the Happy Valley Specific Plan in 1997 to address an 860-acre area to the west of I-680 along Happy Valley Road, in preparation for annexing the previously unincorporated area into the city (City of Pleasanton Department of Planning and Community Development 1998). The Happy Valley Specific Plan was created to guide the development of a municipal golf course and adjacent community.

Circulation objectives in the specific plan refer to internal roads only and not to I-680. One objective is to provide a "safe and free-flowing vehicular circulation system," and "to ensure adequate access for emergency vehicles to new and existing development."

City of Livermore

Livermore General Plan. The City of Livermore General Plan covers a 24-square mile (16,000-acre) area and also designates land uses for a planning area that includes lands outside of its urban growth that are within the jurisdictional authority of Alameda County. The General Plan supports the use of designated highways and freeways to carry vehicles longer distances at high speeds as well as designating them for truck traffic (City of Livermore 2014c). The General Plan

[18] Alameda CTC's predecessor agency.

also supports the continued development of bicycle facilities. The following policy specifically addresses the project area.

> Policy 4: Provide for the eventual removal of existing driveways from SR 84, when feasible.

Habitat Conservation Plans

No approved habitat conservation plans or natural community conservation plans are currently in effect for the project area (U.S. Fish and Wildlife Service 2016; California Department of Fish and Wildlife 2016).

The project area is directly adjacent to a bioregional habitat restoration program site established by the SFPUC as part of its Water System Improvement Program. The Sheep Camp Creek facility is approximately bordered by SR 84 on the south, Little Valley Road and the Little Valley community on the east, I-680 and Koopman Road on the west, and open space on the north. In addition to providing habitat for special-status species, the facility allows for cattle grazing to reduce fuel loads and fire risk (SFPUC 2016a,b). SFPUC is currently preparing a habitat conservation plan for the Alameda Creek watershed, which would include the Sheep Camp Creek facility.

East Alameda County Conservation Strategy

The project area is also within the study area for the East Alameda County Conservation Strategy, which was developed by local stakeholders including the Alameda County Community Development Agency; Alameda County Congestion Management Agency (a predecessor agency of Alameda CTC); Alameda County Waste Management Authority; the Cities of Dublin, Livermore; and Pleasanton; East Bay Regional Parks District; and Zone 7 Water Agency. The strategy was developed to provide a blueprint for regional conservation of and mitigation for biological species in East Alameda County and to streamline the environmental permitting process for stakeholder-sponsored projects (East Alameda Conservation Strategy 2009, 2010). The following policies specifically address the project area.

> Goal 2: Maintain and enhance the effective movement and genetic exchange of native organisms within and between natural communities inside and outside the study area.
>
> Goal 6: Protect and enhance functional oak woodland communities (blue oak woodland, valley oak woodland, coast live oak forest and woodland, mixed evergreen forest/oak woodland) to benefit local species and promote the level of native biodiversity expected to occur within this natural community in the study area.

Other Regulatory and Planning Influences

Bicycle Plans

The SR 84 portion of the project area is within the East Planning Area of the *Alameda Countywide Bicycle Master Plan* (Alameda CTC 2012b). SR 84 (Vallecitos Road) is identified as a proposed Class III bicycle route. The same portion of SR 84 is also included in the *Alameda County Bicycle and Pedestrian Master Plan for Unincorporated Areas* (Alameda County Public Works Agency 2012) as part of a 6.7-mile proposed "Class IIIC" bicycle route between Paloma Way in Sunol and Vallecitos Road (east of SR 84)/Wetmore Road in Livermore. The Class IIIC designation applies to rural roadways and provides wide shoulders for bicycle use. For SR 84,

achieving the Class IIIC designation would require widening to a 4-foot minimum shoulder and adding signage.

The *Alameda County Bicycle and Pedestrian Master Plan for Unincorporated Areas* also identifies the portion of I-680 from north of the SR 84 interchange to the Sunol Boulevard interchange as part of the Alameda CTC 2006 Countywide Bicycle Network. The 2006 plan proposed a future Class I bikeway along the east side of I-680 that would connect Niles Canyon in Sunol with Shadow Cliffs Regional Park in Pleasanton (Alameda County Congestion Management Agency 2006).

The statewide bicycle and pedestrian plan, *Toward an Active California* (Caltrans 2017a), lays out policies and actions to support active modes of transportation with the goal to double walking and triple bicycling trips by 2020, and reduce bicycle and pedestrian fatalities by 10 percent each year. The plan does not include goals for specific roadways or locations.

Alameda County Measure D (2000)

In November 2000, Alameda County voters approved the Save Agriculture and Open Space Lands Initiative (Measure D; effective December 22, 2000). Measure D enacted several changes to the Alameda County East County Area Plan (discussed further in "General Plans and Related Plans," above) that included revising the UGB in the East County to reserve less land for urban growth and more land for agriculture and open space, requiring new housing to be located primarily within existing cities, modifying land use restrictions applicable to rural areas, and requiring a county-wide vote on changes to these policies.

In many areas, the UGB was set to coincide with existing or proposed city urban growth boundaries. Outside the UGB, the measure removed land from the former urban development use designation (which included industrial, major commercial and land use categories having a density of one or more residential units per acre) and converted it in most cases to 20-acre enhanced agricultural parcels upon demonstration of available water. Under the measure, new housing, including affordable housing obligations, must be within the UGB unless otherwise required by State law. Land outside the proposed UGB that was formerly designated as urban land use was redesignated as agricultural land (Alameda County 2000). Measure B also added provisions allowing Alameda County to permit areas designated as Large Parcel Agriculture to be used for agricultural processing facilities such as wineries, limited agricultural support services, and limited agricultural enhancing commercial uses. Changes to land uses that involve addition of residential units or new mining or quarry uses outside of the UGB must be approved by Alameda County voters.

State Scenic Highway Program

The Caltrans Scenic Highway Program is intended to protect and enhance the natural scenic beauty of California's highways and adjacent corridors, through special conservation treatment. The program protects against encroachment of incompatible land uses, mitigates and minimizes development activities along the corridor, prohibits billboards, regulates grading activity, and other activities causing visual degradation.

I-680 in Alameda County is an Officially Designated State Scenic Highway from Mission Boulevard in Fremont to Bernal Avenue in Pleasanton. The entire project limits on I-680 are within the scenic corridor.

SR 84 between I-680 and SR 238 is also an Officially Designated State Scenic Highway. The project limits on SR 84 to the east of the I-680 interchange are not included in the scenic highway designation.

The State Scenic Highway Program has guidelines for identifying and designating scenic highways, which address regulation of land use and density of development, detailed land and site planning, control of outdoor advertising, attention to and control of earthmoving and landscaping, and attention to design and appearance of structures and equipment. Most guidelines apply to land uses outside of the State right-of-way. None of the guidelines are specific to the project area.

2.1.2.2 Environmental Consequences

Table 2.1.2-1 summarizes the consistency of the No Build and Build Alternatives with applicable state, regional, and local plans, policies.

Table 2.1.2-1: Consistency of Proposed Project with Applicable Plans and Policies

Plan/Policy	No Build Alternative	Build Alternative
Transportation Plans		
Plan Bay Area 2040		
Implement a regional express lane network.	**Not consistent**. The No Build Alternative would not extend the existing HOV/express lane on southbound I-680.	**Consistent**. The northward extension of the existing HOV/express lane on southbound I-680 is consistent with the intent of the regional express lane network.
(Region-wide) Reduce by 50 percent the number of injuries and fatalities from all collisions (including bike and pedestrian).	**Not consistent**. The No Build Alternative would not support a reduction in injuries and fatalities.	**Consistent**. The Build Alternative would add a concrete median barrier and provide controlled access to SR 84 in the project limits, which would help to increase safety and reduce the number of injuries and fatalities.
(Region-wide) Direct all non-agricultural development within the urban footprint (existing urban development and urban growth boundaries).	**Consistent**. The No Build Alternative would not place facilities in new locations outside of the UGB.	**Consistent**. The proposed project improvements would be to existing transportation facilities and would not place facilities in new locations outside of the UGB.
Alameda Countywide Transportation Plan		
The county transportation system should be multimodal; accessible, affordable, and equitable for people of all ages, incomes, abilities and geographies; integrated with land use patterns and local decision-making; connected across the county, within and across the network of streets, highways and transit, bicycle and pedestrian routes; reliable and efficient; cost effective; well maintained; safe; and supportive of a healthy and clean environment. Also continue to develop policies to encourage revenue generation from HOV/express lanes.	**Generally consistent**. The No Build Alternative would not wholly conflict with the goals for the county transportation system, but it also would not improve multi-modality or safety in the project area or encourage revenue generation from HOV/express lanes.	**Consistent**. The Build Alternative would improve multi-modality and safety in the project area by providing bikeways along SR 84 with connections to Calaveras Road and Paloma Way. The Build Alternative would increase safety by providing a new signalized intersection along SR 84 for Little Valley Road/Vallecitos Atomic Laboratory Road, improving ramps at the SR 84/I-680 interchange, and providing concrete median barriers along SR 84. The Build Alternative would also encourage revenue generation from HOV/express lanes.
Alameda County Transportation Expenditure Plan		
The plan does not contain specific goals but identifies improvements at the SR 84/I-680 interchange and widening of SR 84 as needed to support safety, connectivity and efficiency.	**Not consistent**. The No Build Alternative would not implement improvements at the SR 84/I-680 interchange or widen SR 84 and therefore would not support safety, connectivity and efficiency.	**Consistent**. The Build Alternative would implement the planned improvements and would support safety, connectivity and efficiency.

Table 2.1.2-1: Consistency of Proposed Project with Applicable Plans and Policies

Plan/Policy	No Build Alternative	Build Alternative
California Transportation Plan 2040		
Goal 4: Improve Public Safety and Security Policy 1: Reduce fatalities, serious injuries, and collisions	**Not consistent**. The No Build Alternative would not make any improvements to safety to reduce fatalities, injuries, and collisions.	**Consistent**. The Build Alternative would increase safety by providing a new signalized intersection along SR 84 for Little Valley Road/Vallecitos Atomic Laboratory Road, improving ramps at the SR 84/I-680 interchange, and providing concrete median barriers along SR 84. These safety improvements would help reduce fatalities, serious injuries, and collisions.
Goal 6: Practice Environmental Stewardship Policy 1: Integrate environmental considerations in all stages of planning and implementation	**Not applicable**.	**Consistent**. Environmental considerations were integrated throughout the project development process and will continue to be integrated during the final design phase of the project.
General Plans and Related Plans		
East County Area Plan		
Policy 13: The County shall not provide nor authorize public facilities or other infrastructure in excess of that needed for permissible development consistent with the Initiative. This policy shall not bar 1) new, expanded or replacement infrastructure necessary to create adequate service for the East County, 2) maintenance, repair or improvements of public facilities which do not increase capacity, and 3) infrastructure such as pipelines, canals, and power transmission lines which have no excessive growth-inducing effect on the East County area and have permit conditions to ensure that no service can be provided beyond that consistent with development allowed by the Initiative [Measure D].	**Consistent**. The No Build Alternative would not expand infrastructure.	**Consistent**. The Build Alternative would expand infrastructure as necessary to create adequate service for the East County. The additional capacity from the widening of SR 84 would not be in excess of that needed and would support the goal of achieving a balanced subregion with compact communities.
Policy 71: The County shall conserve prime soils (Class I and Class II, as defined by the USDA Soil Conservation Service Land Capability Classification) and Farmland of Statewide Importance and Unique Farmland (as defined by the California Department of Conservation Farmland Mapping and Monitoring Program) outside the Urban Growth Boundary.	**Consistent**. The No Build Alternative would not affect prime soils or important/unique farmland.	**Consistent**. The Build Alternative would not affect prime soils or important/unique farmland.
Policy 85: The County shall utilize provisions of the Williamson Act and other appropriate economic incentives to support agricultural uses.	**Consistent**. The No Build Alternative would not affect the county's ability to support agricultural uses.	**Consistent**. Although the Build Alternative would affect parcels with Williamson Act contracts, it would not affect the county's ability to support agricultural uses.

Table 2.1.2-1: Consistency of Proposed Project with Applicable Plans and Policies

Plan/Policy	No Build Alternative	Build Alternative
Policy 86: The County shall not approve cancellation of Williamson Act contracts within or outside the County Urban Growth Boundary except where findings can be made in accordance with state law, and the cancellation is consistent with the Initiative. In no case shall contracts outside the Urban Growth Boundary be canceled for purposes inconsistent with agricultural or public facility uses. Prior to canceling any contract inside the County Urban Growth Boundary, the Board of Supervisors shall specifically find that there is insufficient non-contract land available within the Boundary to satisfy state-mandated housing requirements. In making this finding, the County shall consider land that can be made available through reuse and rezoning of non-contract land.	**Consistent**. The No Build Alternative would not result in property impacts to parcels under Williamson Act contracts.	**Consistent**. The Build Alternative would result in property impacts to six parcels under Williamson Act contracts, but it would not cause the contracts on those parcels to be nullified or require changes to any contract.
Policy 176: The County shall allow development and expansion of transportation facilities (e.g., streets and highways, public transit, bicycle and pedestrian paths, airports, etc.) in appropriate locations inside and outside the Urban Growth Boundary consistent with the policies and Land Use Diagram of the *East County Area Plan*.	**Generally consistent**. While the No Build Alternative would not place facilities in new locations outside of the UGB, it also would not improve multi-modality or safety, which are part of the goal associated with this policy.	**Consistent**. The proposed project improvements would be to existing transportation facilities and would not place facilities in new locations outside of the UGB. In keeping with the goal associated with this policy, the Build Alternative would increase the multi-modality of the project area by providing bikeways along SR 84 with connections to Calaveras Road and Paloma Way. The Build Alternative would also increase safety by providing a new signalized intersection along SR 84 for Little Valley Road/Vallecitos Atomic Laboratory Road, improving ramps at the SR 84/I-680 interchange, and providing concrete median barriers along SR 84.
Policy 183: The County shall seek to minimize traffic congestion levels throughout the East County street and highway system.	**Not consistent**. The No Build Alternative would not minimize traffic congestion in the East County.	**Consistent**. The Build Alternative would provide additional capacity and geometric improvements in areas of SR 84 and the SR 84/I-680 interchange that constrain traffic flow.
Policy 184: The County shall seek to minimize the total number of Average Daily Traffic (ADT) trips throughout East County.	**Generally Consistent**. The No Build Alternative would not allow for an increase in ADT.	**Generally consistent**. The Build Alternative would allow for a localized increase in ADT in the project area; however, the project is not expected to increase regional ADT.
Policy 188: The County shall promote the use of transit, ridesharing, bicycling, and walking, through land use planning as well as transportation funding decisions.	**Generally consistent**. The No Build Alternative would not promote bicycling, but the existing HOV/express lane supports transit and ridesharing.	**Consistent**. The Build Alternative would provide bikeways along SR 84 with connections to Calaveras Road and Paloma Way. It would also extend the southbound I-680 HOV/express lane northward by approximately 2 miles, which would support transit and ridesharing by providing a dedicated lane that buses and carpools can use at no charge.

Table 2.1.2-1: Consistency of Proposed Project with Applicable Plans and Policies

Plan/Policy	No Build Alternative	Build Alternative
Policy 192: The County shall work with Caltrans to improve the interstate and state highway systems and the County road system according to the street classifications shown on the East County Area Plan Transportation Diagram, consistent with Policy 177.	**Not consistent**. With the No Build Alternative, SR 84 in the project area would continue to have two or three lanes, depending on the location, instead of the four lanes shown in the East County Area Plan Transportation Diagram.	**Consistent**. The Build Alternative would provide four lanes on SR 84 as shown in the East County Area Plan Transportation Diagram.
Policy 211: The County shall create and maintain a safe, convenient, and effective bicycle system that maximizes bicycle use.	**Generally consistent**. The No Build Alternative would not increase bicycle or pedestrian access but would not prevent future improvements.	**Consistent**. The Build Alternative would provide bikeways along SR 84 with connections to Calaveras Road and Paloma Way.
Little Valley Specific Plan		
Permit rural residential development that is consistent with provision of adequate access to and circulation within the plan area.	**Generally inconsistent**. The No Build Alternative would not improve access between SR 84 and the Little Valley community.	**Generally consistent**. The Build Alternative would provide a new signalized intersection along SR 84 for Little Valley Road/Vallecitos Atomic Laboratory Road that would provide access to Little Valley Road. The project would facilitate entering and exiting SR 84 at the Little Valley community.
City of Pleasanton General Plan		
Policy 9: Work with other local jurisdictions and regional agencies such as … the Alameda County Transportation Improvement Authority to plan and coordinate transportation improvements. Program 9.2: Support State and regional efforts to improve SR 84 including the widening to four lanes between Pigeon Pass and I-680.	**Not consistent**. The No Build Alternative would not widen SR 84 from Pigeon Pass to I-680.	**Consistent**. The Build Alternative would widen SR 84 to four lanes from Pigeon Pass to I-680.
Happy Valley Specific Plan		
Provide a safe and free-flowing vehicular circulation system and ensure adequate access for emergency vehicles to new and existing development.	**Consistent**. The No Build Alternative would make no changes to traffic circulation and access in the area of I-680 closest to Happy Valley.	**Generally consistent**. The Build Alternative would extend the southbound I-680 HOV/express lane northward by approximately 2 miles, which could provide an incremental traffic benefit on southbound I-680 in the vicinity of Sunol Boulevard and Happy Valley Road.
City of Livermore General Plan		
Policy 4: Provide for the eventual removal of existing driveways from SR 84, when feasible.	**Not consistent**. The No Build Alternative would maintain existing private driveway connections with SR 84.	**Consistent**. The Build Alternative would divert most driveways in the project area along SR 84 to frontage roads that would connect with a new signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road.
Habitat Conservation Plans		
No habitat conservation plans or natural community conservation plans are currently in effect for the project area. The project area is adjacent to the SFPUC bioregional habitat restoration program at Sheep Camp Creek. SFPUC is currently preparing a habitat conservation plan for the Alameda Creek watershed, which would include the Sheep Camp Creek facility.	**Generally consistent**. The No Build Alternative would not conflict with the intent of the SFPUC bioregional habitat restoration program at Sheep Camp Creek or the habitat conservation plan for the Alameda Creek watershed.	**Generally consistent**. The Build Alternative would not conflict with the intent of the SFPUC bioregional habitat restoration program at Sheep Camp Creek or the future habitat conservation plan for the Alameda Creek watershed. SFPUC has provided input into the proposed project design to minimize impacts to the Sheep Camp Creek facility.

Table 2.1.2-1: Consistency of Proposed Project with Applicable Plans and Policies

Plan/Policy	No Build Alternative	Build Alternative
East Alameda County Conservation Strategy		
Goal 2: Maintain and enhance the effective movement and genetic exchange of native organisms within and between natural communities inside and outside the study area.	**Generally consistent**. The No Build Alternative would not conflict with the intent of the East Alameda County Conservation Strategy.	**Consistent**. The Build Alternative would provide wildlife crossing structures to maintain and enhance the effective movement of native organisms.
Goal 6: Protect and enhance functional oak woodland communities (blue oak woodland, valley oak woodland, coast live oak forest and woodland, mixed evergreen forest/oak woodland) to benefit local species and promote the level of native biodiversity expected to occur within this natural community in the study area.	**Generally consistent**. The No Build Alternative would not conflict with the intent of the East Alameda County Conservation Strategy.	**Not consistent**. Although the project was designed to minimize impacts to natural communities, the project would affect oak woodland communities to meet the purpose and need of the project. Approximately 68 oak trees would be removed.
Other Planning Influences		
Bicycle Plans	**Generally consistent**. The No Build Alternative would not increase bicycle or pedestrian access but would not prevent future improvements.	**Consistent**. By providing bikeways along SR 84 with connections to Calaveras Road and Paloma Way, the Build Alternative would support local bicycle plans. The project would not preclude the future consideration of a Class I bikeway along the east side of I-680 that would connect Niles Canyon in Sunol with Shadow Cliffs Regional Park in Pleasanton.
Alameda County Measure D (2000)	**Consistent**. The No Build Alternative would not affect development in Alameda County.	**Consistent**. The Build Alternative would not directly or indirectly intensify development outside of city UGBs beyond that already planned in the East County Area Plan, as revised based on Measure D. The project would expand infrastructure as necessary to create adequate service for the East County area. The proposed improvements would be consistent with the level of development envisioned in Measure D.
State Scenic Highway Program	**Consistent**. The No Build Alternative would not affect land use and density of development, land and site planning, control of outdoor advertising, earthmoving and landscaping, or design and appearance of structures and equipment.	**Generally consistent**. The Build Alternative would not affect land use and density of development, land and site planning, control of outdoor advertising, earthmoving and landscaping, or design and appearance of structures and equipment outside of the State right-of-way within an Officially Designated State Scenic Highway corridor. The Build Alternative would result in earthmoving and replacement landscaping and introduce additional HOV/express lane signage, toll readers, and highway lighting in the State right-of-way within an Officially Designated State Scenic Highway.

The No Build Alternative would be generally consistent with applicable regional and local plans, but would not implement a regional express lane network, reduce collisions, improve the SR 84/I-680 interchange, expand infrastructure for the eastern portion of Alameda County, minimize traffic congestion, or widen SR 84 and remove existing driveways on SR 84.

The Build Alternative would be generally consistent with applicable regional and local plans and where the project would be inconsistent with the intent of the East Alameda County Conservation Strategy Goal 6, the proposed project was designed to minimize impacts to natural communities (as discussed in Section 2.3.1). The project would not enable unplanned development to take place or stimulate unforeseen development. See Section 2.1.4 in regard to potential growth inducement.

2.1.2.3 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation is required.

2.1.3 Park and Recreation Facilities

2.1.3.1 Affected Environment

The following discussion is from the *Community Impact Assessment* completed for the proposed project in March 2017 (AECOM and Vernazza Wolfe 2017).

The immediate project area contains no parks or recreation areas. Parks and recreation areas within approximately 1 mile of the project area (many of which are shown in Figure 2.1.1-1) are accessed via SR 84 and I-680 in the project limits and in some cases have views of the project area. Therefore, potential effects from the proposed project on parks and recreation areas within approximately 1 mile of the project area are discussed below. See Appendix A for a discussion of these facilities with respect to Section 4(f).

Publicly Owned Parks and Recreation Facilities

Pleasanton Ridge Regional Park (5,271 acres) contains a multi-purpose trail system that accommodates hikers, equestrians, and bicyclists, and provides canyon views, ridgetop vistas, and access to remote, deep-canyon streams (East Bay Regional Parks District 2016). The park is northwest of the SR 84/I-680 interchange and at its closest point is less than 0.25 mile from I-680 in the project area (near Verona Road).

Sycamore Grove Regional Park (1051 Wetmore Road) is approximately 0.9 mile east of the northern project limit on SR 84, in Livermore. The 847-acre park has hiking, bicycle, and horse trails and picnic facilities (Livermore Area Recreation and Park District 2016).

Augustin Bernal Community Park is a 237-acre open space community park in the City of Pleasanton that provides hiking, biking, and equestrian trails (City of Pleasanton 2016a). The park is north of Pleasanton Ridge Regional Park and approximately 1 mile west of the northern project limit on I-680 at Sunol Boulevard.

The Sunol Water Temple (505 Paloma Way) is a point of local interest where future recreation improvements are planned. The temple is on SFPUC property approximately 0.6 mile west-northwest of I-680 in the project area but is open to the public. Designed by architect Willis Polk, the temple was constructed by the Spring Valley Water Company in 1910 to mark the confluence of Alameda Creek, Arroyo de la Laguna, and the Pleasanton Wells flowing into the Sunol Valley (SFPUC 2015). On the same property, construction of an Alameda Creek Watershed Center is proposed to provide information about the watershed, its natural resources and role in the water supply system, and the history of the Sunol Valley. An outdoor discovery trail is also planned (SFPUC 2016c).

Pleasanton Ridge Regional Park, Sycamore Grove Regional Park, Augustin Bernal Community Park, and the Sunol Water Temple are protected by the Park Preservation Act of 1971 (California Public Resources Code [PRC] Sections 5400-5409) as well as Section 4(f) of the Department of Transportation Act of 1966 (49 United States Code [USC] 303), which protect park land from being converted to non-park land.

Other Recreation Facilities

Sunol Paintball Outdoor Park is 0.3 mile south of SR 84 at 7900 Vallecitos Road. Visitors pay for admission and equipment rental to shoot paintballs at other players using semi-automatic paintball guns in an approximately 3.5-acre area. On the same parcel as the paintball park is an outdoor rodeo arena that is no longer used for public events. The rodeo arena is not part of the paintball park.

Two private golf courses are within 0.5 mile or less of the project area. The Club at Ruby Hill is approximately 0.25 mile northeast of the northern project limit on SR 84. Castlewood Country Club is approximately 0.4 mile west of the northern project limit on I-680.

Callippe Preserve Golf Course, also a private course, is approximately 0.6 mile from the project area on I-680, southeast of Happy Valley Road. Sunol Valley Golf Club, which closed in 2016, was approximately 0.3 mile southwest of the southern project limit on I-680.

2.1.3.2 Environmental Consequences

No Build Alternative

The No Build Alternative would not affect park or recreation facilities near the project area.

Build Alternative

Publicly Owned Parks and Recreation Facilities

The Build Alternative would not require the temporary or permanent use of any publicly owned park or recreational facility. Pleasanton Ridge Regional Park, Sycamore Grove Regional Park, Augustin Bernal Community Park, and the Sunol Water Temple are not expected to experience temporary construction-related noise, air, or visual effects because of their distance from the project construction areas and the visual shielding provided by trees and hills.

To the west of I-680 in the project area, Pleasanton Ridge Regional Park has trails along the hills and ridgeline above the freeway and could potentially have views of the proposed HOV/express lane and associated signage. If visible, the HOV/express lane and signage would be visually consistent with the existing freeway infrastructure, which already includes overhead signs. The project would have no long-term effects to Sycamore Grove Regional Park, Augustin Bernal Community Park, or the Sunol Water Temple.

The project would not directly or indirectly affect a park or recreation facility. “Use” of a Section 4(f) property would not occur; therefore, the provisions of Section 4(f) do not apply.

Other Recreation Facilities

Public access to Sunol Paintball Outdoor Park would be temporarily affected during project construction. Construction would be staged to maintain access to the property except for approximately two nights, when access would need to be temporarily closed to allow for pavement work. As the paintball park is not open at night, a temporary closure would not be a major adverse change. Construction activities in the vicinity of the paintball park would consist of roadway widening, retaining wall installation, and construction of a frontage road on the south side of SR 84. Construction activities would take place intermittently over a 1-year period. Construction-related traffic, noise, air, or visual effects are not expected to disrupt visitor use nor would they affect visitor experience of the paintball park. The primary activity area is

approximately 0.25 mile south of SR 84. Visitor use of the park is typically focused on other players engaged in paintball games rather than views of SR 84.

The Build Alternative would result in a permanent change in access to the paintball park. Visitors currently use a private driveway and unpaved frontage road to access the paintball park entry road. After project construction, visitors would have to use the proposed intersection at SR 84 for Little Valley Road/Vallecitos Atomic Laboratory Road to reach the proposed frontage road south of SR 84, then travel approximately 0.5 mile west to reach the paintball park entry road. The change in access would increase safety for visitors turning onto and off of SR 84 and would not represent a major adverse change.

The Club at Ruby Hill, Castlewood Country Club, and Callippe Preserve Golf Course are not expected to experience temporary construction-related noise, air, or visual effects because of their distance from the project construction areas and the visual shielding provided by trees and hills. The Build Alternative would have no long-term effects to any of the golf courses.

2.1.3.3 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation is required.

2.1.4 Growth

Transportation projects can foster economic or population growth, or the construction of additional housing, either directly or indirectly. These effects can occur if a project removes obstacles to growth (particularly by creating new or additional access to areas not previously served by a transportation mode or facility); facilitates or accelerates growth beyond planned or projected developments; or induces growth elsewhere in the region.

This discussion addresses the potential for the proposed project to contribute to growth.

2.1.4.1 Regulatory Setting

The Council on Environmental Quality (CEQ) regulations, which established the steps necessary to comply with the NEPA of 1969, require evaluation of the potential environmental effects of all proposed federal activities and programs. This includes a requirement to examine indirect effects, which may occur in areas beyond the immediate influence of a proposed action and at some time in the future. The CEQ regulations (40 CFR 1508.8) refer to these consequences as indirect impacts. Indirect impacts may include changes in land use, economic vitality, and population density, which are all elements of growth.

CEQA also requires the analysis of a project's potential to induce growth. The CEQA 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…"

2.1.4.2 Affected Environment

The following discussion is from the *Community Impact Assessment* completed for the proposed project in March 2017 (AECOM and Vernazza Wolfe 2017).

The project area is located in the Tri-Valley region. The Tri-Valley region includes Dublin, Livermore, and Pleasanton in Alameda County as well as Danville and San Ramon in Contra Costa County. The Tri-Valley region has been home to a growing high-tech economy over the last 40 years that includes research and development (R&D) infrastructure as well as an entrepreneurial environment. As the two national labs in the region, Lawrence Livermore National Laboratory and Sandia National Laboratory, expand the commercial uses of their facilities and the applications of their R&D, growth in business activity and an increasing movement of people and goods is expected between the Tri-Valley region and the rest of the Bay Area.

The fast pace of growth in the last 40 years is evident from the population change in the five Tri-Valley cities compared with Alameda County (Table 2.1.4-1). Between 1970 and 2010, the growth rate in the Tri-Valley region was over seven times that of Alameda County; cities in the Tri-Valley experienced a 297 percent increase in population, while Alameda County only had a 41 percent increase.

Table 2.1.4-1: Population Change 1970–2010, Tri-Valley Region and Alameda County

Jurisdiction	1970	2010	Percent change
Danville	4,770	42,039	781
Dublin	13,641	46,036	238
Livermore	37,703	80,968	115
Pleasanton	18,328	70,285	284
San Ramon	4,084	72,148	1,667
Total Tri-Valley Cities	78,526	311,476	297
Alameda County	1,071,446	1,510,271	41

Note: Danville, Dublin, and San Ramon were not incorporated until the early 1980s.

Sources: MTC-ABAG Library 2017 (for 1970); Danville's 1970 population estimated from Wikipedia 2017; U.S. Census Bureau 2010 (for 2010).

Another indicator of this growth is change in employment. Over 75,000 jobs were added in the Tri-Valley region between 1994 and 2011 (Bay Area Council Economic Institute 2015). The sectors experiencing the highest increase in employment are related to software, telecommunications, publishing, and data processing.

Growth is expected to continue. *Plan Bay Area* projects that Alameda County's population will increase by 32 percent from 2010 to 2040 (ABAG and MTC 2013b). The population growth is anticipated to be accompanied by a 36 percent increase in employment and 25 percent increase in housing units.[19] Growth in employment and housing units is envisioned primarily within cities and inside urban growth boundaries to match population growth with economic growth and multi-modal transportation options. As discussed in Section 2.1.2.1, *Plan Bay Area* designates PDAs in support of focusing future growth in areas that have proximity to transit, jobs, shopping, and other services. Promoting compact development within PDAs is intended to take development pressure off the region's open space and agricultural lands (ABAG and MTC 2012).

In addition to SR 84, I-580, and I-680, the community impact study area is currently served by both bus and rail transit. Bus service is provided by the Livermore-Amador Valley Transit Authority (Wheels). County Connection (Contra Costa), Modesto Commuter Express (MAX), and San Joaquin Regional Transit District provide service from nearby counties. Rail service is provided by the Altamont Commuter Express (ACE), which runs trains between Stockton and San Jose (City of Livermore 2014c), as well as BART.

Several freeway and transit improvements are currently being constructed or proposed to accommodate this projected growth. The widening of SR 84 to expressway standards has already been completed from the I-580/Isabel Avenue (SR 84) interchange to Concannon Boulevard, and the section of SR 84 between Concannon Boulevard and Ruby Hill Drive is under construction (Alameda CTC 2016). Alameda CTC is also proposing to add HOV/express lanes on northbound and southbound I-680 from SR 84 to Alcosta Boulevard (Alameda CTC 2016). BART has proposed to extend its Dublin-Pleasanton line to a new station at the I-580/Isabel Avenue

[19] *Plan Bay Area 2040* (ABAG and MTC 2017a) provides only regional projections and not specific county projections for growth; therefore, this remains the most current plan data.

interchange in Livermore. BART is also currently constructing an expansion of its system southward and will reach northern San Jose by the end of 2017.

In unincorporated East Alameda County, including Sunol, less growth is expected than in Alameda County as a whole due to land use requirements set forth in the East County Area Plan. According to plan projections, housing units in unincorporated lands were anticipated to increase from a total of 300 in 1990 to 470 at plan buildout, and jobs were anticipated to remain at a total of 100 in both 1990 and at plan buildout (Alameda County Planning Department 2002).

The current land use designations in unincorporated areas limit potential growth outside of designated city UGBs. Large parcel agricultural, resource management, and water management parcels are typically required to have a minimum size of 100 acres with a maximum of 12,000 square feet floor area for residential and residential accessory buildings. Rural density residential parcels have a maximum of 1 unit per 5 acres, except where smaller lots existed before the plan was adopted; parcels with this designation may not be changed to a designation that permits more development. The GE-Hitachi Vallecitos Nuclear Center is designated as industrial, which allows for a maximum building density of 60 acres of the approximately 150 acre property (Alameda County Planning Department 2002). This allows for warehouses, storage, and low intensity office uses. In the Little Valley Specific Plan Area just north of SR 84 at Little Valley Road, land is designated as planned development with one dwelling unit per each full 4.5 acres and a minimum parcel size of 2 acres (Alameda County Community Development Agency 1997).

2.1.4.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not increase roadway capacity or change existing property access in the project area. The No Build Alternative would not influence growth patterns in the project area.

Build Alternative

Although the proposed project would increase roadway capacity and change existing property access in the project area, it is not anticipated to influence growth patterns in the community impact study area for the reasons described below.

Increased Capacity

The Build Alternative would widen SR 84 from one to two lanes in each direction within a 5-mile area east of I-680 and limit access to controlled intersections, providing for SR 84 to become a continuous expressway facility from I-580 to I-680. The Build Alternative would also improve the existing SR 84/I-680 interchange as described in Section 1.4.2 and extend the existing HOV/express lane on southbound I-680 northward by 2 miles.

The additional capacity would alleviate congestion in the project area, which is expected to attract additional vehicles to SR 84. However, the traffic analysis shows that the additional vehicles would shift from using I-680 and local roadways in the community impact study area, such as Stanley Boulevard and Bernal Avenue, to SR 84. The effect of the capacity increase would remain localized because the project would not increase the capacity of I-680 over the Sunol Grade or SR 84 west of I-680, including SR 84 in Sunol and through Niles Canyon (Fehr

and Peers 2017). The project-related shifts in traffic demand are expected in the following locations and time periods:

- In the AM peak period (5 to 10 AM), the Build Alternative would eliminate the existing bottleneck along southbound SR 84 by providing two lanes in the currently one-lane section west of Pigeon Pass. This would increase the vehicle throughput and reduce congestion along southbound SR 84 in the project area. In doing so, the Build Alternative would result in a shift of vehicle demand away from southbound I-680 in Pleasanton to SR 84, which would reduce congestion along that segment of southbound I-680 and on local streets through Pleasanton between the SR 84 and I-680 corridors.

- In the PM peak period (3 to 8 PM), the Build Alternative would eliminate the existing bottleneck along northbound SR 84 by providing two lanes in the currently one-lane section east of the SR 84/I-680/Calaveras Road interchange. This would increase the vehicle throughput and eliminate the existing backup that forms on northbound I-680 and Calaveras Road. The elimination of the backup onto northbound I-680 would reduce the duration and severity of congestion along northbound I-680 to the south of the SR 84/I-680/Calaveras Road interchange (i.e., the Sunol Grade). The increased throughput on northbound I-680 would result in some slowing through the I-680/Sunol Boulevard interchange, but this condition is expected to be isolated to the interchange area.

- In general, the additional capacity of SR 84 in the project area would result in a shift of traffic away from the Pleasanton-Sunol Road corridor between Koopman Road and Paloma Way and to the Paloma Way corridor between I-680 and Pleasanton-Sunol Road. The Build Alternative would modify traffic operations at the intersection of Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road by shifting the highest volumes at the intersection from the southbound approach on Pleasanton-Sunol Road (as it is under existing conditions and projected 2025 and 2045 No Build Alternative) to the westbound approach (from Paloma Way [SR 84]). However, the total traffic volume at the intersection would be identical with the No Build and Build Alternatives. The Build Alternative would not increase the total number of vehicles forecast to use SR 84 in Sunol and through Niles Canyon compared with the No Build Alternative.

- The project would also add capacity through the northward extension of the southbound I-680 HOV/express lane. Traffic volumes along southbound I-680 are constrained by an existing bottleneck at the I-680/Sunol Boulevard interchange. The extension of the HOV/express lane would allow for vehicles to shift from the general purpose lanes into HOV/express lane, and some traffic that would enter southbound I-680 from Bernal Avenue or other local roadways with the No Build Alternative would shift to entering southbound I-680 from SR 84 with the Build Alternative. Extending the southbound HOV/express lane would contribute to the improved flows on southbound I-680 south of the I-680/Sunol Boulevard interchange in both the AM and PM peak periods (see Section 2.1.9.3).

The capacity increase would accommodate a shift in traffic but would not result in new vehicle trips on a regional level (Fehr and Peers 2017).

The shift of vehicles within the local roadway system is not expected to encourage more people or employers to move to unincorporated Alameda County, Sunol, Pleasanton, Livermore, or the

surrounding areas. The Build Alternative would not create additional land availability. Furthermore, development in those jurisdictions is subject to the applicable General Plans. In unincorporated Alameda County, including Sunol, growth is constrained by current land use designations in the East County Area Plan, which limit development outside of designated city UGBs.

Another planned, programmed project would widen both northbound and southbound I-680 to accommodate an HOV/express lane between SR 84 and Alcosta Boulevard (RTP ID 240059; TIP ID ALA170009). The planned future project, which is expected to be constructed in 2023, would help to alleviate the existing bottleneck at the I-680/Sunol Boulevard interchange. Completion of the HOV/express lanes on northbound and southbound I-680 between SR 84 and Alcosta Boulevard would likely accommodate an increase in new vehicle trips and could indirectly result in development and intensification of land uses in cities surrounding the project limits. By essentially constructing a portion of the HOV/express lane project between SR 84 and Alcosta Boulevard, the proposed SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project could incrementally hasten the potential for indirect growth. However, as stated above, development would be subject to the General Plans of the jurisdictions surrounding the project limits.

In addition, this area is currently served by mass transit, and proposed future transit improvements such as the BART extension to San Jose will assist in accommodating existing and future growth. Since the Build Alternative by itself would not result in new vehicle trips, and growth from any cumulative increase in new vehicle trips from the project combined with other planned, programmed transportation improvements would be constrained by applicable General Plans, the project would not allow for an increase in growth beyond reasonably foreseeable levels.

Change in Land Access

As noted in Section 1.4.1, the proposed project would consolidate existing access openings to private driveways and rural roads at new frontage roads. The frontage roads would connect to a new signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road. The new intersection would provide access to frontage roads to the north of SR 84 connecting to Little Valley Road and to the south of SR 84 connecting to private driveways and rural roads (Figure 1.4-1, pages 3 and 4).

The proposed project would change the existing direct driveway access for some parcels along SR 84 to use new frontage roads. The parcels along the proposed frontage roads are designated as resource management, water management, and industrial (the GE-Hitachi Vallecitos Nuclear Center) by the East County Area Plan and planned development by the Little Valley Specific Plan. Resource management and water management parcels are typically required to have a minimum size of 100 acres with a maximum of 12,000 square feet floor area for residential and residential accessory buildings; industrial parcels are limited to a maximum ratio of 0.4 gross floor area to parcel size, that is, a maximum of 40 percent of the total parcel can be developed into buildings; and planned development parcels are limited to one dwelling unit per each full 4.5 acres and a minimum parcel size of 2 acres (Alameda County Planning Department 2002; Alameda County Community Development Agency 1997). The change in access and capacity increase from the proposed project could facilitate development on the parcels adjacent to the

frontage roads, but the development would not exceed the intensity designated for each parcel in the applicable planning document.

The change in land access would not provide any additional or new parcels with access to SR 84. All parcels would continue to have access to SR 84. Since the proposed project would not change overall land use in the project area and would not increase access to land, the Build Alternative would not allow for an increase in growth beyond reasonably foreseeable levels.

2.1.4.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation is required.

2.1.5 Farmlands

2.1.5.1 Regulatory Setting

NEPA and the Farmland Protection Policy Act (7 USC 4201-4209; and its regulations, 7 CFR Part 658) require federal agencies, such as FHWA, to coordinate with the Natural Resources Conservation Service (NRCS) if their activities may irreversibly convert farmland (directly or indirectly) to nonagricultural use. For purposes of the FPPA, farmland includes prime farmland, unique farmland, and land of statewide or local importance.

CEQA requires the review of projects that would convert Williamson Act contract land to non-agricultural uses. The main purposes of the Williamson Act are to preserve agricultural land and to encourage open space preservation and efficient urban growth. The Williamson Act provides incentives to landowners through reduced property taxes to discourage the early conversion of agricultural and open space lands to other uses.

2.1.5.2 Affected Environment

The following discussion is from the *Community Impact Assessment* completed for the proposed project in March 2017 (AECOM and Vernazza Wolfe 2017).

There are three organizations/agencies that monitor farmlands in and around the project area: the California Department of Conservation, Division of Land Resource Protection; Alameda County, which administers Williamson Act contracts; and the Tri-Valley Conservancy (TVC). Farmland types in the project area are shown in Figure 2.1.5-1.

Farmland is classified and mapped by the California Department of Conservation, Division of Land Resource Protection for the purposes of tracking farmland development throughout the state. The Farmland Mapping and Monitoring Program (FMMP) classifies farmland according to five types:

- Prime Farmland: Farmland with the best combination of physical and chemical features able to sustain long term agricultural production.
- Farmland of Statewide Importance: Farmland similar to Prime Farmland but with minor shortcomings, such as greater slopes or less ability to store soil moisture.
- Unique Farmland: Farmland of lesser quality soils used for the production of the state's leading agricultural crops.
- Farmland of Local Importance: Land of importance to the local agricultural economy as determined by each county's board of supervisors and a local advisory committee.
- Grazing Land: Land on which the existing vegetation is suited to the grazing of livestock (California Department of Conservation 2016a).

The primary agricultural use in and adjacent to the project area is grazing, and the majority of the project area is identified as Grazing Land. One section of Prime Farmland is mapped along southbound I-680, southwest of the SR 84/I-680 interchange and approximately 250 feet west of

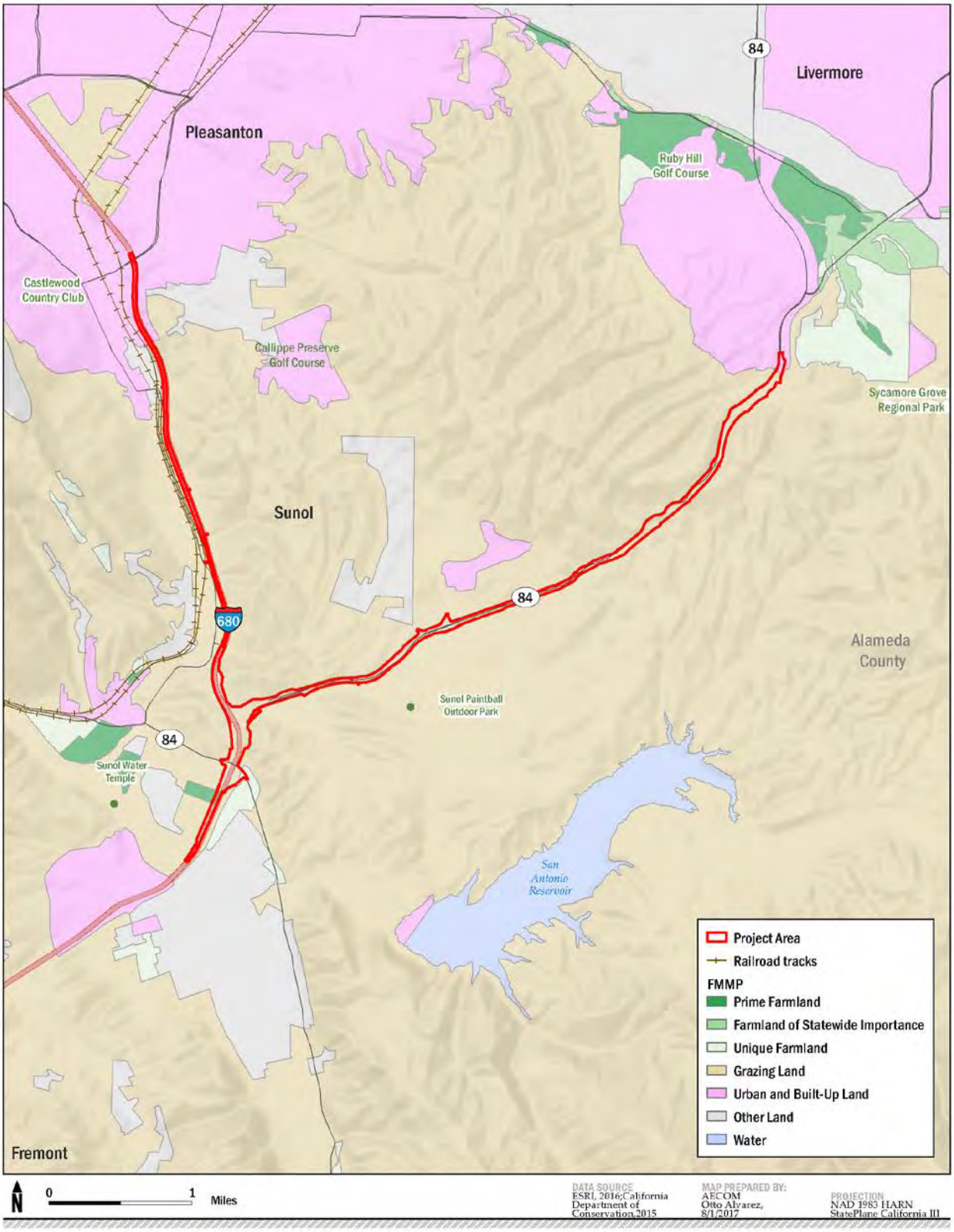


Figure 2.1.5-1: Farmland in the Project Area

the southbound I-680 shoulder. Two sections of Unique Farmland are mapped near or adjacent to the project area. One is just east of the northern project limit on SR 84, and the other is along northbound I-680 between the Paloma Way/Calaveras Road undercrossing and approximately 0.1 mile north of the southern project limit on I-680.

The California Land Conservation Act of 1965, which is commonly referred to as the Williamson Act, enables local governments to enter into contracts with private landowners for the purpose of restricting specific parcels of land to agricultural or related open space uses. In return, the landowners receive property tax assessments that are much lower than would otherwise be the case, because the taxes are based upon property value assessments that assume farming and open space uses in contrast to potential market rate development. Unlike the FMMP, which designates Prime Farmland based on soil characteristics, the Williamson Act designates land as Prime Agricultural Land and Non-Prime Agricultural Land based on economic and production criteria. Many Non-Prime agricultural parcels with Williamson Act contracts are located in the community impact study area.

The TVC was formed to work with property owners to acquire conservation easements from willing landowners. A conservation easement is a legal agreement between a property owner and the TVC. The easement places permanent restrictions on future use in order to maintain the property's agricultural, scenic, or habitat values. As a legal deed restriction, the easement is attached to the land in perpetuity. The TVC acquires conservation easements through purchase or donation of land. The areas included in the TVC now cover the South Livermore Valley Area, North Livermore, Pleasanton, Dublin, San Ramon, and Sunol. One TVC easement is mapped in the project area, along southbound SR 84 just south of the Ruby Hill development (Tri-Valley Conservancy 2009).

Williamson Act contract and TVC easement properties in the project area are shown in Figure 2.1.5-2.

2.1.5.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not convert Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance and would not change the use of any lands. The No Build Alternative would not affect farmlands.

Build Alternative

The project would not convert Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance. The project would require the permanent partial property acquisitions of approximately 17 acres of grazing land; however, the acquisitions would not affect the continued use of the properties for grazing or the minimum parcel sizes designated in the East County Area Plan (Alameda County Planning Department 2002). The project would not convert farmland as defined by the FMMP to nonagricultural use or bisect agricultural parcels. A Farmland Conversion Impact Rating Form has been completed for the project and is included in Appendix C.

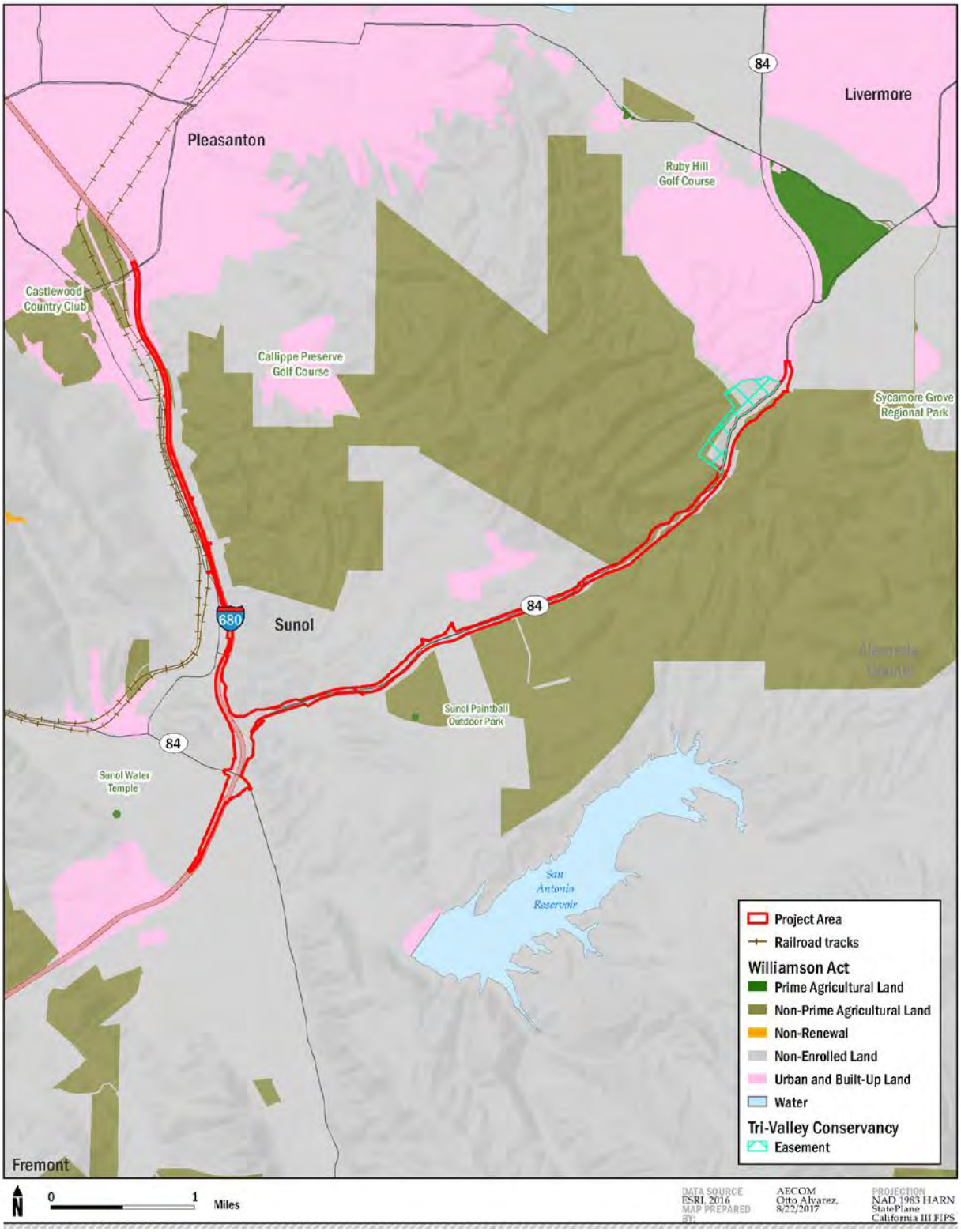


Figure 2.1.5-2: Williamson Act Properties and Tri-Valley Conservancy Easements in the Project Area

The widening of SR 84 to four lanes is anticipated to require partial permanent property acquisitions from six parcels under Williamson Act contracts as well as temporary construction easements and utility easements, as shown in Table 2.1.5-1.

Table 2.1.5-1: Williamson Act Property Acquisition

Assessor's Parcel Number[1]	Property Address	Total Parcel Size	Partial Acquisition (Acres)	Temporary Construction Easement (Acres)	Utility Easement (Acres)
096-0365-002-05	7820 Vallecitos Road, Sunol 94586	100.77	1.37	-	<0.01
096-0365-007-01	Vallecitos Road, Sunol 94586	399.99	0.14	-	-
096-0365-004-02	7000 Vallecitos Road, Sunol 94586	99.84	3.55	-	0.05
096-0360-001-06	Vallecitos Road, Sunol 94586	552.78	2.19	-	1.18
096-0350-001-02	Vallecitos Road, Sunol 94586	602.84	0.04	-	-
096-0350-003-04	Vallecitos Road, Sunol 94586	260.89	0.23	0.03	-
Total			**7.52**	**0.03**	**1.23**

Note: Parcels identified based on Alameda County Williamson Act Program mapping (California Division of Land Resource Protection 2016).

The properties all have the Williamson Act designation of Non-Prime Agricultural Land. In 2015, the most recent year for which data are available, 135,560 acres were reported to be enrolled as Williamson Act Non-Prime Agricultural Land in Alameda County (California Department of Conservation 2016b). The minimum parcel size that Alameda County sets for Non-Prime Agricultural Land is 40 acres (Alameda County 2011). The Build Alternative would not affect the minimum parcel size required by Alameda County. In addition, minimum parcel size requirements do not apply in cases when Williamson Act property is acquired by a public agency (Alameda County 2011). Therefore, the Build Alternative would not nullify or require changes to the Williamson Act contracts on the properties listed in Table 2.1.5-1. Notification of the proposed conversion of lands under Williamson Act contracts will be sent to the Department of Conservation in accordance with California Government Code Section 51291.

No project activities are planned on the TVC easement parcel; therefore, no TVC easement would be affected.

2.1.5.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation is required.

2.1.6 Community Character and Cohesion

2.1.6.1 Regulatory Setting

NEPA of 1969, as amended, established that the federal government use all practicable means to ensure for all Americans safe, healthful, productive, and aesthetically and culturally pleasing surroundings (42 USC 4331[b][2]). FHWA in its implementation of NEPA (23 USC 109[h]) directs that final decisions on 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 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.

2.1.6.2 Affected Environment

The following discussion is from the *Community Impact Assessment* completed for the proposed project in March 2017 (AECOM and Vernazza Wolfe 2017).

Community

Residential land uses in the project area are described in Section 2.1.1.1, and parks and recreational facilities are described in Section 2.1.3.1. There are no activity centers such as child care centers, banks, churches, or grocery stores in the immediate project area. The closest activity center is in Sunol, approximately 1 mile west of the project area, which contains a church, an elementary school, restaurants, an event center, the Niles Canyon Railway Depot, and businesses including a realtor and an antiques store.

Eight properties to the south of SR 84 currently have direct access to SR 84 in the project area (Figure 1.4-1, pages 3 and 4). Approximately 30 residences and a commercial horse stable to the north of SR 84 currently have direct access to SR 84 via Little Valley Road. Just east of Little Valley Road is Vallecitos Atomic Laboratory Road, which connects the GE-Hitachi Vallecitos Nuclear Center and Schafer Laboratories to SR 84.

Housing

Housing data can be an indicator of community cohesion. Alameda County is almost split between homeowners and renters; 53 percent own homes and 47 percent rent. The study area has more homeowners than the county, suggesting a higher degree of community cohesion, since homeowners often live in their community longer. In Livermore and Pleasanton, about 70 percent of residents are homeowners while about 30 percent are renters (Census 2014). In Sunol, 75 percent of residents are homeowners while 25 percent are renters. Among homeowners, length of residency in Pleasanton and Livermore is similar to the county as a whole. More than 30 percent of homeowners moved into their current homes prior to 2000 and more than 15

percent moved in prior to 1990. In Sunol, nearly 60 percent of homeowners moved into their current homes prior to 2000 and more than 35 percent moved in prior to 1990 (Census 2014).

In the nine-county Bay Area, the largest job clusters are in Santa Clara County (916,000), Alameda County (700,000), and San Francisco (591,000). Most residents work within their county of residence (ABAG 2015). Alameda County is no exception: the most common work destination for Alameda County residents is within Alameda County (approximately 64 percent of observed trips), followed by San Francisco County (approximately 13 percent) and Santa Clara County (approximately 11 percent; Alameda CTC 2015a). In the project area, the primary traffic movements between SR 84 and I-680 are southbound SR 84 to southbound I-680 during the AM peak period, and northbound I-680 to northbound SR 84 in the PM peak period (Fehr and Peers 2017). This demonstrates a strong commute pattern between residential areas in Pleasanton and Livermore (as well as points north and east, such as Brentwood and Tracy, using SR 84 via I-580 and other roadways) and employment centers in southern Alameda County and Santa Clara County.

Local Economy

The unemployment rate in the study area was lower in 2014 than the county as a whole. Alameda County had an unemployment rate of 6.3 percent whereas Livermore and Pleasanton had an unemployment rate below 5 percent. Sunol had an employment rate below 4 percent.

The largest employers in Pleasanton include Kaiser Permanente, Safeway, Oracle, Workday Incorporated, Pleasanton Unified School District, Macy's, Valley Care Medical Center, Clorox Services Company, State Fund – Compensation Insurance, and E M C Corporation (City of Pleasanton 2016b). In Livermore, the largest employers include Lawrence Livermore National Laboratory, Valley Care Health System Lifestyle Rx Fitness Center, Livermore Valley Joint Unified School District, Comcast Cable, Sandia National Laboratory, FormFactor Incorporated, Wente Vineyards, Kaiser Permanente Regional Distribution Center, City of Livermore, and Livermore Area Recreation and Park District (Livermore Valley Chamber of Commerce 2016).

Employers adjacent to the project area include the GE-Hitachi Vallecitos Nuclear Center and Schafer Laboratories north of SR 84, the Sunol Paintball Outdoor Park south of SR 84, and Lisa Arnold Nursery Sales and ITC Engineering on Calaveras Road (General Electric 2016; Schafer 2016; Manta 2016; ITC Engineering 2010).

2.1.6.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not change access to the existing community and would not affect neighborhoods or the local economy. It would have no effect on existing community cohesion.

Build Alternative

Community

The proposed project would not change any existing community boundaries or physically divide an established community. The project is not anticipated to influence growth patterns for the reasons described in Section 2.1.4.3 or change the existing character of the communities within the project area.

As described in Section 2.1.4.3, the project proposes to change existing access for some parcels along SR 84 to use new frontage roads that would connect with SR 84 at a new signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road (Figure 1.4-1, pages 3 and 4). Of the locations where access to SR 84 would be rerouted to the frontage road and new intersection, drivers would have to travel an additional distance of between 0.02 and 0.75 mile to access SR 84, depending on the location. No properties or households would be isolated as a result of the project. Section 2.1.3.2 describes access changes to SR 84 for the Sunol Paintball Outdoor Park.

Residents and visitors of those properties may consider the extra distance an inconvenience, especially if it requires driving opposite of the intended travel direction on SR 84. The inconvenience would be at least partly offset by the increased safety for drivers turning onto and off of SR 84. During public scoping, residents along SR 84 and Little Valley Road noted the difficulty of safely turning to or from SR 84 due to heavy, fast-moving traffic for several hours each day. Comments received during the project's scoping period were generally supportive of the proposed signalized intersection (particularly the dedicated left-turn lanes) and the frontage roads.

Local residents could also experience temporary access impacts from the construction closures and detours described in Section 1.4.4. Property access would be maintained throughout project construction, although single-night closures may be needed for paving new driveway/road connections and switching traffic. No full closures of SR 84 or I-680 are anticipated, and ramp and undercrossing closures and detours would be limited to approximately 15 single day or night closures over the three-year construction period. Implementation of a Transportation Management Plan as described in Section 2.1.6.4 would minimize the potential for short-term construction impacts.

The project could also have short-term and long-term changes to the noise environment, which are discussed in Section 2.2.7.2.

Housing

The project would not displace or relocate any residents or encourage more people to move to unincorporated Alameda County, Sunol, Pleasanton, Livermore, or the surrounding areas (see Section 2.1.4.3). The proposed project would not create additional land availability or affect housing stock in the study area or at a regional level.

Local Economy

The project would not affect employment rates in the study area. The project would provide a signalized intersection at the current location of Vallecitos Atomic Laboratory Road and modify the northbound I-680 on-ramp connections from Calaveras Road. These changes would improve access to and from the businesses on Vallecitos Atomic Laboratory Road, Little Valley Road, and Calaveras Road. Reductions in traffic congestion due to the proposed project's implementation (described in Section 2.1.9) can also be reasonably expected to support efficient customer access and deliveries to these businesses.

2.1.6.4 Avoidance, Minimization, and/or Mitigation Measures

TR-1. During the final design phase for the Build Alternative, a Transportation Management Plan (TMP) will be prepared in accordance with Caltrans requirements and guidelines to minimize the construction-related delays and inconvenience for travelers in the project area. The TMP will address the potential traffic impacts as they relate to staged construction, detours, and other traffic handling concerns associated with construction of the proposed project. It will include:

- Distribution of press releases and other documents as necessary to notify the public of upcoming road closures and detours;
- Coordination with CHP and local law enforcement on contingency plans;
- Utilization of portable Changeable Message Signs, CHP Construction Zone Enhanced Enforcement Program, and Freeway Service Patrol where possible to minimize delays.

The TMP will also minimize complete road closures by recommending staged construction in the contract bid package.

2.1.7 Relocations and Real Property Acquisition

2.1.7.1 Regulatory Setting

The Caltrans Relocation Assistance Program is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended (Uniform Act), and Title 49 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.

All relocation services and benefits are administered without regard to race, color, national origin, persons with disabilities, religion, age, or sex. Please see Appendix B for a copy of the Caltrans Title VI Policy Statement.

2.1.7.2 Affected Environment

The following discussion is from the *Community Impact Assessment* completed for the proposed project in March 2017 (AECOM and Vernazza Wolfe 2017).

The majority of the project would be constructed within the existing right-of-way. However, to accommodate the widening of SR 84 and bridge and ramp modifications at the SR 84/I-680 interchange, the project would result in partial property acquisitions, temporary construction easements (TCEs), maintenance easements, and utility easements at several properties.

Table 2.1.7-1 identifies the potentially affected properties, and the locations of the properties are shown in Figure 2.1.7-1. The actual impacts to properties will be determined during detailed project design.

2.1.7.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not require partial property acquisitions, TCEs, maintenance easements, or utility easements. The No Build Alternative would not result in relocations of homes or businesses.

Build Alternative

Based on the preliminary design, the Build Alternative would affect the private and public properties listed in Table 2.1.7-1. The land required for the project consists of property frontages and areas around ramps and bridge structures. Permanent property acquisitions include portions of large parcel agriculture, resource management, water management, mixed use, and rural density residential properties.

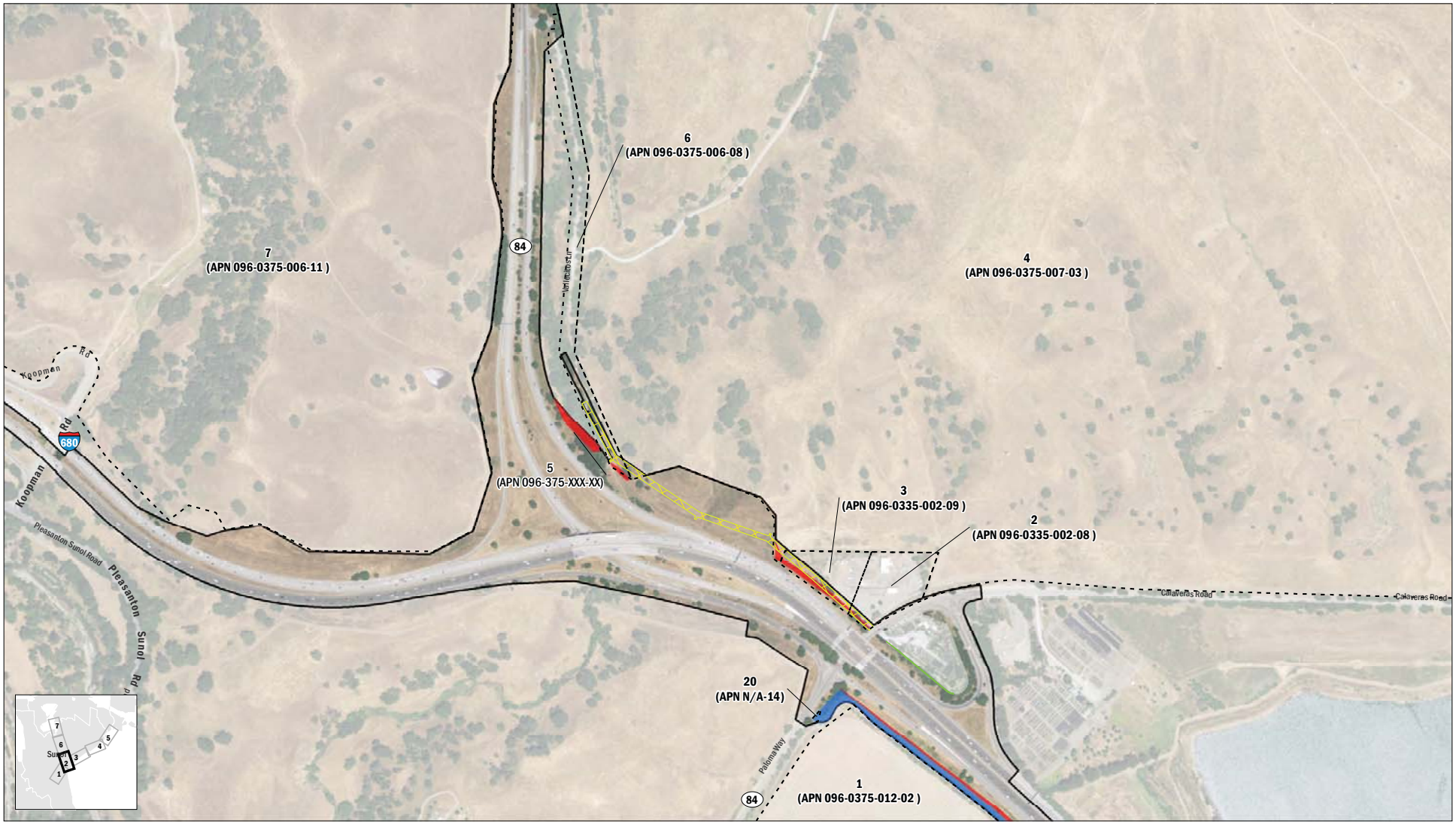
Temporary construction easements would be needed to accommodate construction equipment and vehicles during project construction. Maintenance easements are typically for periodic future maintenance access to roadway features such as electrical connections or landscaping on property owned by another public agency. Utility easements would involve installation or relocation of infrastructure such as electrical and communications lines, or connecting new lines to existing lines. Once the infrastructure is installed, relocated, or connected to, periodic future utility maintenance may need to be conducted on the property.

Table 2.1.7-1: Identification of Proposed Property Acquisitions and Easements

Parcel (see Figure 2.1.7-1)	**Page** (see Figure 2.1.7-1)	**Assessor's Parcel Number**	**Street Address**	**Partial Acquisition (Acres)**	**TCE (Acres)**	**Permanent Maintenance Easement (Acres)**	**Permanent Utility Easement (Acres)**
1	1, 2	096-0375-012-02	8301 Niles Canyon Road	0.78	2.57	-	-
2	2	096-0335-002-08	9959 Calaveras Road	0.02	-	-	0.06
3	2	096-0335-002-09	9959 Calaveras Road	0.22	-	-	0.27
4	2, 3	096-0375-007-03	Calaveras Road	0.19	-	-	0.73
5	2	096-0375-XXX-XX	Vallecitos Lane	0.05	-	-	0.31
6	2, 3	096-0375-006-08	Vallecitos Road	0.30	-	-	-
7	2, 3, 6	096-0375-006-11	Pleasanton Sunol Road	3.85	3.21	-	-
8	3	096-0365-001-04	8350 Vallecitos Road	0.82	-	-	0.25
9	3	096-0365-002-05	7820 Vallecitos Road	1.37	-	-	<0.01
10	3	096-0365-003-02	7010 Vallecitos Road	2.94	-	-	0.07
11	3, 4	096-0350-001-07	6705 Vallecitos Road	6.57	0.64	-	0.01
12	3	096-0365-007-01	Vallecitos Road	0.14	-	-	-
13	3, 4	096-0365-004-02	7000 Vallecitos Road	3.55	-	-	0.05
14	3, 4	096-0360-001-06	Vallecitos Road	2.19	-	-	1.18
15	4	096-0350-001-02	Vallecitos Road	0.04	-	-	-
16	4, 5	096-0350-003-04	Vallecitos Road	0.23	0.03	-	-
17	6	096-0320-002-04	Koopman Road	-	0.02	-	-
18	7	946-3102-003-02	Pleasanton-Sunol Road	-	0.01	-	-
19	3	N/A-8, N/A-9		0.23			
20	2	N/A-14	Paloma Way		0.03		
21	4, 5	096-360-003-02	Vallecitos Road	0.37			
22	5	950-0007-005-11	East Vallecitos Road	0.07			
Total				**23.93**	**6.51**	**0.05**	**2.93**

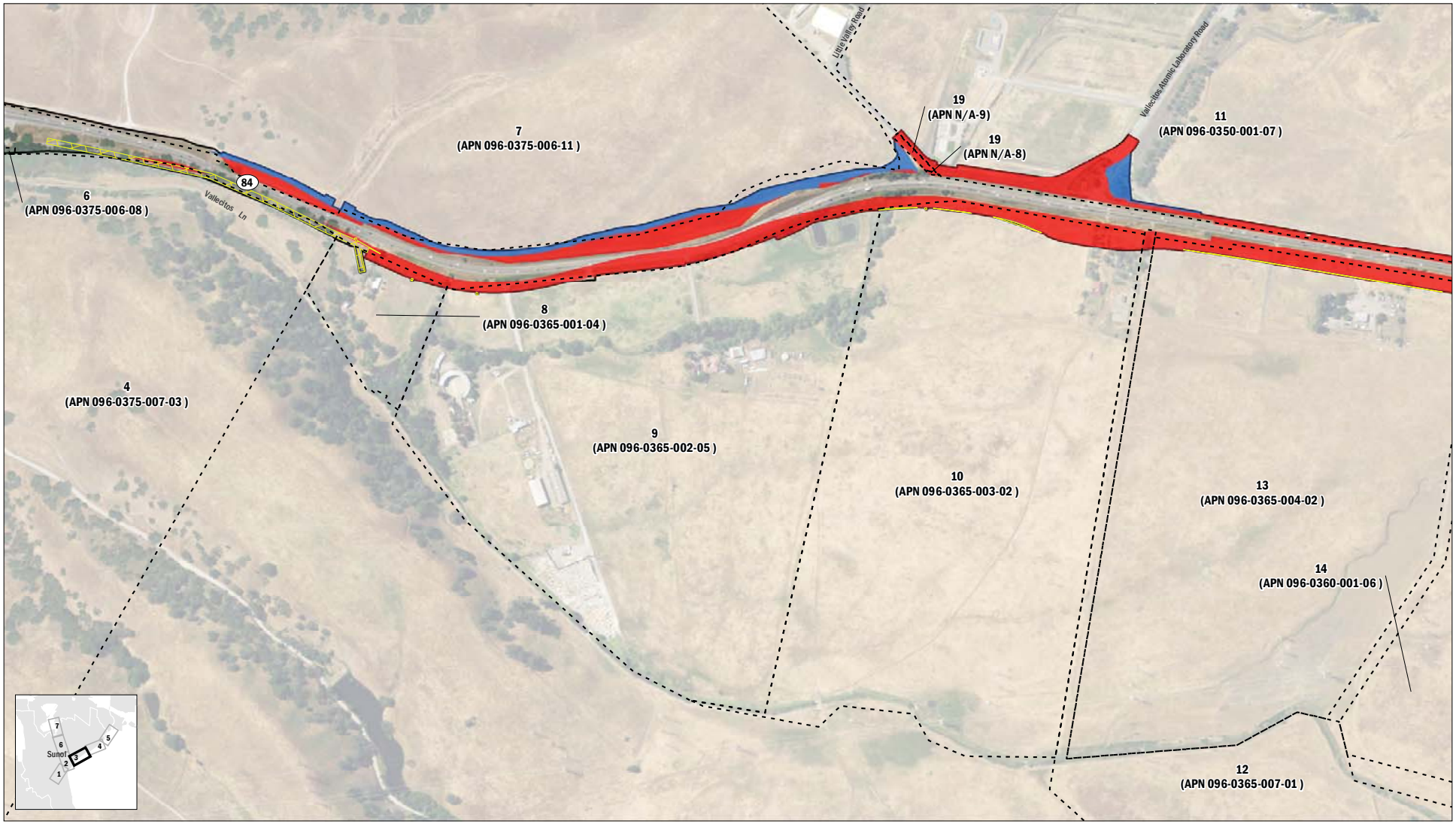
SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 2.1.7-1
Potential Property Acquisitions and Easements
Page 1 of 7



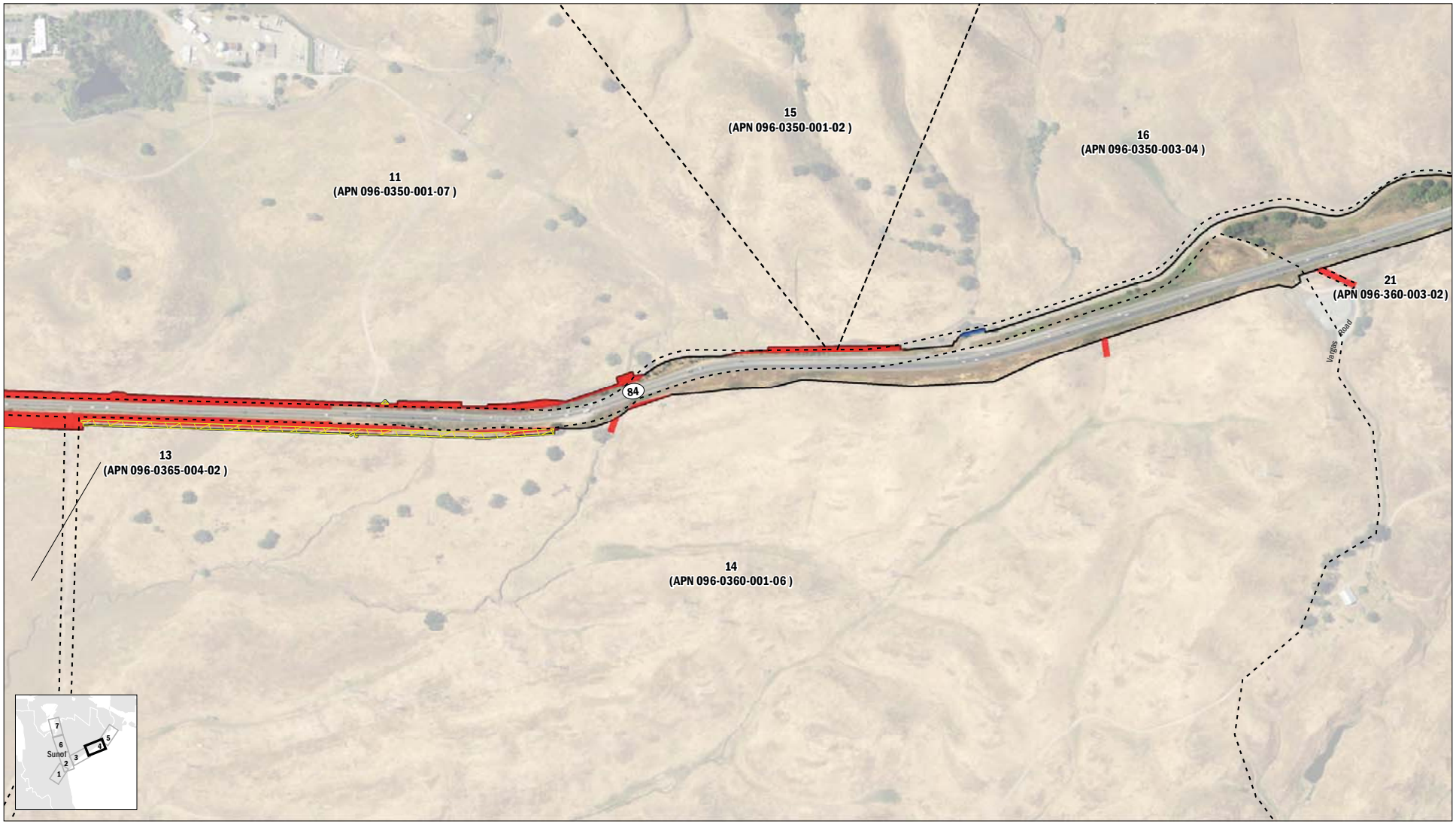
SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 2.1.7-1
Potential Property Acquisitions and Easements
Page 2 of 7



SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 2.1.7-1
Potential Property Acquisitions and Easements
Page 3 of 7



SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

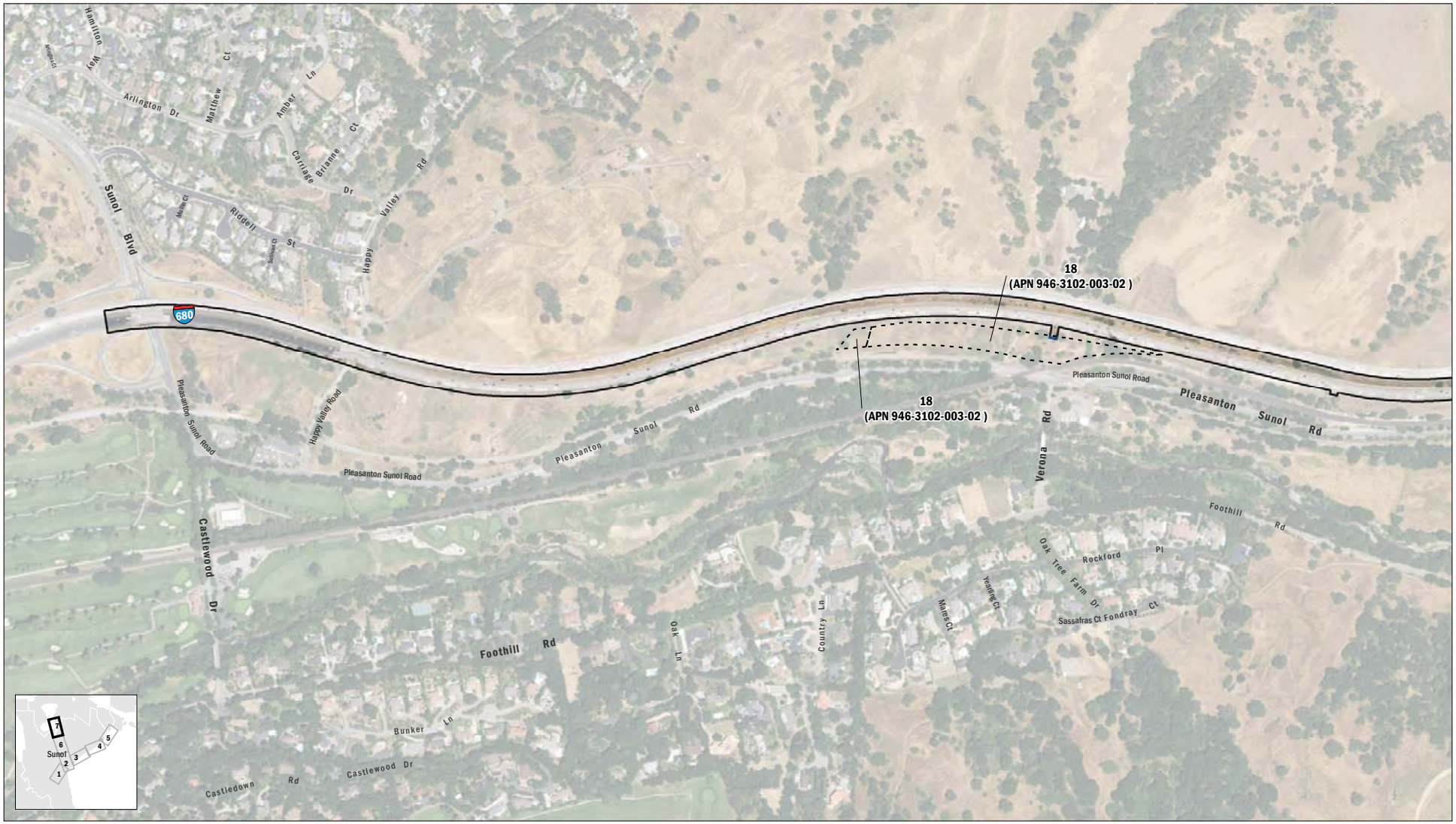
FIGURE 2.1.7-1
Potential Property Acquisitions and Easements
Page 4 of 7

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 2.1.7-1
Potential Property Acquisitions and Easements
Page 5 of 7

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 2.1.7-1
Potential Property Acquisitions and Easements
Page 6 of 7



SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE 2.1.7-1
Potential Property Acquisitions and Easements
Page 7 of 7

The Build Alternative would not require any full property acquisitions and would not relocate any residences or businesses. The Build Alternative would not result in the conversion of any parcels to a new land use or otherwise interfere with the continued use of parcels for their existing purpose.

The Build Alternative is not anticipated to result in any relocations or economic effects to property owners as a result of the proposed property acquisitions. Property owners along SR 84 could experience temporary access impacts from the construction closures and detours described in Section 1.4.4. Property access would be maintained throughout project construction, although single-night closures may be needed for paving new driveway/road connections and switching traffic. Property owners whose access may be temporarily affected by project construction will be notified prior to the start of construction.

2.1.7.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation is required.

2.1.8 Utilities/Emergency Services

2.1.8.1 Affected Environment

Power, gas, telecommunication (fiber optic), and water utilities are located within the community impact study area. PG&E provides gas and electricity service, and AT&T provides telecommunication service. SFPUC, Alameda County Water District (ACWD), and Zone 7 Water Agency manage water utilities within the community impacts study area (Section 2.1.1); however, within the project area, water is supplied from wells and tanks.

Police protection and traffic enforcement services in the study area are provided by the Pleasanton Police Department, Livermore Police Department, and Alameda County Sherriff's Department. CHP has jurisdiction over the SR 84 and I-680 corridors for matters involving traffic violations and emergency services. Fire protection services in the community impact study area are provided by the Livermore-Pleasanton Fire Department and the Alameda County Fire Department. The California Department of Forestry and Fire Protection (Cal Fire), under contract to Alameda County, operates the Sunol Fire Station at 11345 Pleasanton-Sunol Road, less than 1 mile from the project area.

Emergency services in the community impact study area are provided under contract to Alameda County. First responders are also deployed from the Alameda County Fire Dispatch Center near the Lawrence Livermore National Laboratory.

2.1.8.2 Environmental Consequences

No Build Alternative

As the No Build Alternative would not result in changes to SR 84, I-680, or the SR 84/I-680 interchange, it would not require utility relocations or construction activities that could interfere with the provision of emergency services.

Build Alternative

The Build Alternative would require relocation of some PG&E overhead electrical distribution lines and AT&T aerial telephone lines. Nine wooden poles with approximately 2,900 feet of 3-12 kilovolt (kV) electric distribution and telephone lines between Paloma Way and the eastern end of the northbound I-680 to northbound SR 84 connector would be relocated outside of the State right-of-way. Approximately 45 wooden poles with approximately 10,900 feet of 3-12 kV electric distribution and telephone lines between Vallecitos Lane and approximately 1 mile east of Vallecitos Atomic Laboratory Road would be relocated to the south, along the proposed frontage road on the south side of SR 84. Also, three wooden poles with 1,100 feet of 3-12 kV electric distribution lines on the north side of SR 84, approximately 1 mile east of Vallecitos Atomic Laboratory Road, would be shifted northward due to the SR 84 widening. Other utilities that would not be affected would be protected in place.

The relocation of the electrical and telephone lines may result in temporary interruptions of service. Final verifications of utilities would be performed during the project's detailed design phase, and any needed relocations would be coordinated with the affected utility owner. No impacts to water service are anticipated.

During project construction, temporary lane closures on SR 84 and full closures of SR 84/I-680 interchange ramps and the Koopman Road and Calaveras Road/Paloma Way undercrossings of I-680 would be required, as described in Section 1.4.4. These actions could result in short-term, temporary impacts to emergency service providers, which would be minimized by Measure TR-1 described in Section 2.1.6.4. After construction, the Build Alternative would reduce congestion and delay time for emergency service providers and other travelers in the project area. Therefore, no permanent effects to emergency services are anticipated.

2.1.8.3 Avoidance, Minimization, and/or Mitigation Measures

Short-term, temporary impacts during project construction would be minimized through implementation of Measure TR-1 in Section 2.1.6.4. No other avoidance, minimization or mitigation is required.

2.1.9 Traffic and Transportation/Pedestrian and Bicycle Facilities

2.1.9.1 Regulatory Setting

Caltrans, as assigned by FHWA, directs that full consideration should be given to the safe accommodation of pedestrians and bicyclists during the development of Federal-aid highway projects (see 23 CFR 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 who share the facility.

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

2.1.9.2 Affected Environment

The information from this section is based on the *Traffic Operations Analysis Report* (TOAR; Fehr and Peers 2017) completed in May 2017.

Roadway Network

As described in Section 1.2.1, SR 84 in the project area has one to two lanes in each direction. Paloma Way, Calaveras Road, Vallecitos Road, and Isabel Avenue are all designated as SR 84 at various points in the traffic study area. Between I-580 and the Pigeon Pass area (Figure 1.1-1), SR 84 is categorized as an expressway, with access only provided at signalized key intersections or right-in/right-out only connections.[20]

In the study area, I-680 has three general purpose lanes in each direction, and an HOV/express lane along southbound I-680 from south of the SR 84 interchange to SR 237. A northbound HOV/express lane is in design and expected to be in operation by 2020. All southbound on-ramps within the study area are metered during the AM peak period starting at 6:00 AM.

Local streets that intersect with SR 84 east of I-680 include Vineyard Avenue, Vallecitos Road, Ruby Hill Drive–Kalthoff Common (north and south of SR 84, respectively), Vallecitos Atomic Laboratory Road, Little Valley Road, and Vallecitos Lane. West of I-680, Paloma Way intersects with Pleasanton-Sunol Road and Niles Canyon Road near downtown Sunol. East of I-680, Paloma Way becomes Calaveras Road. Another local street, Koopman Road, crosses under I-680 north of SR 84.

[20] The project to widen and conform SR 84 to expressway standards between Concannon Boulevard and Ruby Hill Drive (PM 22.9 to 27.3; EA 29762) is under construction and anticipated to be completed in 2018.

SR 84 in the project area is a designated truck route. SR 84 is part of the Surface Transportation Assistance Act Terminal Access network from I-680 to Vallecitos Atomic Laboratory Road. From Vallecitos Atomic Laboratory Road to Vineyard Avenue (east of the project limits), SR 84 is part of the 65-foot California Legal route network. SR 84 in the project area is also identified as a through truck route in the City of Livermore General Plan and City of Pleasanton Municipal Code.

I-680 is also a designated truck route and part of the Surface Transportation Assistance Act National Network, a network of highways for use by large trucks that includes almost all of the Interstate Highway System.

Transit in the project area is described in Section 2.1.4.2.

Bicycle and Pedestrian Facilities

No designated bicycle or pedestrian facilities exist on SR 84 in the project limits. At the SR 84/I-680/Calaveras Road interchange, bicyclists are currently permitted to enter northbound I-680 at Calaveras Road and exit at northbound SR 84 (Vallecitos Road; signed as eastbound in this area). In the southbound direction of SR 84 (signed as westbound in this area), bicyclists are permitted to ride through the SR 84 connector, where they must cross high-speed on- and off-ramps. Bicyclists wishing to travel between Livermore and the Calaveras Road/Paloma Way corridors and avoid the interchange must divert through downtown Pleasanton and the Pleasanton-Sunol Road corridor parallel to I-680. The diversion route is approximately 2 miles longer (each way) than the direct route using SR 84.

East of the project limits on SR 84, a separate project (EA 29762) is constructing additional bicycle facilities that are anticipated to be completed in 2018. The additional facilities include Class II bikeways on both sides of SR 84 from south of Ruby Hill Drive to north of Concannon Boulevard, and the southward extension of the Isabel Trail, a Class I bikeway for shared bicycle/pedestrian use that parallels SR 84, from Alden Lane to Vineyard Avenue.

The following bicycle facilities are outside of the project limits but in the project vicinity:

- Isabel Avenue (SR 84): A Class I shared use path parallels Isabel Avenue from Jack London Boulevard to approximately 0.25 mile north of the Isabel Avenue (SR 84)/Vineyard Avenue intersection. This Class I path is proposed to be extended to Vineyard Avenue.
- Vineyard Avenue: Class II bike lanes are provided from Isabel Avenue (SR 84) west toward the City of Pleasanton.
- Vallecitos Road (SR 84): A future Class III bike route is planned between Isabel Avenue and I-680.

Pedestrian facilities outside of the project limits but in the project vicinity include sidewalks, crosswalks, and pedestrian signals at signalized intersections. Generally, pedestrian volumes along SR 84 are very low due to the rural nature of the SR 84 corridor. All study intersections lack crosswalks, except for Isabel Avenue (SR 84)/Vineyard Avenue, which provides a crosswalk on the southern leg of the intersection. As noted in Section 1.3.2.2, wide shoulders are provided along SR 84 that could be used by pedestrians walking along SR 84; however, the high

traffic volumes and high traffic speeds generally discourage pedestrians from walking along SR 84.

Future planned bicycle and pedestrian facilities are described in Section 2.1.2.1 (under Other Regulatory and Planning Influences: Bicycle Plans).

Traffic Operations Analysis Study Area and Methods

The traffic study area was developed in consultation with Caltrans staff and is intended to capture the local and regional traffic effects of the proposed project. The study area is shown in Figure 2.1.9-1 and includes SR 84 and I-680 in unincorporated Alameda County and Pleasanton, Livermore, and Sunol. The study area includes I-680 between the Washington Boulevard interchange and the Sunol Boulevard interchange in the northbound direction, and between the Sunol Boulevard interchange and Sheridan Road interchange in the southbound direction. The following intersections were included in the study area:

1. Isabel Avenue (SR 84)/Vineyard Avenue (signalized)
2. Isabel Avenue (SR 84)/Vallecitos Road (signalized)
3. Vallecitos Road (SR 84)/Ruby Hill Drive-Kalthoff Common (signalized)
4. Vallecitos Road (SR 84)/Vallecitos Atomic Laboratory Road (side-street stop-controlled; proposed to be consolidated into a single signalized access point as part of the project)
5. Vallecitos Road (SR 84)/Little Valley Road (side-street stop-controlled; proposed to be consolidated into a single signalized access point as part of the project)
6. Paloma Way (SR 84)/I-680 Southbound Ramps (side-street stop-controlled)
7. Calaveras Road (SR 84)/I-680 Northbound Ramps (side-street stop-controlled)
8. Koopman Road/Pleasanton-Sunol Road (side-street stop-controlled)
9. Koopman Road/I-680 Southbound Off-ramp (side-street stop-controlled)
10. Koopman Road/I-680 Northbound On-ramp (uncontrolled)
11. Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road (all-way stop-controlled)

The numbers correspond to those shown in Figure 2.1.9-1.

Traffic Operations Analysis

The traffic study analyzed the following scenarios:

- Existing conditions, which represent 2015, the year when the traffic study began;
- 2025, which represents the project's opening year, for the No Build and Build alternatives; and
- 2045, which represents the design year (20 years after the opening year), for the No Build and Build alternatives.

Figure 2.1.9-1: Traffic Study Area

The traffic forecasting procedure for 2025 and 2045 volumes used the Alameda CTC Travel Demand Forecasting Model, a regional travel demand model that covers the entire Bay Area, with a higher level of geographic detail within Alameda County. The model reflects demographic inputs and regional land use projections consistent with *Plan Bay Area*, as well as roadway network improvements in the cities around the study area included in *Plan Bay Area* (ABAG and MTC 2013a).[21] The land use assumptions include *Plan Bay Area* projections for planned developments throughout the Bay Area through 2040.

The forecast assumed completion of the following roadway network improvements in the study area for both the No Build and Build alternatives:

- 2025: Widening of SR 84 to four lanes between Concannon Boulevard and Ruby Hill Drive (PM 22.9 to 27.3; EA 29762); completion of the I-680 Northbound HOV/Express Lane Project from Auto Mall Parkway to just north of the northbound SR 84 off-ramp (continuous access); completion of the I-680 Southbound HOV/Express Lane conversion to continuous access (currently under study); and signalization of the Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road intersection.
- 2045: The projects listed above, and completion of the I-680 Northbound HOV/Express Lane Project from Auto Mall Parkway to Alcosta Boulevard (continuous access).

Freeway and intersection operations were analyzed using VISSIM microsimulation analysis software (Version 5.4) and Synchro analysis software (Version 9), based on the procedures and methodologies outlined in the 2010 *Highway Capacity Manual* (Transportation Research Board 2011).

VISSIM was used to evaluate freeway operations and intersection operations along SR 84 and at the ramp terminal intersections at the SR 84/I-680/Calaveras Road interchange. Intersections 1 through 7 were analyzed using VISSIM in accordance with the Highway Capacity Manual, which requires microsimulation modeling for closely spaced, congested intersections. For the VISSIM analysis, a 30-minute peak period was used because a 1-hour peak period at these locations would not accurately reflect the growth and change in congestion over time in the study area.

Synchro was used to evaluate peak-hour intersection operations along Pleasanton-Sunol Road and Koopman Road. For the Synchro analysis, the hour of highest total entry volume at each intersection was used to determine the peak hour for analysis. The peak period conditions for the SR 84 mainline, I-680 mainline, and study area intersections are defined as follows:

- SR 84 and I-680 mainlines: AM peak period, 5:00 to 10:00 AM; PM peak period, 3:00 to 8:00 PM.
- Study area intersections:
  - Intersections along SR 84 (Intersections 1 through 7 listed above and shown in Figure 2.1.9-1): AM peak period, 7:00 to 7:30 AM; PM peak period, 4:30 to 5:00 PM.

[21] *Plan Bay Area 2040* (ABAG and MTC 2017a), an update to the RTP, was approved on July 27, 2017. While the update includes minor modifications to land use patterns assumed for 2040, the overall levels of population and employment growth anticipated for the Bay Area are similar to those used as the basis for the traffic forecasts.

- Intersections along Pleasanton-Sunol Road and Koopman Road (Intersections 8 through 11 listed above and shown in Figure 2.1.9-1):

	Intersection	AM peak hour	PM peak hour
8	Koopman/Pleasanton-Sunol Road	8:00–9:00	4:30–5:30
9	Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road	8:00–9:00	5:00–6:00
10	Koopman Road/I-680 Northbound On-ramp	7:30–8:30	6:30–7:30
11	Koopman Road/I-680 Southbound Off-ramp	9:00–10:00	5:00–6:00

The traffic study analyzed system-wide performance measures to provide an understanding of overall traffic operations and how they vary among alternatives. The following Measures of Effectiveness (MOEs) were used to quantify traffic operations on the SR 84 and I-680 mainlines:

- Volume Served – a measure of the vehicles that can be served by the study area roadway system during the analysis period.
- Vehicle Miles of Travel (VMT) – a measure of the total vehicle throughput of the study area taking into consideration the actual volume served versus the demand and the trip lengths of those vehicles.
- Vehicle Hours of Delay (VHD) – the total delay incurred by vehicles during the peak period due to traffic congestion.
- Average Travel Time – a measure of the time taken by all vehicles (on average) to travel through the network, i.e., between two discreet points during the study period. The travel time calculation considers the average delay, vehicle queues, and friction caused by merging vehicles.
- Average Travel Speed – a measure of vehicle speeds in the network that travel between two discreet points during the study period. This measure depends both on the posted speed for a given link and the level of congestion.
- Maximum Individual Delay – a measure of the maximum delay that a motorist would experience through the corridor during the most congested time period (for this analysis, the most congested 30-minute period in the peak period). This measure is calculated by subtracting the average travel time through the corridor under free-flow conditions from the travel time during the most congested period.

The analysis results also include levels of service (LOS), a measure of the quality of traffic operating conditions varying from LOS A (indicating free-flow traffic conditions with little or no delay) to LOS F (representing over-saturated conditions where traffic flows exceed capacity resulting in long queues and delays). LOS represents the perspective of drivers and is an indication of the comfort and convenience associated with driving. The LOS standard adopted by the Alameda CTC for Congestion Management Program (CMP) and Metropolitan Transportation System (MTS) roadway segments (e.g., I-580, I-680, and SR 84) is LOS E.

Existing Conditions

SR 84 and I-680 Mainlines

This section describes existing traffic conditions in the project area. Table 2.1.9-1 describes the existing conditions on SR 84 and I-680. As noted above, maximum individual vehicle delay is the extra time it takes to travel SR 84 or I-680 in the project limits during the most congested period as compared to the time it would take at free-flow speeds (50 mph for SR 84 and 65 mph for I-680). For the study segments, the delay is greatest during the AM peak hour traveling southbound and during the PM peak hour traveling northbound. This is consistent with the commute patterns in the study area.

Table 2.1.9-1: Existing Conditions Network Measures of Effectiveness

Measure	AM Peak Period[1]	PM Peak Period[2]
All Origin-Destination Pairs[3]		
Volume Served	65,760	70,130
Vehicle Miles of Travel (VMT)	403,741	413,178
Vehicle Hours of Delay (VHD) in hours	755	2,941
Travel Through the Corridor (Southbound I-680)[4]		
Average Travel Time (minutes)	6.7	5.8
Average Travel Speed (mph)	58	67
Maximum Individual Vehicle Delay (minutes)	1.0	0.0
Travel Through the Corridor (Northbound I-680)[5]		
Average Travel Time (minutes)	8.1	14.4
Average Travel Speed (mph)	67	38
Maximum Individual Vehicle Delay (minutes)	0.2	10.3
Travel Through the Corridor (Southbound SR 84)[6]		
Average Travel Time (minutes)	8.9	5.7
Average Travel Speed (mph)	33	51
Maximum Individual Vehicle Delay (minutes)	6.7	0.2
Travel Through the Corridor (Northbound SR 84)[7]		
Average Travel Time (minutes)	7.7	10.6
Average Travel Speed (mph)	50	36
Maximum Individual Vehicle Delay (minutes)	0.6	4.3

Notes:

Delay is calculated relative to 65 mph on freeways and relative to 50 mph on highways.

1. AM Peak Period represents five hours from 5:00 AM to 10:00 AM.
2. PM Peak Period represents five hours from 3:00 PM to 8:00 PM.
3. Combined statistics of all origin-destination pairs i.e., mainlines, entry and exit points, all on- and off-ramps, and intersections in the study network.
4. Travel through the corridor extends from the Sunol Boulevard on-ramp gore to the Sheridan Road on-ramp gore.
5. Travel through the corridor extends from the Washington Boulevard on-ramp gore to the Sunol Boulevard off-ramp gore.
6. Travel through the corridor extends from the Vineyard Avenue intersection exit to the northbound I-680 on-ramp gore.
7. Travel through the corridor extends from the northbound I-680 to SR 84 north off-ramp gore point to the Vineyard Avenue stop bar.

For southbound I-680 in the AM and PM peak periods and northbound I-680 in the AM peak period, speeds are generally at or near the speed limit, and delays are minimal. On northbound I-680 in the PM peak period, speeds are substantially lower, and the maximum individual delay is high compared to the average travel time, which indicates congestion in the corridor. A bottleneck (a point where traffic demand exceeds capacity) develops between 3:30 and 7:30 PM on northbound I-680 between the Andrade Road on-ramp and the Calaveras Road (SR 84) off-ramp.

Southbound SR 84 experiences congestion throughout the AM peak period, as shown by an average travel speed that is substantially lower than the speed limit, combined with a maximum individual delay that is high compared to the average travel time. During the AM peak period, a bottleneck forms on southbound SR 84 from 6:00 to 9:30 AM where the number of travel lanes drops from two to one (on the west side of Pigeon Pass). The queue from this bottleneck extends over the Pigeon Pass summit to within 0.5 mile of the Vallecitos Road (SR 84)/Ruby Hill Drive-Kalthoff Common intersection.

Northbound SR 84 experiences congestion north of I-680 throughout the PM peak period. During the PM peak period, a bottleneck forms on northbound SR 84 from 3:00 to 7:30 PM at the lane reduction east of the I-680 interchange. The queue for this bottleneck spills onto the northbound I-680 mainline and occasionally affects mainline flow along northbound I-680.

Southbound SR 84 in the PM peak period and northbound SR 84 the AM peak period are generally uncongested. On northbound SR 84 during the PM peak period, speeds are substantially lower than the posted speed limit, and delays are high.

Southbound I-680 HOV/Express Lane

In the southbound I-680 HOV/express lane, the average weekday travel speed from 7:00 to 10:00 AM is 70 mph, compared with 60 mph in the general purpose lanes. The average hourly traffic volume in the HOV/express lane during that period is 1,237 vehicles per hour (vph) (Alameda CTC 2015b). The capacity of an HOV lane is typically considered to be 1,650 vph, which is the threshold of operation needed to provide HOVs with reliable travel time savings and a travel speed of 45 mph (discussed further in Section 1.3.2.1).

The HOV/express lane accounts for approximately 21 percent of the total corridor flow between 7:00 AM and 10:00 AM. Lane users consist of approximately 52 percent HOVs and 48 percent SOVs.

Local Intersections

Table 2.1.9-2 lists the traffic control device at each intersection as well as the operating delay and LOS for both the AM and PM peak periods.

Table 2.1.9-2: Existing Intersection Operations

Intersection		Peak Period	Control	Average Delay (seconds)[1]	LOS[2]
1	Isabel Avenue (SR 84)/ Vineyard Avenue	AM PM	Signalized	**81** 29	**F** C
2	Isabel Avenue (SR 84)/ Vallecitos Road	AM PM	Signalized	**>180** 17	**F** B
3	Vallecitos Road (SR 84)/ Ruby Hill Drive-Kalthoff Common	AM PM	Signalized	8 6	A A
4	Vallecitos Road (SR 84)/ Vallecitos Atomic Laboratory Road	AM PM	Side-Street Stop-Control	3 (49) 2 (47)	A (E) A (E)
5	Vallecitos Road (SR 84)/ Little Valley Road	AM PM	Side-Street Stop-Control	2 (48) 3 **(62)**	A (E) A **(F)**
6	Paloma Way (SR 84)/ I-680 Southbound Ramps	AM PM	Side-Street Stop-Control	20 **(71)** 1 (8)	C **(F)** A (A)
7	Calaveras Road (SR 84)/ I-680 Northbound Ramps	AM PM	Side-Street Stop-Control	5 (12) 6 (14)	A (B) A (B)
8	Pleasanton-Sunol Road/ Koopman Road	AM PM	Side-Street Stop-Control	1 (14) 7 (20)	A (B) A (C)
9	Koopman Road/ Southbound I-680 Off-ramp	AM PM	Uncontrolled	2 (9) 5 (10)	A (A) A (B)
10	Koopman Road/ Northbound I-680 On-ramp	AM PM	Side-Street Stop-Control	7 (8) 7 (8)	A (A) A (A)
11	Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road	AM PM	All-Way Stop-Control	**78 (95)** **104 (>180)**	**F (F)** **F (F)**

Notes:

Bold indicates unacceptable intersection operations

1. Weighted average control delay presented for signalized intersections. For side-street stop-controlled intersections, the first number is the Whole-Intersection Average Delay, and the second number (in parentheses) is the Worst Approach Delay.

2. For side-street intersections, the first letter is the Whole-Intersection Average LOS, and the second letter (in parentheses) is the Worst Approach LOS.

As shown in Table 2.1.9-2, motorists approaching SR 84 from Vallecitos Atomic Laboratory Road (Intersection 4) and Little Valley Road (Intersection 5) experience delays of 47 to 62 seconds in both the AM and PM peak periods. On SR 84 east of the project limits, the Vallecitos Road intersection (Intersection 2) operates at LOS F during the AM peak period, creating queues that extend eastward to Vineyard Avenue and resulting in LOS F conditions at Intersection 1. On SR 84 west of the project limits, Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road (Intersection 11) operates at LOS F during the AM and PM peak hours.

2.1.9.3 Environmental Consequences

Opening Year (2025)

SR 84 and I-680 Mainlines

Table 2.1.9-3 summarizes the 2025 conditions on the mainlines of SR 84 and I-680 in the traffic study area. The Build Alternative would increase the number of vehicles served in the study area

by 4 percent to 5 percent compared to the No Build Alternative throughout the course of each 5-hour study period, leading to a slight increase in VMT. However, the Build Alternative would decrease VHD between 37 and 68 percent over the course of the 5-hour study periods compared to the No Build Alternative.

Table 2.1.9-3: Year 2025 Network Measures of Effectiveness

Measure	No Build Alternative		Build Alternative		Percent Change between No Build and Build	
	AM Peak Period[1]	PM Peak Period[2]	AM Peak Period[1]	PM Peak Period[2]	AM Peak Period[1]	PM Peak Period[2]
All Origin-Destination Pairs[3]						
Volume Served	69,760	78,560	72,730	82,510	4%	5%
Vehicle Miles of Travel (VMT)	1,450,000	1,100,000	1,477,000	1,136,000	2%	3%
Vehicle Hours of Delay (VHD) in hours	19,600	16,100	12,300	5,200	-37%	-68%
Travel Through the Corridor (Southbound I-680)[4]						
Average Travel Time (minutes)	7.8	6.4	7.6	6.2	-3%	-3%
Average Travel Speed (mph)	50	61	51	62	2%	2%
Maximum Individual Vehicle Delay (minutes)	4.0	0.9	2.3	0.9	-43%	0%
Travel Through the Corridor (Northbound I-680)[5]						
Average Travel Time (minutes)	14.6	45.5	14.6	22.0	0%	-52%
Average Travel Speed (mph)	67	22	67	45	0%	105%
Maximum Individual Vehicle Delay (minutes)	0.2	49.4	0.2	18.1	0%	-63%
Travel Through the Corridor (Southbound SR 84)[6]						
Average Travel Time (minutes)	40.2	7.3	8.4	7.3	-79%	0%
Average Travel Speed (mph)	10	53	46	53	360%	0%
Maximum Individual Vehicle Delay (minutes)	44.9	0.9	3.6	0.8	-92%	-11%
Travel Through the Corridor (Northbound SR 84)[7]						
Average Travel Time (minutes)	7.7	11.7	7.6	8.0	-1%	-32%
Average Travel Speed (mph)	50	33	51	48	2%	45%
Maximum Individual Vehicle Delay (minutes)	0.8	4.8	0.8	1.2	0%	-75%

Notes:
Delay is calculated relative to 65 mph on freeways and relative to 50 mph on highways.
1. AM Peak Period represents five hours between 5:00 AM to 10:00 AM.
2. PM Peak Period represents five hours between 3:00 PM to 8:00 PM.
3. Combined statistics of all origin-destination pairs i.e., mainlines, entry and exit points, all on- and off-ramps, and intersections in the study network.
4. Travel through the corridor extends from the Sunol Boulevard on-ramp gore to the Sheridan Road on-ramp gore.
5. Travel through the corridor extends from the edge of the network (capturing the back of queue for the bottleneck between Washington Boulevard and Mission Boulevard/SR 238) to the Sunol Boulevard off-ramp gore.
6. Travel through the corridor extends from the Vineyard Avenue intersection exit to the northbound I-680 off-ramp gore.
7. Travel through the corridor extends from the northbound I-680 to SR 84 north off-ramp gore to the Vineyard Avenue stop bar.

Along southbound I-680, travel times and travel speeds would improve slightly with the Build Alternative, as traffic that would bottleneck between the Sunol Boulevard on-ramp and Koopman Road off-ramp with the No Build Alternative would shift to SR 84. The primary traffic shift would be from drivers who travel through local streets in Pleasanton to access southbound I-680 with the No Build Alternative, who would shift to the southbound SR 84 corridor to access southbound I-680 with the Build Alternative.

Along northbound I-680, travel times, speeds, and delays would be the same for the No Build and Build alternatives in the AM peak period, as the corridor would be uncongested in both scenarios. In the PM peak period, the Build Alternative would eliminate the bottleneck on northbound I-680 created by the one-lane segment of SR 84 east of I-680. As a result, the Build

Alternative would decrease travel time on northbound I-680 by 52 percent, increase travel speed by 105 percent, and decrease maximum individual delay by 63 percent (over 30 minutes) compared with the No Build Alternative.

For southbound SR 84, the Build Alternative would substantially improve AM peak travel times, speeds, and delays compared to the No Build Alternative. The Build Alternative would eliminate the bottleneck on southbound SR 84 west of Pigeon Pass during the AM peak period, reducing travel times by 79 percent and maximum individual delay by 92 percent compared to the No Build Alternative.

For the southbound SR 84 PM peak period and northbound SR 84 AM peak period, Build Alternative conditions would be similar to No Build Alternative conditions, as the corridor would be uncongested under both scenarios.

With the additional northbound lane on SR 84, northbound PM peak period travel times, speeds, and delays would substantially improve with the Build Alternative compared to No Build: travel times would decrease by 32 percent, and speeds would increase by 45 percent.

HOV/Express Lane

The Build Alternative would increase traffic volume in the HOV/express lane on southbound I-680 compared to the No Build Alternative; however, in the HOV/express lane segment with the highest volume during the peak hour, the volume would remain below 1,650 vehicles, and the average speed would remain above 50 mph.

Local Intersections

Table 2.1.9-4 summarizes the No Build and Build alternative intersection operations for 2025. All intersections in the traffic study area would operate at LOS E or better with the Build Alternative in the AM and PM peak periods. Where SR 84 would have one lane in each direction with the No Build Alternative, the Build Alternative would provide two lanes in each direction, alleviating the bottlenecks on southbound SR 84 west of Pigeon Pass (AM peak period) and on northbound SR 84 west of I-680 (PM peak period).

Table 2.1.9-4: Year 2025 Intersection Operations

Intersection		Peak Period	Control	No Build Alternative		Build Alternative	
				Average Delay (seconds)[1]	LOS[2]	Average Delay (seconds)[1]	LOS[2]
1	Isabel Avenue (SR 84)/ Vineyard Avenue	AM PM	Signalized	**>180** 33	**F** C	19 23	B C
2	Isabel Avenue (SR 84)/ Vallecitos Road	AM PM	Signalized	**>180** 8	**F** A	14 12	B B
3	Vallecitos Road (SR 84)/ Drive-Kalthoff Common	AM PM	Signalized	**137** 9	**F** A	8 9	A A
4	Vallecitos Road (SR 84)/ Vallecitos Atomic Laboratory Road	AM PM	Side-Street Stop-Control[3]/ Signalized[4]	4 (26) 2 (31)	A (D) A (D)	11 11	B B
5	Vallecitos Road (SR 84)/ Little Valley Road	AM PM	Side-Street Stop-Control	13 **(>180)** 3 **(151)**	A **(F)** A **(F)**	*Consolidated with Intersection #4*	
6	Paloma Way (SR 84)/ I-680 Southbound Ramps	AM PM	Side-Street Stop-Control	6 (9) **>180 (>180)**	A (A) **F (F)**	4 (6) 3 (4)	A (A) A (A)
7	Calaveras Road (SR 84)/ I-680 Northbound Ramps	AM PM	Side-Street Stop-Control	8 (13) 14 **(79)**	A (B) B **(F)**	7 (9) 6 (6)	A (A) A (A)
8	Pleasanton-Sunol Road/ Koopman Road	AM PM	Side-Street Stop-Control	1 (18) 16 (41)	A (C) C (E)	1 (18) 10 (26)	A (C) A (D)
9	Koopman Road/ Southbound I-680 Off-ramp	AM PM	Uncontrolled	3 (9) 6 (11)	A (A) A (B)	3 (9) 5 (10)	A (A) A (B)
10	Koopman Road/ Northbound I-680 On-ramp	AM PM	Side-Street Stop-Control	7 (8) 7 (8)	A (A) A (A)	7 (8) 7 (8)	A (A) A (A)
11	Niles Canyon Road-Paloma Way (SR 84)/ Pleasanton-Sunol Road	AM PM	Signalized	75 54	E D	75 69	E E

Notes:
Bold indicates unacceptable intersection operations.
1. Weighted average control delay presented for signalized intersections. For side-street stop-controlled intersections, the first number is the Whole-Intersection Average Delay, and the second number (in parentheses) is the Worst Approach Delay.
2. For side-street intersections, the first letter is the Whole-Intersection Average LOS, and the second letter (in parentheses) is the Worst Approach LOS.
3. Side-street stop control under No Build Alternative.
4. Signalized under Build Alternative.

As a result, the Build Alternative would substantially improve operations during the AM peak period east of Pigeon Pass (Intersections 1-3), and during the PM peak period at the Calaveras Road (SR 84)/I-680 Northbound Ramps (Intersection 7), compared to the No Build Alternative.

The Build Alternative would also provide a signalized intersection at Little Valley Road and Vallecitos Atomic Laboratory Road (Intersection 4), substantially reducing delays for motorists approaching SR 84 from Little Valley Road (Intersection 5 with the No Build Alternative) during both the AM and PM peak periods.

The additional lanes on SR 84 with the Build Alternative would allow for a shift of traffic from the I-680 corridor onto SR 84 as described above, improving PM peak period operations at Pleasanton-Sunol Road/Koopman Road (Intersection 8). In the PM peak period, the additional capacity on SR 84 would encourage drivers to shift their travel paths at the Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road intersection (Intersection 11). The total volume entering this intersection would not change as a result of the project.

Design Year (2045)

SR 84 and I-680 Mainlines

Table 2.1.9-5 summarizes the 2045 conditions on the mainlines of SR 84 and I-680 in the traffic study area. As with the 2025 scenario, the Build Alternative would increase the number of vehicles served in the study area compared to the No Build Alternative throughout the course of each 5-hour study period, leading to a minor increase in VMT. With the Build Alternative, the volume served would be 5 percent to 9 percent higher and the VHD would be 9 percent to 23 percent lower than with the No Build Alternative.

Table 2.1.9-5: Year 2045 Network Measures of Effectiveness

Measure	No Build Alternative		Build Alternative		Percent Change between No Build and Build	
	AM Peak Period[1]	PM Peak Period[2]	AM Peak Period[1]	PM Peak Period[2]	AM Peak Period[1]	PM Peak Period[2]
All Origin-Destination Pairs[3]						
Volume Served	75,230	90,390	79,260	98,490	5%	9%
Vehicle Miles of Travel (VMT)	2,237,000	1,203,000	2,361,000	1,293,000	6%	7%
Vehicle Hours of Delay (VHD) in hours	36,500	20,300	33,300	15,600	-9%	-23%
Travel Through the Corridor (Southbound I-680)[4]						
Average Travel Time (minutes)	8.4	6.6	8.3	6.2	-1%	-6%
Average Travel Speed (mph)	47	59	48	64	2%	8%
Maximum Individual Vehicle Delay (minutes)	4.7	0.9	3.7	0.8	-21%	-11%
Travel Through the Corridor (Northbound I-680)[5]						
Average Travel Time (minutes)	15.9	43.6	15.2	34.1	-4%	-22%
Average Travel Speed (mph)	62	23	65	29	5%	26%
Maximum Individual Vehicle Delay (minutes)	3.6	53.9	0.8	29.7	-78%	-45%
Travel Through the Corridor (Southbound SR 84)[6]						
Average Travel Time (minutes)	52.4	8.5	43.5	7.8	-17%	-8%
Average Travel Speed (mph)	7	45	9	50	29%	11%
Maximum Individual Vehicle Delay (minutes)	74.9	4.7	62.0	1.5	-17%	-68%
Travel Through the Corridor (Northbound SR 84)[7]						
Average Travel Time (minutes)	7.8	11.8	7.8	8.6	0%	-27%
Average Travel Speed (mph)	49	32	49	45	0%	41%
Maximum Individual Vehicle Delay (minutes)	1.2	4.9	1.2	1.9	0%	-61%

Notes:
Delay is calculated relative to 65 mph on freeways and relative to 50 mph on highways.
1. AM Peak Period represents five hours between 5:00 AM to 10:00 AM.
2. PM Peak Period represents five hours between 3:00 PM to 8:00 PM.
3. Combined statistics of all origin-destination pairs i.e., mainlines, entry and exit points, all on- and off-ramps, and intersections in the study network.
4. Travel through the corridor extends from the Sunol Boulevard on-ramp gore to the Sheridan Road on-ramp gore.
5. Travel through the corridor extends from the edge of the network (capturing the back of queue for the bottleneck between Washington Boulevard and Mission Boulevard/SR 238) to the Sunol Boulevard off-ramp gore.
6. Travel through the corridor extends from the Vineyard Avenue intersection exit to the northbound I-680 off-ramp gore.
7. Travel through the corridor extends from the northbound I-680 to SR 84 north off-ramp gore to the Vineyard Avenue stop bar.

Along southbound I-680, travel times and travel speeds would improve slightly with the Build Alternative for both the AM and PM peak periods. As with the 2025 scenario, traffic that would bottleneck between the Sunol Boulevard on-ramp and Koopman Road off-ramp with the No Build Alternative would continue to shift to SR 84. Along northbound I-680, the Build Alternative would increase travel speed by 26 percent during the PM peak period compared to the No Build Alternative, which would continue to have a bottleneck from the one-lane segment of SR 84 east of I-680. The Build Alternative would improve travel time reliability along northbound I-680, as the maximum individual delay would decrease by 45 percent to 78 percent compared to the No Build Alternative.

The SR 84 corridor would have overall improvements with the Build Alternative in 2045. The Build Alternative would eliminate the bottleneck on southbound SR 84 west of Pigeon Pass, decreasing travel time by 17 percent and increasing travel speed by 29 percent during the AM peak period compared to the No Build Alternative.

For the northbound SR 84 AM peak period, Build Alternative conditions would be the same as No Build Alternative conditions, as the corridor would be uncongested under both scenarios. With the additional northbound lane on SR 84, northbound PM peak period travel times, speeds, and delays would improve with the Build Alternative compared to No Build: travel times would decrease by 27 percent, and speeds would increase by 41 percent.

HOV/Express Lane

The Build Alternative would increase traffic volume in the HOV/express lane on southbound I-680 compared to the No Build Alternative; however, in the HOV/express lane segment with the highest volume during the peak hour, the volume would remain below 1,650 vehicles, and the average speed would remain above 50 mph.

Local Intersections

Table 2.1.9-6 summarizes the No Build and Build alternative intersection operations for 2045. The Build Alternative would improve traffic flow and allow SR 84 to better serve anticipated increases in future traffic demand than the No Build Alternative. All but two intersections in the traffic study area would operate at LOS E or better with the Build Alternative in the AM and PM peak periods. Nine intersections would operate at LOS F with the No Build Alternative in either the AM and PM peak periods, or both.

Table 2.1.9-6: Year 2045 Intersection Operations

	Intersection	Peak Period	Control	No Build Alternative		Build Alternative	
				Average Delay (seconds)[1]	LOS[2]	Average Delay (seconds)[1]	LOS[2]
1	Isabel Avenue (SR 84)/ Vineyard Avenue	AM PM	Signalized	>180 28	F C	26 48	C D
2	Isabel Avenue (SR 84)/ Vallecitos Road	AM PM	Signalized	>180 10	F A	108 49	F D
3	Vallecitos Road (SR 84)/ Ruby Hill Drive-Kalthoff Common	AM PM	Signalized	124 10	F B	20 17	B B
4	Vallecitos Road (SR 84)/ Vallecitos Atomic Laboratory Road	AM PM	Side-Street Stop-Control[3]/ Signalized[4]	6 (36) 3 (58)	A (E) A (F)	29 15	C B
5	Vallecitos Road (SR 84)/ Little Valley Road	AM PM	Side-Street Stop-Control	30 (>180) 17 (>180)	D (F) C (F)	Consolidated with Intersection #4	
6	Paloma Way (SR 84)/ I-680 Southbound Ramps	AM PM	Side-Street Stop-Control	16 (71) >180 (>180)	C (F) F (F)	12 (29) 12 (22)	B (D) B (C)
7	Calaveras Road (SR 84)/ I-680 Northbound Ramps	AM PM	Side-Street Stop-Control	8 (14) 98 (122)	A (B) F (F)	8 (10) 9 (10)	A (A) A (C)
8	Pleasanton-Sunol Road/ Koopman Road	AM PM	Side-Street Stop-Control	3 (30) 98 (>180)	A (D) F (F)	2 (25) 10 (31)	A (D) B (D)
9	Koopman Road/ Southbound I-680 Off-ramp	AM PM	Uncontrolled	4 (10) 9 (14)	A (A) A (B)	4 (10) 5 (10)	A (A) A (B)
10	Koopman Road/ Northbound I-680 On-ramp	AM PM	Side-Street Stop-Control	7 (8) 8 (8)	A (A) A (A)	7 (8) 8 (8)	A (A) A (A)
11	Niles Canyon Road-Paloma Way (SR 84)/ Pleasanton-Sunol Road	AM PM	Signalized	178 120	F F	>180 >180	F F

Notes:
Bold indicates unacceptable intersection operations.
1. Weighted average control delay presented for signalized intersections. For side-street stop-controlled intersections, the first number is the Whole-Intersection Average Delay, and the second number (in parentheses) is the Worst Approach Delay.
2. For side-street intersections, the first letter is the Whole-Intersection Average LOS, and the second letter (in parentheses) is the Worst Approach LOS.

3. Side-street stop control under No Build Alternative.
4. Signalized under Build Alternative.

As with the 2025 scenario, the Build Alternative would alleviate the bottlenecks on southbound SR 84 west of Pigeon Pass (AM peak period) and on northbound SR 84 west of I-680 (PM peak period) that would occur with the No Build Alternative. The nearest intersections to the bottleneck locations—Vallecitos Road (SR 84)/Ruby Hill Drive-Kalthoff Common (Intersection 3) and Calaveras Road (SR 84)/I-680 Northbound Ramps (Intersection 7)—would operate at LOS F with the No Build Alternative and LOS C or better with the Build Alternative.

In the AM peak period, Isabel Avenue (SR 84)/Vallecitos Road (Intersection 2) would operate at LOS F with both the No Build and Build alternatives, although the Build Alternative would reduce the delay by 72 seconds compared to No Build. In the PM peak period, delay would increase slightly with the Build Alternative at the eastern end of the study area (Intersections 1–3); the project would alleviate the bottleneck on northbound SR 84 east of the I-680 interchange, allowing more vehicles to reach the intersections than with No Build. However, Intersections 1–3 would continue to operate at acceptable LOS D or better with the Build Alternative.

The signalized intersection at Little Valley Road and Vallecitos Atomic Laboratory Road included in the Build Alternative (Intersection 4) would continue to substantially reduce delays for motorists approaching SR 84 from Little Valley Road (Intersection 5 with the No Build Alternative) during both the AM and PM peak periods.

By attracting traffic onto SR 84 and away from I-680 and Koopman Road, the Build Alternative would substantially improve PM peak period delays at the Pleasanton-Sunol Road/Koopman Road intersection (Intersection 8) compared to the No Build Alternative.

The Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road intersection (Intersection 11) would operate at LOS F in both the AM and PM peak periods with both the No Build and Build Alternatives. The average delay would increase with the Build Alternative during the AM and PM peak periods compared to the No Build Alternative. This change results from the increased capacity of SR 84 in the traffic study area, which would result in a shift of traffic away from the Pleasanton-Sunol Road corridor between Koopman Road and Paloma Way, and to the Paloma Way corridor between I-680 and Pleasanton-Sunol Road (Figure 2.1.9-2). With the Build Alternative, the highest volumes approaching the Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road intersection (Intersection 11) would shift from the southbound approach on Pleasanton-Sunol Road (as it is under existing conditions and projected 2025 and 2045 No Build Alternative) to the westbound approach (from Paloma Way [SR 84]) (Figure 2.1.9-2). However, the total traffic volume at the intersection would be identical with the No Build and Build Alternatives. The Build Alternative would not increase the amount of traffic on SR 84 through downtown Sunol, because it would not increase the capacity of SR 84 through Niles Canyon.

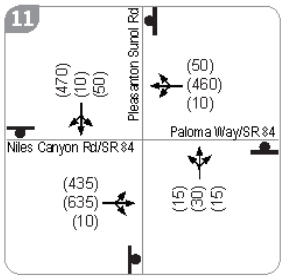
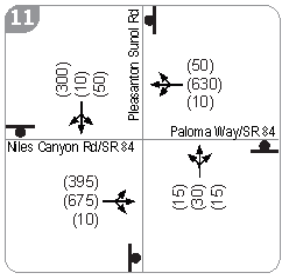
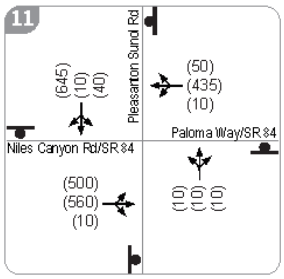
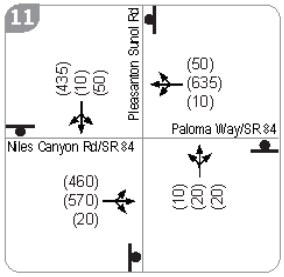
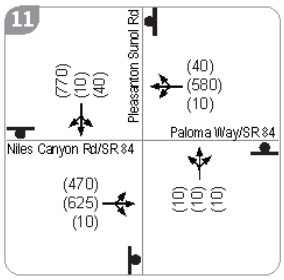
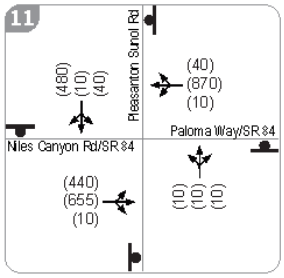
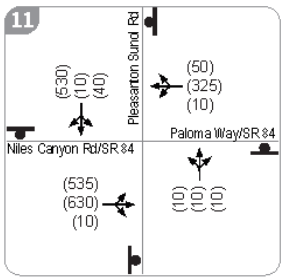
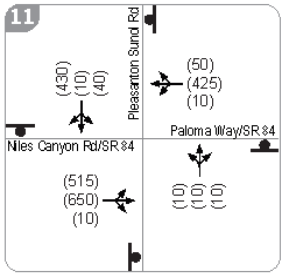
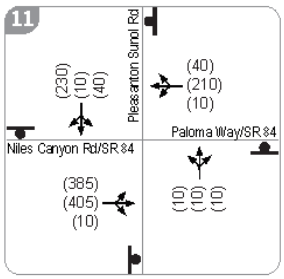
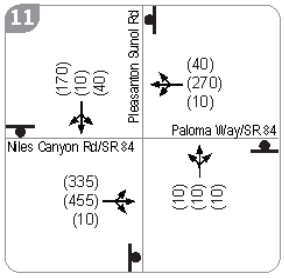
Bicycle and Pedestrian Facilities

No Build Alternative

The No Build Alternative would not modify bicycle or pedestrian facilities in the project area. Bicyclists and pedestrians would continue to be prohibited from using the SR 84/I-680/Calaveras Road interchange.

Build Alternative

Proposed improvements to bicycle facilities with the Build Alternative are described in Sections 1.4.1 and 1.4.2. The proposed Class I bikeway between the northbound SR 84 to northbound I-680 on-ramp and the southbound SR 84 to Paloma Way (SR 84) off-ramp would provide a new bicycle and pedestrian connection through the SR 84/I-680/Calaveras Road interchange.

Peak Hour	No Build	Build
3:00 PM		
4:00 PM		
5:00 PM		
6:00 PM		
7:00 PM		

Source: Fehr and Peers 2017

Figure 2.1.9-2: Year 2045 PM Peak Period Demand Volumes, No Build and Build, Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road Intersection (Intersection 11)

The proposed improvements to the bicycle and pedestrian network in the project area would establish a Class II or higher bicycle facility between Pleasanton and Livermore east of the project area and the Calaveras Road/Paloma Way (SR 84) corridor. Shoulder rumble strips would be placed between the travel lanes and the shoulders/Class II bikeways. A new Class I bikeway would be provided through the interchange area to connect the southbound SR 84 Class II bikeway with Paloma Way. A new Class II bikeway would be provided along the northbound I-680 on-ramp from Calaveras Road to connect with the northbound SR 84 Class II bikeway. The proposed project bicycle elements would conform to National Association of City Transportation Officials urban street design guidelines.

Construction Impacts

No Build Alternative

The No Build Alternative would not result in construction impacts.

Build Alternative

Construction-related closures and detours are described in Section 1.4.4. The closures could result in temporary, short-term disruption to motorists, bicyclists, and pedestrians during project construction. With the implementation of Measure TR-1, no adverse construction impacts are anticipated.

2.1.9.4 Avoidance, Minimization, and/or Mitigation Measures

Short-term, temporary impacts during project construction would be minimized through implementation of Measure TR-1 in Section 2.1.6.4. No other avoidance, minimization or mitigation is required.

2.1.10 Visual/Aesthetics

2.1.10.1 Regulatory Setting

NEPA 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 USC 4331[b][2]). To further emphasize this point, FHWA, in its implementation of NEPA (23 USC 109[h]), directs that final decisions on 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.

CEQA 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" (PRC Section 21001[b]).

2.1.10.2 Affected Environment

The information presented in this section is from the *Visual Impact Assessment* (VIA) for the proposed project completed in January 2017 (Haygood & Associates 2017). The study area for the VIA is the area of land that is visible from, adjacent to, and outside of the SR 84 and I-680 rights-of-way, and is determined by topography, vegetation, and viewing distance.

The project is located in the East Bay region of the San Francisco Bay Area. The landscape is characterized by hilly terrain surrounded on all sides by mountains and ridges. To the south are Mount Hamilton, Mission Peak, and the Maguire Peaks, the most scenic visual resources in the region visible from the project area. Also visible are the Pleasanton and Apperson Ridges to the south of I-680. The upper regions of the hills and mountains remain natural in character due to their status as protected open space.

Land use designations in the project area are discussed in Section 2.1.1.1. Land uses within the SR 84 project corridor are generally rural and rural-residential. In addition, the GE-Hitachi Vallecitos Nuclear Center is on the north side of SR 84, and the Sunol Paintball Outdoor Park is on the south side of SR 84, both in the vicinity of Little Valley Road. On I-680 north of the interchange with SR 84, land uses are generally rural and residential. To the south of the interchange, land uses are rural, agriculture-based commercial, and quarries. Lisa Arnold Nursery Sales and ITC Engineering are directly adjacent to I-680 on Calaveras Road.

Scenic Quality

State Scenic Highway Program

In 1978, Caltrans designated I-680 between Mission Boulevard (SR 238) and Bernal Avenue near Pleasanton as an Officially Designated State Scenic Highway. The portion of I-680 in the project limits is within the Officially Designated State Scenic Highway limits. Five elements are required by California Guidelines for Official Designation of Scenic Highways:

- Regulation of land use and intensity (density) of development;
- Detailed land and site planning processes;
- Prohibition of off-site outdoor advertising and control of on-site outdoor advertising;

- Careful attention to and control of earthmoving and landscaping; and
- Design and appearance of structures and equipment.

SR 84 within the project limits is not an Officially Designated State Scenic Highway but is identified by the City of Livermore as a scenic route.

Viewers and Viewer Response

The population that could be affected by the proposed project is composed of *viewers.* Viewers are people whose views of the landscape may be altered by the project—either because the landscape itself has changed, or their perception of the landscape has changed. There are two major types of viewer groups for highway projects: *highway users* and *highway neighbors.* Viewer response is a measure or prediction of the viewer's reaction to changes in the visual environment and has two dimensions: viewer exposure and viewer sensitivity. Viewer exposure is a measure of the viewer's ability to see an object, based on the viewer's location in relation to the object, how many people see the object, and how long the object is in view. Viewer sensitivity is a measure of the viewer's recognition of an object and tends to correlate with whether viewers will have a high concern for any visual change. The following discusses the project's highway users and highway neighbors and their anticipated response to changes in their visual environment.

Highway Users

Highway users comprise motorists and bicyclists traveling in the project corridor who have views *from* the road. Highway users generally have high exposure to SR 84 and I-680. Daily commuters may have an increased awareness of views from the road due to the amount of time spent on the highway each day. Those who experience congested traffic conditions would tend to focus views toward the highway itself. Drivers traveling at normal highway speeds usually focus attention on long range non-peripheral views. Passengers have a heightened awareness of a wide range of views. Although the awareness and concern with scenic quality could vary among different types of highway users, all motorists are considered to have high viewer sensitivity due to the Officially Designated State Scenic Highway status of I-680.

Highway Neighbors

Highway neighbors are primarily community residents along the project corridor who have views *to* the road.

Adjacent to SR 84, the greatest concentration of residents with views of the proposed project features is at the east end of the project in the Ruby Hill development. In addition, there is a single residence opposite the development and south of SR 84. Approximately four residences with screened to partially screened views of SR 84 are within 0.5 mile of the intersection with Vallecitos Atomic Laboratory Road—three on the south side of SR 84 and one to the north on Little Valley Road.

Adjacent to I-680, the greatest concentration of residents with views of the proposed project features is northwest of the SR 84/I-680 interchange, in the area accessed by Railroad Road and Foothill Road. Other residences with views of proposed project features are accessed by Verona Road, Pleasanton-Sunol Road, and Koopman Road. Residences accessed by Happy Valley Road

and another residence southwest of I-680 accessed by Pleasanton-Sunol Road do not have views of proposed project features due to intervening vegetation.

For highway neighbors, the majority of residential views of SR 84 and I-680 are partially screened by trees and shrubs. However, because of long durations of views from their residential and neighborhood vantage points, their exposure is considered high. Residents are considered to be the most concerned about the ways in which the project would result in changes within their viewshed, and would typically have high sensitivity to visual changes.

Other highway neighbors include those at recreation areas (described in Section 2.1.3), Sunol Glen Elementary School (whose outdoor play area is 0.7 mile to the west of the SR-84/I-680 interchange), the Little Brown Church of Sunol (located on Kilkare Road in Sunol, 1.1 miles to the west of the SR 84/I-680 interchange), workers and visitors at the approximately 11 single-service commercial land uses near SR 84 and I-680, and several hundred drivers and a few bicyclists that use the six local streets each day within the project limits (Vallecitos Atomic Laboratory Road, Little Valley Road, and Vallecitos Lane along SR 84 and Koopman Road, Paloma Way, and Calaveras Road adjacent to I-680).

Exposure to views of SR 84 and I-680 from the school, church, and commercial land uses would be low because of distance and intervening topography. Park visitors at the Sunol Water Temple and Sunol Paintball Outdoor Park (described in Section 2.1.3) would experience moderate exposure to views toward the project highways and would have a high exposure to any project feature placed within their viewshed. Drivers and the few bicyclists using the six local streets each day have short-duration views of SR 84 and/or I-680 in the project limits; therefore, their exposure would be low.

Highway neighbors at recreation areas, Sunol Glen Elementary School, the Little Brown Church of Sunol, and bicyclists and pedestrians on local streets would have a high level of sensitivity to any project feature placed within their viewshed. Workers and visitors at the commercial land uses near SR 84 and I-680 would likely have a moderate to low awareness of the project features.

Visual Assessment Units and Key Views

As noted above, the study area is the area of land that is visible from, adjacent to, and outside of the SR 84 and I-680 rights-of-way, and is determined by topography, vegetation, and viewing distance. The study area was divided into *visual assessment units.* Each visual assessment unit has its own visual character (the natural and man-made components that comprise a particular view) and visual quality.

Visual quality, the value of the views and aesthetics surrounding the project, can be described in terms of vividness, intactness, and unity. Vividness is the extent to which the landscape is memorable and is associated with distinctive, contrasting, and diverse visual elements. Intactness is the integrity of visual features in the landscape and the extent to which the existing landscape is free from non-typical visual intrusions. Unity is the extent to which all visual elements combine to form a coherent, harmonious visual pattern.

A visual assessment unit is typically defined by the limits of a particular viewshed. A viewshed is often associated with landscape units, which are geographically discrete areas that can be separated by natural features such as ridges, changes in vegetation, or bodies of water.

For this project, two visual assessment units—SR 84 and I-680—and associated key views were identified to represent potential project impacts. A total of six key views were selected: three from SR 84, and three from or adjacent to I-680. The key views were determined based on their ability to demonstrate the change in the project's visual resources and to represent the viewer groups with the highest potential to be affected by the project considering their exposure and sensitivity. Figure 2.1.10-1 shows the locations and directions of the key views.

2.1.10.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not affect the visual character or quality of the project area.

Build Alternative

Impacts to State Scenic Highway

I-680 within the project limits is an Officially Designated State Scenic Highway and is subject to the five elements required for Scenic Highways, listed at the beginning of Section 2.1.10.2. The Build Alternative would convert the existing land uses along the frontages of some properties to transportation use, but it would not affect land uses of the remainder of those properties or trends in existing or proposed development, as discussed in Section 2.1.1.2. The Build Alternative would not result in the construction of any outdoor advertising in the project vicinity on I-680. The Build Alternative would not have an adverse effect on Officially Designated State Scenic Highway.

SR 84 within the project limits is not an Officially Designated State Scenic Highway.

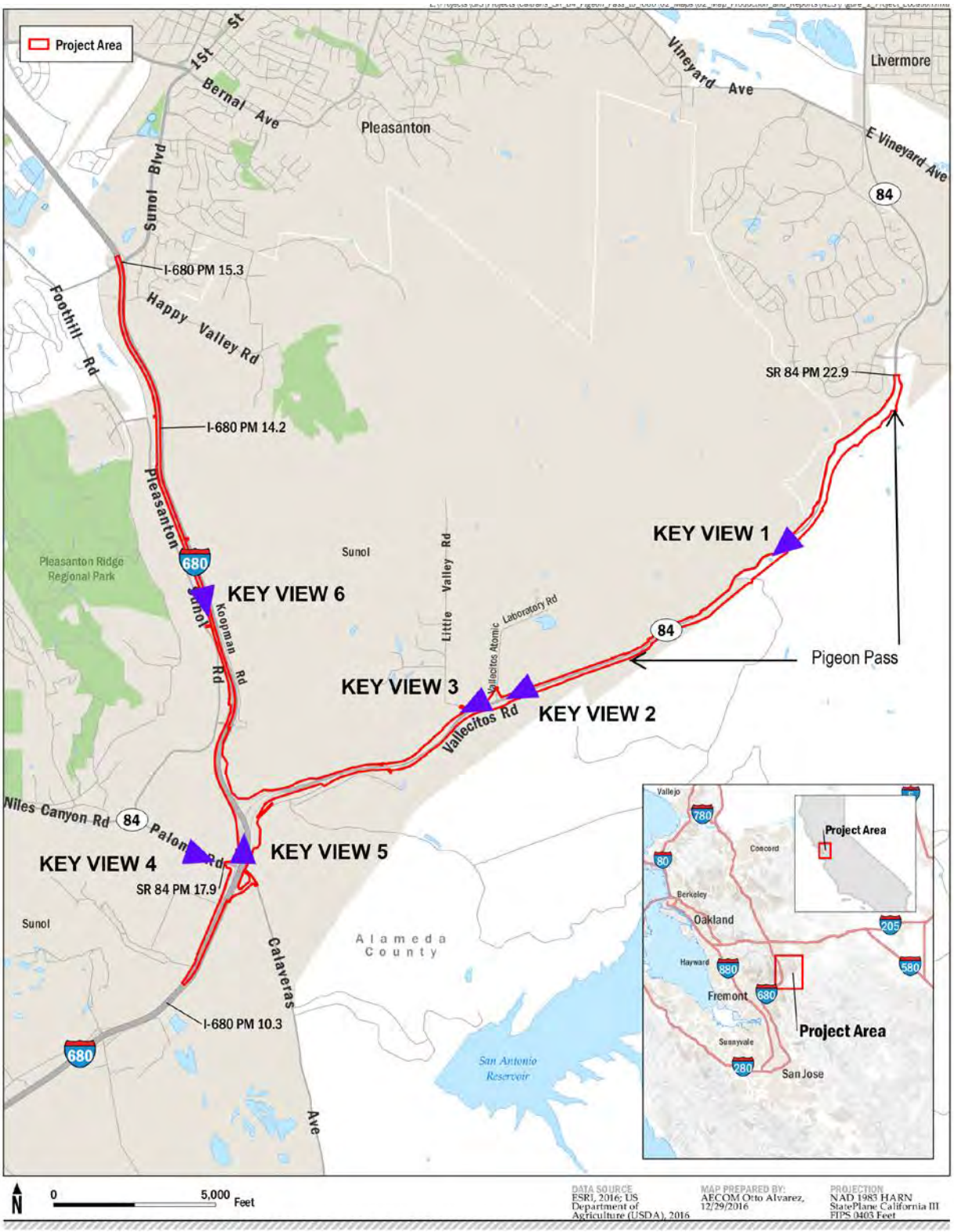


Figure 2.1.10-1: Key View Location Map

Visual Impacts From Key Views

KEY VIEW 1: SR 84 (PM 21.92), LOOKING WEST

Key View 1 was selected to illustrate the widening of the two-lane highway to four lanes, the addition of a median barrier, and the construction of a retaining wall along the north side of SR 84.

Key View 1: Existing Condition

The existing visual setting, shown in Figure 2.1.10-2, consists of low grass-covered hills in the foreground and tall peaks and ridges in the distance to the south and west. SR 84, a two-lane highway, is in the foreground. Originally constructed on sloped terrain, evidence remains of slope cuts in the hillsides at the north edge of the highway—shaped to accommodate the width of the road. Native grasses that have established themselves on those slopes have partially blended the disturbed slopes into the undisturbed natural terrain beyond the edges of the highway. The occasional small post-mounted sign is seen at the edge of the highway, as well as wood and steel barriers and concrete drainage ditches. Double striping delineates the median at the center of the highway. High-tension power lines and clusters of towers spaced approximately 870 feet apart parallel the highway to the south.

Figure 2.1.10-2: Key View 1, Existing View, SR 84 (PM 21.92), Looking West

Visual Character and Quality

The memorability of Key View 1 is moderate-high because of the vastness of the scenic ridges and peaks stretching from south to west in the distance and the peaks and valleys of the grass-covered, sloped terrain in the foreground that descends southwestward toward the San Antonio Reservoir. Although not an intact view due to highway features in the foreground and the utility towers and lines to the south, the magnitude of the scenic vistas draws the viewer's attention through and beyond the constructed features toward the natural environment. The quality of

intactness is moderate. The view maintains a moderate-low balance between constructed and natural features, with the utility towers and lines diminishing the level of unity. The overall quality of the existing view is moderate.

Key View 1: Proposed Condition

As shown in Figure 2.1.10-3, the project would add a 36-inch-tall concrete barrier in the median that would block views of ground-level terrain from the vantage point of motorists in the westbound outside lane. Motorists in the inside lane next to the barrier would be able to see over it, assuming an average window height of 36 inches in midsized sedan-style cars. The Build Alternative would add retaining walls where SR 84 is widened to the north. The retaining wall in the view would be approximately 351 feet long and would vary in height from 8 to 16 feet. The pavement would be widened by one lane in each direction (two lanes total) plus a bicycle lane in each direction.

Figure 2.1.10-3: Key View 1, Simulated View of Project Features, SR 84 (PM 21.92), Looking West

With the project features, views of distant scenic ridges and peaks would remain, maintaining a moderate-high level of visual quality from the View 1 vantage point. A greater number of constructed features would intrude on the view, reducing the element of intactness from moderate to moderate-low. The balance between constructed and natural features in the view with the project features would not be diminished, and the element of unity would remain at a moderate-low level. The constructed features within SR 84 would be balanced with the natural features that are beyond the highway. The overall quality of the view with the project features would remain moderate.

Visual impacts with the addition of proposed project features from the perspective of motorists on SR 84 would be low.

KEY VIEW 2: SR 84 EAST OF VALLECITOS ATOMIC LABORATORY ROAD (PM 19.92), LOOKING WEST

Key View 2 was selected to illustrate the proposed addition of a signalized and lighted intersection at Little Valley Road/Vallecitos Atomic Laboratory Road, the widening of the two-lane highway to four lanes, the addition of left- and right-turn lanes, the addition of frontage roads to the north and south of SR 84, the removal of existing research facility sign and vegetation, and the relocation of overhead utilities.

Key View 2: Existing Condition

The existing visual setting, shown in Figure 2.1.10-4, is a valley with flat terrain surrounded by low grass-covered hills to the north and west, and long-range views to the ridges and peaks to the south and west. Rural single-family residences with landscaped trees and shrubs are adjacent to SR 84 to the south. To the north, there is a signed and landscaped entrance road leading to the GE-Hitachi Vallecitos Nuclear Center that is partially screened from view by vegetation and intervening terrain. Beyond the facility to the west is Little Valley Road, where land uses include a sewer plant associated with the GE-Hitachi facility, a horse training facility, and single-family residences. Long-range views to mountainous scenic resources are screened by trees and shrubs on the south side of SR 84 until motorists are west of Vallecitos Atomic Laboratory Road.

Figure 2.1.10-4: Key View 2, Existing View, SR 84 East of Vallecitos Atomic Laboratory Road (PM 19.92), Looking West

Visual Character and Quality

The memorability of the view from the vantage point of Key View 2 is moderate-low. Views are close-range and are not striking due to the contrasting introduced landscaping, aboveground

utilities, signs, and edge of road barriers. The visual environment is not intact. Intruding on the natural environment are buildings and landscaping, highway features such as pavement, a wood and steel barrier on the north side of the road, and the utility poles and lines that parallel the south edge of SR 84. The element of intactness is low. There is a low degree of balance between introduced structures and natural features. The overall quality of the visual environment is moderate-low.

Key View 2: Proposed Condition

As shown in Figure 2.1.10-5, the project would add a lighted and signalized intersection serving Little Valley Road and Vallecitos Atomic Laboratory Road, and remove the existing Little Valley Road intersection with SR 84 to the west and individual property access points along the south side of SR 84. The entry of the GE-Hitachi Vallecitos Nuclear Center would be relocated to the north as part of intersection and frontage road construction, and any entry features such as landscaping and signage would remain in contrast to the natural environment. Two-lane frontage roads would be added along each side of SR 84. In general, SR 84 would be widened by one lane in each direction; however, within the intersection, the pavement would be wider to accommodate turning and merge lanes, for a total of seven lanes plus two bicycle lanes (see Figure 1.4-1, page 3 inset map).

Figure 2.1.10-5: Key View 2, Simulated View of Project Features, SR 84 at Proposed Intersection Serving Little Valley Road and Vallecitos Atomic Laboratory Road (PM 19.92), Looking West

With the addition of the proposed project features, the view would be less memorable, be intruded upon to a greater extent by structures, and have a diminished balance between the natural and constructed environments. With the project features, the quality of the visual environment would be low.

Visual impacts from the perspective of motorists on SR 84 would be moderate.

KEY VIEW 3: SR 84 WEST OF LITTLE VALLEY ROAD (PM 19.79), LOOKING WEST

Key View 3 was selected to illustrate the proposed realignment of SR 84 to the north—cutting through hilly terrain, adding a retaining wall, widening of the two-lane highway to four lanes, adding a median barrier, relocating overhead utilities, and removing trees and other vegetation.

Key View 3: Existing Condition

The existing visual setting as shown in Figure 2.1.10-6 includes forested wetland on both sides of SR 84 just west of Little Valley Road. From this vantage point, the motorist views a low grass-covered hill to the west in the foreground and a taller hill in the background that is textured with the dark green vegetation of trees and shrubs, and light-tan-colored grass areas. Hidden from view are the properties on Little Valley Road to the north of the viewer. Also hidden is a residence located approximately 0.3 mile to the southwest and south of the dense wetland vegetation.

Figure 2.1.10-6: Key View 3, Existing View, SR 84 West of Little Valley Road (PM 19.79), Looking West

Visual Character and Quality

The memorability of the view is moderate-high with pleasing views of a rural landscape. The element of intactness or freedom from encroaching structures on the natural environment is moderate. Structures include utility poles and lines to the north of the highway, power lines across the horizon, a low wood fence to the south, highway pavement and a wood and steel barrier at the edge of the road. There is a moderate balance between structures and natural features in the view with structures in the center view and natural features to the north, south, and west. The overall quality of the visual environment is moderate.

Key View 3: Proposed Condition

As shown in Figure 2.1.10-7, the project would widen SR 84 to include two travel lanes and a bicycle lane in each direction. The existing highway would serve as a two-lane frontage road to the south of the new alignment of SR 84 (see Figure 1.4-1, page 3), and would be approximately 3 feet lower in elevation than the new alignment of SR 84. The existing curve on SR 84 would be straightened, shifting the highway to the north by approximately 88 feet into the hillside visible in the foreground. To support the cut slope, a concrete retaining wall would be added along the north edge of SR 84 and would be approximately 675 feet long and vary in height from 12 to 20 feet. A 36-inch-tall concrete barrier would be added in the median. With the realignment, a wedge-shaped cut would be removed from the low hill in the foreground to accommodate the straightened section of SR 84. The slope of the hill that descends to the west beyond the view would remain instead of being removed. SR 84 would curve around the remaining hill in much the same way as the existing highway curves around the hill in the foreground. The existing utility poles and lines on the north side of SR 84 would be relocated to the south of the frontage road, removing the lines that appear in the center of the horizon in the existing view. Due to the cut in the hill in the foreground, the slopes of the tall hill in the background that is textured with dark green vegetation would become more visible.

Figure 2.1.10-7: Key View 3, Simulated View of Project Features, SR 84 West of Little Valley Road (PM 19.79), Looking West

Vegetation to the north and south of SR 84 would be removed. Beyond the south edge of the new SR 84 alignment, existing vegetation would remain, providing a view similar to the existing with the exception that the highway would be wider. All existing trees near the edge of SR 84 to the north would be removed. Removal of the vegetation on the south side of SR 84 would increase views of the dark green, textured hills to the west and the ridges beyond.

With the project, the memorability of the view would remain moderate-high. Long-range views of the rural landscape and hills to the west would become more visible. The utilities that cross the corridor in the existing view would be moved to the south side of the frontage road, intruding upon views of the rural vistas to the south and west. The additional highway pavement, the retaining wall, and the concrete median barrier would encroach on views of the natural environment such that the element of intactness would diminish to moderate-low. The balance between natural features and structures in the visual environment would remain moderate. The overall quality of the view would be moderate.

Visual impacts from the perspective of motorists on SR 84 would be moderate.

KEY VIEW 4: PALOMA WAY AT I-680/CALAVERAS ROAD INTERCHANGE, LOOKING NORTH TOWARD SR 84/I-680 INTERCHANGE

Key View 4 was selected to illustrate the proposed construction of a retaining wall along the southbound I-680 off-ramp to Calaveras Road and the widening of the Calaveras Road Separation bridge (33-0351L) over I-680 toward the west. In addition, Key View 4 was selected to assess whether the proposed flyover ramp from Calaveras Road to northbound I-680 would be visible to ground-level viewers on the west side of I-680.

Key View 4: Existing Condition

The existing visual setting as shown in Figure 2.1.10-8 consists of highway structures to the east, north, and south. From the Paloma Way vantage point, the I-680 southbound off- and on-ramps and the I-680 overcrossing of Calaveras Road are visible as well as utility poles and lines, overhead lights, a utility cabinet, small highway signs, and highway lights. Dense clusters of oak trees around the I-680/Calaveras Road interchange screen highway features and vehicles.

Figure 2.1.10-8: Key View 4, Existing View, Paloma Way at I-680/Calaveras Road Interchange, Looking North Toward SR 84/I-680 Interchange

West of (behind) the vantage point of Key View 4, viewers on Paloma Way between the Pleasanton-Sunol Road intersection and the interchange have views of hills in the foreground and long-range views to the south.

Visual Character and Quality
The memorability of Key View 4 is low due to the absence of striking landscape features. Momentary views of the ridges from the southbound I-680 on-ramp (south of the vantage point of Key View 4) are the single pleasing element in an otherwise highway-dominated environment. The element of intactness is low because utility poles and lines, lights, vehicles, the highway bridge, ramps, and related signs intrude upon views of the natural environment. The element of unity is low since there is no harmonious balance between structures and natural features evident in the view.

Key View 4: Proposed Condition
As shown in Figure 2.1.10-9, the project would widen the Calaveras Road Separation bridge (33-0351L) over I-680 to the west by approximately 23 feet to accommodate an HOV bypass lane and auxiliary lanes. The existing oak trees and other vegetation on the slopes between I-680 and the off- and on-ramps would be removed. Measure BIO-4 (Section 2.3.1.3) provides for replanting native species within riparian areas, and coast live oaks and valley oaks in oak woodlands (including uplands), at a 3:1 ratio. A concrete retaining wall would be constructed along the northwest edge of the interchange, with a length of approximately 680 feet and height varying from approximately 7 to 17 feet. Another concrete retaining wall would be added to the southwest edge of the interchange, with a length of approximately 550 feet and a height varying from approximately 6 to 12 feet. A bicycle lane would be added to the western edge of the southbound SR 84 to Paloma Way connector.

Figure 2.1.10-9: View 4, Simulated View of Project Features, Paloma Way at I-680/Calaveras Road Interchange, Looking North Toward SR 84/I-680 Interchange

From the vantage point of Key View 4, the low memorability and intactness of the existing view would remain low with the project's addition of concrete retaining walls and removal of highway-screening vegetation, allowing new views of vehicles and lights on I-680. The low degree of balance between structures and natural features in the existing view would be maintained with the proposed addition of highway features.

The project would construct additional features on I-680 that would not be visible to ground-level viewers from the Key View 4 vantage point. On the east side of the SR 84/I-680 interchange, the project would construct a new flyover ramp connecting Calaveras Road with northbound I-680. Approximately 600 feet north of Calaveras Road, in the I-680 median, the project would add a static overhead "Express Lane 1 Mile" sign facing the I-680 southbound lanes. These features are discussed further under Key View 5, below.

On the east side of the intersection, out of view to Paloma Way motorists but visible to motorists on Calaveras Road, the project would widen the bridge to the east by approximately 60 feet and add concrete retaining walls along the east edge of the interchange to the north and south of Calaveras Road. Along the eastern side of the northbound I-680 on-ramp from Calaveras Road, the project would construct an approximately 430-foot-long retaining wall that would vary in height from 8 feet to 19 feet. Along the eastern edge of the northbound I-680 to northbound SR 84 off-ramp, the project would construct an approximately 350-foot-long retaining wall that would vary in height from 5 feet to 22 feet. A new Class II bikeway would be provided along the northbound I-680 on-ramp from Calaveras Road to connect with the northbound SR 84 Class II bikeway.

From the motorist's perspective on Calaveras Road to the east of the interchange, changes in the quality of the visual environment with the project features would be similar to those from the vantage point of Paloma Way. The overall quality of the view with the project features would be low from the perspective of motorists on Paloma Way and on Calaveras Road.

Visual impacts with the project features from the perspective of motorists on Paloma Way and Calaveras Road would be low.

KEY VIEW 5: I-680 (PM 11.29), LOOKING NORTH

Key View 5 was selected to illustrate the proposed Calaveras Road to northbound I-680 flyover, northbound I-680 auxiliary lane extension, shoulder widening, Class I bikeway connecting the southbound SR 84 Class II bikeway with Paloma Way, hillside cut, and addition of a retaining wall in the northeast quadrant of the interchange adjacent to the southbound SR 84 to northbound I-680 on-ramp.

Key View 5: Existing Condition

The existing visual setting shown in Figure 2.1.10-10 is rural, with low hills in the foreground and tall ridges and peaks in the distance to the east, west, and south. Motorists have long-range vistas through the I-680 corridor and to the east of the hills and valley floor through which SR 84 passes. Single-family residences on the hillsides to the northwest of Key View 5 are barely visible due to the approximate 0.75 mile distance and intervening dense vegetation. Highway pavement, concrete barriers along the median and shoulders, a video camera on a pole, and the back of a southbound-facing sign are visible.

Figure 2.1.10-10: Key View 5, Existing View, I-680 (PM 11.29), Looking North

Figure 2.1.10-11: Key View 5, Simulated View of Project Features, I-680 (PM 11.29), Looking North

Visual Character and Quality
The memorability of the view is high, with pleasing views of the rural landscape extending in all directions. The foothills of the Wahaub Ridge are visible through the SR 84 corridor to the east. The element of intactness is moderate, with highway structures visible in the foreground. The element of unity is moderate-high. A harmonious balance exists between structures and natural features in the view, with structures concentrated in the middle and natural features to the east and west. The view of the SR 84 corridor from northbound I-680 is fleeting and less visible to the driver than a passenger. Because I-680 curves to the west and the highway is superelevated (sloping up to the east), the driver must focus on the highway to the north for safety of travel. For southbound motorists, views to SR 84 are blocked by the superelevation (upward slope) of I-680.

Key View 5: Proposed Condition
As shown in Figure 2.1.10-11, the proposed project would increase the width of the interchange to the east and west and add a single-lane flyover ramp connecting Calaveras Road with northbound I-680. The top of the flyover ramp would be approximately 25 feet higher than I-680. The existing one-lane northbound I-680 to northbound SR 84 connector would be replaced with a new two-lane connector (visible in the lower right of Figure 2.1.10-11) realigned to accommodate the flyover ramp. The existing southbound SR 84 to northbound I-680 on-ramp would be realigned, requiring the hillside cut and construction of the new retaining wall near the center of the view in Figure 2.1.10-11, on the east side of the northbound lanes. The retaining wall would be approximately 875 feet long and vary in height from 10 to 20 feet.

Approximately 600 feet north of Calaveras Road, in the I-680 median, the project would add a static overhead "Express Lane 1 Mile" sign facing the I-680 southbound lanes (visible in the center left of Figure 2.1.10-11). In addition, a highway light would be mounted on the sign's central mounting pole. The total height of the sign structure would be approximately 44 feet above ground level. The approximate 8-foot-high by 18-foot-wide sign plate would be mounted on the western half of an approximately 50-foot-long by 9-foot-high steel trestle gantry. The total width of the sign structure would be approximately 50 feet. The surface finish on the face of the sign would have reflective properties, designed to be illuminated by headlights of oncoming vehicles. Toll readers would be mounted on the bottom of the gantry facing downward.

Near but out of view of Key View 5, an "Express Lane 1 Mile" sign and light would be added on southbound SR 84 east of I-680, and a second "Express Lane 1 Mile" sign and light would be added between the interchange and Paloma Way (behind the viewer) in the I-680 median, facing the southbound lanes of travel.

With the proposed project, the addition of the flyover ramp would diminish the quality of views for motorists on northbound I-680 looking east at the valley bordering SR 84 (Figure 2.1.10-11). While the quality of those views would be diminished, the flyover would provide a new northbound vantage point for motorists traveling from Calaveras Road to northbound I-680. The flyover would be higher in elevation than I-680 and would offer vivid views of the valley to the east and the Wahaub Ridge in the distance. The loss and gain of vivid views would result in an overall low net effect on the element of vividness.

The proposed flyover would diminish existing levels of intactness and unity. The element of intactness would be reduced from moderate to moderate-low. The element of unity would be reduced from moderate-high to moderate.

Visual impacts with the project features would be moderate. From the perspective of southbound motorists on I-680, views to the east would be minimally affected with the addition of the project features. Where I-680 crosses SR 84, the eastern edge of the I-680 is tilted upward (superelevated), blocking lower-range views of the valley to the east through which SR 84 passes.

The quality of views to the north, west, and south would not be diminished by project features. The element of vividness would remain high, intactness would remain moderate, and unity would remain moderate-high. The proposed flyover ramp would have no impact on views for motorists on southbound I-680.

Text will resume on the next page.

KEY VIEW 6: KOOPMAN ROAD, LOOKING SOUTH TOWARD I-680

Key View 6 was selected to illustrate proposed construction of a variable toll message signs (VTMS) facing the I-680 southbound lanes. It would be located in the median, approximately 0.20 mile south of the View 6 vantage point. Koopman Road is a local street serving highway neighbors.

Key View 6: Existing Condition

The existing visual setting, as shown in Figure 2.1.10-12, is rural and hilly, characterized by grasslands to the east and oak woodlands to the west. Ridges and Mission Peak are visible to the south. Beyond I-680 to the west, densely screened large-parcel single-family residences in the vicinity of Foothill Road are partially visible on the slopes of the hills. I-680, with pavement, vehicles, and vehicle lights, is visible west of Koopman Road. There are no highway signs or lights in the view. Both sides of Koopman Road have steel post and wire fencing.

Figure 2.1.10-12: Key View 6, Existing View, Koopman Road, Looking South Toward I-680

Visual Character and Quality

The memorability of View 6 is high, sharing the same striking vistas of rural landscape, distant ridges and Mission Peak as I-680, an Officially Designated State Scenic Highway. The intactness of the view is moderate-high. Structures are limited, confined to the ground level, and partially screened. There are no structures intruding upon views within the horizon. The balance between structures and natural features is high, with transportation corridor features in the center, and rural hillsides and oak woodlands to the east and west.

Key View 6: Proposed Condition

As shown in Figure 2.1.10-13, the proposed project would add an overhead HOV/express lane VTMS facing the I-680 southbound lanes. A representative view of an HOV/express lane VTMS is shown in Figure 1.4-2. Though not highly visible from this vantage point, the sign

would be located in the median, approximately 0.20 mile south of the View 6 vantage point. In addition, a highway light would be attached to the sign's central mounting pole, approximately 10 feet above the top of the sign. The total height of the sign structure plus light would be approximately 44 feet above the highway pavement level. The approximately 13-foot-high by 29-foot-long sign plate would be mounted on the western half of an approximate 50-foot-long by 9-foot-high steel trestle gantry. The total width of the sign structure would be approximately 50 feet. The electronic message sign would display the toll pricing for the HOV/express lane. The prices displayed would change depending on the level of congestion on the highway. The surface finish on the face of the sign would have reflective properties, enhanced by headlights of oncoming vehicles shining on the surface. Toll readers would be mounted on the bottom of the gantry facing downward. The top of the sign and light would be visible to a small degree due to the distance from the vantage point, the decreased elevation of the highway at the location of the sign, and to intervening vegetation that screens views of the highway. A toll gantry would be installed to the north of the VTMS and would be visible to a small degree, similar to the VTMS, and screened as noted above.

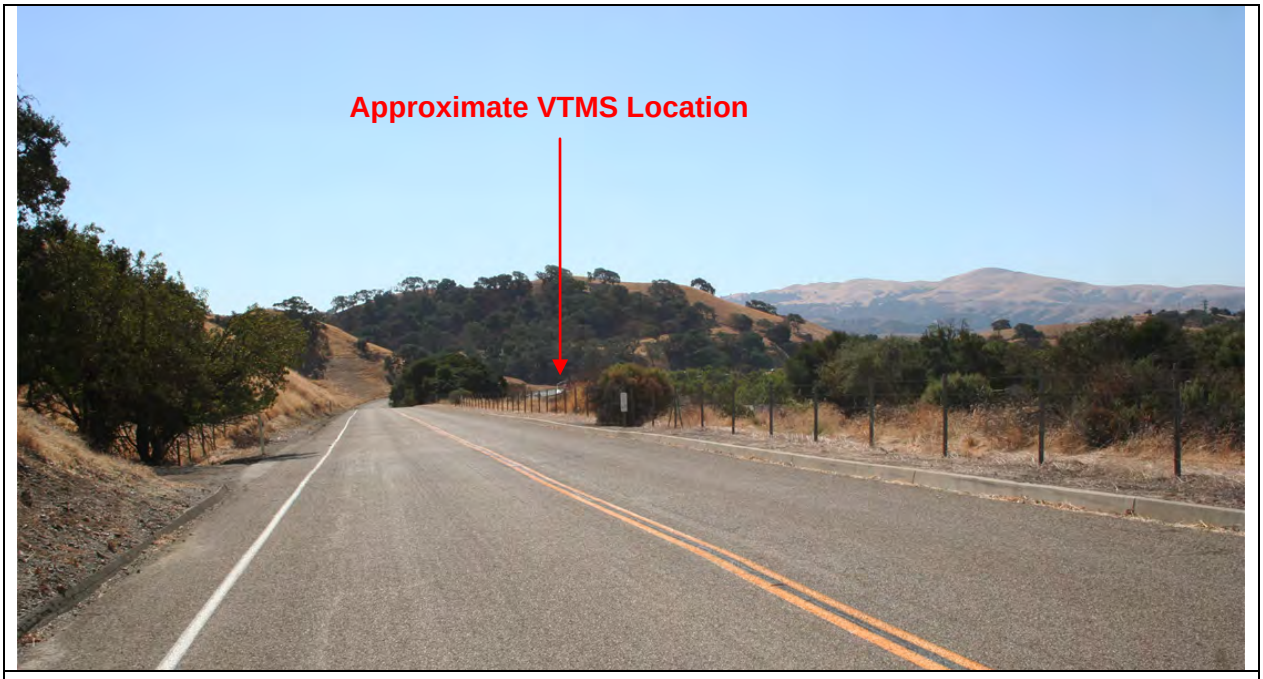


Figure 2.1.10-13: Key View 6, Simulated View of Project Features, Koopman Road, Looking South Toward I-680

The memorability of Key View 6 would remain high even with the addition of a new sign, light, and toll gantry in the view due to the magnitude of the striking scenic vistas that surround the viewer. The sign structure, light, and gantry would be partially visible above and between intervening screening vegetation. The moderate-high level of intactness in the existing view would not be diminished. The unity of the view would remain the same. The proposed sign would not degrade the balance between natural features and structures in the view.

Visual impacts with the addition of the proposed project features, from the perspective of motorists on Koopman Road at the vantage point of Key View 6 and northward, would be low.

Other Visual Impacts

Tree Removal
Construction of the Build Alternative would result in tree removal as well as earthmoving and landscaping activities. Trees located in permanent impact areas would be removed during project construction. Trees located in temporary impact areas may be preserved depending on the specific activity occurring nearby. Following construction, all temporarily impacted areas would be restored and enhanced. Tree removal and avoidance, minimization, and mitigation are discussed in detail in Section 2.3.1.

Project Roadwork, Earthwork, and Structures
Additional project components that could affect visual quality are described below by visual assessment unit.

SR 84. Project-related changes on SR 84 would include the addition of travel lanes and frontage roads to the north and south of SR 84, a new signalized intersection, earthwork including hill cuts and placement of fill, retaining walls, and a concrete median barrier, all of which would be visible to motorists and to some adjacent residents.

As described in Section 1.4.1 and shown on Figure 1.4-1 (pages 3 and 4), the project would add frontage roads connecting the proposed signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road with Little Valley Road on the north side of SR 84, and private driveways and rural roads on the south side of SR 84. The roads would be in the view of residents whose properties connect with the frontage roads. Depending on their location, residents would also have closer views of utility poles and lines, and of a retaining wall topped by a concrete barrier.

The residence on the western end of the proposed southern frontage road (west of the Sunol Paintball Outdoor Park) is expected to experience the greatest visual change along SR 84. Existing views of SR 84 from the residence include the two-lane highway approximately 3 feet above the ground elevation of the residence, vehicles, vehicle lights, utility poles and lines along the north and south edges of SR 84, and grass-covered hills beyond SR 84 to the north. The visual quality of the existing view toward SR 84 is moderate-low to low due to the lack of harmonious balance between natural features and structures in the view.

With the project implemented, the resident would see utility poles and lines approximately 137 feet closer in view, SR 84 approximately 40 feet closer than the existing highway, the two-lane frontage road, and, approximately 40 feet to the north of the frontage road, a retaining wall with a concrete barrier on top. The retaining wall with concrete barrier would be added to the south edge of the new roadway of SR 84. The retaining wall would face the residence and be approximately 842 feet long. The wall and barrier combined would vary in height between approximately 8 and 14 feet. Views of the rural landscape to the north would be visible beyond SR 84. However, the proposed project would diminish existing moderate-low to low quality views to low. Viewer response to the proposed project features would be moderate-high.

In addition, motorists on southbound SR 84 approaching the I-680 interchange would see a new FasTrak (1 Mile) sign east of the I-680 overcrossing, as well as the Calaveras Road to

northbound I-680 flyover ramp. There are no scenic resources that would be affected by the express lane sign or the flyover ramp. Visual impacts from the perspective of SR 84 motorists would be low.

I-680. Project-related changes on I-680 would include bridge widening, an additional overhead sign visible on the horizon to motorists, the addition of HOV/express lane signs and accompanying lighting, and the construction of retaining walls, which would be visible to motorists primarily in the southbound direction. HOV/express lane VTMS, FasTrak signs, and lights would briefly interfere with southbound motorists' views of Mission Peak and Maguire Peaks. The existing views are memorable with a high level of vividness. The project features would not degrade the vividness of existing views because the height and magnitude of the mountains and peaks in the distance would still be visible and appreciated in much the same way as in the existing view. While the project features would intrude briefly upon scenic views until the motorist passes the signs and lights, slow travel times during commute hours would increase the duration of exposure to those structures. A high level of unity exists in the balance between natural features and structures and would not be diminished by project signs and lights.

For northbound motorists on I-680, views would be minimally diminished by the proposed project signs and lights. While views of the low hills adjacent to the highway are pleasing, there are no distant scenic resources visible through the corridor similar to what is visible in the southbound direction. In the existing view, vividness, intactness and unity are at moderate levels of quality and would remain moderate with the proposed signs and lights. Visual impacts with the proposed signs and lights would be low due to their temporary and sometimes fleeting views of the signs depending on the flow of traffic. The proposed Calaveras Road to northbound I-680 flyover ramp, as discussed above for Key View 5, would result in moderate visual impacts for northbound I-680 motorists whose views to the valley to the east would be briefly and partially blocked by the flyover while traveling through the interchange.

Visual impacts from the perspective of northbound and southbound I-680 motorists would range from moderate-low to low.

From the perspective of the majority of residents adjacent to I-680 and in the vicinity of proposed project features, views of project features would either be blocked by intervening topography or blocked or screened by dense vegetation. In two locations, however, project features would be partly or fully visible to residents: the proposed VTMS located approximately 0.3 mile north of the Koopman Road undercrossing (PM 12.76), and the FasTrak Express Lane Entrance sign located approximately 0.9 mile north of the same undercrossing (PM 13.26). These signs are shown on Figure 1.4-1, page 6, and representative views of these types of signs are shown in Figure 1.4-2. The two signs would result in moderate visual impacts from the perspective of residents adjacent to I-680. The approximately 34-foot-high VTMS sign would have visible lighted numerals, a reflective sign surface, and an overhead light that would extend approximately 10 feet above the top of the sign. The approximately 29-foot-high FasTrak Express Lane Entrance sign would have a reflective surface as well as an overhead light. In addition, approximately five freestanding overhead highway lights would be added in the median to the north of the Express Lane Entrance sign. These features would be perceived as an annoyance by residents who would see the express lane signs and lights, causing a moderate visual impact.

Visual impacts from the remaining proposed additional signs, a gantry with a reader, and freestanding highway lights would range from low to moderate. Visual impacts would be due to the signs' reflective surface and overhead lights. Viewer response from the residential communities to the west and the approximately four residents to the east with the project features is expected to be moderate to low. The project would not block views of scenic resources from communities adjacent to I-680.

Impact Summary

The project components described in Sections 1.4.1 through 1.4.4 would change the visual environment of the existing SR 84 and I-680 corridors. Within SR 84, proposed project features such as intersection signals, lights, median barriers, retaining walls, drainage features, utility cabinets, and bicycle lanes are already visible in the existing SR 84 corridor to the east of Ruby Hill Drive. Proposed project features on I-680 such as illuminated overhead signs (including HOV/express lane VTMS and other signs), median barrier mounted signs, lights, cameras, utility cabinets, vehicle pull-outs, drainage features, ramps, barriers, and retaining walls are visible in the existing I-680 corridor. Therefore, the visual character of the proposed project would be compatible with the existing visual character of the corridor.

The project features would result in moderate to low visual impacts from the perspectives of highway users on SR 84 and I-680, and from highway neighbors including residences, with the exception of the residence on SR 84 on the western end of the proposed southern frontage road. Viewers at recreation facilities, the school, and the church would not be impacted. Highway motorists would be directly exposed to project features while just a handful of others (highway neighbors) would have views of the project. As described in Section 1.4.4, additional project lighting would be downward cast, per Caltrans requirements, which would prevent the illumination of areas outside of the highway right-of-way; therefore, light trespass is not expected to adversely affect adjacent residents. Overall visual impacts would be moderate to low. However, the residence on SR 84 on the western end of the proposed southern frontage road would experience moderate-high visual impacts due to the construction of project features, including a retaining wall with a barrier on top, closer to the residence than existing highway features.

2.1.10.4 Avoidance, Minimization, and/or Mitigation Measures

Measure BIO-4 (Section 2.3.1.3) provides for replanting native species within riparian areas, and coast live oaks and valley oaks in oak woodlands (including uplands), at a 3:1 ratio. In addition, the following measures will be implemented.

VIS-1. Any roadside vegetation and irrigation systems that are damaged or removed during project construction would be replaced according to Caltrans policy and highway landscaping standards. Highway planting would be installed under a separate contract and within two years following the completion of the highway construction, with a three-year plant establishment period. The highway planting would be funded by Alameda CTC.

VIS-2. When trenching for utilities, avoid trenching within drip lines of trees and screening shrubs. Directional drilling that would avoid damaging root systems of established plant material shall be used, when reasonable, as opposed to open trenching to install new conduit in

places where work within the drip line would be required. Trees and screening shrubs shall be protected from damage during construction.

VIS-3. Add trees and irrigation within Caltrans right-of-way where necessary to screen residential views of proposed express lane signs and lights.

VIS-4. Attach all electronic toll readers to sign gantries.

VIS-5. Incorporate aesthetic features such as architectural treatments to walls, bridges, and barriers to lessen visual impacts, as illustrated in Figures 2.1.10-3, 2.1.10-7, and 2.1.10-9.

VIS-6. As directed by Caltrans, appropriate light and glare screening measures should be used at the construction staging areas including the use of downward-cast lighting.

2.1.11 Cultural Resources

2.1.11.1 Regulatory Setting

The term "cultural resources" as used in this document refers to the "built environment" (e.g., structures, bridges, railroads, water conveyance systems, etc.), places of traditional or cultural importance, and archaeological sites (both prehistoric and historic), regardless of significance. Under federal and state laws, cultural resources that meet certain criteria of significance are referred to by various terms including "historic properties," "historic sites," "historical resources," and "tribal cultural resources." Laws and regulations dealing with cultural resources include:

The National Historic Preservation Act (NHPA) of 1966, as amended, sets forth national policy and procedures for historic properties, defined as districts, sites, buildings, structures, and objects included in or eligible for listing in the National Register of Historic Places (NRHP). Section 106 of the NHPA requires federal agencies to take into account the effects of their undertakings on historic properties and to allow the Advisory Council on Historic Preservation (ACHP) the opportunity to comment on those undertakings, following regulations issued by the ACHP (36 CFR 800). On January 1, 2014, the First Amended Section 106 Programmatic Agreement (PA) among FHWA, the ACHP, the California State Historic Preservation Officer (SHPO), and Caltrans went into effect for Caltrans projects, both state and local, with FHWA involvement. The PA implements the ACHP's regulations, 36 CFR 800, streamlining the Section 106 process and delegating certain responsibilities to Caltrans. FHWA's responsibilities under the PA have been assigned to Caltrans as part of the Surface Transportation Project Delivery Program (23 USC 327).

The Archaeological Resources Protection Act (ARPA) applies when a project may involve archaeological resources located on federal or tribal land. The ARPA requires that a permit be obtained before excavation of an archaeological resource on such land can take place.

Historic properties may also be covered under Section 4(f) of the U.S. Department of Transportation Act, which regulates the "use" of land from historic properties (in Section 4(f) terminology—historic sites). See Appendix A for specific information about Section 4(f).

CEQA requires the consideration of cultural resources that are historical resources and tribal cultural resources as well as "unique" archaeological resources. PRC Section 5024.1 established the California Register of Historical Resources (CRHR) and outlined the necessary criteria for cultural resource to be considered eligible for listing in the CRHR and, therefore, a historical resource. Historical resources are defined in PRC Section 5020.1(i). In 2014, AB 52 added the term "tribal cultural resources" to CEQA, and AB 52 is commonly referenced instead of CEQA when discussing the process to identify tribal cultural resources (as well as identifying measures to avoid, preserve, or mitigate effects to them). Defined in PRC Section 21074(a), a tribal cultural resource is a CRHR or local register eligible site, feature, place, cultural landscape, or object which has a cultural value to a California Native American tribe. Tribal cultural resources must also meet the definition of a historical resource. Unique archaeological resources are referenced in PRC Section 21083.2.

PRC Section 5024 requires state agencies to identify and protect state-owned historical resources that meet the NRHP listing criteria. It further 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 SHPO before altering, transferring, relocating, or demolishing state-owned historical resources that are listed on or are eligible for inclusion in the NRHP or are registered or eligible for registration as California Historical Landmarks. Procedures for compliance with PRC Section 5024 are outlined in a Memorandum of Understanding (MOU) between Caltrans and SHPO, effective January 1, 2015. For most Federal-aid Projects on the State Highway System, compliance with the Section 106 PA will satisfy the requirements of PRC Section 5024.

2.1.11.2 Affected Environment

The following discussion is from the *Historic Property Survey Report* completed for the proposed project in May 2017 (Archaeological/Historical Consultants 2017a). The *Historic Property Survey Report* incorporates the results of the *Archaeological Survey Report,* the *Historical Resources Evaluation Report,* and the *Extended Phase I Archaeological Survey Report* (Archaeological/Historical Consultants 2017b, c, d).

The study area for cultural resources is the archaeological and architectural Area of Potential Effects (APE), which encompasses all areas within the physical footprint of the improvements proposed for the Build Alternative as well as areas that may either be directly or indirectly affected by project construction activities.

The archaeological APE consists of the existing Caltrans right-of-way along with parts of private properties where right-of-way acquisition, TCEs, or utility or maintenance easements are proposed.

The architectural APE encompasses the archaeological APE and generally includes the entirety of the parcels containing buildings or structures in which right-of-way acquisition is proposed.

The vertical APE represents the maximum vertical extent of project-related activities for the proposed undertaking. The vertical APE varies within the project APE, with excavation depths ranging from 6 feet for conduit trenching, utility relocation, bioswales, and retaining wall foundations to up to 80 feet for foundation piles for new or widened bridge structures.

Records and Archival Review

A cultural resources records search was conducted by the Northwest Information Center of the California Historical Resources Information System, at California State University, Sonoma, for the APE and a 0.5-mile radius. Reports for previous studies were reviewed for the APE and a 0.5-mile radius. Other standard cultural resource inventories and references were also reviewed, including at the Amador-Livermore Valley Historical Society in Pleasanton, the Livermore Heritage Guild, the Earth Sciences and Map Library at University of California Berkeley, and the Alameda County Assessor-Recorder.

Two previously recorded archaeological sites – one prehistoric and one historic – were previously identified in the APE. There are eight bridges within the APE that were previously determined as Category 5 – Not eligible for the NRHP, in the Caltrans Statewide Historic Bridge Inventory.

Native American Consultation

The Native American Heritage Commission (NAHC) was contacted on January 12, 2016, to request a search of the Sacred Lands File for cultural resources of significance to Native Americans within or near the APE.

The NAHC replied on January 28, 2016, providing a list of tribes with traditional lands or cultural places located within Alameda County and stating that no sacred lands were identified in the project APE. On February 3, 2016, preliminary project information and maps were sent to Native American groups via e-mail and U.S. Mail. This communication initiated consultation as required under Section 106 of the NHPA and CEQA (PRC Section 21080.3.1 and Chapter 532 Statutes of 2014, also known as California AB 52). Follow-up e-mails were sent on March 16, 2016, to all recipients who had not responded.

Four recipients replied. Representatives of the Ohlone Indian Tribe and Indian Canyon Mutsun Band of Costanoan requested, and were provided, information about archaeological sites near the project area. A representative of the North Valley Yokuts Tribe expressed concern about the project; noted that the project area was a former ancestral residence; recommended monitoring of the project by Native Americans, including during subsurface testing; and asked to be kept informed of the project's progress. A representative of the Ohlone/Costanoan-Esselen Nation noted that the site is outside of the tribe's traditional territory of the Ohlone/Costanoan-Esselen Nation, recommended coordination with the Muwekma Ohlone Indian Tribe.

The representatives of the North Valley Yokuts Tribe and the Indian Canyon Mutsun Band of Costanoan requested direct contact with Caltrans, and the Caltrans Office of Cultural Resources Studies responded to the inquiries. No other responses or inquiries were made.

Field Survey Results

Accessible portions of the archaeological APE and a 150-foot buffer were surveyed by archaeologists between March and June 2016. One of two previously recorded archaeological sites within the APE, which was previously determined ineligible for the NRHP, was examined. The property owner did not grant access to the other site; therefore, the site was assumed eligible for the NRHP for the purposes of this project because a complete recording and evaluation could not be completed.

Two historic built environment resources within the APE were also recorded but found ineligible for NRHP or CRHR by an architectural historian. Access to two other built environment resources, the GE-Hitachi Vallecitos Nuclear Center (6075 East Vallecitos Road) and a residential property (8350 East Vallecitos Road), was denied by the landowners. Background research and a drive-by survey of the GE-Hitachi Vallecitos Nuclear Center suggest that it would be eligible for the NRHP if evaluated. The residential property was also assumed eligible for the NRHP for the purposes of this project because it is a ranch property of more than 45 years of age, and a complete recording and evaluation could not be performed.

No additional sites have been identified that would qualify as historical resources for CEQA purposes.

Potential for Presence of Buried Resources

The project would require subsurface disturbance in the form of excavations for retaining walls, bridge abutments, foundation piles, HOV/express lane gantry foundations, and utility pole relocation. Previous studies and project vicinity geomorphology were used to develop a model of weighted sensitivity to assess the APE's likelihood to contain buried archaeological deposits. The model indicated that the APE contains areas of high or very high sensitivity for buried archaeological resources.

Because the APE contains areas sensitive for buried archaeological resources, a program of geoarchaeological coring was undertaken as a good-faith effort to identify obscured or buried archaeological resources that could be affected by project construction. No cultural resources were found during this subsurface testing.

2.1.11.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not affect any cultural resources.

Build Alternative

There are 14 cultural resources within the APE. Nine were previously determined ineligible for listing in the NRHP and CRHR and received SHPO concurrence. Two were evaluated for listing in the NRHP and CRHR, and found ineligible as a result of this project and received SHPO concurrence on October 5, 2017. The other three resources are considered eligible for inclusion in the NRHP for the purposes of this project only because evaluation was not possible, pursuant to the Caltrans Section 106 Programmatic Agreement Stipulation VIII.C.4.

Caltrans submitted the cultural resources studies to SHPO on June 5, 2017, for concurrence on the eligibility of the resources within the APE. SHPO provided concurrence on October 5, 2017 (see Appendix C).

Construction would occur near portions of the cultural resources presumed eligible. In accordance with Measure CUL-1, a Post-Review Discovery and Monitoring Plan will be implemented during construction to help resolve potential adverse effects to cultural resources if encountered during project construction. Therefore, the anticipated cultural resources finding for this project is No Adverse Effect with Non-Standard Conditions.

Two Section 4(f) historic resources are present within the project area and are described in Appendix A. The project would not cause a substantial adverse change to a historical or archaeological resource as defined by CEQA, or use or adversely impact any Section 4(f) historic resource.

The Build Alternative would not affect a tribal cultural resource.

2.1.11.4 Avoidance, Minimization, and/or Mitigation Measures

CUL-1. During project construction, implement the monitoring protocols, discovery procedures, chain of command, and treatment and analysis protocols set forth in the Post-Review Discovery and Monitoring Plan.

CUL-2. If cultural materials are discovered during construction, all earth-moving activity within and around the immediate discovery area will be diverted until a qualified archaeologist can assess the nature and significance of the find.

CUL-3. If human remains are discovered, California Health and Safety Code Section 7050.5 states that further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner contacted. If the remains are thought by the coroner to be Native American, the coroner will notify the Native American Heritage Commission (NAHC), who, pursuant to PRC Section 5097.98, will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact the Branch Chief of Cultural Resources, Archaeology so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable.

2.2 Physical Environment

2.2.1 Hydrology and Floodplain

2.2.1.1 Regulatory Setting

EO 11988 (Floodplain Management) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. FHWA requirements for compliance are outlined in 23 CFR 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 affected 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."

2.2.1.2 Affected Environment

The following discussion is based on the *Location Hydraulic Study Report* (WRECO 2016a) for the proposed project, which was completed in November 2016.

Waterways in the project area are shown in Figure 2.2.1-1. Vallecitos Creek and its tributaries cross SR 84 through underground culverts. Vallecitos Creek originates in the hills east of the GE-Hitachi Vallecitos Nuclear Center in unincorporated Alameda County. Multiple tributaries of the creek drain to the west, eventually combining in the Vallecitos Valley before crossing under I-680 through a double 8-foot-by-7-foot box culvert. West of I-680, Vallecitos Creek flows through an open channel for approximately 1 mile before converging with Arroyo de la Laguna near Sunol Glen Elementary School in Sunol.

Horse Creek drains part of I-680 in the project area north of the SR 84/I-680 interchange. Horse Creek runs in a westerly direction and merges with Arroyo de la Laguna approximately 300 feet downstream of the Horse Creek cross culvert under Pleasanton-Sunol Road, west of I-680. The rest of the project south of the SR 84/I-680 interchange drains into Alameda Creek, which crosses I-680 just south (and outside) of the project limits.

The project area has natural and beneficial floodplain values including, but not limited to, fish, wildlife, plants, open space, natural beauty, scientific study, outdoor recreation, agriculture, aquaculture, and forestry, natural moderation of floods, water quality maintenance, and groundwater recharge.

Federal Emergency Management Agency (FEMA) Special Flood Hazard Areas cross I-680 near the southern project limits, as shown in Figure 2.2.1-1. Most of the proposed project area is located within FEMA Special Flood Hazard Area Zone X (unshaded), which represents an area of minimal flood hazard that has an elevation higher than that associated with the 0.2 percent annual-chance flood event.

A portion of I-680, adjacent to the crossing of Alameda Creek and south of the project limits, traverses three different flood hazard areas: Zone X (shaded), Zone AE, and Zone AE (floodway). Zone X (shaded) represents areas impacted by the 0.2 percent annual-chance flood event. Zone AE represents areas impacted by the 1 percent annual-chance flood event where the base flood elevation has been determined to be 247 feet. The floodway designation represents an area that is in the channel of a river or stream, or in the floodplain adjoining the channel required to carry the regional flood discharge.

Flooding on I-680 can occur where Special Flood Hazard Areas cross the freeway (Figure 2.2.1-1), potentially causing traffic disruptions.

2.2.1.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not affect the floodplain.

Build Alternative

The project proposes roadway widening partially into an existing drainage ditch within Zone AE floodway, Zone AE, and Zone X (shaded) areas. However, the existing roadway is above elevation 250 feet, and most of the proposed widening is in areas already above the base flood elevation of 247 feet. The proposed widening is anticipated to result in minimal floodplain impact.

No additional traffic interruptions from flooding on I-680 are expected as a result of the project. The potential for traffic interruptions for the Build Alternative would be the same as for the No Build Alternative. The project would not affect existing flooding patterns or have an adverse effect on the base flood.

Longitudinal Encroachment

FHWA defines a longitudinal encroachment as an action within the limits of the base floodplain that is longitudinal to the normal direction of the floodplain. A longitudinal encroachment is an encroachment that is parallel to the direction of flow. For instance, a highway that runs along the edge of a river is usually considered a longitudinal encroachment. The flow direction in Alameda Creek within the project limits is perpendicular to the direction of the proposed improvements. Therefore, the project would not be considered a longitudinal encroachment.

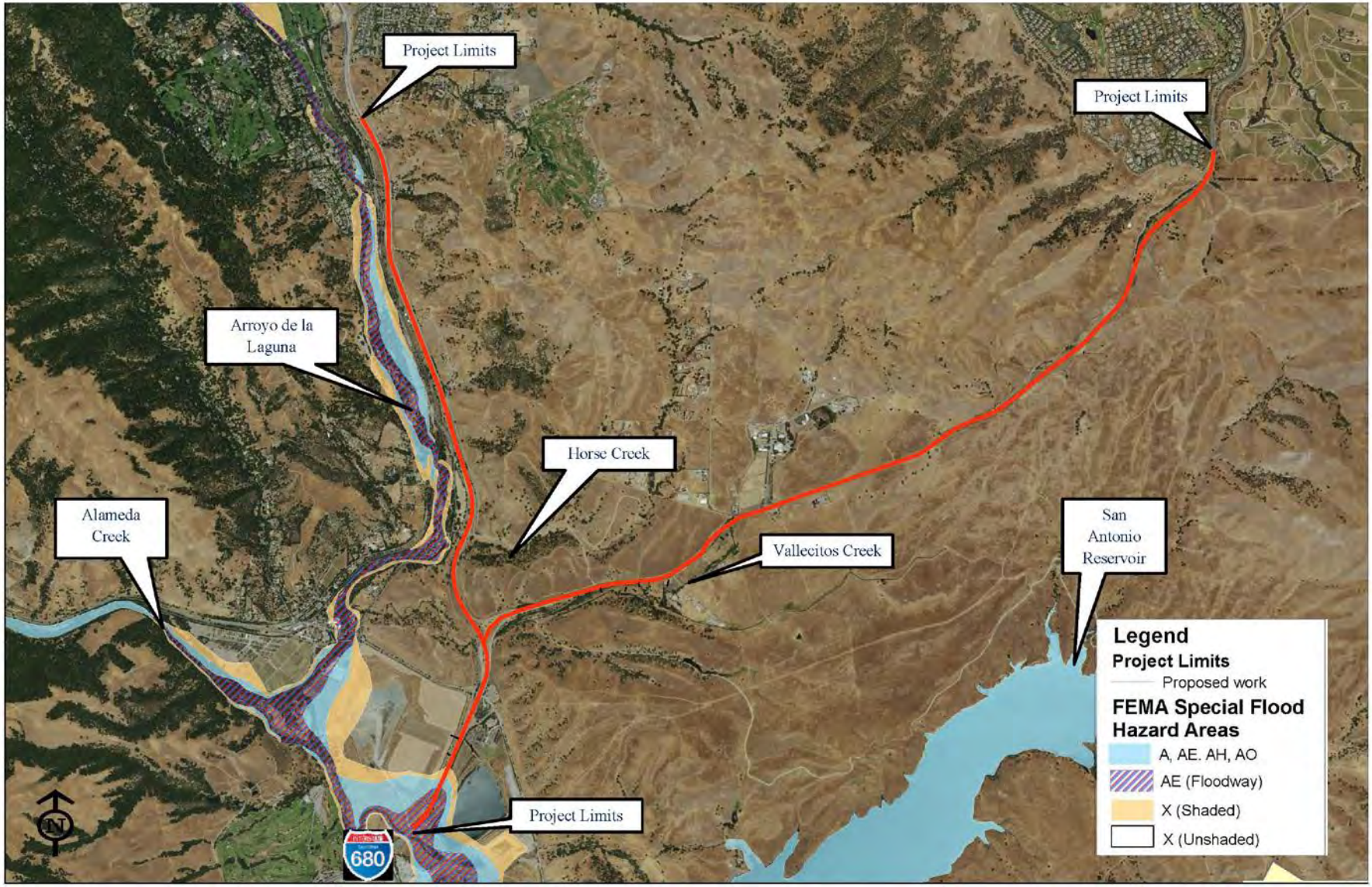


Figure 2.2.1-1: FEMA Special Flood Hazard Area

Risks of the Action

The potential risk associated with the proposed project includes but is not limited to: 1) change in land use, 2) fill inside the floodplain, or 3) change in the 100-year water surface elevation.

The project would not change land uses in the floodplain. The project would result in land use changes along SR 84, outside of the base floodplain.

The project would increase the impervious area within the project limits, resulting in a total of 25.9 acres of added impervious area within the Caltrans right-of-way and 4.3 acres of added impervious area outside of the Caltrans right-of-way (see Table 2.2.1-1). Of this amount, 0.32 acre of added impervious area would be in Zone AE (floodway), and 0.17 acre would be in Zone AE. The amount of added impervious area below the base flood elevation is minimal, and the project is not anticipated to pose a significant floodplain encroachment.

Table 2.2.1-1: Disturbed Surface Area and Added Impervious Area

Right-of-Way	Disturbed Soil Area (acres)	Existing Impervious Area (acres)	Net Added Impervious Area (acres)	Reworked Impervious Area (acres)	Total Added and Reworked Impervious Area (acres)
Caltrans	58.77	62.25	27.40	5.82	33.21
Non-Caltrans	11.18	1.49	4.40	0.15	4.56
Total	69.94	63.74	31.80	5.97	37.77

Note: Acreages rounded to the nearest hundredth, so values shown may not add up to totals.

The proposed widening would affect an existing drainage ditch adjacent to I-680 that serves as flood storage. The proposed widening would be minimal in comparison to the overall floodplain, with an average increase of approximately 0.09 percent for Zone AE (floodway) and 0.14 percent for Zone AE. The project would not result in a loss in flood storage because the drainage ditch would be increased in size to accommodate the existing flow and additional flow from the roadway widening. The project would result in insignificant increases to water surface elevations.

Natural and Beneficial Floodplain Values

The proposed project would have no impacts on the natural and beneficial floodplain values. There are potential jurisdictional wetlands and waters of the U.S. within the project limits; however, these features are outside of the floodplain.

Incompatible Floodplain Development

The proposed project would not create a new access route to developed or undeveloped land in the 1 percent annual-chance flood zone. Therefore, the project would not support incompatible floodplain development.

2.2.1.4 Avoidance, Minimization and/or Mitigation Measures

No further avoidance, minimization, or mitigation is required.

2.2.2 Water Quality and Storm Water Runoff

2.2.2.1 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 (U.S.) from any point source[22] unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. This act and its amendments are known today as the Clean Water Act (CWA). Congress has amended the act several times. In the 1987 amendments, Congress directed dischargers of storm water from municipal and industrial/construction point sources to comply with the NPDES permit scheme. The following are important CWA sections:

- Sections 303 and 304 require states to issue water quality standards, criteria, and guidelines.
- Section 401 requires an applicant for a federal license or permit to conduct any activity that may result in a discharge to waters of the U.S. 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 NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. Regional Water Quality Control Boards (RWQCBs) administer this permitting program in California. Section 402(p) requires permits for discharges of storm water from industrial/construction and municipal separate storm sewer systems (MS4s).
- Section 404 establishes a permit program for the discharge of dredge or fill material into waters of the U.S. This permit program is administered by the U.S. Army Corps of Engineers (USACE).

The goal of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

The USACE issues two types of 404 permits: General and Individual. There are two types of General permits: Regional and Nationwide. 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 allow a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Regional or Nationwide Permit may be permitted under one of the USACE's Individual permits. There are two types of Individual permits: Individual permits and Letters of Permission. For Individual permits, the USACE decision to approve is based on compliance with United States Environmental Protection Agency's (USEPA's) Section 404 (b)(1) Guidelines (40 CFR Part 230), and whether the permit approval is in the public interest. The Section 404(b)(1) Guidelines (Guidelines) were developed by the USEPA in conjunction with the USACE, and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The Guidelines state that the USACE may not issue a

[22] A point source is any discrete conveyance such as a pipe or a man-made ditch.

permit if there is a least environmentally damaging practicable alternative (LEDPA) to the proposed discharge that would have lesser effects on waters of the U.S. 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[23] standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the U.S. In addition, every permit from the USACE, even if not subject to the Section 404(b)(1) Guidelines, must meet general requirements. See 33 CFR 320.4. A discussion of the LEDPA 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 (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 CWA and regulates discharges to waters of the state. Waters of the State include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined, and this definition is broader than the CWA definition of "pollutant." Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA and regulating discharges to ensure compliance with the water quality standards. Details about water quality standards in a project area are included in the applicable RWQCB Basin Plan. In California, RWQCBs designate beneficial uses for all water body segments in their jurisdictions and then set criteria necessary to protect those uses. As a result, the water quality standards developed for particular water segments are based on the designated use and vary depending on that use. In addition, the SWRCB identifies waters failing to meet standards for specific pollutants. These waters are then state-listed in accordance with CWA 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 (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB 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, TMDLs, and NPDES permits. RWCQBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

[23] The U.S. EPA defines "effluent" as "wastewater, treated or untreated, that flows out of a treatment plant, sewer, or industrial outfall."

National Pollutant Discharge Elimination System (NPDES) Program

Municipal Separate Storm Sewer Systems (MS4)

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of storm water discharges, including Municipal Separate Storm Sewer Systems (MS4s). An MS4 is defined as "any conveyance or system of conveyances (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 storm water, that is designed or used for collecting or conveying storm water." The SWRCB has identified Caltrans as an owner/operator of an MS4 under federal regulations. Caltrans' MS4 permit covers all Caltrans rights-of-way, properties, facilities, and activities in the state. The SWRCB or the RWQCB issues NPDES permits for five years, and permit requirements remain active until a new permit has been adopted.

Caltrans' MS4 Permit, Order No. 2012-0011-DWQ (adopted on September 19, 2012 and effective on July 1, 2013), as amended by Order No. 2014-0077-DWQ (effective July 1, 2014) and Order No. 2015-0036-EXEC (effective April 7, 2015) has 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 storm water and non-storm water discharges; and
3. Caltrans storm water discharges must meet water quality standards through implementation of permanent and temporary (construction) BMPs, to the maximum extent practicable, and other measures as the SWRCB determines to be necessary to meet the water quality standards.

To comply with the permit, Caltrans developed the Statewide Storm Water Management Plan (SWMP) to address storm water pollution controls related to highway planning, design, construction, and maintenance activities throughout California. The SWMP assigns responsibilities within Caltrans for implementing storm water management procedures and practices as well as training, public education and participation, monitoring and research, program evaluation, and reporting activities. The SWMP describes the minimum procedures and practices Caltrans uses to reduce pollutants in storm water and non-storm water discharges. It outlines procedures and responsibilities for protecting water quality, including the selection and implementation of BMPs. The proposed project will be programmed to follow the guidelines and procedures outlined in the latest SWMP to address storm water runoff.

Construction General Permit

Construction General Permit Order No. 2009-2009-DWQ (adopted on September 2, 2009 and effective on July 1, 2010), as amended by Order No. 2010-0014- DWQ (effective February 14, 2011) and Order No. 2012-0006-DWQ (effective on July 17, 2012). The permit regulates storm water discharges from construction sites that result in a Disturbed Soil Area (DSA) of one acre or greater, and/or are smaller sites that are part of a larger common plan of development. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation result in soil disturbance of at least one acre must comply with the provisions of the

General Construction Permit. Construction activity that results in soil disturbances of less than one 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 RWQCB. Operators of regulated construction sites are required to develop Storm Water Pollution Prevention Plans (SWPPPs); to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the Construction General Permit.

The Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and 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 storm water 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 SWPPP. In accordance with Caltrans' SWMP and Standard Specifications, a Water Pollution Control Program (WPCP) is necessary for projects with DSA less than one acre.

Section 401 Permitting

Under Section 401 of the CWA, any project requiring a federal license or permit that may result in a discharge to a water of the U.S. 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 CWA Section 404 permits issued by the USACE. The 401 permit certifications are obtained from the appropriate RWQCB, dependent on the project location, and are required before the USACE issues a 404 permit.

In some cases, the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may issue a set of requirements known as WDRs 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. WDRs can be issued to address both permanent and temporary discharges of a project.

Regional and Local Requirements

The San Francisco Bay RWQCB, Region 2, has jurisdiction over the project limits. The San Francisco Bay RWQCB established a General Basin Plan (2015) with goals and policies that apply to the water bodies within the project area, regarding beneficial uses and water quality objectives.

The project is partly within the Alameda County Phase I MS4 under the California RWQCB San Francisco Bay Region Municipal Regional Stormwater NPDES Permit (Order R2-2015-0049, NPDES Permit No. CAS612008). The Municipal Regional Permit presents the provision for permanent post-construction storm water requirements for areas outside of Caltrans' right-of-way. Some or all of these requirements may be required for Caltrans projects that connect or discharge into local drainage facilities as directed by the Caltrans Office of Water Quality or the RWQCB. The permit provides provisions and requirements for permanent storm water treatment and hydromodification management within the County. Stormwater treatment measures are required to reduce the sediment and pollutant load resulting from the loss of pervious area and

creation of impervious area. Hydromodification is the alteration of the hydrologic characteristics of coastal and non-coastal waters, which in turn could cause degradation of water resources. The permit identifies low-impact-development treatment measures as meeting both storm water treatment and hydromodification management requirements. Acceptable low-impact-development treatment measures include rainwater harvesting and reuse systems, infiltration or evapotranspiration systems, and, lastly, biotreatment devices, if the aforementioned systems are infeasible.

The Alameda Countywide Clean Water Program has developed the "C.3 Stormwater Technical Guidance" (2016) to assist developers and engineers in complying with the permit.

2.2.2.2 Affected Environment

This section is based on the *Water Quality Assessment Report* (WRECO 2017), which was completed in January 2017. Hydrology and floodplains are discussed in Section 2.2.1.

Surface Water Resources

Vallecitos Creek and its tributaries are the receiving water bodies for most of the proposed work along SR 84. As described in Section 2.2.1.2, the creek and its tributaries cross SR 84 through underground culverts. Vallecitos Creek originates in the hills east of the GE-Hitachi Vallecitos Nuclear Center in unincorporated Alameda County. Multiple tributaries of the creek drain to the west, eventually combining in the Vallecitos Valley before crossing under I-680 through a double 8-foot-by-7-foot box culvert. West of I-680, Vallecitos Creek flows through an open channel for approximately 1 mile before converging with Arroyo de la Laguna near Sunol Glen Elementary School in Sunol.

Horse Creek drains part of I-680 in the project area north of the SR 84/I-680 interchange. Horse Creek runs in a westerly direction and merges with Arroyo de la Laguna approximately 300 feet downstream of the Horse Creek cross culvert under Pleasanton-Sunol Road, west of I-680. The rest of the project south of the SR 84/I-680 interchange drains into Alameda Creek, which crosses I-680 just south (and outside) of the project limits.

The project is within the Upper Alameda Creek watershed, which has an area of 633 square miles. The watershed consists primarily of grass-covered hills and valleys, with natural creek channels. Most of the project is within the Arroyo de la Laguna sub-watershed. The upper part of the project on SR 84 is within the San Antonio Creek sub-watershed, and the portion of the project just south of the SR 84/I-680 interchange is within the Upper Alameda Creek sub-watershed.

The Upper Alameda Creek watershed is managed by the SFPUC as part of the Hetch Hetchy water system. Most of the land is owned by the SFPUC or private property owners (ranchers). SFPUC is the third largest municipal utility in California, serving 2.6 million residential, commercial, and industrial customers in the Bay Area. The Alameda and Peninsula watersheds produce about 15 percent of the total water supply captured and stored in two area reservoirs: Calaveras (southwest of the project area, as shown in Figure 2.2.1-1) and San Antonio.

Arroyo de la Laguna and Alameda Creek have both been identified under CWA Section 303(d) as impaired water bodies for diazinon pollution. Diazinon is an organothiophosphate used in pest control. Diazinon is not present with the State right-of-way and would not be used as part of the

project. The project area does not contain any other waters identified under CWA Section 303(d) as impaired water bodies.

Projects that increase impervious area can prevent runoff from naturally dispersing and infiltrating into the ground, resulting in increased concentrated flow. The additional flow has the potential to transport an increased amount of sediment and pollutants to waterways and water resources, plus create increased erosion resulting from changes to waterway hydrographs (flow versus time) pre- and post-construction. This phenomenon is termed hydromodification. Hydromodification can cause increased bed and bank erosion, loss of habitat, increased sediment transport and deposition, and increased flooding.

Hydromodification occurs in areas that drain to unlined channels. Areas that drain to hardened channels or culvert systems are not subject to hydromodification. The project area is highly susceptible to hydromodification from added impervious area from the proposed project.

Groundwater Resources

The project area overlies the Sunol Valley (Basin ID 2-11) and the Livermore Valley (Basin ID 2-10) groundwater basins. In general, groundwater may be encountered within about 20 feet of the surface in the hills east and west of the GE-Hitachi Vallecitos Nuclear Center, in relatively impermeable materials mapped as Livermore Gravels. Groundwater may be shallower in the more permeable young alluvium deposits along Vallecitos Creek, in the flat-lying area near the GE-Hitachi Vallecitos Nuclear Center, and along the perennial stream drainages crossing the project alignment to the east.

The Basin Plan identifies narrative and numerical groundwater objectives for the region. It states, "at a minimum, groundwater shall not contain concentrations of bacteria, chemical constituents, radioactivity, or substances producing taste and odor." The existing beneficial uses listed for the Sunol Valley and Livermore Valley groundwater basins are municipal and domestic water supply, industrial process water supply, industrial service water supply, and agricultural water supply. Groundwater sub-basins identified as having the existing groundwater beneficial use of municipal and domestic water supply are subject to further narrative and numeric groundwater objectives for bacteria, organic and inorganic constituents, radioactivity, and taste and odor.

The quality of the groundwater basin is classified as ranging from poor to excellent, with most of the water in the good to excellent range. The quality is generally suitable for irrigation. Some of the shallow wells show high nitrate levels indicating possible degradation from surface sources.

2.2.2.3 Environmental Consequences

No Build Alternative

Short-Term (Construction) Impacts

No short-term water quality impacts would occur with the No Build Alternative.

Long-Term (Permanent) Impacts

Street and highway storm water runoff has the potential to affect receiving water quality. 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 storm water

runoff contains total suspended solids, nitrate nitrogen, total Kjeldahl nitrogen, phosphorus, ortho-phosphate, copper, lead, and zinc. The pollutants are dispersed from tree leaves, combustion products from fossil fuels, and the wearing of brake pads and tires. The No Build Alternative would have potential long-term water quality impacts due to increasing congestion (described further in Section 2.1.9.3), leading to a greater deposition of particulates from exhaust and heavy metals from braking.

Build Alternative

Short-Term (Construction) Impacts

Erosion from disturbed soil areas during project construction has the potential to cause sediment-laden runoff to enter storm drainage facilities and increase the turbidity and decrease the clarity and beneficial uses of receiving water bodies. The project would temporarily disturb a total of 58.77 acres within the existing Caltrans right-of-way and 11.18 acres of proposed right-of-way. Generally, as the disturbed soil area increases, the potential for temporary water quality impacts also increases. Based on the receiving water risk and the sediment risk during construction, the project has been classified as Risk Level 3. Bioassessment (monitoring to assess project effects on the biological integrity of receiving waters) may be necessary before and after project construction because the project is Risk Level 3 with a ground disturbance exceeding 30 acres.

Project construction would also require the use of heavy equipment. Activities such as fueling and maintenance of construction equipment in the project area include the risk of accidental spills or releases of fuels, oils, or other potentially toxic materials. An accidental release of these materials could pose a threat to water quality if contaminants enter storm drains, open channels, or surface water receiving bodies.

The proposed project would require excavations for abutments, bents, and piles varying in depths from 5 to 80 feet. Construction excavations have the potential to affect groundwater resources. The water table is about 20 feet below ground surface; therefore, dewatering would occur prior to excavations in areas of shallow groundwater.

Measure WQ-1 listed in Section 2.2.2.4 and Measure BIO-6 listed in Section 2.3.2.5 would minimize impacts to water quality during project construction.

Long-Term (Permanent) Impacts

Surface Water Resources

The project has the potential to increase levels of vehicle-related pollutants associated with street and highway storm water runoff, and increased traffic loads throughout the project corridor could result in an increase in deposition of particulates. As discussed in Section 2.1.9.3, the Build Alternative would increase the traffic volume served but decrease VHD compared to the No Build Alternative in both 2025 and 2045. Therefore, the proposed project is not expected to increase vehicle-related pollutants or particulate deposition in storm water runoff compared to the No Build Alternative.

Table 2.2.1-1 in Section 2.2.1.3 lists the estimated disturbed soil acreage and existing, added, and reconstructed (reworked) impervious area values for the proposed project. The added impervious area could increase the low-flow and peak-flow velocities, pollutant loading, and volume of storm water flow to downstream receiving water bodies. Storm water runoff from the project corridor drains to nearby storm drain systems, which discharge either to Vallecitos Creek, Horse

Creek, Alameda Creek, or drainage ditches that are tributaries to Arroyo de la Laguna. The additional impervious area is not substantial (less than 1 percent) relative to the 3.5-square-mile Vallecitos Creek watershed. Stormwater impacts would be mitigated through the implementation of Measure WQ-2 listed in Section 2.2.2.4.

The proposed roadway widening and ramp modifications would result in the fill or removal of existing ditches, modification or relocation of existing longitudinal drainage structures, extension or relocation of existing cross culverts, and construction of new drainage structures. Existing culverts would be enlarged and additional culverts would be constructed to help wildlife to cross under SR 84. The goal of the project drainage design would be to maintain existing drainage patterns. Measure WQ-2 listed in Section 2.2.2.4 would minimize impacts to water quality from changes to existing drainage structures.

The portion of the Build Alternative within the project limits but outside of the Caltrans right-of-way is covered under the Alameda County Phase 1 MS4 under the Municipal Regional Permit. Under this permit, projects are required to provide storm water treatment for the combined added and reworked impervious areas, which for the Build Alternative would total 37.77 acres. Potential treatment BMPs identified for the Build Alternative (see Section 1.3.4 under "Storm Water Treatment") would treat a total of 38.11 acres of impervious area. At this stage, there is 100 percent treatment proposed for the Build Alternative (Wreco 2016c).

The increase in impervious area could also result in hydromodification impacts, including increased bed and bank erosion, loss of habitat, increased sediment transport and deposition, and increased flooding. To minimize impacts, all disturbed areas/slopes would be revegetated to prevent erosion after construction. If slopes are steeper than 4:1 (horizontal:vertical), an erosion control plan will be prepared during the design phase and submitted to the Caltrans District 4 Landscape Architect for approval. Swales that provide storm water treatment would be oversized where possible, and weir structures would be included that have small orifices to meter flow so that post-project flow rates and velocities would match the pre-project conditions. This would be the preferred hydromodification measure. Where swales would not adequately meter the post-project flow rates and velocities, additional hydromodification measures may include on-site structural measures to treat storm water just before it is released. Underground detention would be given lowest priority. Measure WQ-2 listed in Section 2.2.2.4 would minimize the impacts to water quality from hydromodification and bank destabilization.

Groundwater Resources

The project would add impervious area and reduce the available unpaved area that previously allowed runoff to infiltrate into the native soils. The reduction of runoff infiltrating through native soils has the potential to result in loss in volume or amount of water that previously recharged localized aquifers and reduce regional groundwater volumes. The reduction in local aquifer and groundwater recharge also has the potential to impact the beneficial uses of groundwater basins described in Section 2.2.2.2.

Table 2.2.2-1 summarizes the increases in impervious areas compared to the total surface area of the Sunol Valley and the Livermore Valley groundwater basins. The additional impervious area is minimal in comparison with the total area of the watershed.

Table 2.2.2-1: Added Impervious Area by Groundwater Basin

Groundwater Basin	Area of Groundwater Basin (acres)	Increase in impervious area (acres)	Percent Increase of Total Surface Area
Sunol Valley	16,623	30.13	0.18
Livermore Valley	69,531	0.07	0.0001

Measures WQ-1 and WQ-2 listed in Section 2.2.2.4 would avoid or minimize potential groundwater impacts.

2.2.2.4 Avoidance, Minimization, and/or Mitigation Measures

A SWPPP will be prepared by the Contractor and approved by Caltrans prior to the start of construction. The SWPPP includes the development of a Construction Site Monitoring Program that presents procedures and methods related to the visual monitoring and sampling analysis plans for non-visible pollutants, sediment and turbidity, and pH. As previously noted, the project has been determined to be Risk Level 3 (the highest risk). Risk Level 3 projects require compulsory monitoring of storm water runoff pH and turbidity, and pre- and post-construction aquatic biological assessments during specified seasonal windows.

With proper implementation of features or BMPs, short-term construction-related water quality impacts and permanent water quality impacts would be avoided or minimized.

Short-Term (Construction) BMPs

WQ-1. Potential temporary impacts to water quality can be avoided or minimized by implementing standard BMPs recommended for a particular construction activity. The selected temporary BMPs are consistent with the practices required under the Construction General Permit and the Caltrans MS4 permit and are intended to achieve compliance with the requirements of the permits. Compliance with the requirements of these permits, and adherence to the conditions, would reduce or avoid construction-related impacts to water quality. Table 2.2.2-2 lists minimum temporary control BMPs that would be implemented before and during construction.

Table 2.2.2-2: Construction BMPs

Temporary BMP	Purpose
Soil Stabilization	
Move-In/Move-Out	Mobilization locations where permanent erosion control or revegetation to sustain slopes is required within the project.
Temporary Cover	Plastic covers for stockpiles.
Sediment Control	
Temporary Fiber Rolls	Degradable fibers rolled tightly and placed on the toe and face of slopes to intercept runoff.
Temporary Silt Fence	Linear, permeable fabric barriers to intercept sediment-laden sheet flow. Placed downslope of exposed soil areas, along channels and project perimeter.
Temporary Gravel Bag Berm	Single row of gravel bags installed end to end to form a barrier across a slope to intercept runoff. Can be used to divert or detain moderately concentrated flows.
Temporary Drainage Inlet Protection	Runoff detainment devices used at storm drain inlets that are subject to runoff from construction activities.
Tracking Control	
Temporary Construction Entrances/Exits	Points of entrance/exit to a construction site that are stabilized to reduce the tracking of mud and dirt onto public roads.
Street Sweeping	Removal of tracked sediment to prevent them entering a storm drain or watercourse.
Non-Stormwater Management	
Dewatering Operations	Dewatering activities associated with storm water and non-storm water to prevent the discharge of pollutants from construction site.
Material and Equipment	Use, storage, and disposal of materials and equipment on barges, boats, temporary

Temporary BMP	Purpose
Use Over Water	construction pads, other platforms or other locations that minimize or eliminate the discharge of potential pollutants to a water course.
All other anticipated non-storm water management measures are covered under Job Site Management.	
Waste Management and Materials Pollution Control	
Temporary Concrete Washout Facilities	Specified vehicle washing areas to contain concrete waste materials.
All other anticipated waste management and materials pollution control measures are covered under Job Site Management.	
Job Site Management	
General measures covered under job site management include: -spill prevention and control -materials management -stockpile management -waste management -hazardous waste management -contaminated soil -concrete waste -sanitary and septic waste and liquid waste	Non-storm water management consists of: -water control and conservation -illegal connection and discharge detection and reporting -vehicle and equipment cleaning -vehicle and equipment fueling and maintenance -paving, sealing, saw cutting and grinding operations -thermoplastic striping and pavement markers -concrete curing and concrete finishing
Miscellaneous job site management includes: -training of employees and subcontractors -proper selection, deployment and repair of construction site BMPs	

Long-Term (Permanent) BMPs

WQ-2. The Caltrans MS4 permit contains provisions to reduce, to the maximum extent practicable, pollutant loadings from the facility once construction is complete. The permit stipulates that permanent measures that control pollutant discharges must be considered and implemented for all new or reconstructed facilities. Permanent control measures located within the Caltrans right-of-way reduce pollutants in storm water runoff from the roadway. These measures reduce the suspended particulate loads, and thus pollutants associated with the particles, from entering waterways. The measures would be incorporated into the final engineering design or landscape design of the project and would take into account expected runoff from the roadway. In addition, the permit also stipulates that an operation and maintenance program be implemented for permanent control measures, including both design pollution prevention BMPs and treatment BMPs.

The following BMPs will be considered to reduce long-term impacts to water quality.

- **Consideration of downstream effects related to potentially increased flow**

The project would discharge into unlined channels; therefore, necessary erosion control will be applied to the ditches. Increased sediment loads may be transported to downstream waterways; therefore, permanent erosion control measures should be applied to all new or exposed slopes. The project will incorporate hydromodification measures per Section7 of the Alameda County C.3 Stormwater Technical Guidance requirements.

- **Concentrated flow conveyance systems**

The project would have the potential to create water gullies, create or modify existing slopes, require the concentration of surface runoff, and be required to cross drains. Each of these conditions would require the proper design to the following drainage facilities to handle concentrated flows: ditches, berms, dikes, and/or swales, overside drains, flared end sections, and outlet protection/velocity dissipation devices.

- **Slope/surface protection systems**

The project would create or modify existing slopes requiring the application of vegetated surfaces and/or hard surfaces.

- **Preservation of existing vegetation**

At all locations, preserving existing vegetation is beneficial. The following general steps should be taken to preserve existing vegetation during the Design Phase:

- Identify and delineate in contract documents all vegetation to be retained.
- Designer should provide specifications in contract documents that the Contractor would delineate the areas to be preserved in the field prior to the start of soil-disturbing activities.
- Designer should provide specifications 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.
- Designer should, when specifying the removal of vegetation, consider provisions included in the contract documents to minimize impacts (increased exposure or wind damage) to the adjacent vegetation that will be preserved.

2.2.3 Geology/Soils/Seismic/Topography

2.2.3.1 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 CEQA.

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. The Caltrans Office of Earthquake Engineering is responsible for assessing the seismic hazard for Caltrans projects. Structures are designed using the Caltrans Seismic Design Criteria (SDC). The SDC 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.

2.2.3.2 Affected Environment

The following discussion is based on the *Preliminary Geotechnical Assessment Report* (AGS 2016), which was completed in October 2016.

Geological Setting

The project area encompasses portions of the Sunol Valley south of the SR 84/I-680 interchange, the southern extent of the Pleasanton Valley along Arroyo de la Laguna north of the interchange, and the Vallecitos Valley and Vallecitos Hills along SR 84 east of the interchange. These areas lie within an inland valley of the Coast Range Geomorphic Province of Central California, a series of northwest-trending mountain ranges and intermountain valleys bordered on the east by the Great Valley and on the west by the Pacific Ocean.

The valleys in the project area are filled with Quaternary deposits and include stream channel deposits, floodplain deposits, and young alluvial fan deposits. Above the valley floor are older alluvial fan deposits that include stream terrace deposits in some narrow canyons and on the margins of the Vallecitos Valley. The alluvial terraces at the mid-level elevations of the rolling foothills north and south of Vallecitos Creek are older sedimentary deposits. Deposits at higher elevation are deformed older sedimentary deposits known as the Livermore Gravels. Small to moderately sized landslide deposits mantle several steep-sided hills in the project area (Helley and Graymer 1997; Roberts et al. 1999). These deposits make up the majority of the geology within the project limits. The uplands to the west, south, and east of the project area are composed of Tertiary, Cretaceous, and late Jurassic deposits on top of the Mesozoic complexes. An unnamed sandstone of the Great Valley Sequence is located to the west of the Calaveras Fault, and farther south of the project area, exposures of the Franciscan Complex are visible.

Geologic Hazards

Surface Fault Rupture and Earthquake Shaking

The project corridor is located in a seismically active region that is subject to strong earthquakes. The active and potentially active faults in the project area are the Calaveras, Verona, Pleasanton,

Las Positas, Greenville-Marsh Creek, Mount Diablo Thrust, Hayward, Concord-Green Valley, and San Andreas faults. These major faults are considered to be capable of causing fault rupture or substantial ground shaking in the project area. The project corridor crosses three actively creeping strands of the Calaveras Fault in the vicinity of I-680, which are within the Alquist-Priolo Earthquake Fault Zone established for the Calaveras Fault. The Verona Fault (considered part of the Pleasanton Fault) crosses SR 84 within the project limits between approximately Vallecitos Atomic Laboratory Road and the western end of Pigeon Pass, and a Special Studies Zone for the Verona Fault extends to the north edge of SR 84. The *maximum moment magnitude* earthquake is defined as the largest earthquake that a given fault is calculated to be capable of generating. The maximum moment magnitude for the Calaveras Fault is 6.9, and for the Verona Fault is 6.6 (Caltrans 2012).

The project area is expected to experience strong to very strong ground shaking during large earthquakes on any of the major faults in the San Francisco Bay Area.

Liquefaction

Liquefaction occurs when a saturated or partially saturated soil substantially loses strength and stiffness in response to an applied stress, such as earthquake shaking or sudden change in stress condition, causing the soil to behave like a liquid. The project corridor is considered to have low to moderate susceptibility to liquefaction.

Landslides

The California Geological Survey (CGS) performed an inventory of existing landslides in much of the San Francisco Bay Area by analyzing aerial photographs and satellite imagery, field reconnaissance and a review of previously published landslide mapping. Areas found to be most susceptible to earthquake-induced landslides are steep slopes in poorly cemented or highly fractured rocks, areas underlain by loose, weak soils, and areas on or adjacent to existing landslide deposits. These geologic and terrain conditions exist in many parts of the project area.

The combination of geology with the proximity of faults constitutes a substantial seismic hazard in the project area. In general, areas mapped as Briones Formation, Livermore Gravels, Pleistocene alluvial fan and fluvial deposits, and Pleistocene alluvial terrace deposits have an elevated risk for seismic slope failure depending upon the slope characteristics including slope inclination, vegetative cover, slope disturbance, and drainage (CGS 2004, 2008a, 2008b).

There are several small landslides along the existing slopes in the project vicinity. Project elements that alter the existing slopes by grading, either by cutting slopes or by placing fill, would change the slope stability characteristics, potentially undercutting or loading unstable or marginally stable existing slopes.

Seiche

The San Antonio Reservoir, owned and operated by the City and County of San Francisco, lies approximately 1.5 miles south of the project corridor on SR 84 and impounds both natural stream runoff from the watershed and imported water from the Hetch Hetchy aqueduct system. In the event of a large earthquake in the project area, a seiche (essentially a wave in an enclosed or partially enclosed body of water) within San Antonio Reservoir could send a small fraction of reservoir water into Vallecitos Creek.

Expansive or Corrosive Soils

Expansive soils that shrink or swell with changes in moisture content have the potential to disrupt structures that are constructed on them. The clayey soils of the Azule, Danville, Diablo, Los Osos, Positas, San Ysidro and Zamora associations in the project area are reported to be moderately to highly expansive (USDA 1966). These soil associations are mapped in the vicinity of the bridges and existing and proposed retaining wall structures in the project area. Expansive soils can cause differential settlement, pavement cracking, and roadway pavement deterioration, leading to poor surface drainage and water ponding on the roadway.

The project area does not contain corrosive soils.

Settlement

Settlement may result in damage to structures, cracking or deterioration of pavements, and trapping of surface runoff in depressions. Fill materials, which may be placed on alluvial soils along the project alignment, can have the potential to settle as a result of consolidation of the underlying soils.

Erosion and Scour

The clayey and silty soils of the Diablo, Los Osos, Perkins, and Positas associations are reported to pose moderate, severe and very severe erosion hazards, especially on steep slopes. These soil associations are mapped in the project vicinity.

Areas near the Vallecitos Creek drainage could be susceptible to scour.

Groundwater

The project corridor is located in Basin 2-11 of the Sunol Valley Groundwater Basin (California Department of Water Resources 2003). In this basin, the general direction of groundwater flow is from upland areas toward Alameda Creek, and then westward out of the basin. Groundwater levels typically vary by season, with the local stream drainages in the Vallecitos Valley flowing with runoff during the rainy season but drying up after winter rains cease and remaining dry through most of the summer. Arroyo de la Laguna typically flows year-round, as its flow is partially controlled through upstream releases from reservoirs for groundwater recharge north of the project. Numerous small stock ponds across the Vallecitos Valley impound surface runoff to provide water for agriculture and livestock.

Groundwater may be encountered within about 20 to 30 feet of the surface in the hills to the east and west of the GE-Hitachi Vallecitos Nuclear Center, in relatively impermeable materials mapped as Livermore Gravels. Groundwater may be as shallow as 2 feet below ground surface in the more permeable Young Alluvium deposits along Vallecitos Creek, in the flat-lying area south of the GE-Hitachi Vallecitos Nuclear Center, and along small perennial stream drainages crossing the project corridor.

2.2.3.3 Environmental Consequences

No Build Alternative

The No Build Alternative would be subject to the same geologic, soils, and seismic hazards as the Build Alternative. The No Build Alternative would not affect groundwater.

Build Alternative

Surface Fault Rupture and Earthquake Shaking

The project corridor crosses three strands of the Calaveras Fault in the vicinity of the SR 84/I-680 interchange and is near several other active faults. These faults have a high potential to affect bridge structures in the vicinity of the SR 84/I-680 interchange through surface fault rupture or fault creep (slow movement along a fault).

Strong ground shaking is anticipated to occur within the project area as a result of any seismic event occurring on nearby active faults. Strong ground shaking in the project vicinity is likely to damage structures not designed to withstand intense or prolonged seismic shaking. Measure GEO-1 listed in Section 2.2.3.4 would limit the potential for people or structures to be exposed to substantial adverse effects from surface fault ruptures and earthquake shaking. No further measures are needed to address seismic risks.

Liquefaction

Liquefaction can damage project structures and the roadway, including through pavement displacement or buckling, retaining wall movement, or bridge foundation settlement. Project features with the highest potential to be affected are near the existing and former stream channels of Vallecitos Creek and its tributaries. Potentially liquefiable soils underlie the Calaveras Road Separation bridge where southbound I-680 crosses over Paloma Way, the Scott's Corner Separation bridge over the I-680 southbound on-ramp connector from SR 84, and the Koopman Road Undercrossing bridge on southbound I-680. Measure GEO-2 listed in Section 2.2.3.4 would limit the potential for people or structures to be exposed to substantial adverse effects from liquefaction.

Landslides

The potential for seismically induced landslides exists on steep slopes within Livermore Gravels deposits along SR 84 and I-680 in the vicinity of the interchange, along I-680 north and south of the interchange, and along SR 84 on slopes east of the interchange, extending to the eastern project limit on SR 84. Measure GEO-2 listed in Section 2.2.3.4 would limit the potential for people or structures to be exposed to substantial adverse effects from landslides.

Further investigation is required to evaluate the potential for non-seismically induced landslides in the project area. Measure GEO-2 listed in Section 2.2.3.4 would provide for investigations to address landslides and other geologic hazards.

Seiche

In the event of an earthquake, seiche-related flooding from the San Antonio Reservoir has the potential to reach Vallecitos Creek. Depending upon the size and duration of the seiche, reservoir water could reach the existing Vallecitos Creek box culvert under I-680 near the SR 84/I-680 interchange and affect the Scott's Corner Separation bridge, the proposed flyover ramp from Calaveras Road to northbound I-680, and nearby proposed retaining walls. Measure GEO-2 listed in Section 2.2.3.4 would limit the potential for people or structures to be exposed to substantial adverse effects caused by a seiche.

Expansive or Corrosive Soils

Soils with moderate to high expansive potential are mapped near the SR 84/I-680 interchange and the GE-Hitachi Vallecitos Nuclear Center (Positas gravelly loam), and near the Koopman Road undercrossing and south of the Calaveras Road Separation bridge (Zamora silt loam). Soils with high expansive potential are mapped on SR 84 southeast of Ruby Hill Drive (Diablo clay). Measure GEO-2 listed in Section 2.2.3.4 would limit the potential for people or structures to be exposed to substantial adverse effects from expansive soils.

Settlement

Soft soils with the highest potential for long-term settlement are located on the north side of SR 84 between the SR 84/I-680 interchange and the GE-Hitachi Vallecitos Nuclear Center. It is anticipated that engineered fill would be installed and allowed to settle for any project structures located on soft soils. Measure GEO-2 listed in Section 2.2.3.4 would limit the potential for people or structures to be exposed to substantial adverse effects from settlement.

Erosion and Scour

There is the potential for moderate to very severe erosion hazards, especially on steep slopes in the vicinity of the proposed flyover ramp from Calaveras Road to northbound I-680 and the Koopman Road Undercrossing bridge, and beneath several proposed retaining wall locations. Retaining wall locations near Vallecitos Creek are potentially susceptible to scour. Measure GEO-2 listed in Section 2.2.3.4 would limit the potential for people or structures to be exposed to substantial adverse effects from erosion and scour.

Groundwater Conditions

Groundwater could be encountered during construction, if piles for proposed structures are drilled rather than driven. Measure GEO-2 listed in Section 2.2.3.4 would limit potential impacts to groundwater.

2.2.3.4 Avoidance, Minimization, and/or Mitigation Measures

GEO-1. Caltrans' design and construction guidelines incorporate engineering standards that address seismic risks. Project elements will be designed and constructed to meet seismic design requirements for ground shaking and ground motions, as determined for the project vicinity and site conditions.

GEO-2. Additional geotechnical subsurface and design investigations will be performed during the final project design and engineering phase. The investigations will include site-specific evaluation of subsurface conditions at the locations of proposed bridge footings and retaining walls, as well as investigations for earthquake-induced liquefaction, soil expansion, compaction settlement, landslide, seiche, erosion, and scour. An evaluation of construction dewatering will be included as a part of the field investigation program to provide the basis for construction dewatering plans.

2.2.4 Paleontology

2.2.4.1 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. The following laws apply to this project:

- 23 USC 1.9(a) requires that the use of Federal-aid funds must be in conformity with all federal and state laws.
- 23 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 CEQA.

2.2.4.2 Affected Environment

This section summarizes the *Paleontological Evaluation Report/Paleontological Mitigation Plan* (WRECO 2016b) prepared for the proposed project, which was completed in September 2016. According to regional geologic maps, SR 84 in the project limits extends eastward from the southern end of the Livermore Valley (an east-west trending structural low located within the Diablo Range of California), traverses over Pigeon Pass into Vallecitos Valley, and lastly into Sunol Valley. I-680 in the project limits extends southward from the southern portion of Amador Valley and follows Arroyo de la Laguna southward into Sunol Valley. Sunol Valley is bounded along the east by the Calaveras Fault, which runs parallel to and west of Arroyo de la Laguna. The valley areas are filled with Quaternary sediments derived from erosion of the surrounding hills that are composed of Tertiary sedimentary rocks.

The Livermore Gravels (QTlg) were deposited in river and stream environments between approximately 1 and 5 million years ago as the Diablo Range and Mount Diablo began to uplift. Regional tectonics at the time included freshwater basin formation (the Livermore-Pleasanton basin) associated with intervening mountain uplift. As strike-slip faulting along the Calaveras Fault propagated northward through this area and subduction-related tectonics ceased, a new terrestrial environment was created in the Livermore-Pleasanton-Sunol basin. The marine environment in that area rolled westward, and streams and rivers began draining from the newly uplifted East Bay Hills and Diablo Range areas into paleo alluvial valleys and floodplains, creating a new paleoenvironment for which now-extinct, latest Pliocene to Pleistocene vertebrates dominated the landscape.

Table 2.2.4-1 describes the geologic units within the project area.

Table 2.2.4-1: Geologic Units in the Project Area (Youngest to Oldest)

Unit Symbol	Unit Description	Age
Qg	Sand and gravel of major stream channels	Holocene
Qa	Alluvial gravel, sand and clay of valley areas	Holocene-Late Pleistocene
Qoa/Qoal	Older alluvial gravel and sand	Late Pleistocene
Qol	Older alluvial gravel and sand, reddish brown	Pleistocene
QTlg	Livermore Gravel, gravel and conglomerate of pebbles and cobbles of mostly Franciscan detritus, includes reddish claystone	Pliocene to Early Pleistocene
Tbr	Briones Sandstone, includes layers of siltstone and commonly fossiliferous	Late Miocene
Tmc	Monterey Formation, clay shale or siltstone	Late to Middle Miocene

Caltrans uses a three-part scale to characterize paleontological sensitivity, consisting of no potential, low potential, and high potential (Caltrans 2012). The scale generally correlates with the likelihood for a geologic unit to contain significant vertebrate, invertebrate, or plant fossils. The paleontological sensitivity of each geologic unit is described in Table 2.2.4-2.

Table 2.2.4-2: Paleontological Sensitivity

Caltrans Sensitivity Designation	Characteristics of Geologic Units in this Category
High Potential (High Sensitivity) -Pleistocene Deposits (Qa, Qol, Qoal) -Livermore Gravel (QTlg) -Briones Sandstone (Tbr) -Monterey Formation (Tmc)	This category consists of rock units known to contain significant vertebrate, invertebrate, or plant fossils anywhere within their geographic extent, including sedimentary rock units that are suitable for the preservation of fossils, as well as some volcanic and low-grade metamorphic rock units. This category includes rock units with the potential to contain: • abundant vertebrate fossils; • a few significant vertebrate, invertebrate, or plant fossils that may provide new and significant taxonomic, phylogenetic, ecological, and/or stratigraphic data; • areas that may contain datable organic remains older than Recent; • areas that may contain unique new vertebrate deposits, traces, and/or trackways; and • fossiliferous deposits with very limited geographic extent or an uncommon origin (e.g., tar pits and cave deposits).
Low Potential (Low Sensitivity) -None	This category includes sedimentary rock units that • are potentially fossiliferous, but have not yielded significant fossils in the past; • have not yet yielded fossils, but have the potential to contain fossil remains; or • contain common and/or widespread invertebrate fossils of species whose taxonomy, phylogeny, and ecology are well understood.
No Potential (No Sensitivity) -Holocene Deposits (Qg)	This category typically includes rock units of intrusive igneous origin, most extrusive igneous rocks, moderate- to high-grade metamorphic rocks, and young (<8,000 year) sediments.

A paleontological resource is significant if one or more of the following criteria apply:

- The fossils provide information on the evolutionary relationships and developmental trends among organisms, living or extinct;
- The fossils provide data useful in determining the age(s) of the rock unit or sedimentary stratum, including data important in determining the depositional history of the region and the timing of geologic events therein;
- The fossils provide data regarding the development of biological communities or interaction between paleobotanical and paleozoological biotas;
- The fossils demonstrate unusual or spectacular circumstances in the history of life;
- The fossils are in short supply and/or in danger of being depleted or destroyed by the elements, vandalism, or commercial exploitation, and are not found in other geographic locations.

As so defined, significant paleontological resources are determined to be fossils or assemblages of fossils that are unique, unusual, rare, uncommon, or diagnostically important. Significant fossils can include remains of large to very small aquatic and terrestrial vertebrates or remains of plants and animals previously not represented in certain portions of the stratigraphy. Assemblages of fossils that might aid stratigraphic correlation, particularly those offering data for the interpretation of tectonic events, geomorphologic evolution, and paleoclimatology are also critically important.

According to the sensitivity rankings for the geologic units in the project area, the only location that is not within a paleontologically sensitive geologic unit is in the immediate vicinity of Alameda Creek, which is Holocene and too young to be paleontologically significant. Otherwise, the entire project area is located within geologic units that could contain significant, nonrenewable paleontological resources.

Due to the presence of sensitive geologic units within the project area, a Paleontological Mitigation Plan (WRECO 2016c) was prepared to address potential discoveries during project construction.

2.2.4.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not include any ground-disturbing activities and would, therefore, not affect paleontological resources.

Build Alternative

Proposed project activities would encounter geologic units that are known to contain paleontological resources. Locations where ground-disturbing activities are proposed in paleontologically sensitive geologic units are summarized below. The specific depths and locations of all excavations are preliminary and will be reevaluated as the project design progresses.

- Ground-disturbing activities for abutments, bents, and piles for work associated with the proposed Calaveras Road undercrossing along northbound I-680 are anticipated to reach depths of up to 62 feet.
- Bridge widening and ground-disturbing activities would disturb native soils and rock along southbound I-680 at the Calaveras Road Separation bridge with anticipated excavations of up to 72.5 feet from existing grade.
- Bridge widening and ground-disturbing activities along the western edge at the Scott's Corner Separation bridge would disturb native soils and rock with anticipated excavations of up to 44.5 feet from existing grade.
- The proposed Calaveras Road to northbound I-680 flyover ramp would disturb native soils and rock with anticipated excavations of up to approximately 53 feet from existing grade.
- Koopman Road Undercrossing bridge widening activities would disturb native soil/rock to depths of up to 74.5 feet from existing grade.
- HOV/express lane signs would require ground-disturbing construction activities to depths of approximately 35 feet below existing grade.
- PG&E utility poles proposed for relocation would require ground-disturbing activities to depths of approximately 6 feet.
- Dual-purpose box culverts for drainage and wildlife crossings and dedicated wildlife crossings would disturb native soils up to 10 feet below existing grade.
- Excavation for several retaining walls would disturb native soils to depths of up to 6 feet below existing grade.

Caltrans Standard Specification 14-7.03 will be implemented to provide for stopping work, securing the area, and performing further investigation if paleontological resources are encountered during project construction. In addition, implementation of Measure PAL-1 described in Section 2.2.4.4 will be required for the ground-disturbance phases of the activities listed above to minimize potential effects on paleontological resources, if present. Measure PAL-1 would reduce potential impacts to paleontological resources by allowing for the recovery of fossil remains and associated specimen data and corresponding geologic and geographic site data that otherwise might be lost. No permits are anticipated to be needed for monitoring or fossil recovery.

2.2.4.4 Avoidance, Minimization, and/or Mitigation Measures

PAL-1. Implementation of the following measures would avoid potential impacts to sensitive paleontological resources, if present.

- Update and finalize the Paleontological Mitigation Plan once project design is nearly complete. The final plan will be implemented during construction.
- Include a specification in the construction contract stating that paleontological monitoring will occur in accordance with the Paleontological Mitigation Plan.

2.2.5 Hazardous Waste/Materials

2.2.5.1 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 (CERCLA) of 1980, and the Resource Conservation and Recovery Act (RCRA) of 1976. The purpose of CERCLA, often referred to as "Superfund," is to identify and cleanup abandoned contaminated sites so that public health and welfare are not compromised. The RCRA provides for "cradle to grave" regulation of hazardous waste generated by operating entities. Other federal laws include:

- Community Environmental Response Facilitation Act of 1992
- CWA
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety and Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act
- Federal Insecticide, Fungicide, and Rodenticide Act

In addition to the acts listed above, EO 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 RCRA in the state. California law also addresses specific handling, storage, transportation, disposal, treatment, reduction, cleanup and emergency planning of hazardous waste. 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 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 material is vital if it is found, disturbed, or generated during project construction.

2.2.5.2 Affected Environment

The analysis summarized in this section is based on the *Initial Site Assessment* (ISA) prepared for the project (Baseline Environmental Consulting [Baseline], December 2016). The ISA was prepared in accordance with the Caltrans (2016) *Environmental Handbook* and American Society for Testing and Materials (ASTM) International's (2013) Standard Practice Method E1527-13 (ASTM 2013). The purpose of the ISA is to identify potential hazardous materials in soil, groundwater, and/or building materials that could be disturbed during project construction and maintenance activities. The assessment included a site reconnaissance and review of historical aerial photographs, environmental records, and investigations of hazardous materials release sites within 1 mile of the proposed project.

In accordance with Caltrans' 2016 guidance, the ISA evaluated potential sources of hazardous materials that could be affected by the project. The ISA identified health risks associated with the potential disturbance of aerially deposited lead (ADL) and pesticide residues in shallow soils and petroleum hydrocarbons in groundwater during project construction and maintenance activities. The ISA also identified health risks associated with the potential disturbance of hazardous building materials and naturally occurring asbestos during project construction and maintenance activities. The potential sources of hazardous materials evaluated in the ISA are discussed in greater detail below.

Hazardous Materials Sites

Based on review of regulatory agency records, the ISA identified five hazardous materials release sites within 1 mile of the proposed project area that required regulatory oversight for investigation and cleanup activities (Table 2.2.5-1 and Figure 2.2.5-1). Three of the release sites' cases have been closed (i.e., cleanup is complete) and do not pose a threat of affecting environmental conditions in the project area. The other two release site cases are in the process of being closed, which indicates that these sites would also not pose a threat of affecting environmental conditions in the project area.

Aerially Deposited Lead from Highways

Lead alkyl compounds were added to gasoline from 1920 up to mid-1980s. As a result, shallow soils along highway corridors have the potential to be contaminated with ADL from historical vehicle emissions. SR 84 and I-680 were constructed before the full phase-out of lead in gasoline. Therefore, exposed shallow soils adjacent to the highways in the project corridor could be contaminated with ADL.

Pesticide Residues from Agriculture

Inorganic pesticides containing elevated concentrations of metals were commonly used in California prior to 1950. From 1950 up to mid-1970s, organochlorine pesticides (OCPs) were commonly used. Arsenic from inorganic pesticide and residues from OCPs have the potential to persist for many decades in soil. Agriculture has been present in the project vicinity as early as 1940, and a plant nursery was located in part of the project corridor as early as about 1960. Therefore, arsenic and OCPs may be present in shallow soils in the project corridor.

Table 2.2.5-1: Hazardous Materials Release Sites within 1 Mile of the Project

Site Name and Address	Regulatory Database	Case Status	Summary
Sunol Tree Gas, 3004 Andrade Rd	LUST	Active (Closure Pending)	A release of petroleum from underground storage tanks was reported in 2002. Residual groundwater contamination remains on the site at levels that present a low threat to human health and the environment. Therefore, the RWQCB is currently in the process of closing the case on the site.
Mission Valley Rock and Asphalt, 7999 Athenour Way	LUST and SLIC	Closed	A release of petroleum from underground storage tanks was reported in 1996. Staining from petroleum hydrocarbons near a sump was also noted during an inspection of an equipment rental facility at this site in 2007. The cases were closed in 2014.
Chevron Sunol Pipeline, 2793 Calaveras Road	SLIC	Closed	A pipeline accident in 2005 resulted in the release of gasoline. The case was closed in 2015.
Walgreens Sunol, 9494 Koopman Road	SLIC	Active (Closure Requested)	A release of diesel from a tractor-trailer truck was reported in 2014. The diesel entered a ditch and flowed west under the I-680 overpass at Koopman Road. The spill was contained and approximately 30 yards of contaminated soil was removed from the spill vicinity. A soil investigation in February 2017 reported low levels of diesel that do not present a threat to human health and the environment. Therefore, a request for case closure is under review by the RWQCB.
GE Vallecitos Nuclear Center, 6705 Vallecitos Road	SLIC and Corrective Action	Closed	Releases of solvents, diesel, and polychlorinated biphenyls have been reported since 1992. Following remediation activities, the case was closed in 1997.

Sources: Baseline 2016; State Water Resources Control Board 2017.
Notes: LUST = Leaking underground storage tank
SLIC = Spills, Leaks, Investigations, and Cleanups

Figure 2.2.5-1: Hazardous Materials Release Sites in the Project Area

Petroleum from Farm Tanks

Existing and former farms in the project vicinity may have used tanks for fueling vehicles and equipment. "Farm tanks" less than 1,100 gallons in capacity are exempt from many regulatory requirements. If an undocumented release of petroleum from a farm tank occurred in the project vicinity, petroleum-related contaminants could potentially have affected groundwater beneath the project corridor.

Petroleum from a Utility Pipeline

An underground petroleum pipeline is located parallel to and immediately west of I-680 north of the Koopman Road undercrossing. Existing pipeline safety regulations would minimize potential impacts associated with future releases of petroleum; however, they do not remove the possibility that undocumented petroleum releases occurred in the past. As a result, groundwater beneath the project corridor could potentially be contaminated by an undocumented release from the petroleum pipeline.

Naturally Occurring Asbestos from Bedrock

Geologic mapping reviewed for the ISA did not identify any deposits of naturally occurring asbestos at or near the project site. However, undocumented fill material in the project corridor could potentially contain naturally occurring asbestos imported from other areas.

Hazardous Building Materials from Roadway and Overpass Structures

Overcrossing structures at the project site may be coated with lead-based paint and/or asbestos-containing materials. Lead and asbestos are state-recognized carcinogens, and lead is a reproductive toxicant. Demolition or renovation of structures containing lead-based paint and/or asbestos-containing materials could pose a risk of releasing lead particles and asbestos fibers into the environment.

Lead chromate has been used in yellow thermoplastic and yellow paint for traffic striping and pavement marking for many years and as recently as 2004. The residue that may be produced from the yellow thermoplastic and yellow paint during road improvement activities may contain lead and hexavalent chromium concentrations that could produce toxic fumes when heated. Existing yellow thermoplastic and yellow paint striping and markings in the project corridor may contain elevated concentrations of lead and hexavalent chromium.

Asphalt concrete grindings and Portland cement concrete grindings have a relatively high pH and may contain metals and petroleum hydrocarbons that can impact storm water runoff and threaten surface water quality.

2.2.5.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not affect potential sources of hazardous materials in the project area.

Build Alternative

Handling and Storage of Hazardous Materials

Project construction and maintenance activities are expected to involve the routine transport, use, and disposal of hazardous materials (e.g., fuels, paints, and lubricants) that could pose a significant threat to human health or the environment if not properly managed. The transport, use, and disposal of hazardous materials during construction is regulated and enforced by federal and state agencies.

Workers who handle hazardous materials are required to adhere to OSHA and Cal/OSHA health and safety requirements. Hazardous materials must be transported in accordance with RCRA and USDOT regulations and disposed of in accordance with RCRA and the California Code of Regulations (CCR) at a facility that is permitted to accept the waste.

In accordance with the SWRCB, a storm water pollution prevention plan (SWPPP) must be prepared and implemented during construction for coverage under the Construction General Permit. The SWPPP requires implementation of BMPs for hazardous materials storage and soil stockpiles, inspections, maintenance, training of employees, and containment of releases to prevent runoff into existing storm water collection systems or waterways.

Adherence to federal and state regulations during project construction and maintenance reduces the risk of exposure to hazardous materials, as well as accidental hazardous materials releases. Compliance with existing regulations is mandatory; therefore, construction of the Build Alternative is not expected to create a hazard to construction workers, the public, or the environment through the routine transport, use, disposal, or accidental release of hazardous materials. As a result, the project would have no adverse effects related to the routine transport, use, disposal, or accidental release of hazardous materials during construction and maintenance activities and no mitigation is required.

Disturbance of Hazardous Materials

Based on the findings of the ISA, construction and maintenance of the Build Alternative could result in the potential disturbance of hazardous materials in soil, groundwater, and building materials in the project corridor. The potential sources of hazardous materials that could affect the Build Alternative are summarized in Table 2.2.5-2.

ADL from the historical use of leaded gasoline exists along roadways throughout California. There is the likely presence of soils with elevated concentrations of lead as a result of ADL on the State Highway System right-of-way within the limits of the project alternatives. Soil determined to contain lead concentrations exceeding stipulated thresholds must be managed under the July 1, 2016 ADL Agreement between Caltrans and the California Department of Toxic Substances Control (DTSC). This ADL Agreement allows such soils to be safely reused within the project limits as long as all requirements of the ADL Agreement are met.

The disturbance of hazardous materials during project construction and maintenance activities, such as excavation and dewatering, could pose an adverse effect to human health and the environment. Implementation of Measure HAZ-1 described in Section 2.2.5.4 would ensure that potential hazardous materials in soil, groundwater, and building materials are investigated prior to construction and site-specific control measures are incorporated into the final project design to

address the potential adverse effects to human health and the environment (if any) that could result from the disturbance of hazardous materials.

Table 2.2.5-2: Potential Hazardous Materials Sources in the Project Area

Hazardous Materials Source	Affected Media	Constituents of Concern
ADL	Shallow soils	Lead
Pesticide Residues	Shallow soils	Arsenic and OCPs
Farm Tanks	Groundwater	Petroleum hydrocarbons
Petroleum Pipeline	Groundwater	Petroleum hydrocarbons
Naturally Occurring Asbestos	Soils	Asbestos
Hazardous Building Materials	Pavement and overpass structures	Lead and asbestos

Source: Baseline 2016

2.2.5.4 Avoidance, Minimization, and/or Mitigation Measures

HAZ-1: During the final project design phase, a Preliminary Site Investigation (PSI) will be performed in accordance with current Caltrans guidance to investigate hazardous materials concerns related to soil, groundwater, and building materials within the project limits, as identified in the project ISA. The purpose of the PSI will be to pre-characterize soils, groundwater, and building materials for potential disposal and/or reuse and evaluate the chemical quality of soils for construction worker health and safety. A work plan for the PSI will be submitted to Caltrans for review and approval. Additional investigation may be required to fully evaluate hazardous materials issues if concerns are identified during the PSI. All environmental investigations for the project will be provided to project contractors, so the findings may be incorporated into their Health and Safety and Hazard Communication Programs.

The PSI will include recommendations for managing hazardous materials encountered during project construction to protect human health and the environment; these measures shall be incorporated into the final project design. Based on the findings of the investigation, the PSI shall refine, as necessary, the following recommendations for managing hazardous materials in soil, groundwater, and buildings materials:

- ADL-contaminated soils shall be reused in accordance with the DTSC's 2016 *Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils*.
- Lead Compliance Plans for ADL-contaminated soils and pavement markings containing lead shall be prepared in accordance with Caltrans Standard Special Provisions and implemented by the project construction contractor(s) to ensure compliance with OSHA and Cal/OSHA worker safety regulations.
- Groundwater from dewatering of excavations, if any, shall be stored in Baker tanks during construction activities and characterized to determine the appropriate treatment requirements (if necessary) for discharge/disposal. The extracted groundwater shall be collected and managed for disposal/treatment in compliance with local and/or state regulations.
- All loose and peeling lead-based paint and asbestos-containing material shall be removed by a certified contractor(s) in accordance with local, state, and federal requirements. All other

hazardous materials will be removed from structures in accordance with Cal/OSHA regulations.

- Asphalt concrete and Portland cement concrete grindings shall be reused in accordance with the San Francisco Bay RWQCB's (2007) guidance to protect water quality or transported off-site for recycling or disposal.

Preparation of the PSI for the Build Alternative is anticipated to cost approximately $250,000. In the event that soils cannot be reused in the project corridor and must be disposed as a hazardous waste at a permitted facility, the off-site disposal activities could cost up to approximately $1.5 million and extend the construction period by about four months; however, this is considered a worst-case scenario and would not likely be required since ADL-contaminated soils can be reused in accordance with the *Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils* (DTSC 2016). Based on the constituents of concern identified in Table 2.2.5-2, implementation of special soil and/or groundwater remediation and handling efforts during construction is anticipated to cost approximately $400,000.

2.2.6 Air Quality

2.2.6.1 Regulatory Setting

The Federal Clean Air Act (FCAA), as amended, is the primary federal law that governs air quality while the California Clean Air Act (CCAA) is its companion state law. These laws, and related regulations by the USEPA and California Air Resources Board (CARB), set standards for the concentration of pollutants in the air. At the federal level, these standards are called National Ambient Air Quality Standards (NAAQS). NAAQS 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 (CO), nitrogen dioxide (NO_2), ozone (O_3), 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 (SO_2). In addition, national and state standards exist for lead (Pb) and state standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS 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 in their general definition.

Federal air quality standards and regulations provide the basic scheme for project-level air quality analysis under NEPA. In addition to this environmental analysis, a parallel "Conformity" requirement under the FCAA also applies.

Conformity

The conformity requirement is based on FCAA Section 176(c), which prohibits the USDOT and other federal agencies from funding, authorizing, or approving plans, programs or projects that do not conform to the State Implementation Plan (SIP) for attaining the NAAQS. "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 NAAQS, and only for the specific NAAQS that are or were violated. USEPA regulations at 40 CFR 93 govern the conformity process. Conformity requirements do not apply in unclassifiable/attainment areas for NAAQS 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 NAAQS for CO, NO_2, O_3, particulate matter (PM_{10} and $PM_{2.5}$), and in some areas (although not in California), SO_2. California has nonattainment or maintenance areas for all of these transportation-related "criteria pollutants" except SO_2, and also has a nonattainment area for lead; however, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on emission analysis of RTPs and Federal Transportation Improvement Programs (FTIPs) that include all transportation projects planned for a region over a period of at least 20 years for the RTP and 4 years for the FTIP. RTP and FTIP 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 FCAA and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization, FHWA, and FTA make determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the FCAA. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept and scope and the "open to traffic" schedule of a proposed transportation project are the same as described in the RTP and FTIP, then the proposed project meets regional conformity requirements for purposes of project-level analysis.

Project-level conformity is achieved by demonstrating that the project comes from a conforming RTP and TIP; the project has a design concept and scope[24] that has not changed significantly from those in the RTP and TIP; project analyses have used the latest planning assumptions and USEPA-approved emissions models; and in PM areas, the project complies with any control measures in SIP. Furthermore, additional analyses (known as hot-spot analyses) may be required for projects located in CO and PM nonattainment or maintenance areas to examine localized air quality impacts.

2.2.6.2 Affected Environment

The analysis summarized in this section is from the *Air Quality Impact Assessment* completed for the proposed project in June 2017 (Baseline 2017).

Climate, Meteorology and Topography

The project is located within the Livermore Valley climatological subregion of the San Francisco Bay Area Air Basin (SFBAAB), as defined by the Bay Area Air Quality Management District (BAAQMD). Air basins have natural characteristics that limit the ability of natural processes to either dilute or transport air pollutants. The major determinants of air pollution transport and dilution are climatic and topographic factors such as wind, atmospheric stability, terrain that influences air movement, and sunshine. Wind and terrain can combine to transport pollutants away from upwind areas, while solar energy can chemically transform pollutants in the air to create secondary photochemical pollutants such as O_3.

The Bay Area has a Mediterranean climate characterized by wet winters and dry summers. During the summer, a high-pressure cell centered over the northeastern Pacific Ocean results in stable meteorological conditions and a steady northwesterly wind flow that keep storms from affecting the California coast. During the winter, the Pacific high-pressure cell weakens, resulting in increased precipitation and the occurrence of storms. The highest air pollutant concentrations in the Bay Area generally occur during inversions, when a surface layer of cooler air becomes trapped beneath a layer of warmer air. An inversion reduces the amount of vertical mixing and dilution of air pollutants in the cooler air near the surface.

The Livermore Valley is a sheltered inland valley within the Diablo Range near the eastern border of the SFBAAB. In the summer, the Livermore Valley is characterized by clear skies and relatively warm weather with maximum temperatures ranging from the high 80s to low 90s (degrees Fahrenheit). Cold water upwelling along the coast and hot inland temperatures during the summer can cause a strong onshore pressure gradient, which translates into a strong

[24] "Design concept" means the type of facility that is proposed, such as a freeway or arterial highway. "Design scope" refers to those aspects of the project that would clearly affect capacity and thus any regional emissions analysis, such as the number of lanes and the length of the project.

afternoon wind. In the winter, the air flow in the Livermore Valley is often affected by local conditions. Winter temperatures are mild and usually range from the high 30s to low 60s (degrees Fahrenheit). The mean precipitation in the winter is about 14 inches.

For the Livermore Valley, the air pollution potential is high especially for photochemical pollutants. The Livermore Valley not only traps locally generated pollutants but can be the receptor of O_3 and O_3 precursors from San Francisco, Alameda, Contra Costa and Santa Clara counties.

Regional Air Quality Conformity

The BAAQMD monitors pollutants of concern and air quality conditions throughout the SFBAAB. Table 2.2.6-1 includes a summary of the applicable air quality standards and the SFBAAB's attainment status with respect to the air quality standards. For the NAAQS, the SFBAAB is currently designated a maintenance area[25] for the 8-hour CO standard and a nonattainment area for the 8-hour O_3 standard and 24-hour $PM_{2.5}$ standard. For the California Ambient Air Quality Standards (CAAQS), the SFBAAB is designated a nonattainment area for the 1-hour and 8-hour O_3 standards, the annual average and 24-hour PM_{10} standards, and the annual average $PM_{2.5}$ standard. The SFBAAB is classified as attainment or unclassified for the remaining NAAQS and CAAQS.

[25] On March 31, 1998, the USEPA approved California's SIP revision and the redesignation became effective on June 1, 1998. CARB submitted a revised CO plan to the USEPA on November 8, 2004, with an update to the CO maintenance plan that showed how the 10 urban areas will continue to maintain the CO standard through 2018.

Table 2.2.6-1: State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	State[1] Standard	Federal[2] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Ozone (O_3)	1 hour	0.09 ppm	--[3]	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 (NO_x) 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.	Nonattainment	Nonattainment (Marginal)
	8 hours	0.070 ppm	0.070 ppm (4^{th} highest in 3 years)				
Carbon Monoxide (CO)	1 hour	20 ppm	35 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.	Attainment	Attainment-Maintenance (Moderate)
	8 hours	9.0 ppm[1]	9 ppm				
Respirable Particulate Matter (PM_{10})[4]	24 hours	50 µg/m^3 [6]	150 µg/m^3 (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.	Nonattainment	Unclassified
	Annual	20 µg/m^3	--[4]				

Pollutant	Averaging Time	State[1] Standard	Federal[2] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Fine Particulate Matter ($PM_{2.5}$)[4]	24 hours	---	35 µg/m^3	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.	Nonattainment	Attainment-Unclassified (Annual standard); Nonattainment (Moderate; 24-hour standard)
	Annual	12 µg/m^3	12.0 µg/m^3				
	Secondary Standard (annual; also for conformity process[4])	---	15 µg/m^3 (98^{th} percentile over 3 years)				
Nitrogen Dioxide (NO_2)	1 hour	0.18 ppm	0.100 ppm[5]	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.	Attainment	Attainment (Annual standard); Designation pending (1-hour standard)
	Annual	0.030 ppm	0.053 ppm				
Sulfur Dioxide (SO_2)	1 hour	0.25 ppm	0.075 ppm[6] (99^{th} percentile over 3 years)	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.	Attainment	Designation pending
	3 hours	---	0.5 ppm[7]				
	24 hours	0.04 ppm	0.14 ppm (for certain areas)				
	Annual	---	0.030 ppm (for certain areas)				

Pollutant	Averaging Time	State[1] Standard	Federal[2] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
Lead (Pb)[9]	Monthly	1.5 µg/m^3	---	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.	N/A	Attainment
	Calendar Quarter	---	1.5 µg/m^3 (for certain areas)				
	Rolling 3-month average	---	0.15 µg/m^3 [9]				
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.	Attainment	N/A
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.	Unclassified	N/A
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 FCAA, 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.	Unclassified	N/A
Vinyl Chloride[8]	24 hours	0.01 ppm	---	Neurological effects, liver damage, cancer.	Industrial processes.	No information available	N/A

Pollutant	Averaging Time	State[1] Standard	Federal[2] Standard	Principal Health and Atmospheric Effects	Typical Sources	State Project Area Attainment Status	Federal Project Area Attainment Status
				Also considered a toxic air contaminant.			

Notes: ppm = parts per million; $\mu g/m^3$ = micrograms per cubic meter

[1] State standards are "not to exceed" or "not to be equaled or exceeded" unless stated otherwise.

[2] Federal standards are "not to exceed more than once a year" or as described above.

[3] Prior to June 2005, the 1-hour ozone NAAQS was 0.12 ppm. Emission budgets for 1-hour ozone are still in use in some areas where 8-hour ozone emission budgets have not been developed, such as the S.F. Bay Area.

[4] Annual PM_{10} NAAQS revoked October 2006; was 50 $\mu g/m^3$. 24-hr. $PM_{2.5}$ NAAQS tightened October 2006; was 65 $\mu g/m^3$. Annual $PM_{2.5}$ NAAQS tightened from 15 $\mu g/m^3$ to 12 $\mu g/m_3$ December 2012 and secondary annual standard set at 15 $\mu g/m^3$.

[5] Final 1-hour NO_2 NAAQS published in the Federal Register on 2/9/2010, effective 3/9/2010. Initial area designation for California (2012) was attainment/unclassifiable throughout. Project-level hot spot analysis requirements do not currently exist. Near-road monitoring starting in 2013 may cause re-designation to nonattainment in some areas after 2016.

[6] USEPA finalized a 1-hour SO_2 standard of 75 ppb (parts per billion [thousand million]) in June 2010. Nonattainment areas have not yet been designated as of 9/2012.

[7] Secondary standard, set to protect public welfare rather than health. Conformity and environmental analysis address both primary and secondary NAAQS.

[8] The CARB has identified vinyl chloride and the particulate matter fraction of diesel exhaust as toxic air contaminants. Diesel exhaust particulate matter is part of PM_{10} and, in larger proportion, $PM_{2.5}$. Both the CARB and USEPA have identified lead and various organic compounds that are precursors to ozone and $PM_{2.5}$ as toxic air contaminants. There are no exposure criteria for adverse health effect due to toxic air contaminants, and control requirements may apply at ambient concentrations below any criteria levels specified above for these pollutants or the general categories of pollutants to which they belong.

[9] Lead NAAQS are not considered in Transportation Conformity analysis.

Local Ambient Air Quality

The BAAQMD operates a network of air monitoring sites throughout the SFBAAB. The nearest and most representative air monitoring station to the project area is currently the Livermore station at 793 Rincon Avenue in Livermore, approximately 3.5 miles north of the project area. The criteria air pollutants monitored at this station are O_3, NO_2, and $PM_{2.5}$. The nearest station where CO levels are measured is the Oakland station, located at 9925 International Boulevard, approximately 17 miles northwest of the project area. The nearest station where PM_{10} levels are measured is the Concord station, located at 2956-A Treat Boulevard, approximately 22 miles north of the project area. These stations are considered representative of the project area as they are located within the closest proximities to the project area and experience similar meteorological conditions. Table 2.2.6-2 presents ambient air quality data recorded at the three stations from 2011 through 2015. As Table 2.2.6-2 shows, exceedances of California standards for 1-hour O_3 occurred in 2011, 2012, 2013, and 2015. Exceedances of the California standards for 24-hour PM_{10} occurred once in 2011. The national and California standards for 8-hour O_3 were exceeded in all five years. Exceedances of the national standards for 24-hour $PM_{2.5}$ occurred in 2011, 2013, and 2014. No exceedances of either the state or national standards were recorded for CO.

2.2.6.3 Environmental Consequences

Air quality issues relate to a range of different pollutants. The evaluation of air quality impacts addressed in this section focuses on the project's conformity with the regional air quality framework and the project's potential to result in an adverse impact to the region's compliance with the relevant standards.

The **No Build Alternative** would make no physical or operational changes to the project area that would affect air quality. The following discussion applies to the **Build Alternative**.

Regional Air Quality Conformity

The project is included in the regional emissions analysis conducted by MTC for the current RTP, *Plan Bay Area 2040* (ABAG and MTC 2017a, RTP ID 17-01-0029). The regional emissions analysis found that significant projects in the San Francisco Bay Area will conform to the SIP for attaining and/or maintaining the NAAQS as provided in Section 176(c) of the Clean Air Act. FHWA and FTA determined that the RTP conforms to the SIP on August 23, 2017.

The project is also included in the MTC's financially constrained 2017 TIP (MTC 2016, TIP ID ALA150001). The TIP gives priority to eligible Transportation Control Measures (TCMs) identified in the SIP and provides sufficient funds to provide for their implementation. FHWA and FTA determined that the TIP conforms to the SIP on December 16, 2016.

The project's design concept, scope, and open-to-traffic date assumptions are generally consistent with the regional emissions analysis performed for the current RTP and TIP. Therefore, the project will not interfere with the timely implementation of any TCMs identified in the SIP.

Table 2.2.6-2: Criteria Air Pollutants Data Summary (Livermore, Oakland, and Concord Air Monitoring Stations)

Pollutant	Standard	2011	2012	2013	2014	2015
Ozone (O_3)	**1-Hour**					
	Maximum Concentration (ppm)	0.115	0.102	0.096	0.093	0.105
	Days > CAAQS (0.09 ppm)	3	2	3	0	1
	8-Hour					
	Maximum Concentration (ppm)	0.084	0.090	0.077	0.080	0.081
	Days > NAAQS (0.075 ppm)	2	3	1	4	1
	Days > CAAQS (0.07 ppm)	9	4	2	7	7
Particulate Matter (PM_{10})	**24-Hour**					
	Maximum Concentration ($\mu g/m^3$)	55.9	33.7	47.6	40.8	22.5
	Days > CAAQS (50 $\mu g/m^3$)	1	0	0	0	0
	Days > NAAQS (150 $\mu g/m^3$)	0	0	0	0	0
	Annual Average					
	Annual Arithmetic Mean ($\mu g/m^3$)[a]	15.2	12.3	15.5	13.8	12.5
Particulate Matter ($PM_{2.5}$)	**24-Hour**					
	Maximum Concentration ($\mu g/m^3$)	45.5	31.1	40.2	42.9	31.2
	Days > NAAQS (35 $\mu g/m^3$)	2	0	4	1	0
	Annual					
	Annual Arithmetic Mean ($\mu g/m^3$)	8.5	6.6	8.7	7.6	8.8
Carbon Monoxide (CO)	**1-Hour**					
	Maximum Concentration (ppm)	4.1	2.9	3.6	2.8	2.4
	Days > CAAQS (20 ppm)	0	0	0	0	0
	Days > NAAQS (35 ppm)	0	0	0	0	0
	8-Hour Maximum Concentration (ppm)	1.7	1.5	1.3	1.5	1.4
	Days > CAAQS (9.0 ppm)	0	0	0	0	0
Nitrogen Dioxide (NO_2)	**1-Hour**					
	Maximum Concentration (ppm)	0.057	0.053	0.051	0.049	0.050
	Days > NAAQS (0.10 ppm)	0	0	0	0	0
	Days > CAAQS (0. 18 ppm)	0	0	0	0	0
	Annual					
	Annual Arithmetic Mean (ppm)	0.011	0.011	0.012	0.010	0.010

Source: CARB 2017a. California Air Quality Data (PST) Query Tool. https://www.arb.ca.gov/aqmis2/aqdselect.php

Notes: $\mu g/m^3$ = micrograms per cubic meter; ppm = parts per million

Ambient data for SO_2 and airborne lead are not included in this table since the SFBAAB is currently in compliance with state and federal standards for these pollutants.

Project-Level Conformity

CO Hot-Spot Analysis

The SFBAAB is currently designated as a federal maintenance area for CO; therefore, a CO hot-spot analysis is required to determine the project-level conformity to the SIP. In accordance with guidance from the UC Davis *Transportation Project-Level Carbon Monoxide Protocol*, a CO hot-spot analysis was performed for the Build Alternative to evaluate the potential

transportation-related impacts on local CO levels at the most congested intersections and/or interchanges.

The maximum estimated CO concentrations for the three intersections/interchanges representing the highest traffic congestion in the project area are summarized in Table 2.2.6-3. The maximum CO concentrations estimated at all three intersections/interchanges in the opening year (2025) and horizon year (2045) were below the applicable CAAQS and NAAQS. Therefore, project-related CO emissions would not cause or contribute to, or worsen, any localized CO violations.

As a result, the project meets the CO hot-spot conformity requirement of 40 CFR 93.116(a).

Table 2.2.6-3: Localized CO Concentrations at Worst-Case Intersections/Interchanges

Intersection/Interchange	Scenario	Maximum 1-hour Concentration (ppm)	Maximum 8-hour Concentration (ppm)
(A) I-680 / Paloma Way / Calaveras Road	2025 Build	8.7	4.5
	2045 Build	8.8	4.5
(B) I-680 / SR 84	2025 Build	7.1	3.5
	2045 Build	7.8	3.9
(C) I-680 / Truck Weigh Station	2025 Build	5.6	2.6
	2045 Build	5.6	2.6
California Ambient Air Quality Standards		**20**	**9**
National Ambient Air Quality Standards		**35**	
Exceedances?		**No**	

Particulate Matter Hot-Spot Analysis

A quantitative particulate matter hot-spot analysis is required for transportation projects that are in federal nonattainment or maintenance areas for PM_{10} or $PM_{2.5}$ and are determined to be a Project of Air Quality Concern (POAQC) as defined in 40 CFR Part 93. The SFBAAB is currently designated as an unclassified area for the federal PM_{10} standard; therefore, a detailed PM_{10} hot-spot analysis is not required for a project-level conformity determination. The SFBAAB is currently designated as a federal nonattainment area for $PM_{2.5}$; therefore, a $PM_{2.5}$ hot-spot analysis is required if the project is determined to be a POAQC.

Rather than using specific $PM_{2.5}$ measurements, the $PM_{2.5}$ hot-spot demonstration process begins with an evaluation of whether a project fits into one or more of the POAQC categories listed in 40 CFR 93.123(b)(i)–(v). In the Bay Area, the process has been established by the MTC and requires interagency consultation with the Bay Area Air Quality Conformity Task Force. The Task Force includes representatives from federal (USEPA Region 9, FHWA, FTA), state (CARB, Caltrans), regional (MTC, Bay Area Air Quality Management District, and ABAG), and sub-regional (Congestion Management Agencies, transit operators, local jurisdictions, etc.) agencies.

In April 2017, Alameda CTC, as the project sponsor, initiated consultation with the Air Quality Conformity Task Force by submitting a Project Assessment Form for $PM_{2.5}$ Interagency Consultation. The Task Force considered projected future traffic conditions, with and without the

project, and whether the project meets the specific regulatory definition of a POAQC set forth in 40 CFR Part 93. On May 3, 2017, the Task Force determined that the project is not a POAQC.

A detailed $PM_{2.5}$ hot-spot analysis is not required for this project. The project will conform to the SIP, including the localized impact analysis conducted with interagency consultation required by 40 CFR 93.116 and 93.123. The Project Assessment Summary and the Air Quality Conformity Task Force determination are included in Appendix C.

Public comment is requested regarding the Task Force determination (Appendix C). Following the close of the public review and comment period for this EIR/EA, all comments received on the air quality conformity determination will be submitted to FHWA. The final determination on project-level conformity will be made by FHWA.

Construction-Related Hot-Spot Analysis

40 CFR 93.123(c)(5) states that: "CO, PM_{10}, and $PM_{2.5}$ hot-spot analyses are not required to consider construction-related activities which cause temporary increases in emissions. Each site which is affected by construction-related activities shall be considered separately, using established 'Guideline' methods. Temporary increases are defined as those which occur only during the construction phase and last five years or less at any individual site." Because construction of the project is expected to last less than five years, an evaluation of CO, PM_{10}, and $PM_{2.5}$ emissions during project construction is not required for a project-level conformity determination.

Ozone Impact Analysis

The SFBAAB is currently designated as a federal nonattainment area for O_3. Because O_3 impacts are regional in nature, projects that are included in a RTP and TIP have already undergone regional conformity analysis and do not require further analysis for a project-level conformity determination. This project is included in a conforming RTP and TIP, and therefore emissions of O_3 precursors from project-related traffic are not anticipated to cause or contribute to, or worsen, any O_3 violations.

In addition, the BAAQMD adopted the 2017 Clean Air Plan (CAP) to plan for and achieve compliance with the federal and State O_3 standards (BAAQMD 2017). The Build Alternative will not interfere with the control measures described in the 2017 CAP. Furthermore, the Build Alternative will provide transportation benefits that reduce pollutant emissions, including O_3 precursors, by improving traffic operations and efficiency.

Additional Environmental Analysis

Mobile Source Air Toxics

In addition to the criteria air pollutants for which standards exist, the USEPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources. Mobile source air toxics (MSATs) are a subset of the air toxics defined by the Clean Air Act. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuel or as secondary combustion products. Metal air toxics also result from engine wear or impurities in oil or gasoline.

The project's potential air quality impacts related to long-term operations emissions of MSATs were evaluated in accordance with FHWA's (2016) *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. Traffic volumes along the I-680 segment of the proposed project are anticipated to be approximately 188,000 to 250,000 Annual Average Daily Traffic (AADT) by design year 2045, which exceeds FHWA's AADT threshold range of 140,000 to 150,000 AADT for projects that have a higher potential for MSAT effects. According to FHWA guidance, the project has a "higher potential for MSAT effects" because it is located in proximity to populated areas and exceeds FHWA's AADT threshold. Therefore, FHWA guidance recommends a quantitative analysis to forecast and compare local-specific emission trends of the priority MSAT for each alternative.

Incomplete or Unavailable Information

In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The USEPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the FCAA and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The USEPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain IRIS, which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects". Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's (2016) *Updated Interim Guidance on Mobile Source Air Toxic Analysis in NEPA Documents*. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations or in the future as vehicle emissions substantially decrease.

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts – each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable.

It is particularly difficult to reliably forecast 70-year lifetime MSAT concentrations and exposure near roadways; to determine the portion of time that people are actually exposed at a specific location; and to establish the extent attributable to a proposed action, especially given that some of the information needed is unavailable.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI. As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel particulate matter. The USEPA states that with respect to diesel engine exhaust, "[t]he absence of adequate data to develop a sufficiently confident dose-response relationship from the epidemiologic studies have prevented the estimation of inhalation carcinogenic risk."

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the USEPA as provided by the FCAA to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires USEPA to determine an "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately 100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld USEPA's approach to addressing risk in its two-step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than deemed acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Project-Level MSAT Analysis

As discussed above, technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent the meaningful or reliable estimates of MSAT emissions and effects for this project. However, even though reliable methods do not exist to accurately estimate the health impacts of MSATs at the project level, it is possible to assess the levels of future MSAT emissions by comparing the No Build and Build alternatives. A quantitative analysis of daily emissions was performed for the nine priority MSATs using the Caltrans CT-EMFAC version 6 model to compare the potential effects of the project Build and No Build alternatives.

As shown in Table 2.2.6-4, all analyzed MSAT emissions (diesel particulate matter, formaldehyde, butadiene, benzene, acrolein, naphthalene, polycyclic organic matter, acetaldehyde, and ethylbenzene) would decrease for the No Build and Build alternatives from the existing year (2015) to the opening year (2025). Between the opening year (2025) and the horizon year (2045), emissions would again generally decrease with the exception of formaldehyde and acetaldehyde, although the emission levels of these two air toxics would remain well below the existing levels. The Build Alternative would not increase MSAT emissions compared to the No Build alternative. MSAT emissions would decrease in the opening year (2025) and horizon year (2045) compared to the existing year (2015). In conclusion, the results from the model runs show that the project would not result in an increase in MSAT emissions compared to the existing year or the future No Build conditions.

Table 2.2.6-4: Daily MSAT Emissions (Grams per Day)

Results	2015 Existing	2025 No Build	2025 Build	2045 No Build	2045 Build
Total Daily VMT	10,506,480	11,692,293	11,660,509	14,063,918	13,968,566
Diesel Particulate Matter	44,714	8,279	8,141	3,076	2,981
Formaldehyde	29,910	13,694	13,193	14,681	13,441
Butadiene	4,400	2,077	2,022	1,940	1,822
Benzene	27,333	14,433	13,963	12,345	11,466
Acrolein	974	456	445	420	396
Naphthalene	1,566	948	912	738	677
Polycyclic Organic Matter	827	385	374	311	290
Acetaldehyde	11,611	5,237	5,029	5,911	5,375
Ethylbenzene	15,821	9,276	8,944	7,319	6,751

Note: VMT = Vehicle miles traveled

Asbestos

As discussed in Section 2.2.5.2, the project is not located on or near any deposits of naturally-occurring asbestos (NOA). However, undocumented fill material at the project site could potentially contain NOA imported from other areas, which could be excavated and released into the air during construction. Overcrossing structures at the project site may have asbestos-containing materials. Demolition or renovation of structures with asbestos-containing materials could pose a risk of releasing asbestos fibers into the environment. Implementation of Measure HAZ-1 described in Section 2.2.5.4 would ensure that potential asbestos in soil and building materials is investigated prior to construction and site-specific control measures are incorporated into the final project design to address the potential adverse effects to human health that could result from the disturbance of asbestos. Furthermore, demolition and removal of the possible asbestos-containing materials would be performed in accordance with local, state, and federal requirements.

Lead

As discussed in Section 2.2.5.2, the project could involve the potential disturbance of ADL in soils and lead-based paint on roadway markings. With implementation of Mitigation Measure HAZ-1, a lead compliance plan for ADL-contaminated soils and pavement markings containing

lead will be prepared in accordance with Caltrans standards and implemented by the contractor(s). A certified contractor(s) will remove all loose and peeling lead-based paint, if any. Caltrans Standard Specifications require that handling of material containing ADL must result in no visible dust migration and that Caltrans standard dust control measures be implemented.

Construction (Short-Term) Impacts

Project construction activities would generate emissions of criteria air pollutants and precursors that could potentially affect regional air quality. Project construction is anticipated to commence in mid-2021 and end in late 2023, if funding is available. Since construction activities will not last for more than five years at one general location, construction-related emissions do not need to be included in regional and project-level conformity analysis (40 CFR 93.123(c)(5)).

The BAAQMD considers construction activities to be typically short-term or temporary in duration; however, criteria pollutant emissions from construction of the Build Alternative were estimated for informational purposes. Construction emissions were quantified using the Sacramento Metropolitan Air Quality Management District's Roadway Construction Emissions Model (Version 8.1.0).

The BAAQMD's current CEQA Guidelines recommend thresholds of significance for project-level criteria air pollutant emissions to assist lead agencies in CEQA determinations. The BAAQMD's thresholds include levels at which construction emissions of O_3 precursors (ROG and NOx), PM_{10}, and $PM_{2.5}$ could cause significant air quality impacts. Since Caltrans has not established significance thresholds for criteria air pollutant emissions for CEQA purposes, the BAAQMD's recommended thresholds are included in Table 2.2.6-5 for comparison only.

Table 2.2.6-5: Construction Emissions (Pounds per Day)

	ROG	NOx	PM_{10} Dust	PM_{10} Exhaust	$PM_{2.5}$ Dust	$PM_{2.5}$ Exhaust
Construction emissions	4.43	42.8	37.9	2.04	7.89	1.76
BAAQMD CEQA thresholds [a]	**54**	**54**	**BMP**	**82**	**BMP**	**54**

Notes: BMP = best management practices

Reduced fugitive dust emissions from implementation of dust-control measures listed under Section 2.2.6.4 cannot be readily quantified.

[a] The BAAQMD's thresholds have not been adopted by Caltrans and are only shown for informational purposes.

As shown in Table 2.2.6-5, the daily average emissions during construction of the Build Alternative would be below the BAAQMD's recommended thresholds for ROG, NO_x, and exhaust PM_{10} and $PM_{2.5}$. Since the daily average emissions of criteria pollutants and precursors would be below the recommended thresholds, the construction of the Build Alternative would not be expected to result in an air quality violation.

Neither Caltrans nor the BAAQMD has a quantitative threshold for fugitive dust emissions; however, the BAAQMD considers implementation of BMPs to control fugitive dust PM_{10} and $PM_{2.5}$ during construction sufficient to reduce potential impacts from dust to a less-than-significant level. Caltrans' Special Provisions and Standard Specifications include the requirement to minimize or eliminate dust during project construction through the application of dust palliatives.

SO^2 is generated by oxidation during combustion of organic sulfur compounds contained in diesel fuel. Under California law and CARB regulations, off-road diesel fuel used in California must meet the same sulfur and other standards as on-road diesel fuel (not more than 15 ppm sulfur), so SO^2-related issues due to diesel exhaust will be minimal.

Some phases of construction, particularly asphalt paving, may result in short-term odors in the immediate area of each paving site(s). Such odors would quickly disperse to below detectable levels as distance from the site(s) increases.

Most of the construction impacts to air quality are short-term in duration and, therefore, will not result in long-term adverse conditions. Implementation of the following standardized measures, some of which may also be required for other purposes such as storm water pollution control, will reduce any air quality impacts resulting from construction activities:

- Water active construction areas as needed.
- Cover all trucks hauling soil, sand, and other loose materials or require all trucks to maintain at least 2 feet of freeboard.
- Stabilize access areas (i.e. temporary access roads or entrances/exits) with rock material and maintain as needed.
- Keep dust to a minimum during street sweeping activities. Use a vacuum whenever dust generation is excessive or sediment pickup is ineffective.
- Apply hydromulch, hydroseed, or soil stabilizers to disturbed areas if inactive for at least 14 days or prior to a forecasted rain event.
- Minimize stockpiles at jobsite. Cover active and inactive soil stockpiles and surround with a linear sediment barrier if inactive for at least 14 days or prior to a forecasted rain event. Water soil stockpiles as needed.
- Limit traffic speeds on unpaved roads to 15 mph.
- Install sandbags or other erosion control measures to prevent silt runoff to public roadways.
- Replant vegetation in disturbed areas as quickly as possible.

In addition, pollutant emissions from construction equipment exhaust can be controlled by the following, in accordance with Caltrans Standard Specifications Section 7-1.02C “Emissions Reduction”:

- Keeping engines properly tuned.
- Limiting idling.

Construction Conformity

Construction activities will not last for more than 5 years at one general location, so construction-related emissions do not need to be included in regional and project-level conformity analysis (40 CFR 93.123(c)(5)).

2.2.6.4 Avoidance, Minimization, and/or Mitigation Measures

No further avoidance, minimization, or mitigation is required.

Climate Change

Neither the USEPA nor FHWA has issued explicit guidance or methods to conduct project-level GHG analysis. FHWA emphasizes concepts of resilience and sustainability in highway planning, project development, design, operations, and maintenance. Because there have been requirements set forth in California legislation and executive orders on climate change, the issue is addressed in the CEQA chapter of this document. The CEQA analysis may be used to inform the NEPA determination for the project.

2.2.7 Noise

2.2.7.1 Regulatory Setting

NEPA of 1969 and CEQA 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 NEPA and CEQA.

California Environmental Quality Act

CEQA 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 CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless those measures are not feasible. The rest of this section will focus on the NEPA/23 Code of Federal Regulations Part 772 (23 CFR 772) noise analysis; please see Chapter 3 of this document for further information on noise analysis under CEQA.

National Environmental Policy Act and 23 CFR 772

For highway transportation projects with FHWA involvement (and Caltrans, as assigned), the Federal-Aid Highway Act of 1970 and its implementing regulations (23 CFR 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 include noise abatement criteria (NAC) that are used to determine when a noise impact would occur. The NAC differ depending on the type of land use under analysis. For example, the NAC for residences (67 A-Weighted decibels [dBA]) is lower than the NAC for commercial areas (72 dBA). Table 2.2.7-1 lists the NAC for use in the NEPA/23 CFR 772 analysis.

Table 2.2.7-1: Noise Abatement Criteria

Activity Category	NAC, Hourly A- Weighted Noise Level, $L_{eq(h)}$[1]	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[1]	67 (Exterior)	Residential.
C[1]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	No NAC—reporting only	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical, etc.), and warehousing.
G	No NAC—reporting only	Undeveloped lands that are not permitted.

Source: Caltrans 2011b

1. Includes undeveloped lands permitted for this activity category.

Figure 2.2.7-1 lists the noise levels of common activities to enable readers to compare the actual and predicted highway noise levels discussed in this section with common activities.

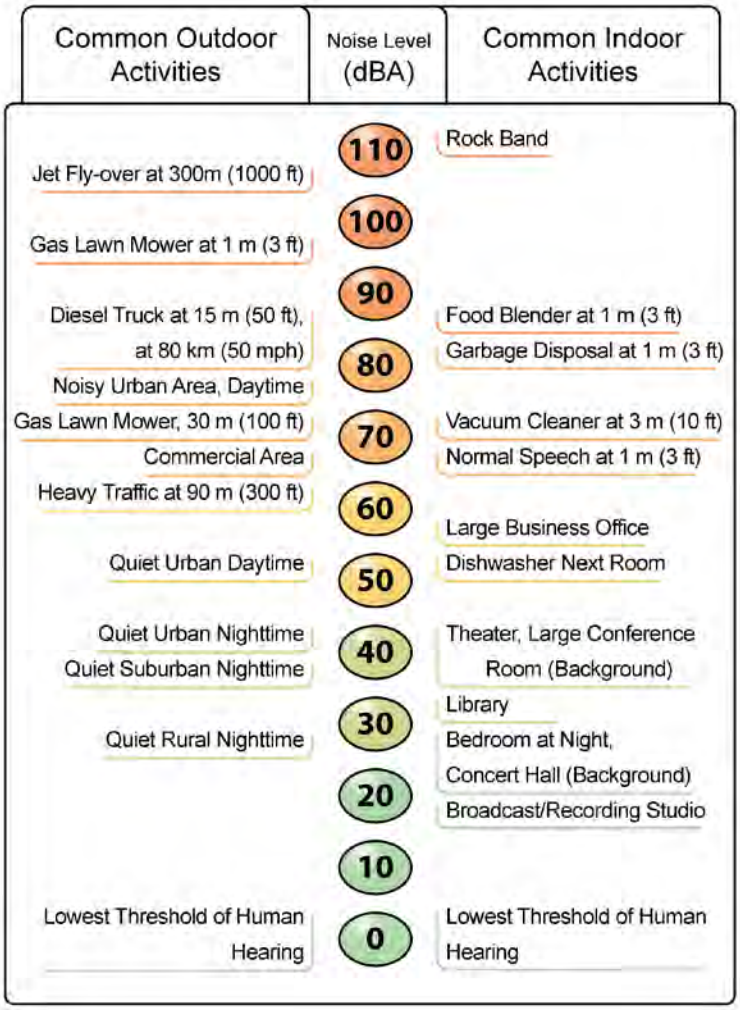


Figure 2.2.7-1: Noise Levels of Common Activities

According to the Caltrans *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, May 2011* (TNAP), a noise impact occurs when the predicted future noise level with the project substantially exceeds the existing noise level (defined as a 12 dBA or more increase), or when the future noise level with the project approaches or exceeds the NAC. Approaching the NAC is defined as coming within 1 dBA of the NAC.

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. This document discusses noise abatement measures that would likely be incorporated in the project.

The Caltrans TNAP 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 dBA reduction for all impacted receptors 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. Additionally, a noise reduction of at least 7dBA must be achieved at one or more benefited receptors for an abatement measure to be considered reasonable. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include: residents' acceptance and the cost per benefited residence.

2.2.7.2 Affected Environment

The analysis summarized in this section is from the *Noise Study Report* completed for the proposed project in July 2017 (Wilson Ihrig 2017).

The noise study area encompasses all developed and undeveloped land uses surrounding the project limits, with a focus on noise-sensitive land uses. In general, noise-sensitive land uses include areas where serenity and quiet are of extraordinary significance, residential land uses, and other community uses such as hospitals, schools, cemeteries, and parks.

The existing noise environment throughout the project limits varies by location, depending on site characteristics such as proximity to other roadways or noise sources, the relative elevation of roadways and receptors, and any intervening structures or topography.

Noise Study Area

The majority of the noise study area is within unincorporated Alameda County. Approximately 0.25 mile of the northern study limits on I-680 is within the City of Pleasanton UGB. The noise study area was divided into four segments, which are shown in Figure 2.2.7-2 and described further below. No existing noise barriers were identified in the noise study area.

SR 84 East of Pigeon Pass

The eastern limit of the project on SR 84 is just south of Ruby Hill Drive. This segment extends from the Ruby Hill community in the east through Pigeon Pass in the west, heading toward I-680. Other than the Ruby Hill neighborhood, which is low-density residential (less than 2 dwelling units per acre), few residences are present along both sides of SR 84 within 1,000 feet of the project, and the remaining land uses are large parcel agricultural or resource management/water management.

The project would re-stripe the existing roadway in this area to accommodate the proposed Class II bicycle lanes and install concrete median barriers and retaining walls.

SR 84 from Pigeon Pass to I-680

From Pigeon Pass to I-680, the project continues through large parcel agricultural or resource management/water management land, except for the GE-Hitachi Vallecitos Nuclear Center and the Little Valley community, both on the north side of SR 84. The Vallecitos Nuclear Center is approximately 0.25 mile north of SR 84 and is an industrial land use. Little Valley has approximately 30 residences and one commercial horse stable; the closest residence is more than 900 feet from the project limits. Little Valley was evaluated for inclusion of a measured or modeled receptor in the study, but due to the substantial topographic shielding that blocks the line of sight to SR 84 and associated traffic noise, no measurements or receptors were placed in this area.

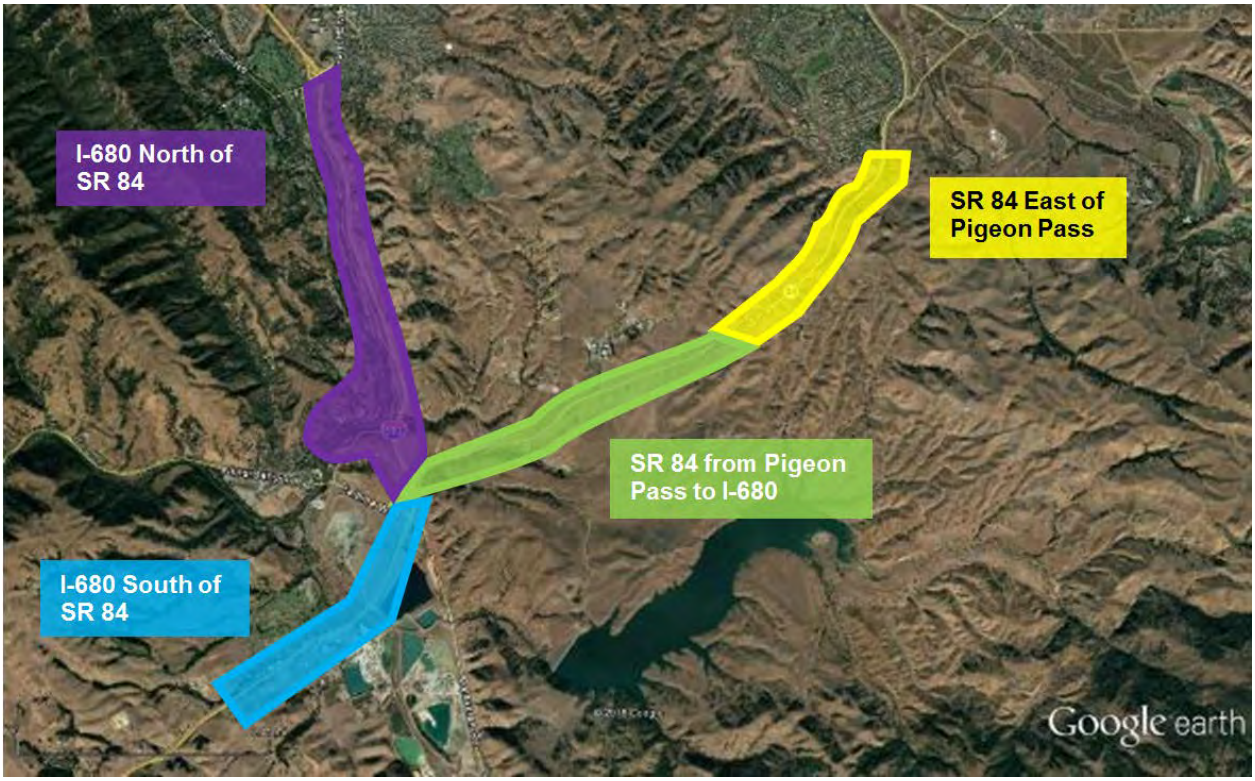


Figure 2.2.7-2: Noise Analysis Segments

Along the south side of SR 84, there are four residences near the highway. In the vicinity of those residences, the project would widen SR 84, create a new signalized intersection near the current location of Vallecitos Atomic Laboratory Road, add frontage roads on both sides of SR 84 that connect to the new intersection, realign SR 84 to the north just west of Little Valley Road (away from the nearby homes), realign firebreak access roads on an adjacent SFPUC property, install retaining walls and concrete barriers, and provide Class II bike lanes on both sides of SR 84.

At the SR 84/I-680 interchange, the project would reconstruct ramp connections, widen a bridge section of southbound I-680, and construct a new flyover ramp from Calaveras Road to northbound I-680 and a new Class I bikeway to connect the southbound SR 84 Class II bikeway with Paloma Way. Some homes on Foothill Road at a great distance from the project would have a line of sight to the new flyover ramp from Calaveras Road to northbound I-680.

I-680 North of SR 84

Most of the land uses near the project are resource management/water management and large parcel agricultural land, except for the northern project limit near the I-680/Sunol Boulevard interchange, which has commercial and residential properties. There are residences on Pleasanton-Sunol Road that would be located in the vicinity of one or more new overhead signs for the HOV/express lanes. Other than these signs, which could be installed during nighttime hours, the project would re-stripe and widen the existing roadway in part of this segment to accommodate the northward extension of the HOV/express lane. The widening would be toward the center median, away from homes in the area. The project would also construct retaining walls and concrete barriers and widen the southbound I-680 bridge over Koopman Road.

I-680 South of SR 84

The designated land use surrounding this segment is water management. A retail nursery and small office building on Calaveras Road east of I-680 are adjacent to the project area. No noise-sensitive receptors have been identified in the project area.

In this segment, the project would widen southbound I-680 toward the west to accommodate a new auxiliary lane from westbound (southbound) SR 84 to southbound I-680, shift an existing access road on SFPUC property toward the west, construct retaining walls and concrete barriers, reconstruct the on-ramp from Calaveras Road, widen the I-680 bridges over Calaveras Road, extend the existing northbound I-680 auxiliary lane to the south, and add Class II bike lanes on Calaveras Road and Paloma Way to connect with the bike lanes on SR 84.

Receptor Categories

Most of the receptors in the noise study area fall into Category B. A maximum peak hour noise level criteria of 67 dBA Equivalent Sound Level (L_{eq}[26]) applies at the exterior of residences (Category B). Most of the other land use is undeveloped (Category G), with some agricultural land along I-680 south of SR 84 (Category F). Recreational areas, active sport areas, and trails are classified as Category C. Primary consideration for noise abatement is given to exterior areas where frequent human use occurs that would benefit from a lowered noise level. In general, an area of frequent human use is an area where people are exposed to traffic noise for an extended period of time on a regular basis.

Future Category B and C land uses are also to be evaluated for noise impacts and abatement in the same manner as existing land uses if they are permitted prior to the date of approval of the final environmental decision document. For this analysis, land development is considered permitted "on the date that the land use (subdivision, residences, schools, churches, hospitals, libraries, etc.) has received all final discretionary approvals from the local agency with jurisdiction, generally the date that the building permit or vesting tentative map is issued" (Caltrans 2013).

Future Land Use Development

No permitted development has been identified within the study limits. A conceptual plan for two 136-acre parcels has been proposed along SR 84 in the study area at 7010 Vallecitos Road, Sunol (Vallecitos Valley Development 2014). Each parcel would have a 12,000-square-foot residence and a 59,000-square-foot building for agricultural, wine tasting, recreational, public, or quasi-public uses. However, no formal development proposal had been filed as of October 2017.

In addition, study area lands in unincorporated Alameda County are subject to the East County Area Plan (Alameda County Planning Department 2002), which strictly limits growth in unincorporated areas of the county that do not fall within the general plan boundaries of Dublin, Livermore, Pleasanton, and a portion of Hayward (see Section 2.1.2.1). Thus, even though the study area includes many properties that have not been developed, there are no immediate or

[26] L_{eq} represents an average of the sound energy occurring over a specified period. In effect, L_{eq} is the steady-state sound level containing the same acoustical energy as the time-varying sound that actually occurs during the same period. The 1-hour A-weighted equivalent sound level ($L_{eq[h]}$) is the energy average of A-weighted sound levels occurring during a one-hour period, and is the basis for noise abatement criteria (NAC) used by Caltrans and FHWA.

future plans to allow development on these lands. Therefore, no additional modeling locations were included in the unoccupied areas.

Noise Measurements and Modeling

In November and December 2016, nine short-term and seven long-term field measurements were taken to document the existing outdoor noise environment within the noise study area. Appendix H includes a map of the noise measurement locations. The estimated worst-hour noise levels at short-term locations were based on daytime measurement data, peak-hour traffic data (discussed further below), and the trends in hourly noise levels measured at nearby representative long-term measurement sites. A direct comparison of the data collected at the long-term and short-term noise measurement sites was made to calculate worst-hour noise levels at the short-term measurement locations. The short-term measurements were taken in conjunction with traffic counts, and this information was used to confirm that the traffic noise model accurately reflects the measured noise data. Noise measurement locations were used as noise modeling receivers for the prediction of existing and future worst-hour traffic noise levels using FHWA's Traffic Noise Model, Version 2.5.

The traffic volumes used for the model were based on free-flowing traffic (Level of Service [LOS] C) with 1,800 vehicles per lane per hour for general purpose lanes and 1,650 vehicles per lane per hour for the southbound I-680 HOV/express lane. Those volumes are considered the maximum capacities for these lane types. Maximum volumes generate the worst-case noise levels. The future (2045) No Build and Build scenarios for SR 84 assume a 4 percent total truck volume, consistent with the *Traffic Operations Analysis Report* (Fehr and Peers 2017). Based on observations made by the project team, the trucks were assumed to consist of 62 percent heavy trucks and 38 percent medium trucks. The future (2045) No Build and Build scenarios assume a speed limit of 50 mph for all vehicles on SR 84,[27] and 65 mph for automobiles and 55 mph for trucks on I-680.

The noise impact assessment was performed for the peak noise period. The peak noise period is not necessarily the time with peak traffic volumes. Congestion results in slower speeds, which substantially reduces traffic noise levels. The peak noise period is typically a time where traffic flows freely at or near-capacity conditions.

Existing noise levels were estimated to be below 66 dBA at all analyzed locations, as described further in Section 2.2.7.3.

2.2.7.3 Environmental Consequences

The project has been determined to be a Type I project per 23 CFR 772.

Long-Term Noise Changes

Noise levels were modeled for the project design year, which is 2045 (20 years after the project's opening year). Noise levels were modeled for 14 receiver locations—modeled locations that can represent one or more dwelling units; labeled as "R"—throughout the project area. The results of

[27] The current posted speed limits on SR 84 range from 50 mph to 55 mph. The project would set the posted speed limit on SR 84 in the project limits at 50 mph to match the posted speed limit between Ruby Hill Drive and I-580.

the projections for the noise measurement locations and modeled receiver locations (shown in Appendix H) are provided in Table 2.2.7-2.

Table 2.2.7-2: Modeled Noise Levels

Study Area Segment	Receiver ID/Location		Residential[1] Criterion NAC	Worst Hour Noise Level (L_{eq} dBA)			Noise Level Increases (dBA)		Impact[2]
				2015 Existing	2045 No Build	2045 Build	Build over Existing	Build over No Build	
SR 84 I-680 to Pigeon Pass	R-1	8350 Vallecitos Lane	67	61	62	62	1	0	None
	R-2	SFPUC Water Management Land[3]	none	61	62	60	-1	-2	None
	R-3	7820 Vallecitos Road	67	53	54	56	3	2	None
	R-4	7010 Vallecitos Road	67	59	60	64	5	4	None
	R-5	6923 Vallecitos Road	67	60	60	63	3	3	None
SR 84 East of Pigeon Pass	R-6	2980 Vallecitos Road	67	46	47	47	1	0	None
	R-7	4378 Campinia Place	67	56	59	59	3	0	None
	R-8	4366 Campinia Place	67	57	60	60	3	0	None
I-680 North of SR 84	R-9	304 Happy Valley Road	67	64	65	65	1	0	None
	R-10	8031 Rockford	67	61	62	62	1	0	None
	R-11	7960 Pleasanton-Sunol Road	67	66	**67**	**67**	1	0	A/E
	R-12	8855 Pleasanton-Sunol Road	67	64	64	64	0	0	None
	R-13	Koopman Road	67	65	**66**	**67**	2	1	A/E
	R-14	10833 Foothill Road	67	53	53	54	1	1	None

Bold entries indicates future with project noise levels that approach or exceed the NAC.
Notes
1. All sensitive land uses in this table are residential, which is Activity Category B.
2. A/E = Approaches or exceeds the NAC.
3. This location was used for a long-term measurement and as a receiver site to model 8350 Vallecitos Lane, due to lack of direct access to the residential property.

No Build Alternative

The No Build Alternative would make no physical or operational changes to the project area that would affect noise levels.

Build Alternative

The Build Alternative is anticipated to increase future noise levels at most receiver locations by 0 to 2 dBA over the No Build condition. However, the proposed frontage roads and signalized intersection near receivers R-3, R-4, and R-5 are anticipated to increase future noise levels at those locations by 2 to 4 dBA over the No Build condition. Because the predicted future noise levels would not approach or exceed the NAC of 67 dBA, or result in a substantial increase in noise, no traffic noise impacts are predicted for receivers R-3, R-4, and R-5.

At receiver R-2, predicted future noise levels are anticipated to be 2 dBA lower than with the No Build Alternative. The Build Alternative would shift SR 84 to the north of its current alignment (see Appendix H, Page 5), and farther away from this receiver location than with the No Build Alternative.

Predicted future noise levels at two receivers along I-680 (R-11 and R-13) would approach or exceed the NAC of 67 dBA with both the No Build and Build alternatives. A noise impact would occur at these receiver locations; therefore, noise abatement is considered in Section 2.2.7.4, below.

Short-Term Noise Changes

No Build Alternative

The No Build Alternative would not result in construction; therefore, no short-term noise impacts would occur.

Build Alternative

Construction phases anticipated with the project would include concrete pavement construction, excavation, and grading; construction of bridge structures, culverts, and drainage systems, retaining walls, guardrails, and concrete barriers; miscellaneous concrete work; relocation of utilities; paving; and installation of overhead signs, toll gantries, and lighting. Construction noise would primarily result from the operation of heavy construction equipment, and arrival and departure of heavy-duty trucks. The highest maximum instantaneous noise levels would result from special impact tools such as impact pile drivers. Driven piles are expected to be used for the new Calaveras Road to northbound I-680 flyover ramp. Cast-in-drilled-hole piles are expected to be used for the remaining structures. Overhead signs and toll antenna gantries would be supported on cast-in-drilled-hole or driven piles in the median of I-680. Many areas of the project would require only re-striping, and some areas would include new concrete median barriers.

Construction noise for all receptors would be short-term and intermittent.

Table 2.2.7-3 summarizes noise levels produced by construction equipment that is commonly used on roadway construction projects. Construction equipment is expected to generate noise levels ranging from 70 to 90 dB at a distance of 50 feet, and noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance.

Table 2.2.7-3: Construction Equipment Noise

Equipment	Maximum Noise Level (dBA at 50 feet)
Scrapers, bulldozer, graders, cranes	85
Excavators	85
Heavy Trucks, tractors	84
Compactors, wheeled loader	80
Scarifier	85
Pneumatic Tools	85
Concrete Pumps	82
Pavers	85
Impact Pile Drivers (sign installation)	95

Source: FHWA 2006 and Caltrans 2013

General roadway construction noise levels are listed in Table 2.2.7-4 based on typical equipment and activity levels for roadway construction activities. To obtain the values shown in Table 2.2.7-4, the reference noise levels were adjusted to a 100-foot distance assuming basic geometric spreading for a point source (e.g., 6 dB per doubling distance). The hourly average noise level was estimated by summing together the three loudest pieces of equipment.

Table 2.2.7-4: Typical Construction Noise at 100 Feet Distance by Phase

Construction Phase	Maximum Noise Level (L_{max}, dBA)	Hourly Average Noise Level ($L_{eq[h]}$, dBA)
Grubbing/Land Clearing	79	78
Grading/Excavation	79	81
Drainage/Utilities/Subgrade	79	81
Paving	84	80
Restriping/scarifying	79	72
Concrete barrier	76	69
Structures (with Pile Driving)	89	82
Structures (without Pile Driving)	79	75

The areas where the loudest roadwork would occur include the study area along SR 84 between I-680 and Pigeon Pass, and along a short section of I-680 from SR 84 to less than 1 mile north of the interchange. Table 2.2.7-5 summarizes the anticipated daytime construction noise levels at the nearest noise-sensitive locations.

Table 2.2.7-5: Estimated Daytime Construction Noise Levels

Receiver	Location	Existing Typical Hourly L_{eq}[1]	Distance to construction (highway)	Construction Noise (9 AM-6 PM), $L_{eq(h)}$
LT-1	SFPUC Water Management Land near 8350 Vallecitos Lane	61 dBA	190 feet (SR 84); 4,400 feet to structure (I-680 ramp)	75 dBA (SR 84); 49 dBA with piles (I-680 ramp)
LT-6	7010 Vallecitos Road	62 dBA	215 feet (SR 84)	74 dBA
LT-5	10833 Foothill Road	55–65 dBA	2,100 feet (I-680 ramp)	56 dBA with piles; 49 dBA without piles
LT-7	4366 Campinia Place	62 dBA	250 feet (SR 84)	64 dBA scarifying; 61 dBA concrete barrier

Note:
1. These are typical daytime noise levels, not the worst-hour noise levels reported in Table 2.2.7-2.

Construction would be conducted in accordance with Caltrans Standard Specifications Section 14.8-02; however, the temporary noise increase could reach 14 dBA for the homes closest to the major areas of road construction work on SR 84, as shown in Table 2.2.7-5.

Construction of overhead HOV/express lane signs in the median of I-680 could require nighttime impact pile driving or installation of cast-in-drilled-hole piles. Driven piles can generate maximum noise levels of 89 dBA and an hourly average L_{eq} of 82 dBA at 100 feet. The residence at 8855 Pleasanton-Sunol Road (LT-3) would be approximately 500 feet from the pile driver, and the residence on Koopman Road (near LT-4) would be approximately 300 feet from the pile driver. If pile driving is used, noise could reach an L_{max} of 75 to 79 dBA or an hourly average L_{eq} of 68 to 72 dBA at these homes.

2.2.7.4 Avoidance, Minimization, and Abatement Measures

Traffic Noise Abatement Evaluation

Receiver locations that approach or exceed the NAC must be evaluated for potential abatement measures. Noise abatement is considered only where frequent human use occurs and where a lowered noise level would be of benefit. Noise abatement must be predicted to provide at least a 5 dBA minimum reduction at an impacted receptor to be considered feasible by Caltrans (i.e., the barrier would provide a noticeable noise reduction). Additionally, the TNAP acoustical design goal states that the noise barrier must provide at least 7 dBA of noise reduction at one or more benefited receptors. Noise abatement measures that provide noise reduction of more than 5 dBA are encouraged as long as they meet the reasonableness guidelines. The cost is based on the 2017 allowance per benefited receptor of $92,000.

As shown in Table 2.2.7-2, projected noise levels for the 2045 design year are expected to approach or exceed the NAC at two receivers along the east side of I-680, R-11 and R-13, with both the No Build and Build alternatives. These areas qualify for evaluation of abatement measures because a traffic noise impact would occur.

Reducing traffic noise levels at these homes would require construction of a barrier. The barrier would have to be high enough to effectively block the line of sight between the outdoor use areas of these homes and the freeway traffic. Given the space available, these barriers would be masonry sound walls rather than earth berms. Noise barriers within the State right-of-way are typically constructed to meet the criteria in Chapter 1100 of the *Highway Design Manual* (Caltrans 2015b). The manual states that noise barriers should not be higher than 14 feet above the pavement when located within 15 feet of the edge of the traveled way, and 16 feet above ground when located more than 15 feet from the edge of the traveled way.

Preliminary noise barriers are evaluated at the most acoustically effective location within the State right-of-way. Where the roadway is at grade, or elevated above receptors, the most acoustically effective location for a barrier is near the edge of the shoulder, either on a structure or at the top of a slope. Where the roadway is located in a cut section, the most acoustically effective location for a barrier is typically at the right-of-way line.

The abatement measures studied consist of sound walls with different height options. Table 2.2.7-6 presents the results of the barrier analysis.

Barrier 1

At location R-11, 7960 Pleasanton-Sunol Road on the east side of I-680, there is one home on the property. Barrier 1, a sound wall along the Caltrans right-of-way on the east side of I-680, was considered as noise abatement for this area and is shown in Appendix H, page 20. Table 2.2.7-6 lists the estimated noise reduction from modeled Barrier 1. The topography and geometry of the roadway and receptor make it extremely difficult to abate the noise; a 16-foot-tall barrier would only result in a 4 dBA noise reduction. Based on preliminary assessment, Barrier 1 would not be feasible because at a maximum height of 16 feet, it would only provide a 4 dBA noise reduction. Since Barrier 1 would not be feasible, it was not evaluated with respect to the reasonableness criteria.

Barrier 2

At location R-13, along Koopman Road on the east side of I-680, there is one home on the property. Barrier 2, a sound wall along the Caltrans right-of-way on the east side of I-680, was considered as noise abatement for this area and is shown in Appendix H, pages 18 and 19. Table 2.2.7-6 lists the estimated noise reduction from modeled Barrier 2. Based on preliminary assessment, Barrier 2 would be feasible at a maximum height of 16 feet because it would provide a 5 dBA noise reduction. However, it is not considered acoustically reasonable because it would not meet the 7 dBA design goal, and was not evaluated further with respect to the other reasonableness criteria.

Table 2.2.7-6: Barrier Acoustical Effectiveness Analysis

Barrier	Location (N[1])	Approximate Length	Height (feet)	Noise Levels at Receiver	
				2045 Noise Level	Noise Reduction
R-11					
1	7960 Pleasanton-Sunol Rd at Right-of-Way (1)	1,300 feet	0 (no barrier[2])	67	NA[3]
			6	67	0
			8	66	1
			10	66	1
			12	65	2
			14	64	3
			16	63	4
R-13					
2	Koopman Rd at Right-of-Way (1)	1,300 feet	0 (no barrier[2])	67	NA[3]
			6	67	0
			8	66	1
			10	65	2
			12	64	3
			14	63	4
			16 [4]	62	5

Notes:
1. Number of benefited receptors.
2. Represents the future noise level with no abatement incorporated.
3. Not applicable
4. Minimum height needed to block line-of-sight to 11.5-foot-high truck stacks.

The final decision on the noise abatement will be made upon completion of the project design and the public involvement processes.

Short-Term (Construction) Noise

NOI-1. Standard Caltrans measures that are used for all projects include that construction noise shall not exceed a maximum sound level of 86 dBA at 50 feet from job site activities between the hours of 9:00 PM to 6:00 AM. The following standard measures will also be implemented to minimize or reduce the potential for noise impacts from project construction:

- Limit pile driving activities to between 7:00 AM to 7:00 PM, where feasible.
- Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.

- Prohibit unnecessary idling (i.e., greater than 5 minutes in duration) of internal combustion engines within 100 feet of residences.
- Avoid staging of construction equipment within 200 feet of residences and locate all stationary noise-generating construction equipment, such as air compressors, portable power generators, or self-powered lighting systems as far as practical from noise-sensitive receptors.
- Utilize "quiet" air compressors and other "quiet" equipment where such technology exists.

2.2.8 Energy

2.2.8.1 Regulatory Setting

NEPA (42 USC Part 4332) requires the identification of all potentially significant impacts to the environment, including energy impacts.

CEQA Guidelines, Appendix F, Energy Conservation, states that EIRs are 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.

2.2.8.2 Affected Environment

In California, the transportation sector consumes the most energy (nearly 39 percent in 2015; U.S. Energy Information Administration 2017). The high consumption of transportation fuels in California is attributed to the state's abundance in airports, military bases, public transportation, and automobiles. In addition, major metropolitan areas, such as San Francisco and Los Angeles, experience extremely long commute travel times and delay because of high traffic congestion and long distances of travel between homes and jobs. Fossil fuels are the predominant source of energy consumed by the transportation sector. As shown in Table 2.2.8-1, approximately 58 percent of the fossil fuel consumed by the California transportation sector is gasoline.

Table 2.2.8-1: Fossil Fuel Consumption in California for the Transportation Sector (2015)

Fuel Type	California Consumption	
	Trillion BTU[1]	Percent of Total California Consumption
Natural Gas	36	1.2
Aviation Gasoline	4	0.1
Distillate Fuel Oil	464	15.4
Jet Fuel	638	21.2
Liquefied petroleum gas	4	0.1
Lubricants	15	0.5
Gasoline	1,733	57.6
Residual Fuel Oil	116	3.9
Total	3,009	100

Source: U.S. Energy Information Administration 2015a.
1. BTU = British thermal unit

The U.S. currently uses the following alternatives to fossil fuels: compressed natural gas; electricity; ethanol, 85 percent; hydrogen; liquefied natural gas; and liquefied petroleum gas. Table 2.2.8-2 shows the estimated consumption of alternative fuels in California in 2015, according to the Energy Information Administration.

Table 2.2.8-2: Estimated Consumption of Alternative Fuels in California, in Thousand Gasoline-Equivalent Gallons (2015)

Compressed Natural Gas	Electricity	Ethanol, 85%	Hydrogen	Liquefied Natural Gas	Liquefied Petroleum Gas	Other	Total
73,281	203	1,675	86	7,101	1,392	-	83,738

Source: U.S. Energy Information Administration 2015b

2.2.8.3 Environmental Consequences

Energy used under the No Build and Build alternatives was evaluated to determine if the proposed project would result in a net increase in energy use and/or decrease in energy efficiency. The Caltrans Standard Environmental Reference, Volume 1, Chapter 13, Energy (Caltrans 2015c) was used as guidance to analyze the direct and indirect energy consumption attributed to the proposed project. Direct energy refers to the fuel consumed by vehicles that would use the proposed project facility. Indirect energy refers to all the remaining energy consumed to run a transportation system, including construction, maintenance, and operation energy (e.g., lighting).

Methodology

Two geographical areas were selected to study the energy use of the proposed project: the project subarea and the project region. The project subarea includes the SR 84 and I-680 mainline segments and associated ramps and connecting roadways that would be modified by the proposed project (see Figure 2.1.9-1). The project region includes the subarea as well as I-580 and the surrounding roadway network in the cities of Dublin, Pleasanton, and Livermore where traffic patterns would be affected by the proposed project. The study areas are the same as those in the *Traffic Operations Analysis Report* (Fehr and Peers 2017).

Direct Energy Use

The direct energy use (i.e., vehicle fuel consumption) for the No Build and Build alternatives was estimated based on the reported vehicle miles traveled (VMT) for automobiles and trucks for the project subarea and region (Fehr and Peers 2017). The project is intended to alleviate regional traffic congestion by increasing the capacity on SR 84, which would reduce the use of local streets to circumnavigate the existing traffic congestion. As shown in Table 2.2.8-3, in the project subarea, the Build Alternative would increase the daily VMT compared to the No Build Alternative in both the opening year (2025) and design year (2045) due to the increased capacity of SR 84. However, the regional VMT under the Build Alternative would decrease compared to the No Build Alternative because there would be less circuitous travel along local roadways and more efficient use of the existing highways.

Table 2.2.8-3: Daily VMT (Thousand Miles) for Project Subarea and Region

Project Area		2015	2025			2045		
		Existing	No Build	Build	Net Change	No Build	Build	Net Change
Subarea	Auto	1,722	1,881	1,927	46	2,199	2,337	139
	Truck	72	78	80	2	92	97	6
	Total	1,793	1,959	2,007	48	2,291	2,435	144
Region	Auto	10,086	11,225	11,194	-31	13,501	13,410	-92
	Truck	420	468	466	-1	563	559	-4
	Total	10,506	11,692	11,661	-32	14,064	13,969	-95

Note: Daily VMT and the associated net changes are rounded to the nearest thousand.
Source: Fehr and Peers 2017

Fuel consumption information for Alameda County was derived from the CARB's EMFAC2014 model (CARB 2017b). According to the model, automobiles and trucks traveling in Alameda

County are predominantly fueled by gasoline and diesel, respectively. Based on the distribution of vehicle types reported in Alameda County, the weighted averages of gasoline and diesel consumption for automobiles and trucks were estimated for the years 2015, 2025, and 2045. As shown in Table 2.2.8-4, fuel consumption rates are expected to decrease over time.

Table 2.2.8-4: Average Fuel Consumption Rates (Gallons/Mile)

Vehicle Type	2015 (Existing)	2025 (Opening Year)	2045 (Design Year)
Gasoline Automobiles	0.048	0.035	0.027
Diesel Trucks	0.168	0.148	0.142

The total daily gasoline and diesel consumption for the project subarea and region was estimated based on the reported daily VMT and average fuel consumption rates (Table 2.2.8-5), which was then used to estimate the annual direct energy consumption in British thermal units (BTUs) for the Build and No Build alternatives (Table 2.2.8-6).

Table 2.2.8-5: Total Daily Fuel Consumption (Gallons)

Project Area		2015 Existing	2025			2045		
			No Build	Build	Net Change	No Build	Build	Net Change
Subarea	Gasoline	81,930	66,356	67,986	1,630	59,462	63,208	3,747
	Diesel	12,033	11,575	11,860	284	12,987	13,805	818
Region	Gasoline	479,988	396,030	394,953	-1,077	365,100	362,624	-2,475
	Diesel	70,494	69,084	68,896	-188	79,740	79,200	-541

Note: Fuel consumption and the associated net changes are rounded to the nearest whole number.

Table 2.2.8-6: Total Annual Direct Energy Consumption (Billion BTU)

Project Area	2015 Existing	2025			2045		
		No Build	Build	Net Change	No Build	Build	Net Change
Subarea	4,200	3,486	3,571	86	3,243	3,447	204
Region	24,608	20,803	20,746	-57	19,913	19,778	-135

Note: Assumed an energy content of 143,700 BTUs per gallon of gasoline and 147,600 BTUs per gallon of diesel. Energy consumption and the associated net changes are rounded to the nearest billion BTU.

The direct energy consumption in 2025 and 2045 is expected to improve relative to existing conditions for both the No Build and Build alternatives in the project subarea and region due to expected improvements in vehicle fuel economy. In the project subarea, the Build Alternative would increase the direct energy consumption compared to the No Build Alternative in 2025 and 2045 due to the increased vehicle capacity on SR 84. However, the regional direct energy consumption under the Build Alternative would decrease compared to the No Build Alternative in 2025 and 2045 because there would be less circuitous travel along local roadways and more efficient use of the existing highways.

Indirect Energy Use

Indirect energy consumption for the No Build and Build alternatives was estimated based on the annual energy-use factors shown in Table 2.2.8-7, which were derived from the Caltrans *Energy and Transportation Systems Handbook* (Caltrans 1983). Because a mix of vehicle types would use the project roadways, the manufacturing and maintenance energy-use factors were calculated based on the fleet-wide distribution of light-duty, medium-duty, and heavy-duty vehicles in Alameda County reported from CARB's EMFAC2014 model. The project-specific construction year, cost, and proposed lane miles are shown in Table 2.2.8-8.

Table 2.2.8-7: Indirect Annual Energy Use Input Parameters

Type of Indirect Energy Use	Indirect Energy-Use Factors	Unit
Facility Construction Energy [a]	46.5	BTU/$
Facility Maintenance Energy	80,300,000	BTU/Lane-Mile/Year
Vehicle Manufacturing Energy	1,466	BTU/VMT/Year
Vehicle Maintenance Energy [b]	1,439	BTU/VMT/Year

[a] Consistent with other indirect energy-use parameters, the rate of energy consumption for construction of a rural conventional highway was amortized over the lifetime of the project (50 years). The energy-use factor was also adjusted for inflation from 1977 to 2021 based on a projected inflation rate of 2.5 percent from 2018 to 2021.

[b] Vehicle maintenance energy is the sum of oil energy, tire energy, and maintenance and repair energy.

Table 2.2.8-8: Project Characteristics for Energy Use Calculations

Construction Year	2021
Cost ($)	277,000,000
No Build Alternative Lane Miles	15.35
Build Alternative Lane Miles	23.09

Note: Lane Miles for No Build and Build alternatives are from Fehr and Peers 2017.

Indirect energy uses for the Build Alternative would include construction and maintenance of the proposed project, as well as manufacturing and maintenance of the vehicles that traverse the proposed project area. The annual indirect energy uses were calculated for both the project subarea and region, as summarized in Tables 2.2.8-9 and 2.2.8-10, respectively.

Table 2.2.8-9: Annual Indirect Energy Consumption (Billion BTU) for the Project Subarea

		2025			2045		
Energy Use Type	2015 Existing	No Build	Build	Net Change	No Build	Build	Net Change
Facility Construction	NA	NA	57.5	57.5	NA	57.5	57.5
Facility Maintenance	1.2	1.2	1.9	0.6	1.2	1.9	0.6
Vehicle Manufacturing	815.0	890.3	912.2	21.9	1,040.9	1,106.5	65.6
Vehicle Maintenance	800.0	873.9	895.4	21.5	1,021.8	1,086.2	64.4
Total Indirect Energy	1,616.3	1,765.5	1,866.9	101.4	2,063.9	2,252.0	188.1

NA = not applicable

Note: Energy consumption and the associated net changes are rounded to one decimal place.

Table 2.2.8-10: Annual Indirect Energy Consumption (Billion BTU) for the Project Region

Energy Use Type	2015 Existing	2025			2045		
		No Build	Build	Net Change	No Build	Build	Net Change
Facility Construction	NA	NA	57.5	57.5	NA	57.5	57.5
Facility Maintenance	1.2	1.2	1.9	0.6	1.2	1.9	0.6
Vehicle Manufacturing	4,774.8	5,313.7	5,299.2	-14.4	6,391.5	6,348.2	-43.3
Vehicle Maintenance	4,686.8	5,215.8	5,201.6	-14.2	6,273.8	6,231.2	-42.5
Total Indirect Energy	9,462.8	10,530.7	10,560.2	29.5	12,666.5	12,638.7	-27.7

NA = not applicable

Note: Energy consumption and the associated net changes are rounded to one decimal place.

In the project subarea, the Build Alternative would increase the annual indirect energy consumption compared to the No Build alternative in 2025 and 2045 primarily due to project construction and increased manufacturing and maintenance of vehicles using the project area. However, the regional indirect energy consumption under the Build Alternative would decrease over time relative to the No Build Alternative, primarily due to the decrease in vehicle maintenance and manufacturing associated with the regional reduction in VMT.

Total Energy Use

The total annual direct and indirect energy uses were combined for the project subarea and region in Table 2.2.8-11. The total annual energy consumption in 2025 and 2045 is expected to improve relative to existing conditions for both the No Build and Build alternatives in the project subarea and region due to expected improvements in vehicle fuel economy. In the project subarea, the total annual energy consumption for the Build Alternative is expected to increase compared to the No Build alternative in 2025 and 2045 due to increased vehicle fuel consumption (from increased VMT), project construction, and manufacturing and maintenance of vehicles using the project area. However, the total annual energy consumption for the project region would decrease compared to the No Build Alternative in 2025 and 2045, primarily due to the regional decrease in vehicle fuel consumption, maintenance, and manufacturing related to the reduction in regional VMT. The regional energy benefits would offset the localized increase in energy consumption within the project subarea. As a result, the proposed project would not have an adverse effect on regional energy consumption.

Table 2.2.8-13: Total Annual Energy Use (Billion BTU)

Project Area	2015 Existing	2025			2045		
		No Build	Build	Net Change	No Build	Build	Net Change
Subarea	5,817	5,251	5,438	187	5,307	5,699	392
Region	34,070	31,334	31,307	-27	32,579	32,416	-163

Consistency with Energy Conservation Plans

The *California Energy Action Plan* was approved in 2003 by the Energy Resources Conservation Development Commission (also known as the California Energy Commission), the Public Utilities Commission, and the Consumer Power and Conservation Financing Authority (which is

now defunct). The goal of the Plan is to ensure that adequate, reliable, and reasonably-priced electrical power and natural gas supplies are achieved and provided through policies, strategies, and actions that are cost-effective and environmentally sound. In 2005, a second Energy Action Plan was adopted and reflects the policy changes and actions of the ensuing two years.

California's energy policies have been substantially shaped by a series of Assembly Bills (AB), Senate Bills (SB), and Executive Orders. AB 32, the California Global Warming Solutions Act of 2006, requires California to reduce its GHG emissions to 1990 levels by 2020. AB 1493, the "Pavley" regulations on clean car standards, sets fuel efficiency standards for vehicle model years through 2016. Following AB 32, the California Legislature passed SB 32 in 2016, which requires a 2030 GHG emissions reduction target of 40 percent below 1990 levels. SB 375, the Sustainable Communities and Climate Protection Act of 2008, supports the climate action goals in AB 32 and SB 32 through coordinated transportation and land use planning with the goal of more sustainable communities.

The proposed project is included in the current RTP (ABAG and MTC 2017a; ID 17-01-0029). An RTP integrates a sustainable communities strategy on land use, housing, and transportation to meet targets in energy efficiency and reduction in fossil fuel consumption, as required by SB 375 (CARB 2014). As discussed above, the Build Alternative would decrease regional energy consumption relative to the No Build Alternative. In addition, the Build Alternative would improve traffic congestion and safety, and provide bikeways to accommodate an alternative travel mode through the project area. Therefore, the operation of the proposed project would not conflict with California's energy conservation plans.

Energy use during project construction would be temporary and would not result in a permanent increase in energy consumption. The construction contractor would have a financial disincentive to waste fuel used by the construction equipment (i.e., excess fuel usage reduces profits). It is generally assumed that fuel used during construction would be conserved to the maximum extent feasible. Furthermore, regulations enforced by CARB (13 CCR 2485) limit the idling time of diesel construction equipment to five minutes. Therefore, it is anticipated that energy consumption during the construction period would be minimized to the maximum extent practical. Therefore, the construction of the proposed project would not conflict with or have an adverse effect on California's energy conservation plans.

2.2.8.4 Avoidance, Minimization, and/or Mitigation Measures

Measures implemented to reduce GHG emissions, such as using energy-efficient lighting, keeping construction engines properly tuned, and limiting idling of construction vehicles, are likely to also reduce energy consumption. See Measure GHG-1 in Section 3.2.1.4.

2.3 Biological Environment

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, fish passage, 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 (FESA) are discussed below in Section 2.3.5. Wetlands and other waters are also discussed below in Section 2.3.2.

2.3.1.1 Affected Environment

This section is summarized from the *Natural Environment Study* (AECOM 2017a) for the proposed project, which was completed in July 2017.

A biological study area (BSA) was established to evaluate the effects of the proposed project on natural communities and other biological resources. The BSA encompasses the project footprint along with a 150-foot buffer to include areas that project construction activities may directly or indirectly impact. For the proposed project, the BSA consists of approximately 605 acres and includes the section of SR 84 from PM 17.9 to 22.9 and the section of I-680 from PM 10.3 to 15.3.

The majority of the BSA (approximately 363 acres) consists of natural vegetation communities: grasslands, forests and woodlands, scrubland, and wetland communities, as well as other waters of the U.S. and waters of the State. The next largest portion consists of developed land (approximately 173 acres), including the paved surfaces of SR 84 and I-680, paved or gravel driveways, structures, and residential and commercial properties. Disturbed vegetation communities comprise approximately 70 acres, including ruderal grassland, landscaped vegetation, and agriculture/pasture. Detailed mapping of vegetation communities in the BSA is included in the *Natural Environment Study* (AECOM 2017a).

Habitat conservation plans in the project vicinity are discussed in Section 2.1.2.1.

Vegetation Communities

Sensitive vegetation communities are defined as those that are considered vulnerable, imperiled, or critically imperiled, in California. These categories contain native plant communities that are regarded by CDFW as having special significance under CEQA. The following describes the vegetation communities in the BSA, along with each community's suitability as wildlife habitat.

Grassland

California Annual Grassland

California annual grassland is defined as being dominated by one or more annual grasses and having no or very little shrub or tree layer. This is among the most abundant community types within the state of California and within the BSA. California annual grassland is a combination

of a variety of vegetation alliances, including semi-natural herbaceous stands such as wild oats grassland, annual brome grasslands, and perennial rye grass fields. Poison hemlock (*Conium maculatum*) or sweet fennel patches (*Foeniculum vulgare*) and upland mustards (black mustard [*Brassica nigra*], and field mustard [*Brassica rapa*]) occur in patches in disturbed areas and on hillsides, within the grassland community. This community is dominated by introduced grasses and forbs such as wild oats (*Avena* sp.), soft chess (*Bromus hordeaceus*), burclover (*Medicago* sp.), and Italian ryegrass (*Festuca perennis*). Sweet fennel, radish (*Raphanus sativus*), poison hemlock, mustard (*Brassica* spp.), and Italian thistle (*Carduus pycnocephalus)* are common invasive species in these areas. Although grasslands in the BSA are dominated by nonnative species, some native wildflowers grow scattered among the annual grasses including California poppy (*Eschscholzia californica*), horseweed (*Erigeron canadensis*), and yarrow (*Achillea millefolium*). This vegetation type includes agricultural fields and pastures that are fallow and have been allowed to return to more natural conditions. Much of the grassland in the BSA is regularly grazed by cattle.

Grasslands, when located sufficiently close to amphibian breeding populations, can be used for upland and aestivation[28] habitat for California red-legged frog (federal threatened, state species of special concern) and California tiger salamander (federally threatened, state threatened). Small mammal burrows are an important resource in grasslands because they may provide aestivation locations for amphibians and reptiles. California vole (*Microtus californicus*), California ground squirrel (*Spermophilus beecheyi*), coyote (*Canis latrans*), and Gilbert's skink (*Plestiodon gilberti*) were some of the species observed in the California annual grasslands during field surveys.

Forests and Woodlands

Coast Live Oak Woodland

Coast live oak woodland occurs in patches throughout the BSA, on the banks of Vallecitos Creek and on alluvial terraces. Coast live oak (*Quercus agrifolia*) is dominant or co-dominant in the tree canopy with valley oak (*Quercus lobata*), California bay tree (*Umbellularia californica*), and California buckeye (*Aesculus californica*) occasionally present in the understory. Because of competition for access to light, and the density and age of the community, the trees are very large and tall and the canopy is continuous. The shrub and herbaceous layers are sparse to intermittent.

Valley Oak Woodland

Valley oak woodland occurs in several places in the BSA, typically at higher elevations than coast live oak woodland, on high riparian terraces and mesic meadows with little other tree competition. This vegetation community is dominated by valley oak, with no shrubby understory and with primarily nonnative annual grasses in the herbaceous understory. The trees are mostly large mature oaks often 50 feet tall or larger. Young trees and saplings are missing, very likely because of intensive grazing and drought. The canopy is typically open; however, it is continuous in some cases. The community occurs on seasonally saturated alluvial soils. Because of its limited current distribution due to clearing for pasture and agricultural land, valley oak woodland is considered a sensitive vegetation community by CDFW.

[28] Aestivation is a state of dormancy, similar to hibernation, that animals enter in response to high temperatures and arid conditions.

This habitat occurs throughout the southwestern and central portions of the BSA. The dominant hardwood species provide nesting habitat for birds such as the oak titmouse (*Baeolophus inornatus*) and black phoebe (*Sayornis nigricans*), and could provide breeding habitat for northern pacific rattlesnakes (*Crotalus oreganus oreganus*). This woodland type is characterized by large expanses of open-forest valley oak canopy interspersed with scattered coast live oak, and an understory dominated by grasses, which provides optimal foraging and nesting habitat for some raptor species such as the red-tailed hawk (*Buteo jamaicensis*).

Mixed Oak Woodland

Mixed oak woodland is present throughout the BSA, in forest stands where several oak species are dominant in the canopy, including valley oak, coast live oak, and interior live oak (*Quercus wislizenii*). Common species in the subcanopy include black walnut (or 'Paradox' hybrid walnut; *Juglans hindsii x. Juglans regia*) and California buckeye. This is the most dominant woodland community within the BSA.

Hinds's Walnut and Related Stands

Hinds's walnut stands are primarily dominated by Northern California black walnut (*Juglans hindsii*). In the BSA, black walnut occurs within the subcanopy of several woodland types. However, there are several semi-natural stands (planted groves) with black walnut as the single dominant tree species located to the west of I-680 along Pleasanton-Sunol Road just north of Koopman Road. These stands have an open canopy with an understory of annual grasses.

Old-growth stands of Hinds's walnut are a sensitive vegetation community. Walnut stands within the BSA (labeled as Hinds's walnut and related stands) are composed of 'Paradox' hybrid walnut species, and not the protected Northern California black walnut, and are therefore not considered communities of concern under CDFW. Walnut groves provide suitable habitat for foraging birds such as the northern mockingbird (*Mimus polyglottos*), and the dark-eyed junco (*Junco hyemalis*).

Red Willow Thickets

Red willow thickets occur along ditches, floodplains, lake edges, and low-gradient depositions along streams. In the BSA this habitat is common along ephemeral and intermittent drainages. Red willow (*Salix laevigata*) is the dominant species. Associated canopy species include arroyo willow (*Salix lasiolepis*) and narrowleaf willow (*Salix exigua*). Associated shrub species in the understory include mule fat (*Baccharis salicifolia*), while herbaceous species include tall flatsedge (*Cyperus eragrostis*) and brown-headed rush (*Juncus phaeocephalus*). In the BSA, wetlands were delineated within stands of red willows where fresh water seasonally floods or saturates this habitat. Red willow thickets are a sensitive vegetation community.

Red willow thickets provide foraging habitat for avian species such as the state-endangered willow flycatcher (*Empidonax traillii*).

Fremont Cottonwood Forest

Fremont cottonwood forest in the BSA is isolated to two remnant stands along SR 84 at Little Valley Road. Much of this habitat was mapped as jurisdictional wetland, based on hydrology, soils and vegetation. The stands are fairly small. Fremont cottonwood (*Populus fremontii*) is the dominant species in the tree canopy, with smaller black walnuts and willow species occurring within the subcanopy. The herbaceous layer consists primarily of emergent wetland species with

patches of California annual grassland. The shrubby layer is absent. Freshwater intermittently or seasonally floods or saturates the wetland habitat within the forest. Naturally established Fremont cottonwood trees occur abundantly in the riparian scrub and forest community described below, although they are not dominant species. Fremont cottonwood forest is a sensitive vegetation community.

Riparian Scrub and Forest

Riparian forest and scrub corridors line the creeks and some of the intermittent drainages in the BSA. The riparian forest and scrub habitat is a multi-alliance assemblage of wetland and riparian trees and shrubs that narrowly line both banks adjacent to the active creek and drainage channels, and in some locations, a flood terrace below the Ordinary High Water Mark (OHWM). Dominant species in the overstory include willows, Fremont cottonwood, valley oak, Coast live oak, and 'Paradox' hybrid walnut. Dominant species in the shrubby and herbaceous layer include poison oak (*Toxicodendron diversilobum*), Himalayan blackberry (*Rubus armeniacus*), and mugwort (*Artemisia douglasiana*). The riparian habitat that lines the banks of Vallecitos Creek is annually exposed to a large variation of flows and water depths as can be observed from the water-deposited debris high up in the canopies of the riparian trees. Creek flow, groundwater, and precipitation are the sources of water for the riparian woodlands in the BSA. Many portions of the riparian habitat contain a dominance of hydrophytic plant species, but may not meet the USACE hydrology or soils criteria to be determined wetlands. See Section 2.3.2.1 for a discussion of these criteria.

All native riparian vegetation communities are considered sensitive by CDFW due to their limited distribution in California. The riparian scrub and forest community is considered high-quality habitat, important to wildlife, of relatively limited (and declining) distribution at the local and statewide level, and warranting preservation and management.

Eucalyptus Groves

Eucalyptus groves consist of areas dominated by one or more nonnative species of eucalyptus. In the BSA, blue gum (*Eucalyptus globulus*) occurs in small groves as planted windrows. The ground layer in this community is often very sparse or devoid of understory vegetation due to the presence of thick duff and the alleopathic nature of eucalyptus trees. Occasional understory species include nonnative grasses and herbs such as clover (*Trifolium* sp.) and Italian ryegrass.

Raptors such as the white-tailed kite (*Elanus leucurus*), and Cooper's hawk (*Accipiter cooperii*) could use this habitat for nesting.

Scrubland

Arroyo Willow Thickets

Arroyo willow thickets are common along seasonally or temporarily flowing streams and at seeps. The dominant species is arroyo willow, with patches of narrowleaf willow and shining willow (*Salix lucida* ssp. *lasiandra*). Associated shrub species in the understory include Himalayan blackberry, while herbaceous and subshrub species include mugwort and California blackberry (*Rubus ursinus*). Within the BSA, some patches of arroyo willow thickets occur with sparse red willow in the overstory. Some of the thickets in the BSA were planted in 2010 as part of an onsite riparian mitigation project for the SR 84 Pigeon Pass Realignment project (Caltrans 2016c; EA 04-17240). Arroyo willow thickets are located along intermittent drainages on the east side of the BSA, where they are largely vegetated with arroyo willow, narrowleaf willow

and mule fat, and in patches within roadside drainages. Arroyo willow thickets are a sensitive vegetation community.

Coyote Brush Scrub

Coyote brush scrub occurs in openings and at the edges of coast live oak woodland and riparian scrub and forest in patches throughout the BSA. This community varies from a dense thicket of coyote brush (*Baccharis pilularis*) and poison oak to more open scrubland intermixed with patches of grassland. Blackberry (*Rubus* sp.) is a common species found mixed within this community. Toyon (*Heteromeles arbutifolia*) occasionally occurs scattered among the coyote brush in openings within the coast live oak woodland.

Wetlands

Baltic and Mexican Rush Marshes

Baltic and Mexican rush marshes are herbaceous wet meadows that typically occur as small to extensive, open to typically dense patches on flat stream benches, along overflow channels, and near springs. Habitats are often alkaline meadows and may have long-term grazing disturbance. Soils are variable and range from poorly to well-drained, sandy clay loam to fine sand-textured, and are usually mottled or gleyed. Stands are characterized by dense swards of Baltic rush (*Juncus balticus*) and Mexican rush (*Juncus mexicanus*). Other species include flatsedge (*Cyperus* sp.) and watercress (*Nasturtium officinale*). Shrubs are not common. This association is often considered to be a grazing-induced community since it increases with disturbance. In the project BSA, the dominant species in this community is common rush (*Juncus patens*). Baltic and Mexican rush marshes are a sensitive vegetation community.

Hardstem Bulrush Marsh

Hardstem bulrush marsh community is present along and within active riparian channels. This vegetation community is found in large patches along and in the bed of Vallecitos Creek. Hardstem bulrush (*Schoenoplectus acutus*) is dominant or co-dominant in the herbaceous layer, along with cattail species (*Typha* sp.). Emergent trees and shrubs may be present at low cover, including blackberry, various willow species, and the occasional cottonwood. Hardstem bulrush marshes are a sensitive vegetation community.

The seeds of bulrush, being less hairy and larger than cattail, are one of the most important and commonly used foods of a variety of bird species, and the stems provide nesting habitat for red-winged blackbirds (*Agelaius phoeniceus*) and marsh wrens (*Cistothorus palustris*).

Cattail Marshes

Within the BSA, cattail marshes are a common freshwater marsh community that occurs in locations with slow moving and shallow water or perennially saturated soils, and may merge into willow scrub and bulrush seeps. Freshwater marshes are typically dominated by perennial emergent monocots and other plants that tolerate inundation or prolonged wet conditions. Dominant species include narrow-leaf cattail (*Typha angustifolia*), and broadleaf cattail (*T. latifolia*), tule (*Schoenoplectus* sp.), and mule fat. This community occurs in scattered small wetland areas along SR 84 and in roadside ditches, canals, and seeps. Cattail marshes are a sensitive vegetation community.

Pale Spike Rush Marshes

Several seasonal wetland and marsh features were mapped within the BSA as pale spike rush marsh vegetation communities, with pale spike rush (*Eleocharis macrostachya*) as the dominant species. These features are typically small, depressional features that collect local precipitation. Seasonal wetlands include swales and depressional wetlands. These features also support weedy hydrophytic species such as tall flatsedge, bristly ox-tongue (*Helminthotheca echioides*), and annual bluegrass (*Poa annua*). Pale spike rush marshes are a sensitive vegetation community.

Forested/Shrub Wetland

Within the BSA, forested/shrub wetlands occur in Fremont cottonwood forests and red willow thickets. These "sub-habitats" occur in depressional features, where wetland indicators (hydric soils and vegetation, and hydrology) were observed. Emergent wetland plant species, such as flatsedge and rushes, are present in the understory. Forested/shrub wetland communities are considered sensitive by CDFW.

Smartweed – Cocklebur Patches

One marsh feature with rough cocklebur (*Xanthium strumarium*) as a dominant species (with wetland facultative species turkey tangle fogfruit [*Phyla nodiflora*] and pappose tarweed [*Centromadia parryi*], as well as upland Italian thistle, as codominants) was mapped in the BSA. This feature was originally observed during surveys conducted during the drought in 2016, and wetland hydrology was not present. However, based on aerial imagery from March 2017 and the site visit conducted in April 2017, it was determined that during a year with normal precipitation, this feature holds water for a substantial period of time and would likely exhibit all three parameters of a jurisdictional wetland. This feature is fed primarily through runoff from an upslope intermittent channel.

Disturbed Vegetation

Ruderal Grassland

Ruderal refers to mainly herbaceous habitats that are invading highly disturbed areas and contain a mix of weedy volunteer species growing in urban or disturbed settings. Ruderal habitats have low native species diversity. Vegetation in ruderal areas is largely composed of disturbance-tolerant native species and invasive weed species. Within the BSA, ruderal habitat is roughly 75 percent vegetated, and appears to be dominated by pineapple weed *(Matricaria discoidea*), mustards, ripgut brome (*Bromus diandrus*), redstem filaree (*Erodium cicutarium*), radish, dissected geranium (*Geranium dissectum*), and fennel. Ruderal habitats within the BSA are confined to the medians, some highway shoulders along SR 84 and I-680, and overgrown access roads.

Landscaped

Landscaped areas comprise all types of development for residential, commercial, industrial, transportation, landfill, landscaping, and recreational uses (e.g., sites with horticultural plantings, golf courses, and irrigated lawns). These areas have been impacted by grading, mowing, filling, and residential use. Both native and non-native trees and shrubs occur within State right-of-way. Private properties contain ornamental plantings dominated by a diverse array of trees and shrubs. Common nonnative species include Victorian box (*Pittosporum undulatum*), and Italian cypress (*Cupressus sempervirens*). Some planted native species were observed, including coast redwood

(*Sequoia sempervirens*) and Monterey pine (*Pinus radiata*). This vegetation community includes planted groves of non-native English walnut (*Juglans regia*).

Agriculture/Pasture

Active agricultural fields and pastures are scattered throughout the BSA along SR 84 and on the south end of the BSA along I-680. These areas are devoid of vegetation if they have recently been tilled. In some locations, non-native grasses and other weedy species may occur. These locations appear to be highly disturbed and the soil compacted.

Trees

A total of 1,129 trees were recorded within the survey area, which included areas that may be permanently or temporarily impacted by project activities. The majority of trees (1,005) are considered native to California.

The project area is dominated by coast live oak. The riparian corridor along Vallecitos Creek contains a mix of upland and riparian species, including coast live oak, valley oak, red willow, arroyo willow, and black walnut. Upland habitat throughout the BSA was dominated by mixed oak woodland species, including coast live oak and valley oak. Landscaped areas include some native trees, such as coast live oak, California sycamore (*Platanus racemosa*) and coast redwood. The remaining 124 non-native trees include landscape trees such as Brazilian pepper tree (*Schinus terebinthifolius*), non-native pines (*Pinus* sp.), pittosporum (*Pittosporum* sp.), and Italian cypress.

Migratory Corridors

The aquatic, upland, wetland, and riparian areas of the BSA may provide habitat for mammals, birds, small reptiles, amphibians and invertebrates.

Along SR 84 and at the SR 84/I-680 interchange, where there is connectivity to preserved land such as Sheep Camp Creek (discussed in Section 2.1.2.1, under "Habitat Conservation Plans") and the Sunol Regional Wilderness, more elusive species (those more sensitive to sound, or those with specific habitat requirements) may be present. These species include coyote, gray fox (*Urocyon cinereoargenteus*), common garter snake (*Thamnophis sirtalis*), great blue heron (*Ardea herodias*), marsh wren (*Cistothorus palustris*), Pacific tree frog (*Pseudacris regilla*), western pond turtle (*Emys marmorata*), California vole, pocket gopher (*Thomomys bottae*), western burrowing owl (*Athene cunicularia hypugaea*), and raptors. Wildlife may use the creek, drainages, and riparian areas as migration corridors to other specific aquatic or terrestrial habitats. Culverts that collect water from the north side of SR 84 and drain to the south side of the road, and from the east side of I-680 to the west side of the interstate, also provide migratory corridors for wildlife.

SR 84 mostly parallels Vallecitos Creek and is perpendicular to many other intermittent and ephemeral drainages. The riparian corridors in the project vicinity function as east-west and north-south migration corridors. Similarly, the open space located immediately north of the BSA functions as an east-west migration corridor for upland species at the southern limits of the Sunol Ridge (Spencer et al. 2010). Altogether, areas within the BSA are expected to facilitate migratory movement, daily travel, and/or dispersal habitat for a variety of wildlife species within the Alameda Creek watershed.

Current barriers in the BSA include buildings, fencing, road berms, steep road shoulders, and metal guardrails, that can impede migration, and roads with high levels of traffic that are a source of mortality. Along I-680, the concrete median is a major barrier to migration. Individuals of some species may occasionally cross SR 84 and other impediments as part of their migration or dispersal, particularly at night when traffic is lighter. Some special-status species that may use the BSA for migration are not expected to breed in or inhabit the BSA in large numbers; these include the Alameda whipsnake (*Masticophis lateralis euryxanthus*), sharp-shinned hawk (*Accipiter striatus*), grasshopper sparrow (*Ammodramus savannarum*), ferruginous hawk (*Buteo regalis*), northern harrier (*Circus cyaneus*), California yellow warbler (*Setophaga petechial*), white-tailed kite, American peregrine falcon (*Falco peregrinus anatum*), merlin (*Falco columbarius*), and golden eagle (*Aquila chrysaetos*).

Wildlife in the west side of the BSA, along I-680 where there is a greater volume of traffic than along SR 84, is largely composed of species that are adapted to and/or tolerant of urban landscapes and disturbances, such as raccoon (*Procyon lotor*), wild turkey (*Meleagris gallopavo*), mule deer (*Odocoileus hemionus*), ground squirrel, California scrub jay (*Aphelocoma californica*), song sparrow (*Melospiza melodia*), and a variety of other common birds.

I-680 runs along the Southern Pacific railroad tracks, crossings of which are enabled by bridges and/or culverts. I-680 is expected to limit the area's function as an east-west migration corridor due to habitat fragmentation, the high level of human activity, vehicle traffic, and associated light and noise pollution, as well as natural impediments such as steep or sheer embankments and rapid stream flows. Along the I-680 corridor, in particular, culverts and undercrossings serve as an important connector for wildlife.

Fish Passage

Resident rainbow trout (*Oncorhynchus mykiss*) populations may be present in the watershed but were not observed during the field surveys. Fish were observed within the BSA in Vallecitos Creek on the west side of I-680. The double box culvert where Vallecitos Creek crosses under I-680 serves as a barrier to fish passage to the upper reaches of the creek, due to the culvert's 2 to 2.5 foot drop on the west side of I-680 and the low flow of water through the culvert. The culvert also inhibits non-anadromous fish reaching the spring-fed section of Vallecitos Creek east of I-680. Based on the fish passage assessment, the BSA does not include any streams where anadromous fish may occur, and no species subject to any fisheries management plans are known to be present in Vallecitos Creek. In addition, no National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) essential fish habitat[29] (EFH) is present within the BSA.

[29] The term "essential fish habitat" means waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity (Magnuson-Stevens Fishery Conservation and Management Act, Public Law 104-297).

2.3.1.2 Environmental Consequences

No Build Alternative

The No Build Alternative would not affect vegetation, migratory corridors, or fish passage.

Build Alternative

Vegetation Communities

Table 2.3.1-1 lists the anticipated permanent and temporary impacts to vegetation communities in the BSA.

Table 2.3.1-1: Vegetation Communities and Acreages in the BSA and Impacts

Vegetation Communities Type[1]	Acres in BSA[2]	Impacts (acres)		
		Permanent	Temporary	Total
Grasslands				
California annual grassland	309.66	22.83	19.71	42.54
Forest and Woodland				
Coast live oak woodland	6.62	0.38	0.74	1.12
Valley oak woodland	1.45	<0.01	0.04	0.04
Mixed oak woodland	24.99	1.78	1.35	3.12
Hinds's walnut and related stands	5.35	0.65	0.15	0.80
Red willow thickets[3]	0.54	0.15	0.20	0.35
Fremont cottonwood forest[3]	0.33	0.20	0.11	0.32
Riparian scrub and forest	5.36	0.07	0.19	0.26
Eucalyptus grove	1.11	--	--	--
Scrubland				
Arroyo willow thickets	0.30	0.02	0.04	0.06
Coyote brush scrub	2.16	0.15	0.02	0.17
Wetlands				
Baltic and Mexican Rush Marshes	0.18	--	<0.01	<0.01
Hardstem bulrush marsh	2.02	0.04	0.07	0.11
Cattail marsh	1.06	--	<0.01	<0.01
Pale spike rush marshes	1.35	<0.01	0.02	0.02
Forested / shrub wetland	0.23	0.14	0.09	0.23
Smartweed – cocklebur patches	0.02	--	--	--
Disturbed Vegetation				
Ruderal grassland	41.66	12.21	7.99	20.20
Landscaped	12.50	2.39	1.83	4.22
Agriculture / pasture	15.49	0.46	0.54	1.00
Total[4]:	**432.39**	**41.49**	**33.08**	**74.57**

Notes:

1. Vegetation communities were assigned classifications based on their dominant species. Some seasonal wetlands were identified within woodland and scrubland communities, and were included as the dominant vegetation type in that mosaic of communities.
2. Acreages rounded to the nearest hundredth, so values shown for each vegetation type in table may not add up to total acreage shown.
3. Vegetation communities that included forested / shrub wetlands, the acreages of which are listed separately.
4. The total area of the BSA is 605.31 acres. Open water and developed areas (defined as the paved surfaces of SR 84 and I-680, paved or gravel driveways, structures, and residential and commercial properties) total 172.77 acres and are not included in the acreage shown above.

Trees

Table 2.3.1-2 presents an estimate of potential impacts to trees from the proposed project. A total of 343 trees may be permanently removed, and 786 trees may be temporarily affected by project activities. The project would have direct and indirect permanent impacts to trees through the removal of woodland habitat due to ground disturbance during construction or heavy pruning (described as a removal of over 30 percent of the canopy). It is assumed that all trees in permanent impact areas would be removed; however, trees in and adjacent to temporary impact areas may not need to be removed. The exact number of trees removed would depend on field conditions such as the geology of the area where cut slopes are excavated, condition of trees, location of supporting roots, and other considerations to ensure the post-construction stability of the permanent structures. Potential impacts of tree removal on sensitive wildlife are further discussed in Section 2.3.4.3.

Table 2.3.1-2: Potential Permanent and Temporary Impacts to Individual Trees

Species	Permanent Impacts[1]	Temporary Impacts[2]	Total in Project Footprint
Acacia	0	1	1
Arroyo willow	2	16	18
Black walnut	38	50	88
Brazilian pepper-tree	5	72	77
California buckeye	0	1	1
Canary Island date palm	0	2	2
Coast live oak	141	357	498
Coast redwood	4	7	11
Elm (non-native)	1	0	1
European olive	0	2	2
Fan palm	0	4	4
Fremont cottonwood	35	14	49
Italian cypress	3	15	18
Maple (non-native)	0	1	1
Pine (non-native)	1	16	17
Red willow	32	63	95
Valley oak	68	148	216
Victorian box	1	0	1
Western sycamore	12	17	29
Total Trees Impacted	**343**	**786**	**1,129**

Source: AECOM field survey 2016

Notes:

1. Permanent impacts include removal of trees, compaction of a significant portion of the root zone, or removal of over 30 percent of the canopy.

2. Temporary impacts to trees include pruning of less than 30 percent of the canopy, removal of less than 25 percent of the roots (within the drip line of the tree), or soil compaction to less than 30 percent of the critical root zone. The standard critical root zone of a tree is the area corresponding to the drip line of the tree, or a distance from the tree trunk outwards calculated as 12 times the DBH of the tree, whichever is greater.

All impacted trees are in unincorporated Alameda County. For any trees removed, pruned (i.e., cutting of branches that are greater than 1 inch in diameter), or planted within Alameda County right-of-way, a permit may be required under the Alameda County Tree Ordinance (Title 12, Chapter 12.11). The ordinance was adopted in 2003 and updated in December 2016 to preserve trees within County right-of-way by establishing standards and regulations for planting,

maintaining, trimming, and removing. No designated species or diameters are outlined in the tree ordinance as requiring a specific replacement ratio.

In addition, California Senate Resolution No. 17 (1989) directs all State agencies to preserve and protect native oak woodlands to the greatest extent possible. This resolution may be interpreted as no additional loss of oak trees in areas that historically supported oak woodlands.

Migratory Corridors

The project vicinity is an important wildlife movement corridor through which wildlife movement is limited, as described in Section 2.3.1.1. The project design includes features that would maintain wildlife connectivity across SR 84 and reduce wildlife-vehicle collisions. The two new designated amphibian culverts would be designed to allow access between habitat to the north and south of SR 84, to accommodate California tiger salamander, California red-legged frog, Pacific tree frog, California newt (*Taricha torosa*), and Western toad (*Bufo boreas*) (Figure 1.4-1). These dedicated amphibian crossing structures would not be used to convey drainage.

Seven larger culverts would be modified to be a minimum of 3 feet by 4 feet, to accommodate coyote, grey fox, small (juvenile) mule deer, opossum (*Didelphis virginiana*), raccoon, squirrel, American badger (*Taxidea taxus*), and bobcat (*Lynx rufus*). Existing culverts would be enlarged and additional culverts would be constructed to help wildlife cross under SR 84 (Figure 1.4-1).

Directional fencing or structures would be included to guide wildlife into and out of the culverts, and openings in the right-of-way fence would be provided to allow wildlife to safely move between the culverts and areas outside of the SR 84 corridor. In addition, the proposed concrete safety barrier would be modified in places to allow for 9-inch-tall openings along the bottoms (Type S). This would allow wildlife to move across SR 84 and not become trapped between the roadway and concrete barrier.

The project design does not include installing large culverts suitable for full grown deer and other large wildlife (such as elk [*Cervus canadensis nannodes*] or mountain lion [*Puma concolor*]). However, the proposed concrete safety barriers in the median would have openings to allow wildlife to cross SR 84. The barriers (Type M) would have openings between the ends to accommodate larger animals. The spacing between Type M barrier ends would be 2 feet. The frequency and number of openings between Type M barrier ends would be determined during the detailed design phase.

Although the project would result in an increase in impermeable surfaces and a decrease in the vegetated right-of-way adjacent to the roadway, installation of the wildlife crossing structures would reduce impacts to wildlife movement through the project vicinity. Widening of the roadway and installation of concrete barriers would not prevent wildlife species from moving over SR 84. In areas where culvert openings occur within the right-of-way, directional fencing would be installed to prevent entrapment of wildlife species and create a safe passage through which they can move under SR 84. Therefore, the project would have minimal impact to existing wildlife movement corridors within the project vicinity. Because the wildlife crossing structures are considered a project element that will ensure safe movement of species under SR 84, avoidance and minimization measures to minimize the project impact on wildlife movement are not required.

Construction activities have the potential to increase the nighttime light and glare sources compared to current levels. In particular, areas most sensitive to increased lighting and glare over natural conditions would be riparian corridors and drainages, which provide for a natural pathway for wildlife. Nighttime illumination is known to adversely affect some species of wildlife in natural areas. It can disturb breeding and foraging behavior and potentially alter breeding cycles of birds, mammals, and nocturnal invertebrates. In addition, light could deter some animal species, especially the larger mammals, from using rivers, creeks, and washes as a movement corridor. If uncontrolled, such lighting where proximal to these movement corridors could adversely impact the composition and behavior of the wildlife that occur in these areas. This impact is considered potentially substantial. In addition, the noise and vibrations from the operation of heavy equipment in active construction areas has the potential to substantially affect the movement of wildlife species.

It is expected that diurnal wildlife activities would be temporarily impacted and wildlife from immediately surrounding construction areas would be temporarily displaced. However, because it would be temporary and because construction would occur along the route in phases, and specific nighttime work avoidance and minimization measures would be implemented, adverse impacts to diurnal wildlife activities are not anticipated.

Fish Passage

The project would not create a barrier to fish passage from its implementation, as it would not block or otherwise alter channel flow. No impacts would occur.

2.3.1.3 Avoidance, Minimization, and/or Mitigation Measures

Vegetation Communities

BIO-1. The measures listed below would be implemented as part of construction to minimize and/or avoid impacts to sensitive vegetation communities, species, and habitat as well as to common biological resources.

- Prior to initiation of the proposed action, the qualifications of the biological monitor(s) would be submitted to USFWS and CDFW for approval. Such approved biologists are hereafter referred to as the "approved biologist(s)."
- The approved biologist(s) (knowledgeable about sensitive species and habitats in the action area) or designee(s) will conduct pre-construction surveys to examine the BSA for occurrences of special-status wildlife species, including nesting birds. In the event that occupied nests or other habitats are found, the approved biologist(s) will adhere to the measures set forth by the USFWS. If the situation is otherwise unique, the USFWS-approved biologist will discuss the situation with a Caltrans biologist who would contact the USFWS and CDFW to determine how to avoid or relocate the resident animal(s).
- Construction Work, Access, and Staging Areas. All proposed construction will be limited to the existing and proposed right-of-way. Environmentally Sensitive Areas (ESAs) will be identified on contract plans and discussed in the Special Provision. The ESAs will include areas designated in the environmental document and biological reports that support wetlands, waters, and/or habitats that potentially support listed species, and have been specifically identified to avoid during construction. ESA provisions may include, but are not

limited to, the use of temporary high visibility fencing to delineate the proposed limit of work in areas adjacent to sensitive resources, or to delineate and exclude sensitive resources from potential construction impacts. Contractor encroachment into ESAs will not be allowed without an approved biologist(s) or designee(s) being present. This includes staging/operation of heavy equipment or casting of excavation materials. ESA provisions will be implemented as a first order of work and remain in place until all construction is completed.

- Construction discharges. No debris, soil, silt, sand, bark, slash, sawdust, cement, concrete, washings, petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the United States or drainages. No discharges of excessively turbid water will be allowed, and all equipment will be well-maintained and free of leaks.
- Onsite Construction Personnel Education Program. Before the onset of construction and within 3 days of any new worker arrival, an approved biologist(s) will conduct an education program for all construction personnel. At a minimum, the training will include a description of California tiger salamander, California red-legged frog, Alameda whipsnake, and other listed species and their habitats; the potential occurrence of these species within the project footprint; an explanation of the status of these species and protection under the FESA, CESA, and all other federal, state, and local regulatory requirements; the measures to be implemented to conserve listed species and their habitats as they relate to the work site; and boundaries within which construction may occur. A fact sheet conveying this information will be prepared and distributed to all construction crews and project personnel entering the project footprint. Upon completion of the program, personnel will sign a form stating that they attended the program and understand all of the avoidance and minimization measures and implications of the FESA, CESA, and all other federal, state, and local regulatory requirements.
- Erosion control. Temporary erosion control and slope stabilization BMPs will be installed before the start of the wet season (October 15 through April 15). Erosion control measures may include silt fencing, straw wattles, straw bales, coir blankets, sediment traps, and other protective measures to minimize the potential for erosion of sediment beyond the work area or degradation of water quality in adjacent aquatic habitats.
- Restoration/revegetation. Upon project completion, all temporarily disturbed areas will be restored to pre-construction conditions.

BIO-2. Compensatory mitigation for temporary impacts to sensitive vegetation communities or natural communities of concern, including valley oak woodland, red willow thickets, Fremont cottonwood forests, and riparian scrub and forest will be provided through the on-site restoration of habitat by planting native species that are typical to that habitat. The restored vegetation communities will be monitored for success. If enough space is not available for on-site mitigation, off-site like-habitat providing these species habitat requirements will be preserved through the purchase of mitigation bank credits.

Trees

The general avoidance and minimization measures listed in Measure BIO-1 would reduce the effects to trees during project construction. The following measures are also proposed.

BIO-3. Post-construction measures will include revegetation of temporarily impacted areas by the planting of trees where appropriate, selecting sites based on existing topography, hydrology, and surrounding habitat. An arborist will work with CDFW to select the most suitable locations for mitigation for trees removed from the riparian corridor of Vallecitos Creek.

Trees located in permanent impact areas are likely to be removed during project activities. Some trees located in temporary impact areas may be preserved depending on the specific activity occurring near them. Caltrans will make an effort to reduce impacts to trees in temporary impact areas and along the edge of the project footprint to the greatest extent possible during construction by designating trees on plan sheets and marking protected areas (the CRZ) around trees with high visibility polypropylene ESA fencing. Most healthy trees can tolerate one-sided root cutting and recover from the loss. Trees that have roots cut on two sides usually suffer much more damage and are less stable. Trees that suffer root loss on three or more sides should be considered permanently impacted and removed. For the purpose of the cumulative effects analysis, Caltrans used the summation of both temporary and permanent impacts for calculating the project's impact to trees. This created a conservative baseline to determine whether the project's contribution to cumulative effects will be considerable.

Only those trees requiring removal will be cut down. Whenever possible, trees will be trimmed rather than removed. To avoid potential damage to retained trees, trees will be safeguarded during construction through implementation of the following measures as applicable:

- No construction equipment, vehicles or materials shall be stored, parked or staged within the CRZ; and
- Work will not be performed within the CRZ of remaining trees without consultation with an ISA-certified arborist. If trees are damaged during construction and become unhealthy or die, the damaged tree(s) will be removed and replaced.

A Tree Protection Plan will be prepared and implemented to minimize damage to native trees during construction.

BIO-4. Tree removal will be mitigated through planting at a 3:1 ratio on-site, to the maximum extent possible given space available, for all native species within riparian areas, and for coast live oaks and valley oaks in oak woodlands (including uplands). For other tree species removed in upland areas, Caltrans will provide tree replacement on-site at a minimum 1:1 ratio in the space available. A 3:1 ratio is standard for replacement of impacted oak trees on Caltrans projects. The need for some off-site upland and riparian tree planting is anticipated. Replanted areas will be monitored for success for up to 10 years. The performance criteria for replacement tree plantings is 70 percent survival of all plantings at the end of the monitoring period (3 to 10 years). If survival drops below 70 percent during the monitoring period, the project sponsor will replace plantings to bring survival above this level.

Within oak woodlands, replacement trees will be primarily coast live oak and valley oak. Of the trees that fall within the permanent footprint, 209 are oak species, and of those 39 have a cumulative

diameter at breast height (DBH; the sum of the diameters of all the main trunks on a given tree) greater than 20 inches. The total replacement numbers for these oaks will be, at a minimum, 627 trees (container stock or acorns, as appropriate) to achieve a 3:1 tree replacement ratio.

Precise planting locations will be identified during the final design phase. Potentially suitable locations have been selected based on soil types, existing drainage patterns, and surrounding habitat types. Riparian habitat removed along Vallecitos Creek will be offset by planting trees in locations where there are currently gaps in the riparian overstory. Planting of trees will occur within the Caltrans right-of-way. Details for off-site planting and riparian tree planting success criteria will be determined during the project permitting process with CDFW (1602 Streambed Alteration Agreement) and RWQCB (401 Certification).

Migratory Corridors

BIO-5. Light, glare, and construction noise and vibration impacts will be addressed through the following measures:

- Use lighting in areas only where necessary for safety and signage. Eliminate all lighting in other areas.
- Artificial lighting of the project footprint during nighttime hours will be minimized to the maximum extent practicable.
- All lighting should be downcast to minimize lighting of natural areas, particularly in riparian areas and adjacent to drainages.
- Limit operation of vibration causing equipment such as pile drivers, dozers, and large excavators to daylight hours when working in areas adjacent to open space.
- A biological monitor shall be present to observe activities of wildlife during nighttime construction adjacent to open spaces. If activities are noted to affect wildlife, the biological monitor shall stop construction activities as necessary.
- New bulbs will be no greater than 235 watt light-emitting diode (LED) with a color temperature no greater than 4,000 Kelvins (K).

Fish Passage

No avoidance, minimization, and/or mitigation measures are proposed.

2.3.2 Wetlands and Other Waters of the United States

2.3.2.1 Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Federal Water Pollution Control Act, more commonly referred to as the CWA (33 USC 1344), is the primary law regulating wetlands and surface waters. One purpose of the CWA is to regulate the discharge of dredged or fill material into waters of the U.S., including wetlands. Waters of the U.S. include navigable waters, interstate waters, territorial seas, and other waters that may be used in interstate or foreign commerce. The lateral limits of jurisdiction over non-tidal water bodies extends to the OHWM, in the absence of adjacent wetlands. When adjacent wetlands are present, CWA jurisdiction extends beyond the OHWM to the limits of the adjacent wetlands. To classify wetlands for the purposes of the CWA, a three-parameter approach is used that includes the presence of hydrophytic (water-loving) vegetation, wetland hydrology, and hydric soils (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 CWA.

Section 404 of the CWA establishes a regulatory program that provides that no 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 USACE with oversight by the USEPA.

The USACE issues two types of 404 permits: General and Individual. There are two types of General permits: Regional and Nationwide. 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 allow a variety of minor project activities with no more than minimal effects.

Ordinarily, projects that do not meet the criteria for a Regional or Nationwide Permit may be permitted under one of USACE's Individual permits. There are two types of Individual permits: Standard permits and Letters of Permission. For Individual permits, the USACE decision to approve is based on compliance with USEPA's Section 404 (b)(1) Guidelines (40 CFR Part 230), and whether permit approval is in the public interest. The Section 404 (b)(1) Guidelines (Guidelines) were developed by the USEPA in conjunction with the USACE, and allow the discharge of dredged or fill material into the aquatic system (waters of the U.S.) only if there is no practicable alternative which would have less adverse effects. The Guidelines state that the USACE may not issue a permit if there is a "least environmentally damaging practicable alternative" (LEDPA) to the proposed discharge that would have lesser effects on waters of the U.S., 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, EO 11990 states that a federal agency such as FHWA, and/or Caltrans, as assigned, cannot undertake or provide assistance for new construction located in wetlands unless the head of the agency finds: (1) that there is no practicable alternative to the construction and (2) the proposed project includes all practicable measures to minimize harm. A Wetlands Only Practicable Finding must be made.

At the state level, wetlands and waters are regulated primarily by the SWRCB, the RWQCBs and the California Department of Fish and Wildlife (CDFW). In certain circumstances, the Coastal Commission (or the Bay Conservation and Development Commission) 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 CDFW before beginning construction. If CDFW determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFW 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 USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from the CDFW.

The RWQCBs were established under the Porter-Cologne Water Quality Control Act to oversee water quality. Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA. In compliance with Section 401 of the CWA, the RWQCBs also issue water quality certifications for activities which may result in a discharge to waters of the U.S. This is most frequently required in tandem with a Section 404 permit request. See Section 2.2.2 for additional details.

2.3.2.2 Affected Environment

This section is summarized from the *Jurisdictional Delineation of Waters of the United States* (AECOM 2017b) and *Natural Environment Study* (AECOM 2017a) for the proposed project, which were completed in February 2017 and July 2017, respectively.

A preliminary wetland delineation was conducted in 2016 to identify potentially jurisdictional wetlands and other (non-wetland) waters of the U.S. and waters of the State in the BSA. The features identified during the delineation include the following:

- A total of 4.86 acres of wetlands, including freshwater marshes, seasonal wetlands, and forested/shrub wetlands;
- Approximately 2.04 acres of potentially jurisdictional non-wetland other waters of the U.S., including perennial creeks, intermittent channels, and ephemeral channels and swales; and
- Approximately 6,464 linear feet of culverted waters that are potentially jurisdictional due to their connectivity to jurisdictional wetlands and other waters.

Table 2.3.2-1 provides additional information about wetlands and waters of U.S. categories. These jurisdictional features would also be considered waters of the State. Detailed figures showing the locations of specific features are provided in the *Jurisdictional Delineation of Waters of the United States* (AECOM 2017b) and the *Natural Environment Study* (AECOM 2017a).

Additionally, approximately 55,167 linear feet of potentially non-jurisdictional stormwater features were identified in the BSA. These potentially non-jurisdictional waters of the U.S. include upland manmade drainage ditches, roadside ditches, concrete lined v-ditches, and some culverts that do not connect wetlands or waters of the United States. Non-jurisdictional features occur in depressions that drain only uplands, collecting storm water runoff from the highway, or

are fed by water from culverts and sprinkler systems upslope. Stormwater features that do not qualify as USACE jurisdictional may be regulated by CDFW and the RWQCB as waters of the State.

A preliminary jurisdictional wetland delineation was submitted to the USACE on March 17, 2017. Additional information about consultation and coordination with the USACE, CDFW, and RWQCB is provided in Section 4.2.

2.3.2.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not affect wetlands, other waters of the U.S., culverts, or potentially non-jurisdictional stormwater features.

Build Alternative

The Build Alternative has been refined to minimize impacts to jurisdictional wetlands and potentially jurisdictional other waters of the U.S., as described in Section 1.4.7.2 (under "Vallecitos Creek Avoidance Options").

Table 2.3.2-1 shows the total acreage and estimated permanent and temporary impacts to jurisdictional wetlands and potentially jurisdictional other waters of the United States. The project has the potential to permanently impact up to 0.18 acre of jurisdictional wetlands and 0.04 acre of potentially jurisdictional other waters of the United States. The project has the potential to temporarily impact 0.18 acre of jurisdictional wetlands and 0.02 acre of potentially jurisdictional other waters of the United States. Although project activities would impact freshwater marsh, seasonal wetlands, and intermittent and ephemeral channels, the functions and values[30] associated with these features would not be diminished.

[30] Functions are self-sustaining properties of a wetland ecosystem that exist in the absence of society. Functions result from both living and non-living components of a specific wetland. These include all processes necessary for the self-maintenance of the wetland ecosystem such as primary production and nutrient cycling. For example, a wetland that has slowly moving water performs the function of retaining sediments and toxicants.
Values are benefits that derive from either one or more functions and the physical characteristics associated with a wetland. The value of a particular wetland function, or combination thereof, is based on human judgment of the worth, merit, quality, or importance attributed to those functions. For example, a particular wetland might be considered valuable because it is known to store flood waters upgradient or adjacent to a developed area (USACE 2015).

Table 2.3.2-1: Wetlands and Other Waters of the U.S. in BSA and Impacts

Jurisdictional Water Type	Acres[1]			
	Total in BSA	Permanent Impacts[2]	Temporary Impacts[3]	Total Impact
Wetlands				
Freshwater marsh wetlands[3]	3.71	0.04	0.09	0.13
Seasonal wetlands[4]	0.92	--	--	--
Forest and shrub wetlands[4]	0.23	0.14	0.09	0.23
Wetlands subtotal	*4.86*	*0.18*	*0.18*	*0.36*
Other Waters of the U.S.				
Vallecitos Creek (perennial channel)	1.24	--	--	--
Ephemeral channels	0.40	0.03	0.02	0.05
Intermittent channels	0.33	<0.01	<0.01	<0.01
Open water (pond)	0.08	--	--	--
Other Waters of the U.S. subtotal	*2.04*	*0.04*	*0.02*	*0.06*
Total[2]	**6.90**	**0.22**	**0.20**	**0.41**

Notes:
1. Acreages rounded to the nearest hundredth, so values shown for each wetland type in table may not add up to total acreage shown.
2. Permanent impact areas are associated with conversion of natural communities to a built environment as a result of project features and construction activities. Temporary impact areas involve damage to the natural community, which may be preserved depending on the specific activity occurring near them, such as construction staging or the siting of a construction access road that could disrupt habitat and/or damage natural communities and can be restored to their original natural community type. During the design phase, Caltrans' Office of Biological Sciences and Permits and Caltrans' Office of Design would make an effort to reduce these impacts to natural communities in temporary impact areas to the greatest extent possible by designating environmentally sensitive areas on plan sheets and marking those locations in the field.
3. This total includes wetlands within waters, including freshwater marsh mapped within the Ordinary High Water Mark (OHWM) of Vallecitos Creek.
4. The three seasonal wetlands were classified as pale spike rush marsh vegetation communities based on dominant plant species.

The project has the potential to permanently impact up to 782 feet and temporarily impact up to 429 feet of culverted waters of the United States.

In addition, 0.19 acre of potentially State jurisdictional riparian scrub and forest (which are not also U.S. jurisdictional waters) along Vallecitos Creek may be temporarily impacted, and 0.07 acre may be permanently impacted.

Project activities have the potential to result in approximately 4,054 linear feet of temporary impacts and 21,919 linear feet of permanent impacts to non-jurisdictional stormwater features. Stormwater features that would be affected by the proposed project would be replaced in kind within the project area, with priority for providing unlined ditches wherever possible. These features would be separate from any treatment areas for roadway runoff and from features preliminarily identified as wetlands or other waters of the United States.

Although project activities would impact seasonal wetland, freshwater marsh, and intermittent and ephemeral channels, the functions and values associated with these features would not be diminished. Hydrologic connectivity would be restored in the temporarily impacted channels.

Permanent impacts to aquatic features are minimal and will be offset through the purchase of credits through a mitigation bank. With the implementation of mitigation measures listed below, impacts would be reduced to a less-than-significant level.

2.3.2.4 Avoidance and Minimization Measures

BIO-6. The General Construction Permit will require the Contractor to submit a storm water pollution prevention plan (SWPPP). This plan must meet the standards and objectives to minimize storm water pollution impacts set forth in Section 13.37 of the Caltrans Standard Specifications. The SWPPP must also comply with the goals and restrictions identified in the RWQCB's Basin Plan. Any additional measures included in the Water Quality Certification will be implemented. The contractor will also comply with the following standards/objectives, at times referred to as BMPs, including but not limited to the following:

- Where work areas encroach on wetlands, RWQCB-approved physical barriers adequate to prevent the flow or discharge of sediment into these systems will be constructed and maintained between working areas and streams, lakes, and wetlands.
- Discharge of sediment into culverts and storm drains will be held to a minimum during construction of the barriers.
- Discharge will be contained through the use of RWQCB-approved measures that will keep sediment from entering jurisdictional waters beyond the project limits.
- All off-road construction equipment should be cleaned of potential noxious weed sources (mud and vegetation) before entering the project footprint and after entering a potentially infested area before moving on to another area. The contractor will employ whatever cleaning methods (typically spraying with a high-pressure water hose) are necessary to ensure that equipment is free of noxious weeds.
- Equipment should be considered free of soil, seeds, and other such debris when a visual inspection does not disclose such material. Disassembly of equipment components or specialized inspection tools is not required. Equipment washing stations will be placed in areas that afford easy containment and monitoring (preferably outside of the project footprint) and that do not drain into sensitive (riparian, wetland, etc.) areas.

Upon completion of the project, all temporarily impacted areas will be restored to approximately original site conditions.

2.3.2.5 Mitigation Measures

BIO-7. Permanent impacts to USACE jurisdictional wetlands will be mitigated at a minimum 3:1 ratio, and temporary impacts at a minimum 1:1 ratio. Stormwater features that are waters of the State will be replaced on-site at a minimum 1:1 ratio. Impacts to riparian habitat will be mitigated through a combination of on-site enhancement of existing habitat and restoration of land within riparian corridors, through the planting of native riparian tree, shrub, and forb species.

Proposed compensation for wetland impacts includes purchase of credits at a local mitigation bank, on-site restoration of existing wetlands and waters within the Caltrans right-of-way, and on-site restoration in temporarily impacted areas. Temporarily disturbed wetlands will be

restored with native species, and topography and hydrology returned to pre-project conditions. When habitat restoration on-site is not possible, the required compensatory mitigation will be done off-site. Arrangements are currently being explored with the Collier Canyon Mitigation and Conservation Bank to purchase credits for the mitigation of impacts to wetlands and waters. If mitigation credits are not available at the Collier Canyon facility, mitigation will be provided at another mitigation bank facility, or through a combination of on- and off-site mitigation. On-site mitigation may be used as compensation for temporary impacts to wetlands and waters. On-site mitigation could be achieved through the restoration or enhancement of existing wetlands or intermittent or ephemeral channels. The temporarily impacted wetlands will be revegetated with native wetland plant species and monitored for success.

2.3.3 Plant Species

2.3.3.1 Regulatory Setting

The U.S. Fish and Wildlife Service (USFWS) and CDFW 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 provided 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 FESA and/or the California Endangered Species Act (CESA). Please see Section 2.3.5 for detailed information about threatened and endangered species.

This section of the document discusses all the other special-status plant species, including CDFW species of special concern, USFWS candidate species, and California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for FESA can be found at 16 USC Section 1531, et seq. See also 50 CFR Part 402. The regulatory requirements for CESA can be found at California Fish and Game Code, Section 2050, et seq. Caltrans projects are also subject to the Native Plant Protection Act, found at California Fish and Game Code, Section 1900-1913, and CEQA, found at PRC Sections 21000-21177.

2.3.3.2 Affected Environment

This section is summarized from the *Natural Environment Study* (AECOM 2017a) for the proposed project, which was completed in July 2017.

A California Natural Diversity Data Base (CNDDB) (CDFW 2016) search indicated that rare or sensitive plants have been recorded within 1 mile of the BSA. The CNPS online Inventory of Rare and Endangered Vascular Plants of California (CNPS 2016) and USFWS species list (USFWS 2017; see Appendix C) were also consulted. Based on those sources and a review of the geographic ranges, habitat requirements, and proximity of recorded occurrences for the various species, the following eight species were found to have low to moderate potential to occur:

- Alkali milk-vetch (*Astragalus tener* var. *tener*)
- Big tarplant (*Blepharizonia plumosa*)
- Round-leaved filaree (*California macrophylla*)
- Congdon's tarplant (*Centromadia parryi* ssp. *Congdonii*)
- Northern California black walnut (*Juglans hindsii*)
- California alkali grass (*Puccinellia simplex*)
- Saline clover (*Trifolium hydrophilum*)
- Caper-fruited tropidocarpum (*Tropidocarpum capparideum*)

No federally, state, or CNPS listed species were observed during project botanical surveys conducted in February, March, May, June, and September 2016. However, not all project areas with suitable habitat were revisited during each round of surveys, and focused floristic surveys did not coincide with blooming periods for all eight of the target species.

2.3.3.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not affect special-status plant species in the project area.

Build Alternative

The proposed project would result in the permanent loss of grassland habitat that could support big tarplant, round-leaved filaree, Congdon's tarplant, and California alkali grass. However, this impact is considered small when compared to the remaining adjacent grasslands that could be used by these species.

Alkali milk-vetch, Northern California black walnut, saline clover, and caper-fruited tropidocarpum are not expected to occur within the project footprint. Therefore, no impacts to these species would occur.

2.3.3.4 Avoidance, Minimization, and/or Mitigation Measures

Implementation of Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4) would avoid potential indirect effects to special-status plants such as dust, spread of invasive species, or downstream changes in hydrology or sedimentation. The following measure is also proposed:

BIO-8. Prior to the commencement of construction activities, a qualified biologist shall conduct appropriately timed surveys for big tarplant, round-leaved filaree, Congdon's tarplant, and California alkali grass. To correspond with these species' blooming period, the surveys shall include botanical inventories during March through May (the blooming period of round-leaved filaree and California alkali grass) and July through September (the blooming period of big tarplant, and Congdon's tarplant). If listed plant species are discovered within the construction area, protective measures will be established, and all such plants shall be numbered, mapped, and identified in the field with pin flags. These protective measures will include setting a temporary protective buffer around the plant and conducting appropriate agency coordination, which may result in moving the species to another location within Caltrans right-of-way and then replanting the species during the restoration phase of the project.

2.3.4 Animal Species

2.3.4.1 Regulatory Setting

Many state and federal laws regulate impacts to wildlife. The USFWS, the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries), and CDFW 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 Acts. Species listed or proposed for listing as threatened or endangered are discussed in Section 2.3.5. All other special-status animal species are discussed here, including CDFW fully protected species and species of special concern, and USFWS or NOAA Fisheries candidate species.

Federal laws and regulations relevant to wildlife include the following:

- NEPA
- Migratory Bird Treaty Act (MBTA)
- Fish and Wildlife Coordination Act

State laws and regulations relevant to wildlife include the following:

- CEQA
- Sections 1600 – 1603 of the California Fish and Game Code
- Sections 4150 and 4152 of the California Fish and Game Code

2.3.4.2 Affected Environment

This section is summarized from the *Natural Environment Study* (AECOM 2017a) for the proposed project, which was completed in July 2017.

The identification of special-status animal species with potential to occur in the region was based on a search of the USFWS species list (USFWS 2017; see Appendix C), the CNDDB (CDFW 2016), the Western Bat Working Group's (WBWG) Regional Priority Matrix (WBWG 2016), previous wildlife studies, and familiarity with the region. A wildlife habitat assessment of the BSA was conducted in 2016.

Several common animal species are expected to use habitat in the BSA. California vole, California ground squirrel, coyote, and Gilbert's skink were some of the species observed in the California annual grasslands during field surveys. Valley oak woodland provides nesting habitat for birds such as oak titmouse and black phoebe, breeding habitat for northern pacific rattlesnakes, and foraging and nesting habitat for some raptor species such as red-tailed hawk. Walnut groves provide habitat for foraging birds such as northern mockingbird and dark-eyed junco. Red willow thickets provide foraging habitat for avian species such as willow flycatcher. Raptors such as white-tailed kite and Cooper's hawk could use eucalyptus groves for nesting.

Special-status species in the BSA are described below.

Western Pond Turtle

The northwestern pond turtle (*Actinemys marmorata marmorata*) and the southwestern pond turtle (*Clemmys marmorata pallida*) are subspecies of the western pond turtle. Both subspecies are listed as California species of special concern by the CDFW.

There are numerous reported occurrences of the species in the CNDDB within the region, and creeks and ponds and their associated uplands in the BSA and surrounding area provide suitable breeding and dispersal/nesting habitat. The closest CNDDB occurrence is 650 feet north of the BSA, located within the Sheep Camp Creek. Although protocol-level surveys were not performed, wetlands and other waters in the BSA provide suitable habitat. Additionally, western pond turtles occupying ponds and creeks in the vicinity of the BSA may disperse between aquatic sites or travel upland to nest or overwinter through the BSA or project footprint.

No positive identification of western pond turtles was made during field visits. One turtle was observed basking on a rock within a ponding wetland near the intersection of SR 84 with Little Valley Road in April 2017. However, the turtle dove into the standing water before positive identification to species level could be made.

Grasshopper Sparrow

The grasshopper sparrow is a California species of special concern and is protected under the MBTA. Grasshopper sparrows are typically found inhabiting areas that consist of dense grasslands, rolling hills, as well as lowland plains. Potential habitat for the species can be found throughout the BSA.

The CNDDB reports no occurrences of grasshopper sparrows within 10 miles of the BSA, and the species was not observed during multiple plant and wildlife surveys conducted within the BSA.

Loggerhead Shrike

The loggerhead shrike (*Lanius ludovicianus*) is listed as a California species of special concern. This species can be found throughout California in habitat that is commonly composed of valley foothills and lowlands, as well as open cropland and agricultural fields. Potential habitat for the loggerhead shrike can be found throughout the BSA.

Observations of the species were reported on the eastern side of the BSA from surveys conducted by Caltrans in 2002 (Caltrans 2003b). There is one CNDDB occurrence within 10 miles of the BSA.

Loggerhead shrikes were not observed during multiple plant and wildlife surveys conducted within the BSA.

California Yellow Warbler

The California yellow warbler is a California species of special concern. The species is also protected under the MBTA. Found throughout California, this species typically resides and breeds within willow scrub, riparian thickets, cottonwoods, sycamores, ash and alders. Much of the potentially suitable habitat in the BSA is too noisy and fragmented to host potential nesting habitat. Marginally suitable nesting habitat for this species exists along Vallecitos Creek within

the riparian habitat that is set back from the road. Potential foraging habitat for the California yellow warbler can be found throughout the BSA.

The CNDDB reports no occurrences of California yellow warblers within 10 miles of the BSA, and the species was not observed during multiple plant and wildlife surveys conducted within the BSA.

Western Burrowing Owl

The western burrowing owl (*Athene cunicularia hypugea*) is designated as a CDFW and USFWS species of concern. Burrowing owls prefer annual and perennial grasslands, typically with sparse or nonexistent tree or shrub canopies. In California, they are found in close association with California ground squirrel burrows, which provide them with year-round shelter and seasonal nesting habitat. Suitable grassland habitat is prevalent throughout the BSA. Ground squirrel burrows, though not present in high numbers within the project footprint, were observed within and adjacent to the BSA.

Several occurrences of this species have been recorded within 10 miles of the BSA. The closest occurrence was in 1983, approximately 3.5 miles northeast of the BSA in Springtown, northeast of the city of Livermore. Other observations are approximately 6 miles east and 5 miles west of the BSA. No recent sign of burrowing owls (pellets or whitewash on burrow aprons) was observed during surveys.

Tule Elk

Tule elk (*Cervus canadensis nannodes*) is a subspecies of elk endemic to California. The species is not federally or state listed. However, tule elk received protection under the Behr Bill in 1971 (California SB 722), which prohibits hunting due to diminished population numbers. They are currently protected by the USFWS Tule Elk Preservation Act (16 USC 673d) and cannot be chased, harassed, killed or injured on public or private land. Hunting is only allowed according to State game laws.

Tule elk are found in a variety of habitats, including marshlands, open grasslands, mixed oak woodland, riparian woodland, and chaparral. Tule elk forage on annual and perennial grasses throughout the year. A close water source must be available for the species; groups of tule elk are usually located within 4 miles of an open water source.

No tule elk were observed during project surveys, and there are no records of the species within, or immediately adjacent to, the BSA. In 1978, tule elk were reintroduced to Grant Ranch County Park in Santa Clara County. By 1980, this herd had split and dispersed, with some elk moving to Mount Hamilton, and the Sunol herd establishing itself around San Antonio Reservoir (Bay Nature Institute 2014). The Sunol herd has been observed near the Sunol Regional Wilderness, off Mines Road south of Livermore, and along Calaveras Road south of I-680. This species may occur as a migrant in the BSA.

San Francisco Dusky-Footed Woodrat

San Francisco dusky-footed woodrat (*Neotoma fuscipes annectens*) is listed as a California species of special concern. This species is found throughout the San Francisco Bay Area, generally in forested habitats with moderate canopy, year-round greenery, a brushy understory, and a sufficient supply of suitable nest building materials. Habitat conditions in the BSA along

Vallecitos Creek are suitable for dusky-footed woodrat; mixed evergreen forests within the project footprint contain evergreen and thick-leaved trees and shrubs typically associated with dusky-footed woodrat habitat, including coast live oak. Areas with fallen logs and other downed woody material are present, potentially providing suitable nest building material.

There is one CNDDB occurrence for this species within 1.5 miles of the BSA, along Alameda Creek. Potential woodrat middens were observed during project surveys in March 2016. These middens were observed within the BSA at the base of trees in the riparian habitat along Vallecitos Creek.

American Badger

American badger is a California species of special concern. American badgers are fossorial mammals that inhabit open grasslands and generally treeless regions. They burrow in friable soils in habitats with drier open shrubland, open forests, grasslands, savannah, desert, and herbaceous habitats. The grassland area along SR 84 has open ground with rodent burrows that could provide habitat for this species.

The CNDDB lists eight historical occurrences of American badger within 10 miles of the BSA. The closest occurrence was 6 miles north of the BSA, in open grassland. The species was not observed during field surveys.

Nesting Raptors

Nesting raptors including Cooper's hawk, white-tailed kite, prairie falcon (*Falco menus*), and American peregrine falcon are protected under California Fish and Game Code Section 3503.5, which states, "It is unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) or to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by this code or any regulation adopted pursuant thereto." In addition, the white-tailed kite and the peregrine falcon are California fully protected species, and the Cooper's hawk is a California species of special concern.

The Cooper's hawk is a CDFW species of special concern. The species primarily feeds on small birds such as robins, jays, doves and pigeons. Cooper's hawks breed in forested areas and build nests at heights of 25 to 50 feet in the tree canopy.

The white-tailed kite is a year-round resident in coastal and valley lowlands in California, and is a CDFW fully protected species. The species inhabits herbaceous and open areas of most habitats, yet is rarely found away from agricultural areas. Nests are usually located near open foraging areas.

The prairie falcon, a CDFW watch list species, forages over shrubby deserts and grasslands searching for ground squirrels and other small mammals and birds. Breeding habitats include grasslands, shrub-steppe desert, and areas of mixed shrubs and grasslands. They typically nest on bluffs and cliffs, and sometimes in rock outcrops.

The American peregrine falcon, a CDFW fully protected species, generally feeds and breeds near water. This species nests on protected ledges of high cliffs, banks, dunes, and mounds in woodland, forest, and coastal habitats. However, pairs are also known to nest on human-made structures such as bridges and buildings.

The CNDDB lists 33 occurrences of special-status nesting raptors within 10 miles of the BSA, five of which were within the BSA. The CDFW range map for the white-tailed kite indicates that the BSA is in the species' year-round range. The American peregrine falcon may occasionally forage in the BSA; however, the species is not known to breed in the project footprint. Oak woodlands and riparian corridors in and adjacent to the BSA may provide potential foraging habitat for Cooper's hawk. Overall, potential nesting habitat for raptors is in the BSA is marginal.

Although suitable breeding habitat is not present in the BSA for the sharp-shinned hawk, golden eagle, ferruginous hawk, Swainson's hawk (*Buteo swainsoni*), northern harrier, and merlin, these species may forage in the area.

An active red-tailed hawk nest was observed in a eucalyptus tree along the outside edge of the BSA along SR 84 during surveys conducted in February 2016. This indicates that there is potential for nesting raptors to be present in and adjacent to the BSA in taller trees and in grasslands during construction.

Migratory Birds

All migratory birds in the BSA are protected by a single law, the MBTA. Many species of migratory birds may inhabit the BSA at a time and would typically use similar resources. For this analysis, migratory birds are grouped into two categories: those that only forage and those that nest in and adjacent to the BSA.

Migratory birds that fall into the category of "foragers" are shorebirds and waterfowl that may stop in the San Francisco Bay Area during their migrations between the northern and southern hemisphere, or that overwinter yearly in the Bay Area. Hundreds of species of migratory shorebirds and waterfowl have been documented to occur in the Bay Area regularly (Takekawa et al. 2006). California yellow warbler and loggerhead shrike, discussed above, may breed in the area, would be considered nesting birds, and are protected under the MBTA. Tricolored blackbirds (*Agelaius tricolor*) and great egrets (*Ardea alba*) may forage in the BSA, particularly in the open grasslands and wetlands and riparian areas. Potential nesting locations in the BSA include roadside trees, tall emergent wetland plants, dense shrubs, and man-made structures along the margins of the roadway corridors.

No migratory birds were observed nesting in the BSA during the field visits. Migratory birds were observed in the BSA foraging or migrating to other locations. The list of migratory birds comprises many different bird species, including many common species. Therefore, it is likely that the BSA would have several species of migratory birds at one time. Migratory birds nesting along the project corridor would likely be tolerant of the disturbances and noise associated with the freeway and the surrounding residential area. Migratory birds could nest in the BSA during construction.

Special-Status and "High Priority" Bats

Five bat species that are California species of special concern or on the WBWG list have the potential to be present in the BSA: pallid bat (*Antrozous pallidus*), Townsend's big-eared bat (*Corynorhinus townsendii*), hoary bat (*Lasiurus cinereus*), long-eared myotis (*Myotis evotis*), and Yuma myotis (*Myotis yumanensis*).

The WBWG Regional Priority Matrix shows the pallid bat and Townsend's big-eared bat as "high priority" species, and the hoary bat, long-eared myotis, and Yuma myotis as "low priority" species, respectively. The WBWG defines "high priority" bat species as species that are imperiled or in high risk of imperilment and should be considered the highest priority for funding, planning, and conservation actions. "Medium priority" bat species are species of concern that warrant further evaluation, research, and conservation actions of both the species and potential threats. For "low priority" bat species, most of the existing data indicate stable populations of the species, and the potential for major changes in status in the near future are unlikely (WBWG 2016).

These bats are generally widespread throughout many regions of California, often found in association with open forests and woodlands, where there is water over which to feed and find suitable roosting areas. The pallid bat, hoary bat, long-eared myotis, and Yuma myotis are multiple habitat users, while the Townsend's big-eared bat is a tree-roosting species (WBWG 2016).

Many bat species are sensitive to disturbance at the roost. When disturbed, they generally retreat into crevices, and with repeated disturbance, they may abandon the roost. Among threats to California bat species are habitat loss and pressures from human-induced changes to the landscape.

The CNDDB lists eight special-status bat occurrences within 10 miles of the BSA. One of these CNDDB occurrences (of a pallid bat) is within, or immediately adjacent to, the BSA. A number of other special-status bat species have been observed within 5 miles of the BSA.

No roosting bats or signs of roosting bats were found during reconnaissance surveys. Potential natal roosts for the pallid bat are present in the trees and human-made structures that exist in the BSA. The Townsend's big-eared bat, hoary bat, long-eared myotis, and Yuma myotis may forage or roost in larger tree crevices within the BSA. Large trees within and near the BSA may provide suitable roosting habitat if cavities, hollows, and/or sufficiently furrowed or sloughing bark is present. Trees large enough to support maternity roosts up to 100 individuals are not present in the project footprint. Bat species may also use the project footprint and BSA along Vallecitos Creek for foraging and temporary occupancy (e.g., night roosts for prey consumption). More suitable open foraging habitats occur outside in fields and grasslands throughout the BSA.

2.3.4.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not affect animal species in the project area.

Build Alternative

Western Pond Turtle

No impacts to western pond turtles are anticipated with implementation of the avoidance and minimization measures listed in Section 2.3.4.4. Potential impacts to western pond turtles, if present in the BSA, would include temporary and permanent loss of upland dispersal, nesting, and aquatic basking habitat. However, loss of habitat would be minimal compared to the amount of habitat available in the project vicinity.

It is not anticipated that noise or activity levels from construction activities would produce a recognizable increase in the amount of noise or activity currently experienced in the BSA. Implementation of the avoidance and minimization measures would prevent any disturbance to western pond turtle, and adverse impacts are not anticipated.

Grasshopper Sparrow

Project-related activities have the potential to permanently impact suitable grasshopper sparrow breeding and foraging habitat. The implementation of the avoidance and minimization measures listed in Section 2.3.4.4 would minimize potential impacts to the grasshopper sparrow.

Loggerhead Shrike

Project-related activities have the potential to permanently impact suitable loggerhead shrike breeding and foraging habitat. The avoidance and minimization measures listed in Section 2.3.4.4 would be implemented to minimize potential impacts to loggerhead shrike.

California Yellow Warbler

Project-related activities have the potential to permanently impact suitable California yellow warbler breeding and foraging habitat. Construction activities such as vegetation clearing and removal (including tree removal), excavation, and other project-related ground disturbances or equipment operation associated with the proposed project could affect yellow warbler nesting in vegetation in or adjacent to work areas. Tree removal could result in direct loss of active nest sites, if nest sites are present within the project footprint. Project construction activities, particularly noise and vibration, also could result in temporary disturbances to active nests or individuals foraging in areas near the BSA that could cause individuals to avoid using adjacent areas or cause nests to be abandoned. However, the implementation of the measures described for special-status bird species would minimize potential impacts to California yellow warbler.

Western Burrowing Owl

Very few ground squirrel burrows were found in the project footprint. Much of the grassland in the project footprint is on compacted soils, which are less suitable for burrowing (Deutschman and McCullough 2011). Additionally, no burrowing owls or signs of occupied burrows were observed during biological surveys in the project footprint. Based upon these observations, burrowing owls are not expected to breed in the project footprint. If this species occurred in the project footprint, it would be expected to forage or fly through the area. Due to the transitory aspects of these behaviors, this species is not expected to be impacted by the project. The implementation of the measure listed in Section 2.3.4.4 would minimize potential impacts to western burrowing owl.

Tule Elk

The loss of potential habitat for the species would not be substantial given the abundant grassland habitat in the region. The project would create a barrier to movement due to the construction of a median barrier along SR 84, which could lead to further habitat fragmentation. However, the project proposes to include openings within the median to allow wildlife to cross SR 84, as described in Section 1.4.4 (under “Wildlife Movement”). The implementation of the measure listed in Section 2.3.4.4 would minimize potential impacts to tule elk.

San Francisco Dusky-Footed Woodrat

The proposed project may result in the permanent and temporary impacts to potentially suitable habitat for the San Francisco dusky-footed woodrat. Permanent impacts would be associated with tree removal within riparian scrub and forest habitat along Vallecitos Creek. Temporary habitat loss could be associated with maneuvering of equipment during construction, staging, access, utilities, laydown, and the installation and temporary operation of traffic control infrastructure in the riparian corridor.

Implementation of the proposed project could also result in both direct and indirect effects on woodrat nests and associated individuals. Construction impacts would be associated primarily with nest sites because woodrats are nocturnal and would most likely be restricted to their nest sites during daytime construction.

Nest destruction could result from vegetation clearing and removal (including tree removal) during project construction. Nest sites are particularly important to woodrat population structure; nests are built over decades and females typically inhabit nests for life, passing them on to female offspring. Therefore, a loss of nest sites would also likely result in the mortality of the individuals inhabiting those nest sites, including associated litters. However, implementation of avoidance and minimization efforts, such as development and implementation of a trapping and nest relocation effort, would reduce these potential effects.

Vegetation clearing and removal (including tree removal) during project implementation could also result in the removal of available nest construction material (e.g., sticks), which could indirectly limit the ability of woodrats, if present, to construct and maintain nest sites in the vicinity. Project-related indirect effects could include increased erosion, sedimentation, or changes in hydrology, any of which could occur either during or after construction. For example, the removal of vegetation could lead to increased potential for erosion and sedimentation of soils, affecting adjacent habitat for woodrats outside the project footprint. Nonetheless, these indirect effects will be avoided through implementation of avoidance and minimization measures for water quality, erosion control, and construction site BMPs, and the SWPPP, as well as the measures listed in Section 2.3.4.4.

American Badger

The disturbance area contains some small mammal burrows and provides potential den and foraging habitat for American badger. The proposed project would result in the permanent loss of upland habitat potentially used by the species and temporary impacts to potential upland habitat. Construction-related noise could affect active dens potentially occurring in the immediate project vicinity. Given the abundance of similar grazed grassland in the project vicinity, and that American badger is not state or federally listed, the project related loss of habitat would not be considered substantial. No indirect impacts are expected to occur.

Although the project would result in the permanent loss of potential dispersal and denning habitat, replanting of the temporarily disturbed areas with native erosion control species coupled with the construction of dedicated wildlife crossing structures would result in improvements to American badger habitat within the project footprint. As such, the proposed project would also not create a barrier to badger movement. The implementation of the measure listed in Section 2.3.4.4 would minimize impacts to American badger.

Nesting Raptors

Project-related activities have the potential to permanently impact raptor nesting and foraging habitat. Construction activities such as vegetation clearing and removal (including tree removal), excavation, and other project-related ground disturbances or equipment operation associated with the proposed project could affect raptors nesting in vegetation in or adjacent to work areas. Tree removal could result in direct loss of active nest sites, if nest sites are present within the project footprint. Project construction activities, particularly noise and vibration, also could result in temporary disturbances to active nests or individuals foraging in areas near the BSA that could cause individuals to avoid using adjacent areas or cause nests to be abandoned. The active red-tailed hawk nest was observed in a eucalyptus tree that would not be removed, at the edge of the BSA. The implementation of the measures listed in Section 2.3.4.4 would minimize impacts to nesting raptors.

Migratory Birds

Project-related activities have the potential to permanently impact nesting or foraging migratory birds and their habitat. Construction activities such as vegetation clearing and removal and other project-related ground disturbances or equipment operation associated with the proposed project could affect raptors nesting in vegetation in or adjacent to work areas. Tree removal could result in direct loss of active nest sites, if nest sites are present within the project footprint. Project construction activities, particularly noise and vibration, also could result in temporary disturbances to active nests or individuals foraging in areas near the BSA that could cause individuals to avoid using adjacent areas or cause nests to be abandoned. However, implementing the measures listed in Section 2.3.4.4 would minimize impacts to nesting birds.

Special-Status and "High Priority" Bats

The proposed project could result in the disturbance and removal of suitable roosting sites for the pallid bat, hoary bat, long-eared myotis, Townsend's big-eared bat, and Yuma myotis. Disruption of suitable roosting and nesting sites could have a temporary negative effect on bats; however, the proposed project would not permanently remove bat habitat, and with the avoidance and minimization measures listed in Section 2.3.4.4, there would be no long-term negative effect on bats.

Temporary disturbance to daytime or maternity roosts adjacent to the project footprint could result from project-related construction noise and vibration. Measures such as preconstruction surveys, buffers, and a work window will be implemented to avoid and minimize impacts on roosts, if any roosts are found adjacent to the BSA. Therefore, project construction is not expected to cause an adverse impact on adjacent roosts for bats. Implementation of the avoidance and minimization measure described in Section 2.3.4.4 and Measure BIO-5 in Section 2.3.1.3 would prevent any additional disturbance of roosting bats. Permanent impacts to these species would be mitigated through the replacement of removed trees, and habitat fragmentation or a loss of suitable foraging habitat would be minimal. Temporary disturbance to individuals foraging or temporarily roosting at night (while consuming prey) caused by noise, vibration, and physical disturbance from equipment movements will be minimized by specific nighttime work avoidance and minimization measures.

2.3.4.4 Avoidance, Minimization, and/or Mitigation Measures

Western Pond Turtle

The following avoidance and minimization measure, in addition to those identified in Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4), will be implemented to avoid impacts to western pond turtle:

BIO-9. Before any construction activities begin, an approved biologist(s) shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the western pond turtle and its aquatic and upland nesting habitat, the general measures that are being implemented to conserve the western pond turtle as they relate to the project, and the boundaries within which the project may be accomplished.

An approved biologist(s) shall survey the work site no more than 48 hours before the onset of activities for signs of western pond turtles and/or western pond turtle nesting activity (i.e. recently excavated nests, nest plugs) or nest depredation (partially to fully excavated nest chambers, nest plugs, scattered egg shell remains, egg shell fragments). Preconstruction surveys to detect western pond turtles should focus on suitable aerial and aquatic basking habitat such as logs, branches, rootwads, and rip-rap, as well as the shoreline and adjacent warm, shallow waters where pond turtles may be present below the water surface beneath algal mats or other surface vegetation. Preconstruction surveys to detect western pond turtle nesting activity should be concentrated within 402 meters (1,319 feet) of suitable aquatic habitat and should focus on areas along south- or west-facing slopes (Jennings and Hayes 1994; Holland 1991) with bare hard-packed clay, silt soils, or a sparse vegetation of short grasses or forbs. If western pond turtles or their nesting sites are found, the biologist shall contact CDFW to determine whether relocation and/or exclusion buffers and nest enclosures are appropriate. If CDFW approves of moving the animal, the biologist shall be allowed sufficient time to move the western pond turtle(s) from the work site before work activities begin.

Special-Status Bird Species, Migratory Birds, and Nesting Raptors

Measure BIO-1 (Section 2.3.1.3) would minimize potential impacts to birds that have the potential to nest and forage within the BSA. Migratory Bird Special Contract Provisions will be adhered to in order to avoid potential effects to special-status bird species. Caltrans will employ the use of a qualified biologist to implement avoidance and minimization measures. The measures below will be implemented for construction work during the nesting season (February 15 through August 31).

Nesting Raptors

BIO-10. Preconstruction surveys for migratory birds, raptors, other special-status bird species, and appropriate nesting habitat will be conducted within 50 feet of the construction area no more than three days prior to ground disturbing activities. If preconstruction surveys indicate the presence of any migratory bird nests where activities will directly result in bird injury or death, a buffer zone of 50 feet will be placed around the nest. In the event that an active nest is found after the completion of preconstruction surveys and after construction begins, all construction activities within a 50-foot radius will be stopped until an approved biologist(s) has evaluated the nest and erected the appropriate buffer around it. If an active raptor or special-status species nest is found, CDFW will be consulted to determine the appropriate buffer area to be established around the nesting site and the type of buffer to be used, which typically is ESA fencing. An

approved biologist(s) will delineate the buffer using ESA fencing, pin flags, and/or yellow caution tape. The buffer zone will be maintained around all active nest sites until the young have fledged and are foraging independently. If establishment of a buffer is not feasible, CDFW will be contacted for further avoidance and minimization guidelines. A biological monitor will be present during the raptor nesting season.

Western Burrowing Owl

Measure BIO-1 (Section 2.3.1.3) would minimize potential impacts to western burrowing owls. Migratory Bird Special Contract Provisions will be adhered to in order to avoid potential effects to special-status bird species. The following measure is also proposed:

BIO-11. Appropriate avoidance, minimization, or protection measures shall be determined in consultation with the CDFW in the event an active burrow is located in an area subject to disturbance, or within the typical setback (i.e., occupied burrows or nests within 150 feet of an area subject to disturbance during the non-breeding season, or within 250 feet of an area subject to disturbance during the breeding season).

Tule Elk

The following avoidance and minimization measure, in addition to Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4), will be implemented to avoid potential impacts to migrant tule elk:

BIO-12. Focused species surveys will be conducted to determine the presence of tule elk in the project area, prior to the start of construction.

If tule elk are observed within or immediately adjacent to the project area during construction, a stop work order may be issued until the individual, or herd, has moved away from the site.

San Francisco Dusky-Footed Woodrat

BIO-13. To avoid or minimize potential impacts on San Francisco dusky-footed woodrat, Caltrans will implement the following measure as part of the proposed project:

- Preconstruction Surveys for San Francisco Dusky-Footed Woodrat. Before the start of construction, an approved biologist(s) will conduct a survey of the project footprint and a 30-foot buffer beyond the project footprint boundaries to determine the location of active and inactive woodrat dens. Any dens detected during the surveys will be recorded and mapped in relation to the construction disturbance footprint. In addition, the biologist will evaluate any signs of current woodrat activity, including the presence of fresh scat, freshly chewed vegetation, and the presence of cobwebs covering nest entrances. A 30-foot equipment exclusion buffer will be established around active and inactive dens that can be avoided; within such buffers, all vegetation will be retained and nests will remain undisturbed.
- Potential Trapping and Relocation. A woodrat trapping and relocation plan will be developed and implemented prior to project construction for any nest site that will be directly affected by the proposed project. Specific methods for trapping woodrats and relocation of individuals and their nest sites, as well as identification of suitable sites for relocation, include:

  1. Trapping at all woodrat middens mapped within the project's temporary and permanent impact areas,

2. Installing relocation midden structures,
3. Relocating trapped woodrats to the relocation midden structures, and
4. Dismantling existing woodrat middens in the project area to be cleared, to discourage woodrat reoccupation.

If suitable habitat is not available for relocation of the woodrats in the project vicinity, offsite locations will be identified. Trapping of the woodrats will be conducted by an approved biologist(s) with a current CDFW collection permit to trap and relocate the species. Ideally, the trapping will occur outside of the breeding period, between September and December.

American Badger

BIO-14. The following measures will be implemented to avoid and minimize potential impacts to the American badger.

- Preconstruction surveys will be conducted within the project footprint in areas of suitable habitat to identify dens or signs of American badger. These surveys will be conducted no more than 30 days before the start of ground-disturbing activities and will be phased with project build-out.
- If an American badger is detected on site at any time during these surveys, CDFW will be contacted to discuss ways to proceed with the project and to avoid take to the maximum extent practicable.

Special-Status and "High Priority" Bats

Implementing the following measure, in conjunction with Measure BIO-5 (Section 2.3.1.3) relating to nighttime work and construction noise and vibration impacts, will avoid or minimize potential effects to bats.

BIO-15. Focused preconstruction surveys will be conducted for all areas that provide suitable bat roosting habitat, including human-made structures, snags, rotten stumps, mature trees with broken limbs, exfoliating bark, and dense foliage. Sensitive habitat areas and roost sites will be avoided to the maximum extent practicable. To avoid mortality and reproductive loss, Caltrans may limit tree removal between September 1 and April 14, outside the breeding season, so as not to disturb maternal colonies or roosts. If potential roost sites (e.g., trees, snags) are to be removed or trimmed, limbs smaller than 3 inches in diameter will be cut and the tree will be left overnight to allow any bats using the tree/snag for roosting time to leave and find another roost. A biological monitor will be present during the trimming or removal of trees/snags. If occupied sites are observed in the BSA, Caltrans will contact CDFW to report occurrences for the agency's database. Caltrans will provide an appropriate buffer between any occupied roost and construction activities. In addition, nighttime construction will be limited. Measures relating to nighttime work include those outlined in Measure BIO-5, as well as the following:

- Bat Day and Night Roost Avoidance. If deemed necessary, specific day and night bat roost avoidance and minimization measure will be developed through technical assistance with CDFW and bat specialists.

2.3.5 Threatened and Endangered Species

2.3.5.1 Regulatory Setting

The primary federal law protecting threatened and endangered species is the FESA: 16 USC Section 1531, et seq. See also 50 CFR Part 402. This act and later 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 FHWA (and the Caltrans, as assigned), are required to consult with the USFWS and NOAA Fisheries 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, or a Letter of Concurrence. Section 3 of FESA defines take as "harass, harm, pursue, hunt, shoot, wound, kill, trap, capture or collect or any attempt at such conduct."

California has enacted a similar law at the state level, the CESA, California Fish and Game Code Section 2050, et seq. CESA 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 CDFW is the agency responsible for implementing CESA. Section 2080 of the California 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 California Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by CDFW. For species listed under both FESA and CESA requiring a Biological Opinion under Section 7 of FESA, the CDFW may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the California Fish and Game Code.

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.

2.3.5.2 Affected Environment

This section is summarized from the *Natural Environment Study* (AECOM 2017a) for the proposed project, which was completed in July 2017.

Species lists were requested and obtained from the USFWS and NOAA Fisheries and are included in Appendix C. The identification of threatened or endangered species with potential to occur in the region was based on a search of the USFWS and NMFS species lists, the CNDDB

(CDFW 2016), previous studies, familiarity with the region, and field surveys completed for the project in 2016 and 2017.

The following federally and state-listed wildlife species have potential to occur, or are known to occur, within the BSA.

- Vernal pool fairy shrimp (*Branchinecta lynchi*), federally threatened;
- California tiger salamander (*Ambystoma californiense*), federally threatened, California threatened;
- California red-legged frog (*Rana draytonii*), federally threatened, California species of special concern;
- Alameda whipsnake (*Masticophis lateralis euryxanthus*), federally threatened, California threatened; and
- San Joaquin kit fox (*Vulpes macrotis mutica*), federally endangered, California threatened.

Figure 2.3.5-1 shows CNDDB occurrences of these species and designated critical habitat for California red-legged frog and Alameda whipsnake within 1 mile of the BSA.

No creeks or drainages within the BSA support federally or state-listed anadromous fisheries because of downstream impediments (see Section 2.3.1 regarding fish passage). Resident rainbow trout (*Oncorhynchus mykiss*) populations may be present in the watershed but were not observed during the field surveys.

Information about these species and their potential presence in the BSA is presented below.

Vernal Pool Fairy Shrimp

Vernal pool fairy shrimp, federally listed as threatened, occupy a variety of different vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools (USFWS 2007). Although the species can be found in very large vernal pools, it is most frequently found in pools measuring less than 0.05 acre with mud or grass substrate. Current distribution includes from Stillwater Plain in Shasta County through most of the Central Valley to Pixley in Tulare County (USFWS 2007). The species is also found from northern Solano County to Pinnacles National Monument in San Benito County. In addition, populations are known in San Luis Obispo County, Santa Barbara County, and Riverside County. The vernal pool fairy shrimp has an ephemeral life cycle and only exists in vernal pools and vernal pool-like habitat. The species is a habitat specialist and cannot live in riverine, marine, or permanent bodies of water (Helm 1998).

During reproduction, the female either drops her eggs to the bottom or carries her eggs in the brood sac until she dies and sinks to the bottom (USFWS 2007). These eggs (cysts) dry up with the vernal pool and stay in a resting state until certain stimuli, rain for instance, induce hatching. The soil in the bottom of an occupied pool may contain viable cysts that are many years old.

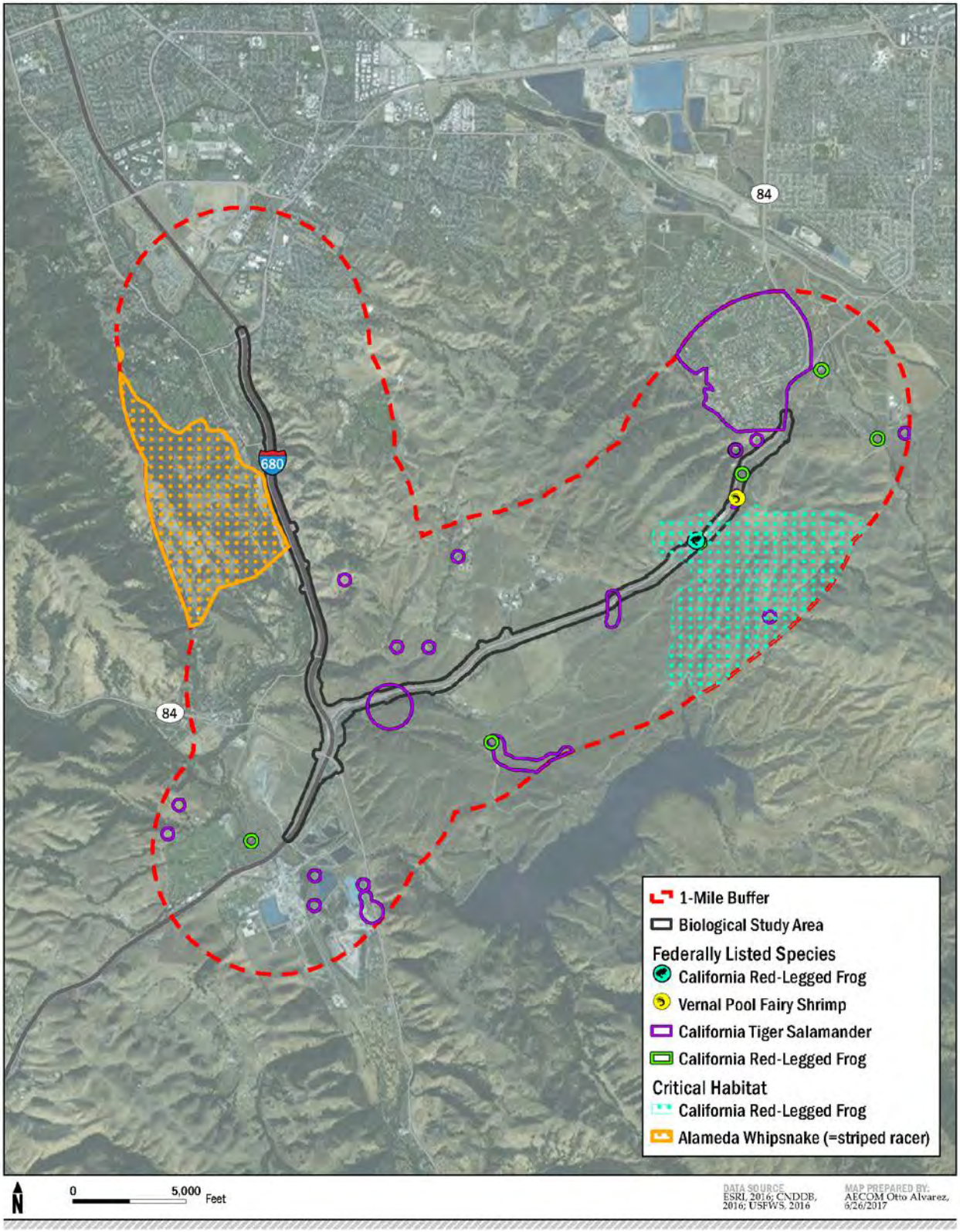


Figure 2.3.5-1: Threatened and Endangered Species Occurrences and Designated Critical Habitat Within 1 Mile of the BSA

The CNDDB lists two historical records within 10 miles of the BSA: from the year 2000, 6.5 miles northeast of the BSA (1031), and from 2010, 8 miles northeast of the BSA (43). Back-to-back dry season and wet season surveys were conducted in 2002/2003 in accordance with the USFWS fairy shrimp survey protocol for the Pigeon Pass Curve Realignment (Caltrans 2003; EA 17240). Dry sample surveys revealed two cysts at one site, which had large polygon morphology characteristic of a variety of fairy shrimp species (*Branchinecta* sp.), including *B. lynchi*, Colorado fairy shrimp (*B. coloradensis*), conservancy fairy shrimp (*B. conservatio*), longhorn fairy shrimp (*B. longiantenna*), San Diego fairy shrimp (*B. sandiegonensis*), mid-valley fairy shrimp (*B. mesovallensis*), and versatile fairy shrimp (*B. lindahli*). The pool where the cysts were observed is on the east side of the BSA, to the south of SR 84.

Wet sample surveys in 2002/2003 did not discover any adult *Branchinecta* sp. at any of the survey locations. According to the URS biologist, habitat associations and geographic ranges indicate that the cysts came from *B. lynchi*, although it could have come from another species listed above. In the interest of erring on the side of the species, it was assumed that the cysts found were of *B. lynchi*, and not one of the other nonlisted species. Therefore, vernal pool fairy shrimp were assumed present within the BSA, although no additional dry or wet season surveys were conducted within the wetland where they were identified in 2003. No additional suitable vernal pool habitat was observed during surveys conducted in 2016.

California Tiger Salamander

The California tiger salamander, a federally and state-listed threatened species, inhabits grasslands and open oak woodlands in central and northern California. The species is estimated to have disappeared from more than 50 percent of its historic range due to habitat loss from agriculture and urbanization and the introduction of non-native aquatic predators (CDFG 2010). The range of California tiger salamanders is currently restricted to the Central Valley and the South Coast Range of California from Butte County south to Santa Barbara County.

California tiger salamanders breed in temporarily ponded environments surrounded by uplands that support small mammal burrows. Vernal pools or seasonal human-made ponds provide ideal breeding habitat. Water must remain for at least 12 weeks or long enough for the aquatic larvae to complete development. Although breeding usually occurs in fish-free ephemeral ponds that form during the winter and dry out in summer, some salamanders may also breed in slow streams and in some semi-permanent to permanent waters including cattle ponds (provided that aquatic vertebrate predators are not present), probably due to the loss of ephemeral ponds in their habitat. Apart from breeding and larval development, California tiger salamanders spend the majority of their lives in subterranean refuges. These sites are typically referred to as aestivation locations, although it appears that California tiger salamander remain active for much of the time they are underground (USFWS 2005). Small mammal burrows, especially those made by ground squirrels (*Spermophilus* ssp.), and soil crevices in upland grassy habitat provide refugia sites for juvenile and adult salamanders.

After winter rains have begun to fill breeding sites with water, the salamanders emerge from their refugia and migrate to breeding pools. Females deposit eggs singly or in small groups in the water, attaching them to submerged vegetation or debris. Larvae usually complete metamorphosis after 3 to 6 months. Larvae typically metamorphose and leave their natal ponds

as the water dries up during the summer months. When breeding occurs in perennial ponds, larvae may over-summer in the water (Shaffer et al. 1993).

After metamorphosis, juveniles spend a few days at the pond margin before migrating to underground refugia. Overland migration has been documented to extend up to 1.24 miles (USFWS 2005), but most California tiger salamander remain within a half mile of their breeding ponds (USFWS 2004). A dispersal distance of 0.7 mile between breeding ponds is thought to account for 99 percent of the inter-pond movement of breeding adults (USFWS 2005).

The BSA is not within designated critical habitat for the current distribution of the Central California Distinct Population Segment (DPS)[31] (National Marine Fisheries Service 2006).

No California tiger salamanders were observed during field visits. There are 159 CNDDB records within 10 miles of the BSA, and over 100 occurrences are within 0.5 mile of the BSA. Four CNDDB occurrences dated before 2004 were reported within or immediately adjacent to the BSA. A single CNDDB occurrence from 1988 consisted of a live California tiger salamander found along SR 84 (Vallecitos Road) within the BSA, approximately 0.5 mile east of the I-680 off-ramp (581). SFPUC surveys have documented California tiger salamander at the Sheep Camp Creek area (CDFW 2016). The Sheep Camp Creek area is directly north of SR 84 between Little Valley Road and I-680. Breeding California tiger salamanders were detected as recently as 2016 in three stock ponds within the Sheep Camp Creek area, approximately 0.25 mile north of the BSA.

Protocol-level surveys were not performed because wetlands and waters in the BSA provide suitable breeding habitat, and given the proximity of known populations, presence of California tiger salamanders in the BSA can be reasonably assumed. Individuals breeding within the BSA or in nearby ponds may travel through or to suitable upland dispersal and refugia habitat in the project footprint. Intermittent and ephemeral drainages throughout the BSA serve as aquatic migration corridors and foraging habitat. Although SR 84 has a considerable amount of traffic, it is not considered a barrier to migrating California tiger salamanders, which experience vehicular mortalities. Due to the consistently high level of traffic and the concrete median barrier on I-680, I-680 is considered a barrier to wildlife movement. However, California tiger salamanders may use culverts under I-680 to travel between the east and west sides of the freeway.

Suitable breeding habitat was observed in wetlands located within temporary and permanent impact areas on the north and south sides of SR 84, near the intersection of Little Valley Road. Ponding water was observed in these wetlands in late April 2017. It is assumed that these areas held water consistently since the early winter rains, based on aerial imagery and observations during surveys conducted in previous months. Although California tiger salamanders typically breed in ephemeral ponds, there is also potential for the species to breed in the reaches of Vallecitos Creek with slow-moving waters. The delineated extent of Vallecitos Creek falls within the temporary impact areas of the project. Therefore, the project would directly affect potential breeding, migratory, and foraging habitat.

[31] This DPS includes all naturally spawned populations of steelhead (and their progeny) in the Sacramento and San Joaquin Rivers and their tributaries, excluding steelhead from San Francisco Bay and San Pablo Bays and their tributaries (National Marine Fisheries Service 2006).

California Red-Legged Frog

The California red-legged frog, a federally listed as threatened and a California species of special concern, is distributed throughout 26 counties in California but is most abundant in the San Francisco Bay Area. Populations have become isolated in the Sierra Nevada, northern Coast, northern and southern Transverse, and Peninsula ranges (Jennings and Hayes 1994; Stebbins 2003). California red-legged frogs predominately inhabit permanent water sources such as streams, lakes, marshes, natural and manmade ponds, and ephemeral drainages in valley bottoms and foothills up to 4,920 feet in elevation (Jennings and Hayes 1994; Bulger et al. 2003; Stebbins 2003).

California red-legged frogs breed between November and April in standing or slow-moving water that is at least 2.5 feet deep with emergent vegetation, such as cattails, tules (*Schoenoplectus* spp.), or overhanging willows (*Salix* spp.) (Hayes and Jennings 1988). Aquatic breeding habitat should hold water for a minimum of 20 weeks in most years and have salinity less than 7.0 parts per thousand. Egg masses containing 2,000 to 5,000 eggs are attached to vegetation below the surface and hatch after 6 to 14 days (Storer 1925; Jennings and Hayes 1994). Larvae undergo metamorphoses 3.5 to 7 months after hatching and reach sexual maturity at 2 to 3 years of age (Jennings and Hayes 1994). California red-legged frogs have been found in drainages and ephemeral pools but prefer deeper pools associated with dense riparian stands.

In a study of California red-legged frog terrestrial activity in the Santa Cruz Mountains, Bulger et al. (2003) categorized terrestrial use as migratory and non-migratory. Non-migratory activity occurred from two days to several days and was associated with precipitation events. Migratory movements are characterized as the movement between aquatic sites and were most often associated with breeding activities. Bulger reported that non-migrating frogs typically stayed within 200 feet of aquatic habitat 90 percent of the time and were most often associated with dense vegetative cover (i.e., California blackberry, poison oak, and coyote brush). However, dispersal during winter rain events for juvenile and adult California red-legged frog has been recorded as up to 2 miles (USFWS 2002a).

Accessibility to shelter within a watershed is a very important component to the survival of the California red-legged frog and can be a limiting factor in population numbers. Sheltering habitat can be aquatic, riparian, and upland areas (including California annual grasslands, ruderal habitat, woodlands and shrub habitats). Ephemeral wetland habitats require animal burrows or other moist refuges for estivation when the wetlands are dry. Areas of potential upland and aquatic habitat exist in various vegetation communities throughout the BSA. Agricultural features within the BSA, such as drains, water troughs and ephemeral pools, can be considered sheltering habitat. Migration within the BSA could occur through interconnected dispersal systems provided by drainages adjacent to, and culverted drainages running under, SR 84 and I-680. Slow-moving and ponded areas of Vallecitos Creek and its in-stream wetlands offer potential breeding habitat. The presence of the California red-legged frog as a migrant, aestivating, or breeding in aquatic habitat is reasonably certain to occur within the BSA.

Critical habitat for the California red-legged frog was designated by the USFWS in April 2006 and revised in March 2010. In designating critical habitat for the California red-legged frog, USFWS evaluated the specific habitat elements required by the species for all of its biological needs. These habitat elements, called Primary Constituent Elements (PCEs), are necessary for

the conservation of the species and were used to evaluate whether habitat present in proposed critical habitat units would indeed have the entire habitat element suite required for the continued survival of the species. These habitat elements can also be used to evaluate potential habitat locations as part of a habitat assessment. If a suspected habitat location does not have one or more of these PCEs, it is unlikely to support California red-legged frog populations. As defined in the USFWS critical habitat designation (USFWS 2010), the PCEs for California red-legged frog are aquatic breeding habitat, nonbreeding aquatic habitat, upland habitat, and dispersal habitat. The BSA contains a total of 35.36 acres of designated critical habitat Unit ALA-2 (Alameda County) for California red-legged frog, as defined in the March 2010 revised critical habitat designation (USFWS 2010). The critical habitat is between PM 21.3 and PM 22.0 on the eastern portion of SR 84 (see Figure 2.3.5-1). The total area of critical habitat Unit ALA-2 is 153,624 acres (USFWS 2010).

No California red-legged frogs were seen during field visits. There are 133 CNDDB records within 10 miles of the BSA; two records (770 and 587) are within the BSA, and seven additional CNDDB occurrences are within 1 mile of the BSA. SFPUC surveys documented California red-legged frogs at the Sheep Camp Creek area (CDFW 2016) along a drainage located 750 feet north of the BSA as recently as 2015, and adult red-legged frogs have been observed in ponds 0.25 mile north of the BSA. Surveys conducted for the SR 84 Pigeon Pass Realignment Project (Caltrans 2016c) documented California red-legged frog egg masses within one of the wetlands located on the east side of the BSA. PCEs for California red-legged frog may be found throughout the BSA in wetland and waters, and in woodlands, shrublands, grasslands, and even the disturbed areas.

Individuals breeding within the BSA or in nearby ponds may travel through or to suitable upland dispersal, foraging, and refugia habitat in the project footprint. Intermittent and ephemeral drainages throughout the BSA serve as aquatic migration corridors and foraging habitat. Although SR 84 has a considerable amount of traffic, it is not considered a barrier to migrating California red-legged frogs, which experience vehicular mortalities. Due to the consistently high level of traffic and concrete median barrier on I-680, I-680 is considered a barrier to wildlife movement. However, California red-legged frogs may use culverts under I-680 to travel between the east and west sides of the freeway.

Suitable breeding habitat was observed in wetlands located within temporary and permanent impact areas on the north and south sides of SR 84, near the intersection of Little Valley Road. Ponding water was observed in these wetlands in late April 2017. It is assumed that these areas held water consistently since early winter rains, based on aerial imagery and observations during surveys conducted in previous months. There is also potential for the species to breed in the reaches of Vallecitos Creek with slow-moving waters. The delineated extent of Vallecitos Creek falls within anticipated temporary impact areas.

Protocol-level surveys were not conducted because wetlands and waters in the BSA provide suitable breeding habitat, frog larvae (not identifiable to species) were observed in ponding water in late April 2017, and given the proximity of previous recorded occurrences, presence of California red-legged frog in the BSA can be reasonably assumed. Individuals breeding within the BSA may disperse to suitable upland dispersal, foraging, and refugia habitat in the project footprint.

Alameda Whipsnake

The Alameda whipsnake is federally and state-listed as threatened. Alameda whipsnakes inhabit the northern coastal and chaparral habitats of Contra Costa and Alameda Counties (USFWS 1997). They predominantly make use of coastal sage scrub and chaparral. However, recent studies have shown that Alameda whipsnake can be found in a wider variety of habitats than previously thought. For example, whipsnakes have been found in grasslands with very little scrub present, in coastal scrub with dense canopy cover, and in patches of scrub less than 0.5 acre in size (Swaim 1994). Therefore, habitat associations for this subspecies should include those that co-occur in the general chaparral/scrub habitat mosaic (Alvarez 2005).

The BSA lies adjacent to (within 20 feet of) the far eastern edge of Unit 3 (Hayward-Pleasanton Ridge population) of USFWS Designated Critical Habitat for the Alameda whipsnake. The total area of Unit 3 is approximately 25,966 acres (USFWS 2006). Within the designated habitat, PCEs are in areas that support scrub communities including mixed chaparral, chamise-redshank chaparral, coastal scrub, annual grassland, and various oak woodlands that lie adjacent to scrub habitats (USFWS 2000). In addition, the PCEs for the Alameda whipsnake may be found in grasslands and various oak woodlands that are linked to scrub habitats by substantial rock outcrops or riparian corridors.

Protocol-level surveys for Alameda whipsnake were not conducted in the BSA because of the lack of suitable coastal sage scrub and chaparral habitat, and because the USFWS bases determination of effects to Alameda whipsnake on presence of suitable habitat. The USFWS does not accept surveys as proof of absence of Alameda whipsnake. Alameda whipsnakes are cryptically colored, secretive, and highly sensitive to human activities, therefore individual snakes are difficult to detect unless they are observed undisturbed at a distance (USFWS 2004). No Alameda whipsnakes were observed during field surveys.

The CNDDB lists 96 occurrence polygons within 10 miles of the BSA, including 21 records in quads the BSA falls within. Detailed location information about these occurrences within 3-mile and 5-mile buffers of the BSA were provided through personal communication with CDFW on February 22, 2017. One occurrence of the Alameda whipsnake from 1974 is 2.8 miles southeast of the BSA along Arroyo Road near Lake Del Valle. An additional 10 occurrences fall within 5 miles of the BSA. Seven of these occurrences are from within the Sunol Regional Wilderness, to the south of the BSA. The most recent occurrence of the Alameda whipsnake is from 2016, 5 miles southeast of the BSA, where it was observed basking in the road in the Sunol Regional Wilderness (CDFW 2017).

Other populations of the Alameda whipsnake are shown in Hayward Hills and Sunol-Cedar Mountain populations, approximately 6 miles and 6 to 8 miles away, respectively.

PCEs for the whipsnake may be found in grasslands and various oak woodlands that are linked to scrub habitats by substantial rock outcrops or riparian corridors. The dominant habitat type throughout the BSA is California annual grassland, but also includes riparian and upland oak woodland and coyote brush scrub. No chaparral habitat, a PCE for the Alameda whipsnake, exists in or within 500 feet of the BSA. Additionally, the BSA is not part of a habitat mosaic that contains scrub/chaparral habitat. Although the BSA has only small areas of scrub habitat likely to support the Alameda whipsnake, the BSA is located within a corridor that the USFWS has proposed to establish connectivity between the Alameda whipsnake recovery unit on Pleasanton

Ridge (Unit 7) and the Sunol-Cedar Mountain Recovery Unit (Unit 5) south of San Antonio Reservoir (USFWS 2002b).

The Alameda whipsnake has been documented in the vicinity, and because the species has been found in grassland habitats, there is some potential that the species could move across the project site. However, the species would not permanently reside on or near the project site given the absence of nearby scrub/chaparral habitats. Nearby CNDDB occurrences all include chaparral in the habitat description for the occurrence location. Because the BSA consists mainly of grassland and oak woodlands that are not adjacent to chaparral, the BSA is not expected to support Alameda whipsnake.

San Joaquin Kit Fox

The San Joaquin kit fox is a subspecies of the kit fox that has a broad distribution in the San Joaquin Valley. The species is federally listed as endangered and state listed as threatened. The USFWS listed the species in the Federal Register on March 11, 1967 (32 Federal Register 4001) and discussed the San Joaquin kit fox in the *Upland Species Recovery Plan* (USFWS 1998). San Joaquin kit foxes are found in a large variety of areas such as annual grasslands and grazed fields. Dens are usually located in open areas with preferably loose soil that is easy for digging. Suitable foraging habitat includes woodlands, scrublands, and wetlands. The San Joaquin kit fox's prey base varies on the season and geographic location of each individual. Typically, they hunt small ground mammals (Jones & Stokes 2006). Adult and pup kit foxes are known to sometimes rest and play near the den entrance in the afternoon, but most above-ground activities begin near sunset and continue sporadically throughout the night (USFWS 2011a).

Critical habitat for the San Joaquin kit fox has not been designated.

No San Joaquin kit fox were seen during field visits; however, suitable kit fox denning and foraging habitat appears to be abundant within the BSA. Ground squirrel burrows were observed in the grassland habitat throughout the BSA during surveys. However, no large burrows, kit fox scat, or kit fox tracks on any ground squirrel burrow aprons were observed within the project footprint. The CNDDB lists two occurrences of the species within 10 miles of the BSA. Occurrence 329 from 1975 is 5.5 miles from the BSA, and occurrence 522 from 1989 is 9 miles from the BSA. Although the BSA is within the historic range of the San Joaquin kit fox, the BSA is located outside (to the northwest) of the species' current range as identified by CDFW (California State University, Stanislaus [CSUS] 2016). Therefore, the likelihood for occurrence of the San Joaquin kit fox in the BSA is very low.

2.3.5.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not affect threatened or endangered species in the project area.

Build Alternative

Table 2.3.5-1 summarizes the preliminary effect findings for the Build Alternative with respect to FESA. The anticipated effects for each species are described in more detail below.

Table 2.3.5-1: Preliminary Federal Endangered Species Act Effect Findings

Common Name	Scientific Name	Status*	Effect Finding	Effect Finding for Critical Habitat (if applicable)
Invertebrates				
Vernal pool fairy shrimp	*Branchinecta lynchi*	FT	May affect, but is not likely to adversely affect	Not applicable
Amphibians and Reptiles				
California tiger salamander	*Ambystoma californiense*	FT	May affect, and is likely to adversely affect	Not applicable
California red-legged frog	*Rana draytonii*	FT	May affect, and is likely to adversely affect	Adverse modification
Alameda whipsnake	*Masticophis lateralis euryxanthus*	FT	May affect, and is likely to adversely affect	No adverse modification
Mammals				
San Joaquin kit fox	*Vulpes macrotis mutica*	FE	May affect, but is not likely to adversely affect	Not applicable

*Federal Endangered (FE); Federal Threatened (FT)

Vernal Pool Fairy Shrimp

Because construction activities would not occur within habitat that could support vernal pool fairy shrimp, direct effects to individuals or their habitat would not occur.

Indirect effects to vernal pool fairy shrimp may occur as a result of project activities. Although permanent impacts to vernal pool fairy shrimp habitat are not expected to occur, there is potential for temporary habitat loss through erosion resulting from project activities upland of these areas. However, because the species is not expected to occur within the project footprint, the implementation of the measures discussed in Sections 2.3.1.3 and 2.3.2.4 would prevent any disturbance to individuals outside of the project footprint, and no impact would occur. Therefore the project "may affect, but is not likely to adversely affect" vernal pool fairy shrimp under FESA.

The project also has the potential to result in take of individual vernal pool fairly shrimp as defined in CESA, which would include injury or mortality to cysts or immature and adult shrimp. However, implementation of the avoidance and minimization measures in Section 2.3.5.4 would prevent any disturbance to individuals outside of the project footprint, and no impact would occur.

California Tiger Salamander

Potential impacts to California tiger salamanders include 38.57 acres of permanent and 30.86 acres of temporary loss of upland dispersal, foraging, and refugia habitat, and habitat fragmentation. In addition, potential impacts include 0.03 acre of permanent and 0.10 acre of temporary impacts to aquatic non-breeding dispersal and foraging habitat, and 0.15 acre of permanent and 0.08 acre of temporary impacts to suitable aquatic breeding habitat (Table 2.3.5-2).

Table 2.3.5-2: Proposed Compensatory Mitigation for Impacts to California Tiger Salamander and California Red-legged Frog Habitat

Habitat Type[1]	Acres[2]				
	Permanent Impact	Temporary Impact	Mitigation for Permanent Impacts (3:1 Ratio)	Mitigation for Temporary Impacts (1:1 Ratio)	Total Mitigation for Project Impacts
Upland Dispersal / Foraging / Refugia Habitat					
Grasslands	22.83	19.71	68.49	19.71	88.20
Forests and Woodlands	2.61	2.67	7.83	2.67	10.50
Scrubland	0.17	0.05	0.51	0.05	0.56
Disturbed Vegetation (ruderal, landscaped, and agriculture/pasture)	12.96	8.43	38.88	8.43	47.31
Subtotal	*38.57*	*30.86*	*115.71*	*30.86*	*146.57*
Aquatic Non-Breeding Dispersal / Foraging Habitat					
Marsh and Forested / Shrub Wetland Vegetation Communities	0.03	0.10	0.09	0.10	0.19
Potential Aquatic Breeding Habitat					
Marsh and Forested / Shrub Wetland Vegetation Communities, and Intermittent Channel	0.15	0.08	0.45	0.08	0.53
Total	**38.75**	**31.04**	**116.25**	**31.04**	**147.29[3]**

Notes:
1. Vegetation communities mapped based on their dominant species. Some seasonal wetlands were identified within woodland communities.
2. Acreages rounded to the nearest hundredth, so values shown for each vegetation type in table may not add up to total acreage shown.
3. Approximately 31.04 acres of the total mitigation will be completed through on-site restoration.

Project activities have the potential to impact movement of California tiger salamander between nearby breeding ponds. Because potential breeding ponds are located to the north and south of SR 84 and drainages as well as upland habitat throughout the project area serve as migration corridors, the construction of a median barrier may create a barrier to potential movement of the species. Ground disturbance activities from staging, clearing and grubbing, etc. could temporarily impact potential upland dispersal, foraging, and refugia habitat, aquatic non-breeding dispersal and foraging habitat, and breeding habitat located along SR 84 and I-680 (Table 2.3.5-2). The construction of Class II bikeways, the frontage road on the south side of SR 84, metal beam guardrails, and culvert work would take place within suitable breeding habitat. Therefore, permanent effects to potential California tiger salamander breeding habitat would occur.

In order to minimize the impacts of the median barrier, the project proposes to include wildlife crossing structures and openings within the median to allow wildlife to cross SR 84 (see Section 1.4.4, under "Wildlife Movement").

Loss of habitat and the effects of habitat fragmentation would be offset by the incorporation of wildlife movement structures as part of the project design and the implementation of the proposed avoidance and minimization measures. The California tiger salamander draft recovery plan outlines recovery actions recommended to facilitate the delisting of California tiger salamander (USFWS 2016). One recommended measure is to reduce population fragmentation

and isolation. The inclusion of wildlife crossing structures in the project design, including three designed exclusively for use by amphibians, would provide a continued connection between potential breeding ponds and uplands habitat along SR 84, limiting the fragmentation and genetic isolation of the species. Implementation of the avoidance and minimization measures described in Section 2.3.5.4 would prevent any disturbance to individuals dispersing through or using small mammal burrows within the project footprint.

Based on the direct impacts to upland dispersal, foraging, and refugia habitat, aquatic non-breeding dispersal and foraging habitat, and potential breeding habitat, as well as the potential for take of individual California tiger salamander to occur, the project "may affect, and is likely to adversely affect" California tiger salamander under FESA.

The project also has the potential to result in take of individual California tiger salamander as defined in CESA, which would include injury or mortality to egg masses, larvae, juveniles, or adults. A request for an Incidental Take Permit for California tiger salamander will be submitted to the CDFW under Section 2081(b) of the CESA.

California Red-Legged Frog

Potential impacts to California red-legged frog would include 38.57 acres of permanent and 30.86 acres of temporary loss of upland dispersal, foraging, and refugia habitat, and habitat fragmentation. In addition, potential impacts include 0.03 acre of permanent and 0.10 acre of temporary impacts to aquatic non-breeding dispersal and foraging habitat, and 0.15 acre of permanent and 0.08 acre of temporary impacts to suitable aquatic breeding habitat (Table 2.3.5-2).

Similar to the California tiger salamander, project activities have the potential to impact movement of California red-legged frog between nearby breeding ponds. The construction of a median barrier has the potential to limit movement of the species between breeding ponds to the north and south of SR 84. Ground disturbance activities from staging, clearing and grubbing, etc. could temporarily impact potential upland dispersal, foraging, and refugia habitat and aquatic non-breeding dispersal and foraging habitat located along SR 84 and I-680 (Table 2.3.5-2). Waters within the BSA also serve as potential California red-legged frog breeding habitat. Suitable breeding habitat was identified in the project footprint within wetlands and other waters of the U.S. near the intersection of Little Valley Road and SR 84. Frog larvae were observed in ponded areas of these aquatic features in April 2017, though identification to species was not made. The construction of Class II bikeways, the frontage road on the south side of SR 84, metal beam guardrails, and culvert work would take place within suitable breeding habitat. Therefore, permanent and temporary effects to potential California red-legged frog breeding habitat would occur.

Loss of habitat and the effects of habitat fragmentation would be offset by the wildlife crossing structures and openings within the median included as part of the project design to facilitate the movement of California red-legged frog and other wildlife species between the north and south sides of SR 84 (see Section 1.4.4, under "Wildlife Movement"). Two new dedicated crossing culverts for amphibians would be constructed, five existing culverts would be enlarged, and two combined drainage/wildlife culverts would be added to better accommodate amphibian movement between breeding ponds and upland aestivation areas. These structures could provide a safe method of crossing the expanded road, in turn minimizing the possible increased mortality associated with crossing a wider highway. Because California red-legged frogs are known to

make point-to-point movements, instead of always following migration corridors, it is difficult to predict where they will cross. This lack of a known migration route makes strategically placing undercrossings problematic. Since culverts would include directional fencing and are proposed at both vegetated riparian corridors and in the upland areas, this will likely increase the possibility that frogs will find them during any point-to-point movements. In addition, the project alignment on SR 84 has been modified to avoid Vallecitos Creek and minimize impacts to other water features that could provide aquatic breeding, dispersal, and foraging habitat for California red-legged frog. Finally, potential upland habitat for the species outside of the project footprint would be fenced off with ESA fencing and avoided. These modifications to the project as well as the implementation of the proposed avoidance and minimization measures mentioned above are expected to minimize potential effects to California red-legged frog.

The project would result in 1.28 acres of permanent and 0.19 acre of temporary impacts to California red-legged frog designated critical habitat. Proposed project activities within the critical habitat include construction of a retaining wall along the north side of SR 84 upslope of the California red-legged frog breeding pond (described in Section 2.3.5.2), a concrete barrier in the median, and Class II bikeways on either side of SR 84. The retaining wall would eliminate potential impacts to the breeding pond from hillside erosion. The concrete median barrier would limit movement of species across the road, but 2-foot gaps between the barrier ends and wildlife scuppers in the base of the barriers every 10 to 20 feet would help limit the impact of the barrier on movement.

Based on the direct impacts to upland dispersal habitat, foraging, and refugia habitat, aquatic non-breeding dispersal and foraging habitat, and breeding habitat, there is potential for take of individual California red-legged frog to occur. Impacts to designated critical habitat are anticipated. Therefore, the project "may affect, and is likely to adversely affect" California red-legged frog under FESA.

The project also has the potential to result in take of individual California red-legged frog as defined in CESA, which would include injury or mortality to egg masses, tadpoles, juveniles, or adults. A request for an Incidental Take Permit for California red-legged frog will be submitted to the CDFW under Section 2081(b) of the CESA.

Alameda Whipsnake

The project would not directly affect core habitat (i.e., scrub and chaparral) of the Alameda whipsnake. There is a low potential that the Alameda whipsnake could pass through the project footprint because the species has been documented in the project vicinity, has been found in grassland habitats, and has designated critical habitat immediately adjacent to the BSA. In the event that the species is present during construction, construction-related activities could result in the loss or harm of individual Alameda whipsnakes.

The loss of potential habitat for the species would not be substantial given that core habitat (i.e., scrub and chaparral) would not be disturbed and grassland habitat is abundant in the region. While the construction of a median barrier along SR 84 could create a barrier to species movement, the project includes wildlife crossing structures and openings within the median to allow wildlife to cross SR 84 (see Section 1.4.4, under "Wildlife Movement").

Potential impacts include 16.67 acres of permanent and 18.42 acres of temporary impacts on potential dispersal and foraging habitat (Table 2.3.5-3). No indirect impacts to Alameda whipsnake are expected to occur. No impacts to designated critical habitat Unit 3 are anticipated.

Proposed project activities adjacent to the critical habitat unit along I-680 would take place between the northbound and southbound lanes and would consist of construction of a concrete barrier and an overhead sign in the median. Due to the consistently high level of traffic and the concrete median barrier on I-680, I-680 is considered a barrier to Alameda whipsnake movement, although the species may use culverts under I-680 to travel between the east and west sides of the freeway. Therefore, the installation of an additional barrier is not expected to create a new impediment to movement or impact any suitable habitat. Caltrans does not anticipate an adverse modification to the adjacent critical habitat Unit 3.

Table 2.3.5-3: Proposed Compensatory Mitigation for Impacts to Alameda Whipsnake Habitat

Habitat Type[1]	Acres[2]				
	Permanent Impact	Temporary Impact	Mitigation for Permanent Impacts (3:1 Ratio)	Mitigation for Temporary Impacts (1:1 Ratio)	Total Mitigation for Project Impacts
Habitat Type					
Grasslands	8.69	11.52	26.07	11.52	37.59
Forests and Woodlands	1.82	2.13	5.46	2.13	7.59
Scrubland	--	--	--	--	--
Disturbed Vegetation (ruderal, landscaped, and agriculture/pasture)	6.15	4.71	18.45	4.71	23.16
Marsh Vegetation Communities	<0.01	0.07	<0.01	0.07	0.07
Total	**16.67**	**18.42**	**50.01**	**18.42**	**68.43[3]**

Notes:
1. Vegetation communities mapped based on their dominant species.
2. Acreages rounded to the nearest hundredth, so values shown for each vegetation type in table may not add up to total acreage shown.
3. Approximately 18.42 acres of the total mitigation will be completed through on-site restoration.

Therefore, the project "may affect, and is likely to adversely affect" Alameda whipsnake under FESA.

The project also has the potential to result in take of Alameda whipsnake as defined in CESA, which would include injury or mortality to individuals. Alameda whipsnake would not permanently reside or nest in or immediately adjacent to the project footprint because suitable coastal sage scrub and chaparral habitats (PCEs for the species) are absent, and therefore take of eggs in nests or adults hibernating underground is not anticipated. However, there is a low potential that Alameda whipsnake could pass through the project footprint because the species has been documented in the project vicinity, has been found in grassland habitats, and has suitable resident habitat immediately adjacent to the BSA. In the event that the species is present during construction, construction equipment movement or grubbing could result in the loss or harm of individual Alameda whipsnakes. A request for an Incidental Take Permit for Alameda whipsnake will be submitted to the CDFW under Section 2081(b) of the CESA.

San Joaquin Kit Fox

Since this project would occur on the margins of the known current range of San Joaquin kit fox, and avoidance and minimization measures would be implemented to protect any transient individuals that may enter the action area, the project is not anticipated to result in impacts to San Joaquin kit fox. The limited number of observations of San Joaquin kit fox reported in the area,

and a general consensus that the BSA is outside the typical range of the species, supports a conclusion that if the species does occur, it occurs sporadically and in low numbers. By following the avoidance and minimization measures detailed in Section 2.3.5.4, direct harm or injury from construction equipment and activities would be avoided. Following the minimization measures in regard to vehicle traffic, light and noise, and den-like structures on-site would be effective in minimizing potential effects. No direct impacts to suitable habitat are expected to affect San Joaquin kit fox through the destruction of foraging or denning habitats. Potential indirect impacts would be avoided through buffers outlined in the avoidance and minimization measures.

San Joaquin kit fox may use human-made structures such as culverts or abandoned pipes as dens (USFWS 1999), though there is limited information on specific needs for kit fox crossings and usage of culverts as travel corridors. The project proposes to enlarge five culverts and add two new culverts that will be of sufficient size to be used by kit fox. Information obtained from USFWS outlines recommendations for designs (USFWS 1998). One suggestion states that undercrossings should be spaced no more than 1,640 feet apart. Spacing between the proposed culverts ranges from 500 feet to 3,500 feet. Kit fox tend to use natural drainages as corridors, and placing undercrossings at drainage/road intersections may increase the likelihood that the culvert is used, should a kit fox occur within the project area. Therefore, the project "may affect, but is not likely to adversely affect" San Joaquin kit fox under FESA.

Take of San Joaquin kit fox as defined in CESA would include injury or mortality to individuals. Because the project is located outside of the species' current range as identified by CDFW, the likelihood is very low for San Joaquin kit fox to occur in the project vicinity as a migrant or denning resident. In addition, with the implementation of the avoidance and minimization measures in Section 2.3.5.4, no take of individuals under CESA is anticipated as a result of the project.

2.3.5.4 Avoidance, Minimization, and/or Mitigation Measures

Vernal Pool Fairy Shrimp

Potential indirect effects on the vernal pool fairy shrimp or its habitat that could result from erosion, sedimentation, or pollution will be avoided or minimized through Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4). No compensatory mitigation is proposed, because implementation of the project is not expected to directly or indirectly affect individual vernal pool fairy shrimp or their associated habitat.

California Tiger Salamander

In addition to Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4), the following avoidance and minimization measures are proposed for California tiger salamander:

BIO-16. The following avoidance and minimization measures are proposed to avoid impacts to California tiger salamander

- An approved biologist(s) shall be onsite during all ground-disturbing activities or vehicle travel not on existing roads or disturbed areas. The biologist(s) through the residential engineer shall be granted the authority to stop any work that may result in the take of listed

species. If the biologist(s) exercises this authority, the CDFW and the USFWS shall be notified by telephone and electronic mail within 1 working day.

- Where feasible, project activities in dispersal habitat will be timed to occur during the dry season (nonbreeding season for the California tiger salamander) (April 15 through October 15) to minimize potential effects to salamander breeding and dispersal.
- Work within potential aquatic breeding habitat will only occur once the aquatic feature no longer holds water, or from April 15 through October 15.
- Portions of the project footprint that are suitable refuge habitats for the California tiger salamander (i.e., grasslands and other natural habitats within 1.24 miles of potential breeding sites) will be surveyed prior to initiating ground-disturbing activities to identify burrows or other potential sites (under materials that could provide cover such as boards, scrap metal, woody debris, or other materials) that might be occupied by this species. To the extent feasible, potentially occupied refugia burrows within the project footprint will be fenced and avoided for the duration of the activity at that location.
- Within 24 hours prior to initial ground-disturbing activities, portions of the project footprint where potential California tiger salamander habitat has been identified will be surveyed by an approved biologist(s) to clear the site of salamanders moving above-ground, or taking refuge in burrow openings or under materials that could provide cover such as boards, scrap metal, woody debris, or other materials.
- An approved biologist(s) will be present during initial ground-disturbing activities in suitable refugia habitats for the California tiger salamander to monitor the removal of the top 12 inches of topsoil at all project locations. If California tiger salamanders are discovered during the initial ground-disturbing activities, work will be stopped immediately and the biologist will contact CDFW and USFWS within one working day. The biologist in consultation with CDFW and USFWS will use adaptive management to modify as necessary project activities to avoid or minimize effects to listed species.
- If individual animals are observed, work at that location will be temporarily halted while the approved biologist(s) excavates the occupied burrow by hand, and the individual salamander is moved to a natural burrow within 0.25 mile of the construction site. CDFW will be notified if California tiger salamanders are found and relocated. Any listed amphibian will be released at the mouth of a suitable burrow and then observed until it has safely entered the burrow.
- An erosion and sediment control plan will be implemented to prevent impacts of construction on breeding, dispersal, and foraging habitat outside the work areas.

BIO-17. Caltrans proposes mitigation for California tiger salamander through on-site restoration of all temporarily impacted areas. Although the project will result in the permanent loss of potential breeding, dispersal, foraging, and refugia habitat, replanting with native erosion control species coupled with the construction of dedicated wildlife crossing structures will result in improvements to California tiger salamander upland habitat within the temporarily disturbed areas of the project footprint.

Caltrans anticipates a need for off-site compensation for permanent impact areas at a 3:1 ratio. In order to mitigate for permanent direct effects to California tiger salamander, Caltrans proposes to

purchase 116.25 acres of habitat (see Table 2.3.5-2) from an approved mitigation bank, and includes mitigation for impacts to potential breeding habitat. Collier Canyon Mitigation and Conservation Bank (which is still in review) will provide credits for California tiger salamander and the project is within the approved service area for this mitigation bank. If Collier Canyon does not have credits available by the time of the anticipated credit purchase (in advance of project construction), arrangements will be made for purchase of credits at a nearby facility such as Oursan Ridge Conservation Bank, or Caltrans will purchase and conserve habitat to address the species' requirements. The purchase of multi-species bank credits may be used to satisfy the conditions of multiple agencies and jurisdictions including FESA, CESA, and the CEQA process. The final mitigation may be subject to change during the consultation and permitting processes. To mitigate the 31.04 acres of temporary impacts, Caltrans proposes to restore the habitat on-site. If it becomes evident after construction that it is not physically possible or appropriate to restore all 31.04 acres on-site, Caltrans will investigate other options such as enhancing existing habitat or purchasing additional off-site mitigation.

California Red-Legged Frog

In addition to the general avoidance and minimizations measured outlined in Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4), the measures listed for California tiger salamander in BIO-16 and BIO-17 will also be implemented for California red-legged frog.

Alameda Whipsnake

The project would only permanently impact roadside ruderal and grassland habitats, thus limiting the loss of potential movement habitat for the species. The project does not include the disturbance of any core habitat (i.e., scrub/chaparral habitat) and would not create a barrier to movement by the species. The measures discussed in Measures BIO-16 and BIO-17 for the California tiger salamander and California red-legged frog, respectively, in addition to Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4), are applicable to the Alameda whipsnake.

Nine wildlife crossing culverts along SR 84 are proposed to be upgraded or installed within the project footprint. Although there is limited information on use of culverts by Alameda whipsnake, these structures could provide a safe method of crossing the widened roadway.

Impacts to low-quality Alameda whipsnake habitat are considered negligible. However, in order to mitigate for permanent direct effects to Alameda whipsnake, the following measure will be implemented:

BIO-18. Caltrans proposes to purchase 50.01 acres of habitat from an approved mitigation bank, such as Oursan Ridge Conservation Bank (Table 2.3.5-3), to compensate for permanent impacts to Alameda whipsnake. This quantity represents a standard mitigation ratio of 3:1, which is required during consultation with USFWS.

San Joaquin Kit Fox

Direct effects to individual San Joaquin kit fox will be avoided or minimized through the proposed installation of wildlife crossing structures as well as the standard construction BMPs discussed in Measure BIO-1 (Section 2.3.1.3).

Additional measures, specific to kit fox, will be implemented if one or more signs of the species is observed during preconstruction surveys or during construction. If active dens are identified, the approved biologist will adhere to the measures set forth by the USFWS, which includes establishing exclusion zones around dens to prohibit ground disturbance from impacting the kit foxes (USFWS 2011a). If the situation is otherwise unique, the USFWS-approved biologist will discuss the situation with a Caltrans biologist, who will contact the USFWS to determine how to avoid or relocate the resident animal(s).

With implementation of the avoidance and minimization measures, the project would not impact San Joaquin kit fox, and compensatory mitigation would not be required.

2.3.6 Invasive Species

2.3.6.1 Regulatory Setting

On February 3, 1999, President William J. Clinton signed EO 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." FHWA guidance issued August 10, 1999, directs the use of the state's invasive species list maintained by the California Invasive Species Council to define the invasive species that must be considered as part of the NEPA analysis for a proposed project.

2.3.6.2 Affected Environment

The BSA supports a number of non-native species, some of which are exotic but not invasive and some of which are both exotic and invasive. Species found in the BSA that are exotic but not invasive include a variety of ornamental species trees that were planted along the roadway. The BSA also includes intermittent stands of non-native blue gum eucalyptus that were planted along I-680.

Invasive species in the BSA include non-natives that are deemed high risk by the California Invasive Plant Council. These include red brome (*Bromus madritensis* ssp. *rubens*), cheatgrass (*Bromus tectorum*), yellow star thistle (*Centaurea solstitialis*), Himalayan blackberry, and sweet fennel. Yellow star thistle and sweet fennel are particularly pervasive on the hillsides to the north of SR 84 in the eastern portion of the BSA.

2.3.6.3 Environmental Consequences

No Build Alternative

The No Build Alternative would not introduce invasive species into the project area.

Build Alternative

None of the identified species on the California list of noxious weeds will be used by Caltrans for erosion control or landscaping. However, project construction activities have the potential to inadvertently spread these species.

2.3.6.4 Avoidance, Minimization, and/or Mitigation Measures

BIO-19. In compliance with the Executive Order on Invasive Species, EO 13112, and guidance from FHWA, the landscaping and erosion control included as part of 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.

2.4 Cumulative Impacts

2.4.1 Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this 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 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, 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.

CEQA Guidelines Section 15130 describes when a cumulative impact analysis is necessary and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts under CEQA can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts under the NEPA can be found in 40 CFR, Section 1508.7.

2.4.2 Cumulative Impact Analysis

This cumulative impact analysis determines whether the Build Alternative in combination with other past, present, or reasonably foreseeable projects would result in a cumulative effect, and, if so, whether the Build Alternative's contribution to the cumulative impact would be considerable. Past, present, and reasonably foreseeable future projects include land use developments, infrastructure, and other transportation improvements that are planned and funded and would be located near the proposed Build Alternative improvements. The projects included in the cumulative impact analysis are described in Table 2.4.2-1.

The No Build Alternative would not include improvements to SR 84, I-680, or the SR 84/I-680 interchange. It would not require construction except from routine maintenance and would not contribute to cumulative environmental effects in combination with other projects.

Table 2.4.2-1: Projects Considered for Cumulative Impacts Analysis

Project Proponent/Name	Project Description	Project Status	Location (Approximate Distance from Project Area)
Transportation			
Caltrans/Pigeon Pass Realignment (EA 17240)	The project realigned the two-lane facility to improve the horizontal and vertical alignment, added standard outside shoulders, a median buffer, and climbing lanes in each direction.	Past project; construction completed in 2012.	SR 84, between I-680 and south of Ruby Hill Drive (within project area)
Caltrans/I-680 HOV Lane + Sunol Express Lanes - Southbound	This project included construction of an HOV lane (later converted to an express lane) from SR 84 to SR 237 with auxiliary lanes and ramp metering facilities.	Past project; completed in 2010.	I-680 (within project area)
Caltrans/I-680 Sunol Express Lanes – Northbound (EA 4G050)	The project will construct an HOV/Express lane on northbound I-680 from south of SR 237 in Santa Clara County to north of SR 84 in Alameda County.	The final environmental document was released and project approved in August 2015. Project is currently in the design phase. Construction is estimated to begin in late 2017.	I-680, from Calaveras Road (SR 237) to SR 84 (within project area)
Caltrans/Niles Canyon Short-Term Safety Improvements Project (EA 02A331)	The project constructed various safety improvements along the Niles Canyon corridor; all improvements were made on paved surfaces.	Past project; completed September 2016.	Niles Canyon Corridor, SR 84 from Mission Boulevard (SR 238) to I-680 (directly west of project area)
Caltrans/Niles Canyon Medium-Term Safety Improvements Project (EA 2A3320)	The project will conduct various safety improvements including the installation of rock drapery systems, curve correction, tree removal and the addition of spot shoulder widening and guard railing.	Future project; final environmental document is anticipated in September 2017.	Niles Canyon Corridor, SR 84 from Mission Boulevard (SR 238) to I-680 (directly west of project area)
Alameda CTC/SR 84 Expressway Widening Project (EA 29762)	Widening of SR 84 (Isabel Avenue) from two lanes to four to six lanes between Jack London Boulevard and Ruby Hill Drive	North Segment completed in 2014. South segment currently under construction. Anticipated completion in 2017.	SR 84 (Isabel Avenue) from Jack London Boulevard to Ruby Hill Drive (directly east of project area)
Caltrans/Arroyo de la Laguna Bridge Scour Project	The project proposes to widen the bridge by 3 feet. Widening will be done to the extent feasible without adding any additional substructures.	Future project; draft environmental document is anticipated fall 2017.	SR 84, in the town of Sunol (0.6 mile west of I-680)
Caltrans/Alameda Creek Bridge Replacement Project (EA 16030)	This project would reconstruct the existing Alameda Creek Bridge over Alameda Creek in Niles Canyon in the City of Fremont to address operational deficiencies and increase the safety of the traveling public. The project would also realign the roadway to the west of the bridge for a length of approximately 1,200 feet, to correct the sharp curve on the existing bridge approach. The project would improve traffic safety by improving sight distances, updating barrier rails, and providing a standard road shoulder width.	Future project; final environmental document released in August 2017.	SR 84 (Niles Canyon Road (3.6 miles west of I-680)
Caltrans/SR 84 Safety Project (Niles 1) (EA 174400)	Roadway improvements along SR 84 between the Rosewarnes Bridge and Farwell Bridge included: widening road shoulders; improving site distance and vertical clearances at bridges; and installation of a retaining wall along a section of Alameda Creek.	Project was terminated in 2011 and never constructed. Preconstruction activities impacted 143 trees along SR 84.	SR 84 between Rosewarnes Bridge and Farwell Bridge (4 miles west of I-680)

Table 2.4.2-1: Projects Considered for Cumulative Impacts Analysis

Project Proponent/Name	Project Description	Project Status	Location (Approximate Distance from Project Area)
Caltrans/I-680 Freeway Performance Initiative (EA 4G111)	Ramp metering system for 16 on-ramps/connectors along I-680 from Scott Creek Road Undercrossing to Alcosta Boulevard Overcrossing with on-ramp/connector widening, retaining walls, and monitoring stations.	Future project; IS/EA approved September 2016.	I-680 (within project area)
Infrastructure			
Alameda County Water District/Vallecitos Channel Repair	The project improved an existing 220-foot-long portion of the unlined water conveyance channel and adjacent access road. The purpose of the work is to repair localized bank damage, prevent further erosion, and restore channel hydraulics and water conveyance efficiency. The project involves the installation of vegetated soil lift revetment, installation of transverse log stabilizers, and installation of a low-flow channel.	Past project; completed in 2016.	SR 84 at Vallecitos Lane (within project area)
Alameda County Water District/Vallecitos Channel Evaluation and Restoration Project	The District-constructed and operated Vallecitos Channel is used to convey water from the South Bay Aqueduct to Alameda Creek for groundwater recharge. Proposed project will restore channel capacity and evaluate long-term channel alternatives to delivery of flows to the Sunol Valley and Alameda Creek. The entire channel will be evaluated, identify critical areas for repair and maintenance. Alternate means of long term water delivery will also be evaluated.	Future project; current status unknown.	SR 84 at Vallecitos Lane (within project area)
Alameda County Resource Conservation District/Arroyo de la Laguna Stream Restoration Project	The project demonstrated bioengineered stream restoration practices on an incised, hydrologically altered system, affected by urban and agricultural development. The project site is on the Arroyo de la Laguna, south of City of Pleasanton, directly underneath and immediately downstream of Verona Bridge, corner of Verona Bridge and Foothill Road.	Past project; restoration completed in 2011.	Arroyo de la Laguna, directly underneath and immediately downstream of Verona Bridge, between Pleasanton and Sunol (within project area)
Alameda County Fire Department/Sunol Fire Department Project	Alameda County Fire Department proposes to build a fire station in Sunol on Paloma Way approximately one half mile west of I-680. The project includes a pre-fabricated 2,000 square-foot fire station and a 2,500 square-foot garage adjacent to the main building.	Proposed project.	SR 84 (Paloma Way) (0.5 mile west of I-680)
San Francisco City and County – SFPUC/San Antonio Backup Pipeline	The project included the construction of several new facilities and improvements to provide reliable conveyance capacity for planned and emergency discharges of Hetch Hetchy water out of the SFPUC regional water system under future flow conditions.	Past project; construction completed June 2015.	Unincorporated Alameda County along the west side of Calaveras Road (0.5 mile south of the I-680/SR 84 interchange)
SFPUC/Town of Sunol Fire Suppression Project	The project includes improvement of fire suppression capabilities by increasing the number of hydrants and flows in and around the Town of Sunol. Project components include 2 miles of new pipelines on County roads, installation of approximately 26 new hydrants, and water tank replacement and upgrade.	Past project; completed 2014.	In and around Sunol (0.8 mile west of I-680)

Table 2.4.2-1: Projects Considered for Cumulative Impacts Analysis

Project Proponent/Name	Project Description	Project Status	Location (Approximate Distance from Project Area)
Zone 7 Water Agency/ Stream Management Master Plan Improvements	The Stream Management Master Plan included implementation of 49 projects over the next 20 years throughout the Zone 7 service area (in the Tri-Valley Area). Reach 10 included Arroyo de la Laguna; project activities included bank stabilization and protection features, grading and terracing of eroded banks, riparian corridor enhancement for 3,000 feet, and removal of barriers to steelhead fish migration.	Construction of the projects in Reach 10 occurred from 2008 to 2010.	In the vicinity of Arroyo de la Laguna, in Sunol (1 mile west of I-680)
Alameda County Resource Conservation District/NRCS/Stonybrook Creek Fish Passage Improvement Project	This project consisted of two culvert improvements that cross Stonybrook Creek along the County of Alameda- maintained Palomares Road at Mile Posts 8.60 and 8.75. It has been determined that both culverts are barriers to all lifestages of anadromous fish, including federally listed DPS Central Coast California steelhead trout (Oncorhynchus mykiss). The project was proposed to address: a) presence of barriers to migration of anadromous Central Coast California steelhead and resident rainbow trout to identified spawning and rearing habitat in Stonybrook Canyon, and b) a concern for damage to public infrastructure and private property due to undersized crossings.	Past project; construction completed in 2016.	Stonybrook Creek, SR 84 near Palomares Road (4 miles west of I-680)
SFPUC/Calaveras Dam Replacement	The project provides for planning, design, and construction of a replacement dam at the Calaveras Reservoir to meet seismic safety requirements. When complete, the new dam will provide for a reservoir with the same storage capacity as the original reservoir (96,850 acre-feet), but the replacement dam will accommodate a potential enlargement of the dam in the future.	Planned construction duration – 2011 to mid-2019.	Calaveras Reservoir (7 miles south of the SR 4/I-680 interchange)
Alameda County Water District/Kaiser Fish Screen Project	This project constructed a new diversion pipeline and cylindrical fish screen and abandoned the existing unscreened pipeline. The replacement facility was constructed about 530 feet downstream of the existing diversion pipe and 2,400 feet upstream of the district's Rubber Dam.	Past project; completed in 2014.	Alameda Creek south of Niles Canyon Road (7.5 miles west of I-680)
Alameda County Water District/Alameda County Flood Control and Water Conservation District/Joint Lower Alameda Creek Fish Passage Improvements Project	This project is intended to enhance steelhead and salmon access through the constructed flood control channel to historic upstream spawning and rearing habitat.	Planned construction to begin in 2019.	Alameda Creek south of the SR 84/I-680 interchange

Table 2.4.2-1: Projects Considered for Cumulative Impacts Analysis

Project Proponent/Name	Project Description	Project Status	Location (Approximate Distance from Project Area)
City of Fremont/Old Canyon Road Bridge Foundation Protection Repair Project	The project removed a total of 2,500 square feet of grouted rock rip-rap (2,135 from the channel around Piers 2, 3, and 4 and 365 square feet on the bank adjacent to the downstream side of Abutment 1). After removal, an equal amount of rock rip-rap and cobble was in the same locations. The completed creek bed was intended to form a one-foot deep low flow channel that would fill the existing scour hole, stabilize the bridge piers, and allow for future fish passage.	Past project; completed in 2016.	Niles Canyon Road (7.25 miles west of I-680)
San Francisco City and County – SFPUC/Sunol/Niles Dam Removal Project	This project partially removed both Sunol and Niles Dams to remove barriers to fish passage, in keeping with the goal of restoring a self-sustaining population of steelhead to the Alameda Creek watershed, while recognizing other beneficial uses of Alameda Creek, such as water supply. Forty thousand cubic yards of impounded sediment were left in place to move downstream naturally over a period of several decades.	Past project; completed in 2006.	Niles Dam along Alameda Creek (6.3 miles west of I-680), Sunol Dam along Alameda Creek (1.7 miles west of I-680)
City of Fremont/ Mission Clay Quarry Amended Reclamation Plan	This project amended the reclamation plan and 2005 grading plan for the former Mission Clay Products quarry and brick and clay pipe manufacturing factory located in the Niles Canyon. The amendment allows for the demolished building and paving materials to be ground up on site and incorporated into the fill material for the quarry pit, with the exception of the asphaltic concrete, which will be transported offsite and recycled at an asphalt recycling facility.	Past project; plan approved 2010.	2225 Niles Canyon Rd (6.5 miles west of I-680)
San Francisco City and County – SFPUC/ Alameda Siphons Seismic Reliability Upgrade Project	This project constructed a new Alameda Siphon 4 using modern earthquake engineering methods making the new siphon more resistant to earthquake damage than the three existing siphons. Additionally, existing facilities associated with operation of the existing siphons and new siphons would also be retrofitted to improve their seismic reliability.	Past project; completed 2010.	One mile south of the Calaveras Road/I-680 intersection (0.7 mile south of the I-680/SR 84 interchange)
San Francisco City and County – SFPUC/New Irvington Tunnel	The Project completed the last of three tunnels in the Water System Improvement Program, installing a seismically sound 3.5 mile long tunnel located between Sunol Valley and Fremont.	Past project; completed 2016.	Adjacent to I-680 (5.8 miles southwest of the I-680/SR 84 interchange)
Commercial and Residential			
City of Pleasanton/Lund Ranch II (Planned Unit Development) PUD-25	The project will develop 195 acres into 43 homes designated for Rural Density (1 dwelling per 5 acres). The majority of the project will remain accessible open space.	City council approved project for 43 homes on January 5, 2016.	APN 948001500104 (1 mile east of I-680)
City of Pleasanton/Roselyn Estates II	The project is a Planned Unit Development for seven lot residential developments over 3.71 acres.	Past project; completed.	1623 Cindy Way, Pleasanton (2 miles north of I-680 project terminus)

Table 2.4.2-1: Projects Considered for Cumulative Impacts Analysis

Project Proponent/Name	Project Description	Project Status	Location (Approximate Distance from Project Area)
City of Pleasanton/Pleasanton Gateway Commons	The project is a Planned Unit Development Plan for 210 multi-family (apartment) dwelling units, 62 three-story row-house style single-family detached units, 35 single-family detached units, and common area amenities on an approximately 26.72-acre site.	Past project; completed.	1600 Valley Avenue (1.3 miles north-northwest of I-680 project terminus)
City of Pleasanton/Golden Eagle Farm	The project proposed installing solar panels.	Withdrawn.	8053 Golden Eagle Way (1 mile west of I-680)
City of Pleasanton/Sycamore lot PUD	The project is a Planned Unit Development over 2.23 acres.	City council approved project.	Sycamore Road, Pleasanton (0.5 mile north-northeast of I-680 project terminus)
City of Pleasanton/Bach/Lamb PUD	The project is a Planned Unit Development over 1.84 acres.	City council approved project.	6059 Sycamore Road, Pleasanton (0.5 mile north-northeast of I-680 project terminus)
City of Pleasanton/Dutra Enterprises PUD	The project is a Planned Unit Development over 11.65 acres.	City council approved project.	1053 Happy Valley Road, Pleasanton (0.5 mile east of I-680)
City of Pleasanton/Balch PUD	The project is a Planned Unit Development over 10.14 acres with large single-family lots.	City council approved project.	6010 Alisai Road, Pleasanton (1 mile north-northeast of I-680 project terminus)
City of Pleasanton/Serenity Terrace	The project is a Planned Unit Development of 46.3 acres with large single-family lots.	City council approved project.	1073 Happy Valley Road, Pleasanton (0.5 mile east of I-680)
City of Pleasanton/Wentworth	The project is a Planned Unit Development.	City council approved project.	1157 Happy Valley Road, Pleasanton (0.5 mile east of I-680)

2.4.3 Resource Areas with No Contribution to Cumulative Effects

The resources considered in the cumulative effects analysis follow the Caltrans Eight Step Guidance for identifying and assessing cumulative impacts (Caltrans 2016d). No cumulative effects are anticipated for the following resource areas:

- Existing and Future Land Use (Section 2.1.1)
- Consistency with State, Regional and Local Plans and Programs (Section 2.1.2)
- Park and Recreation Facilities (Section 2.1.3)
- Growth (Section 2.1.4)
- Farmlands (Section 2.1.5)
- Community Character and Cohesion (Section 2.1.6)
- Relocations and Real Property Acquisition (Section 2.1.7)
- Utilities/Emergency Services (Section 2.1.8)
- Cultural Resources (Section 2.1.11)
- Hydrology and Floodplain (Section 2.2.1)

- Water Quality and Storm Water Runoff (Section 2.2.2)
- Geology/Soils/Seismic/Topography (Section 2.2.3)
- Paleontology (Section 2.2.4)
- Hazardous Waste/Materials (Section 2.2.5)
- Air Quality (Section 2.2.6)
- Noise (Section 2.2.7)
- Invasive Species (Section 2.3.6)

In addition, no cumulative effects are anticipated for the following biological resources:

- Migratory corridors (Section 2.3.1)
- Fish passage (Section 2.3.1)
- Plant species (Section 2.3.3)
- Western pond turtle (Section 2.3.4)
- Grasshopper sparrow (Section 2.3.4)
- Loggerhead shrike (Section 2.3.4)
- California yellow warbler (Section 2.3.4)
- Western burrowing owl (Section 2.3.4)
- Tule elk (Section 2.3.4)
- San Francisco dusky-footed woodrat (Section 2.3.4)
- American badger (Section 2.3.4)
- Nesting raptors (Section 2.3.4)
- Migratory birds (Section 2.3.4)
- Special-status and high priority bats (Section 2.3.4)
- Vernal pool fairy shrimp (Section 2.3.5)
- San Joaquin kit fox (Section 2.3.5)

The amount and quality of these species' habitat potentially affected by the proposed project would not affect local populations. Project avoidance and minimization measures listed in Section 2.3 will avoid or reduce effects to these species during project construction. Furthermore, potential effects to habitat for many of these species would be offset through on-site restoration and enhancement activities described in Section 2.3. As a result, impacts to these species as a result of the proposed project are anticipated to be minimal and would not result in incremental effects that would be cumulatively considerable.

2.4.4 Resources Considered for Contribution to Cumulative Effects

2.4.4.1 Visual/Aesthetics

The project would affect visual/aesthetic resources on 5 miles of an Officially Designated State Scenic Highway (I-680) and introduce new visual elements on SR 84 and I-680 including bridge widening, new flyover ramp, new utility lines, retaining walls, signage, and lighting and would remove vegetation that currently serves as visual screening. Therefore, visual/aesthetic resources are considered for the cumulative effects analysis. The resource study area (RSA) for the visual/aesthetics analysis is the same as the analysis area noted in Section 2.1.10.2 and encompasses the two visual assessment units SR 84 and I-680, including the land visible from, adjacent to, and outside of the SR 84 and I-680 rights-of-way. This area was chosen because it encompasses both the views from the project area as well as views of the project area from nearby residents and businesses.

In the 1800s and 1900s, several large-scale infrastructure projects altered the visual/aesthetic quality of the project area. I-680 was built from 1918 to 1962 and SR 84 was built from 1933 to 1959 (Caltrans 1995). Vallecitos Road (which was designated as SR 84) was originally constructed in the 1860s and rebuilt in 1939. Since the 1880s, farming and ranching have been the dominant land uses in the project area. The village of Sunol was formed in the early 1860s and originally included a store, hotel, brewery, and school (A/HC 2017). The school was removed with the construction of the SR 84/I-680 interchange in 1965. The Vallecitos Nuclear Center was constructed in 1957. Despite the addition of roadways and other development in the project area, wide open spaces are still dominant in the project area. These factors demonstrate a historic stability in the health of visual/aesthetic resources in the project area.

Further contributing to the health of visual/aesthetic resources in the project area was the passage of Alameda County Measure D and the adoption of a State Scenic Highway Corridor Plan (discussed in Section 2.1.2.1). The passage of Measure D, the Save Agriculture and Open Space Lands Initiative, in November 2000 has been critical in the preservation of agricultural land and open space in Alameda County. Approval of this citizen-sponsored ballot measure amended the Alameda County General Plan and the regionally specific East County Area Plan to further restrict development. The initiative provides detailed land and site planning requirements that discourage contemporary sprawl development. Alameda County also has a number of site, building, and landscape design criteria that are part of the policy framework of the East County Area Plan and provide an added layer of protection to the scenic quality of the plan area. Measure D protects the scenic quality of the project area and preserves open space.

Since 2010, Caltrans has completed two transportation projects in the same area as the proposed project. Both the I-680 HOV Lane + Sunol Express Lanes – Southbound project and the Pigeon Pass Realignment project required the removal of trees and vegetation along the roadside, changes to roadside slopes and hillsides along SR 84, and addition of retaining walls along I-680. Both projects included future replanting of vegetation where space exists or in other locations outside of the project limits if all planting cannot be accommodated in the right-of-way.

Four other infrastructure projects have also been completed within the RSA including the San Antonio Backup Pipeline, Stream Management Master Plan Improvements, Alameda Siphons Seismic Reliability Upgrade Project, and New Irvington Tunnel. These projects resulted in temporary affects to visual/aesthetic resources by introducing new project elements onto the

landscape and temporarily removing vegetation. With mitigations including screening views during construction and replanting vegetation, the effects to visual resources were minimal.

Caltrans has five projects currently planned or under construction in the RSA including I-680 Sunol Express Lane – Northbound, the I-680 Freeway Performance Initiative, the Niles Canyon Medium-Term Safety Improvements Project, the Arroyo de la Laguna Bridge Scour Project, and the SR 84 Expressway Widening Project. These projects are anticipated to introduce additional pavement, lighting, signage, traffic signals, and retaining walls as well as remove trees and vegetation along the side of the roadway. Mitigations include replanting vegetation as well as aesthetic treatments for new project elements such as retaining walls.

Two additional infrastructure projects are currently planned or under consideration in the RSA including the the Sunol Fire Department Project and the Calaveras Dam Replacement project. The Sunol Fire Department Project is anticipated to have a minor effect to visual resources from introduction of a new structure and lighting to the Town of Sunol. The Calaveras Dam Replacement project is anticipated to have significant and unavoidable affects to visual resources as viewed from the Sunol Wilderness Area. However, these projects would not contribute to incremental effects on views of the project area.

As described in Section 2.1.10, certain project elements would alter the existing visual/aesthetic quality and contribute to a less rural character in the project area. The proposed project would introduce additional pavement, lighting, signage and structures associated with the extended HOV/express lane, new flyover ramp, additional retaining walls and roadway widening. The proposed project would also result in the temporary and permanent removal of vegetation along the roadway. With implementation of the mitigation measures listed in Section 2.1.10.4, the proposed project would not severely impact or degrade the visual/aesthetic quality and character for motorists or nearby residents. In addition, land use plans such as the East County Area Plan and other General Plans will continue to protect the existing scenic quality by limiting the ability of projects to change land uses next to roadways. Elements constructed as part of the proposed project may disrupt nearby views, but they would not obstruct views of the surrounding landscape from motorists or nearby residents. Impacts to visual/aesthetic resources as a result of the proposed project would not result in incremental effects that would be cumulatively considerable.

2.4.4.2 Traffic and Transportation

The proposed project would provide transportation benefits in both the opening year and design year for northbound I-680 in the PM peak period and for southbound SR 84 in the AM peak period. It would also improve operations during the AM peak period at the Isabel Avenue (SR 84)/Vallecitos Road and Vallecitos Road (SR 84)/Ruby Hill Drive-Kalthoff Common intersections and during the PM peak period at the Calaveras Road (SR 84)/I-680 northbound ramps intersection. The proposed signalized intersection at Little Valley Road/Vallecitos Atomic Laboratory Road would reduce delays for motorists approaching SR 84 from Little Valley Road during both the AM and PM peak periods.

The proposed project would serve a higher volume of vehicles in both the opening year and the design year than the No Build Alternative. However, two intersections continue to experience delays in the design year with and without the proposed project including Isabel Avenue (SR

84)/Vallecitos Road and Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road. The additional capacity on SR 84 from the proposed project would cause a shift of traffic away from the Pleasanton-Sunol Road corridor between Koopman Road and Paloma Way, and to the Paloma Way corridor between I-680 and Pleasanton-Sunol Road, shifting demand at the Niles Canyon Road-Paloma Way (SR 84)/Pleasanton-Sunol Road intersection from the southbound approach on Pleasanton-Sunol Road to the westbound approach from Paloma Way (SR 84). Therefore, traffic and transportation is a resource considered for cumulative impact analysis. The RSA for traffic and transportation includes SR 84 and I-680 in the project area as well as the study intersections as described in Section 2.1.9.2.

As noted in Section 1.3.2, the bulk of the traffic in the project area heads south from Alameda County to Santa Clara County in the morning and north in the evening, as commuters travel to and from the region's fastest-growing job market (Avalos 2017). In addition to high traffic demand between residential areas of Alameda County and employment centers in Santa Clara County, the Tri-Valley Region (including Dublin, Livermore, and Pleasanton) has also experienced strong growth in the last 40 years, growing over seven times faster than Alameda County as a whole (Section 2.1.4.2). Land use plans are in place to keep growth contained to urban areas and to preserve agriculture and open space, but growth is expected to continue. This historic local and regional growth has contributed to the increased congestion in the project area and at study area intersections.

Past, present, and reasonably foreseeable Transportation, Infrastructure, and Commercial and Residential projects listed in Table 2.4.2-1 have the potential to affect traffic and transportation. Recent projects including the Pigeon Pass Realignment, the Niles Canyon Short-Term Safety Improvements Project, and the SR 84 Expressway Widening Project served to ease existing congestion caused by prior growth in the Tri-Valley Region by improving safety and/or increasing capacity on SR 84. Similarly, the I-680 HOV Lane + Sunol Express Lanes – Southbound and I-680 Sunol Express Lanes – Northbound project increased or will increase capacity on I-680 by adding an HOV/express lane to ease existing congestion. The forthcoming Niles Canyon Medium-Term Safety Improvements Project and the Alameda Creek Bridge Replacement Project are also anticipated to improve safety to accommodate existing congestion on SR 84. These projects, in coordination with the proposed project, are anticipated to benefit the traffic and transportation resource.

The proposed Sunol Fire Department Project has the potential to increase the usage of study area intersections and freeways by emergency vehicles. This project could increase congestion and delays west of the SR 84/I-680 interchange. Congestion due to emergency vehicles would be intermittent and short-term.

Past Commercial and Residential projects including the Roselyn Estates II and Pleasanton Gateway Commons and proposed projects including Lund Ranch II PUD-25, Sycamore Lot PUD, Bach/Lamb PUD, Dutra Enterprises PUD, Balch PUD, Serenity Terrace, and Wentworth all serve or will serve growth in the City of Pleasanton. These projects represent some of the anticipated increased growth in urban area in the Tri-Valley Region that will continue to increase congestion into the project design year. The proposed project would respond to the anticipated congestion by decreasing delays on SR 84 and I-680 as well as at most of the study area intersections in the opening year and design year. The proposed project would affect traffic and

transportation, but the impacts are anticipated to be minimal and would not result in incremental effects that would be cumulatively considerable.

2.4.4.3 Natural Communities

The proposed project would affect California annual grassland, forest and woodlands, scrublands, and wetland communities. The temporary and permanent impacts to vegetation communities are described in Table 2.3.1-1. Cumulative effects to wetland communities are discussed in Section 2.4.4.4. Cumulative effects associated with riparian communities and oak woodlands are discussed individually below. Other natural communities of concern including red willow thickets and Fremont cottonwood forests are generally associated with ditches, floodplains, lake edges, and low-gradient depositions along streams. Effects on these communities will be addressed through mitigation of riparian areas (e.g., in the planting of willow poles and cottonwoods within riparian corridors). Therefore, the proposed project would not contribute to a cumulatively considerable effect to red willow thickets or Fremont cottonwood forests.

Riparian Vegetation

The RSA for riparian vegetation consists of a 500-foot buffer around stream courses that flow into Vallecitos Creek and connecting drainages in the BSA (Figure 2.4.4-1).

Riparian scrub and forest corridors line the creeks and some of the intermittent drainages in the project area. The riparian scrub and forest habitat is a multi-alliance assemblage of wetland and riparian trees and shrubs that narrowly line both banks adjacent to the active channels, and in some locations, a flood terrace below the OHWM.

All native riparian vegetation communities are considered sensitive by CDFW. Riparian forest and scrub is considered high-quality habitat, important to wildlife, of relatively limited (and declining) distribution at the local and statewide level, and warranting preservation and management. Native plant riparian communities are considered sensitive vegetation communities due to their limited distribution in California.

Several past, present, or reasonably foreseeable transportation and infrastructure projects in the area had or have the potential to affect riparian vegetation. The SR 84 Safety Project (Niles 1) removed 143 riparian trees prior to being halted. Recent surveys of the area demonstrate canopy expansion from residual trees within the project area and stump re-sprouting. Therefore, long-term effects due to the tree removal associated with this project are not anticipated. However, Caltrans is aware that this project still has unmitigated impacts to trees, and is currently working on a plan for mitigation to plant trees at the ratio required by resource agencies.

Two current projects, the SR 84 Expressway Widening Project and the Stream Management Master Plan Improvements, are anticipated to affect riparian vegetation.

- The SR 84 Expressway Widening Project will remove 59 willows and 1 maple tree. Riparian tree removal will be mitigated through on-site restoration and enhancements as well as off-site riparian scrub plantings at Murray Ranch.
- The Stream Management Master Plan Improvements include a series of riparian enhancements along 76,300 linear feet of channel bank.

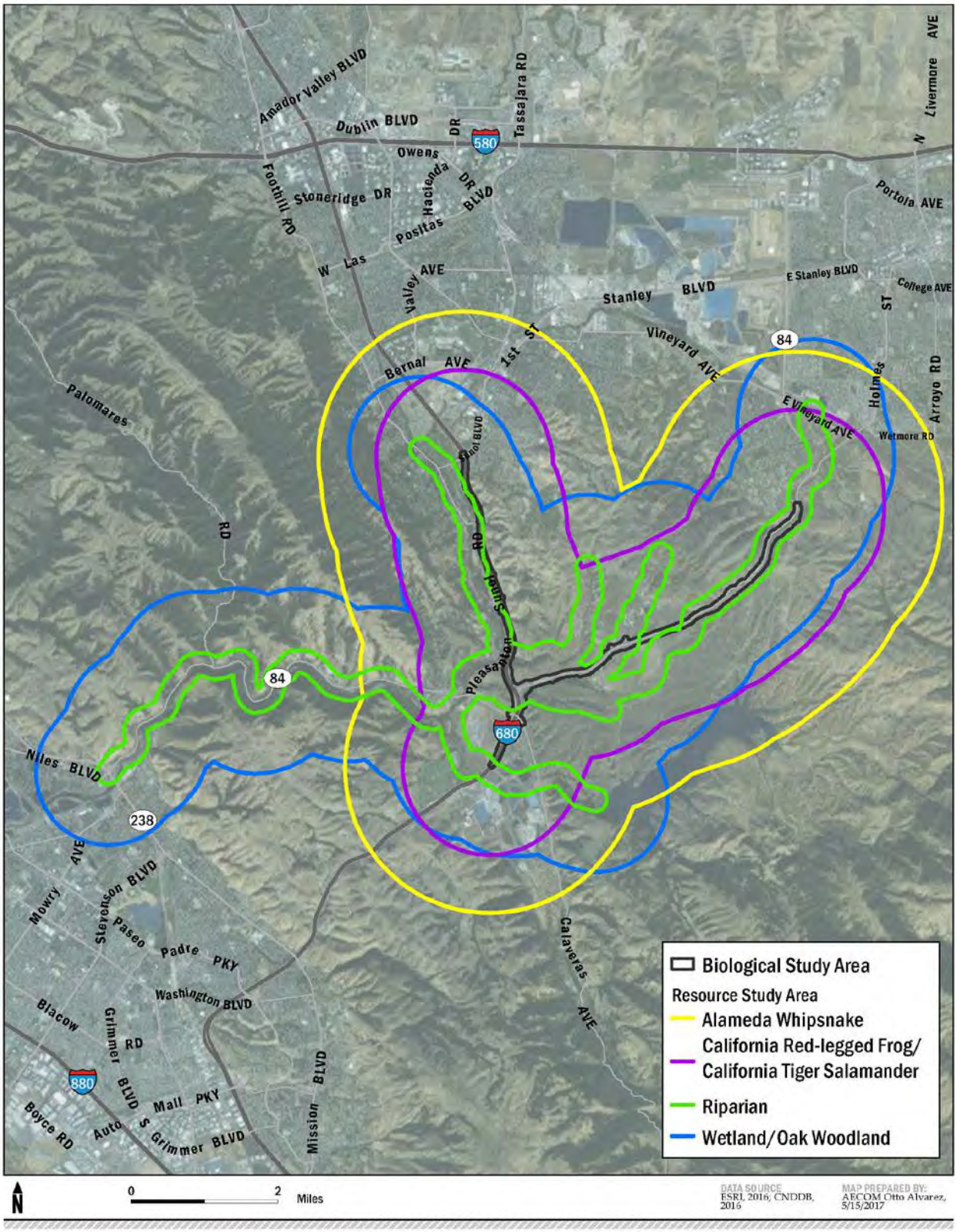


Figure 2.4.4-1: Resource Study Area for Biological Cumulative Impacts

Two future transportation projects including the Niles Canyon Medium-Term Safety Improvements Project and the Alameda Creek Bridge Replacement Project could also affect riparian vegetation.

- The Niles Canyon Medium-Term Safety Improvements Project would temporarily affect 1.61acres and permanently affect 0.35 acre of valley foothill riparian vegetation.
- The Alameda Creek Bridge Replacement Project would temporarily affect up to 1.566 acres and permanently affect 0.314 acre of riparian vegetation. Trees removed from the riparian zone will be replaced at a 3:1 ratio (on-site where space exists and off-site within Alameda Creek watershed).

Past, present, and reasonably foreseeable projects with the potential to affect riparian habitat include mitigation and restorations that would protect the health of the resource. In addition, the proposed project also includes mitigation of all tree removals of native species within riparian areas through replanting at a 3:1 ratio on-site, to the maximum extent possible. As a result, impacts to this riparian vegetation as a result of the proposed project are anticipated to be minimal and would not result in incremental effects that would be cumulatively considerable.

Oak Woodlands

The RSA for the oak woodland analysis includes sections of the Alameda Creek, Arroyo de la Laguna, and Arroyo del Valle watersheds extending from the BSA up to the ridgelines from which waters flow into Vallecitos Creek and connecting drainages (Figure 2.4.4-1).

Coast live oak woodland, valley oak woodland, and mixed oak woodland all occur within the BSA. These communities provide habitat for many special-status species. Mixed oak woodlands are present throughout the BSA, while coast live oak occurs in patches on the banks of Vallecitos Creek and on alluvial terraces. Valley oak woodlands occur at higher elevations on riparian terraces and mesic meadows. Because of its limited current distribution due to clearing for pasture and agricultural land, valley oak woodland is considered a sensitive vegetation community by CDFW.

Several past, present, or reasonably foreseeable transportation and infrastructure projects in the area had or have the potential to affect oak woodlands.

- The Pigeon Pass Realignment project affected 4.4 acres of riparian oak woodland and 1.9 acres of upland oak woodland. Vegetation was replaced in kind where space existed. Effects after replanting were mitigated through an off-site mitigation bank.
- The I-680 HOV Lane + Sunol Express Lanes – Southbound project resulted in the removal of 157 mature and sub-mature coast live oak, valley oak, northern California black walnut, California bay, and California buckeye trees. Tree replanting and mitigation ratios were determined in consultation with CDFW.
- The Stonybrook Creek Fish Passage Improvement Project resulted in the removal of nine trees. Trees are being replaced at a ratio of 3:1 for trees less than 4 inches DBH and 9:1 for trees larger than 4 inches DBH.

Two ongoing projects including the SR 84 Expressway Widening Project and Calaveras Dam Replacement have the potential to affect oak woodlands.

- The SR 84 Expressway Widening Project is anticipated to result in the removal of 30 oak trees. Permanent effects will be mitigated by planting 225 oak trees, 125 of them in riparian areas.
- The Calaveras Dam Replacement project is anticipated to permanently affect 24.3 acres of oak woodland. Effects will be mitigated by enhancements at SFPUC's San Antonio Mitigation Area.

Three reasonably foreseeable transportation projects, including the I-680 Sunol Express Lanes – Northbound Project, the Niles Canyon Medium-Term Safety Improvements Project, and the Alameda Creek Bridge Replacement Project, also have the potential to affect oak woodlands.

- The I-680 Sunol Express Lanes – Northbound Project is anticipated to have permanent impacts on 0.68 acre of oak woodlands.
- The Niles Canyon Medium-Term Safety Improvements Project is anticipated to have temporary effects on 0.66 acre and permanent effects on 0.68 acre of California bay/coast live oak.
- The Alameda Creek Bridge Replacement Project is anticipated to temporarily affect 0.555 acre and permanently affect 0.625 acre of oak woodlands. Temporarily affected areas will be revegetated where appropriate.

The past, present, and reasonably foreseeable projects with the potential to affect oak woodlands include mitigation and restoration that would protect the health of the resource. In addition, the proposed project also includes mitigation of coast live oaks and valley oaks in oak woodlands through replanting at a 3:1 ratio within the project limits close to the areas of removal. If all planting cannot be accommodated within the right-of-way, replanting would take place off-site within as close proximity to the project limits as possible. Therefore, impacts to oak woodlands as a result of the proposed project are anticipated to be minimal and would not result in incremental effects that would be cumulatively considerable.

2.4.4.4 Wetlands and Waters of the United States

The RSA for wetlands and waters of the U.S. includes sections of the Alameda Creek, Arroyo de la Laguna, and Arroyo del Valle watersheds extending from the BSA up to the ridgelines where waters flow into Vallecitos Creek and connecting drainages (Figure 2.4.4-1).

Based on research, historical data, and recent trends, the overall health of the resource is assumed to be stable. Many parcels within the RSA are publicly owned. The ownership of lands by Alameda County and the SFPUC directly protects the land from development and indirectly protects wetlands and other waters located within their jurisdiction. In addition to the ownership by public agencies, the passage of Alameda County's Measure D (Section 2.1.2.1) also indirectly protects and contributes to the stability of wetlands and other waters health within the RSA. While protecting the scenic quality and preserving open space, these measures indirectly protect wetlands and other waters by preventing development.

Several past, present, or reasonably foreseeable transportation and infrastructure projects in the area had or have the potential to affect wetlands and waters of the United States. Six such projects have been completed.

- The Pigeon Pass Realignment project resulted in temporary impacts to 1.0 acre of wetlands and 0.31 acre of other waters of the U.S., which were mitigated through the purchase of mitigation bank credits.
- The I-680 HOV Lane + Sunol Express Lanes – Southbound project resulted in temporary impacts to 0.04 acre of wetlands. Mitigation was determined during coordination with USACE.
- The Vallecitos Channel Repair project resulted in temporary effects to 0.04 acre and permanent effects to 0.03 acre of other waters of the U.S. and State. Permanent effects were mitigated at a ratio of 2:1 through participation in the Arroyo Mocho-Stanley Reach Riparian Restoration and Channel Enhancement Project.
- The San Antonio Backup Pipeline project resulted in temporary effects to 0.09 acre of other waters of the U.S. and State, including wetlands.
- The Sunol/Niles Dam Removal Project resulted in permanent effects to 0.5 acre of wetlands. All temporarily disturbed jurisdictional features were restored to pre-project conditions.
- The Alameda Siphons Seismic Reliability Upgrade Project resulted in temporary effects to 0.1 acre of wetlands.

Three ongoing projects have the potential to affect wetlands and waters of the United States.

- The SR 84 Expressway Widening Project is anticipated to result in temporary effects to 0.406 acre of wetlands, 0.539 acre of other waters of the U.S., and 1.168 acre of waters of the State, to be mitigated through restoration to pre-project or enhanced conditions. The project is also anticipated to result in permanent impacts to 0.159 acre of wetlands and 0.122 acre of other waters of the U.S., to be mitigated by enhancement of 0.115 acres of seasonal pond and installation of riparian scrub plantings at Murray Ranch; 0.514 acre of waters of the State, to be mitigated through preservation of 0.86 acre of seasonal wetland at Murray Ranch, and construction of 4,490 linear feet of vegetated, ephemeral roadside drainages along the widened SR 84.
- The Stream Management Master Plan Improvements project includes enhancements to 28 acres of in-stream and off-channel wetlands. Sediment removal projects included in the plan are anticipated to require 52 acres of wetland mitigation.
- The Calaveras Dam Replacement project is anticipated to temporarily affect 0.54 acre and permanently affect 2.8 acres of wetlands. Effects will be mitigated by enhancing wetlands at SFPUC's Koopman Road, South Calaveras, or San Antonio Mitigation Areas.

Three reasonably foreseeable transportation projects have the potential to affect wetlands and waters of the United States.

- The I-680 Sunol Express Lanes – Northbound project is anticipated to result in temporary impacts to 0.07 acre and permanent impacts to 0.01 acre of wetlands. Any effects to jurisdictional water features that cannot be recreated on-site would be mitigated at an off-site mitigation bank at a ratio of 1:1.
- The Niles Canyon Medium-Term Safety Improvements Project is anticipated to result in temporary effects to 0.2671 acre and permanent effects to 0.0341 acre of wetlands and other

waters. Permanent effects will be mitigated at a ratio of 1:1 through purchase of compensatory mitigation bank credits, in-lieu fee arrangements, or on-site restoration.

- The Alameda Creek Bridge Replacement Project is anticipated to temporarily affect up to 1.146 acres and permanently affect 0.0002 acre of wetlands and other waters. Temporary effects will be mitigated through restoring and revegetating wetlands. Permanent effects will be mitigated at a ratio of 1:1 through removal of the concrete weir upstream of the existing bridge, removal of current in-stream bridge columns for the existing bridge, and removal of invasive giant reed and pampas grass populations within the project area.

The past, present, and reasonably foreseeable projects with the potential to affect wetlands and waters of the U.S. include mitigation and restorations that would protect the health of the resource. In addition, the proposed project also includes mitigation of permanent impacts at a 3:1 ratio and temporary impacts at a 1:1 ratio. As a result, impacts to wetlands and waters of the United States as a result of the proposed project are anticipated to be minimal and would not result in incremental effects that would be cumulatively considerable.

2.4.4.5 Threatened and Endangered Species

The proposed project "may affect, and is likely to adversely affect" three threatened and endangered species under the FESA. Therefore, they are considered for cumulatively considerable effects.

California Tiger Salamander

Potential impacts to California tiger salamanders include 38.57 acres of permanent and 30.86 acres of temporary loss of upland dispersal, foraging, and refugia habitat, and habitat fragmentation. In addition, potential impacts include 0.03 acre of permanent and 0.10 acre of temporary impacts to aquatic non-breeding dispersal and foraging habitat, and 0.15 acre of permanent and 0.08 acre of temporary impacts to suitable aquatic breeding habitat. The RSA for the resource includes the BSA and a 1.24-mile buffer (Figure 2.4.4-1). The distance was determined in accordance with the *Interim Guidance on Site Assessment and Field Surveys for Determining Presence or a Negative Finding of the California Tiger Salamander* (USFWS 2003), which recommends reviewing habitat within 1.24 miles of project boundaries based on the observed mobility of the species. Section 2.3.5.2 provides information about the resource health for this species.

Several past, present, or reasonably foreseeable transportation and infrastructure projects in the area had or have the potential to affect California tiger salamanders.

- The Pigeon Pass Realignment project resulted in 68 acres of temporary impacts to California tiger salamander habitat including 0.05 acre of breeding habitat, and permanent impacts to 19.1 acres of habitat including 0.61 acre of breeding habitat. Mitigation included purchase of 80 acres of bank credits for California tiger salamander habitat from Ohlone Conservation Bank. Twenty-five of the 80 credits were California tiger salamander/California red-legged frog multi-species credits.
- The I-680 Freeway Performance Initiative would result in 6.77 acres of temporary impacts and 3.14 acres of permanent impacts to California tiger salamander habitat. Temporary

impacts will be mitigated through on-site restoration at a ratio of 1:1. Permanent impacts will be mitigated at a ratio of 3:1 (9.42 acres) off-site.

- The Vallecitos Channel Repair project resulted in temporary impacts to 2.15 acres of California tiger salamander habitat, which were mitigated through purchase of credits from the Ohlone West Conservation Bank.
- The San Antonio Backup Pipeline project resulted in permanent effects to 0.5 acre of California tiger salamander habitat. Permanent effects were mitigated through habitat enhancements at a nearby SFPUC Bioregional Habitat Restoration site such as Goat Rock or San Antonio Creek.

Two ongoing projects, including the SR 84 Expressway Widening Project and the Calaveras Dam Replacement, have the potential to affect California tiger salamanders.

- The SR 84 Widening Project would result in temporary effects to 9.35 acres and permanent effects to 12.41 acres of California tiger salamander habitat. Temporary effects will be mitigated at a ratio of 1.1:1 (10.29 acres) and permanent effects will be mitigated at a ratio of 3:1 (37.23 acres) through the purchase of credits at Eagle Ridge Preserve North.
- The Calaveras Dam Replacement project is anticipated to temporarily affect 0.11 acre of aquatic habitat and 30.4 acre of upland habitat for California tiger salamander. The project is anticipated to permanently affect 470.6 acres of upland habitat. Effects are planned to be mitigated through enhancing aquatic habitat and managing upland habitat at the SFPUC Koopman Road and South Calaveras Mitigation Areas.

Two proposed projects including the I-680 Sunol Express Lanes – Northbound project and the Sunol Fire Department Project have the potential to affect California tiger salamanders.

- The I-680 Sunol Express Lanes – Northbound Project is anticipated to result in temporary impacts to 12.01 acres and permanent impacts to 12.85 acres of California tiger salamander habitat. Compensatory mitigation is proposed through purchase of 38.55 acres of credits at the Ohlone West Conservation Bank or Ohlone Preservation Conservation Bank.
- The Sunol Fire Department Project is anticipated to permanently impact 2 to 3 acres of habitat. Effects were planned to be mitigated through land set aside with easements or mitigation bank credits.

The past, present, and reasonably foreseeable projects with the potential to affect California tiger salamander include mitigations that would protect the health of the resource. In addition, the proposed project also includes mitigation through on-site restoration of all temporarily impacted areas and off-site compensation for permanent impact areas at a ratio of 3:1. As a result, impacts to California tiger salamander as a result of the proposed project are anticipated to be minimal and would not result in incremental effects that would be cumulatively considerable.

California Red-Legged Frog

Potential project impacts to California red-legged frogs would include 38.57 acres of permanent and 30.86 acres of temporary loss of upland dispersal, foraging, and refugia habitat, and habitat fragmentation. In addition, potential impacts include 0.03 acre of permanent and 0.10 acre of temporary impacts to aquatic non-breeding dispersal and foraging habitat, and 0.15 acre of permanent and 0.08 acre of temporary impacts to suitable aquatic breeding habitat. The project

would also result in 1.28 acres of permanent and 0.19 acre of temporary impacts to California red-legged frog designated critical habitat (Unit ALA-2). The RSA for this resource is the same as the California tiger salamander, since it encompasses the *Revised Guidance on Site Assessments and Field Surveys for the California Red-legged Frog* (USFWS 2005) recommended 1-mile buffer.

Based on research, historical data, and recent trends, the health of the species within the RSA is assumed to be stable since the listing of the CRLF in 1996 (USFWS 2005). While much of Alameda County was rapidly developing and urbanizing during the 1950s and 1960s, land uses in the RSA remained mostly intact and undeveloped due to the ownership of surrounding lands by public resource agencies and the area's designation as watershed lands. Although historic urban development, particularly road and highway construction, has fragmented CRLF and made them more vulnerable to decline, habitat within the RSA has remained mostly intact and undeveloped. The land is predominantly owned by Alameda County, SFPUC, and private property owners. The passage of Alameda County's Measure D, and the City of Pleasanton and Livermore's restrictions on development and preservation of open space, indirectly helps to protect CRLF habitat within the RSA. These policies aim to protect agricultural and open space and prevent overdevelopment in the proposed project corridor. With land use planning designations insulating the majority of the RSA from development, the health of CRLF was determined to be stable.

Several past, present, or reasonably foreseeable transportation and infrastructure projects in the area had or have the potential to affect California red-legged frog.

- The Pigeon Pass Realignment project resulted in permanent effects on 4.4 acres of riparian summer habitat. Mitigation included purchasing credits from Ohlone Conservation Bank. Twenty-five of the 80 credits purchased were California tiger salamander/California red-legged frog multi-species credits.
- The I-680 Freeway Performance Initiative would result in 6.77 acres of temporary impacts and 3.14 acres of permanent impacts to California red-legged frog habitat. Temporary impacts will be mitigated through on-site restoration at a ratio of 1:1. Permanent impacts will be mitigated at a ratio of 3:1 (9.42 acres) off-site.
- The Vallecitos Channel Repair project resulted in temporary effects to 2.19 acres and permanent effects to 0.03 acres of California red-legged frog habitat. Effects were mitigated through purchase of mitigation credits from the Ohlone West Conservation Bank at a ratio of 0.68:1 for temporary effects and 1.7:1 for permanent effects.
- The San Antonio Backup Pipeline project resulted in permanent effects to 0.5 acre of California red-legged frog habitat, which were mitigated through habitat enhancements at a nearby SFPUC Bioregional Habitat Restoration site.

Two ongoing projects including the SR 84 Expressway Widening Project and the Calaveras Dam Replacement have the potential to affect California red-legged frog.

- The SR 84 Expressway Widening Project is anticipated to result in temporary effects to 9.35 acres and permanent effects to 12.42 acres of California red-legged frog habitat. Temporary effects will be mitigated at a ratio of 1.1:1 (10.29 acres) and permanent effects will be

mitigated at a ratio of 3:1 (37.26 acres) through the purchase of credits at Eagle Ridge Preserve North.

- The Calaveras Dam Replacement Project is anticipated to have temporary effect to 66.19 acres and permanent effects to 592.25 acres of California red-legged frog habitat. Effects will be mitigated through enhancing and maintenance of habitat at the Sage Canyon, San Antonio, Koopman Road, Goat Rock, and South Calaveras Mitigation Areas.

Three proposed projects, including the Niles Canyon Medium-Term Safety Improvements Project, I-680 Sunol Express Lanes – Northbound project, and Sunol Fire Department Project, have the potential to affect California red-legged frog.

- The Niles Canyon Medium-Term Safety Improvements Project is anticipated to result in temporary effects (<1 year) to 0.08 acre, prolonged temporary effects (>1 year) to 5.02 acres, and permanent effects to 1.51 acres of California red-legged habitat. Temporary effects and prolonged temporary effects would be mitigated through on-site restoration at ratios of 1:1 and 1.5:1, respectively. Permanent effects would be mitigated through a combination of purchase of multi-species bank credits from Ohlone Preserve Conservation Banks and on-site restoration at a ratio of 3:1.
- The I-680 Sunol Express Lanes – Northbound project is anticipated to result in temporary effects to 5.10 acres and permanent effects to 1.51 acres of California red-legged frog habitat. Temporary effects will be mitigated through on-site restoration at a ratio of 1:1. Permanent effects will be mitigated through a combination of off-site habitat preservation with multi-species bank credits from Ohlone West or Ohlone Preserve Conservation Banks and on-site restoration at a ratio of 3:1.
- The Sunol Fire Department Project would permanently affect 2–3 acres of habitat. Effects would be mitigated through land set aside with easements or mitigation bank credits.

The past, present, and reasonably foreseeable projects with the potential to affect California red-legged frog include mitigations that would protect the health of the resource. In addition, the proposed project also includes mitigation through on-site restoration of all temporarily impacted areas and off-site compensation for permanent impact areas at a ratio of 3:1. As a result, impacts to California red-legged frog or its designated habitat as a result of the proposed project are anticipated to be minimal and would not result in incremental effects that would be cumulatively considerable.

Alameda Whipsnake

Potential impacts include 16.67 acres of permanent and 18.42 acres of temporary impacts on potential dispersal and foraging habitat. No indirect impacts to Alameda whipsnake are expected to occur. No impacts to designated critical habitat Unit 3 are anticipated. The RSA for the resource includes the BSA with a 2-mile buffer. This distance provides a reasonable study boundary that balances the typical species dispersal range of 1,640 feet from scrub habitat with the maximum dispersal range of 4 miles (USFWS 2011b).

Based on research, historical data, and recent trends, the health of the species within the RSA is assumed to be stable since the Alameda whipsnake listing in 1997 (USFWS 2004). While much of Alameda County was rapidly developing and urbanizing during the 1950s and 1960s, land uses in the RSA remained mostly intact and undeveloped due to the ownership of surrounding

lands by public resource agencies and the area's designation as watershed lands. Although historic urban development, particularly road and highway construction, has fragmented Alameda whipsnake and made them more vulnerable to decline, habitat within the RSA has remained mostly intact and undeveloped. The land is predominantly owned by Alameda County, SFPUC, and private property owners. The passage of Alameda County's Measure D, and the City of Pleasanton and Livermore's restrictions on development and preservation of open space, indirectly helps to protect Alameda whipsnake habitat within the RSA. These policies aim to protect agricultural and open space and prevent overdevelopment in the proposed project corridor. With land use planning designations insulating the majority of the RSA from development, the health of Alameda whipsnake was determined to be stable.

Five past, present, or reasonably foreseeable transportation and infrastructure projects in the area had or have the potential to affect Alameda whipsnake.

- The I-680 Freeway Performance Initiative would result in 6.77 acres of temporary impacts and 3.14 acres of permanent impacts to Alameda whipsnake habitat. Temporary impacts will be mitigated through on-site restoration at a ratio of 1:1. Permanent impacts will be mitigated at a ratio of 3:1 (9.42 acres) off-site.
- The San Antonio Backup Pipeline project resulted in permanent effects to 0.5 acre of Alameda whipsnake habitat. Permanent effects were mitigated through habitat enhancements at a nearby SFPUC Bioregional Habitat Restoration site such as Goat Rock or San Antonio Creek.
- The Calaveras Dam Replacement project is anticipated to result in temporarily affected 33.3 acres of Alameda whipsnake habitat, including 7.3 acres of designated critical habitat; and permanently affected 620.2 acres of Alameda whipsnake habitat, including 5.3 acres of designated critical habitat. Effects will be mitigated through establishing habitat at the Sage Canyon, San Antonio, Koopman Road, Goat Rock, and South Calaveras Mitigation Areas.
- The I-680 Sunol Express Lanes – Northbound project would result in 12.06 acres of temporary effects and 12.91 acres of permanent effects to Alameda whipsnake habitat. Mitigation would include purchase of 38.73 acres of credits at the Ohlone West Conservation Bank or Ohlone Preservation Conservation Bank.
- The Niles Canyon Medium-Term Safety Improvements Project is anticipated to result in temporary effects (<1 year) to 0.08 acre, prolonged temporary effects (>1 year) to 5.02 acres, and permanent effects to 1.51 acres of Alameda whipsnake habitat. Temporary effects and prolonged temporary effects would be mitigated through on-site restoration at ratios of 1:1 and 1.5:1, respectively. Permanent effects would be mitigated through a combination of purchase of multi-species bank credits from Ohlone Preserve Conservation Banks and on-site restoration at a ratio of 3:1.

The past, present, and reasonably foreseeable projects with the potential to affect Alameda whipsnake include mitigations that would protect the health of the resource. In addition, the proposed project also includes mitigation of permanent impacts through the purchase of 50.01 acres of habitat from an approved mitigation bank, such as Oursan Ridge Conservation Bank. As a result, impacts to Alameda whipsnake or its designated critical habitat as a result of the proposed project are anticipated to be minimal and would not result in incremental effects that would be cumulatively considerable.

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Chapter 3 California Environmental Quality Act (CEQA) Evaluation

The proposed project is a joint project by Caltrans and Alameda CTC and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both CEQA and NEPA. FHWA's responsibility for environmental review, consultation, and any other actions required by other applicable Federal environmental laws for this project are being, or have been, carried out by Caltrans pursuant to 23 United States Code Section 327 (23 USC 327) and the Memorandum of Understanding dated December 23, 2016 and executed by FHWA and Caltrans. Caltrans is the lead agency under CEQA and NEPA.

One of the primary differences between NEPA and CEQA is the way significance is determined. Under NEPA, significance is used to determine whether an EIS, or a lower level of documentation, will be required. NEPA requires that an EIS 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 CEQA may not be of sufficient magnitude to be determined significant under NEPA. Under NEPA, once a decision is made regarding the need for an EIS, it is the magnitude of the impact that is evaluated and no judgment of its individual significance is deemed important for the text. NEPA does not require that a determination of significant impacts be stated in the environmental documents.

CEQA, 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 EIR must be prepared. Each and every significant effect on the environment must be disclosed in the EIR and mitigated if feasible. In addition, the CEQA Guidelines list a number of "mandatory findings of significance," which also require the preparation of an EIR. There are no types of actions under NEPA that parallel the findings of mandatory significance of CEQA. This chapter discusses the effects of this project and CEQA significance.

3.1 CEQA Environmental Checklist

This checklist identifies physical, biological, social, and economic factors that might be affected by the proposed project. In many cases, background studies performed in connection with the projects will indicate that there are no impacts to a particular resource. A NO IMPACT answer in the last column reflects this determination. The words "significant" and "significance" used throughout the following checklist are related to CEQA, not NEPA, impacts. The questions in this form are intended to encourage the thoughtful assessment of impacts and do not represent thresholds of significance.

Project features, which can include both design elements of the project, and standardized measures that are applied to all or most Caltrans projects such as BMPs and measures included in the Standard Plans and Specifications or as Standard Special Provisions, are considered to be an integral part of the project and have been considered prior to any significance determinations documented below; see Chapters 1 and 2 for a detailed discussion of these features. The annotations to this checklist are summaries of information contained in Chapter 2 in order to provide the reader with the rationale for significance determinations; for a more detailed discussion of the nature and extent of impacts, please see Chapter 2. This checklist incorporates

by reference the information contained in Chapters 1 and 2.

AESTHETICS

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect on a scenic vista?	☐	☐	☒	☐
b) Substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway?	☐	☒	☐	☐
c) Substantially degrade the existing visual character or quality of the site and its surroundings?	☐	☒	☐	☐
d) Create a new source of substantial light or glare which would adversely affect day or nighttime views in the area?	☐	☒	☐	☐

a) Less Than Significant Impact

A scenic vista is typically a rural area containing natural visual elements that can be seen from a distance. In the project area, San Antonio Reservoir, the Wahaub Ridge, Mission Peak, and the Maguire Peaks are all visible from a distance. SR 84, identified by the City of Livermore as a scenic route, has views of low grass-covered hills and long-range views to ridges and peaks. The Build Alternative would primarily change the appearance of the immediate roadway corridor and would have low impacts on scenic vistas (Section 2.1.10.3). While these impacts are considered less than significant, Measures VIS-1 through VIS-5 (Section 2.1.10.4) would further reduce visual effects.

b) Less Than Significant Impact with Mitigation Incorporated

The Build Alternative would not compromise any of the elements required to maintain the Officially Designated State Scenic Highway status of I-680, as described in Section 2.1.10.3. Impacts from project-related lighting and signs would be low to moderate; however, lighting and signs currently exist in the I-680 corridors, and the visual character of the Build Alternative would be compatible with the existing visual character of the corridors. While these impacts are considered less than significant, Measures VIS-1 through VIS-5 (Section 2.1.10.4) would further reduce visual effects.

Tree removal on I-680 will be mitigated through planting at a 3:1 ratio on-site, to the maximum extent possible given space available, for all native species within riparian areas, and for coast live oaks and valley oaks in oak woodlands (including uplands). For other tree species removed in upland areas, Caltrans will provide tree replacement on-site at a minimum 1:1 ratio in the space available (Measure BIO-4, Section 2.3.1.3).

c) Less Than Significant with Mitigation Incorporated

The Build Alternative features would result in moderate to low visual impacts to highway users and highway neighbors, with the exception of the residence on SR 84 on the western end of the proposed southern frontage road. That residence would experience moderate to high visual impacts due to the construction of project features closer to the residence than existing highway features. Implementation of Measures VIS-1, VIS-2, and VIS-5 (Section 2.1.10.4) and BIO-3 and BIO-4 (Section 2.3.1.3) would preserve existing vegetative screening, provide for tree replanting for additional screening, and incorporate aesthetic features that would reduce impacts at this property to less than significant.

d) Less Than Significant Impact with Mitigation Incorporated

The Build Alternative would add lighting, variable toll message signs, and other illuminated signs as described in Section 2.1.10.3. Impacts would range from low to moderate. Implementation of Measure VIS-3 (Section 2.1.10.4) would reduce impacts by providing for adding trees within the Caltrans right-of-way to screen residential views of proposed express lane signs and lights.

AGRICULTURE AND FOREST RESOURCES

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Convert Prime Farmland, Unique Farmland, or Farmland of Statewide Importance (Farmland), as shown on the maps prepared pursuant to the Farmland Mapping and Monitoring Program of the California Resources Agency, to non-agricultural use?	☐	☐	☐	☒
b) Conflict with existing zoning for agricultural use, or a Williamson Act contract?	☐	☐	☒	☐
c) Conflict with existing zoning for, or cause rezoning of, forest land (as defined in Public Resources Code section 12220(g)), timberland (as defined by Public Resources Code section 4526), or timberland zoned Timberland Production (as defined by Government Code section 51104(g))?	☐	☐	☐	☒
d) Result in the loss of forest land or conversion of forest land to non-forest use?	☐	☐	☐	☒
e) Involve other changes in the existing environment which, due to their location or nature, could result in conversion of Farmland, to non-agricultural use or conversion of forest land to non-forest use?	☐	☐	☐	☒

a) No Impact

The Build Alternative would not convert Prime Farmland, Farmland of Statewide Importance, Unique Farmland, or Farmland of Local Importance to non-agricultural use (Section 2.1.5.3).

b) Less Than Significant Impact

The widening of SR 84 to four lanes would require partial permanent property acquisitions, TCEs, and utility easements from six parcels under Williamson Act contracts. However, the Build Alternative would not nullify or require changes to the Williamson Act contracts on the parcels, as discussed in Section 2.1.5.3. Notification of the proposed conversion of lands under Williamson Act contracts will be sent to the Department of Conservation in accordance with California Government Code Section 51291.

c) No Impact

No zoned forest land or timberland exists in the project area.

d) No Impact

No forest land exists in the project area.

e) No Impact

Farmland impacts from the project would be limited to those described above.

AIR QUALITY

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with or obstruct implementation of the applicable air quality plan?	☐	☐	☒	☐
b) Violate any air quality standard or contribute substantially to an existing or projected air quality violation?	☐	☐	☒	☐
c) Result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non- attainment under an applicable federal or state ambient air quality standard (including releasing emissions which exceed quantitative thresholds for ozone precursors)?	☐	☐	☒	☐
d) Expose sensitive receptors to substantial pollutant concentrations?	☐	☐	☒	☐
e) Create objectionable odors affecting a substantial number of people?	☐	☐	☐	☒

a) Less Than Significant Impact

The Build Alternative is included in the regional emissions analysis conducted for the current RTP, *Plan Bay Area 2040* (ABAG and MTC 2017a). The Build Alternative is also included in the 2017 TIP (MTC 2016). The project's design concept, scope, and open-to-traffic date assumptions are generally consistent with the RTP and TIP. The Build Alternative would not interfere with the timely implementation of the transportation plans.

b) Less Than Significant Impact

The Build Alternative would not exceed Federal or State standards for CO, interfere with the control measures described in the 2017 CAP to plan for and achieve compliance with the Federal and State O_3 standards, increase MSAT emissions compared to the No Build Alternative, or exceed the BAAQMD's recommended thresholds for construction emissions (Section 2.2.6.3). Therefore, the Build Alternative would not cause or contribute to any state or federal air quality violations for criteria air pollutants.

c) Less Than Significant Impact

The project region is in nonattainment of the Federal 8-hour O_3 standard and 24-hour $PM_{2.5}$ standard; and the State 1-hour and 8-hour O_3 standards, annual average and 24-hour PM_{10} standards, and annual average $PM_{2.5}$ standard (Section 2.2.6.2).

O_3 is considered on a regionwide basis, and project-level hot spot analysis for PM10 requirements do not currently exist. The project is included in regional transportation planning, which has been found to conform (Section 2.2.6.3). The project is not expected to result in a cumulatively considerable net increase in O_3 or PM_{10}.

In April 2017, the Air Quality Conformity Task Force determined that the Build Alternative is not a Project of Air Quality Concern as defined in 40 CFR Part 93, and a detailed $PM_{2.5}$ hot-spot analysis is not required (Section 2.2.6.3). The Build Alternative would not result in a cumulatively considerable net increase of $PM_{2.5}$.

In addition, the temporary construction emissions from the Build Alternative would not exceed the recommended BAAQMD thresholds.

d) Less Than Significant Impact

Few residences are within 500 feet of SR 84 in the project area. No schools, hospitals, or senior facilities are in the project vicinity. The Build Alternative would not exceed Federal or State standards for CO, increase MSAT emissions compared to the No Build Alternative, or exceed the BAAQMD's recommended thresholds for construction emissions. The Build Alternative would not expose sensitive receptors to substantial pollutant concentrations. Standard measures to minimize construction-related air quality effects are included in Section 2.2.6.3.

e) No Impact

SR 84 and I-680 are existing roadways, and the project would not introduce odors that are not already associated with existing traffic.

BIOLOGICAL RESOURCES

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Have a substantial adverse effect, either directly or through habitat modifications, on any species identified as a candidate, sensitive, or special status species in local or regional plans, policies, or regulations, or by the California Department of Fish and Wildlife or U.S. Fish and Wildlife Service?	☐	☒	☐	☐
b) Have a substantial adverse effect on any riparian habitat or other sensitive natural community identified in local or regional plans, policies, regulations or by the California Department of Fish and Wildlife or US Fish and Wildlife Service?	☐	☒	☐	☐
c) Have a substantial adverse effect on federally protected wetlands as defined by Section 404 of the Clean Water Act (including, but not limited to, marsh, vernal pool, coastal, etc.) through direct removal, filling, hydrological interruption, or other means?	☐	☒	☐	☐
d) Interfere substantially with the movement of any native resident or migratory fish or wildlife species or with established native resident or migratory wildlife corridors, or impede the use of native wildlife nursery sites?	☐	☐	☒	☐
e) Conflict with any local policies or ordinances protecting biological resources, such as a tree preservation policy or ordinance?	☐	☒	☐	☐
f) Conflict with the provisions of an adopted Habitat Conservation Plan, Natural Community Conservation Plan, or other approved local, regional, or state habitat conservation plan?	☐	☐	☐	☒

a) Less Than Significant with Mitigation Incorporated

The Build Alternative has the potential to result in direct and indirect impacts on special-status plant and animal species, including CESA and FESA listed species, and their

habitats. The species and impacts are described in detail in Sections 2.3.3 through 2.3.5. A combination of project design features such as wildlife crossing structures; measures to avoid or minimize erosion, sedimentation, or pollution (Measures BIO-1 in Section 2.3.1.3 and BIO-6 in Section 2.3.2.4); and the species-specific measures outlined in Sections 2.3.3 through 2.3.5 would reduce impacts.

b) Less Than Significant with Mitigation Incorporated

The Build Alternative would affect riparian habitat along Vallecitos Creek as well as other sensitive natural communities (Section 2.3.1). Implementation of Measure BIO-1 would avoid or minimize construction discharges and erosion and provide for restoration of temporarily disturbed areas, and Measure BIO-2 would provide compensatory mitigation for impacts to sensitive natural communities (Section 2.3.1.3).

c) Less Than Significant with Mitigation Incorporated

The Build Alternative has been refined to minimize impacts to jurisdictional wetlands and potentially jurisdictional other waters of the U.S., as described in Section 1.4.7.2 (under "Vallecitos Creek Avoidance Options"); however, permanent and temporary impacts to wetlands and other waters of the U.S. are anticipated. Measures to avoid or minimize storm water impacts and construct-related discharges (Measure BIO-6 in Section 2.3.2.4) and provide mitigation for permanent impacts at a minimum 3:1 ratio and for temporary impacts at a minimum 1:1 ratio (Measure BIO-7 in 2.3.2.5) would reduce impacts to less than significant.

d) Less Than Significant Impact

The Build Alternative includes features that would maintain wildlife connectivity across SR 84 and reduce wildlife-vehicle collisions (Section 1.4.4, under "Wildlife Movement"). As a result, impacts to native resident or migratory wildlife movement would be less than significant. Measure BIO-5, which addresses light, glare, and construction noise and vibration impacts, would further reduce impacts.

e) Less Than Significant with Mitigation Incorporated

Trees are protected under the Alameda County Tree Ordinance (Title 12, Chapter 12.11) and California Senate Resolution No. 17. Although local ordinances do not apply to the State right-of-way, Measures BIO-3 and BIO-4 (Section 2.3.1.3), which propose to protect or replant oaks and other trees, are consistent with the goal of tree preservation.

f) No Impact

No habitat conservation plans or natural community conservation plans are currently in effect for the project area (Section 2.1.2.2, Table 2.1.2-1).

CULTURAL RESOURCES

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Cause a substantial adverse change in the significance of a historical resource as defined in §15064.5?	☐	☐	☒	☐
b) Cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5?	☐	☐	☒	☐
c) Directly or indirectly destroy a unique paleontological resource or site or unique geologic feature?	☐	☐	☒	☐
d) Disturb any human remains, including those interred outside of dedicated cemeteries?	☐	☐	☒	☐

a) Less Than Significant Impact

The Build Alternative is not expected to cause an adverse change to a historic resource.

b) Less Than Significant Impact

The Build Alternative would be constructed on portions of the cultural resources presumed eligible for listing in the NRHP and CRHR. In accordance with Measure CUL-1, a Post-Review Discovery and Monitoring Plan will be implemented during construction and the project will result in no substantial adverse change to cultural resources.

c) Less Than Significant Impact

The Build Alternative would encounter geologic units that are known to contain paleontological resources. Implementation of Measure PAL-1 (Section 2.2.4.4) would minimize potential effects on paleontological resources, if present.

d) Less Than Significant Impact

See item b, above.

GEOLOGY AND SOILS

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Expose people or structures to potential substantial adverse effects, including the risk of loss, injury, or death involving:	☐	☐	☒	☐
i) Rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map issued by the State Geologist for the area or based on other substantial evidence of a known fault? Refer to Division of Mines and Geology Special Publication 42?	☐	☐	☒	☐
ii) Strong seismic ground shaking?	☐	☐	☒	☐
iii) Seismic-related ground failure, including liquefaction?	☐	☐	☒	☐
iv) Landslides?	☐	☐	☒	☐
b) Result in substantial soil erosion or the loss of topsoil?	☐	☐	☒	☐
c) Be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse?	☐	☐	☒	☐
d) Be located on expansive soil, as defined in Table 18-1-B of the Uniform Building Code (1994), creating substantial risks to life or property?	☐	☐	☒	☐
e) Have soils incapable of adequately supporting the use of septic tanks or alternative waste water disposal systems where sewers are not available for the disposal of waste water?	☐	☐	☐	☒

a) Less Than Significant Impact

i. Less Than Significant Impact

The Build Alternative corridor crosses three active strands of the Calaveras Fault in the vicinity of I-680, which are within the fault's Alquist-Priolo Earthquake Fault Zone. The Verona Fault crosses SR 84 within the project limits between approximately Vallecitos Atomic Laboratory Road and the western end of Pigeon Pass, and a Special Studies Zone for the Verona Fault extends to the north edge of SR 84. Measure GEO-1 (Section 2.2.3.4) would limit the potential for people or structures to be exposed to substantial adverse effects from surface fault ruptures and earthquake shaking.

ii. Less Than Significant Impact

Strong ground shaking is anticipated to occur within the project area as a result of any seismic event occurring on nearby active faults. Measure GEO-1 (Section 2.2.3.4) would limit the potential for people or structures to be exposed to substantial adverse effects from surface fault ruptures and earthquake shaking.

iii. Less Than Significant Impact

Project features with the highest potential to be affected are near the existing and former stream channels of Vallecitos Creek and its tributaries. Potentially liquefiable soils underlie the Calaveras Road Separation bridge where southbound I-680 crosses over Paloma Way, the Scott's Corner Separation bridge over the I-680 southbound on-ramp connector from SR 84, and the Koopman Road Undercrossing bridge on southbound I-680. Measure GEO-2 (Section 2.2.3.4) would limit the potential for people or structures to be exposed to substantial adverse effects from liquefaction.

iv. Less Than Significant Impact

The potential for seismically induced landslides exists on steep slopes within Livermore Gravels deposits along SR 84 and I-680 in the vicinity of the interchange, along I-680 north and south of the interchange, and along SR 84 on slopes east of the interchange, extending to the eastern project limit on SR 84. Measure GEO-2 (Section 2.2.3.4) would limit the potential for people or structures to be exposed to substantial adverse effects from landslides.

b) Less Than Significant Impact

The project area has the potential for moderate to very severe erosion hazards, especially on steep slopes in the vicinity of the proposed flyover ramp from Calaveras Road to northbound I-680 and the Koopman Road Undercrossing bridge, and beneath several proposed retaining wall locations. Retaining wall locations near Vallecitos Creek are potentially susceptible to scour. Measure GEO-2 (Section 2.2.3.4) would limit the potential for people or structures to be exposed to substantial adverse effects from erosion and scour.

c) Less Than Significant Impact

Project elements that alter the existing slopes by grading, either by cutting slopes or by placing fill, would change the slope stability characteristics, potentially undercutting or loading unstable or marginally stable existing slopes (Section 2.2.3.2). Measure GEO-2 (Section 2.2.3.4) would provide for investigations to address landslides and other geologic hazards.

d) Less Than Significant Impact

Soils with moderate to high expansive potential are mapped near the SR 84/I-680 interchange and the GE-Hitachi Vallecitos Nuclear Center (Positas gravelly loam), and near the Koopman Road undercrossing and south of the Calaveras Road Separation

bridge (Zamora silt loam). Soils with high expansive potential are mapped on SR 84 southeast of Ruby Hill Drive (Diablo clay). Measure GEO-2 (Section 2.2.3.4) would limit the potential for people or structures to be exposed to substantial adverse effects from expansive soils.

e) No Impact

No septic tanks or alternative waste water disposal systems would have to be installed for the project.

GREENHOUSE GAS EMISSIONS

<table>
<tr><th>Would the project:</th><th>Significant and Unavoidable Impact</th><th>Less Than Significant with Mitigation Incorporated</th><th>Less Than Significant Impact</th><th>No Impact</th></tr>
<tr><td>a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment?</td><td colspan="4" rowspan="2">Caltrans has used the best available information based to the extent possible on scientific and factual information, to describe, calculate, or estimate the amount of greenhouse gas emissions that may occur related to this project. The analysis included in the climate change section of this document provides the public and decision-makers as much information about the project as possible. It is Caltrans' determination that in the absence of statewide-adopted thresholds or GHG emissions limits, it is too speculative to make a significance determination regarding an individual project's direct and indirect impacts with respect to global climate change. Caltrans remains committed to implementing measures to reduce the potential effects of the project. These measures are outlined in the climate change section that follows the CEQA checklist and related discussions.</td></tr>
<tr><td>b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?</td></tr>
</table>

HAZARDS AND HAZARDOUS MATERIALS

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials?	☐	☐	☒	☐
b) Create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment?	☐	☐	☒	☐
c) Emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school?	☐	☐	☐	☒
d) Be located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code Section 65962.5 and, as a result, would it create a significant hazard to the public or the environment?	☐	☐	☐	☒
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project result in a safety hazard for people residing or working in the project area?	☐	☐	☐	☒
g) Impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan?	☐	☐	☐	☒
h) Expose people or structures to a significant risk of loss, injury or death involving wildland fires, including where wildlands are adjacent to urbanized areas or where residences are intermixed with wildlands?	☐	☐	☐	☒

a) Less Than Significant Impact

The Build Alternative would involve the routine transport, use, and disposal of hazardous materials through activities such as construction and truck traffic. Adherence to federal state regulations on handling of the hazardous materials reduces the risk of exposure to hazardous materials, as well as accidental hazardous materials releases.

b) Less Than Significant Impact

The Build Alternative could disturb existing hazardous materials on and/or near the project site in soil, groundwater, and building materials. Hazardous materials that could be encountered during project construction and maintenance include ADL and pesticide residues in shallow soils and petroleum hydrocarbons in groundwater (Section 2.2.5.3). Implementation of Measure HAZ-1 (Section 2.2.5.4) would provide for investigation of potential hazardous materials in soil, groundwater, and building materials prior to construction, and for site-specific control measures to be incorporated into the final project design.

c) No Impact

No schools are located within one-quarter mile of the Build Alternative location.

d) No Impact

The Build Alternative is not located on a listed hazardous materials site compiled pursuant to Government Code Section 65962.5 (Baseline 206).

e) No Impact

The Build Alternative is not located within 2 miles of a public-use airport.

f) No Impact

There are no private airstrips in the project vicinity.

g) No Impact

The Build Alternative would alleviate traffic congestion and provide more efficient use of the existing highways in the project area. Therefore, the Build Alternative would have no impact related to the impairment or interference with an adopted emergency operation/evacuation plan.

h) No Impact

The Build Alternative is situated in an area with moderate to high fire hazard severity, according to California Department of Forestry and Fire Protection. However, since the Build Alternative would not exacerbate the existing fire hazard condition, the project would not increase the risks of exposure to fire hazards for the surrounding community.

HYDROLOGY AND WATER QUALITY

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Violate any water quality standards or waste discharge requirements?	☐	☐	☒	☐
b) Substantially deplete groundwater supplies or interfere substantially with groundwater recharge such that there would be a net deficit in aquifer volume or a lowering of the local groundwater table level (e.g., the production rate of pre-existing nearby wells would drop to a level which would not support existing land uses or planned uses for which permits have been granted)?	☐	☐	☒	☐
c) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, in a manner which would result in substantial erosion or siltation on- or off-site?	☐	☐	☒	☐
d) Substantially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river, or substantially increase the rate or amount of surface runoff in a manner which would result in flooding on- or off-site?	☐	☐	☒	☐
e) Create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff?	☐	☐	☒	☐
f) Otherwise substantially degrade water quality?	☐	☐	☐	☒
g) Place housing within a 100-year flood hazard area as mapped on a federal Flood Hazard Boundary or Flood Insurance Rate Map or other flood hazard delineation map?	☐	☐	☐	☒
h) Place within a 100-year flood hazard area structures which would impede or redirect flood flows?	☐	☐	☒	☐
i) Expose people or structures to a significant risk of loss, injury or death involving flooding, including flooding as	☐	☐	☒	☐

a result of the failure of a levee or dam?				
j) Inundation by seiche, tsunami, or mudflow	☐	☐	☒	☐

a) Less Than Significant Impact

Erosion from disturbed soil areas during project construction has the potential to cause sediment-laden runoff to enter storm drainage facilities and increase the turbidity and decrease the clarity and beneficial uses of receiving water bodies. Activities such as fueling and maintenance of construction equipment in the project area include the risk of accidental spills or releases of fuels, oils, or other potentially toxic materials. An accidental release of these materials could pose a threat to water quality if contaminants enter storm drains, open channels, or surface water receiving bodies. Measures WQ-1 (Section 2.2.2.4) and BIO-6 (Section 2.3.2.4) would minimize impacts to water quality during project construction.

b) Less Than Significant Impact

The Build Alternative would add impervious area and reduce the available unpaved area that previously allowed runoff to infiltrate into the native soils. The reduction of runoff infiltrating through native soils has the potential to result in loss in volume or amount of water that previously recharged localized aquifers and reduce regional groundwater volumes. The additional impervious area is minimal in comparison with the total area of the watershed. Measures WQ-1 and WQ-2 (Section 2.2.2.4) would avoid or minimize potential groundwater impacts.

c) Less Than Significant Impact

The Build Alternative roadway widening and ramp modifications would result in the fill or removal of existing ditches, modification or relocation of existing longitudinal drainage structures, extension or relocation of existing cross culverts, and construction of new drainage structures. The goal of the project drainage design would be to maintain existing drainage patterns. Measure WQ-2 (Section 2.2.2.4) would minimize impacts to water quality from changes to existing drainage structures.

d) Less Than Significant Impact

The project would increase the impervious area within the project limits, resulting in a total of 25.9 acres of added impervious area within the Caltrans right-of-way and 4.3 acres of added impervious area outside of the Caltrans right-of-way. Of this amount, 0.32 acre of added impervious area would be in the Zone AE floodway, and 0.17 acre would be in Zone AE. The amount of added impervious area below the base flood elevation is minimal, and the project is not anticipated to pose a significant floodplain encroachment (Section 2.2.1.3).

e) Less Than Significant Impact

Stormwater runoff volumes from the project are expected to increase due to the increase in impervious surfaces. Potential stormwater treatment BMPs identified for the Build

Alternative would treat 100 percent of combined added and reworked impervious areas (Section 2.2.2.3).

f) No Impact

See items a–e.

g) No Impact

The Build Alternative does not include housing.

h) Less Than Significant Impact

Roadway widening associated with the Build Alternative would partially encroach into an existing drainage ditch within Zone AE floodway, Zone AE, and Zone X (shaded) areas. However, the existing roadway is above elevation 250 feet, and most of the proposed widening is in areas already above the base flood elevation of 247 feet. The project would not result in a loss in flood storage because the drainage ditch would be increased in size to accommodate the existing flow and additional flow from the roadway widening. Build Alternative features would not impede or redirect flood flows (Section 2.2.1.3).

i) Less Than Significant Impact

The Build Alternative would be constructed in areas with existing transportation facilities and would not increase the exposure of people or structures to a significant risk of loss, injury or death involving flooding.

j) Less Than Significant Impact

San Antonio Reservoir is approximately 1.5 miles south of the project corridor on SR 84. In the event of a large earthquake in the project area, a seiche within San Antonio Reservoir could send a small fraction of reservoir water into Vallecitos Creek (Section 2.2.3.2) via existing surface streams. However, the Build Alternative would not affect the potential for a seiche event in the project area.

LAND USE AND PLANNING

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Physically divide an established community?	☐	☐	☐	☒
b)Conflict with any applicable land use plan, policy, or regulation of an agency with jurisdiction over the project (including, but not limited to the general plan, specific plan, local coastal program, or zoning ordinance) adopted for the purpose of avoiding or mitigating an environmental effect?	☐	☐	☒	☐
c) Conflict with any applicable habitat conservation plan or natural community conservation plan?	☐	☐	☐	☒

a) No Impact

The Build Alternative would not change any existing community boundaries or physically divide an established community (Section 2.1.6.3).

b) Less Than Significant Impact

The Build Alternative would be generally consistent with applicable regional and local plans (Section 2.1.2.2, Table 2.1.2-1).

c) No Impact

No habitat conservation plans or natural community conservation plans are currently in effect for the project area (Section 2.1.2.2, Table 2.1.2-1).

MINERAL RESOURCES

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Result in the loss of availability of a known mineral resource that would be of value to the region and the residents of the state?	☐	☐	☐	☒
b) Result in the loss of availability of a locally-important mineral resource recovery site delineated on a local general plan, specific plan or other land use plan?	☐	☐	☐	☒

a, b) No Impact

The Build Alternative would not affect mineral resources.

NOISE

Would the project result in:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exposure of persons to or generation of noise levels in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies?	☐	☐	☒	☐
b) Exposure of persons to or generation of excessive groundborne vibration or groundborne noise levels?	☐	☐	☐	☒
c) A substantial permanent increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
d) A substantial temporary or periodic increase in ambient noise levels in the project vicinity above levels existing without the project?	☐	☐	☒	☐
e) For a project located within an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒
f) For a project within the vicinity of a private airstrip, would the project expose people residing or working in the project area to excessive noise levels?	☐	☐	☐	☒

a) Less Than Significant Impact

Predicted future noise levels at two receivers along I-680 would approach or exceed the NAC of 67 dBA with both the No Build and Build alternatives, and noise abatement was considered in accordance with NEPA and 23 CFR 772 (Section 2.2.7.4). With the Build Alternative, no other receiver locations would have future noise levels that approach or exceed the NAC (Section 2.2.7.3).

b) No Impact

The project would not generate excessive groundborne vibrations or noise levels.

c) Less Than Significant Impact

According to the TNAP (Caltrans 2011), a noise impact occurs when the predicted future noise level with the project substantially exceeds the existing noise level (defined as a 12 dBA or more increase). The Build Alternative is anticipated to increase future noise levels over the existing condition by 0 to 5 dBA (Table 2.2.7-2, Section 2.2.7.3).

Although a 5 dBA noise increase would be distinctly noticeable (Wilson Ihrig 2017), the increase would not be considered substantial under CEQA.

d) Less Than Significant Impact

Temporary daytime noise increases for the homes closest to the major areas of road construction work on SR 84 could reach 14 dBA (Section 2.2.7.3). If nighttime pile driving must be conducted, noise could reach maximum noise levels of 75 to 79 dBA at two homes. Implementation of Caltrans Standard Specifications Section 14.8-02 and Measure NOI-1 (Section 2.2.7.4) would reduce construction-related noise impacts.

e) No Impact

The Build Alternative is not within an airport land use plan or within two miles of a public airport or public use airport.

f) No Impact

No private airstrips are in the project vicinity.

POPULATION AND HOUSING

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Induce substantial population growth in an area, either directly (for example, by proposing new homes and businesses) or indirectly (for example, through extension of roads or other infrastructure)?	☐	☐	☒	☐
b) Displace substantial numbers of existing housing, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒
c) Displace substantial numbers of people, necessitating the construction of replacement housing elsewhere?	☐	☐	☐	☒

a) Less Than Significant Impact

Although the Build Alternative would increase roadway capacity and change existing property access in the project area, it is not anticipated to induce population growth (Section 2.1.4.3).

b) No Impact

The Build Alternative would not displace any existing housing.

c) No Impact

The Build Alternative would not displace people.

PUBLIC SERVICES

a) Would the project result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times or other performance objectives for any of the public services:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☐	☒
Parks?	☐	☐	☒	☐
Other public facilities?	☐	☐	☐	☒

a) See below.

Fire Protection – Less Than Significant Impact

Temporary lane closures on SR 84 and full closures of SR 84/I-680 interchange ramps and the Koopman Road and Calaveras Road/Paloma Way undercrossings of I-680 would be required, as described in Section 1.4.4. These actions could result in short-term, temporary impacts to fire responders, which would be minimized by the implementation of Measure TR-1 (Section 2.1.6.4).

Police Protection – Less Than Significant Impact

Temporary lane closures on SR 84 and full closures of SR 84/I-680 interchange ramps and the Koopman Road and Calaveras Road/Paloma Way undercrossings of I-680 would be required, as described in Section 1.4.4. These actions could result in short-term, temporary impacts to fire responders, which would be minimized by the implementation of Measure TR-1 (Section 2.1.6.4).

Schools – No Impact

The Build Alternative would not affect schools.

Parks – Less Than Significant Impact

The Build Alternative would not directly or indirectly affect a publicly owned park or recreation facility. Public access to the privately owned Sunol Paintball Outdoor Park would be temporarily affected during project construction, and permanently modified by the project (Section 2.1.3.2). The change in access would increase safety for visitors turning onto and off of SR 84 and would be a less than significant impact.

Other Public Facilities – No Impact

RECREATION –

	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Would the project increase the use of existing neighborhood and regional parks or other recreational facilities such that substantial physical deterioration of the facility would occur or be accelerated?	☐	☐	☐	☒
b) Does the project include recreational facilities or require the construction or expansion of recreational facilities which might have an adverse physical effect on the environment?	☐	☐	☐	☒

a) No Impact

The Build Alternative would not trigger increased use of recreation facilities.

b) No Impact

The Build Alternative would not include or require the construction or expansion of recreation facilities.

TRANSPORTATION/TRAFFIC

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Conflict with an applicable plan, ordinance or policy establishing measures of effectiveness for the performance of the circulation system, taking into account all modes of transportation including mass transit and non-motorized travel and relevant components of the circulation system, including but not limited to intersections, streets, highways and freeways, pedestrian and bicycle paths, and mass transit?	☐	☐	☒	☐
b) Conflict with an applicable congestion management program, including, but not limited to level of service standards and travel demand measures, or other standards established by the county congestion management agency for designated roads or highways?	☐	☐	☒	☐
c) Result in a change in air traffic patterns, including either an increase in traffic levels or a change in location that results in substantial safety risks?	☐	☐	☐	☒
d) Substantially increase hazards due to a design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment)?	☐	☐	☒	☐
e) Result in inadequate emergency access?	☐	☐	☒	☐
f) Conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decrease the performance or safety of such facilities?	☐	☐	☒	☐

a) Less Than Significant Impact

The Build Alternative would be consistent with applicable plans, ordinances, and policies regarding the circulation system, including mass transit and non-motorized travel (Section 2.1.2.2, Table 2.1.2-1).

The LOS standard that applies to SR 84 and I-680 in the project area is LOS E (Section 2.1.9.2). In 2025, all intersections in the traffic study area would operate at LOS E or better in the AM and PM peak periods with the Build Alternative. In 2045, all but two intersections would operate at LOS E in the AM and PM peak periods with the Build Alternative. For both study years, the Build Alternative would have better intersection operations than the No Build Alternative (Section 2.1.9.3).

California SB 743 was signed in 2013, requiring a move away from vehicle delay and LOS within CEQA transportation analyses. SB 743 also requires the Governor's Office of Planning and Research (OPR) to identify new metrics for identifying and mitigating transportation impacts. OPR identified Vehicle Miles Traveled (VMT) as the new metric for transportation analysis. It is anticipated that regulatory language changes to CEQA will be adopted in late 2017 by the Natural Resources Agency and that statewide implementation will occur in 2019 (Caltrans 2017b). Projected VMT with the Build Alternative is presented in Sections 2.1.9 and 2.2.8 for informational purposes.

b) Less Than Significant Impact

Alameda CTC has adopted LOS E for Congestion Management Program roadway segments, including SR 84 and I-680 (Section 2.1.9.2). See item "a" above regarding LOS.

c) No Impact

The Build Alternative would not change air traffic patterns.

d) Less Than Significant Impact

The Build Alternative would reduce hazards due to existing design features (Section 1.3.2.2).

e) Less Than Significant Impact

Temporary lane closures on SR 84 and full closures of SR 84/I-680 interchange ramps and the Koopman Road and Calaveras Road/Paloma Way undercrossings of I-680 would be required, as described in Section 1.4.4. These actions could result in short-term, temporary impacts to emergency access, which would be minimized by the implementation of Measure TR-1 (Section 2.1.6.4).

f) Less Than Significant Impact

The Build Alternative would not conflict with adopted policies, plans or programs regarding public transit, bicycle, or pedestrian facilities, or decrease safety or performance (Section 2.1.2.2, Table 2.1.2-1).

TRIBAL CULTURAL RESOURCES

Would the project cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074 as either a site, feature, place, cultural landscape that is geographically defined in terms of the size and scope of the landscape, sacred place, or object with cultural value to a California Native American tribe, and that is:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Listed or eligible for listing in the California Register of Historical Resources, or in a local register of historical resources as defined in Public Resources Code section 5020.1(k), or	☐	☐	☐	☒
b) A resource determined by the lead agency, in its discretion and supported by substantial evidence, to be significant pursuant to criteria set forth in subdivision (c) of Public Resources Code Section 5024.1. In applying the criteria set forth in subdivision (c) of Public Resource Code Section 5024.1, the lead agency shall consider the significance of the resource to a California Native American tribe.	☐	☐	☐	☒

a, b) No Impact

The Build Alternative would not affect a tribal cultural resource.

UTILITIES AND SERVICE SYSTEMS

Would the project:	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Exceed wastewater treatment requirements of the applicable Regional Water Quality Control Board?	☐	☐	☐	☒
b) Require or result in the construction of new water or wastewater treatment facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☐	☒
c) Require or result in the construction of new storm water drainage facilities or expansion of existing facilities, the construction of which could cause significant environmental effects?	☐	☐	☒	☐
d) Have sufficient water supplies available to serve the project from existing entitlements and resources, or are new or expanded entitlements needed?	☐	☐	☐	☒
e) Result in a determination by the wastewater treatment provider which serves or may serve the project that it has adequate capacity to serve the project's projected demand in addition to the provider's existing commitments?	☐	☐	☐	☒
f) Be served by a landfill with sufficient permitted capacity to accommodate the project's solid waste disposal needs?	☐	☐	☐	☒
g) Comply with federal, state, and local statutes and regulations related to solid waste?	☐	☐	☐	☒

a) No Impact

The Build Alternative would comply with all requirements of the Caltrans statewide NPDES permit, including wastewater treatment requirements (Wreco 2017c).

b) No Impact

The Build Alternative would not result in increased demands for public utilities in the form of new or expanded water or wastewater treatment facilities.

c) Less Than Significant Impact

Stormwater runoff volumes from the Build Alternative are expected to increase due to the increase in impervious surfaces. However, the project includes stormwater treatment

measures, and 100 percent treatment is proposed for the Build Alternative (Section 2.2.2.3).

d) No Impact

The Build Alternative would not require new or expanded water entitlements.

e) No Impact

The Build Alternative would not affect public utilities for wastewater treatment.

f) No Impact

Operation of the Build Alternative would not require solid waste disposal. Construction waste would be disposed at a certified facility based on the waste type, in accordance with Measure HAZ-1 (Section 2.2.5.4); however, the Build Alternative would not affect landfill capacity.

g) No Impact

The Build Alternative would comply with statutes and regulations related to solid waste.

MANDATORY FINDINGS OF SIGNIFICANCE

	Significant and Unavoidable Impact	Less Than Significant with Mitigation Incorporated	Less Than Significant Impact	No Impact
a) Does the project have the potential to degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory?	☐	☒	☐	☐
b) Does the project have impacts that are individually limited, but cumulatively considerable? ("Cumulatively considerable" means that the incremental effects of a project are considerable when viewed in connection with the effects of past projects, the effects of other current projects, and the effects of probable future projects)?	☐	☐	☒	☐
c) Does the project have environmental effects which will cause substantial adverse effects on human beings, either directly or indirectly?	☐	☒	☐	☐

a) Less Than Significant with Mitigation Incorporated

The potential environmental impacts associated with project construction and operation, and the measures proposed to mitigate those impacts, are disclosed in this EIR and summarized in the checklist discussions above. Mitigation has been included to reduce impacts to a less-than-significant level. The proposed measures include those for resources such as special-status wildlife species and their habitats, riparian communities, wetlands, trees, and archaeological and paleontological resources. With implementation of the proposed mitigation measures, the project would not degrade the quality of the environment, substantially reduce the habitat of a fish or wildlife species, cause a fish or wildlife population to drop below self-sustaining levels, threaten to eliminate a plant or animal community, substantially reduce the number or restrict the range of a rare or endangered plant or animal or eliminate important examples of the major periods of California history or prehistory.

b) Less Than Significant Impact

The project has been evaluated for cumulative impacts as described in Section 2.4. The project would not result in incremental effects to any resource that would be cumulatively considerable. The project would not contribute to cumulatively considerable impacts.

c) Less Than Significant with Mitigation Incorporated

While human beings could be affected by a variety of the impacts described above, the project would not have substantial adverse effects on human beings, either directly or indirectly. Mitigation has been included to reduce impacts to a less-than-significant level. The proposed measures include those for resources such as scenic resources, visual character and quality, day and nighttime views, human remains, and tribal cultural resources, as well as to address the potential for upset and accident conditions involving the release of hazardous materials. With implementation of the proposed mitigation measures, the project would not have substantially adverse direct or indirect impacts on human beings.

3.2 Climate Change (CEQA)

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 GHG 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 (IPCC) by the United Nations and World Meteorological Organization in 1988 has led to increased efforts devoted to GHG emissions reduction and climate change research and policy. These efforts are primarily concerned with the emissions of GHGs generated by human activity including carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), tetrafluoromethane, hexafluoroethane, sulfur hexafluoride (SF_6), HFC-23 (fluoroform), HFC-134a (s, s, s, 2-tetrafluoroethane), and HFC-152a (difluoroethane).

In the U.S., the main source of GHG emissions is electricity generation, followed by transportation.[32] In California, however, transportation sources (including passenger cars, light duty trucks, other trucks, buses, and motorcycles) are the largest contributors of GHG emissions.[33] The dominant GHG emitted is CO_2, mostly from fossil fuel combustion.

Two terms are typically used when discussing how we address the impacts of climate change: “greenhouse gas mitigation” and “adaptation.” "Greenhouse gas mitigation" is a term for reducing GHG emissions to reduce or "mitigate" the impacts of climate change. “Adaptation" refers to planning for and responding to impacts resulting from climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels).

3.2.1.1 Regulatory Setting

This section outlines federal and state efforts to comprehensively reduce GHG emissions from transportation sources.

Federal

To date, no national standards have been established for nationwide mobile-source GHG reduction targets, nor have any regulations or legislation been enacted specifically to address climate change and GHG emissions reduction at the project level.

NEPA (42 USC Part 4332) requires federal agencies to assess the environmental effects of their proposed actions prior to making a decision on the action or project.

The FHWA recognizes the threats that extreme weather, sea-level change, and other changes in environmental conditions pose to valuable transportation infrastructure and those who depend on it. FHWA therefore supports a sustainability approach that assesses vulnerability to climate risks and incorporates resilience into planning, asset management, project development and design, and operations and maintenance practices.[34] This approach encourages planning for sustainable highways by addressing climate risks while balancing environmental, economic, and social

[32] https://www.epa.gov/ghgemissions/us-greenhouse-gas-inventory-report-1990-2014
[33] https://www.arb.ca.gov/cc/inventory/data/data.htm
[34] https://www.fhwa.dot.gov/environment/sustainability/resilience/

values—"the triple bottom line of sustainability."[35] Program and project elements that foster sustainability and resilience also support economic vitality and global efficiency, increase safety and mobility, enhance the environment, promote energy conservation, and improve the quality of life. Addressing these factors 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.

Various efforts have been promulgated at the federal level to improve fuel economy and energy efficiency to address climate change and its associated effects.

The Energy Policy Act of 1992 (EPACT92, 102nd Congress H.R.776.ENR): With this act, Congress set goals, created mandates, and amended utility laws to increase clean energy use and improve overall energy efficiency in the United States. EPACT92 consists of 27 titles detailing various measures designed to lessen the nation's dependence on imported energy, provide incentives for clean and renewable energy, and promote energy conservation in buildings. Title III of EPACT92 addresses alternative fuels. It gave the U.S. Department of Energy administrative power to regulate the minimum number of light-duty alternative fuel vehicles required in certain federal fleets beginning in fiscal year 1993. The primary goal of the Program is to cut petroleum use in the United States by 2.5 billion gallons per year by 2020.

Energy Policy Act of 2005 (109th Congress H.R.6 (2005–2006): This act sets forth an energy research and development program covering: (1) energy efficiency; (2) renewable energy; (3) oil and gas; (4) coal; (5) Indian energy; (6) nuclear matters and security; (7) vehicles and motor fuels, including ethanol; (8) hydrogen; (9) electricity; (10) energy tax incentives; (11) hydropower and geothermal energy; and (12) climate change technology.

Energy Policy and Conservation Act of 1975 (42 USC Section 6201) and Corporate Average Fuel Standards: This act establishes fuel economy standards for on-road motor vehicles sold in the United States. Compliance with federal fuel economy standards is determined through the Corporate Average Fuel Economy (CAFE) program on the basis of each manufacturer's average fuel economy for the portion of its vehicles produced for sale in the United States.

EO 13514, *Federal Leadership in Environmental, Energy, and Economic Performance*, 74 Federal Register 52117 (October 8, 2009): This federal EO set sustainability goals for federal agencies and focuses on making improvements in their environmental, energy, and economic performance. It instituted as policy of the United States that federal agencies measure, report, and reduce their GHG emissions from direct and indirect activities.

EO 13693, *Planning for Federal Sustainability in the Next Decade*, 80 Federal Register 15869 (March 2015): This EO reaffirms the policy of the United States that federal agencies measure, report, and reduce their GHG emissions from direct and indirect activities. It sets sustainability goals for all agencies to promote energy conservation, efficiency, and management by reducing energy consumption and GHG emissions. It builds on the adaptation and resiliency goals in previous executive orders to ensure agency operations and facilities prepare for impacts of climate change. This order revokes EO 13514.

[35] https://www.sustainablehighways.dot.gov/overview.aspx

USEPA's authority to regulate GHG emissions stems from the U.S. Supreme Court decision in Massachusetts v. EPA (2007). The Supreme Court ruled that GHGs 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, USEPA finalized an endangerment finding in December 2009. Based on scientific evidence it found that six GHGs constitute a threat to public health and welfare. Thus, it is the Supreme Court's interpretation of the existing Act and USEPA's assessment of the scientific evidence that form the basis for USEPA's regulatory actions.

USEPA in conjunction with the National Highway Traffic Safety Administration (NHTSA) issued the first of a series of GHG emission standards for new cars and light-duty vehicles in April 2010[36] and significantly increased the fuel economy of all new passenger cars and light trucks sold in the United States. The standards required these vehicles to meet an average fuel economy of 34.1 miles per gallon by 2016. In August 2012, the federal government adopted the second rule that increases fuel economy for the fleet of passenger cars, light-duty trucks, and medium-duty passenger vehicles for model years 2017 and beyond to average fuel economy of 54.5 miles per gallon by 2025. Because NHTSA cannot set standards beyond model year 2021 due to statutory obligations and the rules' long timeframe, a mid-term evaluation is included in the rule. The Mid-Term Evaluation is the overarching process by which NHTSA, USEPA, and CARB will decide on CAFE and GHG emissions standard stringency for model years 2022–2025. NHTSA has not formally adopted standards for model years 2022 through 2025. However, the USEPA finalized its mid-term review in January 2017, affirming that the target fleet average of at least 54.5 miles per gallon by 2025 was appropriate. In March 2017, President Trump ordered USEPA to reopen the review and reconsider the mileage target.[37]

NHTSA and USEPA issued a Final Rule for "Phase 2" for medium- and heavy-duty vehicles to improve fuel efficiency and cut carbon pollution in October 2016. The agencies estimate that the standards will save up to 2 billion barrels of oil and reduce CO_2 emissions by up to 1.1 billion metric tons over the lifetimes of model year 2018–2027 vehicles.

Presidential EO 13783, *Promoting Energy Independence and Economic Growth*, of March 28, 2017, orders all federal agencies to apply cost-benefit analyses to regulations of GHG emissions and evaluations of the social cost of carbon, nitrous oxide, and methane.

State

With the passage of legislation including State Senate and Assembly bills and executive orders, California has been innovative and proactive in addressing GHG emissions and climate change.

AB 1493, Pavley Vehicular Emissions: Greenhouse Gases, 2002: This bill requires the CARB to develop and implement regulations to reduce automobile and light truck GHG emissions. These stricter emissions standards were designed to apply to automobiles and light trucks beginning with the 2009-model year.

[36] http://www.c2es.org/federal/executive/epa/greenhouse-gas-regulation-faq
[37] http://www.nbcnews.com/business/autos/trump-rolls-back-obama-era-fuel-economy-standards-n734256 and
https://www.federalregister.gov/documents/2017/03/22/2017-05316/notice-of-intention-to-reconsider-the-final-determination-of-the-mid-term-evaluation-of-greenhouse

EO S-3-05 (June 1, 2005): The goal of this executive order is to reduce California's GHG emissions to: (1) year 2000 levels by 2010, (2) year 1990 levels by 2020, and (3) 80 percent below year 1990 levels by 2050. This goal was further reinforced with the passage of AB 32 in 2006 and SB 32 in 2016.

AB 32, Chapter 488, 2006: Núñez and Pavley, The Global Warming Solutions Act of 2006: AB 32 codified the 2020 GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that CARB create a scoping plan and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases." The Legislature also intended that the statewide GHG emissions limit continue in existence and be used to maintain and continue reductions in emissions of GHGs beyond 2020 (California Health and Safety Code Section 38551(b)). The law requires CARB to adopt rules and regulations in an open public process to achieve the maximum technologically feasible and cost-effective GHG reductions.

EO S-20-06 (October 18, 2006): This order establishes the responsibilities and roles of the Secretary of the California Environmental Protection Agency (CalEPA) and state agencies with regard to climate change.

EO S-01-07 (January 18, 2007): This order sets forth the low carbon fuel standard (LCFS) for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least 10 percent by the year 2020. CARB re-adopted the LCFS regulation in September 2015, and the changes went into effect on January 1, 2016. The program establishes a strong framework to promote the low-carbon fuel adoption necessary to achieve the Governor's 2030 and 2050 GHG reduction goals.

SB 97, Chapter 185, 2007, Greenhouse Gas Emissions: This bill requires the OPR to develop recommended amendments to the CEQA Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

SB 375, Chapter 728, 2008, Sustainable Communities and Climate Protection: This bill requires CARB to set regional emissions reduction targets for passenger vehicles. The Metropolitan Planning Organization for each region must then develop a "Sustainable Communities Strategy" (SCS) that integrates transportation, land-use, and housing policies to plan how it will achieve the emissions target for its region.

SB 391, Chapter 585, 2009, California Transportation Plan: This bill requires the State's long-range transportation plan to meet California's climate change goals under AB 32.

EO B-16-12 (March 2012) orders State entities under the direction of the Governor, including CARB, the California Energy Commission, and the Public Utilities Commission, to support the rapid commercialization of zero-emission vehicles. It directs these entities to achieve various benchmarks related to zero-emission vehicles.

EO B-30-15 (April 2015) establishes an interim statewide GHG emission reduction target of 40 percent below 1990 levels by 2030 in order to ensure California meets its target of reducing GHG emissions to 80 percent below 1990 levels by 2050. It further orders all state agencies with jurisdiction over sources of GHG emissions to implement measures, pursuant to statutory authority, to achieve reductions of GHG emissions to meet the 2030 and 2050 GHG emissions reductions targets. It also directs CARB to update the Climate Change Scoping Plan to express

the 2030 target in terms of million metric tons of carbon dioxide equivalent ($MMTCO_2e$). Finally, it requires the Natural Resources Agency to update the state's climate adaptation strategy, Safeguarding California, every 3 years, and to ensure that its provisions are fully implemented.

SB 32, Chapter 249, 2016, codifies the GHG reduction targets established in EO B-30-15 to achieve a mid-range goal of 40 percent below 1990 levels by 2030.

3.2.1.2 Environmental Setting

In 2006, the Legislature passed the California Global Warming Solutions Act of 2006 (AB 32), which created a comprehensive, multi-year program to reduce GHG emissions in California. AB 32 required CARB to develop a Scoping Plan that describes the approach California will take to achieve the goal of reducing GHG emissions to 1990 levels by 2020. The Scoping Plan was first approved by CARB in 2008 and must be updated every 5 years. CARB approved the First Update to the Climate Change Scoping Plan on May 22, 2014. CARB is moving forward with a discussion draft of an updated Scoping Plan that will reflect the 2030 target established in EO B-30-15 and SB 32.

The AB 32 Scoping Plan and the subsequent updates contain the main strategies California will use to reduce GHG emissions. As part of its supporting documentation for the Draft Scoping Plan, CARB released the GHG inventory for California.[38] CARB is responsible for maintaining and updating California's GHG Inventory per H&SC Section 39607.4. The associated forecast/projection is an estimate of the emissions anticipated to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented.

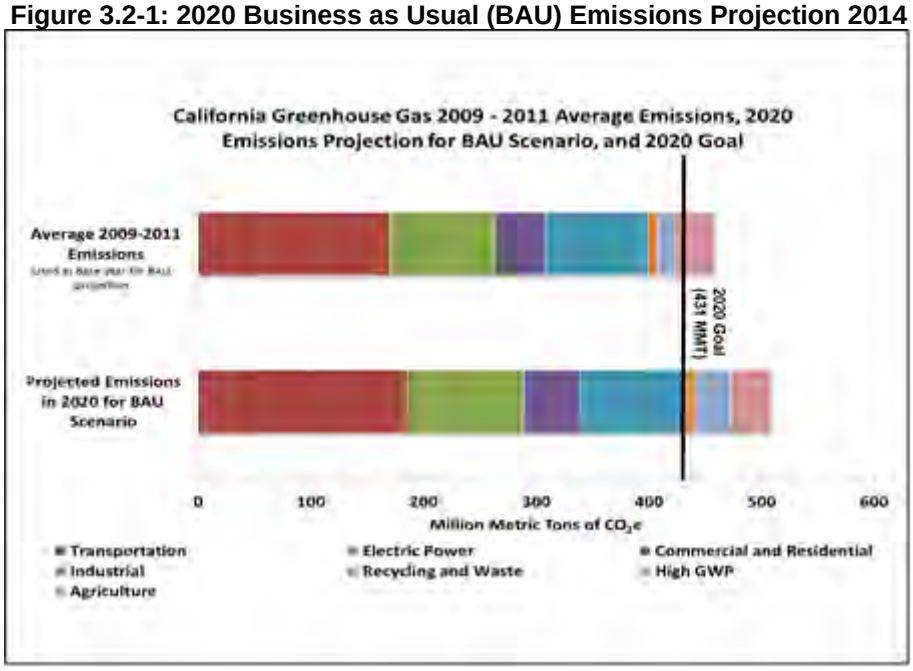
An emissions projection estimates future emissions based on current emissions, expected regulatory implementation, and other technological, social, economic, and behavioral patterns. The projected 2020 emissions provided in Figure 3.2-1 represent a business-as-usual (BAU) scenario assuming none of the Scoping Plan measures are implemented. The 2020 BAU emissions estimate assists CARB in demonstrating progress toward meeting the 2020 goal of 431 $MMTCO_2e$.[39] The 2017 edition of the GHG emissions inventory (released June 2017) found total California emissions of 440.4 $MMTCO_2e$, showing progress towards meeting the AB 32 goals.

The 2020 BAU emissions projection was revisited in support of the First Update to the Scoping Plan (2014). This projection accounts for updates to the economic forecasts of fuel and energy demand as well as other factors. It also accounts for the effects of the 2008 economic recession and the projected recovery. The total emissions expected in the 2020 BAU scenario include reductions anticipated from Pavley I and the Renewable Electricity Standard (30 $MMTCO_2e$ total). With these reductions in the baseline, estimated 2020 statewide BAU emissions are 509 $MMTCO_2e$.

[38] 2016 Edition of the GHG Emission Inventory Released (June 2016): https://www.arb.ca.gov/cc/inventory/data/data.htm

[39] The revised target using Global Warming Potentials (GWP) from the IPCC Fourth Assessment Report (AR4)

Figure 3.2-1: 2020 Business as Usual (BAU) Emissions Projection 2014



https://www.arb.ca.gov/cc/inventory/data/bau.htm

3.2.1.3 Project Analysis

An individual project does not generate enough GHG 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 GHGs.[40] In assessing cumulative impacts, it must be determined if a project's incremental effect is "cumulatively considerable" (CEQA 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.

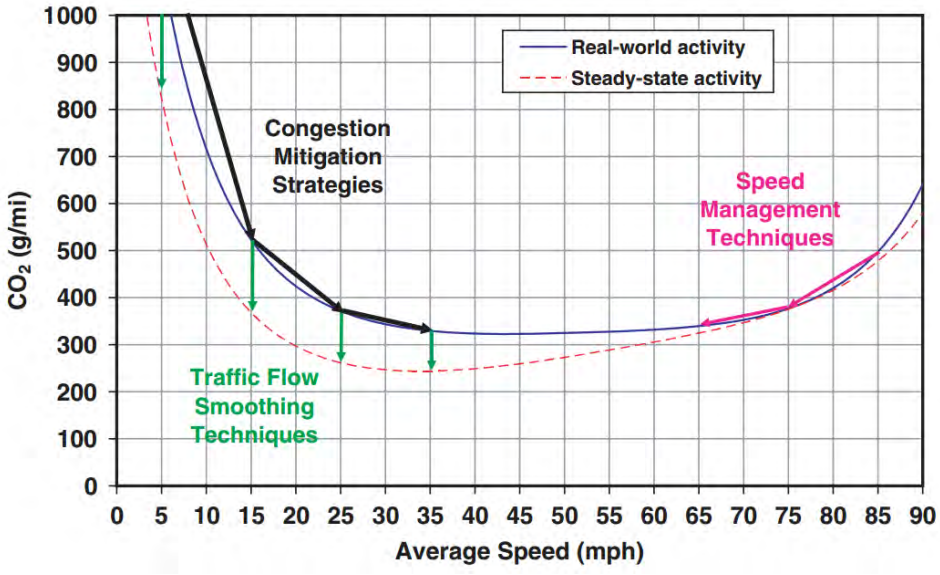
GHG emissions for transportation projects can be divided into those produced during operations and those produced during construction. The following represents a best faith effort to describe the potential GHG emissions related to the proposed project.

Operational Emissions

Four primary strategies can reduce GHG emissions from transportation sources: (1) improving the transportation system and operational efficiencies, (2) reducing travel activity), (3) transitioning to lower GHG-emitting fuels, and (4) improving vehicle technologies/efficiency. To be most effective all four strategies should be pursued concurrently.

[40] 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 U.S. Forest Service (Climate Change Considerations in Project Level NEPA Analysis, July 13, 2009).

Figure 3.2-2: Possible Effect of Traffic Operation Strategies in Reducing On-Road CO_2 Emissions



Source: Matthew Barth and Kanok Boriboonsomsin, University of California, Riverside, May 2010 (http://uctc.berkeley.edu/research/papers/846.pdf)

FHWA supports these strategies to lessen climate change impacts, which correlate with efforts that the state of California is undertaking to reduce GHG emissions from the transportation sector.

The highest levels of CO_2 from mobile sources such as automobiles occur at stop-and-go speeds (0–25 miles per hour) and speeds over 55 miles per hour; the most severe emissions occur from 0–25 miles per hour (see Figure 3.2-2 above). To the extent that a project relieves congestion by enhancing operations and improving travel times in high-congestion travel corridors, GHG emissions, particularly CO_2, may be reduced.

The project is included in the current RTP, *Plan Bay Area 2040* (ABAG and MTC 2017a, RTP ID 17-01-0029), and the 2017 TIP (MTC 2016, TIP ID ALA150001). A performance objective of the 2017 RTP is maintaining the share of jobs accessible within 30 minutes by automobile or 45 minutes by transit in the Bay Area and achieving a 35 percent reduction in vehicular CO_2 emissions by year 2040, despite the expected regional population growth of roughly 30 percent between 2006 and 2040 (ABAG and MTC 2017b). The 2017 RTP will implement measures to reduce per capita vehicle miles traveled (VMT) and/or improve levels of service (LOS), including but not limited to travel demand management (TDM) mitigation requirements for new developments, incorporation of supporting infrastructure for non-motorized modes, incentive programs for using alternative travel modes, and parking management requirements (ABAG and MTC 2017c). The 2017 RTP incorporated the MTC's Climate Initiatives Program, which is designed to reduce GHG emissions from the transportation sector. The key strategies of the Climate Initiatives Program include financial tools such as grants and tax incentives for emissions-reduction strategies, education programs, and transportation demand management. The MTC will work with other regional agencies and the CARB to curb sprawl and reduce GHG under SB 375. The 2017 RTP also incorporated a state-mandated Sustainable Communities

Strategy that addresses sustainable development through transportation investment and land use decisions.

The proposed project would provide improvements to travel along the SR 84 and I-680 corridors in the project area by widening SR 84 from two to four lanes, modifying the SR 84/I-680 interchange, lengthening the existing HOV/express lane on southbound I-680, adding bikeways on SR 84, and including other traffic systems management (TSM) and TDM components as described in Section 1.4.4.1. The proposed project is predicted to reduce vehicle hours of delay compared to the No Build Alternative as described in Section 2.1.9.3. The proposed project would address the lack of adequate bicycle access on SR 84, and provide a Class II bikeway in both directions to improve safety for motorists and cyclists.

The project's long-term operational and short-term construction emissions of GHG were evaluated in the *Air Quality Impact Assessment* (Baseline 2017) and are discussed further below.

Quantitative Analysis

The CO_2 emissions from vehicles operating in the region affected by the project were evaluated based on the annual VMT under the existing conditions and the Build and No Build alternatives for the opening year (2025) and horizon year (2045). The regional annual VMT and average daily speeds were obtained from the traffic study prepared for the project (Fehr and Peers 2017). Based on average daily speeds, project-related CO_2 emission factors were estimated using interpolation of EMFAC2014 data for the vehicle fleet mix in Alameda County. Calculation results are shown in Table 3.2-1.

Table 3.2-1: Annual CO_2 Emissions for Existing and Future No Build and Build Alternatives

Analysis Year/ Scenario	Scenario	Annual VMT (10^9 miles)	Annual CO_2 Emissions (10^6 metric tons/year)
Existing Year (2015)	Existing	3.257	1.395
Opening Year (2025)	No Build	3.625	1.215
	Build	3.615	1.211
Horizon Year (2045)	No Build	4.360	1.464
	Build	4.330	1.454

Notes: mph = miles per hour; VMT = vehicle miles traveled; 10^9 miles = billion miles; 10^6 metric tons = million metric tons
Emission factors obtained from EMFAC2014 for fleet mix in Alameda County, in combination with the average daily speeds for each analyzed scenario. Annual VMTs were used to calculate annual GHG emissions.

As shown in Table 3.2-1, compared to the existing year (2015), annual CO_2 emissions for both the Build and No Build alternatives would be lower in the opening year (2025), but would be higher in the horizon year (2045). In both the opening year (2025) and horizon year (2045), the Build Alternative would have lower annual CO_2 emissions compared to the No Build Alternative due to lower regional VMT, and because the proposed project is expected to improve the traffic flow in the affected area and therefore reduce the CO_2 emissions. The traffic operations analysis (Section 2.1.9) shows that most intersection delays are expected to improve in both 2025 and 2045 under the Build Alternative, versus the No Build conditions, which would reduce emissions from idling traffic. Furthermore, the traffic analysis found that average mainline speeds and delays also would improve under the Build Alternative versus the No Build Alternative, helping to reduce emissions associated with stop-and-go travel.

While EMFAC has a rigorous scientific foundation and has been vetted through multiple stakeholder reviews, its emission rates are based on tailpipe emission test data. The numbers are estimates of CO_2 emissions and not necessarily the actual CO_2 emissions. The model does not account for factors such as the rate of acceleration and the vehicles' aerodynamics, which would influence CO_2 emissions. To account for CO_2 emissions, CARB's GHG Inventory follows the IPCC guideline by assuming complete fuel combustion, while still using EMFAC data to calculate CH_4 and N_2O emissions. Though EMFAC is currently the best available tool for use in calculating GHG emissions, it is important to note that the CO_2 numbers provided are only useful for a comparison of alternatives.

Construction Emissions

Construction GHG emissions would result from material processing, on-site construction equipment, and 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 GHG emissions produced during construction can be offset to some degree by longer intervals between maintenance and rehabilitation activities.

Based on the *Air Quality Impact Assessment* (Baseline 2017), the average CO_2 emissions during the three-year project construction period would be approximately 1,060 tons per year. While project construction may result in a temporary increase in GHG emissions, it is anticipated that any increase in GHG emissions due to construction will be offset by the improvement in operational GHG emissions compared with the No Build Alternative. As described in Section 2.2.6.3, the project will implement measures to reduce construction emissions, such as maintenance of construction equipment and vehicles, limiting of construction vehicle idling time, and scheduling and routing of construction traffic to reduce engine emissions.

3.2.1.4 CEQA Conclusion

As discussed above, the CO_2 emissions from both the Build and No Build Alternatives in the horizon year (2045) would be higher than existing year GHG emissions. However, CO_2 emissions from the Build Alternative would be lower than those emitted under the No Build Alternative in both 2025 and 2045. Nonetheless, there are also limitations with EMFAC and with assessing what a given CO_2 emissions increase means for climate change. Therefore, it is Caltrans' determination that in the absence of further regulatory or scientific information related to GHG emissions and CEQA significance, it is too speculative to make a determination regarding significance of the project's direct impact and its contribution on the cumulative scale to climate change. However, Caltrans is firmly committed to implementing measures to help reduce the potential effects of the project. These measures are outlined in the following section.

Greenhouse Gas Reduction Strategies

Statewide Efforts

In an effort to further the vision of California's GHG reduction targets outlined an AB 32 and SB 32, Governor Brown identified key climate change strategy pillars (concepts). These pillars highlight the idea that several major areas of the California economy will need to reduce

emissions to meet the 2030 GHG emissions target. These pillars are (1) reducing today's petroleum use in cars and trucks by up to 50 percent; (2) increasing from one-third to 50 percent our electricity derived from renewable sources; (3) doubling the energy efficiency savings achieved at existing buildings and making heating fuels cleaner; (4) reducing the release of methane, black carbon, and other short-lived climate pollutants; (5) managing farm and rangelands, forests, and wetlands so they can store carbon; and (6) periodically updating the state's climate adaptation strategy, Safeguarding California.

Figure 3.2-3: The Governor's Climate change pillars: 2030 Greenhouse gas reduction goals

The transportation sector is integral to the people and economy of California. To achieve GHG emission reduction goals, it is vital that we build on our past successes in reducing criteria and toxic air pollutants from transportation and goods movement activities. GHG emission reductions will come from cleaner vehicle technologies, lower-carbon fuels, and reduction of vehicle miles traveled. One of Governor Brown's key pillars sets the ambitious goal of reducing today's petroleum use in cars and trucks by up to 50 percent by 2030.

Governor Brown called for support to manage natural and working lands, including forests, rangelands, farms, wetlands, and soils, so they can store carbon. These lands have the ability to remove carbon dioxide from the atmosphere through biological processes, and to then sequester carbon in above- and below-ground matter.

Caltrans Activities

Caltrans continues to be involved on the Governor's Climate Action Team as the CARB works to implement EOs S-3-05 and S-01-07 and help achieve the targets set forth in AB 32. EO B-30-15, issued in April 2015, and SB 32 (2016), set a new interim target to cut GHG emissions to 40 percent below 1990 levels by 2030. The following major initiatives are underway at Caltrans to help meet these targets.

California Transportation Plan (CTP 2040)

The California Transportation Plan (CTP) is a statewide, long-range transportation plan to meet our future mobility needs and reduce GHG emissions. The CTP defines performance-based goals, policies, and strategies to achieve our collective vision for California's future statewide, integrated, multimodal transportation system. It serves as an umbrella document for all of the other statewide transportation planning documents.

SB 391(Liu 2009) requires the CTP to meet California's climate change goals under AB 32. Accordingly, the CTP 2040 identifies the statewide transportation system needed to achieve maximum feasible GHG emission reductions while meeting the state's transportation needs. While Metropolitan Planning Organizations s have primary responsibility for identifying land use patterns to help reduce GHG emissions, CTP 2040 identifies additional strategies in Pricing, Transportation Alternatives, Mode Shift, and Operational Efficiency.

Caltrans Strategic Management Plan

The Strategic Management Plan, released in 2015, creates a performance-based framework to preserve the environment and reduce GHG emissions, among other goals. Specific performance targets in the plan that will help to reduce GHG emissions include:

- Increasing percentage of non-auto mode share
- Reducing VMT per capita
- Reducing Caltrans' internal operational (buildings, facilities, and fuel) GHG emissions

Funding and Technical Assistance Programs

In addition to developing plans and performance targets to reduce GHG emissions, Caltrans also administers several funding and technical assistance programs that have GHG reduction benefits. These include the Bicycle Transportation Program, Safe Routes to School, Transportation Enhancement Funds, and Transit Planning Grants. A more extensive description of these programs can be found in Caltrans Activities to Address Climate Change (2013).

Caltrans Director's Policy 30 (DP-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) provides a comprehensive overview of activities undertaken by Caltrans statewide to reduce GHG emissions resulting from agency operations.

Project-Level GHG Reduction Strategies

GHG-1. The following measures will also be implemented in the project to reduce GHG emissions and potential climate change impacts from the project.

- Caltrans and the CHP are working with regional agencies to implement intelligent transportation systems (ITS) to help manage the efficiency of the existing highway system. ITS is 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. Proposed project components that use ITS include the variable toll

message signs [VTMS] with pricing information for the southbound I-680 HOV/express lane, and the ramp meter at the southbound SR 84 to southbound I-680 connector ramp.

- Utilizing energy efficient lighting, which will be defined during final design.
- Keeping construction equipment engines properly tuned.
- Limiting idling of construction vehicles.
- Improving the bicycle/pedestrian network may encourage more travelers to use nonmotorized modes, reducing their motor vehicle use and associated GHG emissions.

In addition, implementing Measure TR-1, the TMP (Section 2.1.6.4), will minimize construction-related delays for travelers in the project area by addressing the potential traffic impacts related to staged construction, detours, and other traffic handling concerns associated with construction of the proposed project. Reducing idling time reduces tailpipe GHG emissions.

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—or, put another way, planning and design for resilience. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, variability in storm surges and intensity, and the frequency and intensity of wildfires. These changes may affect the transportation infrastructure in various ways, such as damage to roadbeds from 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. These types of impacts to the transportation infrastructure may also have economic and strategic ramifications.

Federal Efforts

At the federal level, the Climate Change Adaptation Task Force, co-chaired by the CEQ, the Office of Science and Technology Policy, and the National Oceanic and Atmospheric Administration (NOAA), released its interagency task force progress report on October 28, 2011[41], 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 provided an update on auctions 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.

The U.S. DOT issued the *U.S. DOT Policy Statement on Climate Adaptation* in June 2011, committing to "integrate consideration of climate change impacts and adaptation into the planning, operations, policies, and programs of DOT in order to ensure that taxpayer resources are invested wisely and that transportation infrastructure, services and operations remain effective in current and future climate conditions." [42]

[41] https://obamawhitehouse.archives.gov/administration/eop/ceq/initiatives/resilience
[42] https://www.fhwa.dot.gov/environment/sustainability/resilience/policy_and_guidance/usdot.cfm

To further the DOT Policy Statement, in December 15, 2014, FHWA issued order 5520 *(Transportation System Preparedness and Resilience to Climate Change and Extreme Weather Events).*[43] This directive established FHWA policy to strive to identify the risks of climate change and extreme weather events to current and planned transportation systems. The FHWA will work to integrate consideration of these risks into its planning, operations, policies, and programs in order to promote preparedness and resilience; safeguard federal investments; and ensure the safety, reliability, and sustainability of the nation's transportation systems.

FHWA has developed guidance and tools for transportation planning that fosters resilience to climate effects and sustainability at the federal, state, and local levels.[44]

State Efforts

On November 14, 2008, then-Governor Arnold Schwarzenegger signed EO S-13-08 which directed a number of state agencies to address California's vulnerability to sea level rise caused by climate change. This EO set in motion several agencies and actions to address the concern of sea level rise and directed all state agencies planning to construct projects in areas vulnerable to future sea-level rise to consider a range of sea-level rise scenarios for the years 2050 and 2100, 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, and storm surge and storm wave data.

Governor Schwarzenegger also requested the National Academy of Sciences to prepare an assessment report to recommend how California should plan for future sea-level rise. The final report, *Sea-Level Rise for the Coasts of California, Oregon, and Washington* (Sea-Level Rise Assessment Report)[45] was released in June 2012 and included relative sea-level rise projections for the three states, taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge, and land subsidence rates; and the range of uncertainty in selected sea-level rise projections. It provided 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; and a discussion of future research needs regarding sea-level rise.

In response to EO S-13-08, the California Natural Resources Agency (Resources Agency), in coordination with local, regional, state, federal, and public and private entities, developed *The California Climate Adaptation Strategy* (Dec 2009),[46] which summarized the best available science on climate change impacts to California, assessed California's vulnerability to the identified impacts, and outlined solutions that can be implemented within and across state agencies to promote resiliency. The adaptation strategy was updated and rebranded in 2014 as *Safeguarding California: Reducing Climate Risk (Safeguarding California Plan).*

Governor Jerry Brown enhanced the overall adaptation planning effort by signing EO B-30-15 in April 2015, requiring state agencies to factor climate change into all planning and investment

[43] https://www.fhwa.dot.gov/legsregs/directives/orders/5520.cfm
[44] https://www.fhwa.dot.gov/environment/sustainability/resilience/
[45] 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.
[46] http://www.climatechange.ca.gov/adaptation/strategy/index.html

decisions. In March 2016, sector-specific Implementation Action Plans that demonstrate how state agencies are implementing EO B-30-15 were added to the Safeguarding California Plan. This effort represents a multi-agency, cross-sector approach to addressing adaptation to climate change-related events statewide.

EO S-13-08 also gave rise to the State of California Sea-Level Rise Interim Guidance Document (SLR Guidance), produced by the Coastal and Ocean Working Group of the California Climate Action Team (CO-CAT), of which Caltrans is a member. First published in 2010, the document provided "guidance for incorporating sea-level rise (SLR) projections into planning and decision making for projects in California," specifically, "information and recommendations to enhance consistency across agencies in their development of approaches to SLR." The March 2013 update[47] finalizes the SLR Guidance by incorporating findings of the National Academy's 2012 final Sea-Level Rise Assessment Report; the policy recommendations remain the same as those in the 2010 interim SLR Guidance. The guidance will be updated as necessary in the future to reflect the latest scientific understanding of how the climate is changing and how this change may affect the rates of SLR.

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 actively engaged in in working towards identifying these risks throughout the state and will work to incorporate this information into all planning and investment decisions as directed in EO B-30-15.

Project-Level Future Climate Conditions

The proposed project is outside the coastal zone and not in an area subject to sea-level rise. Accordingly, direct impacts to transportation facilities due to projected sea-level rise are not expected.

[47] http://www.opc.ca.gov/2013/04/update-to-the-sea-level-rise-guidance-document/

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 and tribal consultation and public participation for this project have been accomplished through a variety of formal and informal methods, including interagency coordination meetings, public meetings, public notices, and Project Development Team (PDT) meetings. This chapter summarizes the results of Caltrans' efforts to fully identify, address, and resolve project-related issues through early and continuing coordination.

4.1 Public Scoping and Participation

Caltrans filed a Notice of Preparation of an Environmental Impact Report (EIR) with the State Clearinghouse on May 12, 2016. The filing of the Notice of Preparation began a 30-day scoping period that extended through June 13, 2016. A copy of the Notice of Preparation (State Clearinghouse No. 2016052033) is included in Appendix G.

The scoping period was noticed through newspaper advertisements that ran in the *East Bay Times*, covering Alamo, Oakland, Hayward, Fremont, Walnut Creek, Brentwood, Martinez, Danville, Blackhawk, San Ramon, Dublin, Pleasanton, Livermore, and Sunol, on May 13 and 15, 2016. The advertisements also ran in the online version of the *East Bay Times*.

The meetings were also noticed as part of the newspaper advertisements in the print and online versions of the *East Bay Times* on May 13 and 15, 2016. Invitations were mailed to approximately 4,165 addresses in the project area, including addresses on Isabel Avenue (SR 84) between Ruby Hill Drive and Stanley Boulevard. Meeting information was also posted on the Patch.com local community websites for Pleasanton, Livermore, and Dublin; the Alameda CTC Facebook page; and Sunol.net. In addition, Caltrans mailed invitations to elected officials and emailed invitations to staff that represent the officials.

Three public scoping meetings have been held near the project area. Locations, dates, times, and attendance were as follows:

- Sunol Glen Elementary School Auditorium, Sunol; May 17, 2016, 6 PM to 8 PM; 26 members of the public attended
- Granada High School Student Union, Livermore; May 18, 2016, 6 PM to 8 PM; 29 members of the public attended
- Veterans Memorial Building Main Hall, Pleasanton; May 24, 2016, 6 PM to 8 PM; 12 members of the public attended.

The purpose of these meetings was to discuss the scope of the EIR/EA and the potential effects of the proposed project. Each meeting included a brief presentation on the project and environmental review process, as well as presentation of detailed exhibits that explained the project area and key elements of the planned improvements. Attendees were encouraged to

submit comments in writing, either during the meeting or directly to Caltrans staff via postal mail or email. Comments were requested to be submitted by June 13, 2016.

A total of 37 comments were submitted during the scoping period, and many comments covered more than one topic area. Comments regarding speed/accident rate/safety issues were the most prevalent (21 comments on this topic area), followed by pedestrian and bicycle access, traffic/congestion, noise, trucks, project design components, nuclear facility/Little Valley Road, and other environmental issues. One comment expressed that the proposed northward extension of the southbound I-680 HOV/express lane is unnecessary, and that any lane should be used without a cost.

Many comments addressed the Little Valley community. Among the comments was that turning left onto SR 84 at Little Valley Road currently poses a safety issue for community residents. Another concern was a potential decrease in property values from the proposed consolidation of Little Valley Road with Vallecitos Atomic Laboratory Road to access SR 84. One comment suggested moving the intersection of Vallecitos Atomic Laboratory Road and Little Valley Road westward to avoid the impression that one is turning into the nuclear facility and then to the neighborhood. Another commenter suggested letting the road name remain Little Valley Road without referencing the atomic laboratory. As a result of these comments, the design of the proposed frontage road was modified to move the intersection of Vallecitos Atomic Laboratory Road and Little Valley Road westward. The comment on the naming of the frontage road will be considered during the development of project signage plans in the detailed design phase.

Some comments expressed concerns about quality of life impacts as a result of the potential increase in noise, traffic, pollution, and safety issues from the project. Some comments also requested consideration of aesthetic and visual impacts from the project. One commenter stated that the community would appreciate more information and efforts for increasing the quality of life in the area. Potential impacts from the proposed project are discussed in Chapter 2.

Additional public outreach will take place during the circulation period of this Draft EIR/EA.

4.1.1 Stakeholder Meetings

In addition to the public scoping meetings and periodic PDT meetings, which include representatives from Caltrans, Alameda CTC, and the Cities of Livermore and Pleasanton, PDT members met with the following owners and/or representatives of properties that could be affected by the project:

- GE-Hitachi Vallecitos Nuclear Center (February 12, 2016)
- Little Valley (February 29, 2016)
- Hodges Family (February 29, 2016)
- Franco and Perez Family (May 4, 2016)
- City and County of San Francisco (August 11, 2016)

The purpose of these meetings was to discuss potential project activities along the frontages of these properties and answer questions from the property owners/representatives.

Communications with potentially affected property owners and project stakeholders will continue throughout the project.

4.1.2 Project Development Team Meetings

PDT meetings provided the forum for coordination, issue resolution, and information feedback between Caltrans, Alameda CTC, Alameda County, and the Cities of Pleasanton and Livermore. PDT meetings have occurred regularly since June 2015, and will continue to occur throughout the remainder of the environmental and project approval process. The PDT represents various fields of expertise, including design, environmental review, traffic operations, right of way, and project management. Accordingly, the PDT convenes to review the project status, address issues as they arise, and provide overall direction throughout the project development process.

4.1.3 Environmental Document Meetings

During the public review period for the Draft EIR/EA, the public will have a minimum of 45 days to comment on the document. Three public meetings will be held. See the cover sheet for information on the public meeting and review period.

4.2 Consultation and Coordination with Public Agencies

4.2.1 Federal Agencies

Federal Highway Administration

After public circulation of this EIR/EA, the project's air quality studies will be submitted to FHWA for a project-level conformity determination.

NOAA Fisheries

A National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) species list was created for the project on September 19, 2017 (Appendix C). Consultation with NOAA Fisheries under Section 7 of FESA is not anticipated because the project will not affect any listed species that fall within NOAA Fisheries jurisdiction, as described in Section 2.3.1.

U.S. Army Corps of Engineers

The proposed project will affect waters of the U.S. as defined in Section 404 of the CWA, as described in Section 2.3.2.3. A preliminary jurisdictional wetland delineation has been prepared and was submitted to the USACE on March 17, 2017. In addition, a field meeting was conducted with USACE staff on April 25, 2017, to review the proposed project. A permit application will be submitted to the USACE during the detailed design phase.

U.S. Department of Agriculture

A Farmland Conversion Impact Rating Form has been completed for the project and is included in Appendix C. The project would not convert farmland to nonagricultural use or bisect agricultural parcels, as described in Section 2.1.5.3.

U.S. Fish and Wildlife Service

A USFWS species list was created for the project on January 11, 2016, most recently updated on September 19, 2017 (Appendix C), and used to identify target species for reconnaissance-level surveys for terrestrial plants and animals. The project will require consultation with the USFWS under Section 7 of FESA, as described in Section 2.3.5.3. Field meetings were conducted with USFWS staff on August 5, 2016, and April 25, 2017, to review the proposed project. A draft Biological Assessment for the project was submitted to the USFWS on July 26, 2017, to initiate consultation under Section 7.

4.2.2 Tribal Entities

In January 2016, the Native American Heritage Commission (NAHC) was contacted to request a search of the Sacred Lands File for Native American cultural resources in or near the APE. The NAHC responded with a list of interested tribes or individuals.

Representatives from the Ohlone Indian Tribe, North Valley Yokuts Tribe, Indian Canyon Mutsun Band of Costanoan, and Ohlone/Costanoan-Esselen Nation expressed concern about the proposed project and were referred to Caltrans for consultation.

Native American consultation is described further in Section 2.1.11.2.

4.2.3 State Agencies

California Department of Fish and Wildlife

The project has the potential to affect state-listed species, as described in Section 2.3.5.3. A request for an Incidental Take Permit for California tiger salamander will be submitted to the CDFW under Section 2081(b) of the CESA during the detailed design phase.

A Section 1600 Lake or Streambed Alteration Agreement with CDFW is necessary when a project would alter the flow, bed, channel, or bank of a stream or lake. The proposed project would include work at Vallecitos Creek. A 1600 permit application will be submitted to the CDFW during the detailed design phase.

State Historic Preservation Officer

The project's cultural resource studies were submitted to SHPO on June 5, 2017, for concurrence of a determination of resources that are not eligible for the NRHP, and notification of Caltrans's finding that there are historic properties within the APE that will be affected by the undertaking. SHPO's concurrence, received on October 5, 2017, is included in Appendix C.

The Build Alternative includes a Post-Review Discovery and Monitoring Plan to protect known cultural resources within the APE, as described in Section 2.1.11.4. In accordance with Section 106 Programmatic Agreement Stipulation X, Caltrans will continue consultation with SHPO on the assessment of effects.

4.2.4 Regional Agencies

Metropolitan Transportation Commission

The project team initiated consultation with the Bay Area Air Quality Conformity Task Force by submitting a Project Assessment Form for $PM_{2.5}$ Interagency Consultation. On May 3, 2017, the Task Force determined that the project is not a project of air quality concern.

Public comment is requested regarding the information in the Project Assessment Summary for $PM_{2.5}$ Interagency Consultation and the Task Force's determination (see Appendix C). Following the close of the public review and comment period for this EIR/EA, all comments received on the air quality conformity determination will be included in an air quality conformity report to be submitted to FHWA. The final determination on project-level conformity will be made by FHWA.

San Francisco Bay Regional Water Quality Control Board

Project construction could affect waters of the State, as described in Section 2.3.2. A field meeting was conducted with RWQCB staff on April 25, 2017, to review the proposed project. Caltrans conducted additional coordination with RWQCB in July 2017 regarding the project's avoidance, minimization and mitigation strategy for stormwater treatment, hydromodification control, and waters of the State.

Pursuant to Section 401 of the CWA, a joint "Application for 401 Water Quality Certification and/or Report of Waste Discharge" will be submitted to the RWQCB during the detailed design phase. The project will implement any general Waste Discharge Requirements issued by the RWQCB.

San Francisco Public Utilities Commission

The project is anticipated to require property acquisition from SPFUC, including at the Sheep Camp Creek bioregional habitat restoration program facility (see Section 1.4.7.2: Vallecitos Creek Avoidance Options). Alameda CTC conducted a project review with SFPUC on March 30, 2016, and will conduct a second project review after public circulation of this EIR/EA. In addition, a field meeting was conducted with SFPUC staff on April 25, 2017, to review the proposed project.

4.3 Circulation, Review, and Comment on the Draft Environmental Document

Public input on the project will be solicited during the review period for this Draft EIR/EA, which will last a minimum of 45 days. The review period, information about public meetings, and instructions for submitting comments are included on the first page of this document.

All formal comments will be addressed and responses published in the Final EIR/EA. After receiving comments from the public and reviewing agencies, a Final EIR/EA will be prepared. Caltrans 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 CEQA, and Caltrans will decide whether to issue a Finding of No Significant Impact (FONSI) or require an Environmental Impact Statement (EIS) for compliance with NEPA. 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 EO 12372.

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Appendix A Section 4(f)

Section 4(f) of the Department of Transportation Act of 1966, codified in federal law at 49 United States Code (USC) 303, declares that "it is the policy of the United States Government that special effort should be made to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges, and historic sites."

Section 4(f) specifies that the Secretary of Transportation may approve a transportation program or project . . . "requiring the use of publicly owned land of a public park, recreation area, or wildlife and waterfowl refuge of national, state, or local significance, or land of an historic site of national, state, or local significance (as determined by the federal, state, or local officials having jurisdiction over the park, area, refuge, or site) only if:

- There is no prudent and feasible alternative to using that land; and
- The program or project includes all possible planning to minimize harm to the park, recreation area, wildlife and waterfowl refuge, or historic site resulting from the use."

Section 4(f) further requires coordination with the Department of the Interior and, as appropriate, the involved offices of the Department of Agriculture and the Department of Housing and Urban Development in developing transportation projects and programs that use lands protected by Section 4(f). If historic sites are involved, then coordination with the State Historic Preservation Officer (SHPO) is also needed.

Responsibility for compliance with Section 4(f) has been assigned to Caltrans pursuant to 23 USC 326 and 327, including determinations and approval of Section 4(f) evaluations, as well as coordination with those agencies that have jurisdiction over a Section 4(f) resource that may be affected by a project action.

This appendix provides a discussion of properties in the project area that may qualify for consideration under Section 4(f). No wildlife and waterfowl refuges exist in the project area; therefore, they will not be discussed further.

Description of the Proposed Project

The California Department of Transportation (Caltrans), in cooperation with the Alameda County Transportation Commission (Alameda CTC), proposes to widen and conform State Route (SR) 84 to expressway standards between south of Ruby Hill Drive and the Interstate 680 (I-680) interchange. The project would also improve SR 84/I-680 interchange ramps and extend the existing southbound I-680 High Occupancy Vehicle/express lane (HOV/express lane) northward by approximately 2 miles, to approximately 0.8 mile north of Koopman Road. Figure 1.1-1 shows the location of the project improvements, which would extend from post mile (PM) 17.9 to 22.9 on SR 84 and PM 10.3 to 15.3 on I-680, in Pleasanton, Sunol, and unincorporated Alameda County. Chapter 1 provides a detailed description of the project.

The purpose of the project is to alleviate existing and projected traffic congestion and improve traffic circulation between SR 84 and I-680, and in the vicinity of the SR 84/I-680 interchange; improve safety for motorists and cyclists on this segment of SR 84; and complete the statutory designation of this segment of SR 84 as an expressway facility. An expressway is a type of highway where access is typically limited to controlled locations such as intersections. The

project is needed because high transportation demand leads to congestion and reduced vehicle speeds on SR 84 in the project area. During the afternoon/evening peak commute period, congestion on northbound SR 84 also contributes to a bottleneck at the weaving area on northbound I-680 between the Calaveras Road/SR 84 on-ramp and northbound SR 84 off-ramp. Motorists use local roadways and the I-580/I-680 interchange to avoid the limited capacity and congestion along SR 84, which further congests these routes.

Non-Section 4(f) Properties

The following properties in the project vicinity are not publicly owned and are therefore not Section 4(f) properties:

- Sunol Paintball Outdoor Park, 0.3 mile south of SR 84 at 7900 Vallecitos Road.
- The Club at Ruby Hill, a golf course that is approximately 0.25 mile northeast of the northern project limit on SR 84.
- Castlewood Country Club, approximately 0.4 mile west of the northern project limit on I-680.
- Callippe Preserve Golf Course, a private course, approximately 0.6 mile from the project area on I-680, southeast of Happy Valley Road.
- Sunol Valley Golf Club, which closed in 2016, approximately 0.3 mile southwest of the southern project limit on I-680.

These properties are not Section 4(f) properties; therefore, the provisions of Section 4(f) do not apply.

Section 4(f) Properties

Parks and Recreation Areas

The following are considered publicly owned parkland that would qualify for consideration under Section 4(f):

- Pleasanton Ridge Regional Park (5,271 acres) contains a multi-purpose trail system that accommodates hikers, equestrians, and bicyclists, and provides canyon views, ridgetop vistas, and access to remote, deep-canyon streams (East Bay Regional Parks District 2016). The park is northwest of the SR 84/I-680 interchange and at its closest point is less than 0.25 mile from I-680 in the project area (near Verona Road).
- Sycamore Grove Regional Park (1051 Wetmore Road) is approximately 0.9 mile east of the northern project limit on SR 84, in Livermore. The 847-acre park has hiking, bicycle, and horse trails and picnic facilities (Livermore Area Recreation and Park District 2016).
- Augustin Bernal Community Park is a 237-acre open space community park in the City of Pleasanton that provides hiking, biking, and equestrian trails (City of Pleasanton 2016a). The park is north of Pleasanton Ridge Regional Park and approximately 1 mile west of the northern project limit on I-680 at Sunol Boulevard.

- The Sunol Water Temple (505 Paloma Way) is a point of local interest where future recreation improvements are planned. The temple is on SFPUC property approximately 0.6 mile west-northwest of I-680 in the project area but is open to the public. Designed by architect Willis Polk, the temple was constructed by the Spring Valley Water Company in 1910 to mark the confluence of Alameda Creek, Arroyo de la Laguna, and the Pleasanton Wells flowing into the Sunol Valley (SFPUC 2015). On the same property, construction of an Alameda Creek Watershed Center is proposed to provide information about the watershed, its natural resources and role in the water supply system, and the history of the Sunol Valley. An outdoor discovery trail is also planned (SFPUC 2016c).

The project would not require the temporary or permanent use of any publicly owned park or recreational facility. Pleasanton Ridge Regional Park, Sycamore Grove Regional Park, Augustin Bernal Community Park, and the Sunol Water Temple are not expected to experience temporary construction-related noise, air, or visual effects because of their distance from the project construction areas and the visual shielding provided by trees and hills.

To the west of I-680 in the project area, Pleasanton Ridge Regional Park has trails along the hills and ridgeline above the freeway and could potentially have views of the proposed HOV/express lane and associated signage. If visible, the HOV/express lane and signage would be visually consistent with the existing freeway infrastructure, which already includes overhead signs. The project would have no long-term effects to Sycamore Grove Regional Park, Augustin Bernal Community Park, or the Sunol Water Temple.

The project would not directly or indirectly affect a park or recreation facility.

These properties are Section 4(f) properties, but no "use" will occur. Therefore, the provisions of Section 4(f) do not apply.

Historic Properties

The following archaeological sites and potential historic properties have been identified within the Area of Potential Effects (APE) as determined by Caltrans under the January 1, 2014 *First Amended Programmatic Agreement Among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act, as it Pertains to the Administration of the Federal-Aid Highway Program in California* (Section 106 PA):

- A historic archaeological site with a cluster of features relating to historic ranching activities;
- Eight bridges of approximately 50 years of age or more;
- Three ranch properties;
- The General Electric (GE)-Hitachi Vallecitos Nuclear Center; and
- A prehistoric archaeological site.

The historic archaeological site was previously determined ineligible for listing in the National Register of Historic Places (NRHP) and confirmed by the SHPO. The eight bridges were listed as ineligible for the NRHP in the Caltrans Historic Highway Bridge Inventory. Caltrans Professionally Qualified Staff (PQS) determined and the SHPO concurred that two of the ranch properties are not eligible for inclusion in the NRHP. Therefore, the historic archaeological site, eight bridges, and two ranch properties are not protected by Section 4(f).

The other Section 4(f) resources are discussed below.

Prehistoric Archaeological Site

The archaeological site is a buried prehistoric midden identified during excavation for a Pacific Gas and Electric Company gas line. Located on private property, the site was not accessible during the identification phase. The Caltrans Cultural Studies Office approved the assumption of eligibility for the NRHP on March 6, 2017. The finding is anticipated to be a Finding of No Adverse Effect with Non-Standard Conditions. The site, however, is not considered a Section 4(f) resource because it is an archaeological site eligible primarily under Criterion D, its potential to contain data important to the understanding of prehistory, and has minimal value for preservation in place.

GE-Hitachi Vallecitos Nuclear Center

The GE Vallecitos Nuclear Research Center (6705 East Vallecitos Road) was constructed in 1956. The facility was the world's first privately funded and constructed nuclear plant to supply power in megawatt amounts to an electric utility grid. During its life as an active power plant (1957-1963), the Vallecitos Boiling Water Reactor helped develop and test boiling water reactor fuel, core components, controls and systems; and served as a development model for the GE boiling water reactors that now operate all over the world. The American Society of Mechanical Engineers designated the facility as International Historical Mechanical Engineering Landmark #1 in 1987 (A/HC 2017c). Now owned by GE-Hitachi, the facility is still in operation, though the nuclear reactors are no longer active.

Permission to access the facility to conduct a historic architectural evaluation was denied by the property owners; however, review of historic-era construction photos, aerial photographs, and United States Geological Survey (USGS) maps indicate that most of the original buildings and structures, including laboratory buildings and containment vessels, are still extant on the property. This suggests that the facility is likely to have sufficient integrity to convey its historical significance.

Pursuant to Stipulation VIII.C.4 of the Section 106 PA, Caltrans PQS proposed to consider the GE-Hitachi Vallecitos Nuclear Center eligible for the NRHP for the purposes of the project, due to its important role in the development of commercial nuclear electricity generation, and because it is a surviving prototype for the architecture of GE boiling water nuclear reactors, one of the most common reactor types in nuclear power plants today. The Caltrans Cultural Studies Office approved the assumption of eligibility on February 7, 2017.

Due to the assumption of NRHP eligibility,the GE-Hitachi Vallecitos Nuclear Center is considered a Section 4(f) resource.

Project Use. Sewage treatment facilities for the Vallecitos Nuclear Center are adjacent to the north side of SR 84. A modern entry sign is just northwest of the intersection of SR 84 with Vallecitos Atomic Laboratory Road, and landscaped vegetation is present on both sides of Vallecitos Atomic Laboratory Road on the north side of SR 84. All structures associated with the facility are a minimum of 0.23 mile from SR 84. Views of the structures from SR 84 are mostly obstructed by hills and trees.

The project would create a new signalized intersection in the vicinity of the existing intersection of SR 84 with Vallecitos Atomic Laboratory Road, as shown in Figure 1.4-1. A frontage road on the north side of SR 84 would connect the intersection with Vallecitos Atomic Laboratory Road and Little Valley Road, which currently intersects with SR 84 approximately 0.17 mile to the west of Vallecitos Atomic Laboratory Road (Figure 1.4-1). The proposed new signalized intersection would require relocation or replacement of the facility's entry sign and landscaped vegetation to the north. The frontage road would avoid the sewage treatment facilities (Figure 1.4-1).

The project would require permanent acquisition of approximately 6.57 acres along the frontage of the 597-acre property to accommodate the roadway widening, new intersection, and frontage road (see Section 2.1.7.2 and Figure 2.1.7-1, pages 3 and 4, property 11 [APN 096-0350-001-07]). The project would also require a temporary construction easement of approximately 0.64 acre as well as a permanent utility easement of approximately 0.01 acre.

Temporary construction-related impacts would be limited to short-term access changes to allow traffic entering and exiting the facility to be routed from the existing Vallecitos Atomic Laboratory Road to the new frontage road. Drivers entering and exiting the facility would also have short-term views of project construction and may be exposed to temporary construction-related noise or dust. Construction-related noise or dust is not expected to affect people at the structures associated with the facility, which are a minimum of 0.23 mile from SR 84.

Ranch Property

Pursuant to Stipulation VIII.C.4 of the Section 106 PA, Caltrans PQS proposed to consider the property at 8350 Vallecitos Road eligible for the NRHP for the purposes of this project, because it is a ranch property of more than 45 years of age, and permission to access the property to conduct an historic architectural evaluation was denied by the property owner. The Caltrans Cultural Studies Office approved the assumption of eligibility on July 24, 2017. The property was previously recorded in 1990.

The 8.8-acre property includes four structures: a house, a barn, a tank house, and a garage. The appearance, plan, and structural features of the house (including use of round nails) suggest that it was built after 1895. In the 1940s, the gas lights were replaced by electricity, and the balustrade on the porch appears to also be a replacement. Asbestos siding has been added over the original horizontal wood siding.

The barn's appearance and construction techniques (including the use of square nails) suggest a date in the 1890s or before. The barn's original wood shingle roof has been replaced with corrugated metal.

The tank house was rebuilt in the 1950s–1960s, at which time its external cladding was removed and water tank replaced. At some point in the 1990s or 2000s, the water tank was also removed. The chicken house was built in 1941 and converted to a garage by 1990.

Due to the assumption of NRHP eligibility, the ranch property at 8350 Vallecitos Road is considered a Section 4(f) resource.

Project Use. The frontage of the property along the south side of SR 84 contains a modern entry gate and fencing along the driveway, grass, and approximately three oak trees. The house is approximately 200 feet and the garage is approximately 175 feet from the existing edge of pavement of SR 84. The remaining buildings are behind the house and garage.

The project is anticipated to require permanent acquisition of 0.82 acre and a utility easement of 0.25 acre along the SR 84 frontage of the property (see Section 2.1.7.2 and Figure 2.1.7-1, page 3, property 8 [APN 096-0365-001-04]). The property acquisition would accommodate the widening of SR 84, including the construction of a retaining wall topped by a concrete barrier along the southern roadway edge, and the construction of a frontage road on the south side of SR 84 to connect with the property's driveway. With the proposed project, the property would use the frontage road to access SR 84 via the new signalized intersection in the vicinity of the existing intersection of SR 84 with Vallecitos Atomic Laboratory Road, as shown in Figure 1.4-1. (The property is at the western end of the proposed frontage road.) The utility easement would allow for relocation of approximately four utility poles and a set of overhead lines from the north side of SR 84 to the south side, within the property.

The construction of the widened SR 84 and the frontage road would require relocation or replacement of the entry gate and fencing and removal of approximately three oak trees. With the project, the widened SR 84 would be approximately 40 feet closer to the house and garage than the existing highway. The southern side of the proposed frontage road would be approximately 105 feet from the house and 80 feet from the garage. The nearest relocated utility poles and overhead lines would be approximately 137 feet closer to the house than the existing overhead utility corridor.

Temporary construction-related impacts could include views of project construction, construction-related noise and dust, and a potential single-night disruption in property access for paving the new driveway/frontage road connection.

De Minimis Definition and Application to the Project

This section of the document discusses *de minimis* impact determinations under Section 4(f). Section 6009(a) of SAFETEA-LU[48] amended Section 4(f) legislation at 23 USC 138 and 49 USC 303 to simplify the processing and approval of projects that have only de minimis impacts on lands protected by Section 4(f). This amendment provides that once the U.S. Department of Transportation (USDOT) determines that a transportation use of Section 4(f) property, after consideration of any impact avoidance, minimization, and mitigation or enhancement measures, results in a *de minimis* impact on that property, an analysis of avoidance alternatives is not required and the Section 4(f) evaluation process is complete. The Federal Highway

[48] The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (Public Law 109-59).

Administration's (FHWA's) final rule on Section 4(f) *de minimis* findings is codified in 23 Code of Federal Regulations (CFR) 774.3 and CFR 774.17.

Responsibility for compliance with Section 4(f) has been assigned to Caltrans pursuant to 23 USC 326 and 327, including *de minimis* use determinations, as well as coordination with those agencies that have jurisdiction over a Section 4(f) resource that may be affected by a project action.

A *de minimis* use of historic sites occurs when there is a Finding under Section 106 of the National Historic Preservation Act of either "no adverse effect" or "no historic properties affected." The SHPO concurred with Caltrans' determinations of eligibility that identified historic resources within the project area on October 5, 2017 (Appendix C). The proposed finding for the Vallecitos Nuclear Center and the ranch property is No Adverse Effect, and consultation with the SHPO is ongoing. The SHPO consultation regarding the Finding of Effect will be included in the Final Environmental Document.

Potential project-related impacts to the Vallecitos Nuclear Center are considered *de minimis* because the project would not affect the qualities that make it eligible for the NRHP. The structures associated with the facility, which are a minimum of 0.23 mile from SR 84, would not be directly or indirectly affected by the project. The entry signage and landscaping appear to be modern and are not contributing, character-defining elements for purposes of the facility's assumed eligibility for the NRHP. The remaining property frontage that would be permanently acquired for the project is undeveloped land that does not contribute to the NRHP eligibility.

Potential project-related impacts to the ranch property are also considered *de minimis* because the project would not affect the qualities that support an assumption of eligibility for the NRHP. The proposed project components would be closer to the buildings than the existing SR 84, as described above. However, the buildings themselves would not be affected, and the proximity of the project would not impair the features and attributes that relate to the property's assumed eligibility for the NRHP. The entry gate and fencing appear to be modern and are not contributing, character-defining elements for purposes of the property's assumed eligibility. The remaining property frontage that would be permanently acquired for the project is undeveloped land that does not contribute to the NRHP assumption of eligibility.

Notice

The proposed *de minimis* finding will be provided to the SHPO along with the anticipated finding of "No Adverse Effect with Non-Standard Conditions" for concurrence. In accordance with the January 1, 2014 *First Amended Programmatic Agreement among the Federal Highway Administration, the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act, as it Pertains to the Administration of the Federal-Aid Highway Program in California*, the SHPO will be informed in writing that a non-response for the purposes of a "no adverse effect" or a "no historic properties affected" determination will be treated as the written concurrence for the *de minimis* determination.

Caltrans, as assigned by the FHWA, will make the final determination on the *de minimis* finding.

Avoidance, Minimization, and/or Mitigation

No avoidance, minimization, and/or mitigation measures are required.

Appendix B Title VI Policy Statement

STATE OF CALIFORNIA—BUSINESS, TRANSPORTATION AND HOUSING AGENCY EDMUND G. BROWN Jr., Governor

DEPARTMENT OF TRANSPORTATION
OFFICE OF THE DIRECTOR
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March 2013

NON-DISCRIMINATION
POLICY STATEMENT

The California Department of Transportation, under Title VI of the Civil Rights Act of 1964 and related statutes, ensures that no person in the State of California shall, on the grounds of race, color, national origin, sex, disability, religion, sexual orientation, or age, be excluded from participation in, be denied the benefits of, or be otherwise subjected to discrimination under any program or activity it administers.

For information or guidance on how to file a complaint based on the grounds of race, color, national origin, sex, disability, religion, sexual orientation, or age, please visit the following web page: http://www.dot.ca.gov/hq/bep/title_vi/t6_violated.htm.

Additionally, if you need this information in an alternate format, such as in Braille or in a language other than English, please contact the California Department of Transportation, Office of Business and Economic Opportunity, 1823 14th Street, MS-79, Sacramento, CA 95811. Telephone: (916) 324-0449, TTY: 711, or via Fax: (916) 324-1949.

MALCOLM DOUGHERTY
Director

"Caltrans improves mobility across California"

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Appendix C Consultation and Coordination

This appendix includes the following consultation and correspondence regarding the proposed project.

- U.S. Department of Agriculture Farmland Conversion Impact Rating Form
- Bay Area Air Quality Conformity Task Force Project Assessment Summary and interagency consultation meeting notes
- National Marine Fisheries Service species list
- U.S. Fish and Wildlife Service species list
- State Historic Preservation Officer concurrence on Caltrans' eligibility determinations

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U.S. Department of Agriculture Farmland Conversion Impact Rating Form

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U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request **1/24/17**	4. Sheet 1 of **1**
1. Name of Project **SR 84 Expressway Widening**	5. Federal Agency Involved **Cal Trans - State**	
2. Type of Project **Corridor Improvement**	6. County and State **Alameda, CA**	

PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS **1/24/17**	2. Person Completing Form **Ken Oster**
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☐ NO ☑		4. Acres Irrigated **8893** / Average Farm Size **393**
5. Major Crop(s) **Hay, Grapes, Fruit & Nut, Vegetables**	6. Farmable Land in Government Jurisdiction Acres: **20347** % **3.9**	7. Amount of Farmland As Defined in FPPA Acres: **109050** % **20.8**
8. Name Of Land Evaluation System Used **CA Rev Storie Index**	9. Name of Local Site Assessment System **None**	10. Date Land Evaluation Returned by NRCS **2/3/17**

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment ____ Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly				
B. Total Acres To Be Converted Indirectly, Or To Receive Services				
C. Total Acres In Corridor				
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland				
B. Total Acres Statewide And Local Important Farmland				
C. Percentage Of Farmland in County Or Local Govt. Unit To Be Converted				
D. Percentage Of Farmland in Govt. Jurisdiction With Same Or Higher Relative Value				
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*				
PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))* — Maximum Points				
1. Area in Nonurban Use — 15				
2. Perimeter in Nonurban Use — 10				
3. Percent Of Corridor Being Farmed — 20				
4. Protection Provided By State And Local Government — 20				
5. Size of Present Farm Unit Compared To Average — 10				
6. Creation Of Nonfarmable Farmland — 25				
7. Availablility Of Farm Support Services — 5				
8. On-Farm Investments — 20				
9. Effects Of Conversion On Farm Support Services — 25				
10. Compatibility With Existing Agricultural Use — 10				
TOTAL CORRIDOR ASSESSMENT POINTS — 160	0	0	0	0
PART VII *(To be completed by Federal Agency)*				
Relative Value Of Farmland (From Part V) — 100	0	0	0	0
Total Corridor Assessment (From Part VI above or a local site assessment) — 160	0	0	0	0
TOTAL POINTS *(Total of above 2 lines)* — 260	0	0	0	0

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES ☐ NO ☐

5. Reason For Selection:

Signature of Person Completing this Part: | DATE

NOTE: Complete a form for each segment with more than one Alternate Corridor

Clear Form

CORRIDOR - TYPE SITE ASSESSMENT CRITERIA

The following criteria are to be used for projects that have a linear or corridor - type site configuration connecting two distant points, and crossing several different tracts of land. These include utility lines, highways, railroads, stream improvements, and flood control systems. Federal agencies are to assess the suitability of each corridor - type site or design alternative for protection as farmland along with the land evaluation information.

(1) How much land is in nonurban use within a radius of 1.0 mile from where the project is intended?
More than 90 percent - 15 points
90 to 20 percent - 14 to 1 point(s)
Less than 20 percent - 0 points

(2) How much of the perimeter of the site borders on land in nonurban use?
More than 90 percent - 10 points
90 to 20 percent - 9 to 1 point(s)
Less than 20 percent - 0 points

(3) How much of the site has been farmed (managed for a scheduled harvest or timber activity) more than five of the last 10 years?
More than 90 percent - 20 points
90 to 20 percent - 19 to 1 point(s)
Less than 20 percent - 0 points

(4) Is the site subject to state or unit of local government policies or programs to protect farmland or covered by private programs to protect farmland?
Site is protected - 20 points
Site is not protected - 0 points

(5) Is the farm unit(s) containing the site (before the project) as large as the average - size farming unit in the County ? (Average farm sizes in each county are available from the NRCS field offices in each state. Data are from the latest available Census of Agriculture, Acreage or Farm Units in Operation with $1,000 or more in sales.)
As large or larger - 10 points
Below average - deduct 1 point for each 5 percent below the average, down to 0 points if 50 percent or more below average - 9 to 0 points

(6) If the site is chosen for the project, how much of the remaining land on the farm will become non-farmable because of interference with land patterns?
Acreage equal to more than 25 percent of acres directly converted by the project - 25 points
Acreage equal to between 25 and 5 percent of the acres directly converted by the project - 1 to 24 point(s)
Acreage equal to less than 5 percent of the acres directly converted by the project - 0 points

(7) Does the site have available adequate supply of farm support services and markets, i.e., farm suppliers, equipment dealers, processing and storage facilities and farmer's markets?
All required services are available - 5 points
Some required services are available - 4 to 1 point(s)
No required services are available - 0 points

(8) Does the site have substantial and well-maintained on-farm investments such as barns, other storage building, fruit trees and vines, field terraces, drainage, irrigation, waterways, or other soil and water conservation measures?
High amount of on-farm investment - 20 points
Moderate amount of on-farm investment - 19 to 1 point(s)
No on-farm investment - 0 points

(9) Would the project at this site, by converting farmland to nonagricultural use, reduce the demand for farm support services so as to jeopardize the continued existence of these support services and thus, the viability of the farms remaining in the area?
Substantial reduction in demand for support services if the site is converted - 25 points
Some reduction in demand for support services if the site is converted - 1 to 24 point(s)
No significant reduction in demand for support services if the site is converted - 0 points

(10) Is the kind and intensity of the proposed use of the site sufficiently incompatible with agriculture that it is likely to contribute to the eventual conversion of surrounding farmland to nonagricultural use?
Proposed project is incompatible to existing agricultural use of surrounding farmland - 10 points
Proposed project is tolerable to existing agricultural use of surrounding farmland - 9 to 1 point(s)
Proposed project is fully compatible with existing agricultural use of surrounding farmland - 0 points

$PM_{2.5}$ Interagency Consultation Summary and MTC Air Quality Conformity Task Force Determination

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Summary of Project Assessment for $PM_{2.5}$
Interagency Consultation for SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project

The proposed project is located in the San Francisco Bay Area Air Basin, which does not attain National Ambient Air Quality Standards for particulate matter 2.5 micrometers in diameter or less ($PM_{2.5}$). Therefore, the proposed project and other federally funded projects are required to undergo a screening process set forth by United States Environmental Protection Agency (USEPA) Final Conformity Rule EPA-420-F-10-011 (71 Federal Register 12468). This process was established to protect public health with a margin of safety. The process involves interagency consultation, facilitated through the Metropolitan Transportation Commission's (MTC's) Air Quality Conformity Task Force, regarding whether a project meets specific criteria defined in Title 40 CFR Part 93 for Projects of Air Quality Concern.

On April 27, 2017, the Air Quality Conformity Task Force determined that the proposed project is not a Project of Air Quality Concern (POAQC) as defined by 40 CFR 93.123(b)(1). Therefore, a project-level $PM_{2.5}$ hot-spot analysis is not required for the project.

The proposed project is not a POAQC based on the following:

- Truck AADT would increase on SR 84, reflecting a route shift from I-680 and local streets, but truck percentage would be the same with and without the project (4%).There would be no change in diesel truck capacity on I-680.
- The project would not increase the number of diesel vehicles in the project area or result in land use changes that would attract more diesel vehicles.
- The project would generally improve travel speeds and reduce $PM_{2.5}$ emission rates compared to the No Build alternative.
- Intersections at LOS D, E, or F as well as delay times would improve with the Build scenario in 2025 and 2045.

Meeting notes from the April 27, 2017, Air Quality Conformity Task Force meeting follow.

Air Quality Conformity Task Force
Summary Meeting Notes
April 27, 2017

Participants:

Andrea Gordon – BAAQMD
Amir Fanai – BAAQMD
Lynn McIntyre – AECOM
Ivy Tao – Baseline
Gary Sidhu – Alameda County Transportation Commission (ACTC)
Dick Fahey – Caltrans
Ginger Vagenas – EPA
Rodney Tavitas – Caltrans
Elizabeth Racca-Johnson – City of Sunnyvale
Shahid Abbas – City of Sunnyvale
Daniel Carley – Kimley-Horn
Dominique Paukowits – FTA
Adam Crenshaw – MTC
Harold Brazil – MTC

1. **Welcome and Self Introductions**: Harold Brazil (MTC) called the meeting to order at 9:35 am.

2. $PM_{2.5}$ Project Conformity Interagency Consultations

a. Consultation to Determine Project of Air Quality Concern Status

i. Maude Avenue Bikeway and Streetscape Project

Elizabeth Racca-Johnson (City of Sunnyvale) introduced the project's design consultant, Daniel Carley (Kimley-Horn) and Mr. Carley began his presentation of Maude Avenue Bikeway and Streetscape project by discussing the background:

- 2014: The City of Sunnyvale conducted a corridor study along Maude Avenue between Mathilda Avenue and North Fair Oaks Avenue to determine feasible alternatives to implement bicycle lanes on the project corridor.
- The City's transportation plan and the 2006 Sunnyvale Bicycle Plan identifies the addition of bicycle lanes on Maude Avenue.
- In addition to the bicycle lanes, the proposed project includes pedestrian improvements (ADA-compliant curb ramps, enhanced crosswalks, removal of free-right turns, etc
- 2015: The City presented the alternatives developed during the Maude Avenue Roadway Allocation Study to the community at two meetings
- May 17, 2016: Based on the recommendations of the City of Sunnyvale staff, the project was approved by the Sunnyvale City Council to proceed to the design and environmental stage.

Mr. Carley went on to give a brief description of traffic conditions in the existing project corridor area by mentioning that there currently is approximately 1,320 vehicles/hour near Mathilda Avenue during PM peak and approximately 750 vehicles/hour near North Fair Oaks Avenue during PM peak. Mr. Carley also gave a thorough description of the Maude Avenue Bikeway and Streetscape project by indicating:

- No roadway widening or new signalization occurs with the project

- Corridor-wide restriping to maintain center-turn lane and provide buffered bicycle lanes by utilizing pavement that currently serves on-street parking
- Upgrade existing curb ramps to meet current ADA guidelines at 23 locations
- Eliminate channelized right-turn movements at Sunnyvale Avenue to improve pedestrian safety
- Modify the existing signal at the Sunnyvale Avenue intersection
- Remove and replace landscaping at the Sunnyvale Avenue intersection
- Relocate VTA bus stop from Maude Avenue to Sunnyvale Avenue to reduce mid-block crossings
- Upgrade In-Roadway Warning Light system at Bayview Avenue
- Corridor-wide slurry seal pavement rehabilitation

Rodney Tavitas (Caltrans) did not believe that the Maude Avenue Bikeway and Streetscape project was of air quality concern, but asked what the opening and horizon analysis years were. Mr. Carley responded stating that 2017 was the opening year and 2035 was the horizon year. Mr. Tavitas mentioned that this information is required in order to make a determination and Mr. Carley indicated that he would make the revision to the project assessment form.

Amir Fanai (BAAQMD) asked if the on-street parking removal (occurring with the constructed Maude Avenue Bikeway and Streetscape project) could cause negative traffic impacts and Shahid Abbas (City of Sunnyvale) answered by stating that the City of Sunnyvale has not experienced any problems with on-street parking removal in the project area and the City does not anticipate any future problems.

Final Determination: With input from FTA, EPA, Caltrans and FHWA (via email follow-up after the meeting), the Task Force concluded that the Maude Avenue Bikeway and Streetscape project was not of air quality concern.

ii. State Route (SR) 84 Widening, Pigeon Pass to I-680 Project

Gary Sidhu (ACTC) provided an overview to the SR 84 Widening, Pigeon Pass to I-680 project by saying that improvements have been made all along SR 84 from I-580 to I-680 and this project will complete the last segment of improvements to the corridor.

Lynn McIntyre (AECOM) continued with the presentation by saying that the SR 84 Widening, Pigeon Pass to I-680 project will improve SR 84 as a regional connection between I-680 and I-580 and noted that demographic growth in the tri-valley area (between 1970 and 2010) has be seven times the growth that has occurred in Alameda County during that same time period.

Ms. McIntyre stated that the SR 84 Widening, Pigeon Pass to I-680 project is needed to address traffic congestion in the project area:

- SR 84 has congestion and reduced vehicle speeds for approximately 9 hours each weekday
- Bottleneck during PM peak period on northbound I-680 between the Calaveras Road/SR 84 on-ramp and northbound SR 84 off-ramp
- Local roadway congestion from motorists diverting from SR 84 and I-680

Ms. McIntyre concluded by indicating that the SR 84 Widening, Pigeon Pass to I-680 project would not be a project of Air Quality Concern because:

- Truck AADT would increase on SR 84, reflecting a route shift from I-680 and local streets, but truck percentage would be the same with and without the project (4%).
- No change in diesel truck capacity on I-680.
- The project would improve travel speeds and reduce $PM_{2.5}$ emission rates compared to No Build.
- Intersections at LOS D, E, or F and delay times improve with the Build scenario in 2025 and 2045.

Dominique Paukowits (FTA) asked the crash data in the project area and Ms. McIntyre stated she could send it to Harold Brazil (MTC) and Mr. Brazil could distribute the data to the Task Force members. Ms. Paukowits also asked what the CEQA process timeline was and Ms. McIntyre that the environmental document will be a joint NEPA/CEQA document (EIR/EA) will be circulated for public review in the October/November 2017 timeframe. Ms. McIntyre estimated approval of the environmental document in the spring of 2018 and project construction is expected to occur between the years 2021 and 2023.

Ginger Vagenas (EPA) did not think the SR 84 Widening, Pigeon Pass to I-680 project was of air quality concern – EPA does not feel that increases in traffic are not sufficient to create the need for further analysis – and noted that the truck data is not that relevant to EPA's decision when looking at localized impacts. Rodney Tavitas (Caltrans) also mentioned that when reviewing projects of this HOV/HOT-lane types statewide, since commercial vehicles are not allowed on these facilities, Caltrans typically does not feel that these are projects of air quality concern.

Final Determination: With input from FTA, EPA, Caltrans and FHWA (via email follow-up after the meeting), the Task Force concluded that the SR 84 Widening, Pigeon Pass to I-680 project was not of air quality concern.

b. Confirm Projects Are Exempt from $PM_{2.5}$ Conformity

i. Confirmation of the list of exempt projects from $PM_{2.5}$ conformity (2b_Exempt List 041417.pdf)

Harold Brazil (MTC) heard no comments from the Task Force on the **2b_Exempt List 041417.pdf** list of projects.

Final Determination: With input from FTA, EPA, Caltrans and FHWA, the Task Force agreed the projects on the exempt list **(2b_Exempt List 041417.pdf)** were exempt from $PM_{2.5}$ project level analysis.

3. Consent Calendar

a. February April 27, 2017 Air Quality Conformity Task Force Meeting Summary

Final Determination: With input from all members, the Task Force concluded that the consent calendar was approved.

4. **Other Items**

   a. N**EPA Delegation Approval from the Governor** – Rodney Tavitas (Caltrans)

   b. **Possible Federal Government Shutdown Discussion –** All

   c. **Statewide Conformity Meeting/MTC Teleconference site for March 17th** – Harold Brazil (MTC)

   d. **Release of the Draft Transportation-Air Quality Conformity Analysis: Draft Plan Bay Area 2040 and Amended 2017 (in early May 2017)** – Harold Brazil (MTC)

McIntyre, Lynn

From: Harold Brazil <HBrazil@mtc.ca.gov>
Sent: Wednesday, May 03, 2017 3:09 PM
To: Gary Sidhu; McIntyre, Lynn
Cc: Adam Crenshaw
Subject: Fwd: FMS POAQC Project TIP ID ALA150001 (Route 84 widening, Pigeon Pass to I-680) update: Project is a not a POAQC

Lynn & Gary, attached is your confirmation email.

If you have any questions, let me know and thanks.
Harold

-------- Original Message --------
Subject: FMS POAQC Project TIP ID ALA150001 (Route 84 widening, Pigeon Pass to I-680) update: Project is a not a POAQC
From: Fund Management System <fms@mtc.ca.gov>
Date: May 3, 2017, 2:54 PM
To: vbhat@alamedactc.org
Dear Project Sponsor

Based on the recent interagency consultation with the Air Quality Conformity Task force, Project TIP ID ALA150001 (FMS ID:5985.00) does not fit the definition of a project of air quality concern as defined by 40 CFR 93.123(b)(1) or 40 CFR 93.128 and therefore is not subject to PM2.5 project level conformity requirement. Please save this email as documentation confirming the project has undergone and completed the interagency consultation requirement for PM2.5 project level conformity. Note project sponsors are required to undergo a proactive public involvement process which provides opportunity for public review as outlined by 40 CFR 93.105(e). For projects that are not of air quality concern, a comment period is only required for project level conformity determinations if such a comment period would have been required under NEPA. For more information, please see FHWA PM2.5 Project Level Conformity Frequently Asked Questions (FAQ): http://www.fhwa.dot.gov/environment/air_quality/conformity/reference/faqs/pm25faqs.cfm

If you have any questions, please direct them to Harold Brazil at hbrazil@mtc.ca.gov or by phone at (510) 817-5747

USFWS and NOAA Fisheries Species Lists

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United States Department of the Interior

FISH AND WILDLIFE SERVICE
Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
Phone: (916) 414-6600 Fax: (916) 414-6713

In Reply Refer To: September 19, 2017
Consultation Code: 08ESMF00-2016-SLI-0628
Event Code: 08ESMF00-2017-E-09097
Project Name: State Route 84 Pigeon Pass Expressway and Interstate 680 Interchange and Widening Project

Subject: Updated list of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, under the jurisdiction of the U.S. Fish and Wildlife Service (Service) that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the Service under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 et seq.).

Please follow the link below to see if your proposed project has the potential to affect other species or their habitats under the jurisdiction of the National Marine Fisheries Service:

http://www.nwr.noaa.gov/protected_species/species_list/species_lists.html

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the

Act and its implementing regulations (50 CFR 402 et seq.), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment(s):

- Official Species List

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

Sacramento Fish And Wildlife Office
Federal Building
2800 Cottage Way, Room W-2605
Sacramento, CA 95825-1846
(916) 414-6600

Project Summary

Consultation Code: 08ESMF00-2016-SLI-0628

Event Code: 08ESMF00-2017-E-09097

Project Name: State Route 84 Pigeon Pass Expressway and Interstate 680 Interchange and Widening Project

Project Type: TRANSPORTATION

Project Description: Roadway widening and improvement project

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/37.60551928848787N121.83390481026787W

Counties: Alameda, CA

Endangered Species Act Species

There is a total of 16 threatened, endangered, or candidate species on this species list. Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

Mammals

NAME	STATUS
Salt Marsh Harvest Mouse *Reithrodontomys raviventris* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/613	Endangered
San Joaquin Kit Fox *Vulpes macrotis mutica* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/2873	Endangered

Birds

NAME	STATUS
California Least Tern *Sterna antillarum browni* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8104	Endangered

Reptiles

NAME	STATUS
Alameda Whipsnake (=striped Racer) *Masticophis lateralis euryxanthus* There is **final designated** critical habitat for this species. Your location overlaps the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/5524	Threatened

Amphibians

NAME	STATUS
California Red-legged Frog *Rana draytonii*	Threatened

There is **final designated** critical habitat for this species. Your location overlaps the critical habitat.

Species profile: https://ecos.fws.gov/ecp/species/2891

California Tiger Salamander *Ambystoma californiense*	Threatened

Population: U.S.A. (Central CA DPS)
There is **final designated** critical habitat for this species. Your location is outside the critical habitat.

Species profile: https://ecos.fws.gov/ecp/species/2076

Fishes

NAME	STATUS
Delta Smelt *Hypomesus transpacificus*	Threatened

There is **final designated** critical habitat for this species. Your location is outside the critical habitat.

Species profile: https://ecos.fws.gov/ecp/species/321

Steelhead *Oncorhynchus (=Salmo) mykiss*	Threatened

Population: Northern California DPS
There is **final designated** critical habitat for this species. Your location is outside the critical habitat.

Species profile: https://ecos.fws.gov/ecp/species/1007

Insects

NAME	STATUS
Bay Checkerspot Butterfly *Euphydryas editha bayensis* There is **final designated** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2320	Threatened
San Bruno Elfin Butterfly *Callophrys mossii bayensis* There is **proposed** critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/3394	Endangered
Valley Elderberry Longhorn Beetle *Desmocerus californicus dimorphus* There is **final designated** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7850 Habitat assessment guidelines: https://ecos.fws.gov/ipac/guideline/assessment/population/436/office/11420.pdf	Threatened

Crustaceans

NAME	STATUS
Conservancy Fairy Shrimp *Branchinecta conservatio* There is **final designated** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/8246	Endangered
Vernal Pool Fairy Shrimp *Branchinecta lynchi* There is **final designated** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/498	Threatened
Vernal Pool Tadpole Shrimp *Lepidurus packardi* There is **final designated** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/2246	Endangered

Flowering Plants

NAME	STATUS
Contra Costa Goldfields *Lasthenia conjugens* There is **final designated** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/7058	Endangered
Palmate-bracted Bird's Beak *Cordylanthus palmatus* No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/1616	Endangered

Critical habitats

There are 2 critical habitats wholly or partially within your project area under this office's jurisdiction.

NAME	STATUS
Alameda Whipsnake (=striped Racer) *Masticophis lateralis euryxanthus* https://ecos.fws.gov/ecp/species/5524#crithab	Final designated
California Red-legged Frog *Rana draytonii* https://ecos.fws.gov/ecp/species/2891#crithab	Final designated

From:	Deichsel, Saana
To:	"nmfswcrca.specieslist@noaa.gov"
Subject:	SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project- Caltrans
Date:	Tuesday, September 19, 2017 3:56:00 PM

The project falls within the Dublin, Niles, La Costa Valley, and Livermore 7.5-minute quadrangles
(quads).
Within the Dublin, Niles, and La Costa Valley quads, CCC Steelhead DPS (T) may be present.
Within the Dublin, Niles, La Costa Valley, Livermore quads, Essential Fish Habitat for Chinook
Salmon and Coho Salmon is present.
No Marine Mammal Protection Act resources were identified in search within Dublin, Niles, La Costa Valley, and Livermore quads.

Caltrans District 04
111 Grand Ave
Oakland, CA 94612

Non-federal agency conducting biological studies:
AECOM
300 Lakeside Drive, Suite 400
Oakland, CA 94612, USA
T +1-510-893-3600
aecom.com

Point of contact:
Saana Deichsel
Senior Ecologist
D 510-874-1718 M 510-409-7963
saana.deichsel@aecom.com

From:	NMFSWCRCA Specieslist - NOAA Service Account
To:	Deichsel, Saana
Subject:	Auto reply - NMFS CA Species List Re: SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project- Caltrans
Date:	Tuesday, September 19, 2017 3:57:03 PM

Thank you for using NMFS' California Species List. Receipt of this message confirms that NMFS has received your email to nmfswcrca.specieslist@noaa.gov. If you have used the tools and followed the steps outlined on the California Species List Tools webpage (http://www.westcoast.fisheries.noaa.gov/maps_data/california_species_list_tools.html), you have generated an official species list.

Messages sent to this email address are not responded to directly. For project specific questions, please contact your local NMFS office.

Northern California/Klamath (Arcata) 707-822-7201

North-Central Coast (Santa Rosa) 707-387-0737

Southern California (Long Beach) 562-980-4000

California Central Valley (Sacramento) 916-930-3600

From: NMFSWCRCA Specieslist - NOAA Service Account
To: Deichsel, Saana
Subject: Re: SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project- Caltrans
Date: Tuesday, September 19, 2017 3:57:03 PM

Thank you for using NMFS' California species list, providing information for ESA, MSA, and MMPA resources under the jurisdiction of NMFS. Messages sent to this email address are not responded to directly. For questions, please contact Darren Howe by phone at 707-575-3152 or by email at darren.howe@noaa.gov.

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State Historic Preservation Officer Concurrence on Caltrans' Eligibility Determinations

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OFFICE OF HISTORIC PRESERVATION
DEPARTMENT OF PARKS AND RECREATION
1725 23rd Street, Suite 100
SACRAMENTO, CA 95816-7100
(916) 445-7000 Fax: (916) 445-7053
calshpo@parks.ca.gov
www.ohp.parks.ca.gov

October 5, 2017

VIA ELECTRONIC MAIL

Reply in Reference To: FHWA_2017_0607_001

Mr. Brett Rushing
Office Chief, Office of Cultural Resource Studies
California Department of Transportation, District 4
P.O. Box 23660
Oakland, CA 94623-0660

Subject: Eligibility Determinations for the State Route 84 Expressway Widening and SR 84/Interstate 680 Interchange Improvements Project in Alameda County

Dear Mr. Rushing:

The Office of Historic Preservation (OHP) received your letter on September 22, 2017. The California Department of Transportation (Caltrans) is continuing consulting with the State Historic Preservation Officer (SHPO) regarding the above referenced undertaking in accordance with the January 1, 2014 *First Amended Programmatic Agreement Among the Federal Highway Administration (FHWA), the Advisory Council on Historic Preservation, the California State Historic Preservation Officer, and the California Department of Transportation Regarding Compliance with Section 106 of the National Historic Preservation Act, as it Pertains to the Administration of the Federal-Aid Highway Program in California* (Section 106 PA). Pursuant to Stipulation VIII.C.6 of the Section 106 PA, Caltrans is seeking SHPO comment on their determination of eligibility, and have requested an expedited review.

Caltrans, in cooperation with the Alameda County Transportation Commission (Alameda CTC), proposes to widen and conform State Route (SR) 84 to expressway standards. The undertaking will also improve the SR 84/Interstate (I) 680 interchange ramps and extend the existing southbound lane. A more detailed description of the undertaking and the area of potential effects (APE) can be found on pages 1 through 3 of the Historic Properties Survey Report (HPSR) enclosed with your letter.

Caltrans has provided clarification and supplementation information in response to questions sent by OHP staff via email on June 29, 2017.

Efforts to identify historic properties that may be affected by the undertaking were conducted on behalf of Caltrans by Archaeological/Historical Consultants (A/HC). Efforts are documented in the HPSR, and included a records search, archival research, pedestrian survey, Extended

Phase I (XPI) archaeological investigations, and Native American consultation. Identification efforts identified the following resources within the APE:

- 7010 E Vallecitos Rd., Sunol, CA (Perry/Hodges Ranch);
- 7820 E Vallecitos Rd., Sunol, CA (Franco/Barrett Property;
- 8350 E Vallecitos Rd., Sunol, CA (Eckroat Farm/Duerr Ranch);
- GE Hitachi Vallecitos Nuclear Facility; and
- CA-ALA-656, a buried prehistoric archaeological site containing moderately-developed midden soils with fire-cracked rock, animal bone, battered cobbles, and human remains.

An XPI study was conducted to determine the extent of CA-ALA-656, and to confirm the presence or absence of buried archaeological soils in locations of high geoarchaeological sensitivity within the vertical APE. As part of the XPI study, trenching occurred near the proposed retaining wall location adjacent to CA-ALA-656. No archaeological deposits associated with the resource were identified. The geoarchaeological testing also concluded that the area of direct impact (ADI) of the APE has a low sensitivity for historical archaeology.

Caltrans' identification efforts determined that 7010 E Vallecitos Rd and 7820 E Vallecitos Rd are ineligible for listing in the National Register of Historic Places (NRHP). Based on review of the submitted documentation, I concur.

Native American consultation was conducted by A/HC, and is documented in the HPSR. To date, Caltrans has not received comments from any consulting Native American tribe, group, or individual that CA-ALA-656 has cultural values other than those associated with NRHP Criterion D (data potential).

In accordance with Stipulation VIII.C.4 of the Section 106 PA, Caltrans will treat CA-ALA-656, 8350 E Vallecitos Rd., Sunol, CA, and the GE Hitachi Vallecitos Nuclear Facility as eligible for listing on the NRHP for the purposes of this undertaking.

In accordance with Stipulation X of the Section 106 PA, Caltrans will continue consultation with the SHPO on the assessment of effects as a result of this undertaking.

If you require further information, please contact my staff Natalie Lindquist at 916-445-7014 or Natalie.Lindquist@parks.ca.gov or Alicia Perez at 916-445-7020 or Alicia.Perez@parks.ca.gov.

Sincerely,

Julianne Polanco
State Historic Preservation Officer

Appendix D Environmental Commitments Record

In order to be sure that all of the environmental measures identified in this document are executed at the appropriate times, the following mitigation program (as articulated on the proposed Environmental Commitments Record [ECR] which follows) would be implemented. During project design, avoidance, minimization, and /or mitigation measures will be incorporated into the project's final plans, specifications, and cost estimates, as appropriate. All permits will be obtained prior to implementation of the project. During construction, environmental and construction/engineering staff will ensure that the commitments contained in this ECR are fulfilled. Following construction and appropriate phases of project delivery, long-term mitigation maintenance and monitoring will take place, as applicable. As the following ECR is a draft, some fields have not been completed, and will be filled out as each of the measures is implemented. Note: Some measures may apply to more than one resource area. Duplicative or redundant measures have not been included in this ECR.

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
Community Character and Cohesion, Utilities/Emergency Services, Traffic and Transportation/Pedestrian and Bicycle Facilities			
TR-1. During the final design phase for the Build Alternative, a Transportation Management Plan (TMP) will be prepared in accordance with Caltrans requirements and guidelines to minimize the construction-related delays and inconvenience for travelers in the project area. The TMP will address the potential traffic impacts as they relate to staged construction, detours, and other traffic handling concerns associated with construction of the proposed project. It will include: • Distribution of press releases and other documents as necessary to notify the public of upcoming road closures and detours; • Coordination with CHP and local law enforcement on contingency plans; • Utilization of portable Changeable Message Signs, CHP Construction Zone Enhanced Enforcement Program, and Freeway Service Patrol where possible to minimize delays. The TMP will also minimize complete road closures by recommending staged construction in the contract bid package.	2.1.6.4	Caltrans, Alameda CTC	Final design

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
Visual/Aesthetics			
VIS-1. Any roadside vegetation and irrigation systems that are damaged or removed during project construction would be replaced according to Caltrans policy and highway landscaping standards. Highway planting would be installed under a separate contract and within two years following the completion of the highway construction, with a three-year plant establishment period. The highway planting would be funded by Alameda CTC.	2.1.10.4	Caltrans, Alameda CTC	Construction
VIS-2. When trenching for utilities, avoid trenching within drip lines of trees and screening shrubs. Directional drilling that would avoid damaging root systems of established plant material shall be used, when reasonable, as opposed to open trenching to install new conduit in places where work within the drip line would be required. Trees and screening shrubs shall be protected from damage during construction.	2.1.10.4	Caltrans, Alameda CTC	Construction
VIS-3. Add trees and irrigation within Caltrans right-of-way where necessary to screen residential views of proposed express lane signs and lights.	2.1.10.4	Caltrans, Alameda CTC	Construction
VIS-4. Attach all electronic toll readers to sign gantries.	2.1.10.4	Caltrans, Alameda CTC	Construction
VIS-5. Incorporate aesthetic features such as architectural treatments to walls, bridges, and barriers to lessen visual impacts, as illustrated in Figures 2.1.10-3, 2.1.10-7, and 2.1.10-9.	2.1.10.4	Caltrans, Alameda CTC	Final design
VIS-6. As directed by Caltrans, appropriate light and glare screening measures should be used at the construction staging areas including the use of downward-cast lighting.	2.1.10.4	Caltrans, Alameda CTC	Construction
Cultural Resources			
CUL-1. During project construction, implement the monitoring protocols, discovery procedures, chain of command, and treatment and analysis protocols set forth in the Post-Review Discovery and Monitoring Plan.	2.1.11.4	Caltrans, Alameda CTC, Construction Contractor	Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
CUL-2. If cultural materials are discovered during construction, all earth-moving activity within and around the immediate discovery area will be diverted until a qualified archaeologist can assess the nature and significance of the find.	2.1.11.4	Caltrans, Alameda CTC, Construction Contractor	Construction
CUL-3. If human remains are discovered, California Health and Safety Code Section 7050.5 states that further disturbances and activities shall stop in any area or nearby area suspected to overlie remains, and the County Coroner contacted. If the remains are thought by the coroner to be Native American, the coroner will notify the Native American Heritage Commission (NAHC), who, pursuant to PRC Section 5097.98, will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact the Branch Chief of Cultural Resources, Archaeology so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable.	2.1.11.4	Caltrans, Alameda CTC, Construction Contractor	Construction
Water Quality and Storm Water Runoff			
A SWPPP will be prepared by the Contractor and approved by Caltrans prior to the start of construction. The SWPPP includes the development of a Construction Site Monitoring Program that presents procedures and methods related to the visual monitoring and sampling analysis plans for non-visible pollutants, sediment and turbidity, and pH. As previously noted, the project has been determined to be Risk Level 3 (the highest risk). Risk Level 3 project requires compulsory monitoring of stormwater runoff pH and turbidity, and pre- and post-construction aquatic biological assessments during specified seasonal windows. With proper implementation of features or BMPs, short-term construction-related water quality impacts and permanent water quality impacts would be avoided or minimized.	2.2.2.4	Caltrans, Alameda CTC, Construction contractor	Final design

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
WQ-1. Potential temporary impacts to water quality can be avoided or minimized by implementing standard BMPs recommended for a particular construction activity. The selected temporary BMPs are consistent with the practices required under the Construction General Permit and the Caltrans MS4 permit and are intended to achieve compliance with the requirements of the permits. Compliance with the requirements of these permits, and adherence to the conditions, would reduce or construction-related impacts to water quality. Table 2.2.2-2 lists minimum temporary control BMPs that would be implemented before and during construction.	2.2.2.4	Caltrans, Alameda CTC, Construction contractor	Final design, Construction
WQ-2. The Caltrans MS4 permit contains provisions to reduce, to the maximum extent practicable, pollutant loadings from the facility once construction is complete. The permit stipulates that permanent measures that control pollutant discharges must be considered and implemented for all new or reconstructed facilities. Permanent control measures located within the Caltrans right-of-way reduce pollutants in stormwater runoff from the roadway. These measures reduce the suspended particulate loads, and thus pollutants associated with the particles, from entering waterways. The measures would be incorporated into the final engineering design or landscape design of the project and would take into account expected runoff from the roadway. In addition, the permit also stipulates that an operation and maintenance program be implemented for permanent control measures, including both design pollution prevention BMPs and treatment BMPs. The following BMPs will be considered to reduce long-term impacts to water quality. **Consideration of downstream effects related to potentially increased flow.** The project would discharge into unlined	2.2.2.4	Caltrans, Alameda CTC	Final design

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
channels; therefore, necessary erosion control will be applied to the ditches. Increased sediment loads may be transported to downstream waterways; therefore, permanent erosion control measures should be applied to all new or exposed slopes. The project will incorporate hydromodification measures per Section7 of the Alameda County C.3 Stormwater Technical Guidance requirements. **Concentrated flow conveyance systems**. The project would have the potential to create water gullies, create or modify existing slopes, require the concentration of surface runoff, and be required to cross drains. Each of these conditions would require the proper design to the following drainage facilities to handle concentrated flows: ditches, berms, dikes, and/or swales, overside drains, flared end sections, and outlet protection/velocity dissipation devices. **Slope/surface protection systems.** The project would create or modify existing slopes requiring the application of vegetated surfaces and/or hard surfaces. **Preservation of existing vegetation.** At all locations, preserving existing vegetation is beneficial. The following general steps should be taken to preserve existing vegetation during the Design Phase: - Identify and delineate in contract documents all vegetation to be retained. - Designer should provide specifications in contract documents that the Contractor would delineate the areas to be preserved in the field prior to the start of soil-disturbing activities. - Designer should provide specifications 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.			

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
- Designer should, when specifying the removal of vegetation, consider provisions included in the contract documents to minimize impacts (increased exposure or wind damage) to the adjacent vegetation that will be preserved.			
Geology/Soils/Seismic/Topography			
GEO-1. Caltrans's design and construction guidelines incorporate engineering standards that address seismic risks. Project elements will be designed and constructed to meet seismic design requirements for ground shaking and ground motions, as determined for the project vicinity and site conditions.	2.2.3.4	Caltrans, Alameda CTC	Final design
GEO-2. Additional geotechnical subsurface and design investigations will be performed during the final project design and engineering phase. The investigations will include site-specific evaluation of subsurface conditions at the location of proposed Hearn Avenue overcrossing footings and proposed retaining walls as well as investigations for earthquake-induced liquefaction, soil expansion, soil corrosivity, and compaction settlement. An evaluation of construction dewatering will be included as a part of the field investigation program to provide the basis for construction dewatering plans used for final design.	2.2.3.4	Caltrans, Alameda CTC	Final design
Paleontology			
PAL-1. Implementation of the following measures would avoid potential impacts to sensitive paleontological resources, if present. • Update and finalize the Paleontological Mitigation Plan once project design is nearly complete. The final plan will be implemented during construction. • Include a specification in the construction contract stating that paleontological monitoring will occur in accordance with the Paleontological Mitigation Plan.	2.2.4.4	Caltrans, Alameda CTC	Final design, Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
Hazardous Waste/Materials			
HAZ-1. During the final project design phase, a Preliminary Site Investigation (PSI) will be performed in accordance with current Caltrans guidance to investigate hazardous materials concerns related to soil, groundwater, and building materials within the project limits, as identified in the project ISA. The purpose of the PSI will be to pre-characterize soils, groundwater, and building materials for potential disposal and/or reuse and evaluate the chemical quality of soils for construction worker health and safety. A work plan for the PSI will be submitted to Caltrans for review and approval. Additional investigation may be required to fully evaluate hazardous materials issues if concerns are identified during the PSI. All environmental investigations for the project will be provided to project contractors, so the findings may be incorporated into their Health and Safety and Hazard Communication Programs. The PSI will include recommendations for managing hazardous materials encountered during project construction to protect human health and the environment; these measures shall be incorporated into the final project design. Based on the findings of the investigation, the PSI shall refine, as necessary, the following recommendations for managing hazardous materials in soil, groundwater, and buildings materials: • ADL-contaminated soils shall be reused in accordance with the DTSC's *2016 Soil Management Agreement for Aerially Deposited Lead-Contaminated Soils*. • Lead Compliance Plans for ADL-contaminated soils and pavement markings containing lead shall be prepared in accordance with Caltrans Standard Special Provisions and implemented by the project construction contractor(s) to ensure compliance with OSHA and	2.2.5.4	Caltrans, Alameda CTC	Final design, Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
Cal/OSHA worker safety regulations. • Groundwater from dewatering of excavations, if any, shall be stored in Baker tanks during construction activities and characterized to determine the appropriate treatment requirements (if necessary) for discharge/disposal. The extracted groundwater shall be collected and managed for disposal/treatment in compliance with local and/or state regulations. • All loose and peeling lead-based paint and asbestos-containing material shall be removed by a certified contractor(s) in accordance with local, state, and federal requirements. All other hazardous materials will be removed from structures in accordance with Cal/OSHA regulations. • Asphalt concrete and Portland cement concrete grindings shall be reused in accordance with the San Francisco Bay RWQCB's (2007) guidance to protect water quality or transported off-site for recycling or disposal.			
Noise			
NOI-1. Standard Caltrans measures that are used for all projects include that construction noise shall not exceed a maximum sound level of 86 dBA at 50 feet from job site activities between the hours of 9:00 PM to 6:00 AM. The following standard measures will also be implemented to minimize or reduce the potential for noise impacts from project construction: • Limit pile driving activities to between 7:00 AM to 7:00 PM, where feasible. • Equip all internal combustion engine driven equipment with intake and exhaust mufflers that are in good condition and appropriate for the equipment.	2.2.7.4	Caltrans, Alameda CTC, Construction contractor	Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
• Prohibit unnecessary idling (i.e., greater than 5 minutes in duration) of internal combustion engines within 100 feet of residences. • Avoid staging of construction equipment within 200 feet of residences and locate all stationary noise-generating construction equipment, such as air compressors, portable power generators, or self-powered lighting systems as far as practical from noise-sensitive receptors. • Utilize "quiet" air compressors and other "quiet" equipment where such technology exists.			
Energy			
Measures implemented to reduce greenhouse gas (GHG) emissions, such as using energy-efficient lighting, keeping construction engines properly tuned, and limiting idling of construction vehicles, are likely to also reduce energy consumption. See Measure GHG-1 in Section 3.2.1.4.	2.2.8.4	Caltrans, Alameda CTC, Construction contractor	Construction
Natural Communities			
Vegetation Communities - BIO-1. The measures listed below would be implemented as part of construction to minimize and/or avoid impacts to sensitive vegetation communities, species, and habitat as well as to common biological resources. • Prior to initiation of the proposed action, the qualifications of the biological monitor(s) would be submitted to USFWS and CDFW for approval. Such approved biologists are hereafter referred to as the "approved biologist(s)." • The approved biologist(s) (knowledgeable about sensitive species and habitats in the action area) or designee(s) will conduct pre-construction surveys to examine the BSA for occurrences of special-status wildlife species, including nesting birds. In the event that occupied nests or other habitats are	2.3.1.3	Caltrans, Alameda CTC	Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
found, the approved biologist(s) will adhere to the measures set forth by the USFWS. If the situation is otherwise unique, the USFWS-approved biologist will discuss the situation with a Caltrans biologist who would contact the USFWS and CDFW to determine how to avoid or relocate the resident animal(s). • Construction Work, Access, and Staging Areas. All proposed construction will be limited to the existing and proposed right-of-way. Environmentally Sensitive Areas (ESAs) will be identified on contract plans and discussed in the Special Provision. The ESAs will include areas designated in the environmental document and biological reports that support wetlands, waters, and/or habitats that potentially support listed species, and have been specifically identified to avoid during construction. ESA provisions may include, but are not limited to, the use of temporary high visibility fencing to delineate the proposed limit of work in areas adjacent to sensitive resources, or to delineate and exclude sensitive resources from potential construction impacts. Contractor encroachment into ESAs will not be allowed without an approved biologist(s) or designee(s) being present. This includes staging/operation of heavy equipment or casting of excavation materials. ESA provisions will be implemented as a first order of work and remain in place until all construction is completed. • Construction discharges. No debris, soil, silt, sand, bark, slash, sawdust, cement, concrete, washings, petroleum products or other organic or earthen material shall be allowed to enter into or be placed where it may be washed by rainfall or runoff into waters of the United States or drainages. No discharges of excessively turbid water will be allowed, and all equipment will be well-maintained and free of leaks.			

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
• Onsite Construction Personnel Education Program. Before the onset of construction and within 3 days of any new worker arrival, an approved biologist(s) will conduct an education program for all construction personnel. At a minimum, the training will include a description of California tiger salamander, California red-legged frog, Alameda whipsnake, and other listed species and their habitats; the potential occurrence of these species within the project footprint; an explanation of the status of these species and protection under the FESA, CESA, and all other federal, state, and local regulatory requirements; the measures to be implemented to conserve listed species and their habitats as they relate to the work site; and boundaries within which construction may occur. A fact sheet conveying this information will be prepared and distributed to all construction crews and project personnel entering the project footprint. Upon completion of the program, personnel will sign a form stating that they attended the program and understand all of the avoidance and minimization measures and implications of the FESA, CESA, and all other federal, state, and local regulatory requirements. • Erosion control. Temporary erosion control and slope stabilization best management practices (BMPs) will be installed before the start of the wet season (October 15 through April 15). Erosion control measures may include silt fencing, straw wattles, straw bales, coir blankets, sediment traps, and other protective measures to minimize the potential for erosion of sediment beyond the work area or degradation of water quality in adjacent aquatic habitats. • Restoration/vegetation. Upon project completion, all temporarily disturbed areas will be restored to pre-construction conditions.			

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
Vegetation Communities - BIO-2: Compensatory mitigation for temporary impacts to sensitive vegetation communities or natural communities of concern, including valley oak woodland, red willow thickets, Fremont cottonwood forests, and riparian scrub and forest will be provided through the on-site restoration of habitat by planting native species that are typical to that habitat. The restored vegetation communities will be monitored for success. If enough space is not available for on-site mitigation, off-site like-habitat providing these species habitat requirements will be preserved through the purchase of mitigation bank credits.	2.3.1.3	Caltrans, Alameda CTC, Sonoma County	Final design
Trees - BIO-3. Post-construction measures will include revegetation of temporarily impacted areas by the planting of trees where appropriate, selecting sites based on existing topography, hydrology, and surrounding habitat. An arborist will work with CDFW to select the most suitable locations for mitigation for trees removed from the riparian corridor of Vallecitos Creek. Trees located in permanent impact areas are likely to be removed during project activities. Some trees located in temporary impact areas may be preserved depending on the specific activity occurring near them. Caltrans will make an effort to reduce impacts to trees in temporary impact areas and along the edge of the project footprint to the greatest extent possible during construction by designating trees on plan sheets and marking protected areas (the CRZ) around trees with high visibility polypropylene ESA fencing. Most healthy trees can tolerate one-sided root cutting and recover from the loss. Trees that have roots cut on two sides usually suffer much more damage and are less stable. Trees that suffer root loss on three or more sides should be considered permanently impacted and removed. For the purpose of the cumulative effects analysis, Caltrans used the summation of both temporary and permanent impacts	2.3.1.3	Caltrans, Alameda CTC	Final design, construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
for calculating the project's impact to trees. This created a conservative baseline to determine whether the project's contribution to cumulative effects will be considerable. Only those trees requiring removal will be cut down. Whenever possible, trees will be trimmed rather than removed. To avoid potential damage to retained trees, trees will be safeguarded during construction through implementation of the following measures as applicable: • No construction equipment, vehicles or materials shall be stored, parked or staged within the CRZ; and • Work will not be performed within the CRZ of remaining trees without consultation with an ISA-certified arborist. If trees are damaged during construction and become unhealthy or die, the damaged tree(s) will be removed and replaced. A Tree Protection Plan will be prepared and implemented to minimize damage to native trees during construction.			
Trees - BIO-4: Tree removal will be mitigated through planting at a 3:1 ratio on-site, to the maximum extent possible given space available, for all native species within riparian areas, and for coast live oaks and valley oaks in oak woodlands (including uplands). For other tree species removed in upland areas, Caltrans will provide tree replacement on-site at a minimum 1:1 ratio in the space available. A 3:1 ratio is standard for replacement of impacted oak trees on Caltrans projects. The need for some off-site upland and riparian tree planting is anticipated. Replanted areas will be monitored for success for up to 10 years. The performance criteria for replacement of tree plantings is 60 percent survival of all plantings at the end of the monitoring period (3 to 10 years). If survival drops below 60 percent during the monitoring period, the project sponsor will replace plantings to bring survival above this level.	2.3.1.3	Caltrans, Alameda CTC	Final design, construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
Within oak woodlands, replacement trees will be primarily coast live oak and valley oak. Of the trees that fall within the permanent footprint, 209 are oak species, and of those 39 have a cumulative DBH (the sum of the diameters of all the main trunks on a given tree) greater than 20 inches. The total replacement numbers for these oaks will be, at a minimum, 627 trees (container stock or acorns, as appropriate) to achieve a 3:1 tree replacement ratio. Precise planting locations will be identified during the final design phase. Potentially suitable locations have been selected based on soil types, existing drainage patterns, and surrounding habitat types. Riparian habitat removed along Vallecitos Creek will be offset by planting trees in locations where there are currently gaps in the riparian overstory. Planting of trees will occur within the Caltrans ROW. Details for off-site planting and riparian tree planting success criteria will be determined during the project permitting process with CDFW (1602 Streambed Alteration Agreement) and RWQCB (401 Certification).			
Migratory Corridors - BIO-5. Light, glare, and construction noise and vibration impacts will be addressed through the following measures: • Use lighting in areas only where necessary for safety and signage. Eliminate all lighting in other areas. • All lighting should be downcast to minimize lighting of natural areas, particularly in riparian areas and adjacent to drainages. • Limit operation of vibration causing equipment such as pile drivers, dozers, large excavators to daylight hours when working in areas adjacent to open space. • A biological monitor shall be present to observe activities of wildlife during nighttime construction adjacent to	2.3.1.3	Caltrans, Alameda CTC	Final design, construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
open spaces. If activities are noted to affect wildlife, biological monitor shall stop construction activities as necessary. • New bulbs will be no greater than 235 watt light-emitting diode (LED) with a color temperature no greater than 4,000 Kelvins (K).			
Wetlands and Other Waters of the United States			
BIO-6. The General Construction Permit will require the Contractor to submit a storm water pollution prevention plan (SWPPP). This plan must meet the standards and objectives to minimize storm water pollution impacts set forth in Section 13.37 of the Caltrans Standard Specifications. The SWPPP must also comply with the goals and restrictions identified in the RWQCB's Basin Plan. Any additional measures included in the Water Quality Certification will be implemented. The contractor will also comply with the following standards/objectives, at times referred to as BMPs, including but not limited to the following: • Where work areas encroach on wetlands, RWQCB-approved physical barriers adequate to prevent the flow or discharge of sediment into these systems will be constructed and maintained between working areas and streams, lakes, and wetlands. • Discharge of sediment into culverts and storm drains will be held to a minimum during construction of the barriers. • Discharge will be contained through the use of RWQCB-approved measures that will keep sediment from entering jurisdictional waters beyond the project limits. • All off-road construction equipment should be cleaned of potential noxious weed sources (mud and vegetation) before entering the project footprint and after entering a potentially infested area before moving on to another area. The	2.3.2.4	Caltrans, Alameda CTC, Construction contractor	Final design, Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
contractor will employ whatever cleaning methods (typically spraying with a high-pressure water hose) are necessary to ensure that equipment is free of noxious weeds. • Equipment should be considered free of soil, seeds, and other such debris when a visual inspection does not disclose such material. Disassembly of equipment components or specialized inspection tools is not required. Equipment washing stations will be placed in areas that afford easy containment and monitoring (preferably outside of the project footprint) and that do not drain into sensitive (riparian, wetland, etc.) areas. Upon completion of the project, all temporarily impacted areas will be restored to approximately original site conditions.			
BIO-7. Permanent impacts to USACE jurisdictional wetlands will be mitigated at a minimum 3:1 ratio, and temporary impacts at a minimum 1:1 ratio. Stormwater features that are waters of the State will be replaced on-site at a minimum 1:1 ratio. Impacts to riparian habitat will be mitigated through a combination of on-site enhancement of existing habitat and restoration of land within riparian corridors, through the planting of native riparian tree, shrub, and forb species. Proposed compensation for wetland impacts includes purchase of credits at a local mitigation bank, on-site restoration of existing wetlands and waters within the Caltrans ROW, and on-site restoration in temporarily impacted areas. When habitat restoration on-site is not possible, the required compensatory mitigation will be done off-site. Arrangements are currently being explored with the Collier Canyon Mitigation and Conservation Bank to purchase credits for the mitigation of impacts to wetlands and waters. If mitigation credits are not available at the Collier Canyon facility, mitigation will be	2.3.2.5	Caltrans, Alameda CTC,	Final design

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
provided at another mitigation bank facility, or through a combination of on- and off-site mitigation. On-site mitigation may be used as compensation for temporary impacts to wetlands and waters. On-site mitigation could be achieved through the restoration or enhancement of existing wetlands or intermittent or ephemeral channels. The temporarily impacted wetlands will be revegetated with native wetland plant species and monitored for success.			
Plant Species			
Implementation of Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4) would avoid potential indirect effects to special-status plants such as dust, spread of invasive species, or downstream changes in hydrology or sedimentation.	2.3.3.4	Caltrans, Alameda CTC	Final design, construction
BIO-8. Prior to the commencement of construction activities, a qualified biologist shall conduct appropriately timed surveys for big tarplant, round-leaved filaree, Congdon's tarplant, and California alkali grass. To correspond with these species' blooming period, the surveys shall include botanical inventories during March through May (the blooming period of round-leaved filaree and California alkali grass) and July through September (the blooming period of big tarplant, and Congdon's tarplant). If listed plant species are discovered within the construction area, protective measures will be established. These protective measures will include setting a temporary protective buffer around the plant and conducting appropriate agency coordination, which may result in moving the species to another location within Caltrans ROW and then replanting the species during the restoration phase of the project.	2.3.3.4	Caltrans, Alameda CTC	Construction
Animal Species			
Western Pond Turtle The following avoidance and minimization measure, in addition to those identified in Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4), will be implemented to avoid	2.3.3.4	Caltrans, Alameda CTC,	Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
impacts to western pond turtle: **BIO-9**. Before any construction activities begin, an approved biologist(s) shall conduct a training session for all construction personnel. At a minimum, the training shall include a description of the western pond turtle and its aquatic and upland nesting habitat, the general measures that are being implemented to conserve the western pond turtle as they relate to the project, and the boundaries within which the project may be accomplished. An approved biologist(s) shall survey the work site no more than 48 hours before the onset of activities for signs of western pond turtles and/or western pond turtle nesting activity (i.e. recently excavated nests, nest plugs) or nest depredation (partially to fully excavated nest chambers, nest plugs, scattered egg shell remains, egg shell fragments). Preconstruction surveys to detect western pond turtles should focus on suitable aerial and aquatic basking habitat such as logs, branches, rootwads, and rip-rap, as well as the shoreline and adjacent warm, shallow waters where pond turtles may be present below the water surface beneath algal mats or other surface vegetation. Preconstruction surveys to detect western pond turtle nesting activity should be concentrated within 402 meters (1,319 feet) of suitable aquatic habitat and should focus on areas along south- or west-facing slopes (Jennings and Hayes 1994; Holland 1991) with bare hard-packed clay, silt soils, or a sparse vegetation of short grasses or forbs. If western pond turtles or their nesting sites are found, the biologist shall contact CDFW to determine whether relocation and/or exclusion buffers and nest enclosures are appropriate. If CDFW approves of moving the animal, the biologist shall be allowed sufficient time to move the western pond turtle(s) from the work site before work activities begin.			

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
Special-Status Bird Species, Migratory Birds, and Nesting Raptors Measure BIO-1 (Section 2.3.1.3) would minimize potential impacts to birds that have the potential to nest and forage within the BSA. Migratory Bird Special Contract Provisions will be adhered to in order to avoid potential effects to special-status bird species. Caltrans will employ the use of a qualified biologist to implement avoidance and minimization measures. The measures below will be implemented for construction work during the nesting season (February 15 through August 31). **BIO-10**. Preconstruction surveys for migratory birds, raptors, other special-status bird species, and appropriate nesting habitat will be conducted within 50 feet of the construction area no more than three days prior to ground disturbing activities. If preconstruction surveys indicate the presence of any migratory bird nests where activities will directly result in bird injury or death, a buffer zone of 50 feet will be placed around the nest. In the event that an active nest is found after the completion of preconstruction surveys and after construction begins, all construction activities within a 50-foot radius will be stopped until an approved biologist(s) has evaluated the nest and erected the appropriate buffer around it. If an active raptor or special-status species nest is found, CDFW will be consulted to determine the appropriate buffer area to be established around the nesting site and the type of buffer to be used, which typically is ESA fencing. An approved biologist(s) will delineate the buffer using ESA fencing, pin flags, and/or yellow caution tape. The buffer zone will be maintained around all active nest sites until the young have fledged and are foraging independently. If establishment of a buffer is not feasible, CDFW will be contacted for further avoidance and minimization guidelines. A biological monitor will be present during the raptor nesting season.	2.3.3.4	Caltrans, Alameda CTC,	Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
Western Burrowing Owl Measure BIO-1 (Section 2.3.1.3) would minimize potential impacts to western burrowing owls. Migratory Bird Special Contract Provisions will be adhered to in order to avoid potential effects to special-status bird species. The following measure is also proposed: **BIO-11**. Appropriate avoidance, minimization, or protection measures shall be determined in consultation with the CDFW in the event an active burrow is located in an area subject to disturbance, or within the typical setback (i.e., occupied burrows or nests within 150 feet of an area subject to disturbance during the non-breeding season, or within 250 feet of an area subject to disturbance during the breeding season).	2.3.3.4	Caltrans, Alameda CTC,	Construction
Tule Elk The following avoidance and minimization measure, in addition to Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4), will be implemented to avoid potential impacts to migrant tule elk: **BIO-12.** Focused species surveys will be conducted to determine the presence of tule elk in the project area, prior to the start of construction. If tule elk are observed within or immediately adjacent to the project area during construction, a stop work order may be issued until the individual, or herd, has moved away from the site.	2.3.3.4	Caltrans, Alameda CTC,	Construction
San Francisco Dusky-Footed Woodrat **BIO-13**. To avoid or minimize potential impacts on San Francisco dusky-footed woodrat, Caltrans will implement the following measure as part of the proposed project: • Preconstruction Surveys for San Francisco Dusky-Footed Woodrat. Before the start of construction, an approved biologist(s) will conduct a survey of the project footprint and a 30-foot buffer beyond the project footprint boundaries to determine the location of active and inactive	2.3.3.4	Caltrans, Alameda CTC,	Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
woodrat dens. Any dens detected during the surveys will be recorded and mapped in relation to the construction disturbance footprint. In addition, the biologist will evaluate any signs of current woodrat activity, including the presence of fresh scat, freshly chewed vegetation, and the presence of cobwebs covering nest entrances. A 30-foot equipment exclusion buffer will be established around active and inactive dens that can be avoided; within such buffers, all vegetation will be retained and nests will remain undisturbed. • Potential Trapping and Relocation. A woodrat trapping and relocation plan will be developed and implemented prior to project construction for any nest site that will be directly affected by the proposed project. Specific methods for trapping woodrats and relocation of individuals and their nest sites, as well as identification of suitable sites for relocation, include: 1. Trapping at all woodrat middens mapped within the project's temporary and permanent impact areas, 2. Installing relocation midden structures, 3. Relocating trapped woodrats to the relocation midden structures, and 4. Dismantling existing woodrat middens in the project area to be cleared, to discourage woodrat reoccupation. If suitable habitat is not available for relocation of the woodrats in the project vicinity, offsite locations will be identified. Trapping of the woodrats will be conducted by an approved biologist(s) with a current CDFW collection permit to trap and relocate the species. Ideally, the trapping will occur outside of the breeding period, between September and December.			

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
American Badger **BIO-14.** The following measures will be implemented to avoid and minimize potential impacts to the American badger. • Preconstruction surveys will be conducted within the project footprint in areas of suitable habitat to identify dens or signs of American badger. These surveys will be conducted no more than 30 days before the start of ground-disturbing activities and will be phased with project build-out. • If an American badger is detected on site at any time during these surveys, CDFW will be contacted to discuss ways to proceed with the project and to avoid take to the maximum extent practicable.	2.3.3.4	Caltrans, Alameda CTC,	Construction
Special-Status and "High Priority" Bats **BIO-15.** Focused preconstruction surveys will be conducted for all areas that provide suitable bat roosting habitat, including human-made structures, snags, rotten stumps, mature trees with broken limbs, exfoliating bark, and dense foliage. Sensitive habitat areas and roost sites will be avoided to the maximum extent practicable. To avoid mortality and reproductive loss, Caltrans may limit tree removal between September 1 and April 14, outside the breeding season, so as not to disturb maternal colonies or roosts. If potential roost sites (e.g., trees, snags) are to be removed or trimmed, limbs smaller than 3 inches in diameter will be cut and the tree will be left overnight to allow any bats using the tree/snag for roosting time to leave and find another roost. A biological monitor will be present during the trimming or removal of trees/snags. If occupied sites are observed in the BSA, Caltrans will contact CDFW to report occurrences for the agency's database. Caltrans will provide an appropriate buffer between any occupied roost and construction activities. In addition, nighttime construction will be limited. Measures relating to nighttime work include those	2.3.3.4	Caltrans, Alameda CTC,	Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
outlined in Measure BIO-5, as well as the following: • Bat Day and Night Roost Avoidance. If deemed necessary, specific day and night bat roost avoidance and minimization measure will be developed through technical assistance with CDFW and bat specialists.			
Threatened and Endangered Species			
Vernal Pool Fairy Shrimp Potential indirect effects on the vernal pool fairy shrimp or its habitat that could result from erosion, sedimentation, or pollution will be avoided or minimized through Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4). No compensatory mitigation is proposed, because implementation of the project is not expected to directly or indirectly affect individual vernal pool fairy shrimp or their associated habitat.	2.3.5.4	Caltrans, Alameda CTC	Construction
California Tiger Salamander In addition to Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4), the following avoidance and minimization measures are proposed for California tiger salamander: **BIO-16.** The following avoidance and minimization measures are proposed to avoid impacts to California tiger salamander • An approved biologist(s) shall be onsite during all ground-disturbing activities or vehicle travel not on existing roads or disturbed areas. The biologist(s) through the residential engineer shall be granted the authority to stop any work that may result in the take of listed species. If the biologist(s) exercises this authority, the CDFW and the USFWS shall be notified by telephone and electronic mail within 1 working day. • Where feasible, project activities in dispersal habitat will be timed to occur during the dry season (nonbreeding season for the	2.3.5.4	Caltrans, Alameda CTC	Final design, construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
California tiger salamander) (April 15 through October 15) to minimize potential effects to salamander breeding and dispersal. • Work within potential aquatic breeding habitat will only occur once the aquatic feature no longer holds water, or from April 15 through October 15. • Portions of the project footprint that are suitable refuge habitats for the California tiger salamander (i.e., grasslands and other natural habitats within 1.24 miles of potential breeding sites) will be surveyed prior to initiating ground-disturbing activities to identify burrows or other potential sites (under materials that could provide cover such as boards, scrap metal, woody debris, or other materials) that might be occupied by this species. To the extent feasible, potentially occupied refugia burrows within the project footprint will be fenced and avoided for the duration of the activity at that location. • Within 24 hours prior to initial ground-disturbing activities, portions of the project footprint where potential California tiger salamander habitat has been identified will be surveyed by an approved biologist(s) to clear the site of salamanders moving above-ground, or taking refuge in burrow openings or under materials that could provide cover such as boards, scrap metal, woody debris, or other materials. • An approved biologist(s) will be present during initial ground-disturbing activities in suitable refugia habitats for the California tiger salamander to monitor the removal of the top 12 inches of topsoil at all project locations. If California tiger salamanders are discovered during the initial ground-disturbing activities, work will be stopped immediately and the biologist will contact CDFW and			

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
USFWS within one working day. The biologist in consultation with CDFW and USFWS will use adaptive management to modify as necessary project activities to avoid or minimize effects to listed species. • If individual animals are observed, work at that location will be temporarily halted while the approved biologist(s) excavates the occupied burrow by hand, and the individual salamander is moved to a natural burrow within 0.25 mile of the construction site. CDFW will be notified if California tiger salamanders are found and relocated. Any listed amphibian will be released at the mouth of a suitable burrow and then observed until it has safely entered the burrow. • An erosion and sediment control plan will be implemented to prevent impacts of construction on breeding, dispersal, and foraging habitat outside the work areas.			
BIO-17. Caltrans proposes mitigation for California tiger salamander through on-site restoration of all temporarily impacted areas. Although the project will result in the permanent loss of potential breeding, dispersal, foraging, and refugia habitat, replanting with native erosion control species coupled with the construction of dedicated wildlife crossing structures will result in improvements to California tiger salamander upland habitat within the temporarily disturbed areas of the project footprint. Caltrans anticipates a need for off-site compensation for permanent impact areas at a 3:1 ratio. In order to mitigate for permanent direct effects to California tiger salamander, Caltrans proposes to purchase 116.67 acres of habitat (see Table 2.3.5-2) from an approved mitigation bank, and includes mitigation for impacts to potential breeding habitat. Collier Canyon Mitigation and	2.3.4.5	Caltrans, Alameda CTC	Construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
Conservation Bank (which is still in review) will provide credits for California tiger salamander and the project is within the approved service area for this mitigation bank. If Collier Canyon does not have credits available by the time of the anticipated credit purchase (in advance of project construction), arrangements will be made for purchase of credits at a nearby facility such as Oursan Ridge Conservation Bank, or Caltrans will purchase and conserve habitat to address the species' requirements. The purchase of multi-species bank credits may be used to satisfy the conditions of multiple agencies and jurisdictions including FESA, CESA, and the CEQA process. The final mitigation may be subject to change during the consultation and permitting processes. To mitigate the 31.04 acres of temporary impacts, Caltrans proposes to restore the habitat on-site. If it becomes evident after construction that it is not physically possible or appropriate to restore all 31.04 acres on-site, Caltrans will investigate other options such as enhancing existing habitat or purchasing additional off-site mitigation.			
California Red-Legged Frog In addition to the general avoidance and minimizations measured outlined in Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4), the measures listed for California tiger salamander in BIO-16 and BIO-17 will also be implemented for California red-legged frog.	2.3.4.5	Caltrans, Alameda CTC	Final design, construction
Alameda Whipsnake The measures discussed in Measures BIO-16 and BIO-17 for the California tiger salamander and California red-legged frog, respectively, in addition to Measures BIO-1 (Section 2.3.1.3) and BIO-6 (Section 2.3.2.4), are applicable to the Alameda whipsnake. **BIO-18.** Caltrans proposes to purchase 50.01 acres of habitat from an approved mitigation bank, such as Oursan Ridge Conservation Bank (Table 2.3.5-3), to	2.3.4.5	Caltrans, Alameda CTC	Final design

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
compensate for permanent impacts to Alameda whipsnake. This quantity represents a standard mitigation ratio of 3:1, which is required during consultation with USFWS.			
San Joaquin Kit Fox Direct effects to individual San Joaquin kit fox will be avoided or minimized through the proposed installation of wildlife crossing structures as well as the standard construction BMPs discussed in Measure BIO-1 (Section 2.3.1.3). Additional measures, specific to kit fox, will be implemented if one or more signs of the species is observed during preconstruction surveys or during construction. If active dens are identified, the approved biologist will adhere to the measures set forth by the USFWS, which includes establishing exclusion zones around dens to prohibit ground disturbance from impacting the kit foxes (USFWS 2011a). If the situation is otherwise unique, the USFWS-approved biologist will discuss the situation with a Caltrans biologist, who will contact the USFWS to determine how to avoid or relocate the resident animal(s). With implementation of the avoidance and minimization measures, the project would not impact San Joaquin kit fox, and compensatory mitigation would not be required.	2.3.4.5	Caltrans, Alameda CTC	Final design, construction
Invasive Species			
BIO-19. In compliance with the Executive Order on Invasive Species, EO 13112, and guidance from the Federal Highway Administration (FHWA), the landscaping and erosion control included as part of 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.	2.3.6.4	Caltrans, Alameda CTC	Final design, construction

Minimization and/or Mitigation Measure	EIR/EA Section Reference	Responsible Party	Timing
Climate Change			
GHG-1. The following measures will also be implemented in the project to reduce GHG emissions and potential climate change impacts from the project. • Caltrans and the California Highway Patrol are working with regional agencies to implement intelligent transportation systems (ITS) to help manage the efficiency of the existing highway system. ITS is 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. Proposed project components that use ITS include the variable toll message signs [VTMS] with pricing information for the southbound I-680 HOV/express lane, and the ramp meter at the southbound SR 84 to southbound I-680 connector ramp. • Utilizing energy efficient lighting, which will be defined during final design. • Keeping construction equipment engines properly tuned. • Limiting idling of construction vehicles. • Improving the bicycle/pedestrian network may encourage more travelers to use nonmotorized modes, reducing their motor vehicle use and associated GHG emissions. In addition, implementing Measure TR-1, the TMP (Section 2.1.6.4), will minimize construction-related delays for travelers in the project area by addressing the potential traffic impacts related to staged construction, detours, and other traffic handling concerns associated with construction of the proposed project. Reducing idling time reduces tailpipe GHG emissions.	3.2.1.4	Caltrans, Alameda CTC	Final design, construction

Appendix E List of Acronyms

AADT	Annual Average Daily Traffic
AB	Assembly Bill
ABAG	Association of Bay Area Governments
ACHP	Advisory Council on Historic Preservation
ADL	aerially deposited lead
Alameda CTC	Alameda County Transportation Commission
APE	Area of Potential Effects
ARPA	Archaeological Resources Protection Act
ASTM	American Society for Testing and Materials
BART	Bay Area Rapid Transit
BMP	Best Management Practice
BSA	Biological Study Area
CalEPA	California Environmental Protection Agency
Caltrans	California Department of Transportation
CAP	Clean Air Plan
CARB	California Air Resources Board
CCAA	California Clean Air Act
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
CDP	Census Designated Place
CEQ	Council on Environmental Quality
CEQA	California Environmental Quality Act
CERCLA	Comprehensive Environmental Response, Compensation and Liability Act
CESA	California Endangered Species Act
CFR	Code of Federal Regulations
CGS	California Geological Survey
CH_4	methane

CHP	California Highway Patrol
CNDDB	California Natural Diversity Data Base
CO	carbon monoxide
CRHR	California Register of Historical Resources
CRZ	clear recovery zone
CWA	Clean Water Act
dB	decibel(s)
dBA	A-Weighted decibel(s)
DBH	diameter at breast height
DPS	Distinct Population Segment
DSA	Disturbed Soil Area
DTSC	Department of Toxic Substances Control
EFH	essential fish habitat
EO	Executive Order
ESA	environmentally sensitive area
FCAA	Federal Clean Air Act
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FMMP	Farmland Mapping and Monitoring Program
FTA	Federal Transit Administration
FTIP	Federal Transportation Improvement Program
GHG	greenhouse gas
HEI	Health Effects Institute
HOV	High Occupancy Vehicle
H_2S	hydrogen sulfide
I-	Interstate
IPCC	Intergovernmental Panel on Climate Change

K	Kelvin(s)
LAVTA	Livermore-Amador Valley Transit Authority
LED	light-emitting diode
LEDPA	least environmentally damaging practicable alternative
LOS	Level of Service
MAX	Modesto Area Express
MBTA	Migratory Bird Treaty Act
MLD	Most Likely Descendent
MOU	Memorandum of Understanding
mph	mile(s) per hour
MS4	municipal separate storm sewer systems
MSAT	Mobile source air toxic
MTC	Metropolitan Transportation Commission
NAAQS	National Ambient Air Quality Standards
NAC	noise abatement criteria
NAHC	Native American Heritage Commission
NEPA	National Environmental Policy Act
NHPA	National Historic Preservation Act
NHTSA	National Highway Traffic Safety Administration
NO_2	nitrogen dioxide
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries Service
NRCS	Natural Resources Conservation Service
NPDES	National Pollutant Discharge Elimination System
O_3	ozone
OCP	organochlorine pesticides
OHWM	ordinary high water mark
OPR	Governor's Office of Planning and Research
OSHA	Occupational Safety and Health Act

Pb	lead
PCE	Primary Constituent Element
PDA	priority development areas
PG&E	Pacific Gas and Electric Company
PM	post mile
PM_{10}	particulate matter 10 micrometers or smaller
$PM_{2.5}$	particulate matter 2.5 micrometers or smaller
POAQC	Project of Air Quality Concern
PRC	Public Resources Code
PSR/PDS	Project Study Report/Project Development Support
PUD	Planned Unit Development
R&D	research and development
RCRA	Resource Conservation and Recovery Act
RTP	Regional Transportation Plan
RWQCB	Regional Water Quality Control Board
SB	Senate Bill
SCS	Sustainable Communities Strategy
SDC	Seismic Design Criteria
SF_6	sulfur hexafluoride
SFPUC	San Francisco Public Utilities Commission
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
SR	State Route
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TCE	temporary construction easement

TCM	Transportation Control Measure
TIP	Transportation Improvement Program
TMDL	Total Maximum Daily Load
TMP	Transportation Management Plan
TNAP	Traffic Noise Analysis Protocol
TOS	Traffic Operations Systems
TVC	Tri-Valley Conservancy
VOC	volatile organic compound
UGB	urban growth boundary
US 101	United States Highway 101
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VMT	vehicle mile(s) traveled
VTMS	variable toll message sign
vph	vehicle(s) per hour
WBWG	Western Bat Working Group
WDR	Waste Discharge Requirements
WPCP	Water Pollution Control Plan

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Appendix F List of Technical Studies

Complete references to the following studies are provided in Chapter 6.

Air Quality Impact Assessment (Baseline 2017)

Archaeological Survey Report (Archaeological/Historical Consultants 2017b)

Community Impact Assessment (AECOM and Vernazza Wolfe 2017)

Extended Phase 1 Archaeological Survey Report (Archaeological/Historical Consultants 2017d)

Historic Property Survey Report (Archaeological/Historical Consultants 2017a)

Historical Resources Evaluation Report (Archaeological/Historical Consultants 2017c)

Initial Site Assessment (Baseline 2016)

Jurisdictional Delineation (AECOM 2017b)

Location Hydraulic Study (WRECO 2016a)

Natural Environment Study (AECOM 2017a)

Noise Study Report (Wilson Ihrig 2017)

Paleontological Evaluation Report/Paleontological Mitigation Plan (WRECO 2016d)

Preliminary Geotechnical Report (AGS 2016)

Storm Water Data Report (WRECO 2016c)

Traffic Operations Analysis Report (Fehr and Peers 2017)

Visual Impact Assessment (Haygood and Associates 2017)

Water Quality Assessment Report (WRECO 2017b)

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Appendix G Notice of Preparation of a Draft Environmental Impact Report

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SCH No. _____

NOTICE OF PREPARATION

To: _____ From: California Department of Transportation, District 4
111 Grand Avenue MS 8B
Oakland, CA 94612

Subject: **Notice of Preparation of a Draft Environmental Impact Report**

Reference: California Code of Regulations, Title 14, (CEQA Guidelines) Sections 15082(a), 15103, 15375.

Project Title: SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project

Project Location: Alameda County, State Route 84 Post Mile (PM) 17.9 to 22.9 and Interstate 680 PM 10.3 to 15.3

Project Description: The California Department of Transportation (Caltrans), in cooperation with the Alameda County Transportation Commission, proposes to widen and conform State Route (SR) 84 to expressway standards between south of Ruby Hill Drive and the Interstate 680 (I-680) interchange. The project would also improve SR 84/I-680 interchange ramps and extend the existing southbound I-680 High Occupancy Vehicle/express lane northward by approximately 2 miles. The purpose of the project is to alleviate traffic congestion on SR 84 and at the SR 84/I-680 interchange, and to improve safety and conform SR 84 to expressway standards between south of Ruby Hill Drive and the I-680 interchange.

This is to inform you that Caltrans will be the Lead Agency and will prepare an Environmental Impact Report (EIR) for the proposed project. We need to know the views of your agency as to the scope and content of the environmental information that is germane to your agency's statutory responsibilities in connection with the proposed project. Your agency will need to use the EIR prepared by our agency when considering your permit or other approval for the project.

A more detailed project description, location map, and description of potential environmental effects are contained in the attached materials.

A copy of the Initial Study (___is) (_**X**_is not) attached.

Due to the time limits mandated by State law, your response must be sent at the earliest possible date but not later than 30 days after receipt of this notice.

Please send your response to Mr. Jamie Le Dent, Branch Chief (telephone 510-622-8729, email 84expresswayproject@dot.ca.gov) at the address shown above. Please supply us with a name for a contact person in your agency.

Date 5/11/2016 Signature _____
Title Branch Chief

Supplemental Project Information

Introduction

The California Department of Transportation (Caltrans), in cooperation with the Alameda County Transportation Commission (Alameda CTC), proposes to widen and conform State Route (SR) 84 to expressway standards between south of Ruby Hill Drive and the Interstate 680 (I-680) interchange. The project would also improve SR 84/I-680 interchange ramps and extend the existing southbound I-680 High Occupancy Vehicle/express lane[1] (HOV/express lane) northward by approximately 2 miles. Figure 1 shows the location of the project improvements, which would extend from post mile (PM) 17.9 to 22.9 on SR 84 and PM 10.3 to 15.3 on I-680, in Pleasanton, Sunol, and unincorporated Alameda County.

Project Description

The alternative developed to meet the purpose and need of the project is the Build Alternative. The No Build Alternative is also considered. With the No Build Alternative, no changes would be made to SR 84, the SR 84/I-680 interchange ramps, or I-680; therefore, no construction activities would occur and there would be no change in the operations of the existing facility.

The following sections describe the Build Alternative components by area.

SR 84

The proposed project would widen SR 84 from two to four lanes (two lanes in each direction) and overlay and restripe the roadway. A Class II bikeway[2] would be provided in each direction. Appropriate median barriers would be placed to enhance user safety.

As part of conforming SR 84 to expressway standards, access would be limited to controlled intersections to improve traffic flow and safety. The project would consolidate existing access openings to private driveways and rural roads at new frontage roads. The frontage roads would connect to a new signal intersection at Vallecitos Atomic Laboratory Road. The new intersection would provide access to frontage roads to the north of SR 84 connecting to Little Valley Road and to the south of SR 84 connecting to private driveways and rural roads. Existing driveways in the Pigeon Pass summit section would be converted to right-in, right-out access.

SR 84/I-680 Interchange and Auxiliary Lanes

At the SR 84/I-680 interchange, the project would reconstruct the existing ramps between SR 84 and northbound I-680. The project would add an HOV preferential on-ramp lane from westbound SR 84 to southbound I-680, making the on-ramp a total of three lanes, and construct

[1] The HOV/express lane is a specially designated freeway lane that is free for vehicles with two or more occupants, motorcycles, and certain alternative fuel vehicles, but also gives single-occupant vehicles the option to pay a toll to use the lane.
[2] A Class II bikeway provides a striped lane for one-way bike travel.

FIGURE 1
Project Location

an approximately 1,000-foot-long auxiliary lane[3] on southbound I-680. A realigned two-lane off-ramp connector would be provided from northbound I-680 to eastbound SR 84, and the existing northbound I-680 auxiliary lane would be lengthened to approximately 1,500 feet. The project would remove the existing on-ramp connection to the northbound I-680 auxiliary lane and provide a new grade-separated access from Paloma Way/Calaveras Boulevard on the east side of I-680 to northbound I-680 and a slip on-ramp to eastbound SR 84. The project would also realign the westbound SR 84 to northbound I-680 connector to merge with the northbound on-ramp to I-680 from Paloma Way.

A new Class I bikeway[4] would be provided at the interchange to connect the westbound SR 84 Class II bikeway with Paloma Way. A new Class II bikeway would be provided along the southbound I-680 on-ramp from Calaveras Road to connect with the eastbound SR 84 Class II bikeway.

I-680

On southbound I-680, the project would extend the existing HOV/express lane northward from its current entry point at approximately Calaveras Road to approximately 0.8 mile north of Koopman Road, a distance of approximately 2 miles. The pavement in the center median of southbound I-680 would be widened to accommodate the HOV/express lane. Overhead signs (including dynamic message signs [DMS] with pricing information) and toll readers for FasTrak transponders would be installed in the median of I-680. The northernmost overhead sign would be approximately 1.8 miles north of Koopman Road (at PM 14.2). As shown in Figure 1, the project area is currently shown as extending to Sunol Boulevard; however, no ground disturbance is currently planned north of PM 14.2.

Like the existing HOV/express lane, the new segment would allow continuous access between the HOV/express lane and the adjacent mixed-flow (general purpose) lanes. All eligible users, including HOVs, motorcycles, buses, clean air vehicles as authorized by the California Air Resources Board, and toll-paying single occupant vehicles, would be able to access the HOV/express lane. During the hours of operation (Mondays to Fridays from 5 a.m. to 8 p.m.), HOV/express lane use would be as follows:

- Eligible vehicles with HOV status will continue to use the HOV/express lane for free.
- Solo drivers can choose to use the new express lane for a fee.
- Two-axle, delivery-type trucks will also be allowed to use the HOV/express lane, but trucks with three or more axles will be excluded from the lane.

At nights and on weekends, the lane would be open to all drivers for free.

[3] An auxiliary lane is a lane used for weaving, truck climbing, speed change, or other purposes supplementary to through movement.
[4] A Class I bikeway provides a completely separated right-of-way for the exclusive use of bicycles and pedestrians, with crossflow by motorists minimized.

Like the existing HOV/express lane, the new segment would be operated by the Sunol Smart Carpool Lane Joint Powers Authority.[5]

Potential Environmental Effects

Based on preliminary surveys and information, Caltrans identified the following main subject areas for analysis in the EIR. The scope of environmental analysis will be modified based on input from this Notice of Preparation and project scoping.

- Aesthetic/Visual
- Agricultural Land
- Air Quality
- Archeological/Historical
- Biological Resources
- Drainage/Absorption
- Flood Plain/Flooding
- Geologic/Seismic
- Growth Inducement
- Land Use
- Noise
- Paleontology
- Public Services/Facilities
- Soil Erosion/Compaction/Grading
- Toxic/Hazardous
- Traffic/Circulation
- Vegetation
- Water Quality
- Wetland/Riparian
- Cumulative Effects

[5] California Streets and Highway Code Section 149.5 established the Sunol Smart Carpool Lane Joint Powers Authority and authorized the Authority and its members, consisting of Alameda CTC and Santa Clara Valley Transportation Authority, to conduct, administer, and operate a value pricing HOV program in the I-680 corridor in Alameda and Santa Clara counties.

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Appendix H Noise Measurement and Modeled Receiver and Barrier Locations

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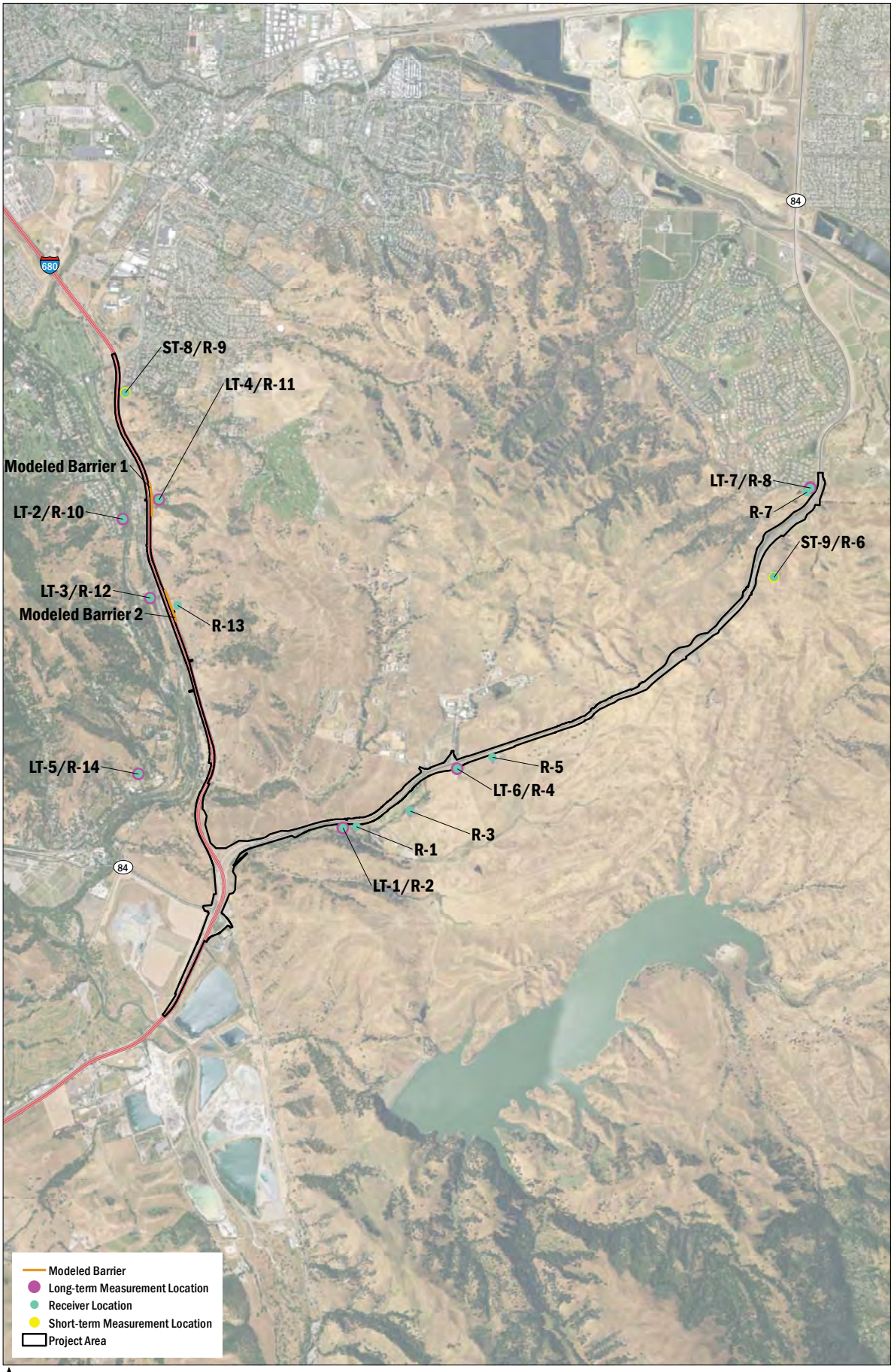

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations

0 150 Feet

1 inch = 150 feet

1:1,800

Project Area

DATA SOURCE
ESRI, 2016

MAP PREPARED BY:
AECOM Otto Alvarez, 7/5/2017

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project

Alameda County

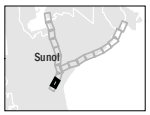

FIGURE H

Noise Measurement and Modeled Receiver and Barrier Locations

Page 1 of 22

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ESRI, 2016

MAP PREPARED BY:
AECOM Otto Alvarez, 7/5/2017

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project

Alameda County

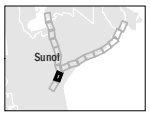

FIGURE H

Noise Measurement and Modeled Receiver and Barrier Locations

Page 2 of 22

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

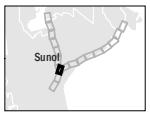

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 3 of 22

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SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

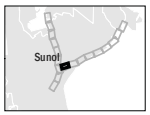

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 4 of 22

0 150 Feet
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1:1,800

Long-term Measurement Location
Receiver Location
Project Area

DATA SOURCE
ESRI, 2016

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Alameda County

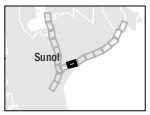

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 5 of 22

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

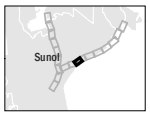

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 6 of 22

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

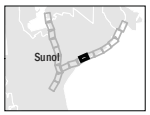

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 7 of 22

0 150 Feet
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1:1,800

Receiver Location
Project Area

DATA SOURCE
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SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

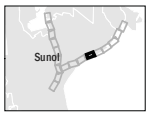

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 8 of 22

0 150 Feet

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1:1,800

Project Area

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AECOM Otto Alvarez, 7/5/2017

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project

Alameda County

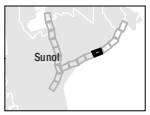

FIGURE H

Noise Measurement and Modeled Receiver and Barrier Locations

Page 9 of 22

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

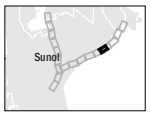

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 10 of 22

0 150 Feet

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1:1,800

Project Area

DATA SOURCE
ESRI, 2016

MAP PREPARED BY:
AECOM Otto Alvarez, 7/5/2017

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project

Alameda County

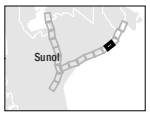

FIGURE H

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1:1,800

Project Area

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Alameda County

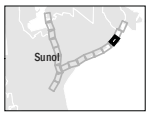

FIGURE H
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Page 12 of 22

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

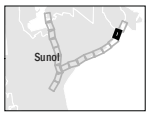


FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 13 of 22

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

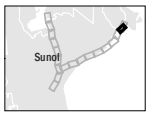


FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 14 of 22

0 150 Feet

1 inch = 150 feet
1:1,800

Project Area

DATA SOURCE
ESRI, 2016

MAP PREPARED BY:
AECOM Otto Alvarez, 7/5/2017

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

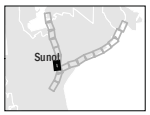
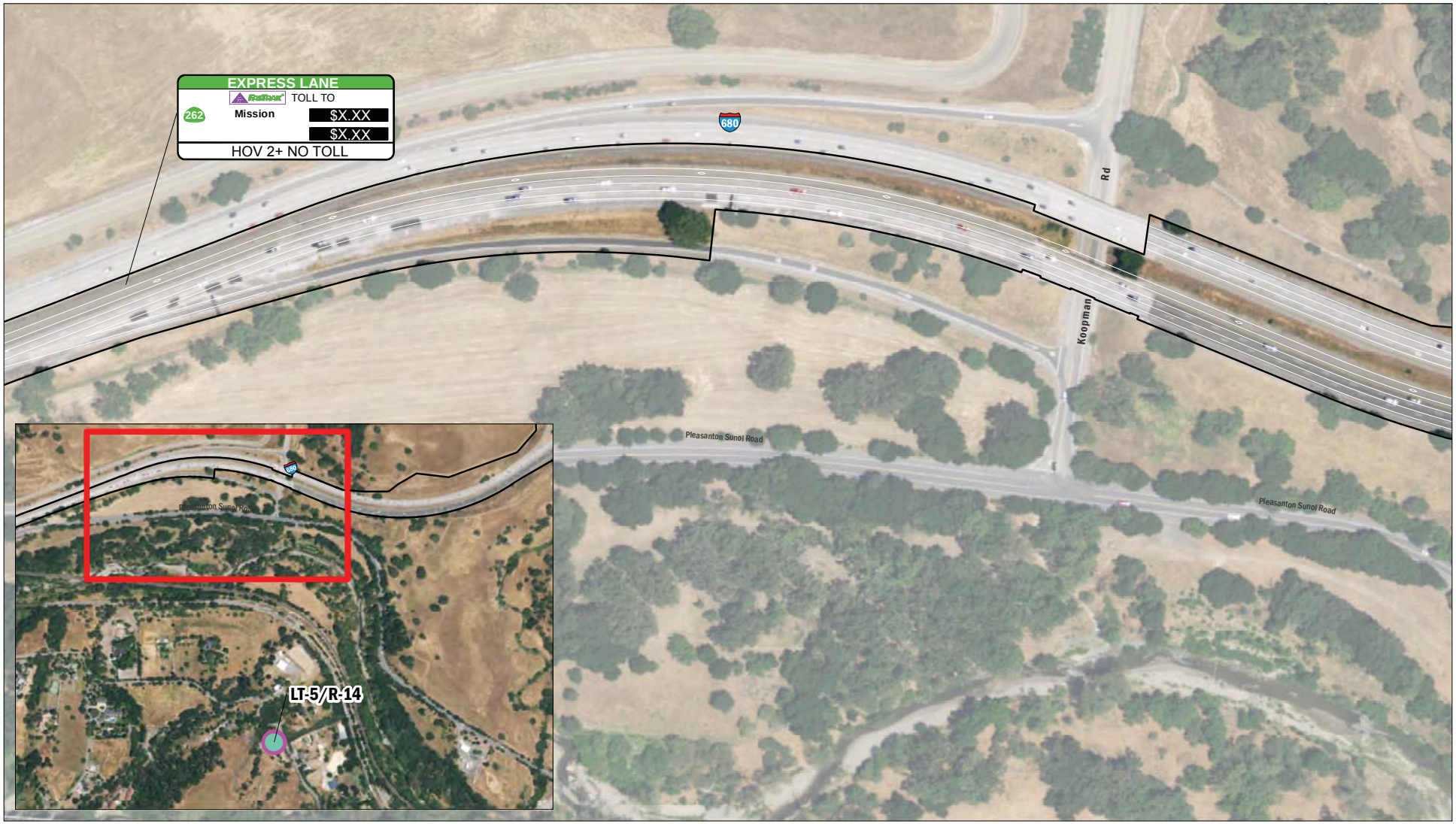


FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 15 of 22



SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 16 of 22

0 150 Feet

1 inch = 150 feet
1:1,800

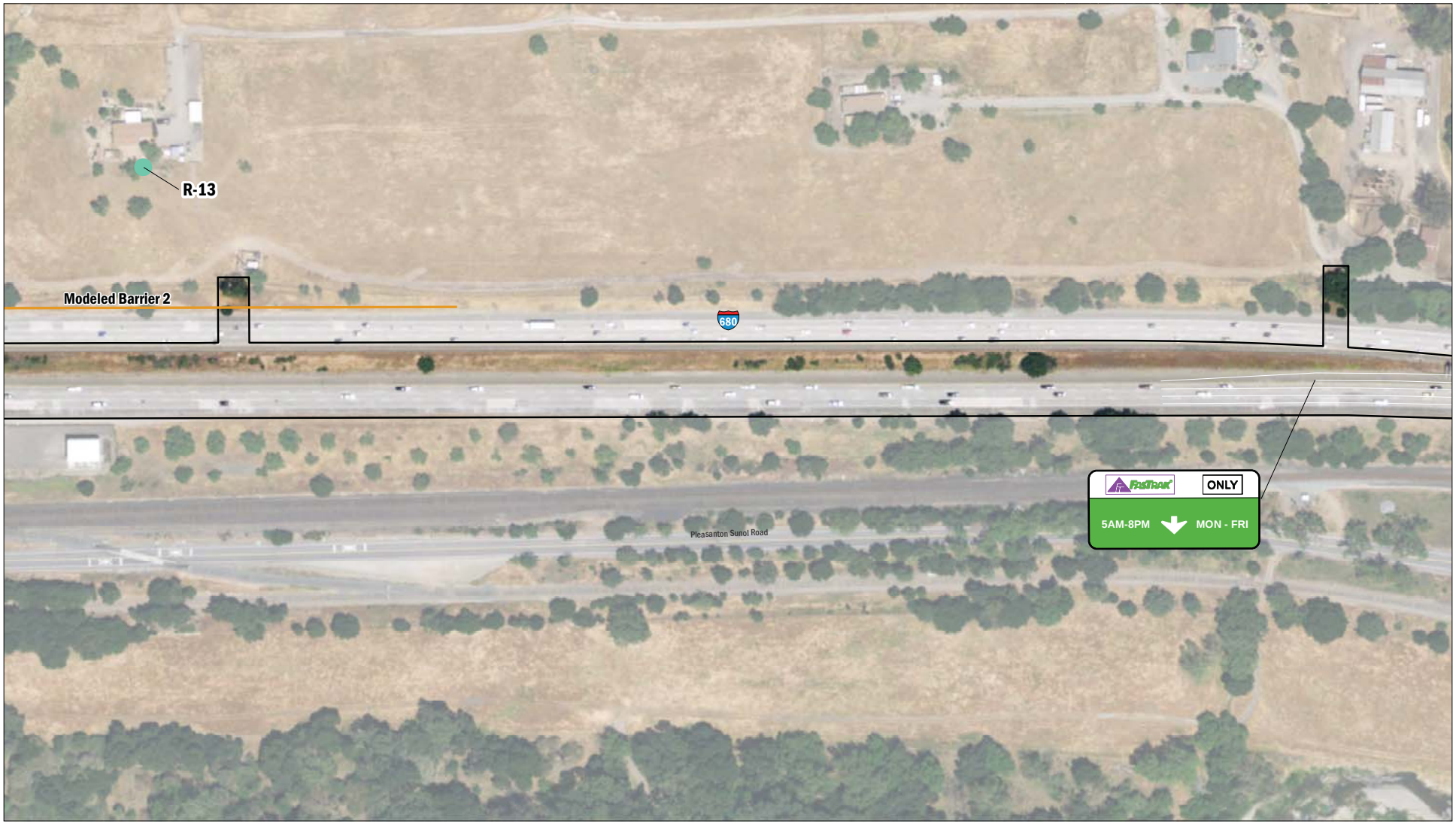
Project Area

DATA SOURCE
ESRI, 2016

MAP PREPARED BY:
AECOM Otto Alvarez, 7/5/2017

SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 17 of 22



SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

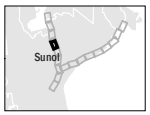


FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 18 of 22

0 150 Feet

1 inch = 150 feet

1:1,800

Long-term Measurement Location

Receiver Location

Modeled Barrier

Project Area

DATA SOURCE
ESRI, 2016

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SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

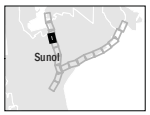
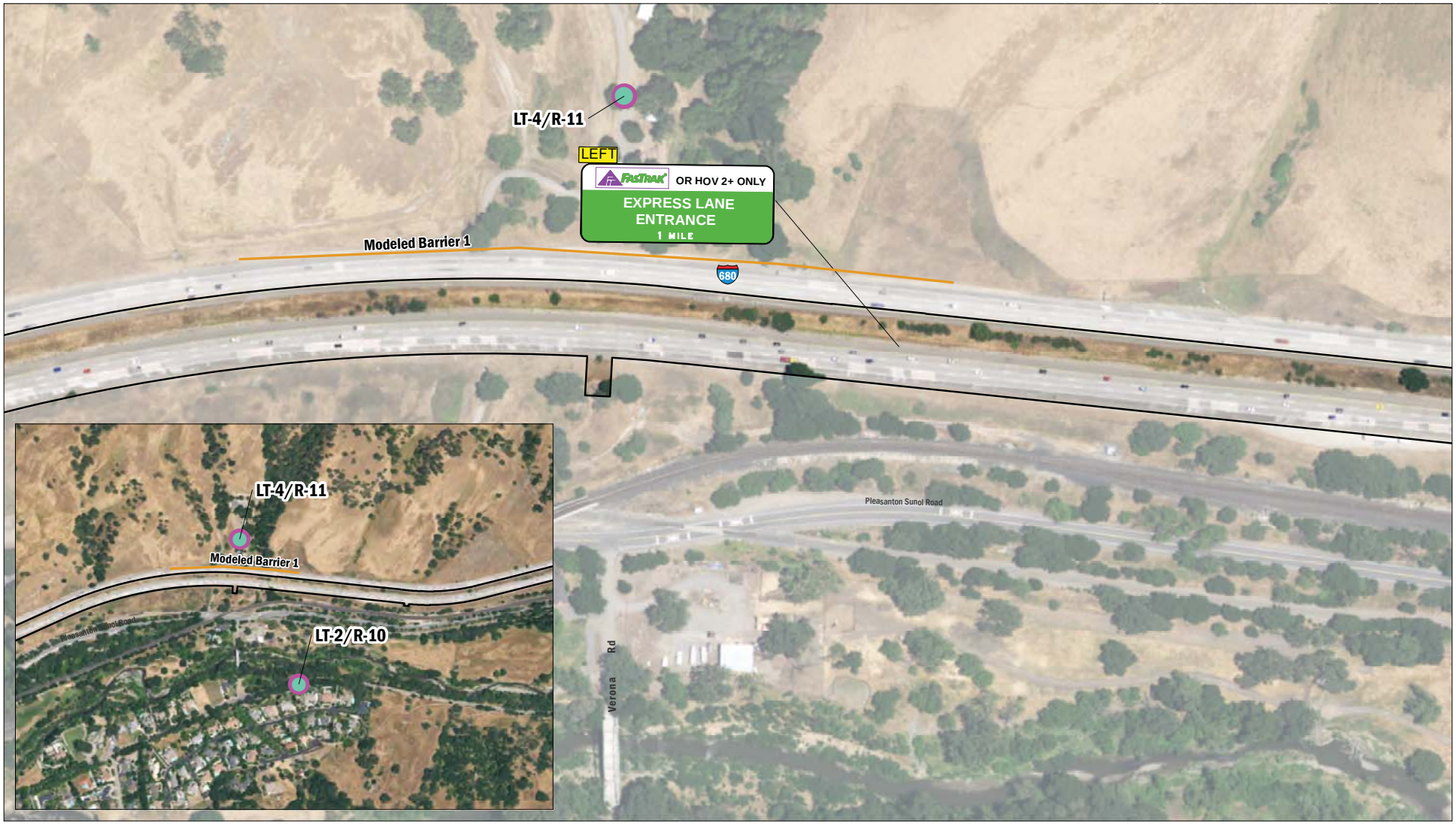


FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 19 of 22



SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

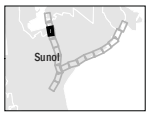


FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 20 of 22

0 150 Feet

1 inch = 150 feet
1:1,800

Project Area

DATA SOURCE
ESRI, 2016

MAP PREPARED BY:
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SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

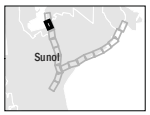

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations
Page 21 of 22

0 150 Feet
1 inch = 150 feet
1:1,800

Receiver Location
Short-term Measurement Location
Project Area

DATA SOURCE
ESRI, 2016

MAP PREPARED BY:
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SR 84 Expressway Widening and SR 84/I-680 Interchange Improvements Project
Alameda County

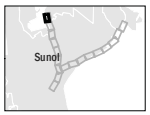

FIGURE H
Noise Measurement and Modeled Receiver and Barrier Locations

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