Interstate 5
Bus/Carpool Lanes Project

SACRAMENTO COUNTY, CALIFORNIA
DISTRICT 3 – SAC 5 – PM 9.7/22.5
EA 03-3C000 / Project Number 0300000454

Draft Environmental Impact Report/ Environmental Assessment

Prepared by the
State of California Department of Transportation

The environmental review, consultation, and any other action required in accordance with applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 USC 327.

Caltrans

January 2013

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 alternatives being considered for the proposed project located in Sacramento County, California. Caltrans is the lead agency under both NEPA and CEQA. The document describes why the project is being proposed, alternatives for the project, the existing environment that could be affected by the project, the potential impacts from each of the alternatives, and the proposed avoidance, minimization, and/or mitigation measures.

What should you do?

- Please read this Environmental Impact Report/Environmental Assessment. Copies of this document, as well as the technical studies, are available for review at:

  Caltrans District 3 Sacramento Office
  2379 Gateway Oaks Dr, Suite 150
  Sacramento, CA 95833
  (916) 274-0586

  Additional copies of this document (without the technical studies) are available for review at the following Sacramento Public Libraries:

Central Library
828 I St.
Sacramento, CA 95814

Belle Cooledge
5600 South Land Park Dr.
Sacramento, CA 95822

Elk Grove
8962 Elk Grove Blvd.
Elk Grove, CA 95624

Robbie Waters Pocket-Greenhaven
7335 Gloria Drive
Sacramento, CA 95831

Southgate
6132 66th Ave.
Sacramento, CA 95823

Valley Hi -North Laguna
6351 Mack Rd.
Sacramento, CA 95823

- Attend public workshop. Public workshops will be held to present the project and solicit comments on the Draft EIR/EA at the following locations, dates, and times:

January 30, 2013
5:00 to 7:00 PM
Joseph Sims Elementary School
Multipurpose Room
3033 Buckminster Dr.
Elk Grove, CA 95758

January 31, 2013
5:00 to 7:00 PM
Robbie Waters Pocket-Greenhaven
Public Library
7335 Gloria Dr.
Sacramento CA 95831

We welcome your comments. If you have any comments regarding the proposed project, please attend the public workshop and/or send your written comments to Caltrans by the deadline.

- Submit comments via postal mail to:

  Kendall Schinke, Environmental Branch Chief
  Attention: Ken Lastufka
  Department of Transportation, Environmental Planning
  2379 Gateway Oaks Dr, Suite 150
  Sacramento, CA 95833

- Submit comments via email to ken_lastufka@dot.ca.gov

- Submit comments by the deadline: March 1, 2013

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) undertake additional environmental studies, or (3) abandon the project. If the project is given environmental approval and funding is appropriated, Caltrans could design and construct all or part of the project.

For individuals with sensory disabilities, this document can be made available in Braille, large print, on audiocassette, or on computer disk. To obtain a copy in one of these alternate formats, please call or write to Department of Transportation, Attn: Kendall Schinke, Office of Environmental Management, 2379 Gateway Oaks Dr, Suite 150, Sacramento, CA 95833-93401; (916) 274-0610 Voice, or use the California Relay Service by dialing 711, or (800) 735-2929 (TTY to Voice) or (800) 735-2922 (Voice to TTY).

SCH Number: 2011042026
03-SAC-5 PM 9.7-22.5
EA 03-3C000 / Project Number 0300000454

Construct Bus/Carpool Lanes on Interstate 5 from 1.1 Miles South of Elk Grove Boulevard to United States (US) 50 in Sacramento County, California (PM 9.7/22.5)

DRAFT ENVIRONMENTAL IMPACT REPORT/
ENVIRONMENTAL ASSESSMENT

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

THE STATE OF CALIFORNIA
Department of Transportation

10 January 2013

Date of Approval

Katrina C. Pierce

Katrina C. Pierce
Chief, North Region Environmental Planning
California Department of Transportation
NEPA and CEQA Lead Agency

Summary

The proposed project is a joint project by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA), and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). Caltrans is the lead agency under CEQA and NEPA. In addition, FHWA's responsibility for environmental review, consultation, and any other action required in accordance with applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 USC 327.

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, it is quite often the case that a "lower level" document is prepared for NEPA. One of the most commonly seen joint document types is an Environmental Impact Report/Environmental Assessment (EIR/EA).

Following receipt of public comments on the Draft EIR/EA and circulation of the Final EIR/EA, Caltrans will be required to take actions regarding the environmental document. Caltrans will determine whether to certify the EIR and issue Findings and a Statement of Overriding Considerations (if applicable) under CEQA and whether to issue a Finding of No Significant Impact (FONSI) or require an Environmental Impact Statement (EIS) under NEPA.

S.1 Proposed Project

Caltrans and the FHWA, in cooperation with the Sacramento Transportation Authority (STA), propose to add bus/carpool lanes on Interstate 5 (I-5) in Sacramento County from 1.1 miles south of Elk Grove Blvd. to United States (US) Highway 50 (post mile (PM) 9.7 to 22.5). The total length of the project is approximately 12.8 miles. New sound walls may be required in two locations, and the existing Casilada Pedestrian Overcrossing (POC) will be replaced in order to meet the requirements of the Americans with Disabilities Act (ADA) of 1990. Figures 1-5.2A-M show the project features.

This project, as originally conceived, included auxiliary lanes in both directions of I-5 between Florin and Pocket/Meadowview Roads, and the environmental impacts associated with the construction of the auxiliary lanes have been considered in the technical studies prepared for this document. However, the construction of the auxiliary lanes has since been split out into a separate project and the 2009/12 Metropolitan Transportation Improvement Plan (MTIP) has been updated to reflect this change (Administrative Modification #30 to the 2009/12 MTIP and Amendment #31 to the 2009/12 MTIP).

The northbound auxiliary lane started at the Pocket Road on-ramp and ended at the Florin Road off-ramp. A bottleneck exists in this segment during the morning commute period, due to the high ramp demand volumes. The southbound auxiliary lanes started at the number 4 mainline lane where it combined with the number 3 lane and ended at the Pocket Road off-ramp. A bottleneck exists during the afternoon commute period, due to the lane drop and high mainline volumes approaching the Florin Road Interchange. A lane drop is a place on a freeway where a mainlane terminates by either becoming an exit-only lane or by way of simply ending and merging into the adjacent lane. High ramp demand volumes in the northbound direction and a mainline lane drop in the southbound direction of this segment impair operations.

The auxiliary lanes have independent utility. The separate auxiliary lane project, in and of itself, would provide congestion relief, improve traffic flow and improve traffic safety in this segment of I-5. Environmental clearance of the auxiliary lane project is not anticipated for at least several years.

S.2 Purpose and Need

Interstate 5 is designated as part of the "National Network" for trucks, and as the primary north-south route in California serves interregional and interstate travel. This portion of the I-5 corridor also serves daily commuters from Elk Grove and south Sacramento. I-5 plays a critical role in California's economy by supporting a high volume of commuter and interregional traffic as well as trucks moving goods to destinations in and outside the state.

The need for the project is to reduce congestion. As described in Section 2.5 of this document, overall mobility and traffic flow are declining in this portion of the I-5 corridor due to increasing traffic congestion. Traffic volumes have steadily grown due to increasing development along this portion of the I-5 corridor, and monitoring of traffic conditions during the peak commute periods has shown a steady increase in both the duration and the length of congestion. The congestion primarily occurs in the northbound direction during the morning commute hours and the southbound direction during the afternoon commute hours. According to the traffic study for the project, traffic volumes in many portions of the route are near capacity or exceed capacity during the morning and afternoon peak periods. The level of traffic congestion will increase substantially without improvements to the corridor. A more detailed description of the project need is included in Chapter 1.4.

The purpose of this project is to:

- Promote ride sharing and the use of high occupancy vehicles, such as carpools, vanpools, and express bus services.
- Provide congestion relief in order to improve traffic flow and mobility on this section of I-5 by carrying more people in fewer vehicles during peak periods.
- Improve traffic operations and safety.
- Provide an option for more consistent and predictable travel time for carpools, vanpools, buses, paratransit services, and emergency vehicles during peak periods.
- Use the highway facilities as efficiently as possible.
- Help achieve the goals of the current Sacramento Area Council of Governments (SACOG) Metropolitan Transportation Plan (MTP 2035).

S.3 Project Description

There are four proposed project alternatives, including the No Build Alternative. Chapter 1.5 provides a more detailed description of project alternatives.

The proposed alternatives are as follows:

Alternative 1, Bus/Carpool Addition and Miscellaneous Improvements

This alternative will add bus/carpool lanes (also known as high occupancy vehicle or HOV lanes) in both directions of I-5. The proposed project will provide HOV lanes in each direction by constructing additional lanes from 1.1 miles south of Elk Grove Blvd. to just south of the I-5/US 50 interchange. The lane additions will be accomplished as follows:

- Beginning of project (1.2 miles south of Elk Grove Blvd.) to just south of Laguna Blvd.: Construct HOV lanes by widening into the existing median in each direction. Provides an HOV lane in addition to the two existing mixed flow lanes for a total of three lanes in each direction.

- South of Laguna Blvd to Florin Road: Restripe the existing paved median to accommodate the HOV lane addition in each direction. Provides an HOV lane in addition to the three existing mixed flow lanes for a total of four lanes in each direction.

- Florin Road to just south of US 50: Provide an HOV lane in each direction by a combination of reconstructing the existing median and outside shoulders, and in some sections widening the outside shoulder area. Provides an HOV lane in addition to the four existing mixed flow lanes for a total of five lanes in each direction.

The widening south of Laguna Blvd. will be to the inside shoulder area; however, just north of Elk Grove Blvd. in the southbound direction, a sliver of outside widening (approximately one-half mile long and, on the average, 12 feet wide) will be required.

North of Florin Rd. to just south of US 50, where the existing median narrows, the existing outside shoulders will be reconstructed with minor widening in some areas to accommodate the proposed bus/carpool lanes. This widening will vary from 1 to 8 feet in width from the existing edge of shoulder. To avoid impacts to adjacent infrastructure, the width of the median and the roadway will be reduced. The cross slopes of the additional lanes will match the existing cross slope of the roadway. The shoulder widths will be narrowed to avoid encroachment into the levee along the Sacramento River.

Double thrie beam barrier or concrete median barrier will be installed from 1.1 miles south of Elk Grove Blvd. to just south of Laguna Blvd. From Laguna Blvd. to Florin Rd., the majority of the existing double thrie beam barrier will be replaced with concrete median barrier. Just north of Laguna Blvd., a short stretch (approximately 1,000 ft) of thrie beam barrier will remain in place in order to avoid potential floodplain impacts at the South Reach of Beach Lake (PM 12.40).

Several overcrossings and bridges will require structural modifications to accommodate the additional traffic lanes. The Beach Lake Bridge at Morrison Creek and the overhead structure at the I-5/State Route (SR) 160 separation will both require widening to the inside—combining each pair of structures into its own single span to accommodate the additional lanes proposed by this project. At a number of overcrossing and underpass locations, the abutment slopes on I-5 will be pulled back and tieback walls will be constructed to accommodate the additional lanes. A tieback wall is a type of retaining wall.

Traffic Operations System (TOS) improvements, such as closed circuit television, highway advisory radio, changeable message sign and ramp metering, are included under Alternative 1, as are drainage improvements and utility relocations.

Although this project does not impact the structure, the existing Casilada Pedestrian Overcrossing (POC) will be replaced to meet the requirements of the Americans with Disabilities Act (ADA) of 1990.

At this time, it is anticipated that two new sound walls will be required, located north and south of the Freeport Blvd. undercrossing (Figure 2-13.7A and B). If conditions substantially change during final project design, noise barriers may not be required. The final decision regarding noise abatement will be made upon completion of the project design and the public involvement process.

Roadway rehabilitation work, including slab replacement and overlay, may also be required.

Chapter 1.5 provides a detailed description of Alternative 1.

The total estimated cost of Alternative 1 is approximately $112 million.

Alternative 2, Mixed Flow Alternative

This alternative is the same as the Bus/Carpool Addition Alternative (Alternative 1), except it includes the construction of mixed flow or general-purpose lanes in both directions rather than bus/carpool lanes. The Mixed Flow Alternative includes all of the other features of Alternative 1 with minor differences in signing and striping. The total estimated cost of Alternative 2 is approximately $112 million.

Alternative 3, Mixed Flow to Bus/Carpool Conversion ("Take-a-lane")

The Bus/Carpool Conversion or "take-a-lane" Alternative (Alternative 3) converts an existing lane for HOV use. Under this alternative, the existing inside shoulder lane (the leftmost lane) would be re-striped and signed to prohibit non-HOV traffic during peak periods. This alternative would reduce the number of current mixed flow lanes during peak periods from 4 to 3 from Florin Road north and from 3 to 2 south of Florin Road. Alternative 3 includes the Traffic Operations System (TOS) improvements of Alternative 1 (close circuit television, highway advisory radio, changeable message sign, ramp metering) and the replaced Casilada POC, but not roadway widening, bridge and drainage improvements, or utility relocations. No additional right-of-way is required. The total estimated cost of Alternative 3 is approximately $22 million.

Alternative 4, No Build

The No Build Alternative would not add any improvements to the existing facility and would not accommodate existing and anticipated traffic growth. Without improvements to the existing facility, periods of congestion will increase. With the No Build Alternative, the existing freeway lane configuration would remain while other future projects within the project limits are constructed.

S.4 Other Proposed Actions in the Project Vicinity

This section provides a summary list of "related" transportation and other proposed actions. For a more comprehensive list of projects please see Section 2.22 of this document.

- Interstate 5—Widen Northbound Onramp from Elk Grove Blvd.
- Interstate 5/Cosumnes River Blvd. Interchange
- I-5 Auxiliary Lane Project
- I-5 Reconnection Project
- Capitol Southeast Connector Project
- Delta Shores
- Sacramento Regional Transit District South Line Extension
- Sacramento Railyards Specific Plan
- Sacramento Intermodal Transportation Facility
- Township 9
- Docks Area Specific Plan
- The Creamery

- River District Specific Plan
- Northwest Land Park
- 800 K & L Street Project
- CADA East End Gateway Site 1
- 7th & H Mixed Use Housing
- 700 Block of K Street Project

S.5 Areas of Potential Controversy

CEQA Guidelines (Section 15123) and NEPA Regulations (40 Code of Federal Regulations [CFR] 1502.12) require the Summary to identify areas of controversy known to the lead agency including issues raised by other agencies and the public. At this time, no areas of potential controversy are known.

S.6 Potential Environmental Consequences and Avoidance, Minimization, and/or Mitigation Measures

Table S-1 summarizes the potential significant impacts under CEQA of the proposed project and proposed mitigation measures to reduce significant impacts. Table S-2 lists other potential environmental impacts and proposed avoidance/minimization measures. Details for each environmental category are presented in Chapter 2 (*Affected Environment, Environmental Consequences, and Avoidance, Minimization and/or Mitigation Measures*) of this document.

S.7 Permits and Approvals Needed

The following permits, reviews, and approvals may be required for project construction:

- United States Army Corps of Engineers (USACE) Section 404 authorization under the Federal Clean Water Act
- Central Valley Regional Water Quality Control Board (CVRWQCB) Section 401 certification
- Central Valley Flood Protection Board (CVFPB) Encroachment Permit
- United States Fish and Wildlife Service (USFWS) formal consultation under Section 7 of the Federal Endangered Species Act
- National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA Fisheries) informal consultation under Section 7 of the Federal Endangered Species Act and for potential

impacts to Essential Fish Habitat (EFH) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act

- California Department of Fish and Game (CDFG) (Section 2080.1 of the California Fish and Game Code) Consistency Determination
- CDFG Streambed Alteration Agreement (Section 1600 et seq. of the California Fish and Game Code)
- National Emissions Standards for Hazardous Air Pollutants (NESHAP) notification to the Sacramento Metropolitan Air Quality Management District for Asbestos Demolition and Renovation
- CVRWQCB notification regarding the re-use of soils containing aerially deposited lead, if applicable
- California Department of Toxic Substances Control notification regarding the re-use of soils containing aerially deposited lead, if applicable
- CVFPB Permit for projects within the Board's jurisdiction

Table S-1 Summary of Potential Significant Impacts (Under CEQA) and Proposed Mitigation Measures

Affected Resources	Potential Significant Impacts (Under CEQA)	Mitigation Measures	Significance After Mitigation	See Section
Threatened and Endangered Species	Alternatives 1 and 2: Permanent impacts to 0.004 acre of giant garter snake (GGS) upland habitat and 0.0004 acre of GGS aquatic habitat, for a total of 0.0044 acre. Temporary impacts to 0.57 acre of aquatic habitat and 4.5 acres of upland habitat, for a total of 5.07 acres.	Giant Garter Snake Habitat • Permanent impacts to giant garter snake (GGS) habitat will be mitigated at a ratio of 3:1 (for a total of 0.0132 acres). • Temporary impacts will be mitigated by onsite restoration plus 1:1 replacement of GGS habitat—approximately 5.07 acres of replacement habitat will be required. • Impacts to GGS habitat will likely be mitigated through the purchase of credits at a US Fish and Wildlife Service (USFWS) approved mitigation bank. See Table S-2 for additional measures.	Less than Significant (LS)	2.19

Table S-2 Summary of Potential Environmental Impacts and Proposed Avoidance/Minimization Measures

Affected Resources	**Potential Impacts**	**Avoidance/Minimization Measures**	**See Section**
Land Use	All Alternatives: None.	None Required.	2.1
Growth	All Alternatives: None.	None Required.	2.2
Community Impacts	All Alternatives: None.	See avoidance and minimization measures for Traffic and Transportation, Air Quality, and Noise.	2.3
Utilities, Emergency Services, and Community Facilities	All Alternatives: None.	See avoidance and minimization measures for Traffic and Transportation, Air Quality, and Noise.	2.4
Traffic and Transportation/Pedestrian and Bicycle Facilities	Alternatives 1, 2, and 3: Temporary construction-related impacts.	• Preparation of a Transportation Management Plan.	2.5
Visual/Aesthetics	Alternatives 1, 2, and 3: Temporary visual changes during construction and minor impacts to the visual character of select locations within the project limits. Permanent impacts include loss of trees and vegetation. Loss will be reduced by implementing avoidance and minimization measures.	• All mature vegetation that is to remain within or adjacent to the project limits and which may be affected by construction activity, will be designated as an environmentally sensitive area (ESA) on project plans and in project specifications. ESA provisions may include, but are not limited to, the use of temporary orange fencing to delineate the proposed limit of work in areas adjacent to vegetation, or to delineate and exclude vegetation from potential construction impacts. Contractor encroachment into ESAs will be prohibited (including the staging/operation of heavy equipment or casting of excavation materials). ESA provisions shall be implemented as a first order of work, and remain in place until all construction activities are complete. • Tree and vegetation removal will be limited to only that which is required to construct the project.	2.6

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section
		• Following construction, all areas used for staging, access, or other construction-related activities will be restored to their original grade and contour graded in order to blend these areas with the surrounding topography. • Aesthetic enhancements will be provided for the new POC. Aesthetic enhancements may include texture and color and must be approved by the Office of Landscape Architecture. • Sound wall design will use materials similar to those incorporated into other sound walls along the project corridor and will be compatible with native materials. Similar materials, patterns, and styles are recommended to provide visual continuity and interest to the corridor landscape. • Aesthetic enhancements of texture and color appropriate for the area will be provided for all concrete barriers that are installed by the project. • A landscape plan must be prepared to provide appropriate landscape screening of sound walls to minimize the potential for graffiti and other nuisances. Appropriate landscape materials will be determined based on the placement of the wall and available setbacks. Generally, trees require a 30-foot setback, shrubs need approximately 20 feet and vines can be planted and trained to grow up the wall. A combination of these plantings may be appropriate for this area. The Office of Landscape Architecture will provide a planting design for the project as a part of the sound wall design effort.	
Hydrology and Floodplains	All Alternatives: None.	• Thrie beam barrier will be constructed from the south levee to the north levee of the South Reach of Beach Lake. • The existing roadway profile may be extended to the concrete median barrier. Transitions will be required on each side of the South Reach of Beach Lake to ensure that the existing roadway profile is not elevated in the metal beam guard rail (MBGR) section.	2.7
Water Quality and Storm	Alternatives 1, 2, and 3:	• The project shall adhere to the conditions of the	2.8

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section
Runoff	Temporary construction-related impacts.	Caltrans Statewide NPDES Permit CAS # 000003, (Order # 2012-0011-DWQ), issued by the State Water Resources Control Board on July 1, 2013. The Statewide Construction General Permit (Order No. 2009-009-DWQ) is also required. • The disturbed soil area (DSA) is approximately 93 acres and it is anticipated that a Storm Water Pollution Prevention Plan (SWPPP) level of temporary pollution controls will be specified for the project; (Standard Special Provision 07-345) therefore shall be included in the PS&E to address these temporary construction water pollution control measures. These measures must address soil stabilization practices, sediment control practices, tracking control practices, and wind erosion control practices. In addition, the project plan must include non-storm water controls, waste management and material pollution controls. • As directed by Caltrans' Storm Water Management Plan (SWMP) and the Project Planning and Design Guide (PPDG), an evaluation of the project using the most recent approved evaluation guide is essential in determining if the incorporation of permanent storm water runoff treatment measures are required for this project. • Since there are no Caltrans targeted design constituents, the treatment BMPs should be designed for general-purpose pollutant removal. Currently, Infiltration Devices, Biofiltration Strips, Wet Basins, Biofiltration swales, Austin Sand Filters, Detention Devices, Delaware Filters, and Multi-Chamber Treatment Trains are treatment measures that are approved for general purpose. • Special care is required when handling and storing contaminated soil, including soil contaminated with aerially deposited lead (ADL). The quantity of the contaminated soil, its level of contamination, where it will be stored, and when this activity will take place (winter/summer season) are all storm water pollution concerns and should be described in detail in the appropriate Special Provision section of the contract. These issues should also be addressed in the SWPPP. Section H.9 of the Caltrans Statewide NPDES Permit	

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section
		requires notification of the appropriate Regional Water Quality Control Board (RWQCB) if the project involves reuse of ADL contaminated soil 30 days prior to advertisement for bids. This is to allow the RWQCB to determine any need for the development of Waste Discharge Requirements. • Disposal of Portland concrete cement grooving or grinding residues shall be in accordance with all federal, state and local laws and regulations. Handling and storage requirements should be described in the Special Provisions and procedures should be addressed in the SWPPP. • A separate WDR from CVRWQCB will be required for the operations of a concrete batch plant. Contractor batch plants located outside the right-of-way (ROW) shall obtain coverage under the Statewide General Permit for Stormwater Discharges Associated with Industrial Activities (Order No. 97-03-DWQ) • Section 401 of the Clean Water Act requires any project that may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the Act. This project may require a 401 permit from the CVRWQCB. • This project may result in storm water discharges to storm water drainage systems owned and operated by local MS4 permit holders. As required by the 1999 Caltrans MS4 NPDES permit, Section G.1.a., compliance with local MS4 permits is expected and therefore coordination is required. • Standard Special Provision 07-346 (Construction Site Management) will be considered during PS&E to control potential sources of water pollution before it encounters any storm water system or watercourse. It requires the Contractor to control material pollution, manage waste and non-storm water at the construction site. The Contractor-prepared SWPPP must incorporate appropriate Temporary Construction Site BMPs to implement effective handling, storage, use and disposal practices during construction activities. • Caltrans will submit the Permit Registration Documents with RWQCB.	

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section
		• Upon completion of the project, submittal of a Notice of Construction Completion (NOCC) to the CVRWQCB is required to indicate that project construction is completed and the SWPPP is no longer in effect.	
Geology	All Alternatives: None.	• In order to avoid or minimize geological risks and impacts, the design and construction of the project will adhere to state codes and criteria. The engineering design for the proposed project will be carried out in accordance with Caltrans' Seismic Design Criteria. • Roadways and bridges will be designed and constructed to the seismic design requirements for ground shaking specified in the Uniform Building Code for Seismic Zone 3. • To satisfy the provisions of the California Building Code, the proposed facilities will be designed to withstand ground motions equating to approximately a 500-year return period (10 percent probability of exceedance in 50 years). Bridges will be designed in accordance with the latest Caltrans Seismic Design Criteria. • Additionally, the following geological hazard avoidance and minimization measures will be included in the design and construction of the proposed build alternative. A geologic and geotechnical investigation of the alignment of the build alternative and laboratory testing of the earth materials will be conducted during the final design phase. • Site-specific exploratory borings and laboratory testing during final design of any bridge structures will be conducted to delineate any potentially liquefiable materials. Potentially liquefiable materials will either be removed or engineered to reduce their liquefaction potential, or the engineering design will incorporate deep foundations that extend beyond soils with the potential for liquefaction. • Potential surface deformation resulting from subsidence could be minimized by periodic repair to the road surface, curbs, and other engineered facilities. • Site-specific borings and testing will include identification of soils with high shrink-swell potential that	2.9

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section
		could damage the roadway over time. Expansive soils will be over-excavated and replaced with non-expansive fill or treated with appropriate soil amendments to reduce the potential for shrinking and swelling. • Soil and slope stability measures will prevent or reduce erosion. Erosion of soils during construction will be minimized using temporary hydroseeding to provide a vegetation cover with straw bales, plastic sheeting slope cover, and other temporary drainage measures to prevent excessive slope runoff, as needed.	
Paleontology	Alternatives 1, 2, and 3: Potential to impact paleontological resources.	• Standard Specification 14.7, Paleontological Resources, will be added to the project's PS&E bid package. • A specification alerting the construction contractor that paleontological monitoring will occur during activities that will disturb native sediments will also be added to the project's specifications. • A Preliminary Paleontological Mitigation Plan was prepared (Appendix I). The plan will be updated and finalized once project design is nearly complete. The final plan will be implemented during construction.	2.10, Appendix I
Hazardous Materials	All Alternatives: Lead may exist within the project limits in the form of Aerially Deposited Lead (ADL), lead-based paint, and lead found in yellow traffic stripe. Asbestos containing materials may be present on bridges. Construction activities could potentially result in minor fuel spills.	*Asbestos Containing Materials (ACM)* • The ACM on the bridges will require removal and proper disposal by a licensed and certified asbestos abatement contractor in conjunction with the planned bridge widening. • The contractor must implement an Asbestos Compliance Plan (ACP) to prevent or minimize exposure to asbestos. Attention is directed to Title 8, California Code of Regulations, Construction Safety Orders, section 5192 (b) and section 1529, "Asbestos", Occupational Safety and Health Guidance Manual published by the National Institute of Occupational Safety and Health (NIOSH) and the USEPA for elements of the ACP. • Non-Standard Special Provision (NSSP) will be included in the project specifications to address National Emissions Standards for Hazardous Air	2.11

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section
		Pollutants (Air Quality - NESHAP) notification. • The NSSP for removal of ACM's, bridges, will be included in the project specifications. Copies of NSSPs can be obtained by contacting Caltrans' Hazardous Waste Office at HQ_HazWaste@dot.ca.gov. • In accordance with Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 902, written notification to SMAQMD is required ten working days prior to commencement of any demolition activity (whether asbestos is present or not) and for renovation activities involving specified quantities of RACM. In accordance with Title 8, CCR 341.9, written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain asbestos-related work. *ADL* • Standard Special Provision 7-1.02K(6)(j)(iii), Earth Material Containing Lead, for soil disturbance when lead concentrations are non-hazardous, and SSP 14-11.03 for when hazardous waste concentrations exist will be included in the project specifications. • The implementation of a Lead Compliance Plan for ADL is required. The contractor shall prepare and submit a project specific "Lead Compliance Plan" prepared by a Certified Industrial Hygienist (CIH) as required by Cal/OSHA. *Lead-Based Paint on Structures* • Lead containing paint (LCP) may be present in the structures proposed for renovation. The contractor must notify the Sacramento Air Quality Management District (AQMD) as required by NESHAP, 40CFR Part 61, and California Air Resources Control Board rules. • Lead paint removal must conform to Cal/OSHA requirements in Title 8 Sections 1532.1 and 341. Packaging, storage, transporting, and disposing of material containing lead paint at hazardous levels must conform to Title 22, Division 4.5, Chapters 11, 12 and 13 of the California Code of Regulations. • The Contractor must prepare a Lead Compliance Plan	

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section
		to prevent or minimize exposure to lead containing paint. • NSSP 15-025 will be included in the project specifications to address the hazardous waste requirements for lead paint on structures. *Yellow Traffic Stripes* • The Contractor is required to properly manage removed stripe and pavement marking and shall implement a project specific lead compliance plan prepared by a Certified Industrial Hygienist (CIH) as required by Cal/OSHA. The text containing the requirements for the lead compliance plan is found in the 2010 Standard Specifications in Section 7-1.02. • The below Standard Special Provisions (SSP) will be included in the project specifications: • SSP 14-11.07, Remove Yellow thermoplastic and yellow painted Traffic Stripe, and Pavement Marking. Use if the project includes separate removal of paint or thermoplastic (yellow or white – mix paint) from the road surface, and the residue is expected to be a hazardous waste. • SSP 15-1.03B, Residue Containing Lead from paint and thermoplastic. Use if yellow paint or yellow thermoplastic paint will be ground or cold planed but residue will be non-hazardous. • SSP 15-2.02C(2) , Remove Traffic Stripe and Pavement Markings. Use for white traffic stripe, and/or for the yellow traffic stripe if tested and residue is non-hazardous.	
Air Quality	All Alternatives: Temporary constructed-related emissions of particulate matter and carbon monoxide (CO), nitrogen oxides, volatile organic compounds, and toxic air contaminants.	• The contractor is required to comply with all pertinent and legally enforceable rules and regulations of the Sacramento Metropolitan Air Quality Management District (SMAQMD). The Contractor is required to comply with Caltrans' *Standard Specifications* Sections 14-9.01 ("Air Pollution Control" and 14-9.02 ("Dust Control"). Section 7, "Legal Relations and Responsibility," addresses the Contractor's	2.12

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section

		responsibility on many items of concern, such as: air pollution; protection of lakes, streams, reservoirs, and other water bodies; use of pesticides; safety; sanitation; convenience of the public; and damage or injury to any person or property as a result of any construction operation.
		• Caltrans Standard Specifications for construction (Sections 10 and 18 for dust control and Section 39-3.06 for asphalt concrete plants) will be adhered to in order to reduce emissions generated by construction equipment.
		• The best available control measures shall be incorporated into the project commitments. With implementation of standard construction measures (providing 50 percent effectiveness) such as frequent watering (e.g., minimum twice per day), fugitive dust and exhaust emissions from construction activities would not result in any adverse air quality impacts with implementation of the project.
		• Implementation of the following measures would reduce construction impacts:
		    • **Measure AIR-1:** The contractor shall obtain all necessary Sacramento County permits and approvals and shall follow all required County laws and procedures and respect to BMPs, grading and excavation for the proposed project and all construction related and emission generating activities.
		    • **Measure AIR-2:** Construction of the project shall comply with all applicable Sacramento County APCD codes for Best Management Practices, Grading Standards, and Air Quality Control.
		    • **Measure AIR-3:** The contractor and all of the general contractor's subcontractors and suppliers to comply with all the terms and conditions of all project permits, approvals and conditions of the Sacramento County.
		• Wet suppression and wind speed reduction are the two most common methods used to control open dust sources at construction sites because a source of water and material for wind barriers tend to be readily available on a construction site.	

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section
Noise	Alternatives 1, 2, and 3: Temporary construction-related noise impacts and noise levels that will approach or exceed the federal Noise Abatement Criteria. Sound walls are recommended at several locations.	• Construction noise is regulated by Caltrans' Standard Specifications Section 14-8.01, "Noise Control". • Caltrans intends to incorporate noise abatement measures in the form of barriers (sound walls) in two locations—SW1 and SW2—please see Figures 2-13.6B and 2-13.7A and B for the locations of proposed sound walls.	2.13
Energy	Alternatives 1 and 2: Temporary increase in energy consumption during construction of the project, including fuel necessary for the movement of equipment, materials, and personnel to the project site, fuel for the operation of equipment, and lighting for night work.	None required.	2.14
Wetlands and other waters	Alternatives 1 and 2: Minor temporary and permanent impacts to wetlands and other waters. Temporary wetland impacts: 4.18 acres of Great Valley Mixed Riparian Forest habitat (CDFG jurisdictional), of which 1.95 acres of seasonal wetland under potential USACE jurisdiction, and 0.18 acres of potentially USACE jurisdictional seasonal freshwater wetland. Permanent wetland impacts: 0.004 acre of Great Valley Mixed Riparian Forest habitat (CDFG jurisdictional), of which 0.002 acre is seasonal wetland under potential USACE jurisdiction. Temporary impacts to other waters: 0.57 acres under potential USACE jurisdiction. Permanent impacts to other waters: 0.004 acres under potential USACE jurisdiction.	• Establish Environmentally Sensitive Areas • Limit vegetation removal • Containment measures/construction site best management practices • Minimize disturbance to creek channel and adjacent areas • Restore wetland, riparian, and stream habitat disturbed by construction • Dewatering activities • Restrict timing of in-stream activities • Compensation required by permits will also be provided for impacts to wetlands and other waters.	2.16
Special-Status Plant Species	Alternative 1 and 2:	• Establish Environmentally Sensitive Areas • Limit vegetation removal.	2.17

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section
	No impacts to Sanford's arrowhead with implementation of avoidance and minimization measures.	• Containment measures/construction site best management practices. • Minimize disturbance to creek channel and adjacent areas. • Pre-construction plant surveys.	
Special-Status Animal Species	Alternatives 1 and 2: Low potential to impact special-status animal species including tri-colored blackbird and other migratory bird species, burrowing owl, white-tailed kite, Cooper's hawk, hoary bat, and other bat species protected by California law. Anadromous fish species downstream of the ESL could be affected due to impacts to water quality. Implementation of the measures will minimize potential impacts to anadromous fish species. May result in direct impacts to individual western pond turtles if relocation efforts are necessary.	• Establish Environmentally Sensitive Areas • Limit vegetation removal. • Containment measures/construction site best management practices. • Minimize disturbance to creek channel and adjacent areas. • Restore wetland, riparian, and stream habitat disturbed by construction. • Dewatering activities. • Restrict timing of in-stream activities. • Restrict timing of woody vegetation removal. • Nesting bird surveys. • Pre-construction burrowing owl surveys. • Pre-construction pond turtle surveys. • Pre-construction roosting bat surveys. • Bat and bird exclusion measures.	2.18
Threatened and Endangered Species	Alternatives 1 and 2: Low potential to impact vernal pool invertebrates, Valley Elderberry Longhorn Beetle, Central Valley Steelhead, Central Valley Chinook salmon (spring run), and Sacramento River Chinook salmon (winter run). Potential to impact Swainson's hawk. Level 3 permanent and Level 2 temporary impacts to GGS.	• Establish Environmentally Sensitive Areas • Limit vegetation removal. • Containment measures/construction site best management practices. • Minimize disturbance to creek channel and adjacent areas. • Restore wetland, riparian, and stream habitat disturbed by construction. • Dewatering activities. • Restrict timing of in-stream activities. • Restrict timing of woody vegetation removal. • Nesting bird surveys. • Pre-construction surveys and construction monitoring for Swainson's hawks. • Protection of elderberry shrubs. • Giant garter snake avoidance and minimization	2.19

Affected Resources	Potential Impacts	Avoidance/Minimization Measures	See Section
		measures. • Giant garter snake habitat restoration.	
Invasive Species	Alternatives 1 and 2: Low potential introduction and/or spread of invasive species.	• Weed free construction equipment. • Proper disposal of soil and plant material. • Weed free erosion control treatments.	2.20
Cumulative Impacts	All Alternatives: None.	None required.	2.22

Table of Contents

List of Figures

List of Tables

List of Technical Studies Prepared Under Separate Cover

The following technical studies were prepared to support this environmental document and are available for review at Caltrans District 3 Sacramento Office, 2379 Gateway Oaks Dr, Suite 150, Sacramento, CA 95833.

- Air Quality Analysis Report
- Community Impact Assessment
- Cumulative Impacts Analysis
- Floodplain Report
- Historic Property Survey Report (A finding of "No Historic Properties Affected" was made for the project)
- Initial Site Assessment (ISA)
- Natural Environment Study
- Noise Impact Study
- Paleontological Identification Report, Evaluation Report, and Mitigation Plan
- Traffic Report, HOV Status Report, and Travel Demand Forecast Report
- Visual Impact Assessment
- Water Quality Report

List of Abbreviated Terms[1]

AB	Assembly Bill
AC	Asphalt-Concrete
ADA	Americans with Disabilities Act
ADI	Area of Direct Impact
ADL	Aerially Deposited Lead
APE	Area of Potential Effects
BAT/BCT	Best Available Technology Economically Achievable/Best Conventional Pollutant Control Technology
Blueprint	Sacramento Area Council of Governments' Sacramento Region Blueprint
BFE	Base Floodplain Elevation
BMP	Best Management Practice
B.P.	Before present
CAAA	Clean Air Act Amendments
CAAQS	California Ambient Air Quality Standards
CAFE	National Highway Traffic Safety Administration Corporate Average Fuel Economy
Cal/OSHA	California Occupational Safety and Health Administration
CARB	California Air Resources Board
CRHR	California Register of Historical Resources
Caltrans	California Department of Transportation
CCR	California Code of Regulations
CCTV	Closed circuit television
CDFG	California Department of Fish and Game
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
CMS	Changeable message sign
CNDDB	California Natural Diversity Database
CNPS	California Native Plant Society
CO	Carbon monoxide
CO Protocol	Transportation Project-Level Carbon Monoxide Protocol
CSMP	Corridor System Management Plans
CVRWQCB	Central Valley Regional Water Quality Control Board
CWA	Clean Water Act
dB	Decibel
dBA	A-weighted decibel
DPR	California Department of Parks and Recreation

[1] A *Glossary of Technical Terms* can be found in Appendix B of this document.

DSA	Disturbed soil area
DSB	Disposal, Staging, and Borrow
DWR	California Department of Water Resources
EA	Environmental Assessment
ECOS	Environmental Council of Sacramento
EFH	Essential Fish Habitat
EIR	Environmental Impact Report
EIR/EA	Environmental Impact Report/Environmental Assessment
EIS	Environmental Impact Statement
E.O.	Executive Order
ESA	Environmentally Sensitive Area
ESL	Environmental Study Limits
ESU	Evolutionarily Significant Unit
FEMA	Federal Emergency Management Agency
FESA	Federal Endangered Species Act
FHWA	Federal Highway Administration
FONSI	Finding of No Significant Impact
ft	Foot or feet
FTA	Federal Transit Administration
g	Gravity
GGS	Giant Garter Snake
GHG	Greenhouse gas
HAR	Highway advisory radio
HDM	Highway Design Manual
HOT	High Occupancy Toll
HOV	High Occupancy Vehicle
HSA	Hydrologic Sub Area
I-5	Interstate 5
IC	Interchange
in	Inch
IPCC	(United Nations and World Meteorological Organization) Intergovernmental Panel on Climate Change
IRIS	(United States Environmental Protection Agency) Integrated Risk Information System
ISA	Initial Site Assessment
ITS	Intelligent Transportation Systems
LAU	Landscape Assessment Unit
L_{eq}(h)	The noisiest hour expressed as the energy-average of the A-weighted noise level occurring during a one-hour period
LOS	Level of service
MBTA	Migratory Bird Treaty Act
MCE	Maximum credible earthquake
MLD	Most likely descendant
Mph	Miles per hour

MS4	Municipal Separate Storm Sewer System
MSA	Metropolitan Statistical Area
MSAT	Mobile source air toxic
MTIP	Metropolitan Transportation Improvement Plan
MTP	Metropolitan Transportation Plan
NAAQS	National Ambient Air Quality Standards
NAC	Noise Abatement Criteria
NAHC	Native American Heritage Commission
NATA	National Air Toxics Assessment
NEPA	National Environmental Policy Act
NESHAP	National Emissions Standards for Hazardous Air Pollutants
NO_2	Nitrogen dioxide
NOA	Naturally occurring asbestos
NOAA Fisheries	National Oceanic and Atmospheric Administration-National Marine Fisheries Service
NOC	Notice of Construction
NOCC	Notice of Completion of Construction
NOP	Notice of Preparation
NO_X	Nitrogen oxides
NPDES	National Pollutant Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
O_3	Ozone
OC	Overcrossing
OHWM	Ordinary high water mark
OSHA	Occupational Safety and Health Act
Pb	Lead
PCC	Portland Concrete Cement
PCCP	Portland Concrete Cement Pavement
PG&E	Pacific Gas and Electric Company
PDT	Project Development Team
PM	Post Mile
$PM_{2.5}$	Particulate Matter 2.5 micrometers in diameter or smaller
PM_{10}	Particulate Matter 10 micrometers in diameter or smaller
POC	Pedestrian Overcrossing
ppm	Parts per million
PRC	California Public Resources Code
PS&E	Plans, Specifications, and Estimates
PSR	Project Study Report
RAC	Rubberized Asphalt-Concrete
RCRA	Resource Conservation and Recovery Act
ROG	Reactive Organic Gases
RSA	Resource study area

RT	Sacramento Regional Transit District
RTIP	Regional Transportation Improvement Plan
RTP	Regional Transportation Plan
RWIS	Real-time weather information system
RWQCB	Regional Water Quality Control Board
SACbac	Sacramento City/County Bikeway Advisory Committee
SACMET	Sacramento Regional Travel Demand Model
SACOG	Sacramento Area Council of Governments
SAFCA	Sacramento Area Flood Control Agency
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SASD	Sacramento Area Sewer District
SFHA	Special Flood Hazard Areas
SFHZ	Special Flood Hazard Zone
SIP	State Implementation Plan
SMAQMD	Sacramento Metropolitan Air Quality Management District
SMUD	Sacramento Municipal Utilities District
SO_2	Sulfur dioxide
SOH	Separation overhead
SPRR	Southern Pacific Railroad
SR	State Route
SRCSD	Sacramento Regional County Sanitation District
SSP	Standard Special Provision
STA	Sacramento Transportation Authority
STIP	State Transportation Improvement Program
Stone Lakes	Stone Lakes National Wildlife Refuge
SVAB	Sacramento Valley Air Basin
SVP	Society of Vertebrate Paleontology
SWMP	Storm Water Management Plan
SWPPP	Storm Water Pollution Prevention Plan
SWRCB	State Water Resources Control Board
TASAS	Traffic Accident Surveillance and Analysis System
TeNS	Technical Noise Supplement (Caltrans 1998b)
TDF	Travel Demand Forecasting
TDM	Transportation Demand Management
TDML	Total Maximum Daily Load
TMP	Transportation Management Plan
TNM 2.5	Traffic Noise Model Version 2.5
TOS	Traffic Operations Systems
TSM	Transportation System Management
UP	Underpass
US 50	United States 50
USACE	United States Army Corps of Engineers

USC	United States Code
USDA	United States Department of Agriculture
USDOE	United States Department of Energy
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
VELB	Valley elderberry longhorn beetle
VIA	Visual Impact Assessment
VOC	Volatile Organic Compounds
VMT	Vehicle Miles of Travel
vph	Vehicles per hour
WDR	Water discharge requirement
WET	Waste extraction test
WMRD	Sacramento County Department of Waste Management and Recycling Division
WPCP	Water Pollution Control Plan

Chapter 1 Proposed Project

1.1 Introduction

The California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA), in cooperation with the Sacramento Transportation Authority (STA), propose to add bus/carpool lanes on Interstate 5 (I-5) in Sacramento County from 1.1 miles south of Elk Grove Blvd. to United States (US) 50 (PM 9.7 to 22.5). The total length of the project is approximately 12.8 miles. New sound walls may be required in two locations, and the existing Casilada Pedestrian Overcrossing (POC) will be replaced in order to meet the requirements of the Americans with Disabilities Act (ADA) of 1990.

Caltrans is the lead agency under the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA).

All references in the text are listed in Chapter 7.

1.2 Scope of this Environmental Impact Report/Environmental Assessment

This document contains environmental analyses pertaining to the I-5 Bus/Carpool Lanes Project from 1.1 miles south of Elk Grove Blvd. to US 50 in Sacramento County, California. This document satisfies requirements of CEQA and the NEPA.

This Draft Environmental Impact Report/Environmental Assessment (EIR/EA) is an informational document that: 1) informs the public agency decision-makers and the public of the environmental effects of the proposed project; and 2) identifies potential mitigation measures to minimize any adverse impacts.

A Notice of Preparation (NOP) to prepare an EIR was released in October 2007.

Opportunities for public comment on the Draft EIR/EA will occur during the 45-day public availability period and at the public workshops/open houses that Caltrans will hold. The Final EIR/EA will take into account comments received on the Draft EIR/EA during the 45-day comment period.

1.3 Project Background and History

In 2001, a Project Study Report (PSR) was started to review the possibility of adding HOV lanes from Elk Grove Blvd. to US 50 (EA 03-39170K), but the project was shelved due to lack of funding. In January of 2007, Caltrans prepared a PSR for the current project. During the preliminary project studies for the current project, the beginning and termination limits of the bus/carpool lanes, as well as the work to be included in the project, was modified many times. The current proposed project will begin work 1.1 miles south of Elk Grove Blvd. and terminate work at the I-5/US 50 Interchange (IC). The project originally proposed bus/carpool lanes beginning at Hood-Franklin Rd. and continuing north through the I-5/US 50 IC. The beginning of the project was revised from Hood-Franklin Rd. to south of Elk Grove Blvd. to align with the Measure A project limits (Measure A is defined under the fourth bullet below). The northern termination was revised due to the extent of modification to the I-5/US 50 IC that would have been necessary to facilitate the bus/carpool lanes. The current proposed project terminus carries the bus/carpool lanes south of the I-5/US 50 IC to south of Elk Grove Blvd.

The project limits of this project were determined by the Project Development Team during the initial stages of the Project Initiation Document process. In this case, recurrent morning (northbound, 6 – 10 AM) and afternoon (southbound, 3 – 7 PM) traffic congestion on I-5 occurs between the cities of Elk Grove and Sacramento. The southern limit of the congestion is at Elk Grove Blvd and the northern limit is at the US 50 Interchange. Although congestion continues northward through the boat section (the depressed section of I-5 between US 50 and I Street), it was decided to separate this segment of I-5 into another HOV lanes project. The current project northern limit is near the US 50 eastbound ramp. The project has independent utility and the beginning/ending points provide logical termini.

This bus/carpool lane project is one project within an interdependent multi-modal transportation system that includes a regional bus/carpool lane network, regional passenger rail service, light rail service, express bus/local bus service, bicycle routes, pedestrian facilities, local roads, ports, fright rail lines, and air service.

Caltrans prepared a HOV Lanes Status Report in 2010 for existing HOV lanes on I-80, US 50, and State Route (SR) 99. The report found that vehicles in the HOV lanes on all routes increased an average of 5.5 percent in 2010 from 2009. The report also showed that the HOV lanes on all routes moved 21 percent more persons than a typical mixed flow lane in 2010.

The need for bus/carpool lanes on this portion of I-5 has long been recognized. This project, and the other projects that form the existing and planned bus/carpool lane network in the Sacramento region, have been included in a number of studies, plans, and programs dating from 1989. These include:

- Metro Study (Sacramento Council of Governments (SACOG))
    - 1989 study that recommended a regional HOV lane study.

- Metropolitan Transportation Improvement Program (MTIP)
    - The program includes a listing of all transportation-related projects requiring federal funding or other approval by the federal transportation agencies.
    - The bus/carpool lane project is included in the 2012/2016 MTIP.

- Metropolitan Transportation Plan (MTP) 2035
    - The MTP 2035, adopted in March 2008, is a 28-year plan (through 2035) for transportation improvements in a six-county region (El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba).
    - The bus/carpool project is included in the list of Sacramento County projects in the MTP 2035.

- Measure A Half-Cent Sales Tax, Sacramento County 2004
    - The Measure A Half-Cent sales tax extended an existing half-cent tax from 2009 to 2030.
    - The HOV project was listed under Freeway Safety and Congestion Relief Program, Regional Bus/Carpool Lane Connectors/Extensions in the 2004 election ballot. All projects included on the ballot are also included in the MTP 2035.
    - According to Sacramento County Registrar of Voters, countywide, the measure passed with approximately 75% approval by voters.

- Sacramento Region Blueprint
    - Joint effort of SACOG and Valley Vision.
    - SACOG conducted two years of study and public involvement, resulting in the adoption of the Preferred Blueprint Scenario in December 2004. The Blueprint scenario adopted became part of SACOG's Metropolitan Transportation Plan update for 2035, a formal

document that serves as a long-range transportation plan for the six-county region. The Blueprint will also serve as a framework to guide local government in growth and transportation planning through 2050.
    - The carpool lane project is included in the Blueprint.

- California Transportation Plan 2025
    - The California Transportation Plan 2025 is a blueprint for meeting the State's future transportation needs.
    - Specific policies and strategies include completing the HOV network and maximizing the use of HOV lanes by encouraging transit operators to provide express bus service on HOV lanes.

- Interstate 5 Transportation Concept Report, 1997
    - The 1997 Interstate 5 Transportation Concept Report recommended consideration of HOV lanes on segments of I-5 within Sacramento County.

- Circulation Element, Sacramento County General Plan, October 2011
    - The Circulation Element of the Sacramento County General Plan states that Sacramento County supports the development of a regional network of bus/carpool lanes, of which this project is a component.

1.3.1 Project Development and Environmental Scoping History

Caltrans held an early meeting to present the proposed project to local agency partners on October 18, 2006. Representatives from Sacramento County, the City of Sacramento, and the City of Elk Grove attended this meeting.

A Notice of Preparation (NOP) was sent to the State Clearinghouse on October 11, 2007. The NOP was also distributed directly to approximately 130 local, state, and federal agencies and elected officials; tribal representatives; neighborhood and community groups; and other organizations. The NOP contained information regarding the planned open house/scoping meetings. Invitations to the open house/scoping meetings were also sent to all businesses and residences (approximately 30,500) within one-half mile of the project corridor. The North/City and Elk Grove/Laguna regional sections of the *Sacramento Bee*, the *Elk Grove Citizen*, and the *Laguna Citizen* advertised the open houses.

Two public houses/scoping meetings were held following the publication of the NOP. The first meeting was held on October 24, 2007 in the multi-purpose room of Joseph Sims Elementary School, located at 3033 Buckminster Dr. in Elk Grove. The second meeting was held on October 25, 2007 at the Belle Cooledge Branch of the Sacramento Public Library, located at 5600 South Land Park Dr. in Sacramento.

Approximately 11 people attended the first open house in Elk Grove. Four people provided comments. Approximately 73 people attended the open house at the Belle Cooledge Library and of these, 30 people provided comments. At this meeting, five people asked Caltrans staff for further information on the noise studies (four of which also submitted comment cards repeating this request). Following the open houses, twelve additional comments were received via mail or e-mail.

Between 2007 and 2010, additional meetings were held with members of the Sacramento City Council, environmental advocacy groups, and local cities, counties, and transit agencies in order to present the project and discuss other potential improvements to corridor mobility, including transit, bicycle, and pedestrian improvements. Chapter 4 provides additional information on public participation in the project to date.

Caltrans District 3 sponsored a Value Analysis (VA) study for the I-5 HOV lanes project. Value Management Strategies, Inc. facilitated the five-day VA study in August 2009. Value Analysis or Value Engineering studies, mandated by FHWA for projects costing more than $25 million, are conducted to provide suggestions for reducing the total cost of the project while providing a project of equal or better quality. Eight Caltrans staff from various functional units (including environmental, traffic, hydraulics, geotechnical, design, structures, and landscape architecture) comprised the VA team. Although a number of value analysis suggestions were evaluated (see below), only one improvement to the project was accepted by the VA team —providing a polyester overlay on each of the seven bridge structures within the project limits. This suggestion was selected because it would greatly increase the useful life of the structures, reduce overall maintenance costs while improving mainline operations, reduce noise by providing a smoother ride, and eliminate the sag in the bridge surfaces.

Other suggestions analyzed but rejected included:

- Eliminate the southbound HOV lane (from the vicinity of River Bend Road south) and share a single northbound HOV lane based upon peak traffic

This suggestion was rejected as too experimental. Operating costs for reversal procedures, including gates and visual inspection of traffic evacuation, were also cited as too high to justify this suggestion.

- Use aggregate instead of asphalt for maintenance access roadway behind the sound walls

  This suggestion was rejected because Caltrans Maintenance would not accept this option.

- Leave Casilada POC in place; take no action

  This suggestion was rejected because it does not address the ADA compliance issues.

- Close and demolish POC; provide signage directing pedestrians to the Seamas Avenue undercrossing for pedestrian crossing

  This suggestion was rejected due to the uncontrolled nature of the access for school children needing to go to school across the freeway on the east side.

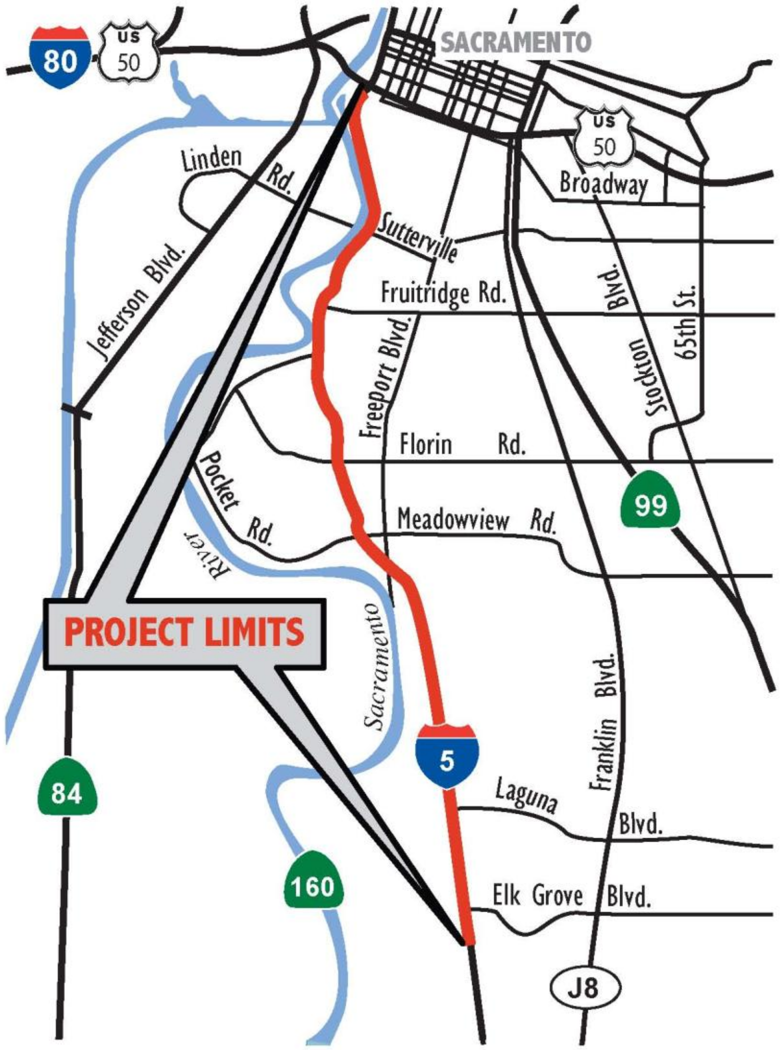
- Leave existing POC; provide signage directing pedestrians to the Seamas Avenue undercrossing for pedestrian crossing

  This suggestion was rejected because it does not provide equal access for people with disabilities.

1.3.2 Circulation of Draft EIR/EA in 2011 and Decision to Re-Circulate Draft EIR/EA

In April 2011, Caltrans circulated the initial draft EIR/EA for the current project. Caltrans received approximately 77 comments from the two public workshops, emails, and letters. As a result of the comments, Caltrans decided to include two additional alternatives (refer to Section 1.5) and re-circulate the draft EIR/EA.

Figure 1-3.1 Project Vicinity Map



1.4 Purpose and Need

1.4.1 Existing Facilities

Interstate 5 within the project limits is a major north-south interstate facility on the National Highway System that varies from four lanes near Elk Grove Blvd. to eight lanes north of Florin Rd. Controlled access is provided at existing interchanges that serve major arterials in Sacramento County and the cities of Sacramento and Elk Grove.

Beginning at the southern end of the project, from south of Elk Grove Blvd. to Laguna Blvd., the project is a rural freeway with two 12-ft lanes in each direction. The inside and outside shoulder widths are 5 ft and 10 ft, respectively, and the total median width is 84 ft.

North of Laguna Blvd., the freeway widens to three lanes in each direction up to the Florin Rd. interchange (IC). Inside and outside shoulders are paved and are also 5 ft and 10 ft wide, respectively. The median width varies between 22 ft and 54 ft.

From north of Florin Rd. to US 50, the freeway turns to a more urban setting as it widens to four lanes in each direction. Throughout this section, the inside and outside shoulder widths range from 8 ft to 10 ft. The total median width is 22 ft.

A median barrier separates northbound from southbound traffic from one-half mile south of the Laguna Blvd. IC to the I-5/US 50 IC. All on-ramps are metered in the northbound direction. Currently, no ramp metering is installed in the southbound direction.

FHWA regulations (23 CFR 771.111 [f]) require that the proposed 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.

The project limits of this project were determined by the Project Development Team during the initial stages of the Project Initiation Document process. In this case, recurrent morning (northbound) and afternoon (southbound) traffic congestion on I-5 occurs between the cities of Elk Grove and Sacramento. The southern limit of the congestion is at Elk Grove Blvd, and the northern limit is at the US 50 Interchange. Although congestion continues northward through the boat section (the depressed section of I-5 between US 50 and I Street), it was decided to separate this segment of I-5 into another HOV lanes project. The project limits coincide with these measured limits of congestion, and the practical requirements of dropping a freeway lane, considering safety and operations. Therefore, the project limits start just south of Elk Grove Blvd and end at US 50.

The project has independent utility. This project, in and of itself, would provide congestion relief, improve traffic flow, improve traffic safety and carry more people in fewer vehicles during peak periods. This will be accomplished by promoting ride sharing and the use of high-occupancy vehicle use.

1.4.2 Project Purpose

The purpose of this project is to:

- Promote ride sharing and the use of high occupancy vehicles, such as carpools, vanpools, and express bus services.
- Provide congestion relief in order to improve traffic flow and mobility on this section of I-5.
- Improve traffic operations and safety.
- Provide an option for more consistent and predictable travel time for carpools, vanpools, buses, paratransit services, and emergency vehicles during peak periods.
- Use the highway facilities as efficiently as possible.
- Help achieve the goals of the current 2035 SACOG Metropolitan Transportation Plan (www.sacog.org/2035/files/MTP-SCS/1%20-%20Introduction%20-%20Final.pdf).

1.4.3 Project Need

Interstate 5 is designated as part of the “National Network” for trucks, and as the primary north-south route in California serves interregional and interstate travel. This portion of the I-5 corridor also serves daily commuters from Elk Grove and south Sacramento. I-5 plays a critical role in California’s economy by supporting a high volume of commuter and interregional traffic as well as trucks moving goods to destinations in and outside the state.

Section 2.5 of this document includes a detailed discussion regarding traffic. A summary is included below.

Traffic Volume and Level of Service

For northbound I-5, the morning peak period model for existing conditions shows congested Level of Service (LOS) F conditions at the Elk Grove Blvd. on-ramp, from Laguna Blvd. to Sutterville Rd., and from the US 50 westbound on-ramp to the J St. off-ramp (see Table 2-5.1). Bottlenecks exist at the end of the acceleration lane north of Laguna Blvd., at the US 50 off-ramp, and at the lane drop north of the J St. off-ramp. Additional bottlenecks occur at high-volume on-ramps at Pocket Rd., Florin Rd., and 43rd St. Shortly after the traffic counts were taken, ramp meters were activated at these on-ramps. Although this resulted in reduced congestion and decreased travel times, overall congestion patterns for these segments of I-5 remain the same.

For southbound I-5, the afternoon peak period model for existing conditions has LOS F from Richards Blvd. to Sutterville Rd. and from Florin Rd. to Pocket Rd. (See Table 2-5.2). The bottlenecks in the southbound direction are located at the US 50 off-ramp, at the lane drop north of Sutterville Rd., and the Pocket Rd. off-ramp. Congestion on US 50 and the low-speed connector ramps result in congestion on southbound I-5. The Sutterville Road bottleneck causes queuing on the US 50 connector ramps that extend to the US 50 mainline in both directions. The combination of entering traffic from Florin Rd. with high off-ramp volume to Pocket Rd. causes the last bottleneck.

Table 2-5.3 presents the observed existing travel time and speed for existing conditions. The travel time and speed for free-flow conditions is compared to the values during the middle two hours of the four-hour peak periods. The average travel speed in the northbound direction during the morning peak period is between 28 and 41 mph. In the southbound direction during the afternoon peak period, the average speed is similar, between 30 and 41 mph.

Table 2-5.4 shows the *network-wide* summary statistics for the four-hour peak period. The results reflect the higher observed level of congestion in the northbound direction, which translates to lower average speeds and higher average delays.

Traffic Safety

Table 2-5.5 summarizes the traffic accident data compiled by the Caltrans Traffic Accident Surveillance and Analysis System (TASAS). The data shown is for the three-year period between January 2008 and December 2010.

The portion of I-5 within the study area had 658 accidents, three of which were fatality-related accidents. The actual accident rate for the project study area (Hood-Franklin Road to US 50) was lower than the average accident rate for similar freeway facilities in both north and southbound directions. The three fatalities in the southbound direction involved a single vehicle. The type of collision was hit object. No unusual roadway or weather conditions were reported.

Table 2-5.6 categorizes the accidents within the three-year period according to peak period and accident type. The morning and afternoon four-hour peak periods (one-third of the day) accounted for majority of the accidents (59 percent). More accidents occurred during the morning peak period than the afternoon peak period, which is consistent with the higher level of congestion during the morning peak period. Rear-end collisions, which are associated with congested conditions, were the most frequent type of accident and accounted for 35 percent of all accidents.

I-5 is a major interstate truck route; therefore, the accident rate according to vehicle type was reviewed. The data revealed that 88 percent of all collisions involved a passenger car. Large trucks and/or tractor-trailers were involved in 15 percent of the northbound collisions and 18 percent of the southbound collisions. Since trucks make up 10 to 15 percent of peak period volume, the proportion of the collision percentage is slightly higher.

1.5 Project Description

This section describes the proposed project and the design alternatives that were developed by the project development team to achieve the project purpose and need while avoiding or minimizing environmental impacts.

1.5.1 Alternative 1, Bus/Carpool Addition and Miscellaneous Improvements

This alternative will add bus/carpool lanes (also known as high occupancy vehicle or HOV lanes) in both directions of I-5 in Sacramento County. This project is included in the Sacramento Area Council of Government’s Metropolitan Transportation Plan (MTP) 2035 covering the federal fiscal years from 2008 through 2035 and the

2012/2016 financially constrained Metropolitan Transportation Improvement Plan (MTIP).[2]

The proposed project will provide HOV lanes in each direction by constructing additional lanes from 1.1 miles south of Elk Grove Blvd. to just south of the I-5/US 50 interchange. The lane additions will be accomplished as follows:

- Beginning of project to just south of Laguna Blvd.: Construct HOV lanes by widening into the existing median in each direction. Provides an HOV lane in addition to the two existing mixed flow lanes for a total of three lanes in each direction.

- South of Laguna Blvd to Florin Road: Restripe the existing paved median to accommodate the HOV lane addition in each direction. Provides an HOV lane in addition to the three existing mixed flow lanes for a total of four lanes in each direction.

- Florin Road to just south of US 50: Provide an HOV lane in each direction by a combination of reconstructing the existing median and outside shoulders, and in some sections widening the outside shoulder area. Provides an HOV lane in addition to the four existing mixed flow lanes for a total of five lanes in each direction.

The widening south of Laguna Rd. will be to the inside shoulder area; however, just north of Elk Grove Blvd. in the southbound direction, a sliver of outside widening (approximately one-half mile long and, on the average, 12 feet wide) will be required.

North of Florin Rd. to just south of US 50, where the existing median narrows, the existing outside shoulders will be reconstructed with minor widening in some areas to accommodate the proposed bus/carpool lanes. This widening will vary from 1 to 8 feet in width from the existing edge of shoulder. To avoid impacts to adjacent infrastructure, the width of the median and the roadway will be reduced. The cross

[2] This project, as originally conceived, would have constructed auxiliary lanes in both directions of I-5 between Florin and Pocket/Meadowview Roads, and the environmental impacts associated with the construction of the auxiliary lanes have been considered in the technical studies prepared for this document. However, the construction of the auxiliary lanes has since been split out into a separate project and the 2009/12 MTIP has been updated to reflect this change (Administrative Modification

slopes of the additional lanes will match the existing cross slope of the roadway. The shoulder widths will be narrowed to avoid encroachment into the levee along the Sacramento River.

Double thrie beam barrier or optionally concrete median barrier will be installed from 1.1 miles south of Elk Grove Blvd. to just south of Laguna Blvd. From Laguna Blvd. to Florin Rd., the majority of the existing double thrie beam barrier will be replaced with concrete median barrier. Just north of Laguna Blvd., a short stretch (approximately 1,000 ft) of thrie beam barrier will remain in place in order to avoid potential floodplain impacts at the South Reach of Beach Lake (PM 12.40).

Several overcrossings and bridges will require structural modifications to accommodate the additional traffic lanes (see Table 1-5.1). The Beach Lake Bridge at Morrison Creek and the overhead structure at the I-5/SR 160 separation will both require widening to the inside—combining each pair of structures into its own single span to accommodate the additional lanes proposed by this project. At a number of overcrossing and underpass locations, the abutment slopes on I-5 will be pulled back and tieback walls will be constructed to accommodate the additional lanes. Each of the seven bridge structures within the project limits will receive a polyester overlay to prolong the useful life of the bridge decks.

Because the existing Casilada Pedestrian Overcrossing (POC) does not meet the current requirements of the Americans with Disabilities Act (ADA) of 1990, Caltrans has recommended that the structure be replaced as part of the overall project. The proposed structure meets ADA requirements, and will enhance access by providing a safer crossing for the disabled.

At this time, it is anticipated that two new sound walls will be required. If conditions substantially change during final project design, noise barriers may not be required. The final decision regarding noise abatement will be made upon completion of the project design and the public involvement processes (public's review and comment period on the design).

#30 to the 2009/12 MTIP and Amendment #31 to the 2009/12 MTIP). Please refer to Section S-1 for further discussion.

Table 1-5.1 Required Structure Modifications

Structure Name	PM	Structure Number	Description of Work
Beach Lake	12.93	24-0262L/R	Widen structures to the median
Route 5/160 Separation Overhead (SOH)	15.58	24-0296L/R	Widen structures to the median
Gloria Dr OC	18.19	24-0258	Widen abutment under the structure
Sutterville Rd. OC	20.53	24- 0256	Widen abutment under the structure
Land Park Underpass (UP)	20.82	24-0226	Widen abutment under the structure
Casilada Way Pedestrian Overcrossing (POC)	19.58	24-0254	Replace structure

Roadway rehabilitation work, including slab replacement and overlay, may also be required. A polyester overlay will also be applied to each of the seven bridge structures within the project limits.

As discussed in Chapter 2.6, highway planting, erosion control, and aesthetic treatment will be required for this project.

No right-of-way acquisition is anticipated for this project. Temporary construction easements will likely be required for structure widening and the replacement of the Casilada POC.

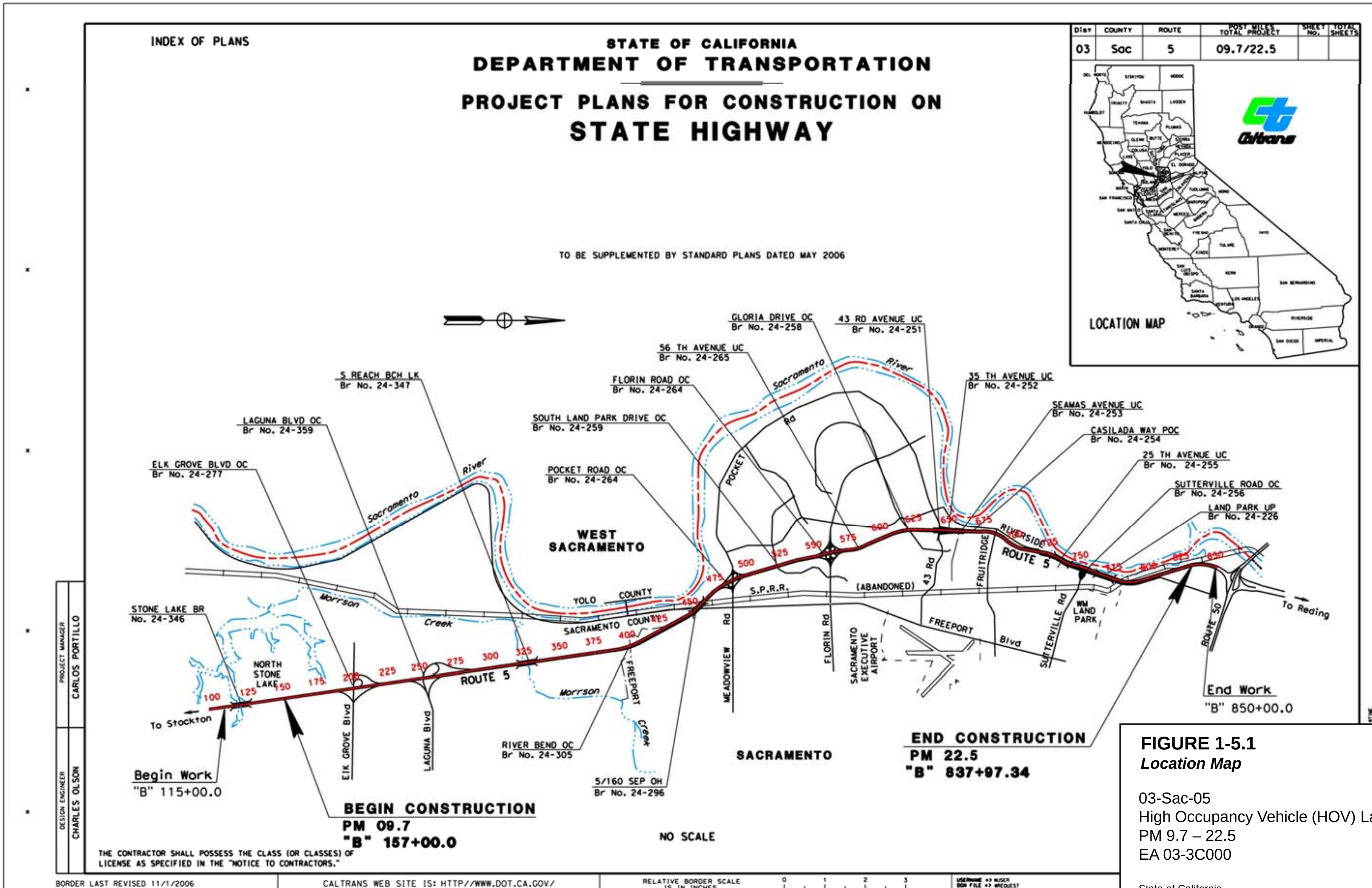


FIGURE 1-5.1
Location Map

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation

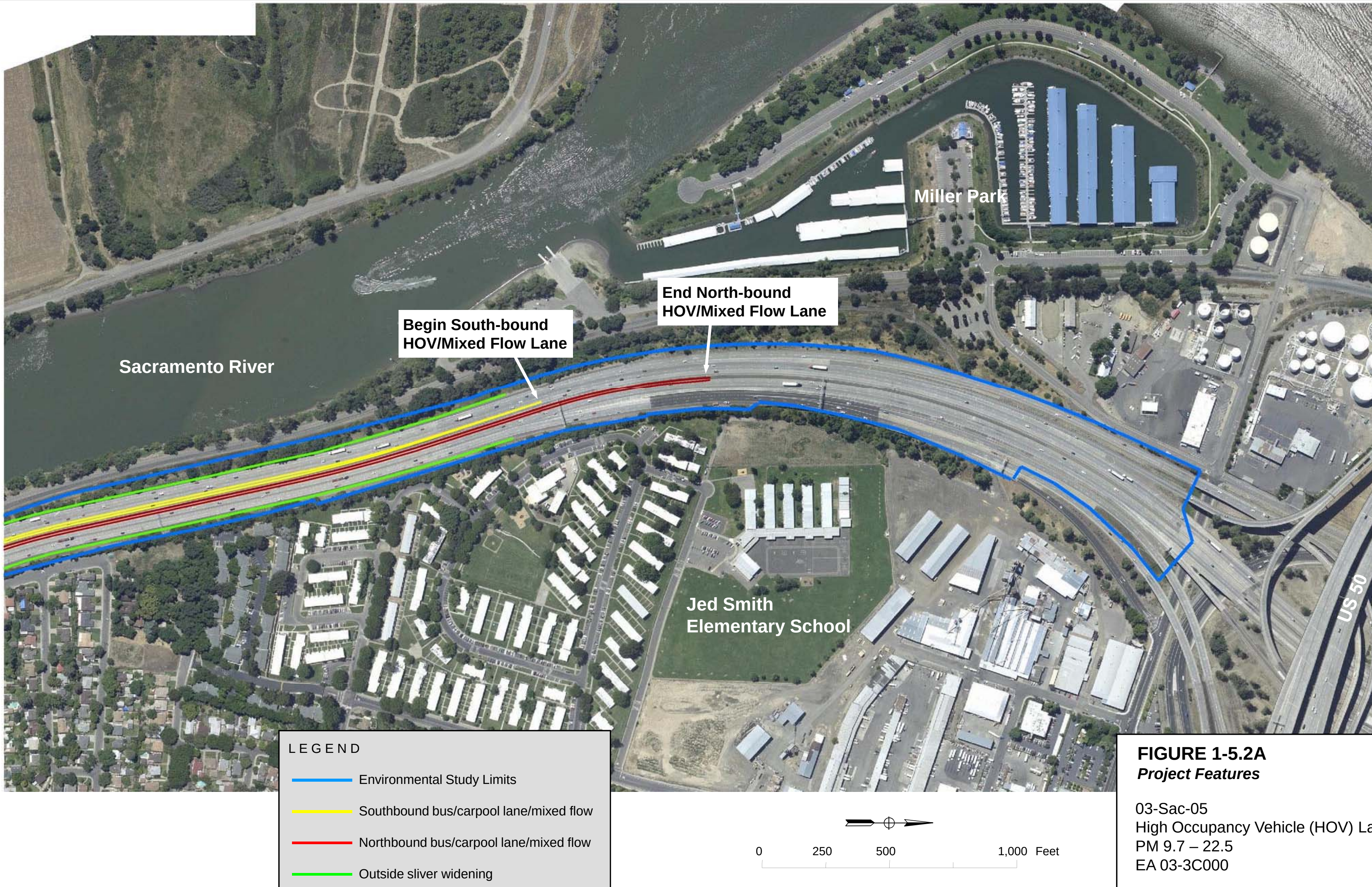


FIGURE 1-5.2A
Project Features

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation

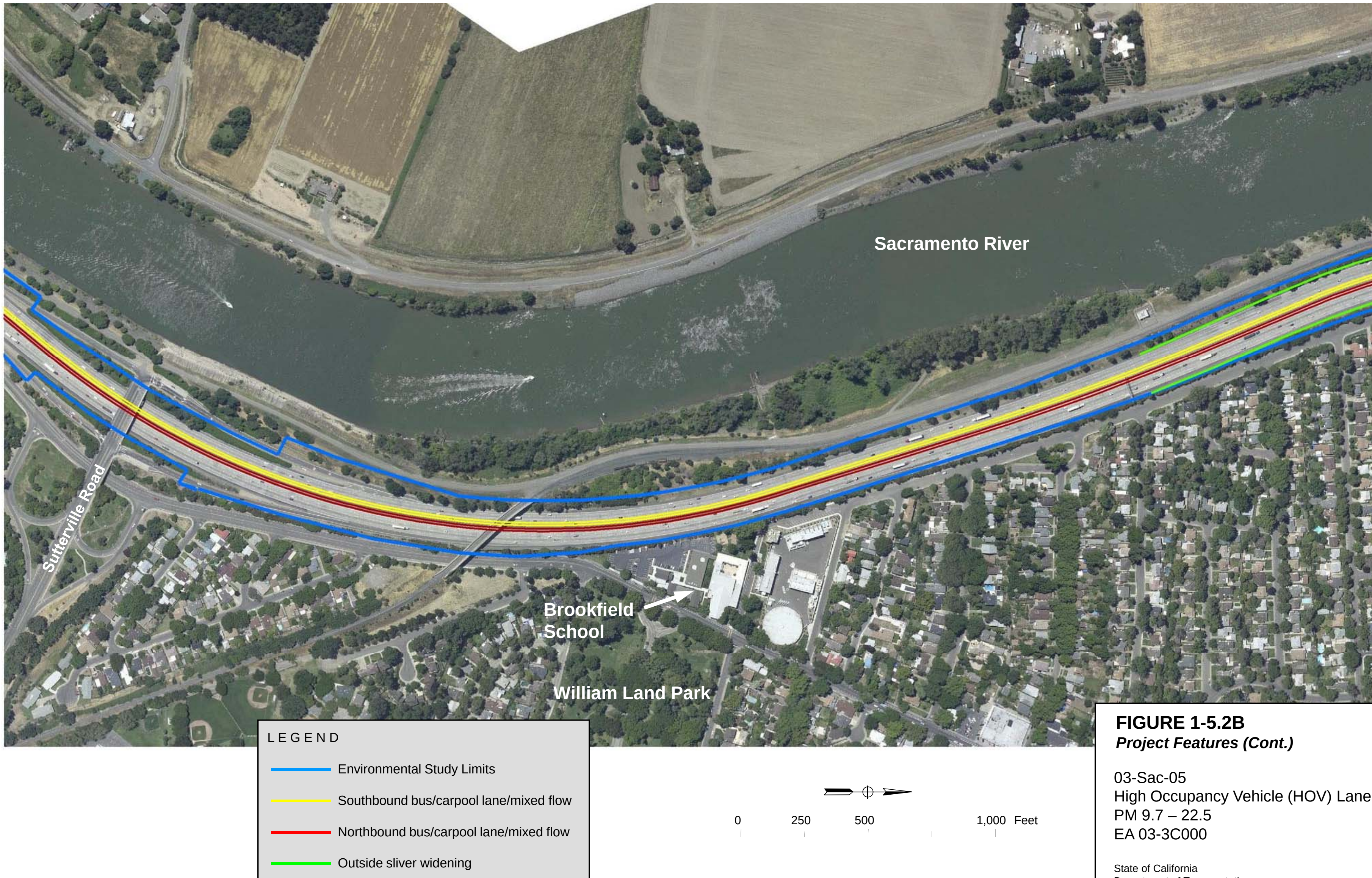
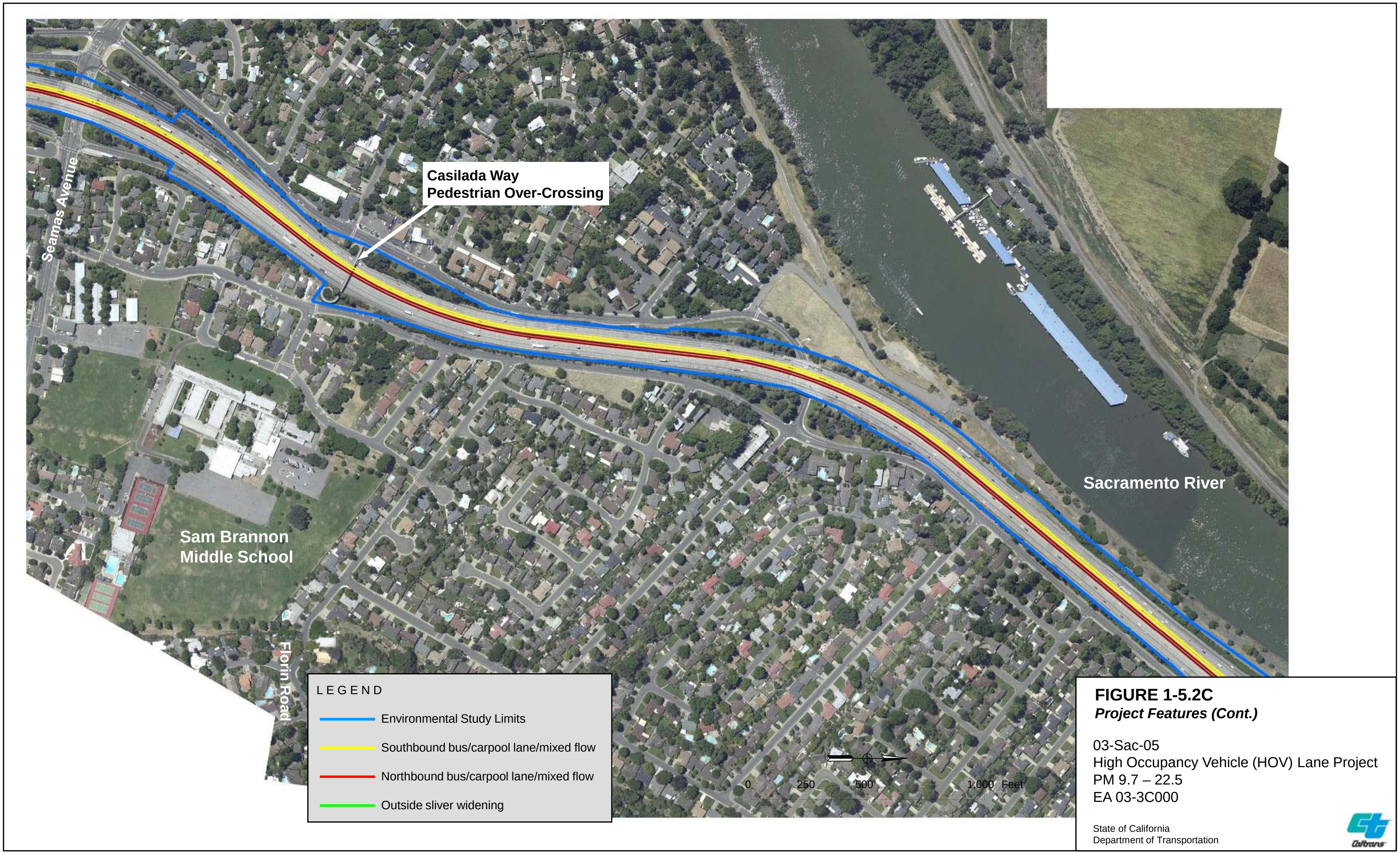
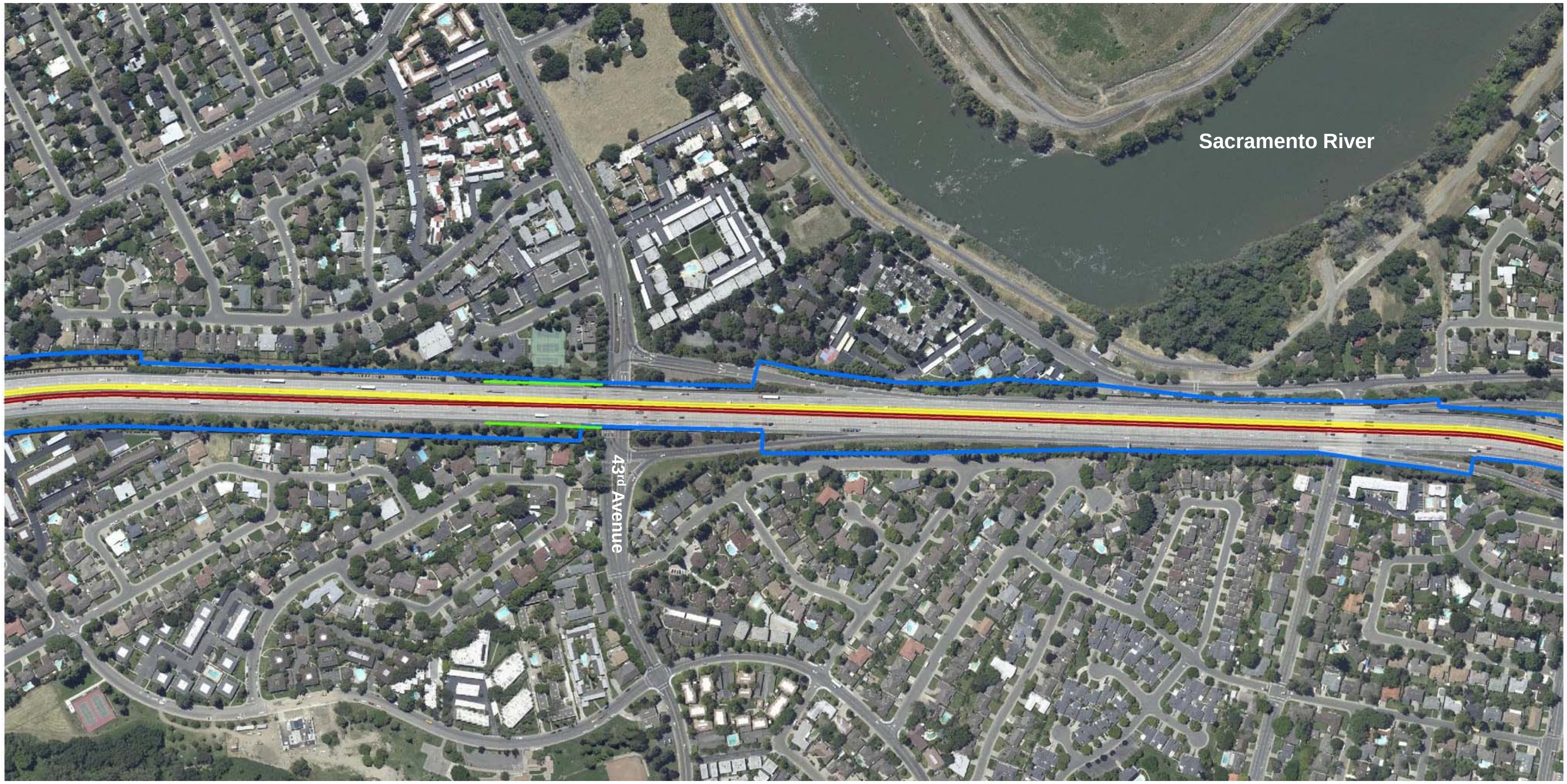


FIGURE 1-5.2B
Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation


Casilada Way
Pedestrian Over-Crossing
Seamas Avenue
Sam Brannon
Middle School
Florin Road
Sacramento River
LEGEND
Environmental Study Limits
Southbound bus/carpool lane/mixed flow
Northbound bus/carpool lane/mixed flow
Outside sliver widening
0 250 500 1,000 Feet
FIGURE 1-5.2C
Project Features (Cont.)
03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000
State of California
Department of Transportation
Caltrans



LEGEND

- Environmental Study Limits
- Southbound bus/carpool lane/mixed flow
- Northbound bus/carpool lane/mixed flow
- Outside sliver widening

FIGURE 1-5.2D

Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

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FIGURE 1-5.2E
Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation

LEGEND

- Environmental Study Limits
- Southbound bus/carpool lane/mixed flow
- Northbound bus/carpool lane/mixed flow
- Outside sliver widening

0 250 500 1,000 Feet

FIGURE 1-5.2F
Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation

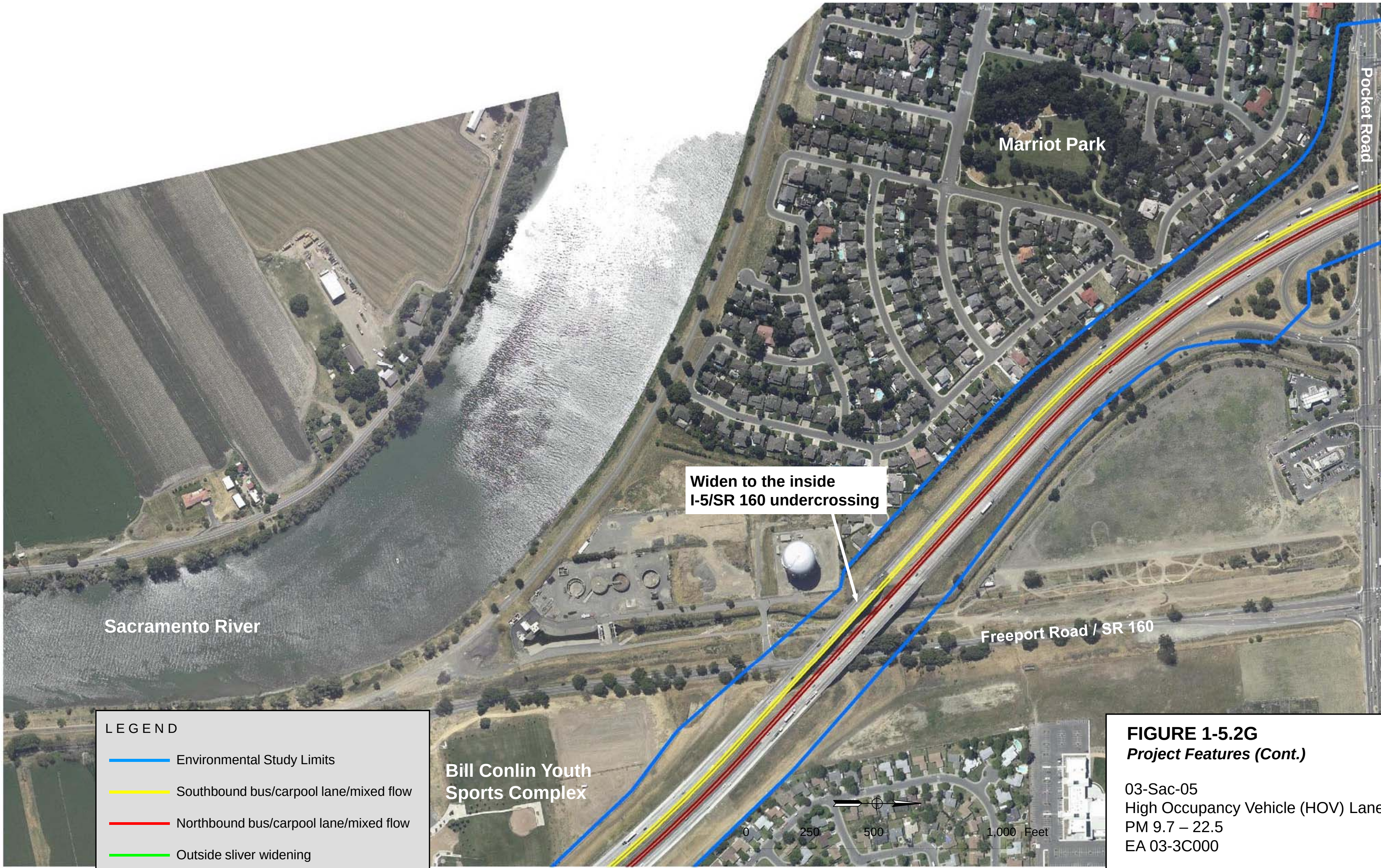


FIGURE 1-5.2G
Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation

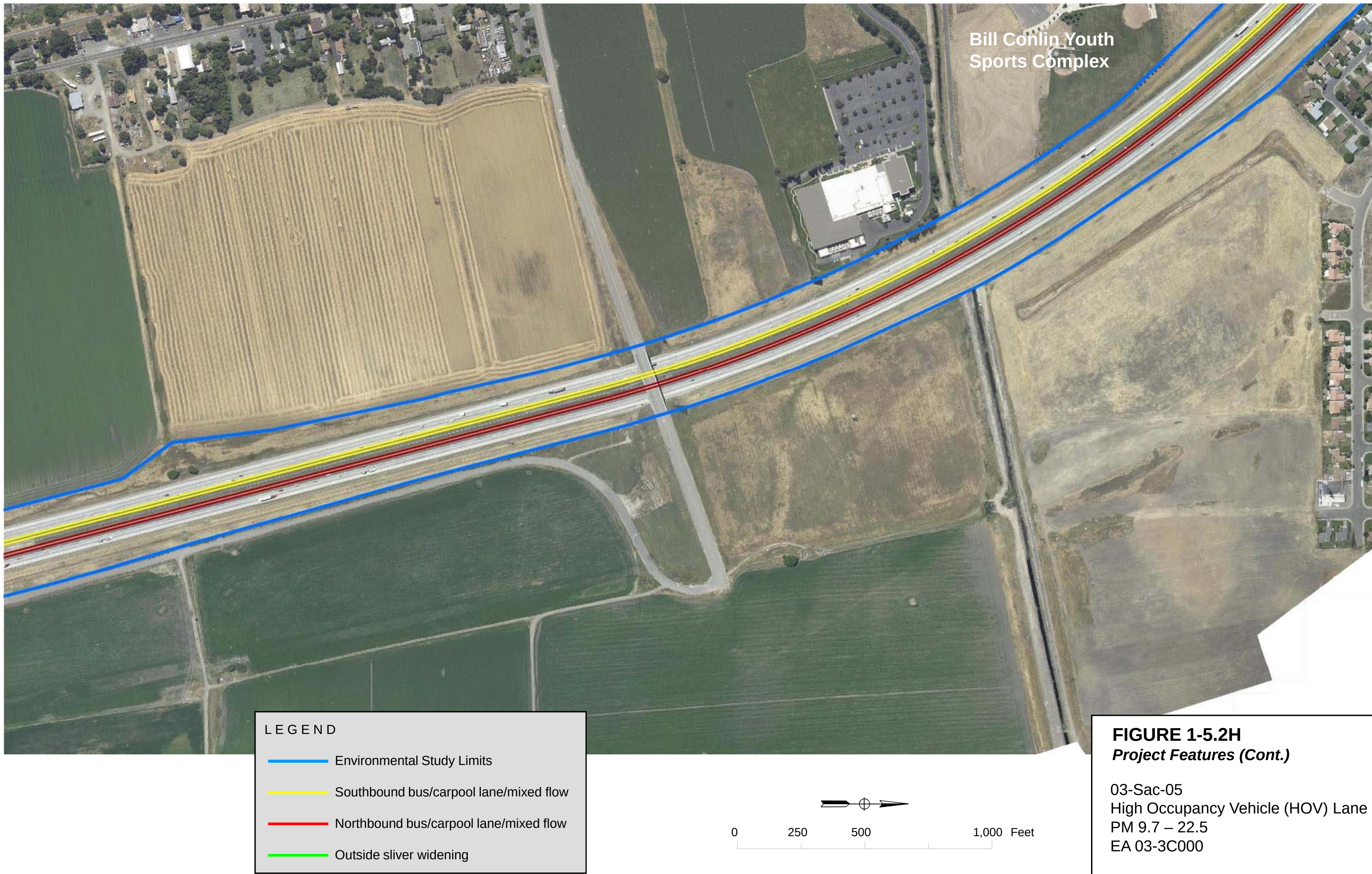
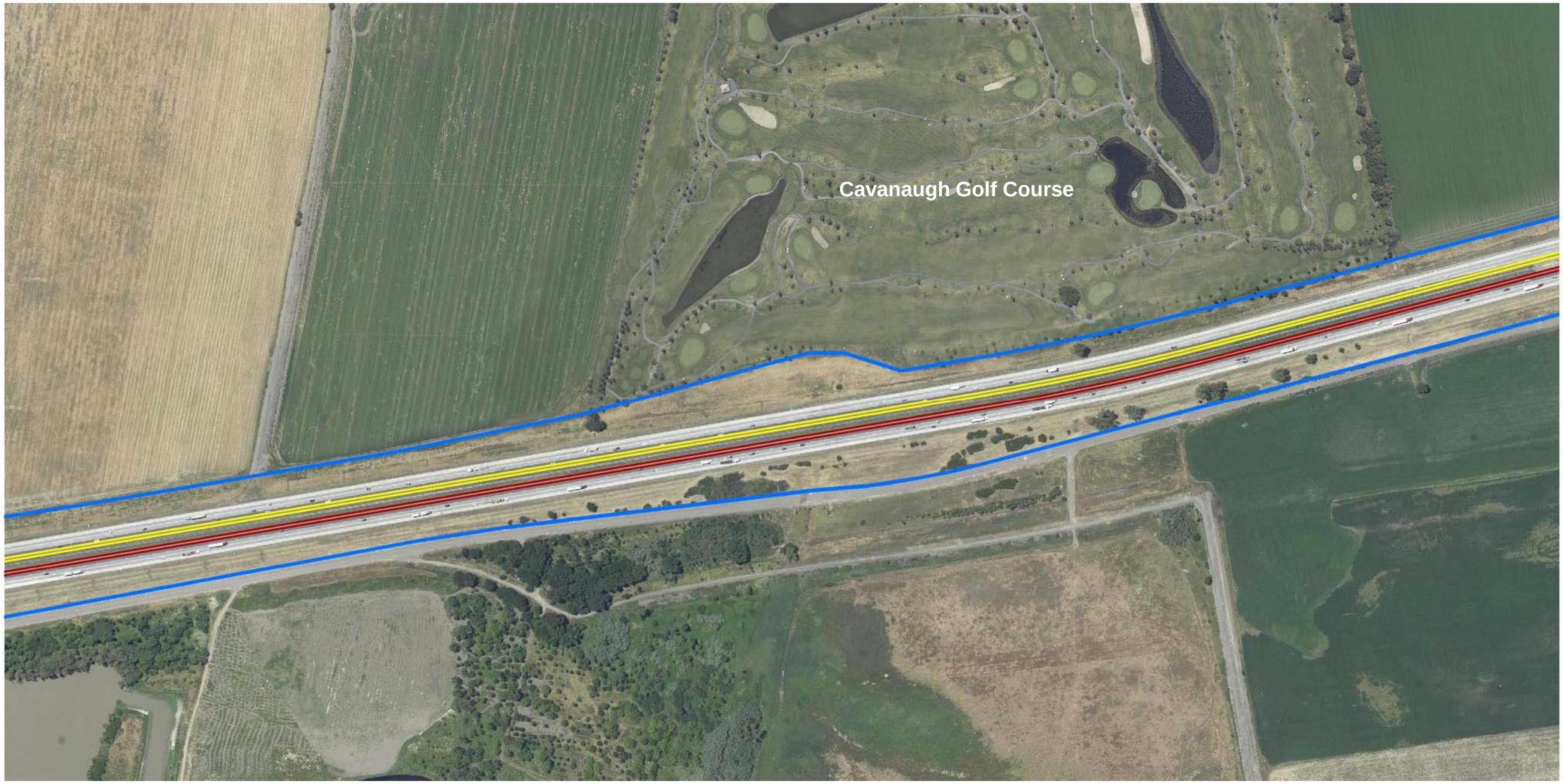


FIGURE 1-5.2H

Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation



LEGEND

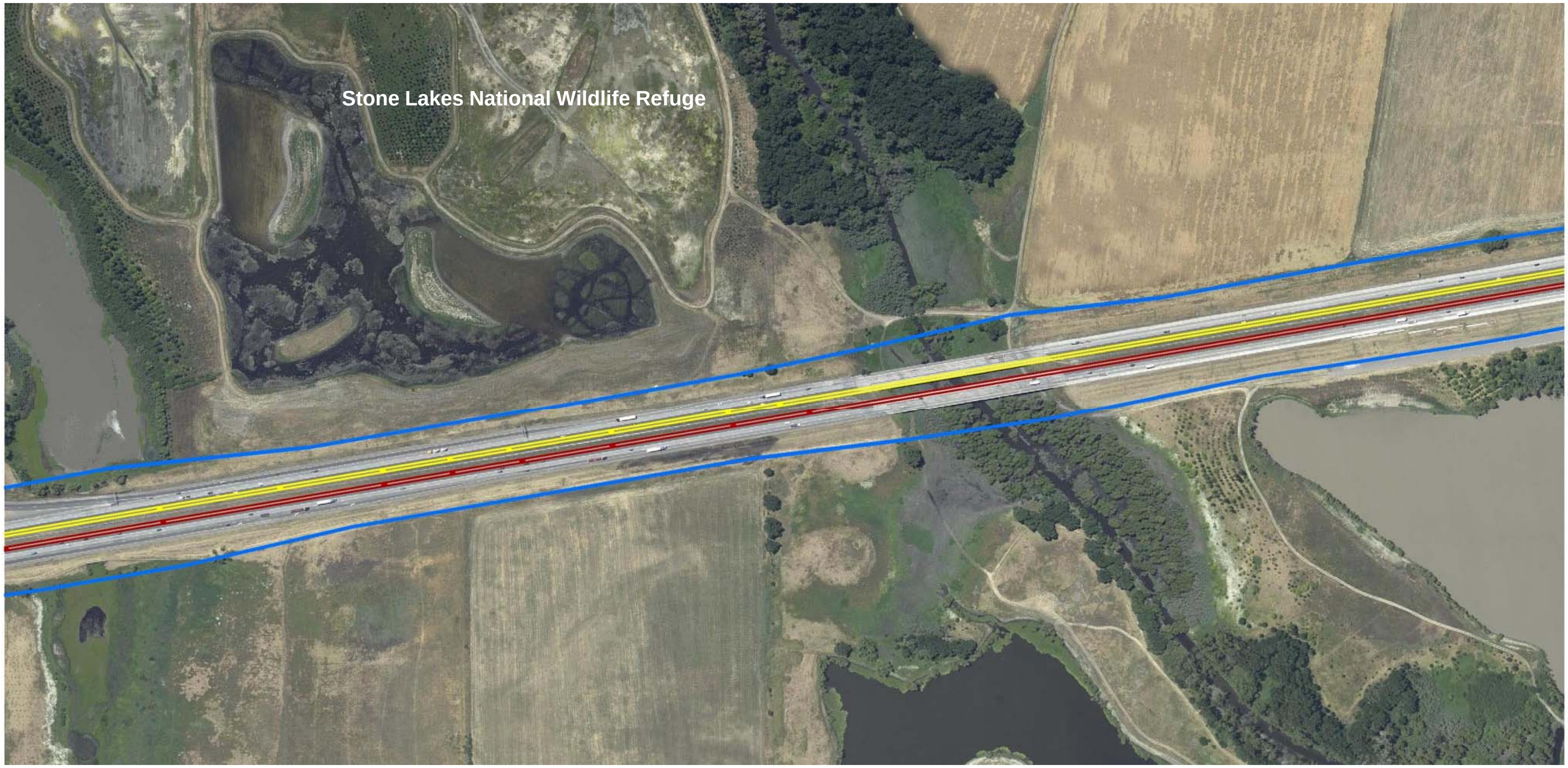
- Environmental Study Limits
- Southbound bus/carpool lane/mixed flow
- Northbound bus/carpool lane/mixed flow
- Outside sliver widening

0 250 500 1,000 Feet

FIGURE 1-5.2I
Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation



LEGEND

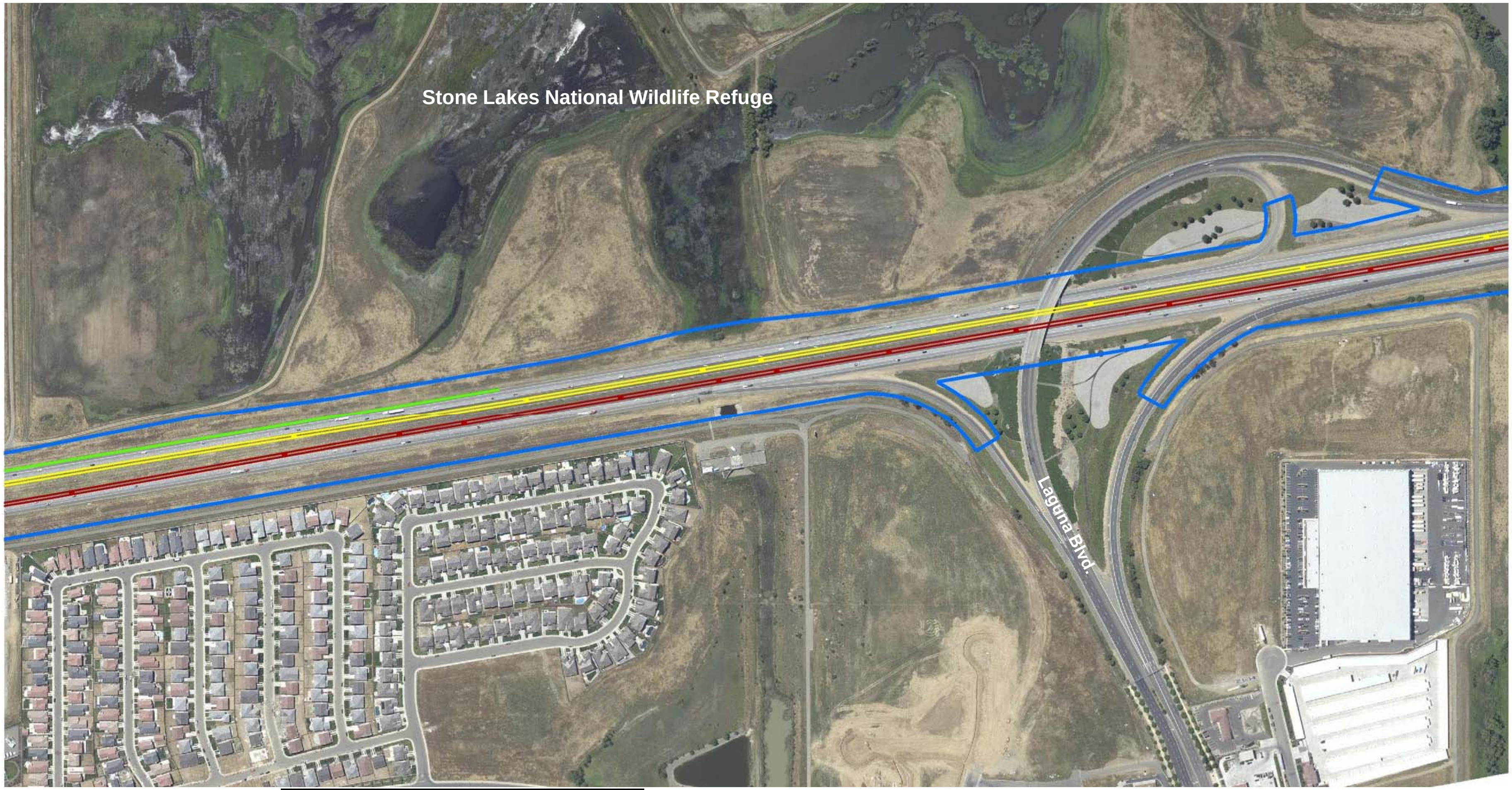
- Environmental Study Limits
- Southbound bus/carpool lane/mixed flow
- Northbound bus/carpool lane/mixed flow
- Outside sliver widening

0 250 500 1,000 Feet

FIGURE 1-5.2J
Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation



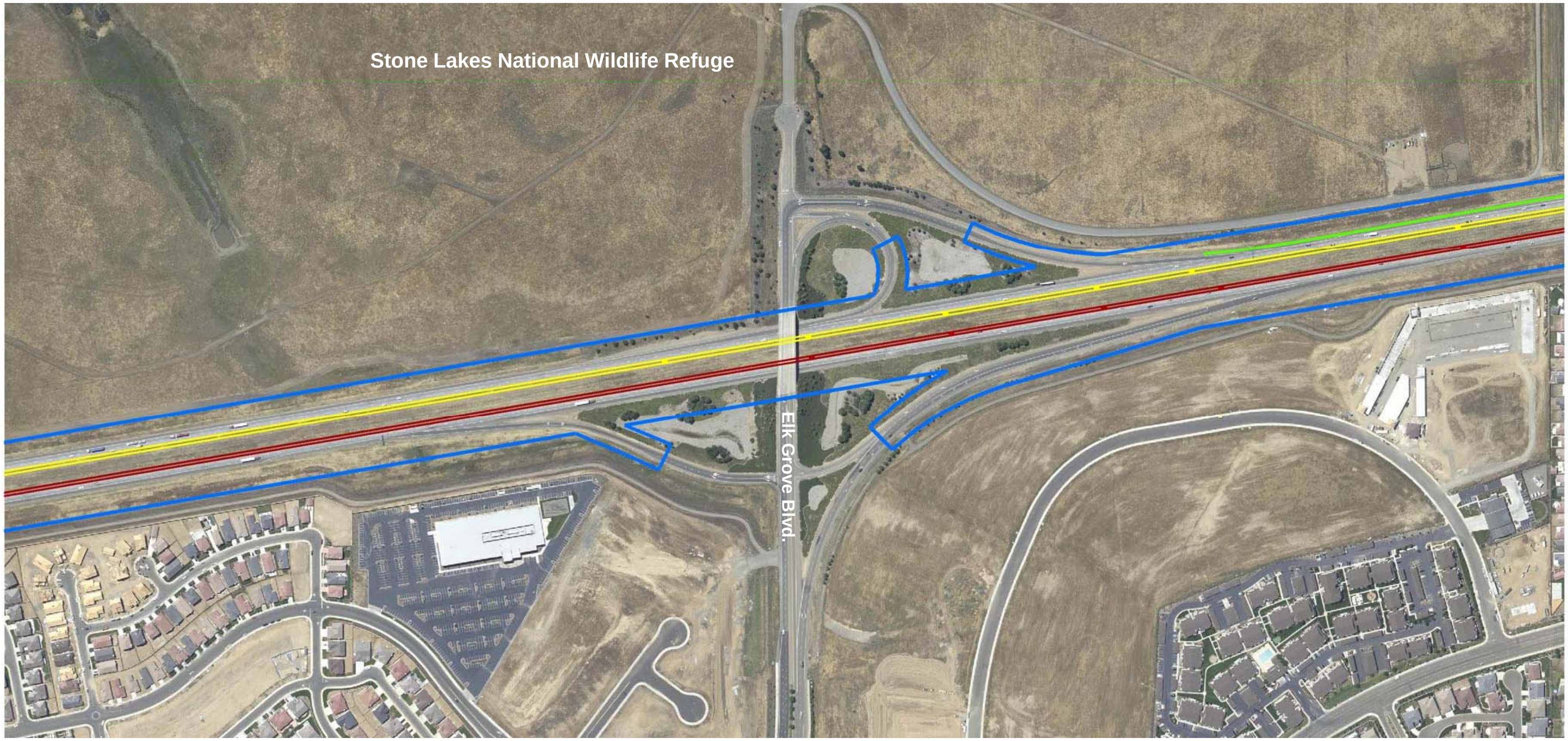
LEGEND

- Environmental Study Limits
- Southbound bus/carpool lane/mixed flow
- Northbound bus/carpool lane/mixed flow
- Outside sliver widening

FIGURE 1-5.2K
Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation



LEGEND

- Environmental Study Limits
- Southbound bus/carpool lane/mixed flow
- Northbound bus/carpool lane/mixed flow
- Outside sliver widening

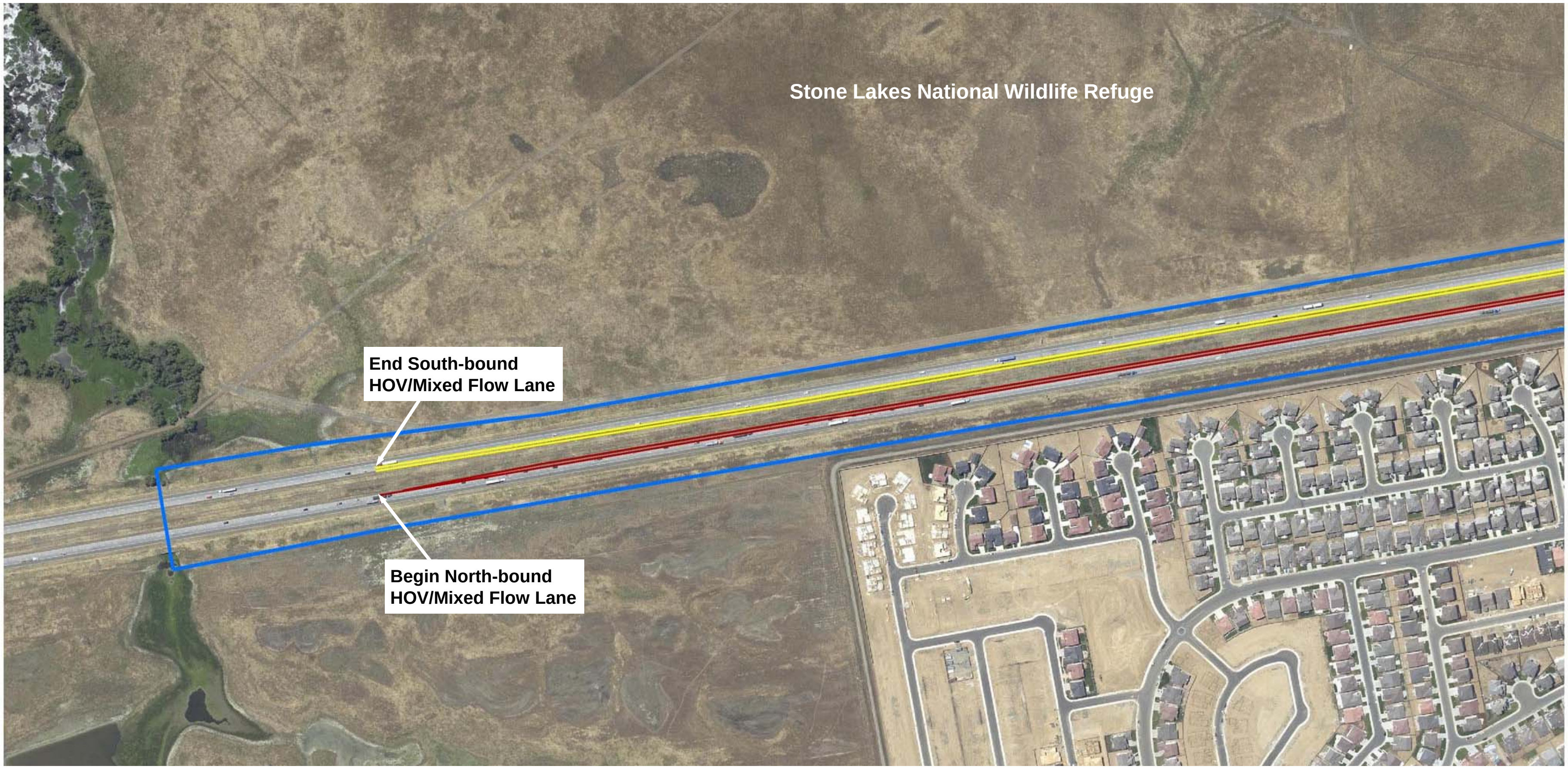
0 250 500 1,000 Feet

FIGURE 1-5.2L

Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation



LEGEND

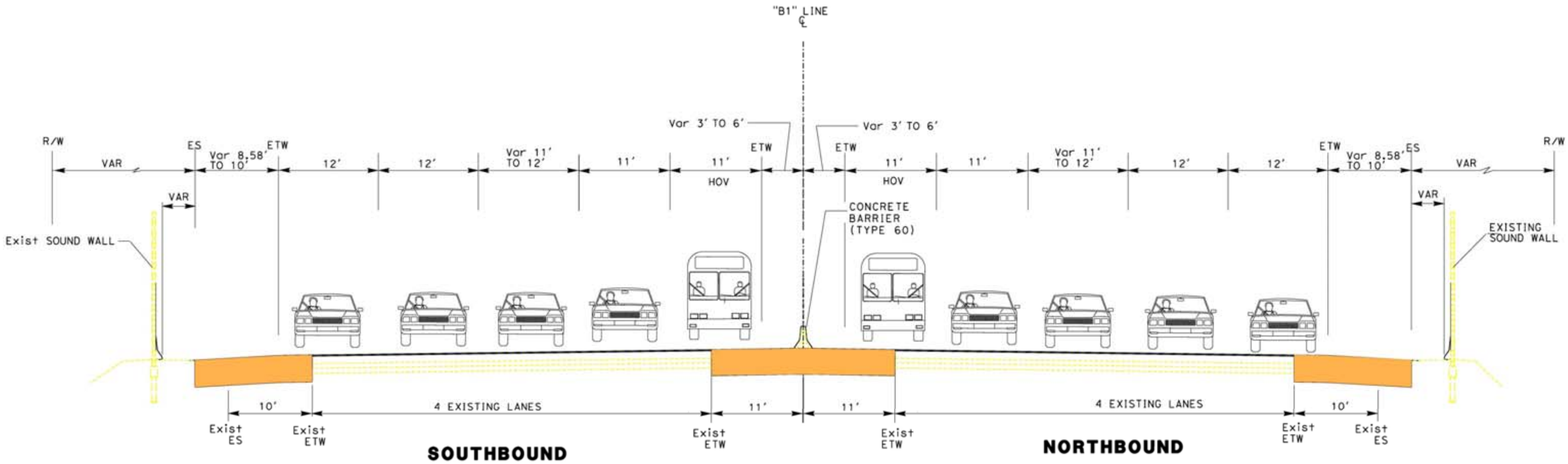
- Environmental Study Limits
- Southbound bus/carpool lane/mixed flow
- Northbound bus/carpool lane/mixed flow
- Outside sliver widening

0 250 500 1,000 Feet

FIGURE 1-5.2M
Project Features (Cont.)

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation

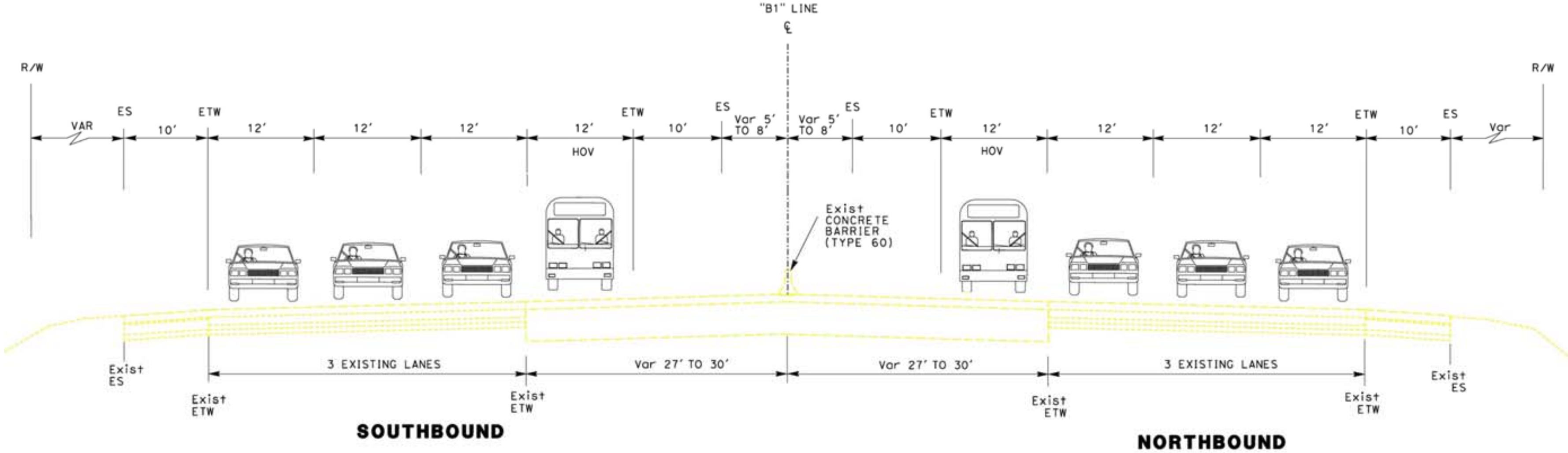


Typical Cross Section, Alternative 1 and 2
Florin Road to US 50
(no scale)

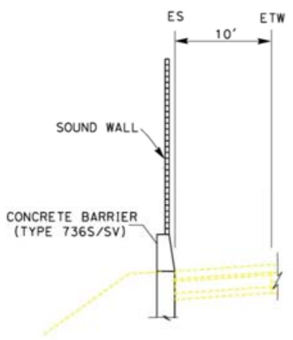
FIGURE 1-5.3A
Typical Cross Sections, Alt. 1 and 2

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation



Typical Cross Section, Alternative 1 and 2
Laguna Blvd. To Florin Road
(no scale)



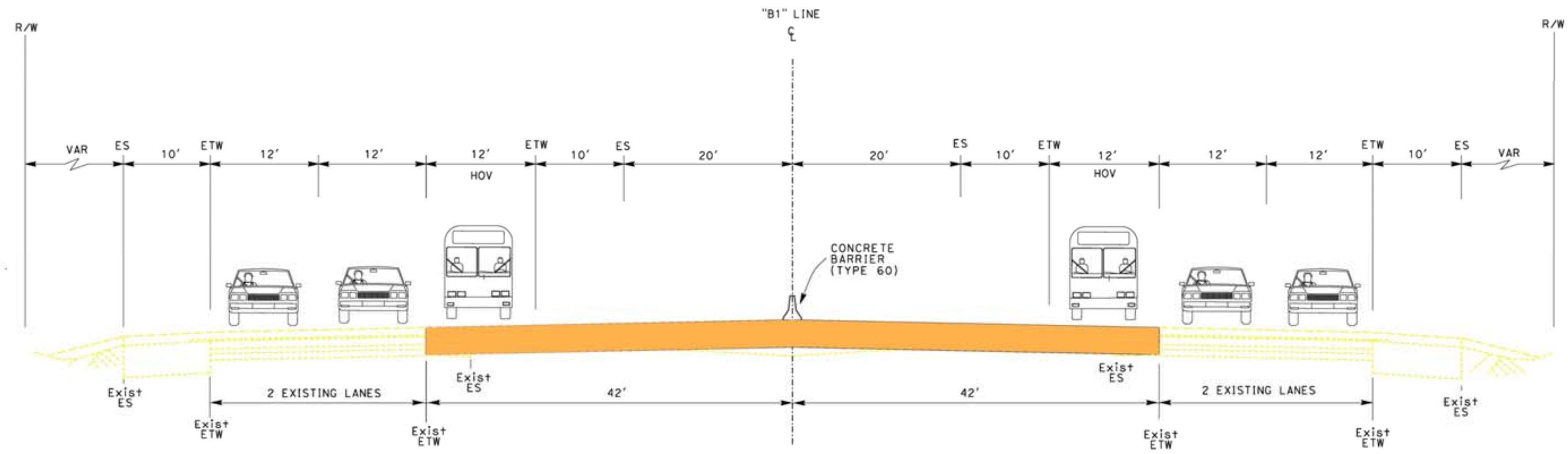
SOUTHBOUND AND NORTHBOUND MAINLINE ROUTE 5
SOUTHBOUND POCKET ROAD ON RAMP

PROPOSED SOUND WALLS
SOUTH OF POCKET ROAD

FIGURE 1-5.3A
Typical Cross Sections, Alt. 1 and 2

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation

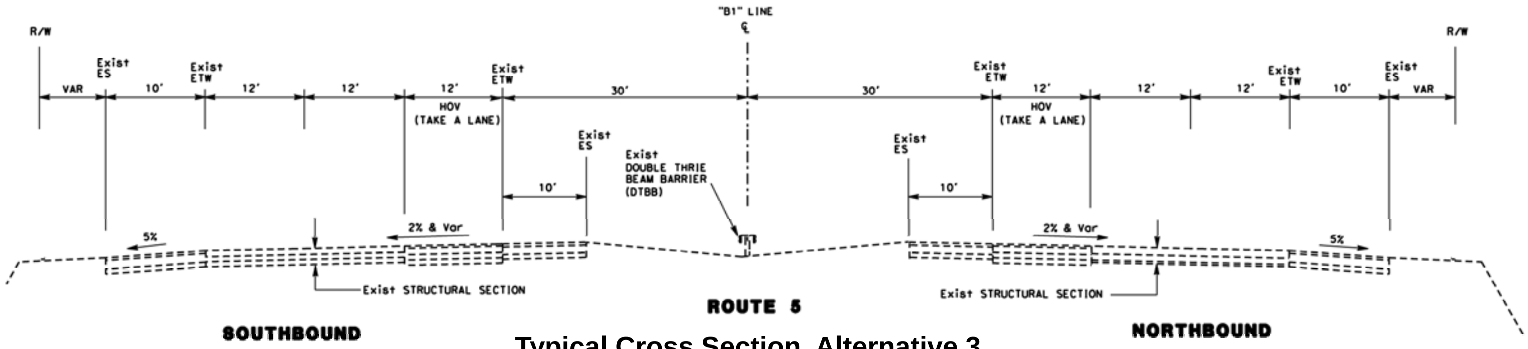


Typical Cross Section, Alternative 1 and 2
South of Laguna Blvd.
(no scale)

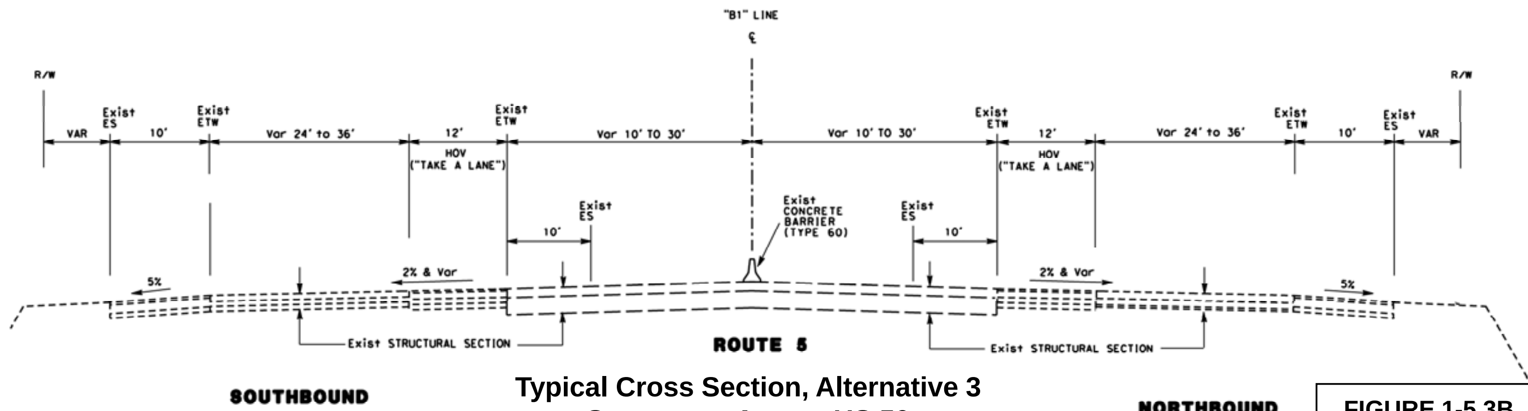
FIGURE 1-5.3A
Typical Cross Sections, Alt. 1 and 2

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation



Typical Cross Section, Alternative 3
North of Elk Grove Blvd. to Stonecrest Ave.
(no scale)



Typical Cross Section, Alternative 3
Stonecrest Ave. to US 50
(no scale)

FIGURE 1-5.3B
Typical Cross Sections, Alt. 3

03-Sac-05
High Occupancy Vehicle (HOV) Lane Project
PM 9.7 – 22.5
EA 03-3C000

State of California
Department of Transportation

Casilada Way Pedestrian Overcrossing (POC)

The proposed project will replace the existing Casilada POC because the existing overcrossing walkway grade of approximately 12% does not meet the requirements of the Americans with Disabilities Act (ADA). ADA requires a more moderate grade. The new grade will be 8.33% (the maximum grade allowed) and will provide a gentler grade for disabled users. The existing structure is about 8 feet wide and stretches about 225 feet across I-5. The structure span will be approximately 8-10 ft in width, 202 ft in length, and will have an elevation of approximately 20 ft. The ramps will be elliptical in shape and located on the east and west sides of I-5. Each ramp will begin at the approximate location of the existing ramps and crossing. Each ramp will be approximately 240 ft long and 10 ft wide, with the west ramp having an approximate elevation of 20 ft and the east ramp having an approximate elevation of 18 ft. Each ramp will require one abutment and three bents.[3] Caltrans anticipates that the estimated depth of ground disturbance for the footings and abutment/bents is approximately 10 ft, and piles will be driven to an approximate depth of 50-60 ft.

Utility Relocation

The proposed structure widening at the I-5/SR 160 separation would require the relocation of a 36 in. water main for the installation of the proposed bridge footings. North of Pocket Rd., roadway electrical control cabinets may be relocated. No other utility impacts are anticipated at this time. Please refer to Chapter 2.4 for more information.

Storm Water and Drainage Features

The existing drainage system is adequately designed to accommodate increased runoff resulting from the additional lanes and increased impervious surface area. The Bus/Carpool Addition Alternative would perpetuate the existing drainage patterns of the project area. Improvements to the existing drainage will include the installation or relocation of drainage inlets as needed. As the design phase progresses, additional temporary and permanent treatment features will be considered for incorporation into the project.

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[3] A bent is a part of a bridge substructure and consists of a rigid frame commonly made of reinforced concrete or steel that supports a vertical load and is placed transverse to the length of a structure. Bents are commonly used to support beams and girders. An end bent is the supporting frame forming part of an abutment.

Safety Improvements

Several elements of this project will improve safety. The addition of bus/carpool lanes is anticipated to reduce congestion and related accidents (please refer to Section 2.5 for a detailed discussion of traffic safety). Installation of thrie beam barrier from 1.1 miles south of Elk Grove Blvd. to just south of Laguna Blvd. will provide a median barrier for the length of the project. This will help to reduce the chance of errant vehicles crossing the median. The installation of safety-shape concrete barriers at the bottom of existing sound walls, as needed, will improve safety by maintaining vehicle alignment with the traveled direction during low-angle impacts. Safety shape barriers are designed to mitigate the energy of crash impacts. A discussion of these barriers can be found at http://safety.fhwa.dot.gov/roadway_dept/policy_guide/road_hardware/ctrmeasures/concrete_barriers/.

Transportation System Management (TSM) and Transportation Demand Management (TDM)

Transportation System Management (TSM) strategies consist of actions that increase the efficiency of existing roadways; they are actions that increase the number of vehicle trips a roadway can carry without increasing the number of through lanes. Examples of TSM strategies include ramp metering, auxiliary lanes, turning lanes, reversible lanes, and traffic signal coordination. Transportation Demand Management (TDM) focuses on regional strategies for reducing the number of vehicle trips and vehicle miles traveled, as well as increasing vehicle occupancy.

Although TSM measures alone could not satisfy the purpose and need of the project, the proposed project includes a number of TSM strategies. Traffic Operations System (TOS) elements, such as ramp metering, changeable message signs, and closed circuit television cameras, will be installed as specified by the Division of Traffic Operations.

TSM strategies incorporated in this project include:

1. Loop detector reconstruction and placement at various locations (exact locations will be determined during the final design phase of the project).
2. Closed circuit television cameras at Elk Grove Blvd. and Laguna Blvd.

A separate project to install TOS elements within the project limits at seven locations is planned; south of Elk Grove Blvd, south of Laguna Blvd, Beach Lake Bridge, north of Beach Lake Bridge, south of River Bend Overcrossing, and State Route 160 Overhead. As of 2012, this project has not been constructed. Another project to place auxiliary lanes between Florin Road and Pocket Road is in the early stages of the project development process. These projects, in conjunction with the fundamental TDM purpose of this carpool lanes project on I-5, fulfill the *Need and Purpose* of the project by reducing travel delay, travel costs, and improving the quality and efficiency of the peak period commutes. Another TSM strategy (reversible lanes) was studied on this project. The concept was rejected because it was proven to not be cost effective.

TDM focuses on regional strategies for reducing the number of vehicle trips and vehicle miles traveled as well as increasing vehicle occupancy. It facilitates higher vehicle occupancy or reduces traffic congestion by expanding the traveler's transportation choice in terms of travel method, travel time, travel route, travel costs, and the quality and convenience of the travel experience. TDM recognizes that as urban areas continue to grow, opportunities for investments in transportation infrastructure ("supply" or capacity side) become limited and that urban transportation corridors increasingly lack the physical space to accommodate more lanes. Thus, typical TDM strategies focus on the "demand" side to make existing transportation facilities work better (Association for Commuter Transportation, et al. 2004). Demand-side strategies are designed to better balance people's need to travel a particular route at a particular time with the capacity of available facilities to efficiently handle this demand. General TDM activities can range from infrastructure investments like high occupancy vehicle lanes and preferential parking spaces, to more programmatic investments like tax-based incentives and marketing. More targeted strategies can include guaranteed ride home programs for carpoolers, transit pass programs, flexible work schedules, and real-time route information.

Construction Disposal, Staging, and Borrow (DSB)

Areas within the highway right-of-way may be required by the Contractor for the disposal of excess materials, the acquisition of necessary borrow materials, and to stage equipment, store supplies, and to house construction offices. Caltrans will identify recommended staging and stockpiling locations within the highway right-of-way for use by the Contractor. These areas will be located in areas that have already been heavily disturbed, such as the interior areas of interchanges or locations that have been used for construction staging in the past. The use of these areas by the Contractor is not mandatory unless otherwise specified in the Special Provisions. Thus, in order to protect sensitive environmental resources from construction-related impacts, Caltrans will establish and delineate Environmentally Sensitive Areas (ESAs) on project plans and specifications to protect these resources. No construction staging, storage/stockpiling, or other construction-related activities will be allowed to occur within these areas.

If the Contractor elects to use alternate sites outside of the highway right-of-way, a DSB site submittal must be prepared by the Contractor and approved by Caltrans.

This project is expected to require the use of disposal sites for excess material, as more material will likely be generated than can be reused as fill on the project. Additionally, disposal sites will be required if unsuitable material is encountered that cannot be reused as fill. No imported borrow is currently anticipated under the build alternative for this project. As the engineering design develops and cut and fill quantities are refined, imported borrow may be required.

Borrow and disposal sites are at the discretion of the Contractor. If borrow and/or disposal sites are required for this project, the Contractor will be responsible for complying with all local, state, and federal environmental regulations and obtaining all necessary permits. A DSB site submittal will be prepared by the Contractor and approved by Caltrans.

If the Contractor elects to use alternate sites for staging and/or stockpiling, or if borrow and/or disposal sites are required for this project, the DSB site submittal prepared by the Contractor will include the following components:

- Site plan, including site limits and access roads
- Property owner agreements
- Release of Liability
- Environmental documentation prepared by appropriately qualified environmental specialists
- All necessary permits, licenses, and agreements
- A final grading plan that conforms with Caltrans' *Standard Specifications*
- Water Pollution Control Plan
- Construction General Permit (Order No. 2009-009-DWQ)

Special Considerations

In the vicinity of the I-5/SR 160 separation, there are two historic properties that have been previously determined to be eligible for listing on the National Register of Historic Places (NRHP). The first of these properties consists of "Victory Trees" that were planted along both sides of SR 160 for the veterans of WWI. These trees, as well as the section of Victory Highway they line, are eligible for NRHP listing. The second property consists of a segment of the Southern Pacific Walnut Grove Branch Railroad. This project has been designed to avoid all effects to these properties. Neither the trees nor the railroad tracks will be impacted during construction. The trees are located along SR 160, outside the footprint of the bridge widening, which will consist of inside widening only, and no trees are located within any of the project's proposed temporary construction easements.

Although the railroad segment passes directly under the I-5/160 separation, it will not be affected by the bridge widening. New bridge supports will be placed parallel to the existing bridge supports, which were constructed in 1975. Once the supports are in place, all widening work will occur from the top of the existing bridge structure. A 36 in. water main that runs underneath the tracks will require relocation; however, a new water main will be installed by boring underneath the tracks and the existing water main will be abandoned in place, therefore no effects to the railroad segment are expected to occur as a result of these activities. No construction equipment or vehicles will be allowed on the tracks at any time, and all access to the bridge supports that are located to the north of the tracks (and on the opposite side of the canal) will be conducted via a paved road which crosses the tracks just to the west of the I-5/160 separation. As a temporary construction easement may be required for work in this location, the railroad tracks and a buffer area will be excluded from this easement to ensure that there are no effects to the railroad tracks.

1.5.2 Alternative 2, Mixed Flow Alternative

This alternative is the same as the Bus/Carpool Addition Alternative (Alternative 1), except it includes the construction of mixed flow or general-purpose lanes in both directions rather than bus/carpool lanes. The Mixed Flow Alternative includes all of the other features of Alternative 1 (replace the existing Casilada POC, utility relocation, storm water and drainage features, etc.), with minor differences in signing and striping.

1.5.3 Alternative 3, Mixed Flow to Bus/Carpool Conversion ("Take-a-lane")

The Bus/Carpool Conversion or "take-a-lane" Alternative (Alternative 3) converts an existing lane for HOV use. Under this alternative, the existing inside shoulder lane (the leftmost lane) would be re-striped and signed to prohibit non-HOV traffic during peak periods. This alternative would reduce the number of current mixed flow lanes during peak periods from 4 to 3 from Florin Road north and from 3 to 2 south of Florin Road. Alternative 3 includes the Traffic Operations System (TOS) improvements of Alternative 1 (closed circuit television, highway advisory radio, changeable message sign, ramp metering) and the replaced Casilada POC, but not roadway widening, bridge and drainage improvements, or utility relocations. No additional right-of-way is required.

1.5.4 Alternative 4, No Build

The No Build Alternative would not add any improvements to the existing facility. Without improvements to the existing facility, the level of service will continue to deteriorate and peak periods of congestion will increase. With the No Build Alternative, the existing freeway lane configuration would remain while other future projects near the project and within the project limits will be constructed.

1.5.5 Construction Phasing

Potential future funding issues may require that the project be constructed in two phases. Phase 1 involves construction from downtown Sacramento to just north of Morrison Creek. Phase 1 also includes the demolition and replacement of the Casilada POC. Phase 2 starts where Phase 1 ends and then continues south to just south of Elk Grove Blvd. The entire project would be constructed all at once if full funding is available.

Each phase will have its own transportation management plan, plan sheets, and all standard and special provisions in order to minimize disruption to the travelling public during construction.

1.6 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. In accordance with 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) in accordance with NEPA.

1.7 Alternatives Considered But Eliminated From Further Discussion

Several mainline alternatives and one additional alternative for the POC replacement were considered but eliminated during project planning.

HOT Lanes

High-occupancy toll (HOT) lanes allow single-occupant vehicles to use the bus/carpool lane for a fee that is based on the value of travel time savings and on the amount of congestion in the mixed-flow lanes (HOVs can still use the lane for free). An analysis of the proposed US-50 bus/carpool lanes in Sacramento concluded that HOT lanes would be infeasible (*US-50 High Occupancy Toll (HOT) Lane Strategy Evaluation*, Dowling Associates, 2005). As conceived in that study, the HOT lane would be a barrier or buffer-separated facility with limited access points so that toll collection and enforcement could be performed. The limited access points would prevent high occupancy vehicles from using the lane as easily as compared to a contiguous bus/carpool lane. The barrier-separated design may have right-of-way impacts, would have higher construction costs, and may have higher accident rates. Other states have recently started HOT lane facilities that do not have barrier separation. In Utah, stickers have been sold to single-occupant drivers to allow access to the I-15 HOV lane. In Washington State, the State Route 167 HOT lane uses electronic tolling for a painted buffer-separated facility, where the width of the buffer is effectively zero feet. Advances in electronic tolling technology may allow HOT lanes to operate on contiguous lane facilities in the future. Caltrans provided funding in 2010 for a feasibility study (co-sponsored by SACOG and the Placer County Transportation Planning Agency {Agency}) of HOT lanes on the I-80 corridor between I-5 in Sacramento County and State Route (SR) 65 in Placer County. The study was presented to the Agency in July 2010. Based on the policy guidance and technical information, the study concluded that the revenues generated would unlikely be enough by 2035 to both construct and operate a HOT lane on the I-80 corridor. The Agency voted down HOT lanes along I-80. A copy of the report is located on the SACOG website at www.sacog.org/calendar/2010/10/07/transportation/.

Transit Only Alternative

Although a "transit only" alternative would meet some of the project objectives, such an alternative would not be consistent with the goals of SACOG's current MTP. The proposed project is part of a larger network of existing and planned bus/carpool or high occupancy vehicle lanes in the Sacramento region. A map of existing bus/carpool lanes is available at www.dot.ca.gov/hq/traffops/systemops/hov/HOV_Map_0609.pdf. A list of planned bus/carpool lane projects in the area are included in the MTP on the SACOG website (www.sacog.org/mtp/). The MTP 2035 acknowledges the need for highway expansion to keep pace with the region's growing population and increasingly congested roadway system, noting:

> With more than a million empty seats in autos, but fewer than 10,000 empty seats in buses every morning and afternoon, carpools clearly have a place in the picture. Regardless, a large increase in the amount of travel by 2035 means that, even if transit use could be increased tenfold and bicycle/walk trips tripled, the region still would face a large increase in travel by auto. At least in some places the road system must be expanded too, and if planned comprehensively, road expansions can improve bicycle and bus circulation (SACOG 2008a).

The MTP 2035, and the preferred Blueprint scenario on which it is based, focuses upon providing a balance of transportation investments in order to provide choices and alternatives for travelers. As Table 1-5.2 shows, the proposed project is expected to improve travel time for high occupancy vehicles including carpools and commuter buses, and is expected to have a positive increase in commuter transit usage. Previous HOV lane projects have shown a positive correspondence between carpooling and bus ridership after implementation (Caltrans 2008). Information on HOV lanes can be found at www.dot.ca.gov/hq/traffops/systemops/hov/hov_sys/index.html.

The Transit Only Alternative was considered because of the regional air quality benefits. It was rejected and not brought forth as a legitimate alternative because the microsimulation traffic model showed it could not compete with other alternatives (even in a low growth scenario). In addition, the quantity of busses required by the cities of Sacramento and Elk Grove under the Transit Only Alternative would be too large for transit providers to operate.

Bus/Carpool Lanes with Standard Roadway Width

During the development of the PSR, the feasibility of constructing the additional lanes while maintaining a standard roadway width was also explored. Due to the narrowing of the existing median north of Florin Rd., widening to the outside would be required in order to maintain a standard roadway width, resulting in greater environmental effects, disruption to local residents, and higher project costs (amount unknown at this time). This alternative would have required existing sound wall relocation, retaining wall construction, changes to vertical clearances of local roads, structure and abutment widening, new right-of-way, and ramp re-configurations. Parallel local roads and the vertical clearance of local roads also would have been affected. Finally, this alternative would have required a substantial increase in the amount of mature vegetation to be removed. As a result, it was decided that widening to the outside would be infeasible.

Casilada POC Replacement Option 1

Two options for replacing the Casilada Pedestrian Overcrossing (POC) were considered. Option 1 would have constructed a new POC with the crossing over I-5 located approximately 408 ft north of the existing crossing. The structure span would have been approximately 8-10 ft in width and 202 ft in length, with an elevation of approximately 20 ft (from original ground). The ramps would have been located on the east and west sides of I-5 and would have begun at the approximate location of the existing ramps and crossing. Each ramp would have been approximately 408 ft in length and 10 ft in width, with the west ramp having an approximate elevation of 16 ft and the east ramp having an approximate elevation of 14 ft. Each ramp would have required one abutment and four bents. Option 1 also would have required a retaining wall on the east side of the structure, approximately 10 ft in height and 125 ft in length. This option had a very large construction footprint and would have resulted in potentially substantial effects to visual resources in the vicinity of the POC, including the removal of many mature redwood trees. In addition, Option 1 would have required that users of the POC, including schoolchildren, travel approximately 800 additional ft due to the greatly increased ramp length on each side of the crossing. Consequently, Option 1 has been eliminated from further consideration.

1.8 Multi-Modal Corridor Improvements

Caltrans supports multi-modal projects, including bike and transit improvements, which would complement the proposed project and enhance corridor mobility.

Corridor System Management Plans (CSMPs) are foundation documents supporting the partnership based, integrated management of all travel modes in a corridor so that mobility along the corridor is provided in the most efficient and effective manner possible. CSMPs were initially developed in the Sacramento region for corridors that received Corridor Mobility Improvement Account and Highway 99 Bond Program funding, as required by the California Transportation Commission.

Caltrans updated the Interstate 5 (I-5) CSMP in 2009 to include additional important transportation improvement projects to the existing CSMP list of "Key Capital Projects," including bike and transit enhancements. Highway projects within the I-5 corridor in Sacramento County include:

- Riverfront Interchange Improvements at US 50 including bus/carpool lane connectors.
- Construct new crossing of the American River between I-5 and SR 51.
- Add Bus / Carpool Lanes and Connectors between I-80 and Garden Highway.
- Interchange reconfiguration at SR 99 in northern Sacramento County.

Transit and pedestrian improvements include:

- South Sacramento Light Rail Extension, Phase 2 from Meadowview to Cosumnes River College
- Downtown, Natomas, Airport Line Light Rail Extension, Phase 1 (Downtown to Richards Blvd.), Phase 2 (Richards Blvd. to Natomas Town Center), and Phase 3 (Natomas Town Center to Sacramento International Airport).

These projects will complement the I-5 HOV lane project and enhance corridor mobility. The projects were selected in consultation with corridor stakeholders including, but not limited to, SACOG, the cities of Sacramento and Elk Grove, Sacramento Regional Transit, e-tran, the Elk Grove Trails Committee and the Sacramento City/County Bikeway Advisory Committee (SACbac). Caltrans will continue to assist each sponsoring jurisdiction with the further development of each project, including identifying and securing local, state and federal funding (Caltrans 2009).

1.9 Permits and Approvals Needed

The following permits, reviews, and approvals would be required for project construction:

- United States Army Corps of Engineers (USACE) Section 404 authorization under the Federal Clean Water Act
- Central Valley Regional Water Quality Control Board (CVRWQCB) Section 401 certification
- Central Valley Flood Protection Board (CVFPB) Encroachment Permit
- United States Fish and Wildlife Service (USFWS) formal consultation under Section 7 of the Federal Endangered Species Act
- National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA Fisheries) informal consultation under Section 7 of the Federal Endangered Species Act and for potential impacts to Essential Fish Habitat (EFH) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act
- CDFG (Section 2080.1 of the California Fish and Game Code) Consistency Determination
- CDFG Streambed Alteration Agreement (Section 1600 et seq. of the California Fish and Game Code)
- National Emissions Standards for Hazardous Air Pollutants (NESHAP) notification to the Sacramento Metropolitan Air Quality Management District for Asbestos Demolition and Renovation
- CVRWQCB notification regarding the re-use of soils containing aerially deposited lead, if applicable
- California Department of Toxic Substances Control notification regarding the re-use of soils containing aerially deposited lead, if applicable

Permits will be acquired after the preferred alternative is selected.

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

This chapter addresses the environmental impacts of the proposed project as well as identified avoidance, minimization, and/or mitigation measures that will be carried out as part of the project. Avoidance, minimization, and/or mitigation measures are discussed for each of the discipline areas covered in the following subsections.

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

- Cultural Resources (A finding of "No Historic Properties Affected" was made for the project)
- Farmlands/Timberlands
- Residential and/or business relocations
- Wild and scenic rivers

Human Environment

2.1 Land Use and Planning

2.1.1 Affected Environment

2.1.1.1 Existing and Future Land Use

The proposed project traverses approximately 13 miles of the I-5 corridor in the cities of Sacramento and Elk Grove and the County of Sacramento. Land uses in the study area include residential, commercial, agricultural, natural preserve, industrial, and recreational.

Land use patterns in the project area are shaped by the locations of the major roadways that cross the affected corridor. There are a total of seven interchanges within the project limits, not including the US 50 Interchange (IC). Major arterials crossing or intersecting with I-5 in the project limits, from south to north are: Elk Grove Blvd., Laguna Blvd., Pocket Rd., Florin Rd, 43rd Ave., Seamas Ave., and Sutterville Rd. A new interchange, the Consumnes River Blvd. Interchange, will be also be operational by 2014.

Zoning in the project area changes as one moves from north to south in the project corridor. In the northern end of the project limits, within the City of Sacramento, land uses are designated as Recreational Reserve on the west side of I-5 at the Sacramento Marina and Miller Park, and high density residential and Intensive Industrial on the east side. To the south and just prior to the Sutterville Rd. IC, the zoning becomes low density residential (Residential 1 unit/acre) on both sides of I-5. Development in this area consists primarily of single-family residential dwellings.

The area within the City of Sacramento at Pocket Rd. and east of the freeway is zoned for commercial uses, while land use west of the freeway continues to be zoned Residential 1 (one unit per acre). Immediately to the south of Pocket Rd., zoning is commercial and industrial. Further south, in the area of Morrison Creek, zoning turns to Agricultural-80 (80 acres minimum) to the east of I-5 and Recreational Reserve Flood Zone to the west of I-5. The city limits end approximately 3.5 miles south of Pocket Rd. at Beach Lake Rd.

Much of the property between the area just south of "the Pocket" and just north of Laguna Blvd. along the corridor is under public management. "The Pocket" is a community within the city of Sacramento and is bordered by Interstate 5 on the east and a semi-circular "pocket" bend in the Sacramento River on the south, west, and north (see Figure 1-5.1). The Sacramento Regional Sanitation District retains 2,650 acres of “bufferland” as open space along the corridor. There are also vernal pools and wetlands located at various locations along the estimated four-mile stretch of I-5 between “the Pocket” and Laguna Blvd., including a vernal pool preserve on the east side of I-5. Zoning in this area consists of combined Agricultural and Resource Conservation Area.

The Delta Shores area, located to the east and west of I-5 and south of Pocket Rd. is identified for future urban development under the City of Sacramento’s General Plan and the South Area Community Plan (adopted March 3, 2009). The 782-acre development will include a compact residential community of approximately 5,092 residences with two mixed-use retail centers.

The land just north of the Laguna Blvd. IC is zoned Commercial and Industrial to the east of I-5 and Agricultural or Natural Preserve to the west. Stone Lakes National Wildlife Refuge is located to the west of I-5, north of Laguna Blvd. to south of Elk Grove Blvd. Between Laguna Blvd. and Elk Grove Blvd. (a distance of about a mile), the land use is predominately zoned high density residential to the east and AG-80 to the west. At the Elk Grove Blvd. IC, land uses on the west also include commercial and industrial.

South of Elk Grove Blvd. to the east of I-5 is newer residential development, which continues for about a mile towards the Hood-Franklin Rd. IC (outside the project limits). The land west of I-5 is zoned AG-80.

There is little commercial development in close proximity to the interchanges within the project limits. The immediate areas surrounding the Pocket Rd. and Elk Grove Blvd. ICs have the most commercial development.

More commercial locations are under construction or planned for the future near the Elk Grove Blvd. and Laguna Blvd. interchanges. New housing tracts have been built in the last several years south of Elk Grove Blvd. and east of I-5. This has occurred as the area in proximity to SR 99 and Elk Grove Blvd. has become built out.

The portion of the interstate just north of the project limits and the I-5/US 50 IC is the gateway to downtown Sacramento, including the area around the Capitol building and Old Town Sacramento. The Natomas area and the Sacramento International Airport lie to the north of downtown along the I-5 corridor.

2.1.1.2 Consistency with State, Regional, and Local Plans and Programs

Sacramento Area Council of Governments (SACOG)

Regional Blueprint

Despite the current economic climate, growth and development projections included in the Regional Blueprint are still valid (see www.sacregionblueprint.org).

Sacramento County is faced with a historical lack of affordable housing (although a drop in pricing has occurred) close to urban job centers and increasingly distant residential housing developments from such centers, increasing traffic congestion, environmental pollution, and encroachment on open space and agricultural lands. In 2002, SACOG began its Sacramento Regional Blueprint planning effort (Blueprint). SACOG consists of El Dorado, Placer, Sacramento, Sutter, Yolo, and Yuba Counties, along with their constituent municipal governments. The Blueprint's purpose is to guide land use and transportation choices over the next 50 years.

As part of this effort, SACOG studied current land use patterns and their potential effects on the region's transportation system, air quality, housing, open space and other resources. The studies found that—assuming recent trends continue—large-lot, low-density housing would consume 660 square miles of undeveloped land by 2050. This would lead to longer commutes, greater air pollution, and a loss of open space and agricultural land. The preferred Blueprint scenario integrates smart growth concepts, such as high- and medium-density mixed-use development; reinvestment in existing developed areas; and the expansion of transportation alternatives. Through changes in land use, the Blueprint seeks to halve the amount of open space that would otherwise be consumed. Through higher density development and greater transit choices the Blueprint also seeks to shorten commute times, reduce traffic congestion, lessen dependence on automobiles, and provide for housing choices that more closely align with the needs of the population (SACOG, 2004).

In December 2004, SACOG defined a preferred Blueprint scenario that focused on compact, mixed-use development and a greater variety of transit choices. This

Blueprint is intended to guide regional development through 2050. The proposed regional network of high occupancy vehicles is included in MTP 2035, which is based upon the principles of the Blueprint Preferred Scenario.

Metropolitan Transportation Plan (MTP) 2035

The proposed project is included in SACOG's MTP 2035, which endorses the concept of a regional network of bus/carpool lanes. The MTP 2035 acknowledges the importance of bus/carpool lanes to an overall transportation strategy noting, "…carpool lanes increase capacity and yield more ridesharing." The MTP states:

> Utilizing carpool lanes for express bus service is an important factor in maximizing productivity. A typical freeway lane running at capacity carries 2,200 people per hour in automobiles, while a carpool lane carries 3,000 to 4,000 people per hour, and hundreds more if express bus service is used (SACOG 2008a).

The 2035 MTP can be found at http://www.sacog.org/mtp/.

City of Sacramento

General Plan

The current City of Sacramento General Plan was adopted on March 3, 2009 and can be found at www.sacgp.org. The previous General Plan dated to 1988, and the update process began in 2004. The General Plan update process included town hall meetings and community forums, aimed at ensuring that the updated General Plan would reflect residents' views and concerns. The city gathered input from more than 4,600 residents, which helped shape the policy direction of the 2030 General Plan.

As part of the General Plan update process, the City adopted its "Vision and Guiding Principles" document in November 2005 found at www.sacgp.org/documents/07_Appendix_A.pdf (City of Sacramento 2005). This document sets out the City's key values and goals for the future and is designed to guide the development of the General Plan throughout the update process. The "guiding vision" identified in this document is to make Sacramento "the most livable city in America." The City's guiding principles for mobility stress that future transportation investments should provide city residents with a range of transportation options. The City's "Vision and Guiding Principles" document emphasizes alternatives to the automobile, such as transit and walking. The proposed project provides an incentive to use bus transit, since buses would be able to use the bus/carpool lane.

As background to the "Visions and Guiding Principles" document, the City also adopted in November 2005, a "Planning Issues Report" that identifies key planning issues. The first of these issues mentioned is "Smart Growth," typified by compact development, higher residential densities, mixed-uses, a range of transportation choices, walkable neighborhoods, and open space protection. The "Planning Issues Report" notes that SACOG's Regional Blueprint advocates this type of growth.

The City of Sacramento's 2030 General Plan supports the development of programs that increase vehicle occupancy.

- Mobility Element Goal M-1.4: Decrease the dependence on single-occupant use of motor vehicles through Transportation Demand Management.
    - Mobility Element Policy M.1.4.1: **Increase Vehicle Occupancy**. The City shall work with a broad range of agencies (e.g., SACOG, SMAQMD, Sacramento RT, Caltrans) to encourage and support programs that increase vehicle occupancy including the provision of traveler information, shuttles, preferential parking for carpools/vanpools, transit pass subsidies, and other methods. *(MPSP/PI)*

Sacramento County

General Plan

Sacramento County adopted its General Plan in December 1993. The Circulation Element of the 1993 General Plan supported the construction of a regional network of bus/carpool lanes. Circulation Element Policy 24 describes bus/carpool lanes as having a "significant potential to increase the effective carrying capacity of the existing road network by increasing the number of individuals in each vehicle" (*ibid.*).

General Plan Update

Sacramento County adopted its General Plan on November 9, 2011. As noted in the General Plan:

> Measures to improve the efficiency of vehicular travel are also an important component of the Circulation Element. High occupancy vehicle (HOV) lanes,

> flexible work hours and schedules, trip reduction and transportation control measures, and parking controls represent measures that are included in this Element and contribute to the improvement of air quality (County of Sacramento, 2011).

According to the Circulation Element of the General Plan:

> Bus/Carpool lanes, is also known as High Occupancy Vehicle (HOV) lanes, is a system of exclusive lanes signed and striped for use by vehicles, buses, motorcycles, and vanpools with multiple occupants (two or more or three or more persons). Bus/Carpool lanes are designed to reduce traffic congestion, improve safety, reduce fuel consumption, and improve air quality. Sacramento County supports the development of a regional network of Bus/Carpool lanes (County of Sacramento, 2011).

See www.msa2.saccounty.net/planning/Pages/GeneralPlan.aspx for more information.

City of Elk Grove

General Plan

The City of Elk Grove adopted its General Plan in November of 2003. Currently, it contains City Council adopted amendments through the year 2009. The Circulation Element notes that although the City will seek to encourage other modes of travel:

> …it is assumed that the majority of travel and transport of goods within Elk Grove will occur in automobiles and trucks. The land use pattern in Elk Grove, which is primarily low-density in nature (particularly in residential areas), poses significant challenges with regard to establishing public transit, bicycle, or walking as the preferred method of travel for most residents (City of Elk Grove, 2009).

The Circulation Element also notes:

> Efficient and convenient vehicle transportation— including parking—is and will remain a vital part of the success of the city’s retail and office areas. The City’s efforts to encourage other modes of transportation will therefore focus

on *incentives* to reduce vehicle use, rather than *disincentives* which would make driving and parking less convenient, more costly, or both (*ibid.*).

These incentives may include:

- Preferential carpool and vanpool parking,
- Bus turnouts, and
- Pedestrian-friendly project designs.

Policy CI-5 of the Circulation Element states:

The City shall encourage the use of transportation alternatives that reduce the use of personal motor vehicles.

Policy CI-7 of the Circulation Element states:

The City shall encourage an approach to public transit service in Elk Grove which will provide the opportunity for workers living in other areas of Sacramento County to use all forms of public transit—including bus rapid transit and light rail—to travel to jobs in Elk Grove, as well as for Elk Grove workers to use public transit to commute to jobs outside the city.

Bus use of the bus/carpool lanes will provide the opportunity for increased public transit to and from Elk Grove. Please refer to Section 2.4.1.4 for more information on public transit use.

Conservation Air Quality Policy CAQ-26 of the Circulation Element states:

It is the policy of the City of Elk Grove to minimize air pollutant emissions from all City facilities and operations to the extent feasible and consistent with the City's need to provide a high level of public service.

CAQ-26-Action 1**:** The City shall encourage all its employees to use transportation alternatives such as public transit, bicycling, walking, and carpooling for commute and other work-related trips.

Sacramento Regional Transit District's Strategic Plan, 2004 - 2009

The Sacramento Regional Transit District's Strategic Plan is a region-wide perspective and consensus recognizing the need to address the growing and varied travel needs within the Sacramento region. The purpose statement in the plan states that:

> The purpose of the Sacramento Regional Transit District is to promote and enhance regional mobility and serve the public by providing quality transit services and solutions that improve the overall quality of life in the Sacramento region (Sacramento Regional Transit District, 2004).

The vision of the plan is to provide "a coordinated regional public transportation system that delivers quality and environmentally sensitive transit services that are an indispensable part of the fabric of communities throughout the Sacramento region." In order to achieve this vision, Regional Transit promises to work with "regional transportation partners, communities and other key regional stakeholders to provide coordinated, seamless, safe and convenient transit services across the region; and encourage investment choices and policy decisions which support smart growth and increased use of transit" (*ibid.*). The project, as part of the Blueprint, supports smart growth and increased transit use.

2.1.1.3 Jobs/Housing Balance Projections

How land uses are distributed within communities has implications for local and regional commuting patterns. A city with very little land used for housing, relative to its supply of industrial or commercial land, will be a destination for commuters. A city that is predominantly residential will be a source of commuters.

The ratio of jobs to housing units in a place provides an estimate of the overall tendency of workers to commute in or out of that place. In theory, a balanced community would be one in which no workers were obliged to leave the community for work. According to SACOG, the jobs-housing balance is defined as the spatial distribution of employment relative to the distribution of workers (by residence) within a defined area. An area with a balance of jobs and housing would imply a greater likelihood that a worker would find a job nearby, minimizing commute trip length. Variations in job and worker types require a concise definition of balance as having complementary job and housing characteristics.

At the same time, commuting patterns are more complicated than the jobs-housing balance alone would indicate. For example, according to SACOG data, the City of Sacramento is the major employment center in the region, with 1.9 jobs for each housing unit (SACOG, n.d. (a)). But even with an abundance of employment opportunities, almost 40 percent of the city's workers worked outside of the city in the year 2000 (up from 32 percent at the time of the 1990 Census).
SACOG projections show that, under the Preferred Blueprint Scenario, the City of Sacramento would have 1.7 jobs for each housing unit in 2050, compared to 2.6 under the base case (SACOG, n.d. (a)). The SACOG planning region as a whole is also expected to attract more jobs than homes overall, reaching a ratio of 1.2 (average) jobs for every household by 2050 (SACOG, n.d. (b)). The proposed regional network of high occupancy vehicles is included in the MTP 2035, which is based upon the SACOG Blueprint Preferred Scenario, and so is part of a larger land use and transportation plan that encourages a balance of jobs and housing opportunities within the region's communities.

2.1.1.4 Parks and Recreational Facilities

Sacramento County's Department of Regional Parks, Recreation, and Open Space manages and operates a total of 14,000 acres of land through which it provides countywide parks, open space, and recreational facility services. The study area has a total of five parks within the jurisdiction of the City of Sacramento. There are seven community parks within Elk Grove in proximity to the study area. The Sacramento Zoo is located at 3930 West Land Park Dr. There are two golf courses located within the study area: one near Sacramento Executive Airport on Freeport Blvd. and another located along Freeport Blvd. on the west side of I-5, just south of the Pocket Rd. IC.

2.1.2 Environmental Consequences

2.1.2.1 Existing and Future Land Use

Alternative 1

Alternative 1 (Bus/Carpool Lane Alternative) would not require full or partial acquisition of private or publicly owned right-of-way and no direct effects to land use are anticipated. Temporary construction easements may be required in selected locations.

Alternative 1 is not expected to result in indirect impacts to land uses, by causing lands to be converted to other uses. Please see Section 2.2 (“Growth”) for more information on potential indirect effects to land use and other environmental resources resulting from the proposed project.

Alternative 1 is not in conflict with relevant state, regional, and local plans and programs. Table 2-1.1 includes specific planning policies and whether the project alternatives are consistent.

Alternative 1 is not expected to result in effects to parks or recreational facilities within the project area. Please see Appendix C for resources evaluated relative to the requirements of Section 4(f) of the US Department of Transportation Act.

In June 2011, Caltrans received an inquiry regarding access to Morrison Creek from I-5 for the purpose of recreational use, citing California Streets and Highways Code Section 84.5. The exact language from Section 84.5 is as follows: “During the design hearing process relating to state highway projects that include the construction by the department of a new bridge across a navigable river, there shall be included full consideration of, and a report on, the feasibility of providing a means of public access to the navigable river for public recreational purposes.”

According to the Sacramento Regional County Sanitation District (owners of the land where Morrison Creek crosses I-5), public access is not allowed at this location. The area where Morrison Creek crosses I-5 is SRCSD property and part of their Bufferlands, protected habitat surrounding the wastewater treatment plant. That said, there is no public access allowed in that area. However, there is public access and fishing is permitted along the west shore of Meadowlark Lake, which is located approx 400 yards north of the Morrison Creek/I-5 bridge. Public access is permitted along the west shore of Meadowlark Lake, located approximately ¼ mile north. This area is accessed by taking Stonecrest Blvd off of Freeport Blvd, driving east and then south parallel to I-5. This will lead to our property gate. Visitors can park at the gate and walk south about 1/2 mile to the lake (Coleman 2011).

Table 2-1.1 Consistent With Local Policies

Policy	Alternative 1	Alternative 2	Alternative 3	Alternative 4
City of Sacramento General Plan				
Mobility Element Policy M.1.4.1: ***Increase Vehicle Occupancy.*** *The City shall work with a broad range of agencies (e.g., SACOG, SMAQMD, Sacramento RT, Caltrans) to encourage and support programs that increase vehicle occupancy including the provision of traveler information, shuttles, preferential parking for carpools/vanpools, transit pass subsidies, and other methods.*	**Consistent.** The Bus/Carpool Alternative increases vehicle occupancy	**Not consistent.** The Mixed Flow Alternative would not result in an increase in vehicle occupancy	**Consistent.** The Bus/Carpool Conversion Alternative may increase vehicle occupancy	**Not consistent.** The No-Project Alternative would not result in an increase in vehicle occupancy
City of Elk Grove General Plan				
Policy CI-5 of the Circulation Element states that the City shall encourage the use of transportation alternatives that reduce the use of personal motor vehicles.	**Consistent.** The Bus/Carpool Alternative would encourage transportation alternatives	**Not consistent.** The Mixed Flow Alternative would not encourage transportation alternatives	**Consistent.** The Bus/Carpool Conversion Alternative would encourage transportation alternatives	**Not consistent.** The No-Project Alternative would not encourage transportation alternatives
Policy CI-7 of the Circulation Element states that the City shall encourage an approach to public transit service in Elk Grove which will provide the opportunity for workers living in other areas of Sacramento County to use all forms of public transit—including bus rapid transit and light rail—to travel to jobs in Elk Grove, as well as for Elk Grove workers to use public transit to commute to jobs outside the city.	**Consistent.** Bus use of the bus/carpool lanes will provide the opportunity for increased public transit to and from Elk Grove	**Not consistent.** Under the Mixed Flow, there are no additional opportunities for public transit use.	**Consistent.** Under the Bus/Carpool Conversion Alternative, there are additional opportunities for public transit use	**Not consistent.** Under the No-Project Alternative, there are no additional opportunities for public transit use.
Conservation Air Quality Policy CAQ-26 of the Circulation Element states that it is the policy of the City to minimize air pollutant emissions from all City facilities and operations to the extent feasible and consistent with the City's need to provide a high level of public service. The City shall encourage all its employees to use transportation alternatives such as public transit, bicycling, walking, and carpooling for commute and other work-related trips to achieve this goal.	**Consistent.** The Bus/Carpool Alternative would encourage transportation alternatives	**Not consistent.** The Mixed Flow Alternative would not encourage transportation alternatives	**Consistent.** The Bus/Carpool Conversion Alternative would encourage transportation alternatives	**Not consistent.** The No-Project Alternative would not encourage transportation alternatives

Alternative 2

Alternative 2 would have the same direct and indirect impacts to land use and parks or recreational facilities as Alternative 1.

Alternative 2 is not consistent with the relevant state, regional, and local plans and programs (see table 2-1.1).

Alternative 3

Alternative 3 would not impact current and future land uses, and parks or recreational facilities.

Alternative 3 is consistent with the relevant state, regional, and local plans and programs (see table 2-1.1).

Alternative 4

The Alternative 4 would not result in impacts to land use or planning.

Alternative 4 is not consistent with the relevant state, regional, and local plans and programs (see table 2-1.1).

2.1.3 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures are required.

2.1.4 CEQA Considerations

Less than significant impacts to land use and planning are anticipated.

2.2 Growth

2.2.1 Regulatory Setting

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

The California Environmental Quality Act (CEQA) also requires the analysis of a project's potential to induce growth. 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…"

2.2.2 Methodology and Affected Environment

2.2.2.1 Methdology

This analysis was prepared using Caltrans' *Guidance for Preparers of Growth-related, Indirect Impact Analysis (Growth-Related Guidance)* (Caltrans, 2006a). This guidance specifically addresses the subset of indirect effects associated with highway projects that encourage or facilitate land use or development that changes the location, rate, type or amount of growth—and are referred to in the *Growth-Related Guidance* as "growth-related impact."

The *Growth-Related Guidance* recommends the following six steps when assessing a project's potential for growth-related impacts:

Step 1: Review previous project information and decide on the approach and level of effort needed for the analysis.
Step 2: Identify the potential for growth for each alternative.
Step 3: Assess the growth-related effects of each alternative to resources of concern.
Step 4: Consider additional opportunities to avoid and minimize growth-related impacts.
Step 5: Compare the results of the analysis for all alternatives.
Step 6: Document the process and findings of the analysis.

Under Step 1, a "first cut" screening process to determine the approach and level of effort needed for the analysis is recommended. The first cut screening process suggests what factors should be considered, how to document the results, and what steps are needed, if any, after completing the first-cut screening. According to the *Growth-Related Guidance*, key elements to look at when evaluating whether or not a project has the potential to have growth-related impacts include accessibility, project type, project location, and growth pressure.

Based on this first cut screening, the study area selected for growth-related impacts consisted primarily of the project limits and to a lesser extent the cities of Sacramento and Elk Grove—which house the expected trip origins and destinations most likely to be affected by the proposed project. To a lesser extent, planned development in southern Sacramento County, including the Vineyard area, is examined to account for potential shifts in travel resulting from the proposed project (e.g., travelers choosing I-5 over SR 99 as a result of the proposed improvements).

Previous project information reviewed for this analysis included the relevant planning documents outlined in Section 1.3 of this document, as well as the Preliminary Environmental Assessment Report and the Draft Project Study Report prepared by Caltrans for the project in October 2006, and January 2007, respectively. The Preliminary Environmental Assessment Report for the project identified the need for a Community Impacts Study, including a growth-related analysis. Comments received at the October 2007 public open houses and those received in response to the Notice of Preparation were also reviewed for growth-related concerns. One commentator whom attended the October 25, 2007 open house stated that the project "is growth-inducing."

Assessing the Need for a Growth-Related Impact Analysis

Accessibility is the most direct link between transportation and land use and refers to the project's potential to reduce time-of-cost travel, either in terms of money or time, potentially enhancing the attractiveness of surrounding land to developers and consumers. When changes in accessibility provided by a transportation project facilitate land use change, one outcome can be growth-related impacts to environmental resources.

Project type is another important factor to consider when evaluating the need for a growth-related analysis. According to the *Growth-Related Guidance*:

> Adding high occupancy vehicle (HOV) lanes or mixed flow lanes are examples of projects that could cause growth-related impacts because they add capacity to an existing facility. These projects warrant closer consideration to determine whether an analysis of growth-related impacts will be necessary.

Project location is another element of growth-related impacts. The proposed project is located within the cities of Sacramento and Elk Grove, as well as unincorporated areas of Sacramento County. While the northern half of the project limits is urban in character with a high concentration of single-family homes, south of Pocket Rd. the surrounding landscape becomes more open, with only limited areas of development located on the east side of I-5 near Elk Grove and Laguna Boulevards. According to the *Growth-Related Guidance*, undeveloped parcels on the urban/suburban fringe (such as those located in the southern half of the project corridor) *can* be prime growth areas, particularly if the land is suitable, development regulations are favorable, and the area is in the path of an expanding urban/suburban core.

Finally, growth pressure must be considered when evaluating the potential for growth-related impacts. Growth pressure is influenced by circumstances such as land availability and price, existing infrastructure, the regional economy, vacancy rates, and land use controls, although the degree to which growth is influenced by these circumstances will vary from project to project.

Based on the project's potential to reduce time-of-cost travel for users of the bus/carpool lanes and location within the urban/suburban fringe, it was determined that an analysis of the project's potential for growth-related impacts was warranted. The growth-analysis is included in the Community Impacts Assessment (CIA) that was prepared for the proposed project. A copy of the CIA can be obtained on the project website at www.dot.ca.gov/dist3/Projects/00165/prjindex.htm.

The study area selected for growth-related impacts consists primarily of the project limits and to a lesser extent the cities of Sacramento and Elk Grove—which house the expected trip origins and destinations most likely to be affected by the proposed project.

2.2.2.2 Affected Environment

At the time of the 2000 US Census, Sacramento County had a population of just over 1.2 million, the City of Sacramento had a population of 407,018, and Elk Grove had a population of 59,984. Today's estimated populations (2010) are 1,418,788 for Sacramento County, 466,488 for the City of Sacramento, and 153,015 for the City of Elk Grove (US Census Bureau, 2012). Sacramento County's population (including the incorporated cities of Sacramento and Elk Grove) is expected to increase by approximately 725,000 between 2010 and 2050, a 50 percent increase (California Department of Finance, 2007).

The projections included in SACOG's 2035 MTP indicated that between 2008 and 2035, the region was expected to add 1.1 million residents requiring 460,000 jobs and 452,000 housing units (SACOG 2008b). In 2010, SACOG updated the regional growth projections included in the 2008 MTP to reflect the affects of the current economic conditions. This update shows that although lower numbers for population, jobs and housing in year 2035 are anticipated, significant growth in these sectors will still occur: an additional 901,000 residents requiring 342,000 jobs and 267,000 housing units (SACOG 2010).

Growth in the region can be attributed to the rise in economic activity in California's Central Valley due to affordable land, labor, and housing costs. This growth has been occurring, and will continue to occur, regardless of any highway and road improvements. Although construction of new homes has slowed in the region due to a weak housing market, as noted by SACOG, over the long run new housing construction is expected to continue in the area.

Potential for Growth and Local Plans

Community comprehensive plans and planning laws, such as land use and zoning regulations, are most often the primary means of controlling growth and development. County and local governments use these plans and regulations to encourage or discourage growth in their communities as they see appropriate. Any changes to these plans or regulations involve significant public review and input. Other constraints to growth can include a lack of public utility infrastructure and services such as water, gas and electric, and sewage.

As stated above, the proposed project is consistent with regional planning efforts, including SACOG's Regional Blueprint Preferred Scenario and the MTP 2035. The population distribution anticipated in SACOG's planning is based on a future transportation network that includes the proposed project

Within the project limits, open space located south of the "Pocket" is protected by public management and stewardship, including the Sacramento Regional County Sanitation District's (SRCSD) "Bufferlands," Stone Lakes National Wildlife Refuge, and a vernal pool preserve located on the east side of I-5. The areas south of the Elk Grove city limits consist of pasture and crop lands, with very high wildlife values, including foraging habitat for Swainson's hawks (state listed) and a wintering population of greater sandhill cranes. The project area is located approximately 10 miles north of the Cosumnes River Preserve, one of the most important biological areas in the Central Valley. Any effort to develop these open space areas would require General Plan amendments, zoning change designations, and environmental review.

Potential for Growth and Accessibility Improvements

The proposed project would improve traffic flow on I-5 and improve travel times for vehicles in the bus/carpool lanes, especially when compared to the No Build Alternative.

The existing development in Sacramento and Elk Grove and along the I-5 corridor has resulted in congestion and travel delays during peak hours. According to the Traffic Report prepared for the proposed project, the current Level of Service (LOS)[4] at key portions of I-5 within the study area during peak hours is " F," where traffic experiences forced or breakdown flow and more vehicles are arriving than are leaving. Despite the current economic conditions, this congestion will only worsen with development anticipated in Sacramento and Elk Grove for the years ahead, as noted in the SACOG Blueprint.

Like any project that improves travel times to work, including public transit projects, the proposed project would provide a benefit to intercity commuters. The proposed project, and a regional network of high occupancy vehicle lanes, is included in both the Blueprint and the MTP 2035. The MTP 2035 is based upon the SACOG Blueprint Preferred Scenario—a planning framework that is expected to improve jobs/housing balance in the communities in the region, when compared to future conditions without the Blueprint. According to the Environmental Impact Report prepared for MTP 2035:

> Through 2035, Sacramento is projected to continue to have the highest population and housing densities in the region due to the Blueprint infill and redevelopment strategies in the cities of Sacramento, Rancho Cordova, Citrus Heights and the county of Sacramento. New growth is projected to occur within and contiguous to the urban core. The cities of Elk Grove and Folsom are fast-growing cities that are expected to reach residential build-out within their current city limits by 2035. Jobs-housing imbalances are projected to move toward balance over time as jurisdictions with heavy jobs-housing ratios (more jobs than housing) work to provide more housing for workers (e.g. Sacramento and Rancho Cordova) while jurisdictions with low jobs-housing

ratios (i.e., less than 1.0—more housing than workers) work to attract more jobs within the city (e.g. Elk Grove and Galt) (SACOG, 2008a).

2.2.3 Environmental Consequences

Alternative 1

Alternative 1 (Bus/Carpool Lane Alternative) is not expected to substantially influence or alter development patterns in the study area and no growth-related indirect effects to resources of concern are expected. As development proceeds in the study area, each project will be evaluated for its impacts to the human and natural environment, including impacts to community character and cohesion, air quality, water quality, cultural resources, and biological resources. Each project will implement any required mitigation for identified impacts.

Alternative 1 seeks to reduce congestion and encourage alternative means of commuting through the addition of a bus/carpool lane to I-5 between downtown Sacramento and the City of Elk Grove. The project would provide greater connectivity within the bus/carpool lane system in the Sacramento region, which consists of existing and planned bus/carpool lanes on I-80, I-5, US 50, and SR 99. These improvements are being proposed because of demands put on the region's transportation system due to the existing rapid rates of growth in the area as discussed in the 2035 MTP.

Alternative 1 would increase the capacity of an existing freeway that is currently heavily congested. Alternative 1 would improve travel times, especially for bus and carpool users, particularly when compared to the No Build Alternative. As detailed in previous sections of this document (Section 2.1 and 2.2), city and regional plans indicate that Sacramento County as well as the cities of Sacramento and Elk Grove are preparing for relatively rapid growth in the near future, and the most current data indicate that despite the current economic conditions, this growth is occurring and is likely to continue to occur according to planned build-out with or without the proposed project.

Alternative 1 is designed to provide an alternative to single-occupancy vehicle travel and encourage drivers to combine vehicle trips, thus removing some cars from the freeway. The design of the project does not create any new access points or alter current ramp locations nor would the project remove any key restraints to growth—it would not change any land use designations or open any new areas to development.

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[4] Please see Section 2.5.2.1 and Table 2-5.1 for more information on Level of Service.

Alternative 2

Under Alternative 2 (Mixed Flow), there would be no incentive to carpool or take buses into Sacramento. Instead, adding another mixed flow lane may actually encourage growth further away from the city center. It does not reduce the number of single occupancy cars and does not meet the primary project purpose. It does reduce traffic congestion for awhile, but only until more drivers decide to use the lane to commute and the traffic jams increase. Current HOV users and those using mass transit could decide to drive again.

As development proceeds in the study area, each project will be evaluated for its impacts to the human and natural environment, including impacts to community character and cohesion, air quality, water quality, cultural resources, and biological resources. Each project will implement any required mitigation for identified impacts.

Alternative 2 would increase the capacity of an existing freeway that is currently heavily congested. The capacity increasing potential of Alternative 2 would be insufficient to ensure a freeway with no delays given the level of residential and non-residential development that has already occurred and is planned for Sacramento and Elk Grove. As detailed in previous sections of this document (Section 2.1 and 2.2), city and regional plans indicate that Sacramento County as well as the cities of Sacramento and Elk Grove are preparing for relatively rapid growth in the near future, and the most current data indicate that despite the current economic conditions, this growth is occurring and is likely to continue to occur according to planned build-out with or without the proposed project.

Alternative 2 does not create any new access points or alter current ramp locations nor would the project remove any key restraints to growth—it would not change any land use designations or open any new areas to development.

Alternative 3

With development already planned and in progress, Alternative 3 (Mixed Flow to Bus/Carpool Lane Conversion) is equally unlikely to result in growth-related indirect impacts to resources. Development would be expected to continue as planned and congestion would worsen. Alternative 3 would not be expected to constrain growth, as no data was found that would suggest that this alternative would prevent or reduce the amount or type of development outlined in local planning documents because this alternative does not add capacity to the I-5.

Alternative 4

With development already planned and in progress, Alternative 4 (No-Build) is equally unlikely to result in growth-related indirect impacts to resources. Without the proposed project, development would be expected to continue as planned and congestion would worsen. Alternative 4 would not be expected to constrain growth, as no data was found that would suggest that this alternative would prevent or reduce the amount or type of development outlined in local planning documents.

2.2.4 Avoidance, Minimization, and/or Mitigation Measures

As discussed above, growth impacts are not anticipated. No avoidance, minimization, and/or mitigation measures are required on the part of Caltrans.

2.2.5 CEQA Considerations

It is not anticipated that the Less than significant growth-related impacts are anticipated.

2.3 Community Impacts

2.3.1 Regulatory Setting

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

Under 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.

All projects involving a federal action (funding, permit, or land) must comply with Executive Order (E.O.) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations,* signed by President Clinton on February 11, 1994. This E.O. directs federal agencies to take the appropriate and necessary steps to identify and address disproportionately high and adverse effects of federal projects on the health or environment of minority and low-income populations to the greatest extent practicable and permitted by law. Low income is defined based on the Department of Health and Human Services poverty guidelines. For 1999 this was $16,700 for a family of four[5] and for 2010, this was $23,050.

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

2.3.2 Affected Environment

2.3.2.1 Regional Overview

Sacramento County encompasses approximately 636,100 acres, 62 percent of which is dedicated to agricultural use (predominantly the eastern and southwestern sections of the County). The study area for the Community Impact Assessment prepared for the proposed project is made up of the Census Tracts within a one-mile plus radius on the east and west sides of I-5 within the project limits (Figure 2-3.1). I-5 in this area is relatively flat and straight; the Sacramento River lies to the west.

I-5 is one of the most important regional routes serving the Sacramento Metropolitan Statistical Area (MSA), which is made up of Sacramento, El Dorado, Yolo, and Placer counties. The City of Sacramento is the largest city in the county and is the seat of state government. As commercial growth in Sacramento and surrounding cities continues, workers are commuting from farther and farther away, straining I-5 and the existing transportation network's capacity.

Based on year 2010 Census data, Sacramento County had a total population of over 1.4 million, representing an estimated 40 percent increase from the County's 1990 population count of just over 1 million.

Historical US Census data shows that between 1990 and 2010, the total number of households in the City of Sacramento increased by 33 percent, from 144,000 to 191,000, while the number of households increased countywide by 15 percent.

[5] Please note that the Department of Health and Human Services Poverty *Guidelines* differ from the Poverty *Thresholds* established by the United States Office of Management and Budget. Data included in this section of the document is from the 2000 Census, which is based upon the poverty thresholds. In 1999, the average weighted poverty threshold for a family of four was $17,029.

The 2010 Census reported an average median household income $52,709 for Sacramento County and $46,731 for the City of Sacramento.

2.3.2.2 Ethnicity

Year 2010 US Census data indicates that percentages of minorities located in the study area are similar to those located in the City of Sacramento as a whole (see Tables 2-3.1 and 2-3.2). However, specific Census Tract data indicates that there are concentrations of African American populations in at least 5 of the 21 tracts analyzed for this study. In particular, the 2010 African American populations in Census Tracts 22, 42.01, 42.02, 43, and 96.01 had a population that was approximately 9 to 13 points higher than the citywide average, and 17 to 21 points higher than the statewide percentage. Similarly, there were higher than average concentrations of Asian only populations in 18 of the 21 tracts analyzed for this study. In these tracts, the Asian only populations exceed the statewide average by up to 23 points.

Only one tract (99) within the study area has a Hispanic or Latino population that is greater than the statewide average. Rather, most of the tracts have Hispanic or Latino populations that fall well short of the citywide average of 26.9% and the statewide average of 37.6%.

2.3.2.3 Income and Poverty Data

As shown by Tables 2-3.3 and 2-3.4, the average poverty rate for the population aged 18 and older was approximately 11.9 percent in Sacramento County and 14.9 percent in the City of Sacramento at the time of the 2010 Census, both of which were slightly higher than the national average of 13.8 (based on 2010 income). Six Census Tracts within the study area—21, 22, 42.01, 42.02, 43, and 96.01—had poverty levels higher than the national average, with one Census Tracts—43—reporting poverty levels greater than 25 percent.

Between 2000 and 2010, median household income in the county had increased from $43,816 to $52,705 and the poverty rate had fallen from 12.6 to 11.9 percent. In the City of Sacramento, median household income increased from $37,049 to $46,731 and poverty fell from 17.7to 14.9 percent.

2.3.2.4 Community/Planned Development/Neighborhood Characteristics

The study area includes several neighborhoods and commercial business park locations within the cities of Sacramento and Elk Grove. Community areas found on the west and east sides of I-5 are: East City, Land Park-Pocket-Meadowview, South

Sacramento, Franklin Laguna, and Delta Shores. There are Community Plan Areas within Elk Grove's city limits including Laguna West and Stone Lake.

Recent residential development has occurred within the project area corridor in the Meadowview area in Sacramento and in Elk Grove. Most of this recent development consists almost entirely of single-family residential units and has been concentrated near the interchanges at Pocket Rd., Laguna Blvd., and Elk Grove Blvd. As noted above, the Delta Shores project is the only planned housing development along the I-5 corridor adjacent to the project limits and is expected to add several new neighborhoods, major shopping centers, and employment. Agricultural lands, natural preserves, wetlands, and existing suburban sprawl limit further residential and commercial expansion at other locations within the study area.

Neighborhoods within the study area range from low-income to high-income, when compared to the 1999 median income levels for the city and county. The population make-up regarding ethnicity and income is similar to the City of Sacramento as a whole. The area between Land Park and the "Pocket" on the east side of I-5 is largely composed of older, less costly housing units (including clusters of multi-family residential units), while neighborhoods to the north and south of this area on both sides of the freeway represent more costly and more elaborate housing units.

Figure 2-3.1 Census Tracts

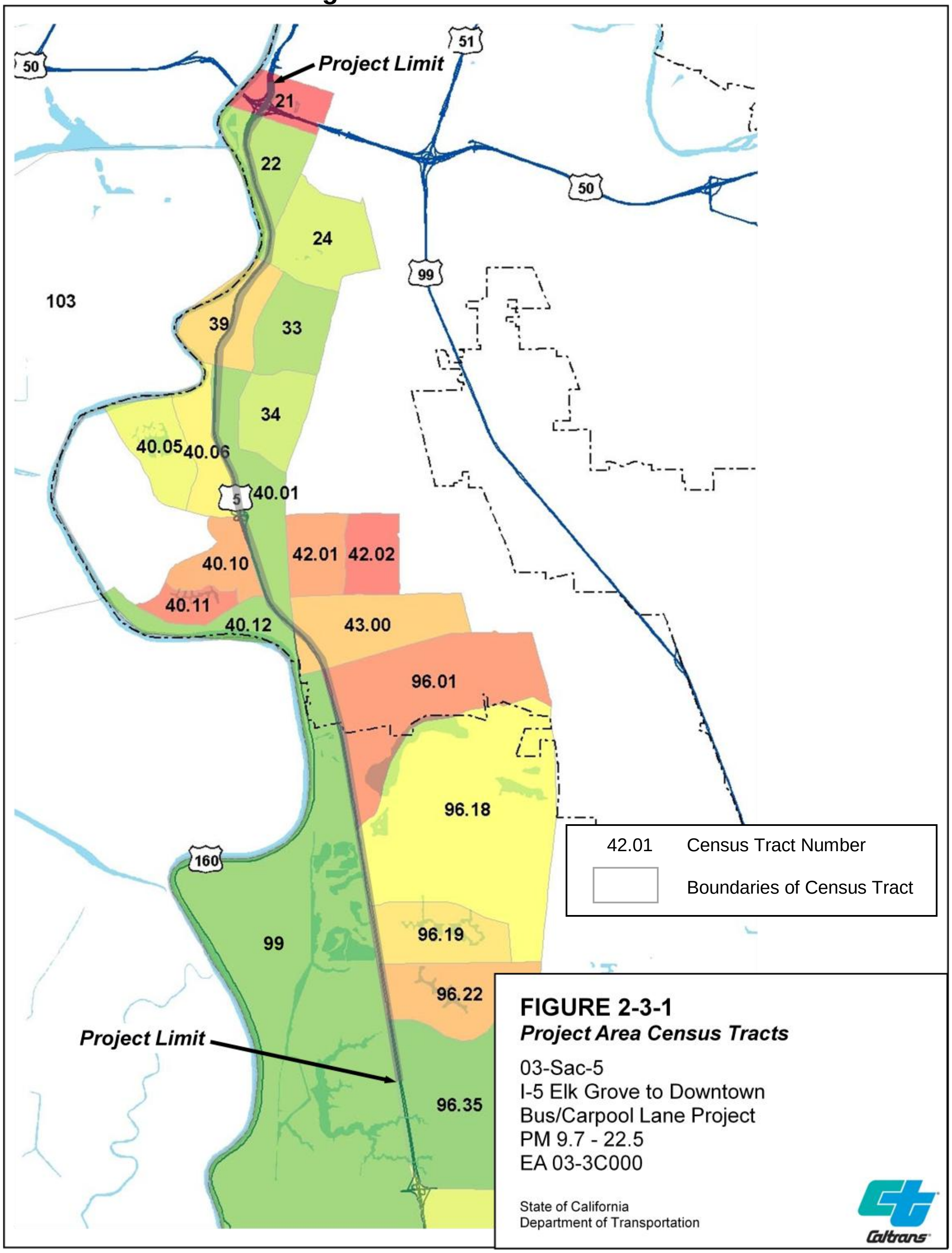


Table 2-3.1 Population by Race/Ethnicity in the Study Area

		Hispanic or Latino (of any race)	Not Hispanic or Latino					
Census Tract	**Total Population**	**Hispanic or Latino (of any race)**	**White Alone**	**African American Alone**	**American Indian or Alaska Native Alone**	**Asian Alone**	**Native Hawaiian or Pacific Islander Alone**	**Other and Population of two or more races**
21	2,377	24.9	44.9	5.2	1.6	29.1	0.0	9.3
22	4,004	18.5	39.6	26.4	1.6	15.7	1.5	9.1
24	4,387	11.7	83.0	1.4	0.3	7.5	0.2	4.7
33	4,073	12.1	67.8	2.8	0.6	20.9	0.1	4.8
34	4,085	22.1	48.8	14.9	0.6	18.7	0.7	7.0
39	3,347	18.9	54.8	9.4	1.4	21.4	0.4	6.6
40.01	5,755	18.1	42.9	14.4	1.3	25.0	1.4	7.4
40.05	4,185	14.1	49.3	14.4	0.5	23.2	0.6	7.4
40.06	4,843	19.2	43.1	18.4	1.2	21.1	1.2	8.3
40.1	5,131	18.5	38.3	18.5	0.9	26.2	0.9	7.6
40.11	3,086	10.4	37.3	11.9	0.1	40.6	0.5	6.8
40.12	3,267	13.8	43.8	11.8	0.6	32.0	0.3	6.6
42.01	5,290	37.0	29.3	27.4	1.5	13.6	2.0	7.8
42.02	5,538	37.1	22.2	24.2	1.0	19.9	4.1	7.8
43	6,553	26.9	19.8	23.7	0.8	30.7	5.0	7.7
96.01	6,621	24.3	19.0	24.7	0.5	31.4	4.8	7.6
96.18	4,642	22.8	39.3	14.4	0.7	24.7	1.4	9.0
96.19	7,824	18.0	45.7	11.6	0.4	27.6	0.8	8.0
96.22	7,222	16.1	48.9	12.1	0.6	24.3	0.6	8.0
96.35	5,941	16.1	38.3	11.8	0.2	35.8	0.6	9.2
99	3,976	46.9	63.9	0.8	1.3	5.0	0.3	4.8
TOTAL	102,147	All data obtained from US Census Bureau American FactFinder, Census 2010, Profile of General Population and Housing Characteristics (DP-1).						

Table 2-3.2 Population by Race/Ethnicity by City, County, and State

		Hispanic or Latino (of any race)	Not Hispanic or Latino					
Area	**Total Population**	**Hispanic or Latino (of any race)**	**White Alone**	**African American Alone**	**American Indian or Alaska Native Alone**	**Asian Alone**	**Native Hawaiian or Pacific Islander Alone**	**Other and Population of two or more races**
State of CA	37,253,956	37.6	57.6	6.2	1.0	13.0	0.4	4.9
Sacramento County	1,418,788	21.6	57.5	10.4	1.0	14.3	1.0	6.6
City of Sacramento	466,488	26.9	45.0	14.6	1.0	18.3	1.4	7.1
All data obtained from US Census Bureau American FactFinder, Census 2010, Profile of General Population and Housing Characteristics (DP-1).								

Table 2-3.3 Income and Poverty Status in the City and County

Area	Population 18 and Older	2010 Median Household Income	Percentage 18 and Older with Income Below the Poverty Line
City of Sacramento	350,367	$46,731	14.9
Sacramento County	1,055,735	$52,705	11.9
All data obtained from US Census Bureau American FactFinder, Census 2010, Profile of General Population and Housing Characteristics (DP-1); Census 2010, Selected Economic Characteristics.			

Table 2-3.4 Income and Poverty Data by Census Tract

Census Tract	Population 18 and Older	2010 Median Household Income	Percentage 18 and Older with Income Below the Poverty Line
21	1,988	$45,288	22.2
22	2,721	$28,689	24.9
24	3,429	$96,540	3.4
33	3,354	$98,988	3.2
34	3287	$61,089	2.9
39	2,781	$62,454	4.4
40.01	4,644	$59,348	10.4
40.05	3,494	$66,012	6.9
40.06	3,846	$64,033	4.8
40.1	4,156	$50,990	10.9
40.11	2,479	$142,500	5.7
40.12	2,578	$126,087	8.0
42.01	3,708	$46,059	16.6
42.02	3,886	$35,787	22.1
43	6,244	$42,725	26.9
96.01	4,413	$56,278	13.9
96.18	3,307	$75,812	8.4
96.19	5,586	$82,121	8.1
96.22	5,094	$85,938	6.0
96.35	3,885	$93,293	7.0
99	3,023	$50,170	10.2
Total	77,903		
All data obtained from US Census Bureau American FactFinder, Census 2010, Selected Economic Characteristics; 2006-2010 American Community Survey 5-Year Estimates (DP03).			

2.3.2.5 Community Cohesion

Community cohesion is the degree to which residents have a "sense of belonging" to their neighborhood; a level of commitment of the residents to the community; or a strong attachment to neighbors, groups, and institutions, usually as a result of continued association over time. Cohesion also refers to the degree of interaction among the individuals, groups, and institutions that make up a community.

2.3.3 Environmental Consequences

Alternative 1

No right-of-way acquisition will be required for the project and no residential or commercial relocations will occur.

This project has been developed in accordance with the Civil Rights Act of 1964, as amended, and Executive Order (E.O.) 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*. The E.O. requires Caltrans, as a recipient of federal highway funding, to take the appropriate and necessary steps to identify and address "disproportionately high and adverse" effects of federal projects on minority and low-income populations.

No permanent substantial socioeconomic impacts are expected to any population within the study area due to implementation of the proposed project.

Because the socioeconomic impacts due to implementation of the proposed project are generally spread evenly throughout the project area and because any temporary impacts during construction are not expected to reach a "high and adverse" level of concern, Alternative 1 will not cause disproportionately high and adverse effects on any minority or low-income populations as per E.O. 12898 regarding environmental justice.

The proposed project would not impact community character or cohesion. Neighborhoods within the project corridor currently have well-defined boundaries, in part based upon the artificial division provided by the existing freeway. The addition of bus/carpool lanes within the median would not be expected to affect the character or cohesion of these neighborhoods.

Alternative 2

Community impacts of Alternative 2 will be the same as Alternative 1.

Alternative 3

Community impacts of Alternative 3 will be the same as Alternative 1.

Alternative 4

Under the No Build Alternative, bus/carpool lanes would not be added and congestion would continue to worsen. No sound walls would be constructed under the No Build Alternative, and no improvements would be made to the Casilada Way Pedestrian Overcrossing. Alternative 4 does not meet the project's purpose and need (promote ride-sharing and use of HOVs, relieve congestion, improve traffic operations and safety).

2.3.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures are required.

2.3.5 CEQA Considerations

Less than significant community impacts are anticipated.

2.4 Utilities, Emergency Services, and Community Facilities

2.4.1 Affected Environment

2.4.1.1 Utilities and Public Services

Designated utility corridors and easements are located in the study area. Utilities such as water, storm drains, sanitary sewer systems, gas, and electrical lines traverse the study area.

Water Supply and Distribution

According to Sacramento County's General Plan, 28 public and private water purveyors are responsible for the treatment and distribution of surface and groundwater as well as securing surface water rights within the county. The county's water purveyors include dependent water districts, autonomous water districts, cities, and private and mutual water companies. Drinking water is supplied by various agencies, including the City of Sacramento's Department of Utilities (85 percent from the American River and 15 percent from groundwater), Sacramento County Department of Water Resources, Arden Water Service, Elk Grove Water Works, California American Water Service, and Southern California Water Company.

Flood Control

The Sacramento Area Flood Control Agency (SAFCA) has been charged with the responsibility of providing the Sacramento area with flood protection from the American and Sacramento rivers. Storm water drainage and flood control services in the study area are provided by the Sacramento County Stormwater Program within the county's Water Resources Department.

Wastewater Collection and Treatment

Sacramento Regional County Sanitation District (SRCSD), through its contributing agencies such as the Sacramento County Sanitation District, provides sewer and wastewater collection, conveyance, and treatment services in the urbanized areas of the county. Wastewater from the City of Sacramento is routed to the Sacramento Regional County Treatment Plant where it receives primary and secondary treatment. The study area is serviced by the Sacramento County Sanitation District and the City of Sacramento's Department of Utilities.

Solid Waste Disposal

Solid waste disposal and recycling services in the study area are provided by the City of Sacramento within the city's jurisdictional limits, the Sacramento County Department of Waste Management and Recycling Division (WMRD), and the City of Elk Grove Integrated Waste Management divisions. The City of Sacramento services all residential and a third of the commercial customers within the city, transporting the waste initially to a transfer station and then to the Lockwood Landfill in Sparks, Nevada. Private franchised haulers service the remaining commercial customers in the City of Sacramento and dispose of the waste at various facilities including the Sacramento County Kiefer Landfill, the Yolo County Landfill, L and D Landfill, Florin Perkins Landfill, and private transfer stations. WMRD disposes of their collected waste at Kiefer Landfill, which is the primary municipal solid waste disposal facility in Sacramento County. Kiefer Landfill is also the only landfill facility in the county permitted to accept household waste from the public.

Natural Gas and Electricity

The Sacramento Municipal Utility District (SMUD) provides electricity in the county and study area, while Pacific Gas and Electric Company (PG&E) provides gas.

Telecommunications

Multiple companies provide telecommunication services in the Sacramento area, offering landline and cellular services, cable television, and internet connectivity. The primary telecommunications service providers in the Sacramento area are AT&T, Sprint, Comcast, SureWest, Electric Lightwave, Inc. and Strategic Technologies, Inc. Citizens Telecom serves the City of Elk Grove.

2.4.1.2 Emergency Services

Police

Primary public safety services are provided by the Sacramento Police Department within the City of Sacramento, by the Sacramento County's Sheriff Department in the unincorporated areas (south of the "Pocket Area" to the Elk Grove city limits), and by the Elk Grove Police Department within the City of Elk Grove. The California Highway Patrol also provides public safety services along I-5.

Fire Districts

Fire protection within the project area is provided by the City of Sacramento, the Pacific Fruitridge Fire Protection District, the Courtland Fire District of Sacramento County, and the Cosumnes Community Services District.

Hospitals

The project area is served by four major medical hospital facilities in the greater project area:

- Kaiser Permanente Medical Center, South Sacramento
  6600 Bruceville Rd.
  Sacramento, CA 95823

- Sierra Vista Hospital
  8001 Bruceville Rd.
  Sacramento, CA 95823

- University of California, Davis, Medical Center
  2330 Stockton Blvd.
  Sacramento, CA 95817

- Shriners Hospitals for Children, Northern California
  2425 Stockton Blvd.
  Sacramento, CA 95817

- Sutter General Hospital
  2801 L St.

Sacramento, CA 95816

2.4.1.3 Community Facilities

Schools

The Sacramento City Unified School District and Elk Grove School District provide educational services in the project area. Below is a listing of schools that serve students within the project area:

Sacramento City Unified

- John F Kennedy High School, 6715 Gloria Dr. 95831
- Luther Burbank High School, 3500 Florin Rd. 95823
- School of Engineering and Sciences, 7245 Gloria Dr. 95831
- New Technology School, 1400 Dickinson St. 95822
- Sam Brannan Middle School, 5301 Elmer Way 95822
- California Middle School, 1600 Vallejo Dr. 95818
- Crocker Riverside Elementary School, 2970 Riverside Blvd. 95818
- Alice Birney Elementary School, 6251 13th St. 95831
- Caroline Wenzel Elementary School, 6870 Greenhaven Dr. 95831
- Freeport Elementary School, 2118 Meadowview Rd. 95832
- Hollywood Park Elementary School, 4915 Harte Way 95822
- John Cabrillo Elementary School, 1141 Seamas Ave. 95822
- John H Still Elementary and Middle School, 2200 John Still Dr. 95832
- Lisbon Elementary School, 7555 South Land Park Dr. 95831
- Pony Express Elementary School, 1250 56th Ave. 95831
- Sutterville Elementary School, 4967 Monterey Way 95822
- Matsuyama Elementary School, 7680 Woodbridge Dr. 95831
- Martin Luther King Jr. (K-8), 480 Little River Way 95831

Elk Grove Unified School District

- Franklin High School, 6400 Whitelock Parkway 95757
- Pleasant Grove High School, 9531 Bond Rd. 95624
- Joseph Kerr Middle School, 8865 Elk Grove Blvd. 95624
- Helen Carr Castillo Elementary School, 9850 Fire Poppy Dr. 95757
- Foulks Ranch Elementary School, 6211 Laguna Park Dr. 95758
- Stone Lake Elementary School, 9673 Lakepoint Dr. 95758

Sacramento City College and Cosumnes River College

Sacramento City College is located in Sacramento at 3835 Freeport Blvd.

Consumes River College is also located in Sacramento at 8401 Center Parkway, between the I-5 and SR 99 corridors, approximately three miles north of Elk Grove.

2.4.1.4 Transit

The major providers of public transportation within the study area are the Sacramento Regional Transit District and the City of Elk Grove's e-tran.

Sacramento Regional Transit District

Sacramento Regional Transit District (RT) operates two bus routes that make a total of 14 trips per day during the morning and afternoon peak periods from 43rd Ave. to downtown Sacramento. Average daily ridership on these routes is 330 to 380 passengers.

e-tran

The City of Elk Grove's transit agency, e-tran, has four routes that make a total of 32 trips per day during the morning and afternoon peak periods from Laguna Blvd. to downtown Sacramento. Average daily ridership for these routes is 750 passengers. According to transit officials there is a great demand for more service of this type of transit, but the city cannot mobilize more buses on the route because of the level of current congestion during peak hours. The City of Elk Grove and e-tran also maintain two park and ride lots in Elk Grove, which are intended for use by bus riders.

The e-tran Short Range Transit Plan recommends expansion of the current system to relieve overcrowding on existing routes and entice more residents to use transit rather than drive alone (City of Elk Grove 2007). The use of bus/carpool lanes provide an opportunity to achieve these goals.

Paratransit

Paratransit is a private nonprofit corporation that provides on-demand transportation services to individuals with disabilities, the elderly, and related agencies throughout the Sacramento County area.

San Joaquin Regional Transit District

The San Joaquin Regional Transit District provides one route on I-5 that makes a total of two trips per day (one northbound in the morning and one southbound in the afternoon) from Stockton to downtown Sacramento. Average daily ridership is 130 passengers (that is, the 65-passenger bus is full).

2.4.2 Environmental Consequences

Alternative 1

Alternative 1 is unlikely to have permanent negative impacts on utilities, emergency services, and community facilities within the proposed project area. Access to public facilities is expected to improve as circulation and access along I-5 is enhanced by implementation of the proposed project. Although project construction could result in some temporary disruptions, Alternative 1 would not change access for emergency vehicles. During roadway construction, emergency vehicles may need to stop temporarily or slow down in order to ensure that they can safely pass through the project area. Caltrans Transportation Management Center will be notified of all lane restrictions which might impact emergency response. Caltrans notifies all emergency services prior to construction so they can plan alternative routes, if necessary.

As noted in Chapter 1, one water main will be replaced in order to widen the I-5/SR 160 separation; however, no disruption in service is expected as the replacement water main would be installed prior to removal of the existing water main.

Implementation of the Bus/Carpool Addition Alternative is expected to improve travel times for high occupancy vehicles including commuter buses, and have a positive increase in commuter transit usage. Previous HOV lane projects have shown a positive correspondence between carpooling and bus ridership after implementation. The Bus/Carpool Lane Alternative is expected to allow for more transit trips during peak hour travel times because of the scheduling advantage of a more open and free flowing lane.

Please see Section 2.22 ("Cumulative Impacts") of this document for more information on potential cumulative construction-related impacts.

Alternative 2

Alternative 2 is unlikely to have permanent negative impacts on utilities, emergency services, and community facilities within the proposed project area. Although project construction could result in some temporary disruptions, Alternative 2 would not change access for emergency vehicles. During roadway construction, emergency vehicles may need to stop temporarily or slow down in order to ensure that they can safely pass through the project area. Caltrans Transportation Management Center will be notified of all lane restrictions which might impact emergency response. Caltrans notifies all emergency services prior to construction so they can plan alternative routes, if necessary.

As noted in Chapter 1, one water main will be replaced in order to widen the I-5/SR 160 separation; however, no disruption in service is expected as the replacement water main would be installed prior to removal of the existing water main.

Because Alternative 2 involves adding a mixed flow lane rather than a lane dedicated to buses and carpools, Alternative 2 would not have the same benefits to transit as Alternative 1. Under Alternative 2, travel time for transit would not significantly improve nor would more peak-period transit trips be expected.

Alternative 3

Alternative 3 would convert an existing lane from mixed flow to bus/carpool use during peak hours, which may benefit transit. However, converting a mixed flow lane to bus/carpool would increase congestion in the remaining lanes and could affect the response times of emergency vehicles during peak hours.

Alternative 4

Alternative 4 would not add bus/carpool lanes to this portion of I-5 and congestion would continue to worsen.

2.4.3 Avoidance, Minimization, and/or Mitigation Measures

A replacement water main would be installed at the I-5/SR 160 separation prior to removal of the existing water main. No other avoidance, minimization and/or mitigation measures will be required.

2.4.4 CEQA Considerations

Less than significant impacts to utilities, emergency services, and community facilities are anticipated.

2.5 Traffic and Transportation/Pedestrian and Bicycle Facilities

This section provides a description of the transportation setting and assesses the potential circulation impacts associated with the implementation of the proposed project. This section also discusses the impact to pedestrian and bicycle facilities. A Traffic Report was completed for this project in September 2009.

2.5.1 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). The regulations further direct 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.

Caltrans is committed to carrying out the 1990 Americans with Disabilities Act (ADA) by building transportation facilities that provide equal access for all persons. The same degree of convenience, accessibility, and safety available to the general public will be provided to persons with disabilities.

2.5.2 Affected Environment

I-5 is a national north-south route that connects California to Oregon to the north and Mexico to the south. As such, this interregional route serves as an important corridor for freight trucks. In the Sacramento area, I-5 is also a vital commuter route for residents traveling into the central business district of the City of Sacramento from both south Sacramento and the City of Elk Grove. Other commuters travel into Sacramento from San Joaquin County or out to the San Francisco Bay area via I-205 and I-580.

The study area for the Traffic Report included the area of I-5 from Hood-Franklin Rd. in the south to Richards Blvd. in the north. The section from US 50 to Richards Blvd. was added to the study area to account for bottleneck locations in downtown Sacramento. There are seven interchanges within the project limits: Elk Grove Blvd., Laguna Blvd., Pocket Rd., Florin Rd., 43rd Ave., Seamas Ave., and Sutterville Rd. Five additional interchanges are located outside of the project limits but were included in the study area selected for the Traffic Report: Hood-Franklin Rd., US 50, P/Q Streets, I/J/L Streets, and Richards Blvd.

Within the study area, I-5 has three grade-separated crossings at former railroad rights of way: Freeport Blvd., Land Park, and R St. Grade-separated crossings for motor vehicles exist at Stonecrest Ave., Freeport Blvd., South Land Park Dr., 56th Ave., Gloria Dr., 35th Ave., Riverside Blvd., Broadway, O St., Capitol Mall, and I St.
Pedestrian-only grade-separated crossings exist at Casilada Way (within the project limits), and the K St. Mall undercrossing (outside the project limits).

I-5 has four lanes in each direction from the north end of the project limits at US 50 to just north of the Florin Rd. IC. At Florin Rd. the freeway narrows to three lanes in each direction. At PM 11.5, just south of the Laguna Blvd. IC, the freeway narrows to just two lanes in each direction.

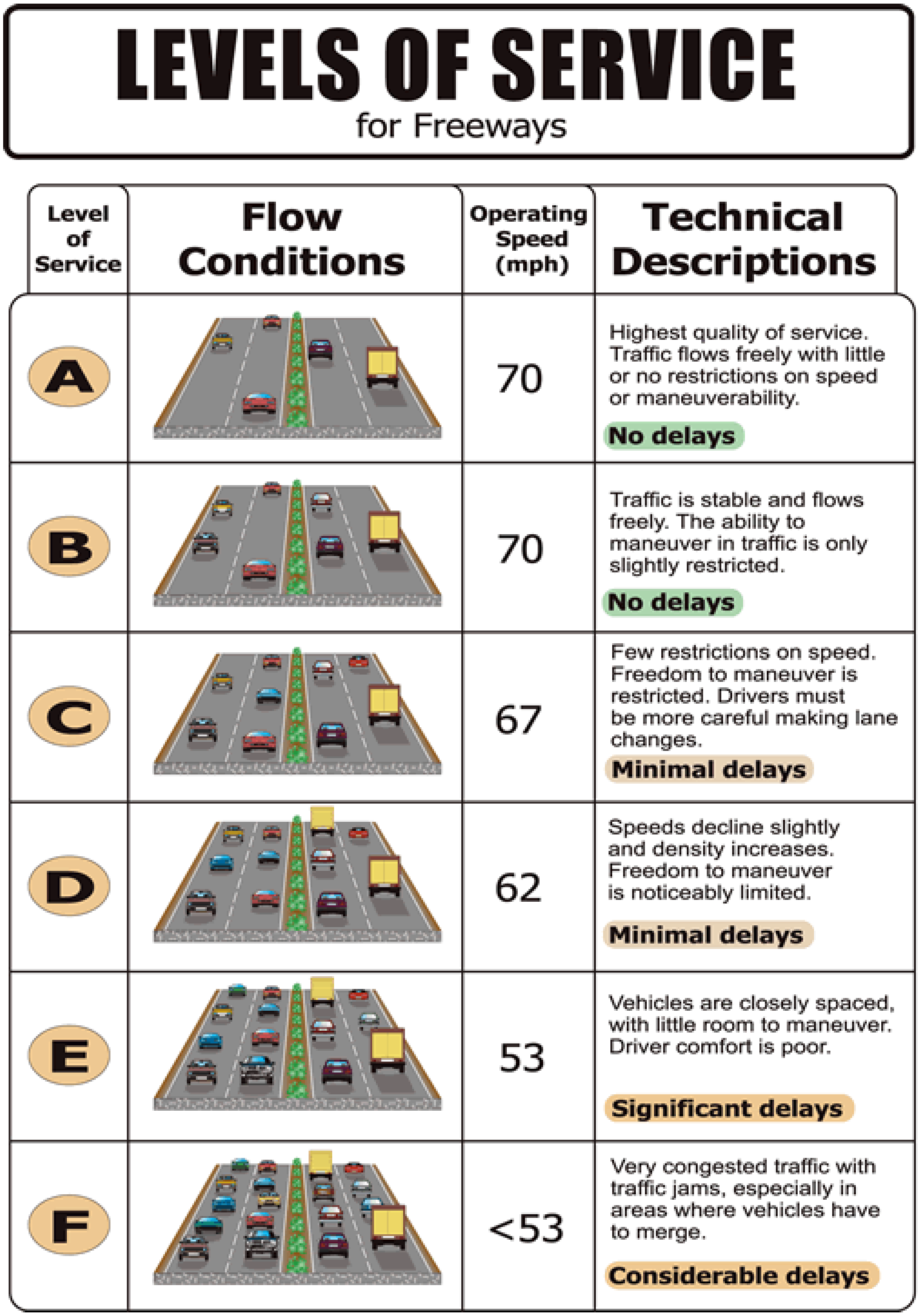
2.5.2.1 Methodolgy and Limitations

The Traffic Study (Fehr & Peers 2009) prepared for the proposed project summarized existing congestion along this portion of I-5. To analyze traffic operations, Fehr & Peers used the VISSIM micro-simulation software to develop models of the northbound direction for the morning peak period and the southbound direction for the afternoon peak period. Existing condition models were constructed from geometric data (aerial photographs, field observations, as-built[6] plans), traffic control data (ramp meter signal timing plans), and traffic flow data (traffic counts, travel time measurements, field observations, etc.). The existing condition models were calibrated and validated to observe traffic volumes, travel time, and queues.

Traffic counts for the freeway mainline and most on- and off-ramps were collected during 2006. Traffic counts for the US 50 connectors and the ramps to the north were collected in 2004 and 2005. A growth factor of three percent per year was used to adjust the counts to 2006 conditions. The results of the analysis are presented in terms of "level of service" or LOS, which is a measure of traffic operating conditions varying from LOS A (the best) to LOS F (the worst). The 2006 traffic counts were used to create the microsimulation traffic model, from which all other project alternative criteria, traffic performance measures, air quality and noise performance measures were determined. Caltrans Office of Traffic Forecasting considers the 2006 traffic data still valid.

[6] As-built plans are design plans that show the final roadway configuration as constructed.

Figure 2-5.1 Levels of Service for Freeways



2.5.2.2 Existing Conditions

Traffic Volume and Level of Service

For northbound I-5, the morning peak period model for existing conditions shows congested LOS F conditions at the Elk Grove Blvd. on-ramp, and from Laguna Blvd. to Sutterville Rd. (see Table 2-5.1). Bottlenecks exist at the end of the acceleration lane north of Laguna Blvd. and at the US 50 off-ramp. Additional bottlenecks occur at high-volume on-ramps at Pocket Rd., Florin Rd., and 43rd St. Shortly after the traffic counts were taken, ramp meters were activated at these on-ramps. As expected, congestion was reduced and travel times decreased at all locations where ramp meters were activated. However, overall congestion patterns for these segments of I-5 remain the same.

Table 2-5.1 Northbound Mainline Morning Peak-Hour Analysis for Existing Conditions

Location	Type	Volume[1]	Speed[1]	LOS/Density[1]
Hood Franklin Rd to Elk Grove Blvd	Basic	1,747	64	B / 18
Elk Grove Blvd to Laguna Blvd	Basic	2,829	55	**F / 60**
Laguna Blvd to Pocket Rd	Basic	4,421	**25**	**F / 126**
Pocket Rd to Florin Rd	Merge[2]	4,940	**18**	**F / 130**
Florin Rd to 43rd Ave	Basic	5,655	**21**	**F / 110**
43rd Ave to Seamas Ave	Weave	4,548	**22**	**F / 122**
Seamas Ave to Sutterville Rd	Basic	7,405	**33**	**F / 85**
Sutterville Rd to US-50/P St/Q St	Basic	7,455	58	D / 36

Notes: Bold and underline font indicates speed below 35 mph or LOS F conditions.

1. Volume is reported in vehicles per hour, speed is reported in miles per hour, and density is reported in vehicles per lane per mile.
2. The distance between the Florin Rd. and Pocket Rd. ramps is less 3,000 feet, so no basic freeway segment exists. Instead, the worst ramp junction (merge or diverge) LOS is shown.

Source: Fehr & Peers, 2009

For southbound I-5, the afternoon peak period model for existing conditions has congested conditions from US 50 to Sutterville Rd. and from Florin Rd. to Pocket Rd. (See Table 2-5.2). The bottlenecks in the southbound direction are located at the US 50 off-ramp, at the lane drop north of Sutterville Rd., and the Pocket Rd. off-ramp. Congestion on US 50 and the low-speed connector ramps result in congestion on southbound I-5. The Sutterville Rd. bottleneck causes queuing on the US 50 connector ramps that extend to the US 50 mainline in both directions. The combination of entering traffic from Florin Rd. with high off-ramp volume to Pocket Rd. causes the last bottleneck.

Table 2-5.2 Southbound Mainline Afternoon Peak-Hour Analysis for Existing Conditions

Location	Type	Volume[1]	Speed[1]	LOS/Density[1]
US-50/P St/Q St to Sutterville Rd	Basic	7,619	37	**F / 120**
Sutterville Rd to Seamas Ave	Basic	7,869	64	D / 32
Seamas Ave to 43rd Ave	Weave	7,486	61	D / 31
43rd Ave to Florin Rd	Basic	6,816	62	D / 33
Florin Rd to Pocket Rd	Diverge[2]	5,663	43	**F / 56**
Pocket Rd to Laguna Blvd	Basic	5,225	62	D / 29
Laguna Blvd to Elk Grove Blvd	Basic	3,507	53	E / 39
Elk Grove Blvd to Hood Franklin Rd	Basic	2,391	63	C / 21

Notes: Bold and underline font indicates speed below 35 mph or LOS F conditions.
1. Volume is reported in vehicles per hour, speed is reported in miles per hour, and density is reported in vehicles per lane per mile.
2. The distance between the Florin Rd. and Pocket Rd. ramps is less 3,000 feet, so no basic freeway segment exists. Instead, the worst ramp junction (merge or diverge) LOS is shown.

Source: Fehr & Peers, 2009

Table 2-5.3 presents the observed existing travel time and speed for existing conditions. The travel time and speed for free-flow conditions is compared to the values during the middle two hours of the four-hour peak periods. The average travel speed in the northbound direction during the morning peak period is between 28 and 41 mph. In the southbound direction during the afternoon peak period, the average speed is similar, between 30 and 41 mph.

Table 2-5.3 Observed Travel Time and Speed for Existing Conditions

Route	Off-peak	7 to 8 AM	8 to 9 AM	4 to 5 PM	5 to 6 PM
Northbound I-5 AM Peak Period Hood-Franklin Rd. to Richards Blvd.	14.8 min (65 mph)	33.9 min (28 mph)	23.5 min (41 mph)		
Southbound I-5 PM Peak Period Richards Blvd. to Pocket Rd.[1]	8.0 min (65 mph)			12.5 min (41 mph)	17.2 min (30 mph)

Notes: 1. The PM peak period model shows congestion in the southbound direction ending at Pocket Rd.

Source: Fehr & Peers, 2009

Table 2-5.4 shows the *network-wide* summary statistics for the four-hour peak period. The results reflect the higher observed level of congestion in the northbound direction, which translates to lower average speeds and higher average delays.

Table 2-5.4 Peak-Period Network Summary for Existing Conditions

Performance Measure	Northbound (AM)	Southbound (PM)
Number of Vehicles Served	49,300	56,000

Number of Persons Served	60,300	69,000
Travel Distance (vehicle-miles)	303,200	409,400
Travel Time (vehicle-hours)	10,400	10,600
Average Speed – All vehicles (mph)	29.2	38.6
Travel Delay[2] (vehicle-hours)	5,300	4,100
Average Delay[2] (seconds per vehicle)	380	260

Notes: 2. Delay is measured as the additional travel time when a vehicle travels less than its desired free-flow speed.

Source: Fehr & Peers, 2009

Traffic Safety

Table 2-5.5 summarizes the traffic accident data compiled by the Caltrans Traffic Accident Surveillance and Analysis System (TASAS). The data shown is for the three-year period between January 2008 and December 2010.

Table 2-5.5 Accident History

Location	Total Accidents	Total Fatalities	Actual Accident Rate[1]	Average Accident Rate[1]
Northbound I-5 (PM 8.49 to 22.57) Hood-Franklin Rd to US 50	362	0	0.46	0.76
Southbound I-5 (PM 22.57 to 8.49) US 50 to Hood-Franklin Rd	296	3	0.38	0.76

Note: 1. The accident rate is accidents per million vehicle-miles.

Source: Caltrans District 3, 2012

The portion of I-5 within the study area had 658 accidents, three of which were fatality-related accidents. The actual accident rate for the project study area (Hood-Franklin Road to US 50) was lower than the average accident rate for similar freeway facilities in both north and southbound directions. The three fatalities in the southbound direction involved a single vehicle. The type of collision was hit object. No unusual roadway or weather conditions were reported.

Table 2-5.6 categorizes the accidents within the three-year period according to peak period and accident type. The morning and afternoon four-hour peak periods (one-third of the day) accounted for majority of the accidents (59 percent). More accidents occurred during the morning peak period than the afternoon peak period, which is consistent with the higher level of congestion during the morning peak period. Rear-end collisions, which are associated with congested conditions, were the most frequent type of accident and accounted for 35 percent of all accidents.

Table 2-5.6 Accidents by Peak Period and Accident Type

Statistic	Peak Period			Accident Type				Total
	6 to 10 AM	3 to 7 PM	Off-peak	Rear End	Hit Object	Sideswipe	Other[1]	
Northbound	157	67	138	145	112	69	36	362
Southbound	46	116	134	84	99	71	42	296
Total	203	183	272	229	211	140	78	658
Percentage	31%	28%	41%	35%	32%	21%	12%	100%

Note: 1. The "Other" category includes head-on, broadside, overturn, and other accident types.
Source: Caltrans District 3, 2012

I-5 is a major interstate truck route; therefore, the accident rate according to vehicle type was reviewed. The data revealed that 88 percent of all collisions involved a passenger car. Large trucks and/or tractor-trailers were involved in 15 percent of the northbound collisions and 18 percent of the southbound collisions. Since trucks make up 10 to 15 percent of peak period volume, the proportion of the collision percentage is slightly higher.

2.5.2.3 Transit Operations

As noted in Section 2.4.1.4 of this document, Sacramento Regional Transit District, the City of Elk Grove's e-tran, Paratransit, and the San Joaquin Regional Transit District all operate routes through this corridor.

Table 2-5.7 shows the number of buses counted during the morning and afternoon peak periods in September 2006. The traffic counts show a larger number of buses than can be accounted for by the scheduled transit routes listed above. Intercity buses (for example, Amtrak and Greyhound Lines), school buses, and charter/tour buses are likely included in these counts.

The proposed bus/carpool lanes would benefit public transit. Bus/carpool lanes would provide reduced travel time and improved travel time reliability, as buses would be allowed to bypass the more congested mixed flow traffic lanes. Bus/carpool lanes along I-5 would provide a travel time advantage during peak periods. Other bus services that could take advantage of the bus/carpool lanes include school buses and recreational tours, such as those that travel to and from the Reno/Lake Tahoe area.

Table 2-5.7 Existing Peak Period Bus Volume

Location	Peak Period	Direction	Occupancy	Total

Seamas Ave.			Full	50% Full	25% Full	Empty	
	AM	Northbound	18	10	10	5	43
Hood-Franklin Rd.	PM	Southbound	12	13	13	17	55
	AM	Northbound	4	2	0	0	6
	PM	Southbound	5	1	0	1	7

2.5.2.4 Bicycle Routes

The City of Sacramento is currently updating their bikeway master plan. There is an extensive system of Class I and II bicycle path routes near the levee and in proximity to the Sacramento River, which lies just to the west of the project limits. Within the project limits, the city is planning a number of on and off road bicycle paths. The City's Freeport Shores Bikeway project will connect the Sacramento River Parkway with the Bill Conlin Youth Sports Complex (formerly the Freeport Shores Youth Sports Complex) located at 7895 Freeport Blvd. (http://www.cityofsacramento.org/transportation/dot_media/street_media/news/bikeandpedprojects2010.pdf)

The Casilada POC is the only pedestrian facility within the project limits. This POC will be replaced in order to meet the requirements of the Americans with Disabilities Act and improve access for the handicapped.

2.5.3 Environmental Consequences

Construction of the project could result in some temporary disruptions of traffic flow, where temporary lane shifts or closures are required, although it is anticipated that most, if not all, of the work that could disrupt traffic flow would occur at night. During roadway construction, emergency vehicles may need to stop temporarily or slow down in order to ensure that they can safely pass through the project area.

Due to the demolition of the existing Casilada Way POC at PM 19.58, it is expected that full freeway closure in one direction at a time will be required. Using full freeway closures will allow structure removal to take place employing weekend night work. It is anticipated that a one-day closure will be needed in each direction to accomplish the demolition. District Lane Closure Review Committee (DLCRC) approval will be required for full freeway closure.

Impacts to pedestrians are expected to be minimal. At this time, it is anticipated that the existing Casilada Way POC will remain in place until construction of the new POC is completed. Upon completion of the new POC, the existing POC would be demolished.

Demolition work is expected to occur on the weekend and at night to minimize interruptions to both pedestrians and traffic on I-5.

A Transportation Management Plan (TMP) will be developed for the project as described in Section 2.5.4.

Traffic Operations

The Traffic Report prepared for the project analyzed the following four alternatives:

- Alternative 1 (Bus/Carpool Addition) - This alternative assumes that a new bus/carpool lane is constructed on I-5 within the project limits. The bus/carpool lane would be contiguous to the mixed flow lanes—no buffer or barrier would separate the bus/carpool lane from the mixed flow lanes, and drivers would enter and exit the bus/carpool lane at any point. This lane would be restricted to high occupancy vehicle use. This restriction—two or more occupants per vehicle, motorcycles, or registered “Clean Air Vehicles”—would be in effect for the morning and afternoon peak periods (weekdays 6:00 to 10:00 morning and 3:00 to 7:00 PM, respectively) to conform to the bus/carpool lane operations elsewhere in the Sacramento area. During off-peak times, the bus/carpool lane would be available to all vehicles (except commercial trucks, which are restricted to the outside lanes).
- Alternative 2 (Mixed Flow) - This alternative assumes that a new mixed flow lane is constructed on I-5 within the project limits. Unlike Alternative 1, the new lane would be open to all traffic.
- Alternative 3 (Bus/Carpool Conversion) - This alternative assumes that no new traffic lanes are constructed on I-5. However, the left lane (Lane 1) of I-5 between Elk Grove Blvd. and US 50 in both directions would be converted from a mixed flow lane to a bus/carpool only lane. Operation of the Alternative 3 would be the same as Alternative 4.
- Alternative 4 (No Build) - This alternative assumes that no additional lanes are constructed on I-5.

The following separate projects will be constructed prior to the Sac 5 Bus/Carpool Lane Project. The projects below were added to the microsimulation traffic model.

- I-5/Cosumnes River Blvd. Interchange—This project would extend Cosumnes River Blvd. from Franklin Blvd. to Freeport Blvd. and construct a partial cloverleaf (Type L-9) interchange at I-5.

- Ramp Meter System—This future project would install ramp meters and associated high occupancy vehicle (HOV) bypass lanes on selected on-ramps that do not currently have them. Currently, there are ramp meters on the Sutterville Road, Seamas Road, 43rd Avenue, Florin Road, Pocket Road, and Mack Road on-ramps.

Future year traffic volume forecasts were prepared for the project alternatives under construction open (2023) and design year (2033) conditions and are based on the SACOG land use and roadway network projections for year 2035 conditions.

Caltrans determined that the current traffic forecast of 2033 in the Fehr & Peers traffic study for the project would be used to represent 2035 forecasts. The 2033 volumes will be conservative compared to the future travel demand model currently being updated by SACOG for the 2035 MTP. The 2033 volumes are also the most up to date information available, at the time the traffic study was completed and the most current information today. SACOG updates its traffic models approximately every 5 years; the most recent is for 2035.

Because regional models are not suited to applications like developing directional freeway corridor volumes, a more detailed sub-area model was developed for this project. The development of the I-5 sub-area model began with a detailed review and update of the roadway network and land use files in the base year version of the Sacramento Regional Travel Demand Model (SACMET) regional travel demand forecasting (TDF) model. Model modifications were made to accurately reflect interchange geometries, roadway conditions, and land use totals. The updates were based on a review of aerial photographs, census data, and parcel map information.

Additional development in Natomas, downtown Sacramento, and Elk Grove is expected to lead to a significant increase in traffic volumes along the I-5 corridor by 2035. Table 2-5.8 compares growth in households and employment to growth in traffic across a nearby screenline[7] in several areas. The results in Table 2-5.8 are based on the Bus/Carpool Addition Alternative; however, the results for the other alternatives are similar.

[7] A screenline is a term used to describe a group of roads that serve the same direction of travel and is used to measure and compare traffic flow.

Table 2-5.8 Comparison of Land Use Growth and Traffic Volume Growth Between 2005 and 2035

2005 to 2035 Land Use Growth			2005 to 2035 Daily Traffic Volume Growth[1]		
Location	**Households**	**Employment**	**Screenline Location[2]**	**All Routes**	**I-5 Corridor**
Downtown/Midtown Sacramento	70%	68%	Between US-50 and Sutterville Rd.	37%	39%
Pocket/South Sacramento	33%	57%	Between Meadowview Rd. and Cosumnes River Blvd.	37%	42%
Western Elk Grove	63%	113%	Between Laguna Blvd. and Elk Grove Blvd.	48%	33%

Notes:
[1] Traffic Volumes Based on the Bus/Carpool Addition Alternative
[2] Screenline between the Sacramento River and State Route 99
Source: Fehr & Peers, 2007

The results in Table 2-5.8 show projected growth in land use and daily traffic volumes. Land use growth will outpace traffic volume growth since new development in the region is expected to be consistent with SACOG's Blueprint (i.e. higher density development and better jobs-housing balance leading to fewer and shorter trips). Even though increased development densities will result in a per household reduction in trip number and length, the increase in total households will result in an increase in overall daily traffic volumes. The relatively small increases in study area roadway capacity will not keep pace with projected increases in traffic demand. As a result, the links that make up the screenline locations will experience congestion typified by reduced travel speeds and increased travel times.

Table 2-5.9 provides a network summary for existing (2005) and design year (2033) conditions for the four-hour morning and afternoon peak periods.

Table 2-5.9 Peak-Period Network Summary for 2033 Conditions

Direction & Peak Period	Alternative	Vehicles Served	Persons Served[1]	Average Speed (All)[2]	Average Speed (HOV)[2]
Northbound AM Peak	Existing (2005)	49,300	58,900	29.2	28.7
	Alt. 1, Bus/Carpool Addition	64,900	91,300	17.3	23.3
	Alt. 2, Mixed Flow	65,100	84,300	18.5	21.7
	Alt. 3, Bus/Carpool Conversion	41,500	59,800	8.7	11.5
	Alt. 4, No Build (2033)	60,000	78,700	14.7	18.1
Southbound PM Peak	Existing (2005)	56,000	69,000	38.6	37.9
	Alt. 1, Bus/Carpool Addition	76,000	103,400	32.2	41.1
	Alt. 2, Mixed Flow	78,700	99,000	39.0	41.2
	Alt. 3, Bus/Carpool Conversion	59,200	77,900	22.1	29.6
	Alt. 4, No Build (2033)	65,000	86,900	23.4	25.9

Notes: 1. Based on traffic counts, HOVs, trucks, and other vehicles are assumed to have vehicle occupancies of 2.35, 1.2, and 1.0 persons per vehicle, respectively.
2. Speed is reported in miles per hour for all vehicles and for HOVs.

Source: Fehr & Peers, 2009

In the northbound (morning) direction, the number of persons served through the corridor may increase as much as 55 percent over existing conditions by 2033. Under 2033 conditions, the lane addition alternatives would serve a higher number of vehicles and persons at a higher average speed compared to Alternative 3 and the Alternative 4. Both Alternative 2 and Alternative 1 would serve similar numbers of vehicles, but Alternative 1 would serve 7,000 more people. The average speed for all vehicles would be about 1.0 mph higher under Alternative 2 compared to Alternative 1, but the average speed for high occupancy vehicles would be about 1.6 mph higher under Alternative 1. Alternative 3 would move fewer persons at a lower overall average speed than the other alternatives.

Under existing conditions, the main bottleneck in the northbound direction is the off-ramp connector to US 50, although smaller bottlenecks exist at Pocket Rd. and Laguna Blvd. Under 2033 conditions, these bottlenecks would remain for Alternative 4, but the severity of the congestion would increase as shown in Table 2-5.9. The lane addition alternatives analyzed for the Traffic Report would add capacity south of US 50, but the US 50 bottleneck would remain. This bottleneck would make Alternative 3 less effective at delivering people to downtown than the other alternatives.

The analysis results for the southbound direction (afternoon) show higher volume served and average speed than the northbound direction. Similar to the results for the northbound direction, the lane addition alternatives would serve a higher number of vehicles and persons at a higher average speed when compared to Alternative 4 and Alternative 3. Alternative 3 would serve more vehicles at a higher overall speed, but Alternative 1 would serve 4,000 more people during the peak period. Alternative 3 is the "Lane Conversion" Alternative. Rather than adding additional median lanes as HOV lanes (Alternative 1), Alternative 3 would convert the existing number nne lanes in each direction into HOV lanes. This would force all single occupancy traffic, currently in three lanes, down to just two lanes. The microsimulation model showed that this alternative performed poorly. These results would be expected, since the loss of a lane resulted in increased traffic density.

The average speed for high occupancy vehicles would be the same under both Alternative 2 and Alternative 1 due to similar bottleneck locations that would affect all lanes. Average speeds in all lanes (including the HOV lane) were slower because traffic density was greater.

In the southbound direction, two bottlenecks exist under current conditions—the lane drop north of Sutterville Rd. and the section between Florin Rd. and Pocket Rd. Under 2033 conditions, these bottlenecks would also exist under Alternative 4 and Alternative 3 and queuing from Pocket Rd. would extend back through the bottleneck at Sutterville Road. For both lane addition alternatives, the lane drop at Pocket Rd. would become a bottleneck and would cause LOS F conditions to the north. LOS E conditions would also occur between Cosumnes River Blvd. and Laguna Blvd. due to the high off-ramp volume to Laguna Blvd.

Table 2-5.10 shows the peak high occupancy lane volume served during the peak hour for the Bus/Carpool alternatives. Caltrans' guidelines recommend a threshold of 800 vehicles per hour (vph) in the HOV lane during the opening year. For years 2023 and 2033, the peak Alternative 1 lane volume would exceed 1,000 vph in both directions. In the northbound direction, Alternative 3 2033 lane volumes would be less than Alternative 1 due to upstream bottlenecks, which constrain the traffic from entering the lane. In the southbound direction, Alternative 3 lane volume would be less than Alternative 1 due to a bottleneck at the start of the HOV lane which constrains HOV (and non-HOV) volume from entering the project area.

Table 2-5.10 Highest Peak-Hour Bus/Carpool Lane Volume Served

Direction	Peak Period	Alternative	Analysis Year 2023	Analysis Year 2033
Northbound	AM	Alt. 1 (Bus/Carpool Addition)	1,120	1,461
		Alt. 3 (Bus/Carpool Conversion)	1,188	1,397
Southbound	PM	Alt. 1 (Bus/Carpool Addition)	1,564	1,662
		Alt. 3 (Bus/Carpool Conversion)	964	890

Source: Fehr & Peers, 2009

Table 2-5.11 shows the northbound morning average peak-travel time and speed for the project alternatives under 2033 conditions. Under Alternative 4, the commute time from Hood-Franklin Rd. to US 50 would be similar to the 2023 conditions—about 55 minutes. For the lane addition alternatives, travel times would improve to about 41 and 49 minutes for Alternative 2 and Alternative 1, respectively. Under Alternative 1, the average travel time for HOVs would be 28 minutes. Total travel time under Alternative 3 would be higher than the other alternatives.

Table 2-5.11 Northbound Morning Peak-Hour Travel Time and Speed, 2033 Conditions

Route	Type	Existing		Alt. 4 (No Build)		Alt. 2 (Mixed Flow Addition)		Alt. 1 (Bus/Carpool Addition)		Alt. 3 (Bus/Carpool Conversion)	
		Time	Speed	Time	Speed	Time	Speed	Time	Speed	Time	Speed
Hood Franklin Rd EB On-ramp to Pocket Rd Off-ramp	All	24.4	18.8	34.1	13.5	23.1	19.9	32.4	14.2	78.1	6.0
	HOV	24.5	18.8	34.2	13.5	22.8	20.2	17.3	26.8	45.2	10.4
Pocket Rd Off ramp to US-50 Off-ramp	All	19.2	18.2	19.2	18.2	18.3	19.0	16.4	21.2	27.2	13.1
	HOV	19.2	18.2	19.0	18.4	18.4	19.0	10.9	32.0	11.4	30.9
Hood Franklin Rd EB On-ramp to US-50 Off-ramp	All	43.6	18.5	53.3	15.5	41.5	19.5	48.8	17.2	105.3	9.1
	HOV	43.7	18.5	53.2	15.6	41.2	19.7	28.2	29.0	56.5	19.2
Peak Hour		7:15 – 8:15 AM		7:15 – 8:15 AM		7:15 – 8:15 AM		7:00 – 8:00 AM		7:30 – 8:30 AM	

Notes: The average travel time and speed for the peak hour are reported as minutes and miles per hour, respectively. The HOV type includes travel by HOVs in any travel lane (mixed flow or bus/carpool lane).

Source: Fehr & Peers, 2009

Table 2-5.12 shows the southbound afternoon average peak-travel time and speed for the project alternatives under 2033 conditions. Under Alternative 4, the commute time from US 50 to Hood-Franklin Rd. would be 31 minutes. The average travel time for Alternative 2 and Alternative 1 would be 17 and 27 minutes, respectively. Both the Alternative 4 and Alternative 1 would have a bottleneck at Pocket Rd., but Alternative 2 would not because the mixed flow lane would provide more capacity and operate at a higher level of service. South of Pocket Rd., travel times are similar under all three alternatives. Under Alternative 1, HOVs would have a shorter travel time—15 minutes—than under the other alternatives. Alternative 3 would have an overall travel time similar to Alternative 4 with an HOV travel time similar to Alternative 1.

Table 2-5.12 Southbound Afternoon Peak-Hour Travel Time and Speed, 2033 Conditions

Route	Type	Existing		Alt. 4 (No Build)		Alt. 2 (Mixed Flow Addition)		Alt. 1 (Bus/Carpool Addition)		Alt. 3 (Bus/Carpool Conversion)	
		Time	Speed	Time	Speed	Time	Speed	Time	Speed	Time	Speed
US-50 WB On-Ramp to Pocket Rd WB On-Ramp	All	16.0	22.2	23.3	15.2	9.6	37.0	19.2	18.5	21.9	16.4
	HOV	16.4	22.1	23.8	14.9	9.6	37.1	7.7	46.3	8.7	41.0
Pocket Rd WB On-Ramp to Hood Franklin Rd WB On-Ramp	All	7.4	47.9	7.8	45.7	7.6	46.5	7.6	46.3	7.9	45.5
	HOV	7.4	48.0	7.8	45.7	7.6	46.5	7.2	49.4	7.1	49.6
US-50 WB On-Ramp to Hood Franklin Rd WB On-Ramp	All	23.4	36.5	31.0	32.2	17.2	42.3	26.9	33.9	29.7	32.5
	HOV	23.4	36.5	31.5	32.0	17.2	42.3	14.9	48.0	15.9	45.8
Peak Hour		5:00 – 6:00 PM		5:00 – 6:00 PM		5:15 – 6:15 PM		5:15 – 6:15 PM		5:15 – 6:15 PM	

Notes: The average travel time and speed for the peak hour are reported as minutes and miles per hour, respectively. The HOV type includes travel by HOVs in any travel lane (mixed flow or bus/carpool lane).

Source: Fehr & Peers, 2009

HOV forecasts were also developed for each alternative and are shown in Table 2-5.13. This table lists the HOV percentage at the mainline entry points into the study area. The HOV percentage at on-ramps has similar variation among alternatives. Although HOV percentages are forecasted to increase in the future, the truck percentages were assumed to remain the same as existing for all analysis years. The HOV forecasts from the sub-area model were adjusted because the model tends to underestimate the number of HOVs on a facility. The final HOV forecasts were based on historic data provided by Caltrans from other bus/carpool lanes in the Sacramento region.

Table 2-5.13 HOV Percentage by Analysis Year

Peak Period	Alternative	Existing 2005	Forecast 2023	Forecast 2033
AM Peak Period Northbound I-5	Alt. 4 (No Build)	17%	20%	22%
	Alt. 2 (Mixed Flow Addition)		20%	22%
	Alt. 1 (Bus/Carpool Addition) and Alt. 3 (Bus/Carpool Conversion)		25%	30%
afternoon Peak Period Southbound I-5	Alt. 4 (No Build)	17%	20%	22%
	Alt. 2 (Mixed Flow Addition)		20%	22%
	Alt. 1 (Bus/Carpool Addition) and Alt. 3 (Bus/Carpool Conversion)		25%	30%
Source: Fehr & Peers, 2009				

The following is a summary of the design year (2033) conditions for the alternatives analyzed in the Traffic Report:

- Alternative 1 (Bus/Carpool lanes) would serve more people than all other alternatives. Although the HOV addition would also serve fewer vehicles than the Mixed Flow Addition Alternative, the Bus/Carpool Addition Alternative would also provide higher speeds for high occupancy vehicles than the other alternatives, encouraging the use of carpools, vanpools, and express bus services.
- Alternative 2 (Mixed Flow) would serve more vehicles, although fewer persons, compared to the Bus/Carpool Addition Alternative, and the average speed of all vehicles would be higher.
- Alternative 3 (Bus/Carpool Conversion) would cause a mode shift to carpools or buses. However, this alternative does not reduce peak period congestion since no additional capacity would be provided and the mode shift to carpools or buses would not offset future vehicle traffic growth. Truck traffic will still be permitted in the three right lanes as they approach downtown Sacramento. Traffic studies determined that the high volumes of traffic entering I-5 in the downtown area cause merge/weave turbulence and large congestion problems if big rig trucks are not permitted to move over. Bottlenecks in the study area would worsen and create long delays resulting in conditions similar to the Alternative 4.
- Alternative 4 (No Build) would not reduce peak period congestion since no additional capacity would be provided. Bottlenecks in the study area would create long delays and could result in a number of different responses by future travelers.

The delays would be severe enough that some people may decide not to travel while others that choose to travel could divert to other routes, other times of day, and/or other travel modes.

Table 2-5.14 provides a summary of time and savings on existing bus/carpool routes in Sacramento County. As shown, HOV lanes in the Sacramento area have provided a reduction in travel time during the peak congested periods. In addition, greater travel time savings are expected in the future when additional projects are completed. These savings should further increase as drivers experience more congestion and longer travel times in the mixed flow lanes and change their habits to incorporate HOV commutes.

Table 2.5.14 Summary of Time and Savings on Existing Bus/Carpool Routes in Sacramento County[8]

Year	Length of HOV Section in Miles	Mixed Flow Travel Time (Min:Sec) (A)	HOV Travel Time (Min:Sec) (B)	Time Saves using HOV Lane (Min:Sec) (A-B)
State Route 99 Northbound AM				
2005	14.3	28:00	17:10	10:50
2006	14.3	31:00	20:14	10:46
2007	14.3	28:00	22:22	5:38
2008	14.3	19.59	15:27	4:32
State Route 99 Southbound PM				
2005	14.3	34:06	17:10	16:35
2006	14.3	31:35	16:21	15:14
2007	14.3	24:06	15:56	8:10
2008	14.3	30:35	20:57	9:38
US 50 Westbound AM				
2005	11.5	22:45	11:35	11:10
2006	11.5	24:43	11:15	13:28
2007	11.5	15:47	11:20	4:27
2008	11.5	15:03	11:20	3:45
US 50 Eastbound PM				
2005	11.5	17:50	10:36	7:13
2006	11.5	18:25	11:24	7:00
2007	11.5	16:51	11:00	5:51
2008	11.5	17:36	11:00	6:36
I-80 Westbound AM				
2005	9.6	20:30	8:51	11:39
2006	9.6	15:15	8:50	6:25
2007	9.6	17:35	8:50	8:45
2008	9.6	16:55	8:50	8:05
I-80 Eastbound PM				
2005	9.6	8:20	7:30	0:50

8 *District 3 High Occupancy Vehicle Lanes Status Report*, Caltrans District 3 Office of Freeway Operations, 2008.

2006	9.6	10:04	7:30	2:34
2007	9.6	7:03	7:30	0:27
2008	9.6	8:07	7:30	0:37

Induced Travel

Induced travel occurs when the cost of travel is reduced, typically in the form of travel time savings. In other words, if a freeway widening project adds more lanes and reduces congestion, it is more convenient to drive and more people will do so. As this occurs, a portion of the new capacity on the freeway is filled up by people who: (1) originally did not make that trip; (2) waited until congestion ended; or (3) used another mode (for example, carpools, bus, or light rail). In the long-run, the additional capacity and faster travel time allows people to move farther from their workplace, since traveling to work is more convenient and takes less time when compared to the no build alternative. This "backfilling" of capacity with new trips is known as induced travel.

The SACMET model that was used to forecast future travel for this project accounts for some aspects of induced travel. Both the shift of transportation mode (for example, from bus to car) and shift in route (for example, from local street to freeway) are included. The model does not account for changes in home or work location (thus using fixed trip generation rates) or in the time of day that people travel (using fixed peak-period percentages that are based on the base year [2006] conditions), which may lead to a low estimate of future demand for the "build" alternatives. On the other hand, the SACMET model also does not consider the effect of greater congestion in the region since the pace of new roadway capacity is not keeping up with growth in population. This region-wide increase in congestion will tend to reduce overall travel by car, encourage more development closer to workplaces, and cause travel to shift to off-peak times. A trend analysis of travel in cities such as Los Angeles and New York suggest that this overall congestion effect plays a significant role in reducing auto travel.

Figure 2-5.2 highlights the effects of induced travel to the extent it was captured by the I-5 sub-area model and shows the difference in daily link flows between Alternative 4 and Alternative 1 under 2035 conditions.

Figure 2-5.2 Induced Travel (Change in Average Daily Traffic) Associated with the Alternative 1 Under 2035 Conditions

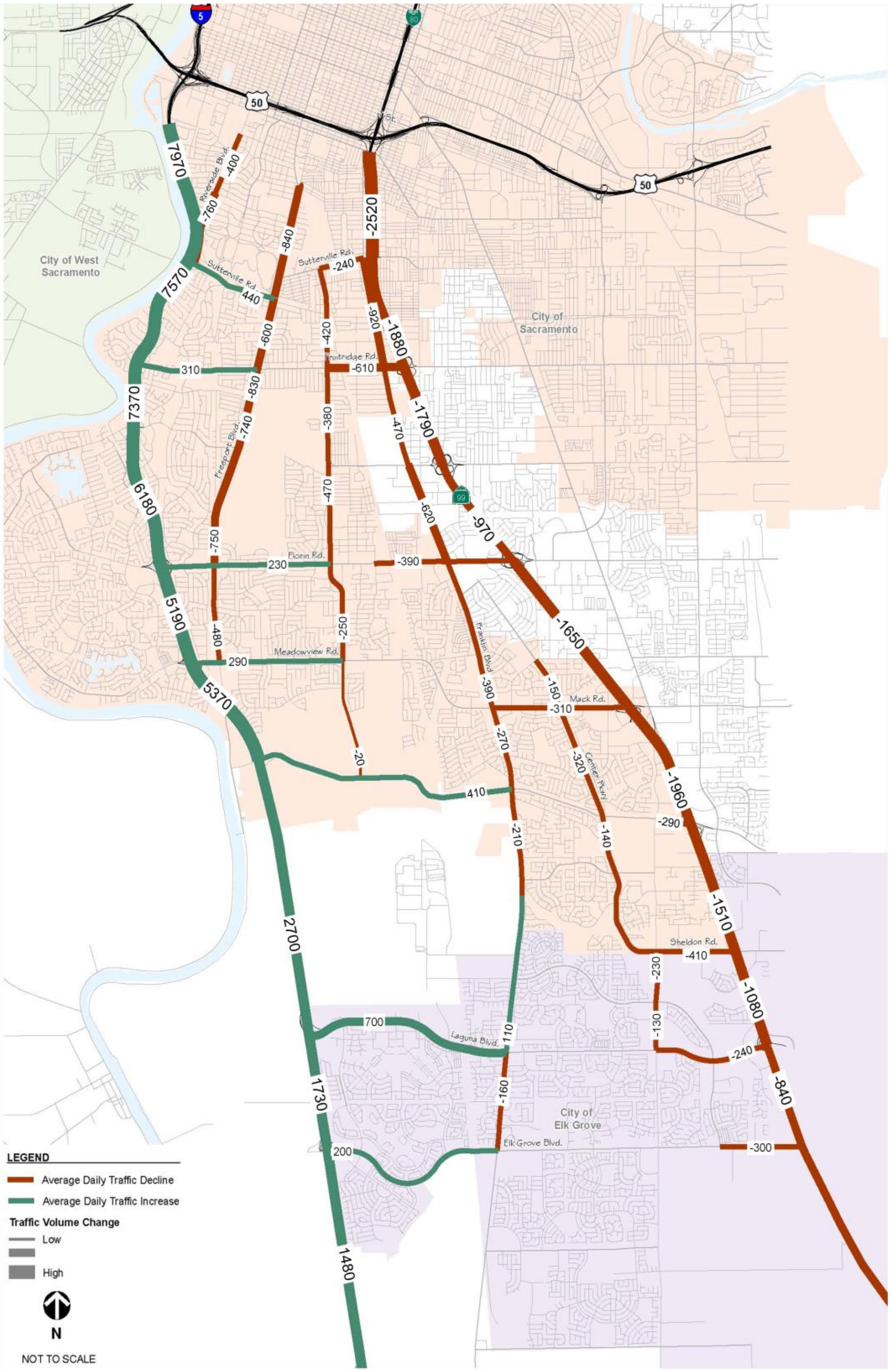


Table 2-5.15 shows the relationship between the change in lane-miles and daily vehicle-miles traveled along the I-5 corridor for the build alternatives under 2035 conditions.

Table 2-5.15 Comparison of Change in Lane-Miles and Vehicle Miles Traveled (VMT) for the Build Alternatives

Add Bus/Carpool Lane (Alternative 1)			**Add Mixed Flow Lane (Alternative 2)**			**Convert Bus/Carpool Lane (Alternative 3)**		
% Change in Lane-Miles	% Change in VMT[1]	Elasticity of Travel Demand[2]	% Change in Lane-Miles	% Change in VMT[1]	Elasticity of Travel Demand[2]	% Change in Lane-Miles	% Change in VMT	Elasticity of Travel Demand[1]
21.6%	4.4%	0.20	21.6%	3.1%	0.14	0.0%	-4.3%	N/A

Notes:
1 Elasticity of travel demand defined as change in vehicle-miles traveled over change in lane-miles
Source: Fehr & Peers, 2009

The results in Table 2-5.15 indicate that the I-5 sub-area model is able to capture most of the effects of induced travel (for the lane addition alternatives) since there is a positive elasticity shown between a change in lane-miles and vehicle-miles traveled.

Many papers have been written on the topic of induced demand, but a study by Robert Cervero is the most relevant to this project (Cervero, 2002). Cervero, Professor of City & Regional Planning and Director of the University of California Transportation Center at UC Berkeley, found an average long-term elasticity rate of 0.39 on 24 freeway corridors in California. This rate is similar to the rates shown in Table 2-5.15, especially when the higher capacity freeways in southern California are considered.

Table 2-5.15 also presents the VMT results for Alternative 3. In this instance, the number of lane-miles does not change between the no build and build scenarios. However, the reduced capacity associated with the bus/carpool lane conversion leads to a reduction of travel along I-5. While there are no recent studies on the impacts of converting a mixed flow lane to a bus/carpool lane, the magnitude and direction of the change in VMT meets expectations. Figure 2-5.3 shows the change in daily traffic flow between Alternative 4 and Alternative 3. As shown, much of the reduction in traffic flow on I-5 is redirected to other routes such as Freeport Blvd., Franklin Blvd., and SR 99.

Figure 2-5.3 Induced Travel (Change in Average Daily Traffic) Associated with the Alternative 3 Under 2035 Conditions

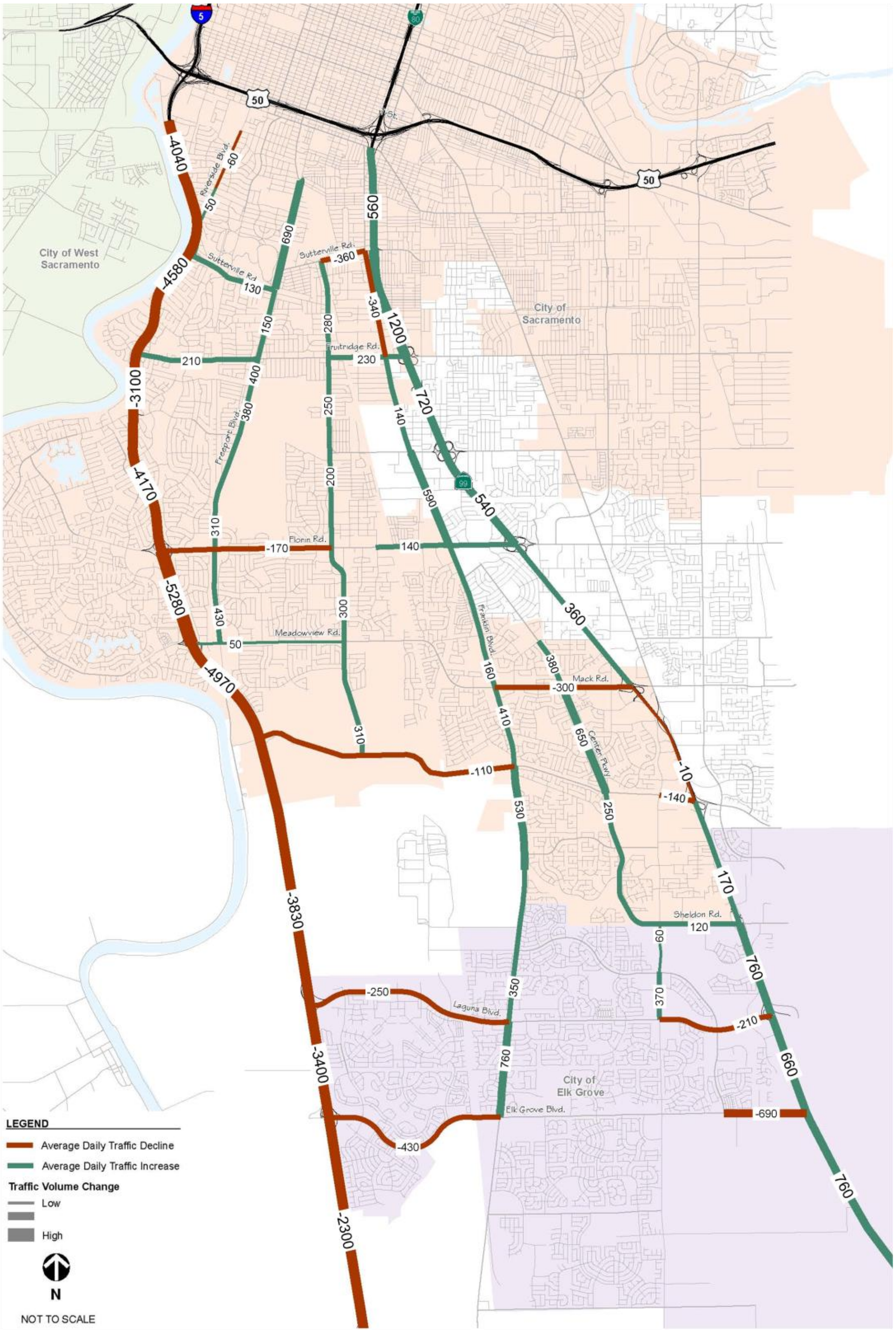
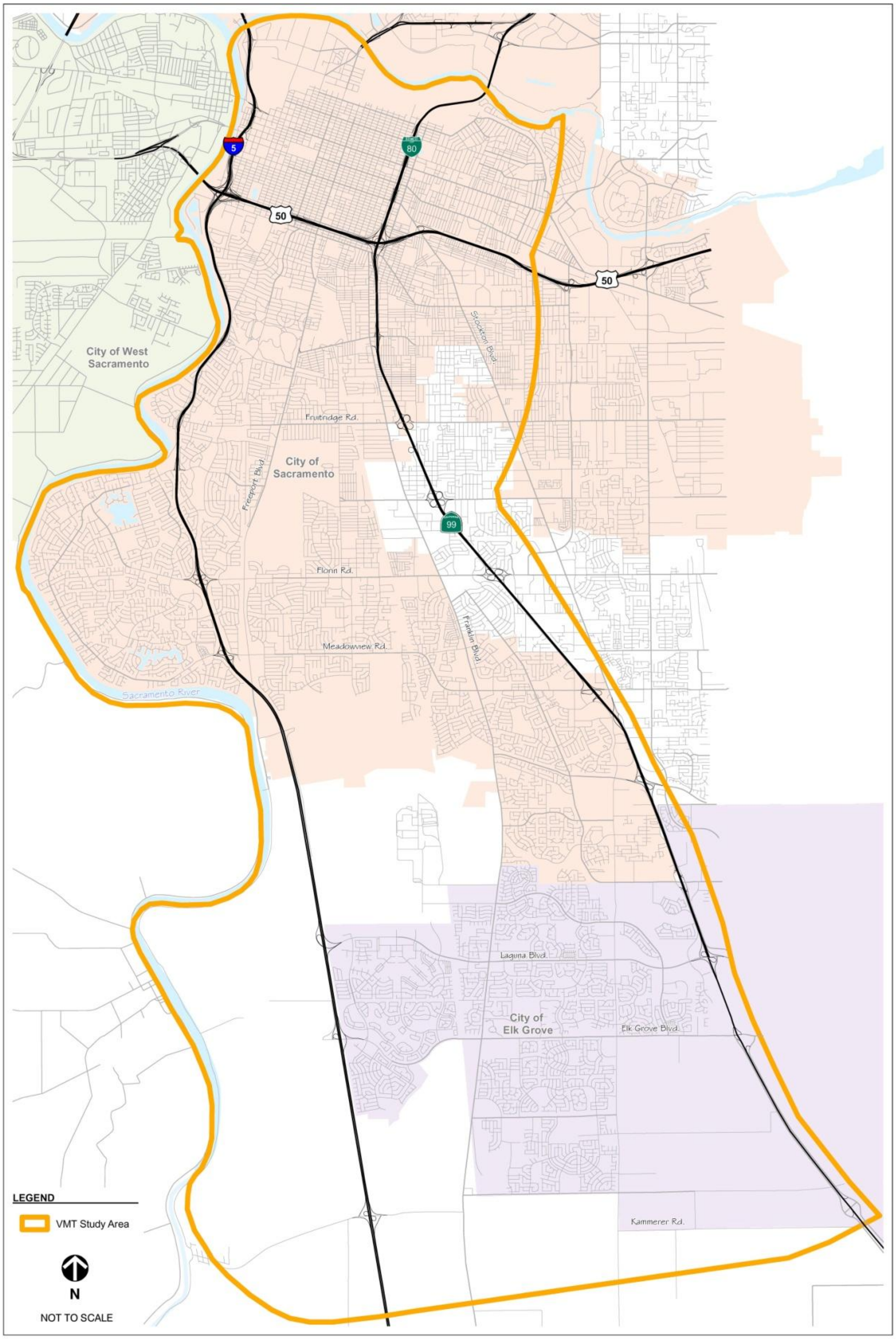


Figure 2-5.4 VMT Study Area



VMT Analysis

In addition to the induced travel analysis, the Traffic Forecast Report included a VMT analysis, which provides information about larger travel patterns and the efficiency of traffic operations. The results of the VMT analysis are also used to calculate air pollution and greenhouse gas emissions. Based on the research from Cervero, much of the change in VMT is anticipated to occur within a four-mile buffer on either side of the project area. This influence area is shown on Figure 2-5.4 and includes SR 99, but is limited on the western edge by the boundary of the Sacramento River, given the limited number of river crossings.

The VMT results are sorted according to five mile-per hour "speed bins." In general, freeway facilities operate more efficiently and with fewer emissions at higher speeds. However for most pollutants and greenhouse gas emissions, maximum efficiency occurs between 45 and 55 miles per hour. The results of the VMT analysis indicate that the alternatives with the greatest capacity (the lane addition alternatives) have the highest levels of VMT. This result is consistent with the induced travel research described earlier. The VMT results also indicate that the alternatives with the greatest capacity have the highest (and therefore more efficient) speeds. Capacity is defined as the maximum rate of flow at which persons or vehicles can be reasonably expected to traverse a point or uniform segment of a lane or roadway during a specified time period under prevailing roadway, traffic and control conditions, usually expressed as vehicles per hour or persons per hour. The facility could have huge capacity but operate at LOS F because the traffic demand has exceeded the available space on the freeway over a given time period. When this happens, the freeway cannot absorb the traffic demand; thus speeds slow and congestion ensues.

Table 2-5.16 2033 VMT by Speed Bin

Speed Bin	Alt. 1 (Add Bus/Carpool Lane)	Alt. 2 (Add Mixed Flow Lane)	Alt. 3 (Convert Bus/Carpool Lane)	Alt. 4 (No Build)
0 - 5 MPH	18,576	19,051	18,635	20,536
5 - 10 MPH	87,704	94,617	91,022	89,500
10 - 15 MPH	314,674	327,021	374,248	350,961
15 - 20 MPH	992,188	976,938	1,133,495	1,062,166
20 - 25 MPH	1,028,275	1,017,625	1,194,048	1,002,822
25 - 30 MPH	1,291,234	1,189,945	1,394,345	1,362,005
30 - 35 MPH	1,408,781	1,554,727	1,333,360	1,527,077
35 - 40 MPH	1,287,769	1,148,049	1,049,473	1,188,923
40 - 45 MPH	1,106,414	1,068,961	960,526	1,117,927

45 - 50 MPH	1,120,654	1,283,919	1,138,044	1,094,329
50 - 55 MPH	1,153,296	1,157,758	1,198,188	1,106,521
55 - 60 MPH	1,133,684	1,141,681	1,092,458	1,213,824
60 - 65 MPH	998,776	974,400	906,728	777,758
65+ MPH	48,937	49,629	46,742	48,111
Total	**11,990,964**	**12,004,323**	**11,931,312**	**11,962,462**
Average Speed	**38.9**	**39.0**	**38.0**	**38.2**
Source: Fehr & Peers, 2009				

Traffic Safety

A study entitled "Contiguous HOV Lane Safety Review," dated November 13, 2006, was completed by the consulting firm Fehr and Peers, working under contract for Caltrans. The study reviewed accident data for at least one year before and after the construction of the HOV Lanes on I-80 and US 50. The accident data was reviewed according to the following categories.

- Type of collision—rear end, sideswipe, hit object, etc.
- Movement preceding collision—changing lanes, proceeding straight, stopped, etc.
- Time of day—peak period (during bus/carpool lane restriction) versus off-peak period
- Location of collision—bus/carpool lane, inside lanes, right lanes, shoulder

The principal conclusion of the study was that accident rates increase as traffic congestion increases, whether or not a freeway has bus/carpool lanes. In addition, no clear differences were found in collision type, movement preceding collision or other factors, indicating that contiguous bus/carpool lanes do not have a negative effect on freeway safety

In addition, an Institute of Transportation Studies, University of California, Berkeley, study entitled "A Comparative Safety Study of Limited versus Continuous Access High Occupancy Vehicle (HOV) Facilities," dated September 18, 2007 determined that continuous access HOV lanes had a lower percentage of total collisions than limited access HOV lanes. The proposed HOV lanes in this project are continuous access.

Due to right-of-way constraints, the build alternatives may require the use of 11-ft lanes in two of the five lanes or the use of reduced shoulder widths ~~in~~ for a small portion of the northern segment of the project. As noted above, this will be similar to the bus/carpool lanes currently existing on SR 99, which has section~~s~~ with reduced lane and shoulder widths. As suggested earlier, reduced lane and/or shoulder widths can present additional safety impacts. However, safety analyses for SR 99 have shown that this freeway segment does not contain a collision rate that is significantly greater that the Statewide average for similar routes.

Additional safety improvements of the project include the installation of thrie beam or concrete barrier from 1.1 miles south of Elk Grove Blvd. to just south of Laguna Blvd., which will provide a median barrier for the length of the project. This will help to reduce the chance of errant vehicles from crossing the median. The installation of safety-shape concrete to the pavement-level portion of existing sound walls, as needed, will improve safety by maintaining vehicle alignment with the traveled direction during low-angle impacts, such as side swipe impacts.

Transit Operations

The purpose of the proposed project is to provide congestion relief, which can be accomplished by carrying more people in fewer vehicles during peak periods and promoting ride sharing and the use of high occupancy vehicles, such as carpools, vanpools, and express bus services. Transit ridership is anticipated to increase as a result of the project. Based on the Traffic Report and data from previously completed bus/carpool lane projects, the proposed project could greatly improve travel time for commuter buses. Implementation of bus/carpool lanes on I-5 would allow buses to bypass congested mixed flow traffic lanes, resulting in improved travel times during peak commuting periods. As growth in the region continues, the need for additional public transit services will also continue to increase.

Bicycle Routes

No effects to bicycle routes are anticipated from the proposed project.

Pedestrian Facilities

The proposed project is expected to result in improved access to pedestrian facilities. The proposed project will replace the existing Casilada POC, eliminating the existing overcrossing walkway grade of approximately 12% that does not meet the requirements of the Americans with Disabilities Act (ADA). No other pedestrian facilities will be affected. The replaced Casilada POC is expected to enhance access for pedestrians and cyclists.

2.5.4 Avoidance and Minimization Measures

Caltrans will prepare a Transportation Management Plan (TMP) in order to minimize disruptions to traffic and to emergency services during construction. A TMP is a program of activities for alleviating or minimizing work-related traffic delays by applying traditional traffic handling practices and innovative strategies including public awareness campaigns, motorist information, demand management, incident management, system management, construction methods and staging, and alternate route planning. TMP strategies also strive to reduce overall duration of work activities where appropriate. Typical components of a TMP can include measures such as the implementation of staging, traffic handling, and detour plans; restricting construction work to certain days and/or hours to minimize impacts to traffic and pedestrians; coordination with other construction projects to avoid conflicts; and the use of portable changeable message signs to inform the public and emergency vehicles of construction activities.

2.5.5 Mitigation Measures

No mitigation measures are required.

2.5.6 CEQA Considerations

Less than significant impacts to traffic and transportation/pedestrian and bicycle facilities are anticipated.

2.6 Visual/Aesthetics

2.6.1 Regulatory Setting

NEPA 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 regarding projects are to be made in the best overall public interest taking into account adverse environmental impacts, including among others, the destruction or disruption of aesthetic values.

Likewise, 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." [CA Public Resources Code Section 21001(b)]

2.6.2 Affected Environment

2.6.2.1 Overview

This section presents the results of a Visual Impact Assessment (VIA) originally completed in June 2008. In January 2011, the VIA was revised. Caltrans landscape staff prepared the VIA according to the guidelines established by the FHWA (*Visual Impact Assessment for Highway Projects*, FHWA 1983, Publication Number FHWA-HI-88-054).

The visual setting of the proposed project area varies from very urban with a diverse array of land uses in the northern end of the project limits, to open, flat, undeveloped fields in the southern end of the project limits. The entire project area, particularly north of Pocket Rd., includes mature highway plantings of trees, shrubs, ground covers, and vines. Vines on the existing sound walls create a green cover and soften the appearance of the sound walls. Trees and shrubs provide a visual relief from the roadway for the adjacent residences.

I-5 within the project limits is neither designated nor eligible as a California Scenic Highway; however, portions of I-5 within the northern half of the project limits are classified as “Landscaped Freeway,” which are planted or landscaped sections of freeway that meet the criteria of the outdoor advertising regulations. This classification is used in the control and regulation of outdoor advertising displays.

2.6.2.2 Visual Impact Assessment Methdology

The VIA evaluated the existing conditions of aesthetic resources in the landscape. The evaluation followed FHWA guidelines by identifying the overall regional visual character and the character within the project area. Visual features (resources) of the landscape were assessed, emphasizing the character and quality of the visual resources.

Viewer groups were identified as either people living or working near the project area or those traveling through the project area. Their views were ranked as levels of sensitivity toward the visual resources in the landscape.

Existing conditions of the visual landscape were documented and compared with the proposed project visual landscape changes and evaluated for the degree of impact. The degree of impact depends on both the magnitude of change in the visual resource (visual character and quality) as well as viewers’ responses to—and concern for—those changes.

2.6.2.3 Visual Impact Assessment Criteria

The visual character and quality of the region and project site were evaluated using established FHWA criteria for visual landscape relationships. These criteria include vividness, intactness, and unity. They are defined as follows and ranked between 1 and 7, with 1 representing very low and 7 representing very high:

- **Vividness**: The visual power or memorability of landscape components as they combine in striking and distinctive visual patterns.

- **Intactness**: The visual integrity of the natural and human-built landscape and its freedom from encroaching elements; this factor can be present in well kept urban and rural landscapes, as well as natural settings.
- **Unity**: The visual coherence and compositional harmony of the landscape concerned as a whole; it frequently attests to the careful design of individual components in the artificial landscape (FHWA 1983).

The appearance of the landscape is described below using these criteria and descriptions of the dominance of certain elements (form, line, color, and texture). These elements are the basic components used to describe visual character and quality for most visual assessments.

Viewer sensitivity or concern is based on the following:

- Visibility of resources in the landscape.
- Proximity of viewers to the visual resource.
- Relative elevation of viewers to the visual resource.
- Frequency and duration of views.
- Number of viewers.
- Types and expectations of individuals and viewer groups.

The criteria for identifying the importance of views are related in part on the position of the viewer relative to the resource. An area of the landscape that is visible from a particular location (e.g. an overlook) or series of points (e.g., a road or trail) is defined as a viewshed.

To identify the importance of views of a resource, a viewshed may be broken into distance zones of foreground, middleground, and background. Generally, the closer a resource is to the viewer, the more dominant it is and the greater its importance to the viewer. Although distance zones in viewsheds may vary between different geographic regions, or types of terrain, a commonly used set of criteria identifies distance zones as follows:

- **Foreground Zone**: 0.25-0.5 mile from the viewer.
- **Middleground Zone**: Extending from the foreground zone to 3-5 miles from the viewer.
- **Background Zone**: Extending from the middleground zone to infinity.

Visual sensitivity also depends on the number and type of viewers and the frequency and duration of views. Generally, visual sensitivity increases with an increase in total numbers of viewers, the frequency of viewing (e.g., daily or seasonally), and the duration of views (i.e., how long a scene is viewed).

Visual sensitivity is higher for views seen by people who are driving for pleasure; people engaging in recreational activities such as hiking, biking, or camping; and homeowners, and tends to be lower for views seen by people driving to and from work or as part of their work. Views from recreational trails and areas, scenic highways, and scenic overlooks are generally assessed as having high visual sensitivity.

2.6.2.4 Viewer Groups

The major viewer groups identified for the project area included residents and persons engaged in commercial activities located along the project corridor, as well as drivers of I-5. Residential and commercial viewers include those who view the roadway as more or less permanent viewers. On the other hand, drivers see the roadway as non-permanent viewers as they pass through the project area. Visual impacts of the project were evaluated for both viewer groups.

2.6.2.5 Landscape Assessment Units

The project area was divided into two landscape units to facilitate the visual impact analysis. A landscape unit is defined as the spatial enclosure and visual interrelationships among the individual landscape types that determine the visual character of the landscape unit. A roadway can have many viewsheds as the motorist’s position shifts. To provide a framework for the visual impact analysis, landscape units were chosen which best represented the nature of the landscape unit. The project area consists of two physically distinct landscape assessment areas, both of which contain I-5 and the surrounding environment. From a visual standpoint, Pocket Rd. is the logical dividing line between the northern and southern portions of the roadway.

Northern LAU

The northern landscape assessment unit (LAU) consists of all those areas from Pocket Rd. to the northern project limits near US 50. Most of the northern LAU includes homes and commercial buildings with the exception of the northwest end, which includes the Sacramento River. The Southern Pacific Railroad (SPRR) and a bicycle path lie between the roadway and Sacramento River. Trees and shrubs provide a visual relief from the roadway for the adjacent residences, while vines on the existing sound walls create a green cover, soften the appearance of the sound walls, and discourage graffiti.

This LAU has a somewhat limited viewshed. This is caused by the mature landscaping and existing sound walls on either side of the freeway in the northern portion of this LAU. The walls at time appear bleak however; the large mature trees soften their appearance. Traveling south from the downtown area of Sacramento there is a mature landscape of rather large trees along the highway facility. Additionally, there are some shrubs and low growing vegetation in front of some of the sound walls; additionally, some of the walls have vines growing on them. This softens the appearance of these walls.

Southern LAU

The southern LAU consists of the portion of I-5 from Pocket Rd. to the southern terminus of the project (1.1 miles south of Elk Grove Blvd.). The lands on the west side of I-5 are open space areas within the Stone Lakes National Wildlife Refuge (Stone Lakes). A small area just south of Pocket Rd. is a part of the proposed Delta Shores development discussed in Section 2.22 ("Cumulative Impacts") of this document.

This LAU has a more open viewshed in various spots along the corridor. The northern portion of this LAU has an established landscape framing the highway facility. There are sections along this stretch that open allowing the motorist to view the existing open fields and urban development. The trees and shrubs on both sides of the freeway provide a nice vegetated buffer between the highway facility and the residential and commercial developments. This vegetation also provides a nice aesthetic value to the motorist as one travels through this corridor. The southern portion of this LAU that travels beyond the city limits of Sacramento is much more open with large expanses of agricultural fields and wetland areas.

2.6.3 Environmental Consequences

A visual impact assessment was conducted in order to measure the magnitude of the potential visual changes caused by the proposed project. This approach compares the visual quality of both the existing and proposed conditions. A separate survey was done from both the northern and southern sections of the proposed project. The changes from the existing to the proposed were not significant; however, the pedestrian overcrossing did present numerous concerns from the surrounding community. This warranted further analysis regarding its visual impact.

As part of the project's visual impact assessment, a numerical rating was assigned for the existing quality of the pedestrian overcrossing and the northern and southern LAUs, with 1 having the lowest value and 7 the highest. Two perspectives of the POC were conducted which used a viewers perspective traveling along the southern and northern directions of the highway corridor. Numerical ratings were then assigned to each of these "proposed" views. The numerical difference, if any, between the existing and proposed conditions quantifies the change which may occur as a result of the proposed project. This numerical difference is compared to the expected sensitivities of potential viewer groups in order to determine a level of visual impact.

Alternative 1

Other visual impacts can be expected, especially during construction which is expected to occur over a 24-month period. Viewers would see materials, equipment, workers, and the operations of construction during this period. Impacts of construction are unavoidable but would be temporary. Motorists would be exposed briefly to construction activities while passing through the construction zone, but residents of adjacent homes would be exposed to these activities on a more continuous basis. This is a temporary impact.

A permanent impact of Alternative 1 will be the loss of trees and vegetation, a valuable visual resource in both landscape assessment units. This loss can be minimized by implementing the *Avoidance and Minimization Measures* described below.

No additional lighting is planned; therefore, there will be no new sources of substantial light or glare.

Northern Landscape Unit (LAU)

The majority of the visual changes resulting from Alternative 1 would affect the northern LAU. A new pedestrian overcrossing (POC) at Casilada Way will require the removal of a large mature tree. Areas of minor outside widening, structure widening, and sound wall construction will also require the removal of mature trees (including sycamores and sequoias), smaller trees, shrubs, and vines on both sides of the freeway. The addition of safety shape barriers to the existing sound walls may also require the removal of established vines from some sound walls. Removal of this vegetation would result in a visual loss for the drivers of I-5. On the other hand, in many locations, the existing sound wall will remain and provide a visual buffer for the residents of this area. The visual loss in the northern LAU can be lessened over time by providing replacement plantings.

The Casilada POC was constructed a number of years ago and contains tightly looped curves on both sides of I-5. The new structure will be built to meet the latest ADA standards. An elliptical design was chosen for this new structure to lessen the environmental effects of the proposed POC replacement. The construction of the new POC will be approximately 10 ft north of the existing structure. The span will be 10 ft in width, 202 ft in length, and will have an elevation of approximately 20 ft. The ramps will be elliptical in shape and located on the east and west sides of I-5. Each ramp will begin at the approximate location of the existing ramps and crossing. Each ramp will be approximately 240 ft long and 10 ft wide, with the west ramp having an approximate elevation of 20 ft and the east ramp having an approximate elevation of 18 ft. Each ramp will require one abutment and three bents. If a shallow foundation (spread footing) is used, the estimated depth of ground disturbance for the footings and abutments is approximately 10 ft. If a pile foundation is used, the estimated depth of ground disturbance for the footings and abutment/bents is approximately 10 ft, and piles will be driven to an approximate maximum depth of 40 ft.

At the public open house for the project held on October 25, 2007 at the Belle Cooledge Branch of the Sacramento Public Library, Caltrans received several comments related to potential visual impacts of the project, including several comments that specifically addressed the need to protect the existing vegetation at the POC as a visual buffer between the residences and the POC.

Table 2-6.1 as seen below presents the before and after visual quality score for the POC that is located in the northern LAU. One tree will be removed to construct the new POC. However, because the number of affected trees is small and because new trees will replace the removed tree, the visual impact is not considered significant.

Table 2-6.1 Existing and Post-Project Visual Quality of the Pedestrian Overcrossing (POC)

Location	Vividness (V)	Intactness (I)	Unity (U)
POC – Existing with landscaping	4	4	4
POC – Proposed with elimination of one large mature tree.	3	4	4

Visual Quality (VQ) = Vividness (V) + Intactness (I) + Unity (U) / 3 (VQ =V+I+U/3)

Existing Visual Quality = 4
Proposed Visual Quality = 3.6
Visual Quality Difference = .-4

Table 2-6.2 presents the before and after visual quality score for the northern LAU, due to the loss of landscaping caused by the construction of sound walls the visual quality of the area would be slightly degraded. Please refer to Table 2-6.2 which shows the before and after visual quality score for the northern LAU. The changes between the existing and post project visual quality will be obvious in its initial stage but over time would be lessened when the minimization measures are implemented. The dominant negative factor is the construction of a sound wall and loss of landscaping.

Table 2-6.2 Visual Quality regarding the Northern LAU with Existing Landscaping and Post- Project Elimination of Trees and Vegetation

Location	Vividness (V)	Intactness (I)	Unity (U)
Northern LAU– Existing with landscaping	5	4	5
Northern LAU– Proposed with elimination of one large mature tree.	4	3	4

Visual Quality (VQ) = Vividness (V) + Intactness (I) + Unity (U) / 3 (VQ =V+I+U/3)

Existing Visual Quality = 4.6
Proposed Visual Quality = 3.6
Visual Quality Difference =-1

Southern LAU

In the southern LAU, the construction of the new bus/carpool lanes in the existing earthen median will result in the reduction of a natural resource where earth will be replaced with concrete. There are many homes in the South Pocket Homeowners Association along I-5 south of Pocket Road.

The open space areas of the Stone Lakes National Wildlife Preserve dominate the landscape. On the east side of I-5, there are homes near Pocket Rd; however, most of the area consists of open fields and wetlands. The exceptions are the areas near Laguna Blvd. and Elk Grove Blvd., where there are residential developments as well as a few commercial establishments.

A sound wall will be constructed in the area south of Pocket Road on the east side of the highway corridor. This obstruction will result in a noticeable change to the existing views. The new bus/carpool lane would be constructed near the roadway median. Visual change for the drivers of I-5 would consist of exposure to one additional lane of traffic in each direction. Drivers further south of the bridge that spans State Route 160 would experience the same views of the surrounding marshlands and residential developments.

The visual quality of the area would be slightly degraded due to the loss in views and vegetation caused by the construction of sound walls and the increase in the highway facility. Please refer to table 2-6.4 which shows the before and after visual quality score for the southern LAU. The changes between the existing and post project visual quality is slight. The dominant negative factor is the construction of a sound wall and loss of landscaping.

Table 2-6.4 Existing and Post Project Visual Quality of the Southern LAU

Location	Vividness (V)	Intactness (I)	Unity (U)
Southern LAU– Existing	4	5	5
Southern LAU– Post-Project.	4	3	4

Visual Quality (VQ) = Vividness (V) + Intactness (I) + Unity (U) / 3 (VQ =V+I+U/3)

Existing Visual Quality = 4.6
Proposed Visual Quality = 3.6
Visual Quality Difference =-1.0

Viewer Groups

Two general viewer groups were considered for the evaluation of viewer response; those with views from the road and those with views of the road.

Viewers from the Road

This viewer group is comprised of the highway user. For viewers travelling I-5 through the project area, distant views are generally restricted in the northern LAU due to the sound walls and trees. The highway corridor is framed in this section of freeway. The foreground and middle ground views along the highway are dominant.

Viewers travelling I-5 through the project area in the southern LAU experience different views. The distant views are more open due to the fact that there are no longer any sound walls. The highway corridor is framed in some sections with trees and vegetation but will periodically open up to views of agricultural land in some areas and commercial and residential developments in other areas. The foreground and middle ground views in this section along the highway are also dominant.

The viewers along this segment of I-5 are primarily in motor vehicles and trucks. During the week the viewers are commuters, business owners and operators, and truck drivers transporting goods. During the weekend hours the viewers are less commuter oriented and more recreational types, such as skiers, hikers, campers, in addition to private property owners.

The awareness of visual resources by these highway users is expected to vary with their specific activity. In general, highway users in vehicles will experience the area as a cumulative sequence of views and may not focus on specific roadway features. Local residents and business owners are the most sensitive to aesthetic issues, due to their familiarity as well as their personal investment in the area.

Viewers of the Road

This viewer group is made of all those who can see the road project or any of its components from off-site locations. For this project, the number of people with views to the specific project location is limited, especially in the northern LAU. Views in this section are limited because of existing sound walls and landscaping between the sound walls and freeway.

In the southern LAU, views of the road are available where there are breaks in the landscaping. The majority of development is set back enough that the highway facility is not a dominant feature.

Views of the project area are located at and from the ramps, interchanges and the Casilada pedestrian overcrossing (POC). Long distance views of the surrounding area are scarce.

Viewers Response to the Proposed Project

The overall viewer response was to protect the trees and vegetation that act as a barrier to the residential area and the highway facility. Concern was also expressed for keeping the new POC within close proximity to the original POC, which is the case.

To the maximum extent possible, revegetation and replacement planting will occur in the same location from which vegetation was removed. When plantings cannot be replaced in the same location from where they were removed due to safety concerns or other constraints, replacement plantings will be placed near the affected area or elsewhere within the project area.

Two sections along the highway corridor will require structural modifications to accommodate additional traffic lanes. The Beach Lake Bridge at Morrison Creek and the overhead structure at the I-5/State Route 160 separation will both require widening on the inside, connecting the south and north bound lanes into one structure and becoming a single span structure. In order to support these structures, additional support columns will be necessary.

The modifications to these bridges will increase the pavement by adding additional lanes. This will have very little effect on the traveling motorist using the highway. The impact of this change will be seen from the motorist traveling along State Route 160. The extra columns will have very little impact visually to motorists.

The shadowed area under the Beach Lake Bridge will not be as visible to the traveling public because this bridge spans Morrison Creek. This area is undeveloped and there is no public access (trails or roads) under the bridge.

Alternative 2

Because the footprint and project features of Alternative 2 are the same as Alternative 1, the impact of Alternative 2 to visual resources would be the same.

Alternative 3

Alternative 3 includes the Traffic Operations System (TOS) improvements of Alternative 1 (closed circuit television, highway advisory radio, changeable message sign, ramp metering) and the replaced Casilada POC , but not roadway widening, bridge and drainage improvements, or utility relocations. As a result, the only visual impacts associated with Alternative 3 involve the demolition and reconstruction of Casilada POC and temporary construction impacts.

Alternative 4

The No Build Alternative would not change the current freeway and would have no visual impacts on existing views.

2.6.4 Avoidance and Minimization Measures

The proposed project will have an effect on the existing visual character of certain locations within the project area. These effects will be minimized by the incorporation of the following measures.

- All mature vegetation that is to remain within or adjacent to the project limits and which may be affected by construction activity, will be designated as an environmentally sensitive area (ESA) on project plans and in project specifications. ESA provisions may include, but are not limited to, the use of temporary orange fencing to delineate the proposed limit of work in areas adjacent to vegetation, or to delineate and exclude vegetation from potential construction impacts. Contractor encroachment into ESAs will be prohibited (including the staging/operation of heavy equipment or casting of excavation materials). ESA provisions shall be implemented as a first order of work, and remain in place until all construction activities are complete.

- Tree and vegetation removal will be limited to only that which is required to construct the project.
- Following construction, all areas used for staging, access, or other construction-related activities will be restored to their original grade and contour graded in order to blend these areas with the surrounding topography.
- Aesthetic enhancements will be provided for the new POC. Aesthetic enhancements may include texture and color and must be approved by the Office of Landscape Architecture.

The new sound walls will have a dominant presence due to the fact that most of the new walls will lack the vines that are apparent on the older walls. Most of the vegetation lining older walls will need to be removed due to the construction of the new walls and the increase in the highway facility. The character of this section of corridor will appear more urban and will increase glare, especially during the hot summer months. Although there are presently walls along the freeway, these walls are less obtrusive due to the existing mature vegetation.

The construction of the new walls provides an opportunity to design the walls in way that will create uniformity throughout the corridor. The walls should have design features incorporated into the structure (i.e. formliner, graphic motifs, or variations in the color of the brick used on the walls). Along the new section of constructed wall there will be areas that will not be able to be planted with trees. The proposed wall design features will help to provide creative uniformity to the visual quality of the structure. This will help minimize the stark presence of the new walls. Additionally, landscaping should be planted where it is feasible, as this will help soften the structure of the walls. Initially, this landscaping will have little impact but after it is established, it will add character and aesthetics to the highway corridor.

If the construction of additional sound walls is required, the following avoidance and minimization measures will be implemented to lessen the visual effects:

- Sound wall design will use materials similar to those incorporated into other sound walls along the project corridor and will be compatible with native materials. Similar materials, patterns, and styles are recommended to provide visual continuity and interest to the corridor landscape.

- Aesthetic enhancements of texture and color appropriate for the area will be provided for all concrete barriers that are installed by the project.
- A landscape plan must be prepared to provide appropriate landscape screening of sound walls to minimize the potential for graffiti and other nuisances. Appropriate landscape materials will be determined based on the placement of the wall and available setbacks. Generally, trees require a 30-foot setback, shrubs need approximately 20 feet and vines can be planted and trained to grow up the wall. A combination of these plantings may be appropriate for this area. The Office of Landscape Architecture will provide a planting design for the project as a part of the sound wall design effort.

2.6.5 Mitigation Measures

- Replacement plantings will be required for all trees, shrubs, vines, and groundcovers to be removed within the northern LAU (north of Pocket Rd.), including those removed for the replacement of the Casilada POC. To the maximum extent possible, revegetation and replacement planting will occur in the same location from which vegetation was removed. When plantings cannot be replaced in the same location from where they were removed due to safety concerns or other constraints, replacement plantings will be placed elsewhere within the northern LAU in order to maintain the visual integrity of this corridor.

2.6.6 CEQA Considerations

Less than significant impacts to visual resources are anticipated.

Physical Environment

2.7 Hydrology and Floodplains

2.7.1 Regulatory Setting

Executive Order 11988 (*Floodplain Management*) directs all federal agencies to refrain from conducting, supporting, or allowing actions in floodplains unless it is the only practicable alternative. The Federal Highway Administration requirements for compliance are outlined in 23 CFR 650 Subpart A.

In order 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, and
- Measures to minimize floodplain impacts and to preserve/restore any beneficial floodplain values impacted by the project.

The base floodplain is defined as "the area subject to flooding by the flood or tide having a one percent chance of being exceeded in any given year." An encroachment is defined as "an action within the limits of the base floodplain."

2.7.2 Affected Environment

A Floodplain Hydraulics Study and a Floodplain Evaluation Report Summary were prepared for the proposed project in March of 2008.

2.7.2.1 Drainage

Within the project limits, I-5 crosses several streams and drainages. According to Caltrans Hydraulics Branch Engineer Clark Townsend, there has been a history of flooding at the Laguna Blvd. on-ramp to northbound I-5 and the off-ramp from southbound I-5, and the outside lanes of both ramps were closed due to flooding in the late 1990s. Flooding is believed to have occurred twice in the last ten years (Townsend 2005).

No flooding has been reported by Caltrans maintenance staff in the northern half of the project corridor (West Sacramento Maintenance Area).

2.7.2.2 Floodplains

The project crosses Federal Emergency Management Agency (FEMA) Special Flood Hazard Areas (SFHAs) throughout the project limits. The area from PM 9.7 to PM 12.2 (1.1 miles south of Elk Grove Blvd. to approximately the north levee of Morrison Creek) is designated as SFHA Zone AE (a 1 percent annual chance of flooding) with a Base Floodplain Elevation (BFE) established of 16 ft (NGVD 1929). The area from approximately PM 12.5 to PM 18.49 is designated as SFHA Zone A99 (An area inundated by 100-year flooding, for which no BFEs have been determined. This is an area to be protected from the 100-year flood by a Federal flood protection system under construction.). From PM 18.49 to the north end of the project (PM 22.50) is designated as SFHA, Other Flood Areas, Zone X (Areas protected from 100-year flood by levees and areas of 500-year flood). Please refer to Figures 2-7.1A to 2-7.1C for the location of floodplains in the project area.

2.7.3 Environmental Consequences

Temporary channel obstructions may be expected to occur during construction, but all work in the channels such as Morrison Creek would typically occur during low flow conditions.

2.7.3.1 Project-Related Flood Risk

The level of risk is expected to be minimal. The proposed project is primarily a transverse encroachment; however, ponding does occur both upstream and downstream of I-5 within the project limits. Concrete barriers will be constructed from the south end of the project to the south levee of the South Reach of Beach Lake and from the north levee of the South Reach of Beach Lake to the existing concrete median barrier just south of Florin Rd. The proposed concrete barrier south of the South Reach of Beach Lake will not have a significant[9] impact on the base floodplain since the developments just east of I-5 have raised the ground elevation above the BFE and/or constructed levees to protect newly developed areas in the Elk Grove area. Extending the roadway cross slope to the median in these areas will not impact the floodplain. Floodwater will cross I-5 to the south of the project and flood northerly along both sides of the median.

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[9] The use of “significant” in this section is consistent with the *Federal-Aid Highway Program Manual* (FHWA 1979) definition for floodplain encroachment and is not used with regard to NEPA.

Figure 2-7.1A FEMA Flood Zone Maps.

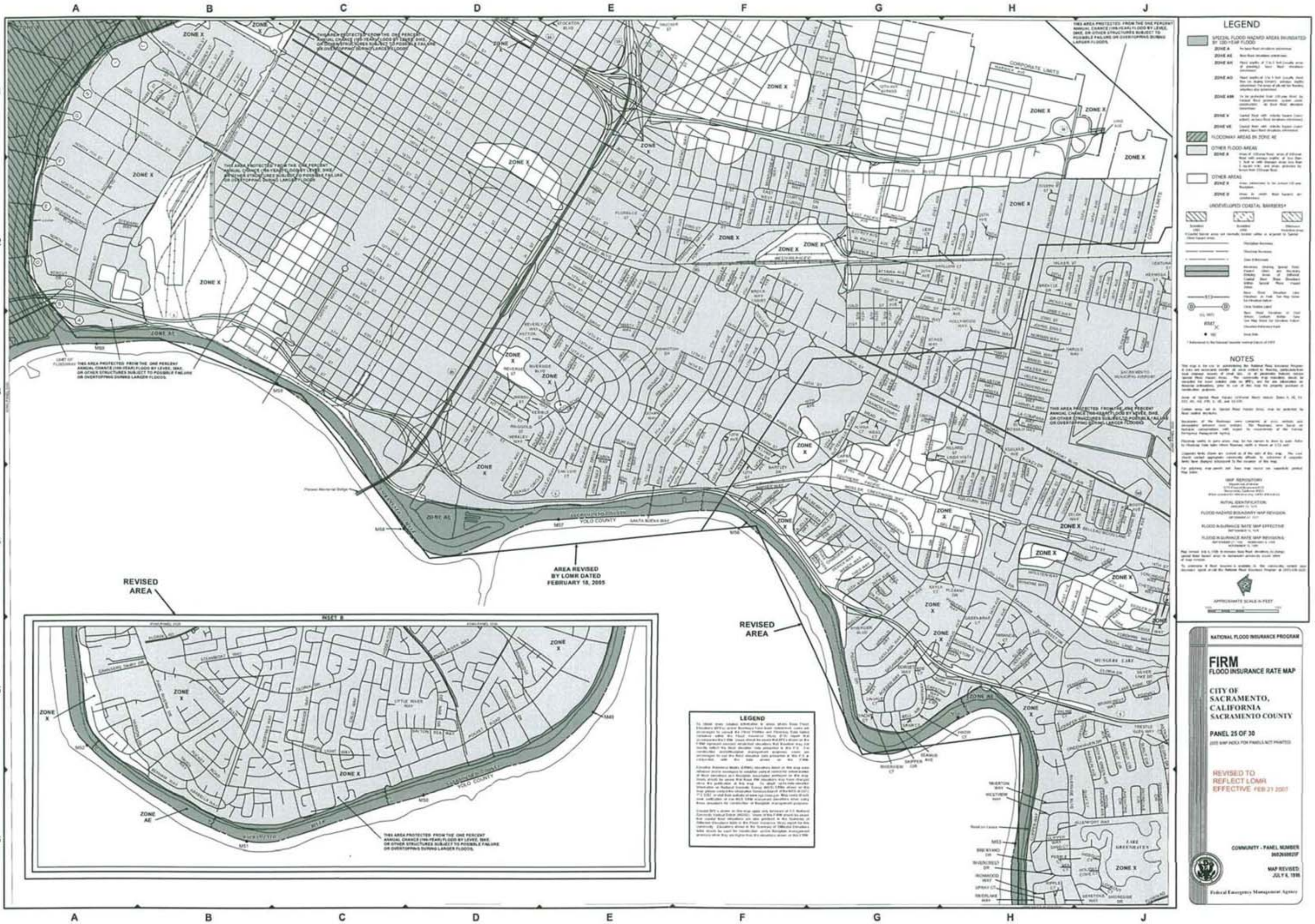
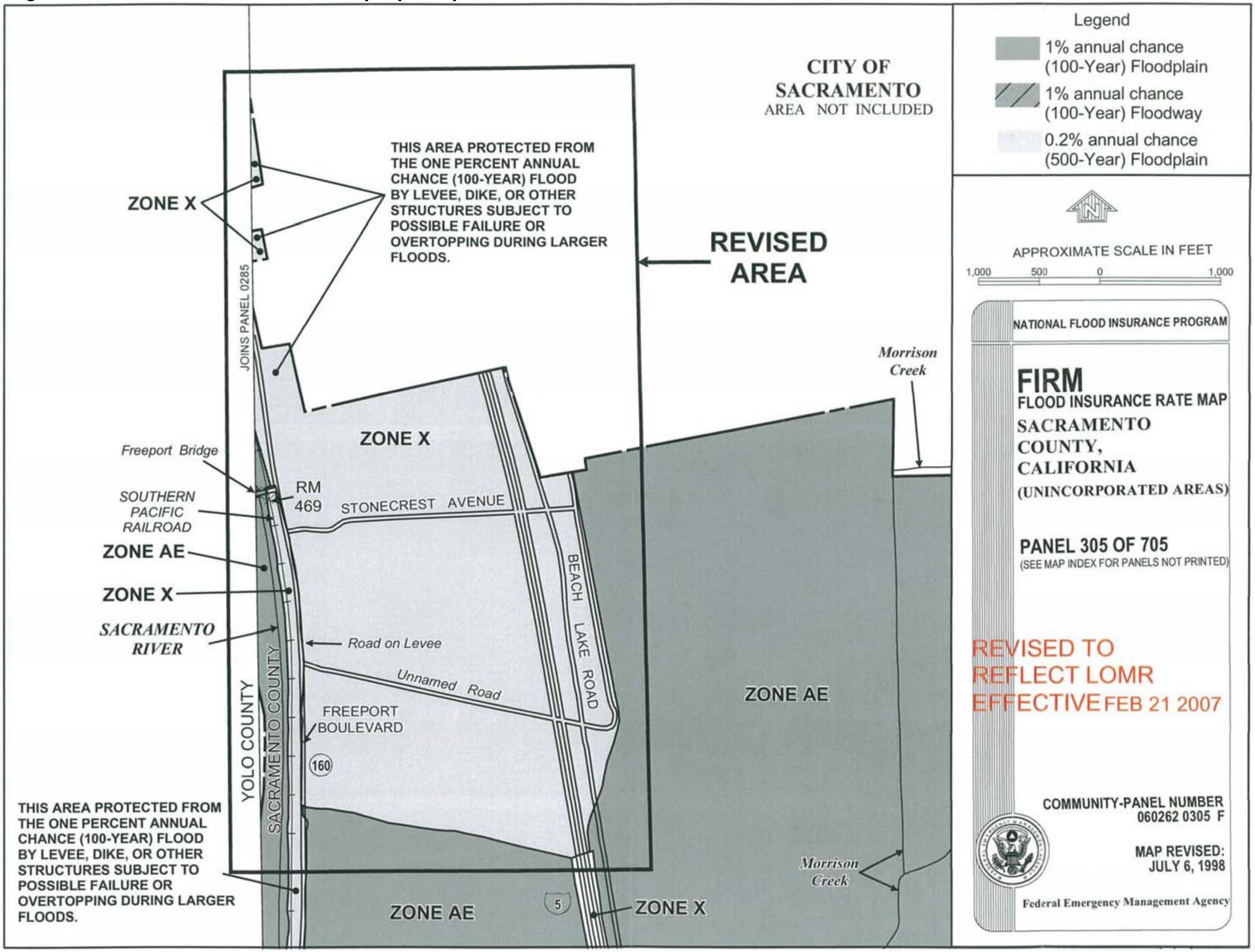


Figure 2-7.1B FEMA Flood Zone Maps (cont.).

Figure 2-7.1C FEMA Flood Zone Maps (cont.).



2.7.3.2 Floodplain Encroachment

Alternative 1

As previously noted, this alternative will encroach on the FEMA floodplain from 1.1 miles south of Elk Grove Blvd. to roughly 1000 ft south of the Beach Lake/Morrison Creek Bridge where the roadway rises above the BFE. As defined by FHWA, a floodplain encroachment is an action within the limits of the base floodplain. A transverse encroachment is one that is transverse or perpendicular to the direction of flow. This project will primarily be a transverse encroachment on the FEMA designated floodplain, which combines the Middle Reach Stone Lake, Stone Lake, South Reach Beach Lake, and the Beach Lake/Morrison Creek floodplains.

As defined by FHWA, a significant floodplain encroachment is a highway encroachment and any direct support of likely base floodplain development that would involve one or more of the following construction or flood-related impacts: (1) a significant potential for interruption or termination of a transportation facility that is needed for emergency vehicles or provides a community's only evacuation route; (2) a significant risk; or (3) a significant adverse impact on the natural and beneficial floodplain values.

This project will not result in a significant floodplain encroachment as defined by 23 CFR, Section 650.105(q): Significant encroachment means a highway encroachment and any direct support of likely base flood-plain development that would involve one or more of the following construction-or flood-related impacts:

(1) A significant potential for interruption or termination of a transportation facility which is needed for emergency vehicles or provides a community's only evacuation route.
(2) A significant risk, or
(3) A significant adverse impact on natural and beneficial flood-plain values.

Alternative 2

Alternative 2's impact on hydrology and floodplains are the same as for Alternative 1.

Alternative 3

Alternative 3 does not impact hydrology or floodplains.

Alternative 4

The No Build Alternative would not improve the roadway and would not result in any impacts on hydrology or floodplains.

2.7.4 Avoidance and Minimization Measures

- Thrie beam barrier will be constructed from the south levee to the north levee of the South Reach of Beach Lake.
- The existing roadway profile may be extended to the concrete median barrier. Transitions will be required on each side of the South Reach of Beach Lake to ensure that the existing roadway profile is not elevated in the metal beam guard rail (MBGR) section.

2.7.5 Mitigation Measures

No mitigation measures are required.

2.7.6 CEQA Considerations

The level of risk is expected to be minimal. Caltrans hydraulics staff have determined that less than significant impacts to hydrology and floodplains are anticipated.

2.8 Water Quality and Storm Water Runoff

2.8.1 Regulatory Setting

Several federal, state, and local agencies have jurisdiction over the project site. Important agencies and statutory authorities relevant to water quality as it relates to this project are outlined below.

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 unlawful unless the discharge is in compliance with a National Pollutant Discharge Elimination System (NPDES) permit. Known today as the Clean Water Act (CWA), Congress has amended it several times. In the 1987 amendments, Congress directed dischargers of storm water from municipal and industrial/construction point sources to be regulated under the NPDES program. Important CWA sections are:

- **Sections 303 and 304** provide for water quality standards, criteria, and guidelines.
- **Section 401** 401requires an applicant for a federal license or permit to conduct any activity, which 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. (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 (RWQCB) 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 United States. This permit program is administered by US Army Corps of Engineers (USACE).

As stated in Section 101(a) of the CWA, the objective of the CWA is "to restore and maintain the chemical, physical, and biological integrity of the Nation's waters."

USACE issues two types of 404 permits: Standard and General permits. There are two types of General permits, Regional permits and Nationwide permits. Regional permits are issued for a general category of activities when they are similar in nature and cause minimal environmental effect. Nationwide permits are issued to authorize a variety of minor project activities with no more than minimal effects.

There are two types of Standard permits: Individual permits and Letters of Permission. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of USACE's Standard permits. For Standard permits, the USACE decision to approve is based on compliance with U.S. Environmental Protection Agency's (USEPA) Section 404 (b)(1) Guidelines (USEPA CFR 40 Part 230), and whether permit approval is in the public interest. The Section 404(b)(1) Guidelines were developed by the USEPA in conjunction with 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 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. Per Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent standards, jeopardize the continued existence of listed species, violate marine sanctuary protections, or cause "significant degradation" to waters of the 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).

Porter-Cologne Water Quality Control Act (California Water Code)

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 in Water Code Section 13050(d). This definition is broader than the CWA definition of "pollutant". Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDR) and may be required even when the discharge is already permitted or exempt under the CWA.

On behalf of the US Environmental Protection Agency (USEPA), 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 regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan. States designate beneficial uses for all water body segments, and then set standards and prescribe necessary requirements to protect these uses. Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, each state identifies waters failing to meet standards for specific pollutants, which 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 controls, 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 State Water Resources Control Board (SWRCB) administers water rights, water pollution control, and water quality functions throughout the state, while the RWQCB is responsible for the protection of beneficial uses of water resources within its jurisdiction and uses planning, permitting and enforcement authorities to meet this responsibility.

National Pollution Discharge Elimination System (NPDES) Program

Municipal Separate Storm Sewer Systems

Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of storm water dischargers, including Municipal Separate Storm Sewer Systems (MS4s). The USEPA defines an MS4 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 are designed or used for collecting or conveying storm water. The SWRCB has identified Caltrans as an owner/operator of an MS4 by the SWRCB. This 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.

The Caltrans' MS4 Permit, under revision at the time of this update, contains three basic requirements:

1. Caltrans must comply with the requirements of the Construction General Permit (see below);

2. Caltrans must implement a year-round program in all parts of the State to effectively control storm water and non-storm water discharges related to its facilities and properties;

3. Caltrans' storm water discharges must meet water quality standards through implementation of permanent and temporary (construction) Best Management Practices (BMPs) and other measures.

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 approved SWMP to address storm water runoff.

Part of and appended to the SWMP is the Storm Water Data Report (SWDR) and its associated checklists. The SWDR documents the relevant storm water design decisions made regarding project compliance with the MS4 NPDES permit. The preliminary information in the SWDR prepared during the Project Initiation Document (PID) phase will be reviewed, updated, confirmed, and if required, revised in the SWDR prepared for the later phases of the project. The information contained in the SWDR may be used to make more informed decisions regarding the selection of BMPs and/or recommended avoidance, minimization, or mitigation measures to address water quality impacts.

Construction General Permit (CGP)

The Construction General Permit (Order No. 2009-009-DWQ), adopted on September 2, 2009, became effective on July 1, 2010. The permit regulates storm water discharges from construction sites which result in a Disturbed Soil Area (DSA) of one acre or greater, and/or 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 results in soil disturbance of at least one acre must comply with the provisions of the CGP. Construction activity that results in soil disturbances of less than one acre is subject to this CGP 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 in order to implement sediment, erosion, and pollution prevention control measures and to obtain coverage under the CGP.

The 2009 CGP 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 Storm Water Pollution Prevention Plan (SWPPP). In accordance with Caltrans' Standard Specifications, a Water Pollution Control Plan (WPCP) is necessary for projects with DSA less than one acre.

Section 401 Permitting

Under Section 401 of the Clean Water Act (CWA), any project requiring a federal license or permit that may result in a discharge to a water body must obtain clearance from the State, which certifies that the project will be in compliance with State water quality standards. The most common federal permit triggering 401 Certification is CWA Section 404 permits issued by the U.S. Army Corps of Engineers (USACE). The 401 permit certifications are obtained from the appropriate Regional Water Quality Control Board (RWQCB).

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 Waste Discharge Requirements (WDR) under the State Water Code 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 from a project.

Regional Water Quality Control Board (RWQCB) Basin Plans

Each RWQCB has adopted a Basin Plan containing the policies, prohibitions and requirements that apply to that region. Caltrans is subject to compliance with the Basin Plans in the region in which the Basin Plan is applicable. Stormwater discharges from Caltrans activities and facilities may not cause or contribute to exceedance of water quality standards.

This project falls under the jurisdiction of the Central Valley Regional Water Quality Control Board (CVRWQCB). Caltrans will file the Permit Registration Documents with RWQCB.

Local Agencies

This project falls within the City and County of Sacramento MS4 Phase 1 area. These local agencies have a National Pollutant Discharge Elimination System (NPDES) Municipal Stormwater Permit issued by the CVRWQB. The Municipal Stormwater Permit requires these agencies to reduce pollutants in storm water discharges to the maximum extent practicable. The agencies comply with this permit in part by developing and enforcing ordinances and requirements to reduce the discharge of sediments and other pollutants in runoff from newly developing and redeveloping areas of the county. The Stormwater Ordinance prohibits the discharge of unauthorized non-storm water to the agencies storm water conveyance system and local creeks. It applies to all private and public projects within their jurisdiction, regardless of size or land use type.

Caltrans General Guidelines:

Caltrans standard practices and guidelines for new projects require the incorporation of storm water quality controls into project plans and specifications that will protect the beneficial uses of waters that may be impacted by project construction and highway usage. All construction contractors are required to implement standard procedures and practices that are intended to reduce impacts to water quality due to roadway-related construction. These procedures and practices are included in the construction contract documents through reference to Caltrans Standard Specifications 7-1.01G, and inclusion of measures identified in the Caltrans Special Provisions for water pollution control 7-345 (SWPPP) or 7-340 (WPCP). Additional procedures and practices are contained in the Highway Design Manual, Project Planning & Design Guide (PPDG) and Caltrans Storm Water Quality Manuals and Handbooks.

The PPDG provides the overall process for selecting and designing BMPs within the Caltrans planning and design processes and incorporating those BMPs into the appropriate documents. The menu of BMPs includes permanent and temporary BMPs that have been approved for statewide application. The BMPs fall into four categories:

- **Design Pollution Prevention BMPs:** Design Pollution Prevention BMPs are permanent measures to reduce pollution discharges after construction is completed and are incorporated as appropriate. The menu includes consideration of downstream effects related to potentially increased flow, preservation of existing vegetation, concentrated flow conveyance systems and slope/surface protection systems.
- **Treatment BMPs:** Treatment BMPs are permanent treatment devices and facilities. Approved devices include biofiltration systems, infiltration devices, detention devices, traction sand traps, dry weather flow diversion, gross solids removal devices, media filters, multi-chamber treatment train and wet basins.
- **Construction BMPs**: Construction BMPs are temporary measures that are deployed during construction activities to reduce pollutants in storm water discharge. Approved categories include temporary soil stabilization, temporary sediment control, wind erosion control, tracking control, non-storm water management, waste management and materials pollution control. The guidance material for construction include: The Construction Site BMP Manual, SWPPP Example Plans, and the SWPPP Preparation Manual.
- **Maintenance BMPs:** Maintenance BMPs are water quality controls used to reduce pollutant discharges during highway maintenance activities and activities conducted at

maintenance facilities. Stenciling messages at storm drain inlets is required for highway facilities that allow for public access to educate the public about stormwater runoff pollution.

The project construction phase includes building the project in accordance with the Permits, Special Provisions, Plans, and Specifications. The Caltrans Standard Specifications and Standard Special Provisions require contractors to conduct work in a manner that protects receiving waters from pollution. This includes preparation and effectively managing a water pollution control program during project construction. For this proposed project, the applicable plan is referred to as a Storm Water Pollution Prevention Plan (SWPPP), which the contractor is required to prepare as described in the Construction Contractor's Guide and Specifications. A template document of a SWPPP has been developed by Caltrans, so the contractor knows the level of work expected, and includes sampling and inspection requirements to assure protection of beneficial uses. Minimum BMPs in the SWPPP include: scheduling, preservation of vegetation, hydraulic mulch, hydroseeding, soil binders, straw mulch, geotextiles, plastic covers, erosion control blankets, silt fence, street sweeping and vacuuming, storm drain inlet protection, wind erosion control, vehicle and equipment cleaning control, vehicle and equipment fueling, vehicle and equipment maintenance controls. The SWPPP preparation manual contains additional BMPs that are deployed as appropriate for site conditions. Implementation of these standard procedures and practices will substantially reduce or eliminate most of the potential impacts that could otherwise be associated with project construction.

2.8.2 Affected Environment

Caltrans completed a water quality study in October 2007 and a Storm Water Data Report in June 2008. The water quality study was updated in January 2011. Copies of these reports are available on the project website at www.dot.ca.gov/dist3/Projects/00165/prjindex.htm.

2.8.2.1 Climate, Topography, and Soils

The climate in the project vicinity is characterized as Mediterranean mild with temperatures ranging from lows in the upper 30s in January and highs in the low 90s in July. The average precipitation ranges from 0.04 inches in July to 3.74 inches in January. The average annual precipitation for this area is approximately 17 inches. Rainfall intensities based on the Sacramento City Rain Gauge are 0.73 inches/hour for a 10-year return and 1.03 inches/hour for a 100-year return period. The rainy season has been defined as October 15 to April 15.

Soils in the project area consist primarily of Type D soils (clay loam, silty clay loam, sandy clay, silty clay, or clay) with a few areas of Type C clay soils (sandy clay loam). There will be fill slopes associated with the construction of this project, which will be constructed as flat as possible, not to exceed a 1:4 ratio. According to the log of test borings, the groundwater levels range from 6.0 feet to 32.5 feet below original grade. Over 85 percent of the highway along this corridor is on either cut or fill soils.

The southern half of the project corridor consists predominately of open space and agricultural land with a limited number of newer residential developments. The project area becomes more urban in the northern section of the corridor, which extends into metropolitan Sacramento. The elevation of the project area is approximately 10 ft above mean sea level and the terrain is generally flat with intermittent vistas made available by increased elevations at bridges.

2.8.2.2 Surface Water

The Project lies within the Valley American and Sacramento Delta Hydrologic Units, Hydrologic Sub-Areas (HSA) 510.00 and 519.11 (see Table 2-8.1). Both HSAs have 303(d) listed water bodies, which are listed below. Morrison Creek Sacramento River (Lower, Knights Landing to the Delta) and Delta Waterways (Northern Portion), which have USEPA approved TMDLs established.

<u>HSA 519.11</u>
Morrison Creek is impaired for Diazinon, Pentachlorophenol, Pyrethroids, and Sediment Toxicity.

<u>HSA 510.00</u>
Sacramento River, Lower (Knights Landing to the Delta) is impaired for Chlordane, DDT, Diazinon, Dieldrin, Diuron, PCBs, Mercury and Unknown Toxicity.

Delta Waterways (Northern Portion) is impaired for Chlordane, Chlorpyrifos, DDT, Diazinon, Dieldrin, Invasive Species, Group A Pesticides, Mercury, PCBs and Unknown Toxicity.

None of the above listed constituents are a Caltrans targeted design constituent; therefore, General Purpose Treatment BMPs should be considered for this project. Caltrans is not a stakeholder for the aforementioned TMDLs since Chlorpyrifos and Diazinon are directed toward agricultural resources. The project would have potential temporary/permanent impacts to the central portion of the Delta Waterways during construction phase; therefore, the project must include an effective combination of erosion, sediment and other pollution control BMPs.

Table 2-8.1. Hydrologic Information

County	Route	Post Miles	RWQCB	Hydrologic Sub Area	Hydrologic Area	Elevation (feet)	Average Annual Precipitation (inches)	Rainfall Intensity (inches/hour)all
SAC	5	9.7 to 11.018	Central Valley	519.11	Valley American			
SAC	5	11.018 to 18.018	Central Valley	510.00	Sacramento Delta	~10	16.6 –17.7	0.16
SAC	5	18.018 to 22.5	Central Valley	519.11	Valley American			

2.8.3 Environmental Consequences

Alternative 1

Alternative 1 (Bus/Carpool Lane Alternative) runoff is conveyed through a series of drainage channels, where the majority of the runoff is eliminated through infiltration. A small portion of the flow is directed to the City of Sacramento's Sump 90, located west of Interstate 5 and Morrison Creek, where it is pumped through the levee and into the Sacramento River.

Based on the highway storm water runoff data collected by the Caltrans Storm Water Research and Monitoring Program, pollutants that are expected to be found in runoff from Alternative 1 include conventional constituents, hydrocarbons, metals, microbial agents, nutrients, volatile and semi-volatile organics, pesticides, and herbicides. Pollutants are usually deposited on the roadway as a result of fuel combustion processes, lubrication system losses, tire and brake wear, transportation load losses, paint from infrastructure, and atmospheric fallout. Sources of specific pollutants are outlined in the following Table 2-8.2.

Table 2-8.2. Highway Runoff Constituents and their Primary Sources

CONSTITUENTS	PRIMARY SOURCES
Particulates	Pavement wear, vehicles, atmosphere, maintenance activities
Nitrogen, Phosphorus	Atmosphere, roadside fertilizer application
Lead	Auto exhaust, tire wear
Zinc	Tire wear, motor oil, grease
Iron	Auto body rust, steel highway structures, moving engine parts
Copper	Metal plating, bearing and bushing wear, moving engine parts, brake

	lining wear, fungicide and insecticide application
Cadmium	Tire wear, insecticide application
Chromium	Metal plating, moving engine parts, brake lining wear
Nickel	Diesel fuel and gasoline, lubricating oil, metal plating, bushing wear, brake lining wear, asphalt paving
Manganese	Moving engine parts
Sulphate	Roadway bed, fuel
Petroleum	Spills, leaks or blow-by of motor lubricants, antifreeze and hydraulic fluids, asphalt leachate
PCBs	Atmospheric deposition

Potential for Creation of Substantial Additional Sources of Polluted Runoff

There is a direct and positive relationship between vehicular activities and the concentration of these pollutants in the storm water runoff. Alternative 1 will increase freeway capacity and the traffic volume in the project area; however, the impact of additional aerially deposited particles on the receiving water quality is not expected to be substantial. By implementation of permanent storm water treatment measures, Alternative 1 will not result in the creation of a substantial source of additional polluted runoff but rather improve storm water quality.

Potential Impact on Water Quality Standards

Alternative 1 proposes to add 38 acres of impervious surface, which is an increase of approximately 15 percent from existing impervious conditions. The increased volume of storm water runoff from the added impervious surface to the entire HSA is very small. Therefore, the pollutant loads Alternative 1's traveled way will be negligible and will not have a substantial impact on the overall water quality of the receiving waters. Treatment control measures will be incorporated to slow down runoff and allow sediments and pollutants to settle out prior to discharge to receiving waters.

Sediment is the main pollutant of concern during Caltrans' construction projects. Highway runoff quality is influenced by several factors, including land use, rainfall, antecedent conditions, soil type, and atmospheric deposition. Along I-5, storm water is anticipated to contain most of the conventional pollutants that have been found at other Caltrans sites with similar usage. The highway storm water discharges can contribute to degradation of beneficial uses if BMPs are not included in the design.

Approximately 25 acres of impervious surface will be added to the Franklin Hydrologic Sub-Area (HSA N0. 519.11) of Morrison Creek Hydrologic Area of the Valley-American Hydrologic Unit. However, less than 1.0 acre will be added to the HSA in the immediate vicinity of Morrison Creek due to widening activities at the Beach Lake Bridge No. 24-

0262. There will be limited paving of the slopes that will be required at the abutments where bridge widening is necessary.

Storm water from the project limits discharges indirectly overland to the lower segment of Morrison Creek, and the Sacramento River (northern portion of the Delta Waterways). There are no beneficial uses named in the Central Valley Basin Plan for Morrison Creek. Per Jacque Kelley of the CVRWQCB, the Sacramento River (I-Street Bridge and Delta) is defined in the Basin Plan as the Sacramento San Joaquin Delta which is named for MUN (Municipal and Domestic Supply), AGR (Agricultural Supply), PRO (Industrial Process Supply), IND (Industrial Service Supply), POW (Hydropower Generation), REC-1 (Water Contact Recreation), REC-2 (Non-contact Water Recreation), FRESH (Freshwater Replenishment) (WARM), FRESH (COLD), MIGR (Mitigation of Aquatic Organisms) (WARM), MIGR (COLD), SPAWN (Spawning, Reproduction and Development) (WARM), WILD (Wildlife Habitat), and NAV (Navigation) beneficial uses.

Groundwater

Groundwater elevation from nearby wells varied depending on proximity to receiving water and was found to be approximately 7 feet above mean sea level. Groundwater toxicity is discussed in the Hazardous Waste report. Groundwater recharge is not expected to change as a result Alternative 1. Any necessary dewatering activities will comply with the Caltrans NPDES permit or separate dewatering permit with the CVRWQB.

Potential for Substantial Downstream Erosion or Siltation

Alternative 1 is not expected to cause substantial downstream erosion or siltation. However, the practices outlined in the SWMP and Statewide Storm Water Practice Guidelines ensure that certain minimum design elements be incorporated into projects to maintain or improve water quality. The key elements are as follows:

- Prevent Downstream Erosion – Design of drainage facilities to avoid causing or contributing to downstream erosion. Drainage outfalls, when appropriate, will discharge to suitable control measures.
- Stabilize Disturbed Soil Areas – Design would incorporate stabilization of disturbed areas (when appropriate) with seeding, vegetative or other types of cover.
- Maximize Existing Vegetative Surfaces – Design would limit footprints of cuts and fills to minimize removal of existing vegetation.

Downstream Effects Related to Potentially Increased Flow

Alternative 1 may increase the velocity and volume of flow within the project limits. The proposed addition of median lanes does not change the overall drainage pattern but increases the impervious areas. The effects of the increased impervious area will need to be evaluated during the final design of this project to determine what pollution prevention and/or velocity and volume measures should be in place to offset the increased runoff.

The potential downstream impacts include an increase in velocity of storm water runoff and an increase in the volume of storm water flow. These impacts will be minimized by incorporating design, treatment and temporary construction best management practices (BMPs) into the project. BMPs that have been proven to be effective include;

- Slope/Surface Protection Systems.
- Concentrated Flow Conveyance Systems,
- Preservation of existing vegetation,
- Utilization of Biofiltration Strips,
- Utilization of Biofiltration Swalesand
- Temporary Construction Site BMPs

These BMPs will be utilized for the project.

<u>Slope/Surface Protection Systems</u>
Slopes will be disturbed at the abutments of the structures where widening is necessary, and these slopes will exceed 1:4 ratio. Slope paving may be required in these areas. Slope paving under crossings significantly reduces sediment loading, but increase the volume velocity control. Outlet controls should be considered when applying slope paving. Minimizing vegetated slope steepness will increase infiltration and decrease the velocity to maximize vegetation pollutant removal.

<u>Concentrated Flow Conveyance Systems</u>
The runoff in the median area is collected in drain inlets and conveyed through culverts to the outside drainage ditches and channels. Most of these drain inlets and culverts will be plugged and abandoned due to the median paving, and the runoff will then sheet flow to the outside shoulder and into the roadside ditches and canals. Flared end sections and energy dissipaters will be installed where feasible. Locations will be determined during final design of the project.

Preservation of Existing Vegetation

Existing vegetation will be preserved to the maximum extent practicable. Alternative 1 will involve clearing and grubbing of approximately 57 acres, of which 38 acres will be paved. Much of the remaining cleared areas will be re-vegetated to the extent possible. Vegetation will be used as part of biofiltration strips.

Proposed Permanent Treatment BMPs to be used on the Project

Alternative 1 is required to consider treatment BMPs in accordance with the Project Planning and Design Guide. Due to the right-of-way limitations and the fully developed nature of the surrounding land use, treatment opportunities are limited, as some of the existing runoff is captured in a storm drain system. While all potentially feasible BMPs will be further evaluated during the project design phase, the primary Treatment BMP strategy is to deploy biofiltration where feasible on this project.

Alternative 1 would therefore not create a substantial increase in downstream erosion or siltation.

Alternative 2

Alternative 2 (Mixed Flow) footprint and features are the same as Alternative 1. Its potential impacts to water quality will be the same as well. Please refer to the impact discussion under Alternative 1.

Alternative 3

Alternative 3 (Mixed Flow to Bus/Carpool Conversion) includes the Traffic Operations System (TOS) improvements of Alternative 1 (closed circuit television, highway advisory radio, changeable message sign, ramp metering) and the replaced Casilada POC, but not roadway widening, bridge and drainage improvements, or utility relocations. As a result, impacts to water quality would be substantially less.

Alternative 3 would incorporate all applicable BMPs and would therefore not create a significant increase in downstream erosion or siltation.

Alternative 4

The No Build Alternative would not change the current freeway and would have no permanent impacts on water quality or storm water runoff.

2.8.4 Avoidance and Minimization Measures

Adherence to the following is recommended to prevent receiving water pollution as a result of construction activities and/or operation of the I-5 HOV project.

1. The project shall adhere to the conditions of the Caltrans Statewide NPDES Permit CAS # 000003, (Order # 2012-0011-DWQ), issued by the State Water Resources Control Board on July 1, 2013. The Statewide Construction General Permit (Order No. 2009-009-DWQ) is also required.

2. The disturbed soil area (DSA) is approximately 93 acres and it is anticipated that a Storm Water Pollution Prevention Plan (SWPPP) level of temporary pollution controls will be specified for the project; (Standard Special Provision 07-345) therefore shall be included in the PS&E to address these temporary construction water pollution control measures. These measures must address soil stabilization practices, sediment control practices, tracking control practices, and wind erosion control practices. In addition, the project plan must include non-storm water controls, waste management and material pollution controls.

3. As directed by Caltrans' Storm Water Management Plan (SWMP) and the Project Planning and Design Guide (PPDG), an evaluation of the project using the most recent approved evaluation guide is essential in determining if the incorporation of permanent storm water runoff treatment measures are required for this project.

4. Since there are no Caltrans targeted design constituents, the treatment BMPs should be designed for general-purpose pollutant removal. Currently, Infiltration Devices, Biofiltration Strips, Wet Basins, Biofiltration swales, Austin Sand Filters, Detention Devices, Delaware Filters, and Multi-Chamber Treatment Trains are treatment measures that are approved for general purpose.

5. Special care is required when handling and storing contaminated soil, including soil contaminated with aerially deposited lead (ADL). The quantity of the contaminated soil, its level of contamination, where it will be stored, and when this activity will take place (winter/summer season) are all storm water pollution concerns and should be described in detail in the appropriate Special Provision section of the contract. These issues should also be addressed in the SWPPP. Section H.9 of the Caltrans Statewide NPDES Permit requires notification of the appropriate Regional Water Quality Control Board (RWQCB) if the project involves reuse of ADL

contaminated soil 30 days prior to advertisement for bids. This is to allow the RWQCB to determine any need for the development of Waste Discharge Requirements.

6. Disposal of Portland concrete cement grooving or grinding residues shall be in accordance with all federal, state and local laws and regulations. Handling and storage requirements should be described in the Special Provisions and procedures should be addressed in the SWPPP.

7. A separate WDR from CVRWQCB will be required for the operations of a concrete batch plant. Contractor batch plants located outside the right-of-way (ROW) shall obtain coverage under the Statewide General Permit for Stormwater Discharges Associated with Industrial Activities (Order No. 97-03-DWQ)

8. Section 401 of the Clean Water Act requires any project that may result in a discharge to waters of the United States to obtain certification from the state that the discharge will comply with other provisions of the Act. This project may require a 401 permit from the CVRWQCB.

9. This project may result in storm water discharges to storm water drainage systems owned and operated by local MS4 permit holders. As required by the 1999 Caltrans MS4 NPDES permit, Section G.1.a., compliance with local MS4 permits is expected and therefore coordination is required.

10. Standard Special Provision 07-346 (Construction Site Management) will be considered during PS&E to control potential sources of water pollution before it encounters any storm water system or watercourse. It requires the Contractor to control material pollution, manage waste and non-storm water at the construction site. The Contractor-prepared SWPPP must incorporate appropriate Temporary Construction Site BMPs to implement effective handling, storage, use and disposal practices during construction activities.

11. Caltrans will submit the Permit Registration Documents with RWQCB.

12. Upon completion of the project, submittal of a Notice of Construction Completion (NOCC) to the CVRWQCB is required to indicate that project construction is completed and the SWPPP is no longer in effect.

2.8.5 Mitigation Measures

No mitigation is required.

2.8.6 CEQA Considerations

Less than significant impacts to water quality and stormwater runoff are anticipated.

2.9 Geology/Soils/Site Seismicity/Topography

2.9.1 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. The current policy is to use the anticipated Maximum Credible Earthquake (MCE), from young faults in and near California. The MCE is defined as the largest earthquake that can be expected to occur on a fault over a particular period of time.

2.9.2 Affected Environment

2.9.2.1 Geology

The proposed project is located in the Sacramento Valley, which together with the San Joaquin Valley, comprise the Great Valley of California. The Great Valley is composed of thousands of feet of sedimentary deposits that have undergone periods of subsidence and uplift over millions of years. During the Jurassic and Cretaceous periods of the Mesozoic era, the Great Valley existed in the form of an ancient ocean. By the end of the Mesozoic era, the northern portion of the Great Valley began to fill with sediment as tectonic forces caused uplift of the basin. By the time of the Miocene epoch, approximately 24 million years ago, sediments deposited in the Sacramento Valley were mostly of terrestrial origin. Most of the surface of the Great Valley is covered with Recent (Holocene, i.e., 10,000 years Before Present [B.P.] to present day) and Pleistocene (i.e., 10,000–1,800,000 years B.P.) alluvium.

Geologic mapping by Helley and Hardwood (1985) shows the northern portion of the project alignment situated on sedimentary deposits of Holocene age, including undivided alluvium and "basin deposits." Helley and Harwood describe the alluvium as unweathered gravel, sand, and silt. The finer-grained deposits consist of silt and clay.

The southern portion of the alignment is situated on strata assigned to the Riverbank Formation of the Pleistocene age. The Riverbank Formation consists of weathered reddish gravels, sand, silt, and clay and ranges from less than 1 foot to over 200 feet thick depending on location.

The Pleistocene Modesto Formation may also be present in the subsurface along the project alignment. Although it is not shown on the geologic map by Helley and Harwood (1985), the Modesto Formation overlies the Riverbank Formation regionally in the Sacramento Valley (Blake et. al, 1999).

2.9.2.2 Soils

The Natural Resources Conservation Service (previously known as the Soil Conservation Service) has prepared detailed mapping of the soils in the project area. The following soils are located within the project area (further information regarding the characteristics of each soil type can be found in the Natural Environment Study prepared for the proposed project):

- Clear Lake Clay, Partially Drained, 0 to 2 Percent Slopes, Frequently Flooded
- Clear Lake Clay, Hardpan Substratum, Drained, 0 to 1 Percent Slopes
- Dierssen Sandy Clay Loam, Drained, 0 to 2 Percent Slopes
- Dierssen Clay Loam, Deep, Drained, 0 to 2 Percent Slopes
- Durixeralfs-Galt Complex, 0 to 2 Percent Slopes
- Egbert Clay, Partially Drained, 0 to 2 Percent Slopes
- Egbert Clay, Partially Drained, 0 to 2 Percent Slopes, Frequently Flooded
- Egbert-Urban Land Complex, Partially Drained, 0 to 2 Percent Slopes
- Galt Clay, 0 to 2 Percent Slopes
- Lang-Urban Land Complex, Drained, 0-2 Percent Slopes
- Laugenour-Urban Land Complex, Partially Drained, 0 to 2 Percent Slopes
- Sailboat-Urban Land Complex, Partially Drained, 0 to 2 Percent Slopes
- San Joaquin Silt Loam, 0 to 3 Percent Slopes
- Valpac Loam, Partially Drained, 0 to 2 Percent Slopes
- Valpac-Urban Land Complex, Partially Drained, 0 to 2 Percent Slopes
- Xerarents-San Joaquin Complex, 0 to 1 Percent Slopes

2.9.2.3 Site Seismicity

Surface Fault Rupture

A fault is a fracture in the crust of the earth along which rocks on one side have moved relative to those on the other side. Most faults are the result of repeated displacements over a long period of time. A fault trace is the line on the earth's surface defining the fault. Surface rupture occurs when movement on a fault deep within the earth breaks through to the surface. Fault rupture almost always follows preexisting faults, which are zones of weakness. Rupture may occur suddenly during an earthquake or slowly in the form of fault creep. According to the California Department of Conservation, there are no mapped Earthquake Fault Zones within Sacramento County (California Geological Survey, 1999). Although no known faults cross the project area, there are several faults within 60 miles of Sacramento that are believed to be capable of producing large earthquakes including the Calaveras Fault, Hayward Fault, Greenville Fault, Concord-Green Valley Fault and the Foothills Fault System. According to the geotechnical report prepared for the I-5/Cosumnes River Blvd. Interchange Project, the controlling seismic consideration for project design purposes would likely be the Coastal Ranges-Sierran Block Boundary Seismic Zone, which is mapped along the west side of the Central Valley (a copy of this report is available at www.cityofsacramento.org/transportation/dot_media/crb_media/PDF_files/15_appA.pdf). Although no faults are visible at the surface, this area is believed to be a tectonic boundary between the Coast Range province and the Sierran Block. This boundary zone was the probable source of the two 1892 Winters earthquakes (estimated magnitudes of between Richter Scale 6.2 and 6.6) and the 1983 Coalinga earthquake (magnitude of Richter scale 6.4).

Ground Shaking

As noted above, a number of earthquake faults in the region are capable of causing ground shaking within the project area. The Coastal Ranges-Sierran Block Boundary Seismic Zone has an estimated maximum magnitude of Richter Scale 7.0. The estimated resulting peak horizontal bedrock acceleration for the project area is approximately 0.2 g (where 1.0 g is equal to the force of gravity), based on the Caltrans 1996 California Seismic Hazard Map.

Liquefaction and Lateral Spreading

Liquefaction is a loss of soil strength and stiffness that can occur during an earthquake. Earthquake waves cause water pressures to increase in the sediment and the sand grains to lose contact with each other, leading the sediment to lose strength and behave like a liquid. The soil can lose its ability to support structures, flow down even very gentle slopes, and erupt to the ground surface to form sand boils. Settlement of the ground surface as a result of liquefaction can cause damage to buildings, roads and pipelines. Three factors are required for liquefaction to occur—loose granular sediment, saturation of the sediment by ground water, and strong ground shaking.

2.9.2.4 Other Geological Considerations

Subsidence

Land subsidence is the downward shifting of the earth's surface, which can result from both natural and human-made phenomena, including earthquake-induced liquefaction, soil consolidation, and groundwater extraction (e.g., lowering the groundwater table). Within wetland areas, the majority of the underlying soils are expected to consist of soft or loose silts and sands with some clay, which may be subject to subsidence. Measures to minimize subsidence may be needed in these areas and would be determined by subsurface investigation.

Expansive Soils

Soils that expand and shrink due to wetting and drying are considered to be expansive soils. The seasonal expansion and shrinking of these soils can result in ground movements that can damage roadways and structures that are not appropriately designed.

2.9.3 Environmental Consequences

Alternative 1

During construction, increased erosion of exposed soils could occur. In addition, the proposed construction may temporarily result in changes to the surface soil moisture content, which could result in temporary shrink or swell behavior of the soil.

Fault Rupture

Although no known faults cross the project area, there are several faults within 60 miles of Sacramento that are believed to be capable of producing large earthquakes. However, because of the nature of the project (road surface construction) and the infrequencies of earthquakes in the area, the construction of Alternative 1 is not expected to expose people or structures to substantial adverse effects resulting from surface fault rupture hazards.

Ground Shaking

The construction of Alternative 1 is not expected to expose people or structures to substantial adverse effects resulting from ground shaking hazards (see above).

Liquefaction and Lateral Spreading

Because of the lack of at least several of the three factors required for liquefaction to occur—loose granular sediment, saturation of the sediment by ground water, and strong ground shaking—the construction of Alternative 1 is not expected to expose people or structures to substantial adverse effects resulting from liquefaction or lateral spreading.

Subsidence

The introduction of loads either during the construction phase or directly from the reconstruction of the road could cause minimal consolidation of the surface soils; however, this is not expected to expose people or structures to substantial adverse effects.

Expansive Soils

Soils with high shrink-swell potential may be found within the project area. Construction of the roadway on expansive soils could result in later damage to the roadway due to the expansion and shrinking action that can result in differential ground movements; however, this is not expected to expose people or structures to substantial adverse effects.

Alternative 2

Alternative 2 footprint and features are the same as Alternative 1. Its potential impacts to geology/soils/seismicity/topography will be the same as well. Please refer to the impact discussion under Alternative 1.

Alternative 3

Alternative 3 includes the Traffic Operations System (TOS) improvements of Alternative 1 (closed circuit television, highway advisory radio, changeable message sign, ramp metering) and the replaced Casilada POC, but not roadway widening, bridge and drainage improvements, or utility relocations. As a result, impacts to geology/soils/seismicity/topography are not anticipated.

Alternative 4

The No Build Alternative would not modify I-5; therefore, no geological impacts would occur.

2.9.4 Avoidance and Minimization Measures

In order to avoid or minimize geological risks and impacts, the design and construction of the project will adhere to state codes and criteria. The engineering design for the proposed project will be carried out in accordance with Caltrans' Seismic Design Criteria.

Roadways and bridges will be designed and constructed to the seismic design requirements for ground shaking specified in the Uniform Building Code for Seismic Zone 3.

To satisfy the provisions of the California Building Code, the proposed facilities will be designed to withstand ground motions equating to approximately a 500-year return period (10 percent probability of exceedance in 50 years). Bridges will be designed in accordance with the latest Caltrans Seismic Design Criteria.

Additionally, the following geological hazard avoidance and minimization measures will be included in the design and construction of the proposed build alternative. A geologic and geotechnical investigation of the alignment of the build alternative and laboratory testing of the earth materials will be conducted during the final design phase.

- Site-specific exploratory borings and laboratory testing during final design of any bridge structures will be conducted to delineate any potentially liquefiable materials. Potentially liquefiable materials will either be removed or engineered to reduce their liquefaction potential, or the engineering design will incorporate deep foundations that extend beyond soils with the potential for liquefaction.
- Potential surface deformation resulting from subsidence could be minimized by periodic repair to the road surface, curbs, and other engineered facilities.
- Site-specific borings and testing will include identification of soils with high shrink-swell potential that could damage the roadway over time. Expansive soils will be over-excavated and replaced with non-expansive fill or treated with appropriate soil amendments to reduce the potential for shrinking and swelling.
- Soil and slope stability measures will prevent or reduce erosion. Erosion of soils during construction will be minimized using temporary hydroseeding to provide a vegetation cover with straw bales, plastic sheeting slope cover, and other temporary drainage measures to prevent excessive slope runoff, as needed.

2.9.5 Mitigation Measures

No mitigation is required.

2.9.6 CEQA Considerations

Less than significant impacts to geology/soils/site seismicity/topology are anticipated.

2.10 Paleontology

2.10.1 Regulatory Setting

Paleontology is the study of life in past geologic time based on fossil plants and animals. A number of federal statutes specifically address paleontological resources, their treatment, and funding for mitigation as a part of federally authorized or funded projects (e.g., Antiquities Act of 1906 [16 USC 431-433], Federal-Aid Highway Act of 1960 [23 USC

305]), and the Omnibus Public Land Management Act of 2009 [16 USC 470aaa]). Under California law, paleontological resources are protected by the California Environmental Quality Act (CEQA).

2.10.2 Overview

In September 2008, a Paleontological Identification Report was prepared for the proposed project. This report identified the potential for paleontological resources to exist within the project area and, subsequently, a Paleontological Evaluation Report and Preliminary Paleontological Mitigation Plan were prepared in January 2009.

2.10.3 Paleontological Sensitivity

Generally, scientifically important paleontological resources are identified sites or geologic deposits containing individual fossils or assemblages of fossils that are unique or unusual, diagnostically or stratigraphically important, and add to the existing body of knowledge in specific areas, stratigraphically, taxonomically, or regionally (Reynolds 1990:6). Particularly important are fossils found *in situ* (undisturbed) in primary context (i.e., fossils that have not been subjected to disturbance subsequent to their burial and fossilization). As such, they aid in stratigraphic correlation, particularly those that can provide data for the interpretation of tectonic events, geomorphological evolution, paleoclimatology, the relationships between aquatic and terrestrial species, and evolution in general. Discovery of *in situ* fossil bearing deposits is rare for many species, especially vertebrates. Terrestrial vertebrate fossils are often assigned greater importance than other fossils because they are rarer than other types of fossils. This is primarily due to the fact that the best conditions for fossil preservation include little or no disturbance after death and quick burial in oxygen depleted, fine-grained, sediments. While these conditions are common in marine settings, they are relatively rare in terrestrial settings where these conditions would only occur following volcanic flows or flashflood events.

Particular rock units can be assigned levels of “sensitivity” or “potential” based on the research potential of fossils suspected to occur in that unit. In most cases, decisions about how to best manage paleontological resources must be based on these categories of sensitivity or potential, because the presence or absence of paleontological resources cannot be known until construction excavation for the project is underway. Caltrans uses the following 3-part scale:

- High Potential: Rock units which, based on previous studies, contain or are likely to contain important vertebrate, invertebrate, or plant fossils. These units include, but are not limited to, sedimentary formations that contain important nonrenewable paleontological resources anywhere within their geographical extent, and sedimentary rock units sufficiently old or physically suited for the preservation of fossils. These units may also include some volcanic and low-grade metamorphic rock units. Fossil containing deposits with very limited geographic extent or an uncommon origin (e.g., tar pits and caves) are given special consideration and ranked as highly sensitive. High sensitivity includes the potential for containing: 1) abundant vertebrate fossils; 2) a few important fossils (large or small vertebrate, invertebrate, or plant fossils) that may provide new and important scientific information; 3) areas that may contain datable organic remains, for example, packrat middens or dens, which may contain fossilized plants, pollen, and animal bones; or 4) areas that may contain unique new vertebrate deposits, traces, and/or trackways.

- Low Potential: This category includes sedimentary rock units that: 1) are potentially fossiliferous, but have not yielded important fossils in the past; 2) have not yet yielded fossils, but possess a potential for containing fossil remains; or 3) contain common and/or widespread invertebrate fossils if the taxonomy, phylogeny (the evolutionary history of a species), and ecology of the species contained in the rock are well understood. Sedimentary rocks expected to contain vertebrate fossils are not placed in this category because vertebrates are generally rare and found in more localized stratum.
- No Potential: Rock units of extrusive and intrusive igneous origin (formed in magma underground) and moderately to highly metamorphosed rocks are classified as having no potential for containing important paleontological resources.

2.10.4 Affected Environment

2.10.4.1 Geographic Location and Setting

The proposed project is located in the Sacramento Valley, which together with the San Joaquin Valley, comprise the Great Valley of California. The Great Valley geomorphic province is located between the Sierra Nevada geomorphic province on the east and the Coast Range geomorphic province on the west.

As discussed in Section 2.9 above, the project area is located in sedimentary deposits of the Holocene and Middle Pleistocene.

Geologic mapping by Helley and Hardwood (1985) shows the northern portion of the project alignment situated on sedimentary deposits of Holocene age, including undivided alluvium and "basin deposits." Helley and Harwood describe the alluvium as unweathered gravel, sand, and silt. The finer-grained deposits consist of silt and clay.

The southern portion of the alignment is situated on strata assigned to the Riverbank Formation of the Pleistocene age. The Riverbank Formation consists of weathered reddish gravels, sand, silt, and clay and ranges from less than 1 foot to over 200 feet thick depending on location. The Pleistocene age of the Riverbank Formation is well represented by important fossils recovered from excavations at the Arco Arena in 1989 and more than a dozen other localities. These include remains of ground sloth, dire wolf, horse, rabbit, birds, wood rat, bison, camel, coyote, antelope, deer, and mammoth, as well as clams, fish, turtles, frogs, snakes, and land plant wood, leaves, and seeds (Jefferson 1991, Hilton, et. al. 2000).

The Pleistocene Modesto Formation may also be present in the subsurface along the project alignment. Although it is not shown on the geologic map by Helley and Harwood (1985), the Modesto Formation overlies the Riverbank Formation regionally in the Sacramento Valley (Blake et. al, 1999). It contains fossils such as rodents, snakes and plants (Allen and Jones & Stokes 2008).

Holocene deposits are found within the project site in the areas closest to the Sacramento River and are considered to have low paleontological potential or sensitivity due to their recent geologic age (present epoch).

The Riverbank Formation is known to contain vertebrate and other fossil remains. Vertebrate content alone would indicate that this unit should be considered highly sensitive for paleontological resources.

The Modesto Formation, if present, would also be considered highly sensitive for paleontological resources because of its vertebrate content.

2.10.5 Environmental Consequences

Alternative 1

Although no fossils are known to directly underlie the proposed project, the Riverbank Formation is known to contain vertebrate and other fossil remains, suggesting that there is a high potential for additional similar fossil remains to be uncovered by excavations in these formations during project construction. Under both Caltrans criteria and the Society of Vertebrate Paleontology (SVP) criteria, this formation has a high sensitivity for producing additional paleontological resources, as does the Modesto Formation. Identifiable fossil remains recovered from these formations during project construction could be scientifically important.

Potential impacts to paleontological resources resulting from construction of Alternative 1 would primarily result from ground disturbance of previously undisturbed sediments during excavation. Except for a few locations in the Land Park area, the project will be within the existing imported fill of I-5 (ranging in depth from 3-40 ft).

There are two sound walls proposed for Alternative 1. Sound wall SW1 is located along the SB lanes between the Pocket Road/Meadowview Road OC and the I-5/SR 160 bridge. The sound wall would be constructed on fill approximately 10 to 35 feet deep. Sound wall SW2 is located along the NB lanes south of the I-5/SR 160 bridge, and would be constructed on fill approximately 5 to 30 feet deep. Because of the depth of existing fill, impacts to paleontological resources from sound wall construction are not anticipated.

The locations where deeper column excavations will occur include the Casilada Pedestrian Overcrossing (POC) replacement, the I-5/SR-160 separation widening, and Beach Lake Bridge widening. The fill at the I-5/SR-160 separation is about 25 to 30 feet above original ground level. Because of the deep fill at the I-5/SR 160 bridge, impacts to paleontological resources are not anticipated at this location.

Potential impacts are at the Casilada POC and the Beach Lake Bridge only. The fill at Casilada POC is about 3 feet above original ground level. Nine new columns are proposed. The depth of the new columns at the Casilada POC may be between 50 to 60 feet, each column is 4 feet wide. Cast-in-place foundation piles will be the likely foundation method used at the Casilada POC. A cast-in-place pile is a concrete pile cast or formed at its permanent location after a hole is bored into the ground.

Fill at the Beach Lake Bridge is located at the bridge abutments and is about 15 feet above original ground level. There is no fill between the abutments (Morrison Creek). There are approximately 72 new columns proposed at the Beach Lake Bridge (6 new columns at 12 bents), each requiring foundation piles about 1 ½ feet wide and 25 feet below ground surface. Concrete piles will be driven into the ground to provide the foundations for the new columns. Deep excavations are not anticipated.

The implementation of a properly designed monitoring program would lessen the potential impacts and thus a substantial effect to paleontological resources is not expected.

Paleontological monitoring will be performed during the Casilada POC and will follow the Preliminary Paleontological Mitigation Plan that is included as Appendix I, if mitigation becomes necessary. Monitoring in additional areas may be added at that time or during construction if construction method assumptions have changed.

Significant impacts to paleontological resources are not anticipated for the following reasons:

- Excavations for the proposed sound walls and the I-5/SR-160 separation will occur on imported fill. No construction activities will reach the depth of the paleontological formations.
- Pre-borings for cast-in-place piles at the Casilada POC will disturb a relatively small area within the formation. Monitoring will be performed during boring activities in case fossils are present in the drill cuttings.
- Pile-driving concrete piles into the ground at the Beach Lake Bridge does not involve deep excavation.

In summary, impacts to previously undisturbed sediments will be small.

Alternative 2

Alternative 2 footprint and features are the same as Alternative 1. Its potential impacts to paleontological resources will be the same as well. Please refer to the impact discussion under Alternative 1.

Alternative 3

Potential impacts from Alternative 3 will only involve the Casilada POC. The fill at Casilada POC is about 3 feet above original ground level. Nine new columns are proposed. The depth of the new columns at the Casilada POC may be between 50 to 60 feet, each column is 4 feet wide. Cast-in-place foundation piles will be the likely foundation method used at the Casilada POC. A cast-in-place pile is a concrete pile cast or formed at its permanent location after a hole is bored into the ground.

Paleontological monitoring will be performed during work at the Casilada POC and will follow the Preliminary Paleontological Mitigation Plan that is included as Appendix I. A Final Paleontological Mitigation Plan will be prepared once design is near completion. Monitoring in additional areas may be added at that time or during construction if construction method assumptions have changed.

Significant impacts to paleontological resources are not anticipated since pre-borings of cast-in-place piles at the Casilada POC will disturb a relatively small area within the formation. Monitoring will be performed during boring activities in case fossils are present in the drill cuttings.

Alternative 4

The No Build Alternative would not have the potential to disturb paleontological resources, as no construction-related activities would take place.

2.10.6 Avoidance and Minimization Measures

As noted in Section 2.10.3, the presence or absence of paleontological resources usually cannot be known until construction excavation for the project is underway. Due to the presence of sensitive rock formations within the project limits, a Preliminary Paleontological Mitigation Plan was prepared to address potential discoveries during construction of the proposed project (Appendix I).

2.10.7 Resource Stewardship Measures

The following will be added to the project's standard specification:

> If paleontological resources are discovered at the job site, do not disturb the material and immediately:
>
> 1. Stop all work within a 60-foot radius of the discovery
> 2. Protect the area
> 3. Notify the Resident Engineer
>
> Caltrans investigates and modifies the dimensions of the protected area if necessary. Do not take paleontological resources from the job site. Do not resume work within the specified radius of the discovery until authorized.

A specification alerting the construction contractor that paleontological monitoring will occur during activities that will disturb native sediments will also be added to the project's specifications.

A Preliminary Paleontological Mitigation Plan has been developed (Appendix I). The plan will be updated and finalized once project design is nearly complete. The final plan will be implemented during construction, if necessary.

2.10.8 CEQA Considerations

Less than significant impacts to paleontological resources are anticipated for the following reasons.

- Excavations for the proposed sound walls and the I-5/SR-160 separation will occur on imported fill. No construction activities will reach the depth of the paleontological formations.
- Pre-boring of cast-in-place piles at the Casilada POC will disturb a relatively small area within the formation. Monitoring will be performed during boring in case fossils are present in the drill cuttings.
- Pile-driving concrete piles into the ground at the Beach Lake bridge does not involve deep excavation.

2.11 Hazardous Waste/Materials

2.11.1 Regulatory Setting

Hazardous materials and hazardous wastes are regulated by many state and federal laws. These include not only specific statutes governing hazardous waste, but also a variety of laws regulating air and water quality, human health, and land use.

The primary federal laws regulating hazardous wastes/materials are the Resource Conservation and Recovery Act of 1976 (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA). The purpose of CERCLA, often referred to as Superfund, is to clean up contaminated sites so that public health and welfare are not compromised. RCRA provides for "cradle to grave" regulation of hazardous wastes. Other federal laws include:

- Community Environmental Response Facilitation Act (CERFA) of 1992
- Clean Water Act
- Clean Air Act
- Safe Drinking Water Act
- Occupational Safety & Health Act (OSHA)
- Atomic Energy Act
- Toxic Substances Control Act (TSCA)
- Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA)

In addition to the acts listed above, Executive Order 12088 (*Federal Compliance with Pollution Control Standards*) mandates that necessary actions be taken to prevent and control environmental pollution when federal activities or federal facilities are involved.

Hazardous waste in California is regulated primarily under the authority of the federal Resource Conservation and Recovery Act of 1976, and the California Health and Safety Code. Other California laws that affect hazardous waste are specific to handling, storage, transportation, disposal, treatment, reduction, cleanup and emergency planning.

Worker health and safety and public safety are key issues when dealing with hazardous materials that may affect human health and the environment. Proper disposal of hazardous material is vital if it is disturbed during project construction.

2.11.2 Affected Environment

The Caltrans North Region Office of Environmental Engineering - South completed an updated Initial Site Assessment (ISA) in December 2010. The ISA consisted of a review of as-built design plans for I-5 within the project limits, a field review, and a search of regulatory agency databases containing information on known hazardous materials sites. The database search identified no recorded active hazardous materials sites within the project area.

2.11.2.1 Petroleum Hydrocarbons

The hazardous waste investigation was limited to a field review and an Environmental Data Resources (EDR) record search review from www.edrnet.com. Based on the nature of the project work scope, the potential for significant petroleum hydrocarbons contamination is not expected within the project study limits.

2.11.2.2 Asbestos-Containing Materials

Based on the review of as-built design plans, the age of the bridges within the project limits, and a visual field inspection, asbestos-containing materials (ACM) may be present at the expansion joints and guardrail shims of bridge structures.

The project involves structure widening. With the exception of expanded polysterene, ACM’s are presumed to be present at the bridge expansion joints and bearing pads (for structures built prior to 1980.). Caltrans conducted an ACM survey for a previous project for Bridge 24-0296 L/R (I-5/160 overhead) and Bridge 24-0268G (westbound US 50 connector) in February 2005, concluding that the structures rail shims contain ACM's. Additional testing will be conducted on the rest of the structures prior to construction.

2.11.2.3 Lead

Aerially Deposited Lead (ADL)

Lead-contaminated soil exists due to the historical use of leaded gasoline, leaded airline fuels, waste incineration, etc. The areas of primary concern in relation to highway facilities are soils along routes that have had high vehicle emissions due to large traffic volumes, congestion, or stop and go situations during the time period when leaded gasoline was in use. For practical purposes, most Aerially Deposited Lead (ADL), due to vehicle emissions, would have been deposited prior to 1986.

Between the southern end of the project and Freeport Blvd:

ADL Preliminary Site Investigations performed by Caltrans consultants determined that soil excavated from 0.0 ft to 3 ft below ground surface (bgs) may be reused on site and/or disposed of outside the project limits without restrictions based on the lead content.

Total lead concentrations ranged as follows:

- At the southern end of the project, from >5 to 8.2 mg/kg
- Between Beach Lake Road and Florin Road, from >5 to 160 mg/kg, waste extraction test (WET) ranged from 0.64 to 11 mg/l;
- Between south of Laguna Blvd. and Freeport Blvd., from >13.5 to 113.5 mg/kg, WET ranged from>0.643 to 4.11 mg/l.

Between Florin Road and the north end of the project (US 50):

Additional ADL testing will need to be conducted prior to construction.

Lead based-paint

Caltrans conducted a lead based paint survey for Bridge 24-0296 L/R (I-5/160 overhead) and for Bridge 24-0268G (westbound US 50 connector) and for Bridge 24-0269G. The survey concluded that the green color paint on the structures contained Total Lead ranging from 68 to 150,000 mg/kg, and WET range from 1.6 to 37 mg/l. Paint debris will require disposal as California Hazardous Waste. Additional testing will be conducted on the rest of the structures prior to construction.

Yellow Traffic Stripes

The existing yellow thermoplastic and yellow painted traffic stripe within the roadway contains lead chromate. The residue produced when yellow thermoplastic, yellow paint, and pavement markings are removed may contain heavy metals in concentrations that exceed thresholds established by the Health and Safety Code and 22 CA Code of Regulations and may produce toxic fumes when heated.

2.11.3 Environmental Consequences

Alternative 1

It is anticipated that ADL, lead-based paint on structures and yellow traffic stripe containing lead may be encountered during construction of the project. Asbestos-containing materials (ACM) may be present on the bridges.

During construction, a number of materials will be used including gasoline, diesel fuel, oil, and lubricants for operation of construction equipment. These materials are typically used, handled, and stored by contractors on all roadway construction projects. No acutely hazardous materials would be used or stored on-site during construction. Construction of the proposed project could potentially result in small fuel spills from construction or vehicles.

Alternative 2

Alternative 2 footprint and features are the same as Alternative 1. Its potential hazardous material impacts will be the same as well. Please refer to the impact discussion under Alternative 1.

Alternative 3

Minor hazardous materials, including gasoline, diesel fuel, oil and lubricants, may be encountered during construction under Alternative 3.

Alternative 4

The No Build Alternative would not involve construction and would not have the potential to encounter or disturb hazardous waste or materials.

2.11.4 Avoidance and Minimization Measures

ACM

The ACM on the bridges will require removal and proper disposal by a licensed and certified asbestos abatement contractor in conjunction with the planned bridge widening.

The contractor must implement an Asbestos Compliance Plan (ACP) to prevent or minimize exposure to asbestos. Attention is directed to Title 8, California Code of Regulations, Construction Safety Orders, section 5192 (b) and section 1529, "Asbestos", Occupational Safety and Health Guidance Manual published by the National Institute of Occupational Safety and Health (NIOSH) and the USEPA for elements of the ACP.

Non-Standard Special Provision (NSSP) will be included in the project specifications to address National Emissions Standards for Hazardous Air Pollutants (Air Quality - NESHAP) notification.

The NSSP for removal of ACM's, bridges, will be included in the project specifications. Copies of NSSPs can be obtained by contacting Caltrans' Hazardous Waste Office at HQ_HazWaste@dot.ca.gov.

In accordance with Sacramento Metropolitan Air Quality Management District (SMAQMD) Rule 902, written notification to SMAQMD is required ten working days prior to commencement of any demolition activity (whether asbestos is present or not) and for renovation activities involving specified quantities of RACM. In accordance with Title 8, CCR 341.9, written notification to the nearest Cal/OSHA district office is required at least 24 hours prior to certain asbestos-related work.

ADL

Standard Special Provision 7-1.02K(6)(j)(iii), Earth Material Containing Lead, for soil disturbance when lead concentrations are non-hazardous, and SSP 14-11.03 for when hazardous waste concentrations exist will be included in the project specifications.

The implementation of a Lead Compliance Plan for ADL is required. The contractor shall prepare and submit a project specific "Lead Compliance Plan" prepared by a Certified Industrial Hygienist (CIH) as required by Cal/OSHA.

Lead-Based Paint on Structures

Lead containing paint (LCP) may be present in the structures proposed for renovation. The contractor must notify the Sacramento Air Quality Management District (AQMD) as required by NESHAP, 40CFR Part 61, and California Air Resources Control Board rules.

Lead paint removal must conform to Cal/OSHA requirements in Title 8 Sections 1532.1 and 341. Packaging, storage, transporting, and disposing of material containing lead paint at hazardous levels must conform to Title 22, Division 4.5, Chapters 11, 12 and 13 of the California Code of Regulations.

The Contractor must prepare a Lead Compliance Plan to prevent or minimize exposure to lead containing paint.

NSSP 15-025 will be included in the project specifications to address the hazardous waste requirements for lead paint on structures.

Yellow Traffic Stripes
The Contractor is required to properly manage removed stripe and pavement marking and shall implement a project specific lead compliance plan prepared by a Certified Industrial Hygienist (CIH) as required by Cal/OSHA. The text containing the requirements for the lead compliance plan is found in the 2010 Standard Specifications in Section 7-1.02.

The below Standard Special Provisions (SSP) will be included in the project specifications:

SSP 14-11.07, Remove Yellow thermoplastic and yellow painted Traffic Stripe, and Pavement Marking.- Use if the project includes separate removal of paint or thermoplastic (yellow or white – mix paint) from the road surface, and the residue is expected to be a hazardous waste.

SSP 15-1.03B, Residue Containing Lead from paint and thermoplastic. Use if yellow paint or yellow thermoplastic paint will be ground or cold planed but residue will be non-hazardous.

SSP 15-2.02C(2) , Remove Traffic Stripe and Pavement Markings. Use for white traffic stripe, and/or for the yellow traffic stripe if tested and residue is non-hazardous.

SSPs can be found at www.dot.ca.gov/hq/esc/oe/standards.php,

2.11.5 Mitigation Measures
No mitigation is required.

2.11.6 CEQA Considerations
Less than significant impacts resulting from hazardous waste/materials are anticipated.

2.12 Air Quality

2.12.1 Introduction

This section discusses the potential impacts to air quality resulting from the proposed project. Caltrans completed an Air Quality Analysis Report for the proposed project in December 2012.

2.12.2 Regulatory Setting

The Federal Clean Air Act (FCAA) as amended in 1990 is the federal law that governs air quality. The California Clean Air Act of 1988 is its companion state law. These laws, and related regulations by the U.S. Environmental Protection Agency (USEPA) and the California Air Resources Board (CARB), set standards for the quantity of pollutants that can be 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. The criteria pollutants are: carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM, broken down for regulatory purposes into particles of 10 micrometers or smaller – PM_{10} and particles of 2.5 micrometers and smaller – $PM_{2.5}$), lead (Pb), and sulfur dioxide (SO_2). In addition, State standards exist for visibility reducing particles, sulfates, hydrogen sulfide (H_2S), and vinyl chloride. The NAAQS and State standards are set at a level that protects public health with a margin of safety, and are subject to periodic review and revision. Both State and Federal regulatory schemes also cover toxic air contaminants (air toxics); some criteria pollutants are also air toxics or may include certain air toxics within their general definition.

Federal and State air quality standards and regulations provide the basic scheme for project-level air quality analysis under the National Environmental Policy Act (NEPA) and the California Environmental Quality Act (CEQA). In addition to this type of environmental analysis, a parallel "Conformity" requirement under the FCAA also applies.

FCAA Section 176(c) prohibits the U.S. Department of Transportation and other Federal agencies from funding, authorizing, or approving plans, programs or projects that are not first found to conform to the State Implementation Plan (SIP) for achieving the goals of Clean Air Act requirements related to the NAAQS. "Transportation Conformity" 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.

Regional conformity is concerned with how well the regional transportation system supports plans for attaining the standards set for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), particulate matter (PM_{10} and $PM_{2.5}$), and in some areas sulfur dioxide (SO_2). California has attainment or maintenance areas for all of these transportation-related "criteria pollutants" except SO_2, and also has a nonattainment area for lead (Pb). However, lead is not currently required by the FCAA to be covered in transportation conformity analysis. Regional conformity is based on Regional Transportation Plans (RTPs) and Federal Transportation Improvement Programs (FTIPs) that include all of the 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 is based on use of travel demand and air quality models to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that requirements of the Clean Air Act and the SIP are met. If the conformity analysis is successful, the Metropolitan Planning Organization (MPO), and the Federal Highway Administration (FHWA) and Federal Transit Administration (FTA), make the determinations that the RTP and FTIP are in conformity with the SIP for achieving the goals of the Clean Air Act. Otherwise, the projects in the RTP and/or FTIP must be modified until conformity is attained. If the design concept, scope, and "open-to-traffic" schedule of a proposed transportation project are the same as described in the RTP and the FTIP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

Conformity at the project-level also requires "hot spot" analysis if an area is "nonattainment" or "maintenance" for carbon monoxide (CO) and/or particulate matter (PM_{10} or $PM_{2.5}$). A region is "nonattainment" if one or more of the monitoring stations in the region measures violation of the relevant standard, and USEPA officially designates the area nonattainment . Areas that were previously designated as nonattainment areas but subsequently meet the standard may be officially redesignated to attainment by USEPA, and are then called "maintenance" areas. "Hot spot" analysis is essentially the same, for technical purposes, as CO or particulate matter analysis performed for NEPA purposes. Conformity does include some specific procedural and documentation standards for projects that require a "hot spot" analysis. In general, projects must not cause the "hot spot"-related standard to be violated, and must not cause any increase in the number and severity of violations in nonattainment areas. If a known CO or particulate matter violation is located in the project vicinity, the project must include measures to reduce or eliminate the existing violation(s) as well.

Climate change is analyzed in Chapter 3. Neither USEPA nor FHWA has promulgated explicit guidance or methodology to conduct project-level greenhouse gas analysis. As stated on FHWA's climate change website (http://www.fhwa.dot.gov/hep/climate/index.htm), climate change considerations should be integrated throughout the transportation decision-making process–from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will facilitate decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project level decision-making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

Because there have been more requirements set forth in California legislation and executive orders regarding climate change, the issue is addressed in the CEQA chapter of this environmental document and may be used to inform the NEPA decision. The four strategies set forth by FHWA to lessen climate change impacts do correlate with efforts that the State has undertaken and is undertaking to deal with transportation and climate change; the strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and reduction in the growth of vehicle hours travelled.

2.12.3 Affected Environment

Under the Federal Clean Air Act, USEPA has designated planning areas throughout the country. Areas are classified as being in "attainment" for a given pollutant if they meet the prescribed standards. If an area does not meet the standard, it is designated as a "non-attainment" area for that pollutant. Areas that were previously designated as non-attainment areas but have now met the standard–with USEPA approval of a suitable air quality plan–are called "maintenance" areas.

The proposed project is located within the Sacramento Valley Air Basin (SVAB). Sacramento County is designated by the USEPA as an "attainment-maintenance" area (the area has attained the air quality standard) for CO; it is designated as a "non-attainment area" for particulate matter 10 microns or less in diameter (PM_{10}) and fine particulate matter ($PM_{2.5}$), and "severe non-attainment" for Ozone.

2.12.3.1 Air Pollutant and Ambient Quality Standards

Impacts are evaluated by comparing predicted air pollutant concentrations to the NAAQS established by the USEPA. An impact is considered significant if the predicted concentration exceed the NAAQS. Both the State of California and the federal government have established health-based ambient air quality standards (AAQS) for seven air pollutants. Ambient air quality standards are shown in Table 2-12.1. In addition, the state has set standards for sulfates, hydrogen sulfide, vinyl chloride, and visibility-reducing particles. These standards are designed to protect the health and welfare of the populace with a reasonable margin of safety. National standards have been established for the following air pollutants:

1) Ozone (O_3)
2) Carbon Monoxide (CO)
3) Nitrogen Dioxide (NO_2)
4) Sulfur Dioxide (SO_2)
5) Suspended Particulate Matter (PM_{10})
6) Fine Particulate Matter ($PM_{2.5}$)
7) Lead (Pb)

In addition to setting out primary and secondary AAQS, the State has established a set of episode criteria for O_3, CO, NO_2, SO_2, and PM_{10}. These criteria refer to episode levels representing periods of short-term exposure to air pollutants that actually threaten public health. Health effects are progressively more severe as pollutant levels increase from Stage 1 to Stage 3. An alert level is that concentration of pollutants at which initial stage control actions are to begin. An alert will be declared when any one of the pollutant alert levels is reached at any monitoring site and meteorological conditions are such that the pollutant concentrations can be expected to remain at these levels for 12 or more hours or to increase; or, in the case of oxidants, the situation is likely to recur within the next 24 hours unless control actions are taken. Additional standards for these pollutants and several others have been adopted by the California Air Resources Board (CARB).

A project level conformity analysis has been prepared showing that the project will conform with the State Implementation Plan (SIP), including the localized impact analysis for CO and PM required by 40 CFR 93.116 and 93.123. This project is not considered a Project of Air Quality Concern regarding PM as defined in 40 CFR 93.123(b)(1) and meets the requirements of the Clean Air Act and 40 CFR 93.116.

Direct emissions from automobiles contain mainly hydrocarbons, nitrogen dioxide and carbon monoxide. Indirect emissions include O_3 and PM_{10}. Lead emissions from automobiles have declined in recent years through the increased use of unleaded gasoline. O_3 is formed when NO_X and reactive organic gases (ROG) react in the presence of sunlight. PM_{10} emissions from vehicular source are largely due to aerosols formed in the atmosphere from nitrogen oxides and ROG compounds and, to a lesser extent, directly from vehicle travel over materials previously deposited on the travel surface or tire and brake wears. Due to their formation and/or dispersion patterns, hydrocarbons, nitrogen dioxide, and ozone can only be reasonably analyzed from a regional perspective. CO is a relatively stable and site-specific pollutant with major concentrations found immediately adjacent to roadways. It is analyzed to determine air quality impacts at the project specific microscale level.

Table 2-12.1 summarizes both the National and California standards. The NAAQS are comprised of both primary and secondary standards. Primary standards are designed to protect public health, while secondary standards protect public welfare from known or anticipated adverse effects of air pollutants (e.g. reduced visibility or property damage). For our purposes, the significance of an impact will be based upon comparison with the more stringent primary standards.

The primary NAAQS and California Standards are based on medical studies which relate pollutant concentration and duration of exposure to morbidity and mortality rates for “at risk” populations. Because of this, the standard must specify both a concentration and an averaging time. As is apparent in Table 2-12.1, higher concentrations can be tolerated when exposure (or averaging) times are shorter. The averaging time plays a critical role in the modeling process.

The NAAQS for CO is established for two averaging times: 1-hour and 8-hours. These standards are not to be exceeded more than once per year. The procedures described in the “Transportation Project- Level CO Protocol” are designed to estimate the second highest 1-hour and 8-hour annual CO concentrations (called the second annual maximum). If either of these values exceed the NAAQS, the impact is considered significant. This approach is often referred to as a “worst case” analysis. The fact that predictions are made for an assumed set of concurrent, worst case conditions guarantees a conservative estimate of the impacts. The California CO standards are not to be exceeded at any time.

Table 2-12.1 State and Federal Criteria Air Pollutant Standards, Effects, and Sources

Pollutant	Averaging Time	California Standards[1]		Federal Standards[2]		
		Concentration[3]	Method[4]	Primary[3,5]	Secondary[3,6]	Method[7]
Ozone (O_3)	1-Hour	0.09 ppm (180 $\mu g/m^3$)	Ultraviolet Photometry	--	Same as Primary Standard	Ultraviolet Photometry
	8-Hour	0.070 ppm (137 $\mu g/m^3$)		0.075 ppm (147 $\mu g/m^3$)		
Respirable Particulate Matter (PM_{10})	24-Hour	50 $\mu g/m^3$	Gravimetric or Beta Attenuation	150 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	20 $\mu g/m^3$		--		
Fine Particulate Matter ($PM_{2.5}$)	24-Hour	No Separate State Standard		35 $\mu g/m^3$	Same as Primary Standard	Inertial Separation and Gravimetric Analysis
	Annual Arithmetic Mean	12 $\mu g/m^3$	Gravimetric or Beta Attenuation	15.0 $\mu g/m^3$		
Carbon Monoxide (CO)	8-Hour	9.0 ppm (10 mg/m^3)	Non-Dispersive Infrared Photometry (NDIR)	9 ppm (10 mg/m^3)	None	Non-Dispersive Infrared Photometry (NDIR)
	1-Hour	20 ppm (23 mg/m^3)		35 ppm(40 mg/m^3)		
	8-Hour (Lake Tahoe)	6 ppm (7 mg/m^3)		—	—	—
Nitrogen Dioxide (NO_2)	Annual Arithmetic Mean	0.030 ppm (57 $\mu g/m^3$)	Gas Phase Chemiluminescence	53 ppb (100 $\mu g/m^3$) (see footnote 8)	Same as Primary Standard	Gas Phase Chemiluminescence
	1-Hour	0.18 ppm (339 $\mu g/m^3$)		100 ppb (188 $\mu g/m^3$) (see footnote 8)	None	
Sulfur Dioxide (SO_2)	24-Hour	0.04 ppm (105 $\mu g/m^3$)	Ultraviolet Fluorescence	—	—	Spectrophotometry (Pararosaniline Method)
	3-Hour	—		—	0.5 ppm (1300 $\mu g/m^3$) (see footnote 9)	
	1-Hour	0.25 ppm (655 $\mu g/m^3$)		75 ppb (196 $\mu g/m^3$) (see footnote 9)	—	
Lead[10]	30 Day Average	1.5 $\mu g/m^3$	Atomic Absorption	—	—	High-Volume Sampler and Atomic Absorption
	Calendar Quarter	—		1.5 $\mu g/m^3$	Same as Primary Standard	
	Rolling 3-Month Average[11]	—		0.15 $\mu g/m^3$		
Visibility-Reducing Particles	8-Hour	Extinction coefficient of 0.23 per kilometer - visibility of 10 miles or more (0.07-30 miles or more for Lake Tahoe) due to particles when relative humidity is less than 70 percent. Method: Beta Attenuation and Transmittance through Filter Tape.		**No Federal Standards**		
Sulfates	24-Hour	25 $\mu g/m^3$	Ion Chromatography			
Hydrogen Sulfide	1-Hour	0.03 ppm (42 $\mu g/m^3$)	Ultraviolet Fluorescence			
Vinyl Chloride[10]	24-Hour	0.01 ppm (26 $\mu g/m^3$)	Gas Chromatography			

Source: California Air Resources Board, September 8, 2010.

Footnotes

1. California standards for ozone, carbon monoxide (except Lake Tahoe), sulfur dioxide (1 and 24 hour), nitrogen dioxide, suspended particulate matter—PM_{10}, $PM_{2.5}$, and visibility reducing particles, are values that are not to be exceeded. All others are not to be equaled or exceeded. California ambient air quality standards are listed in the Table of Standards in Section 70200 of Title 17 of the California Code of Regulations.
2. National standards (other than ozone, particulate matter, and those based on annual averages or annual arithmetic mean) are not to be exceeded more than once a year. The ozone standard is attained when the fourth highest eight hour concentration in a year, averaged over three years, is equal to or less than the standard. For

PM_{10}, the 24 hour standard is attained when the expected number of days per calendar year with a 24-hour average concentration above 150 µg/m3 is equal to or less than one. For $PM_{2.5}$, the 24 hour standard is attained when 98 percent of the daily concentrations, averaged over three years, are equal to or less than the standard. Contact the USEPA for further clarification and current federal policies.

3. Concentration expressed first in units in which it was promulgated. Equivalent units given in parentheses are based upon a reference temperature of 25°C and a reference pressure of 760 torr. Most measurements of air quality are to be corrected to a reference temperature of 25°C and a reference pressure of 760 torr; ppm in this table refers to ppm by volume, or micromoles of pollutant per mole of gas. Any equivalent procedure which can be shown to the satisfaction of the ARB to give equivalent results at or near the level of the air quality standard may be used.
4. National Primary Standards: The levels of air quality necessary, with an adequate margin of safety to protect the public health.
5. National Secondary Standards: The levels of air quality necessary to protect the public welfare from any known or anticipated adverse effects of a pollutant.
6. Reference method as described by the USEPA. An “equivalent method” of measurement may be used but must have a “consistent relationship to the reference method” and must be approved by the USEPA.
7. To attain this standard, the 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area must not exceed 0.100 ppm (effective January 22, 2010). Note that the (ppm). To directly compare the national standards to the California standards the units can be converted from ppb to ppm. In this case, the national standards of 53 ppb and 100 ppb are identical to 0.053 ppm and 0.100 ppm, respectively.
8. Which is based on the 3-year average of the annual 99th percentile of 1-hour daily maximum of 0.14 ppm and the annual primary SO2 standard of 0.030 ppm, effective August 23, 2010.standards are in units of parts per million (ppm). To directly compare the new primary national standard to the California standard the units can be converted to ppm. In this case, the national standard of 75 ppb is identical to 0.075 ppm.
9. The ARB has identified lead and vinyl chloride as 'toxic air contaminants' with no threshold level of exposure for adverse health effects determined. These actions allow for the implementation of control measures at levels below the ambient concentrations specified for these pollutants.
10. National lead standard, rolling 3-month average: final rule signed October 15, 2008.

For more information please call ARB-PIO at (916) 322-2990 California Air Resources Board (09/08/10)

2.12.3.2 Attainment Status and Regional Air Quality Plans

Federal and State air quality laws require identification of areas not meeting the ambient air quality standards. Transportation projects have the potential to affect air quality on a regional level. The regional air quality pollutant most likely to be affected by transportation projects is ozone. Because ozone is formed over time by a chemical reaction involving precursor emissions such as NOx, its concentration is distributed over a geographically regional area. These areas must develop regional air quality plans to eventually attain the standards. Under federal law, the plans are referred to as State Implementation Plans (SIPs). In California, SIP is composed of regional air quality plans from throughout the state.

Authority for air quality planning is divided. Under California law, air pollution control districts and air quality management districts have full regulatory authority for achieving State standards. In Sacramento County, the Sacramento Metropolitan Air Quality Management District (SMAQMD) holds that authority.

The Federal Clean Air Act requires that transportation plans, programs, and projects approved by a Metropolitan Planning Organization that conform to the SIP. The Metropolitan Planning Organization for Sacramento County is Sacramento Area Council of Governments (SACOG). Demonstrating a project's conformity with the SIP involves inclusion of the project in the Metropolitan Transportation Plan (MTP) and Metropolitan Transportation Improvement Plan (MTIP) by SACOG and determining that the project would not result in a violation of the CO air quality standard.

The proposed project has been included in both the MTP and MTIP by SACOG. The design concept and scope match those of the project listed in the MTP and MTIP, and that it would not interfere with timely implementation of any Transportation Control Measure (TCM). In addition, the project would not result in a violation of the CO air quality standard. Therefore, the project is considered to be in conformance with the SIP.

Before adopting the MTP and MTIP, SACOG performed a quantitative analysis to determine if implementation of the set of projects included in these documents would result in violations of the ozone air quality standard. Based on this analysis, SACOG has concluded that implementing the set of projects included in the MTP and MTIP would not result in a violation of the ozone standard. Since this set of projects have been found to not result in a violation of the ozone air quality standard, the impact of the project on regional air quality is considered to be less-than significant.

In addition to planning responsibilities, SMAQMD has permitting authority over stationary sources of pollutants. Permitting authority over mobile sources of pollutants is given to CARB.

Under the NAAQS, Sacramento County is designated as "attainment-maintenance" for CO and "non-attainment" for Ozone, $PM_{2.5}$, and PM_{10}. Under the California Ambient Air Quality Standards (CAAQS), Sacramento County is currently designated as in "attainment" for CO, "non-attainment" for Ozone, $PM_{2.5}$, and PM_{10}.

Greenhouse Gases and Climate Change

USEPA has not set National Ambient Air Quality Standards for carbon dioxide and similar "greenhouse gases" (GHGs). See USEPA's climate change web site: http://www.epa.gov/climatechange/.

GHGs are not criteria pollutants under the California Clean Air Act, and ambient air quality standards have not been set; however they are regulated by the California Air Resources Board (CARB) based on legislation and Governor's executive orders. For more information on CARB's climate change program see: http://www.arb.ca.gov/cc/cc.htm.

2.12.4 Environmental Consequences

Thresholds of Significance

Based on *Guidelines for the Implementation of California Environmental Quality Act*, Appendix G, Public Resource Code (PRC) Sections 15000–15387, a project would normally be considered to have a significant effect on air quality if the project would violate any ambient air quality standards, contribute substantially to an existing air quality violation, expose sensitive receptors to substantial pollutants concentrations, or conflict with adopted environmental plans and goals of the community in which it is located.

In addition to the federal and State AAQS, the Northern Sacramento Valley Air Basin has developed regional daily emissions thresholds for construction and operation of a proposed project in Sacramento County. The guidelines and emissions thresholds established by the SMAQMD in its CEQA Guide are used in this analysis. It should be noted that the emissions thresholds were established based on the attainment status of the air basin in regard to air quality standards for specific criteria pollutants. Because the concentration standards were set at a level that protects public health with an adequate margin of safety, these emissions thresholds are regarded as conservative and would overstate an individual project's contribution to health risks.

According to the Sacramento Valley Air Basin, ROG, NOx, and PM_{10} emission levels in excess of 65 lbs/day, 65 lbs/day, and 105 lbs/day, respectively, would be considered to result in a significant adverse impact on air quality. According to the Sacramento County for all other criteria air pollutants, a project would be considered to have a significant impact on air quality if it will cause or contribute significantly to a violation of the applicable national or state ambient air quality standards. The District uses the latest version of Emfac2011 to calculate mobile source emissions.

Localized air quality impacts (i.e., CO concentrations [CO hot spots]) in the project area would be affected due to the construction of the project. The Caltrans Transportation Project-Level Carbon Monoxide Protocol (December 1997) was used to assess the project's impact on the local CO concentrations.

Figure 2-12.1 Air Quality Receptor Locations

R# Air Receptors

FIGURE 2-12.1
Air Quality Receptor Locations
03-Sac-5
I-5 Elk Grove to Downtown
Bus/Carpool Lane Project
PM 9.7 - 22.5
EA 03-3C000

State of California
Department of Transportation

Figure 2-12.2 Air Quality Receptor Locations

R# Air Receptors

FIGURE 2-12.2
Air Quality Receptor Locations
03-Sac-5
I-5 Elk Grove to Downtown
Bus/Carpool Lane Project
PM 9.7 - 22.5
EA 03-3C000

State of California
Department of Transportation

Figure 2-12.3 Air Quality Receptor Locations

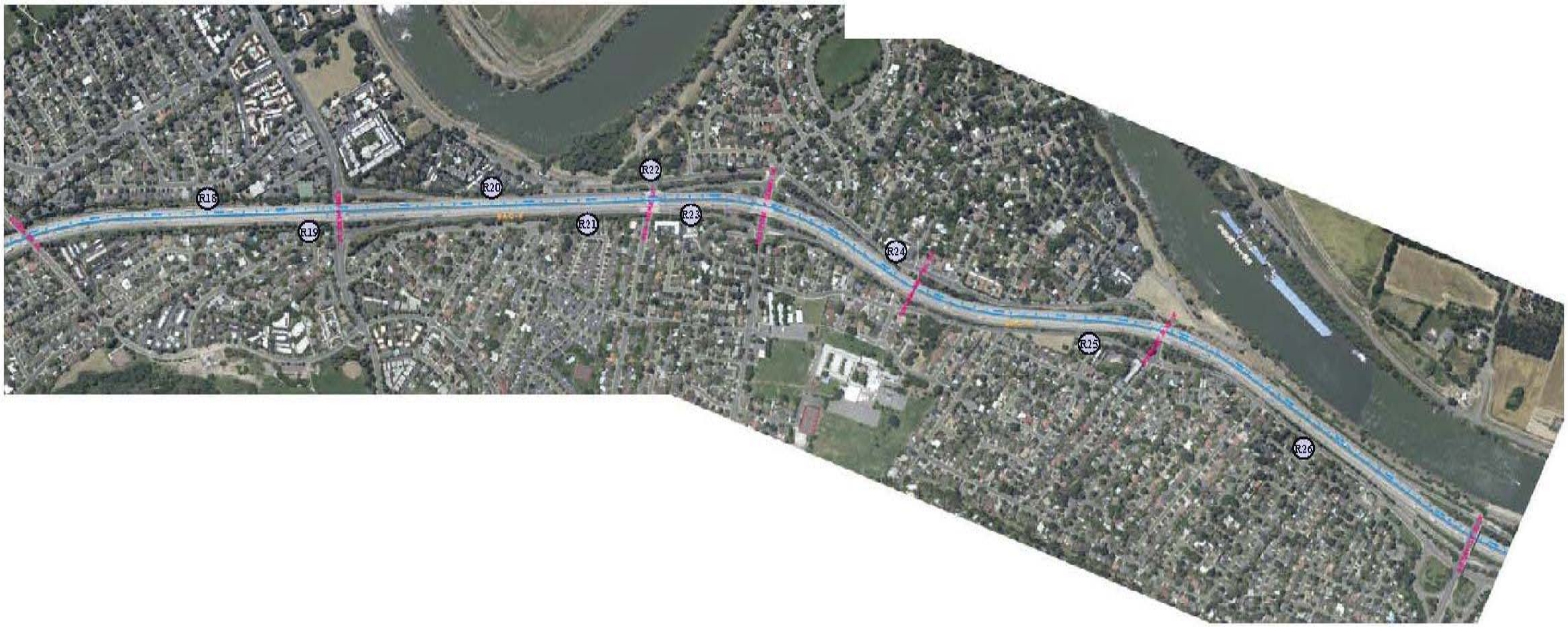


FIGURE 2-12.3
Air Quality Receptor Locations
03-Sac-5
I-5 Elk Grove to Downtown
Bus/Carpool Lane Project
PM 9.7 - 22.5
EA 03-3C000

State of California
Department of Transportation

Figure 2-12.4 Air Quality Receptor Locations

R# Air Receptors

FIGURE 2-12.4
Air Quality Receptor Locations
03-Sac-5
I-5 Elk Grove to Downtown
Bus/Carpool Lane Project
PM 9.7 - 22.5
EA 03-3C000

State of California
Department of Transportation

2.12.4.1 Construction Impacts

Alternatives 1, 2, and 3 may result in the generation of short-term construction-related air emissions, including fugitive dust and exhaust emissions from construction equipment. Fugitive dust, sometimes referred to as windblown dust or PM_{10}, would be the primary short-term construction impact, which may be generated during excavation, grading and hauling activities. However, both fugitive dust and construction equipment exhaust emissions would be temporary and transitory in nature. In order to minimize the temporary construction-related emission impacts, the Contractor will be required to use Best Management Practices and comply with Caltrans Standard Specifications. Section 14-9.02, "Air Pollution Control" and Section 14-9.03, "Dust Control" require the Contractor to comply with all pertinent rules, regulations, ordinances, and statutes of the local air district.

The proposed construction schedule for all improvements is approximately 36 months and is anticipated to be completed by 2020. Construction emissions were estimated for the project using the Sacramento Metropolitan Air Quality Management District's Road Construction Emissions Model (RoadMod), Version 7.1.2. Construction-related emissions are presented in Table 2.12-14. As construction of the project is expected to last less than five years, construction-related emissions were not considered in the conformity analysis.

Under Alternative 4, no construction would occur, and there would be no construction-related emissions.

Table 2-12.14 Road Construction Emissions Estimates (pounds/day)

Road Construction Emissions Model, Version 7.1.2

Emission Estimates **Project Phases (English Units)** (lbs/day)	**ROG**	**CO**	**NOx**	**Total PM10**	**Exhaust PM10**	**Fugitive Dust PM10**	**Total PM2.5**	**Exhaust PM2.5**	**Fugitive Dust PM2.5**	**CO2)**
Grubbing/Land Clearing	11.4	51.6	63.3	23.6	3.6	20.0	7.4	3.2	4.2	8,106.5
Grading/Excavation	11.9	58.4	88.1	24.2	4.2	20.0	7.8	3.7	4.2	13,713.8
Drainage/Utilities/Sub-Grade	9.7	50.7	57.6	23.2	3.2	20.0	7.1	2.9	4.2	8,233.4
Paving	7.5	44.1	38.2	2.2	2.2	-	2.0	2.0	-	6,638.7
Maximum (pounds/day)	11.9	58.4	88.1	24.2	4.2	20.0	7.8	3.7	4.2	13,713.8
Total (tons/construction project)	4.1	21.0	26.8	8.1	1.4	6.7	2.6	1.2	1.4	4,046.1

Notes:
Project Start Year -> 2017

Project Length (months) -> 36
Total Project Area (acres) -> 51
Maximum Area Disturbed/Day (acres) -> 2
Total Soil Imported/Exported (yd^3/day)-> 1000

PM10 and PM2.5 estimates assume 50% control of fugitive dust from watering and associated dust control measures if a minimum number of water trucks are specified.

Total PM10 emissions shown in column F are the sum of exhaust and fugitive dust emissions shown in columns H and I. Total PM2.5 emissions shown in Column J are the sum of exhaust and fugitive dust emissions shown in columns K and L.

Naturally Occurring Asbestos

Naturally occurring asbestos (NOA) is known to exist in serpentine, a greenish greasy-looking rock, found within the ultramafic rock. Based on the California Geologic Survey and National Resource Conservation Service soils map, no ultramafic rocks are found in Sacramento County. If NOA is found during construction, rules and regulation of the Sacramento Metropolitan Air Quality Management District must be adhered to when handling this material

2.12.4.2 Operational Impacts

Carbon Monoxide

Local Carbon Monoxide Impact Analysis

Ambient CO concentrations associated with a transportation project are the sum of background CO levels and the project contribution from vehicular emissions. Background CO is attributable to a variety of emission sources that exist locally, outside of the highway network being specifically modeled in the microscale analysis.

Computer simulation models have been used to estimate project-related CO concentrations for this air quality report. The estimation of project-related CO concentrations is based on three major categories of data:

- An estimate of the number of vehicles (peak hour traffic volumes)
- Emission factors (the rate of CO emitted by vehicles), and
- Dispersion patterns (how CO from vehicles disperses).

The analysis of CO concentrations for this document was conducted following methods described in Caltrans' *Transportation Project-Level Carbon Monoxide Protocol* (Institute of Transportation Studies, University of California, Davis 1996).

The air quality microscale dispersion model, CALINE4, is a line source model developed by Caltrans. It is based on the Guassian diffusion equation and employs a mixing zone concept to characterize pollutant dispersion over the roadway. Given source strength, meteorology, and site geometry, CALINE4 can predict pollutant concentrations for receptors located within 1,500 feet of the roadway. The CALINE4 model was used to estimate one-hour average CO concentrations at receptor locations. A persistence factor of 0.7 was applied to the one-hour average values to estimate eight-hour average values (Institute of Transportation Studies, University of California, Davis 1996).

High concentrations of CO are typically a localized occurrence. High concentrations of CO due to on- road vehicles are associated with high traffic volumes and heavily congested roadway facilities. The CO analysis focused on the locations considered to have the greatest potential for experiencing high CO concentrations based on a review of the project’s traffic study conducted for the proposed project. Receptors R1 through R30 are located at the back/side yards of residences, parking area of private business buildings, parks, and schools along the project area. For exact locations of these receptors see Figures 2-12.1 to 2-12.4.

Background Carbon Monoxide Levels

The CARB monitoring station located at T Street in Sacramento was used as a representative for background CO information. The maximum daily 1-hour data for the last three years of the winter months was analyzed at this monitoring station. It was found that the highest value for the maximum daily 1-hour measurement was 5.6 ppm. Hence, 5.6 ppm was selected as background CO levels for input into the CALINE4. The CALINE4 modeling analysis conducted for this air quality report used peak hour traffic data from the traffic analysis conducted for the proposed project. The traffic data included peak hour volumes and speed. Traffic data for the 2017, 2023, and 2035 conditions were used (Tables 2-12.2 to 2-12.9).

Emission Factors

On-road motor vehicle emission rates, usually expressed in grams per vehicle mile, were used in the analysis of CO concentrations. The estimate of motor vehicle emission rates takes into account the combined effects of vehicle operating mode, types of vehicles, temperature, vehicle speed, year, and altitude. Motor vehicle emission rates used for this report were generated from CARB emission factor model EMFAC2011 (Version 1). Emission rates used in this air quality report were based on the following data:

- The project location is at 5 feet elevation,
- The adjusted January mean minimum temperature is 40 ^{0}F,
- The project location has a motor vehicle inspection and maintenance program, and
- The traffic mix listed in Appendix A of the air quality report.

The output files for EMFAC2011 - SG (Version 1) are included in Appendix A of the Air Quality Report available from Caltrans.

Table 2-12.2 Traffic Data (NB AM Peak Existing Conditions)

Northbound Mainline AM Peak-Hour Analysis for Existing Conditions				
Location	**Type**	**Volume[1]**	**Speed[1]**	**LOS/Density[1]**
Hood Franklin Rd to Elk Grove Blvd	Basic	1,747	64	B / 18
Elk Grove Blvd to Laguna Blvd	Basic	2,829	55	**F / 60**
Laguna Blvd to Pocket Rd	Basic	4,421	**25**	**F / 126**
Pocket Rd to Florin Rd	Merge[2]	4,940	**18**	**F / 130**
Florin Rd to 43rd Ave	Basic	5,655	**21**	**F / 110**
43rd Ave to Seamas Ave	Weave	4,548	**22**	**F / 122**
Seamas Ave to Sutterville Rd	Basic	7,405	**33**	**F / 85**
Sutterville Rd to US-50/P St/Q St	Basic	7,455	58	D / 36
US-50/P St/Q St to I/J/L St	Weave	6,301	51	**F / 46**
I/J/L St to Richards Blvd	Weave	5,566	60	C / 24

Notes: Bold and underline font indicates speed below 35 mph or LOS F conditions.

1. Volume is reported in vehicles per hour, speed is reported in miles per hour, and density is reported in vehicles per lane per mile.
2. The distance between the Florin Road and Pocket Road ramps is less 3,000 feet, so no basic freeway segment exists. Instead, the worst ramp junction (merge or diverge) LOS is shown.

Source: Fehr & Peers, 2009

Table 2-12.3 Traffic Data (SB PM Peak Existing Conditions)

SOUTHBOUND MAINLINE PM PEAK-HOUR ANALYSIS FOR EXISTING CONDITIONS				
Location	**Type**	**Volume[1]**	**Speed[1]**	**LOS/Density[1]**
Richards Blvd to I/J/L St	Weave	6,132	42	**F / 141**
I/J/L St to US-50/P St/Q St	Weave	5,634	**34**	**F / 99**
US-50/P St/Q St to Sutterville Rd	Basic	7,619	37	**F / 120**
Sutterville Rd to Seamas Ave	Basic	7,869	64	D / 32

Seamas Ave to 43rd Ave	Weave	7,486	61	D / 31
43rd Ave to Florin Rd	Basic	6,816	62	D / 33
Florin Rd to Pocket Rd	Diverge[3]	5,663	43	**F / 56**
Pocket Rd to Laguna Blvd	Basic	5,225	62	D / 29
Laguna Blvd to Elk Grove Blvd	Basic	3,507	53	E / 39
Elk Grove Blvd to Hood Franklin Rd	Basic	2,391	63	C / 21

Notes: Bold and underline font indicates speed below 35 mph or LOS F conditions.

1. Volume is reported in vehicles per hour, speed is reported in miles per hour, and density is reported in vehicles per lane per mile.
2. The distance between the Florin Road and Pocket Road ramps is less 3,000 feet, so no basic freeway segment exists. Instead, the worst ramp junction (merge or diverge) LOS is shown.

Source: Fehr & Peers, 2009

Table 2-12.4 Traffic Data (Existing NB AM Peak Volume and Speed)

EXISTING NORTHBOUND AM PEAK-HOUR VOLUME AND SPEED

Freeway Segment	Alt. 4, No Build		Alt. 2, Mixed Flow Addition		Alt. 1, Bus/Carpool Addition		Alt. 3, Bus/Carpool Conversion	
	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed
Hood Franklin Rd to Elk Grove Blvd	2,170	54	2,505	59	2,316	56	1,436	57
Elk Grove Blvd to Laguna Blvd	3,285	**21**	3,715	61	3,419	59	1,963	**14**
Laguna Blvd to Cosumnes River Blvd	3,998	**25**	5,218	60	4,752	**34**	2,317	**27**
Cosumnes River Blvd to Pocket Rd	4,092	**22**	4,984	59	4,722	**25**	2,542	**21**
Pocket Rd to Florin Rd	4,719	**17**	5,754	61	5,471	**19**	2,926	**21**
Florin Rd to 43rd Ave	5,546	**22**	7,386	**29**	6,252	**24**	4,017	**24**
43rd Ave to Seamas Ave	5,541	**18**	5,391	**19**	6,273	**23**	4,582	**21**
Seamas Ave to Sutterville Rd	7,385	**30**	8,868	**30**	8,122	**32**	5,202	**28**
Sutterville Rd to US-50/P St/Q St	7,395	61	8,738	61	8,025	62	5,568	40
US-50/P St/Q St to I/J/L St	6,636	57	6,814	56	6,701	58	6,432	**26**
I/J/L St to Richards Blvd	5,755	61	5,879	61	5,759	62	6,817	60
Peak Hour	7:15 – 8:15 AM		7:00 – 8:00 AM		7:15 – 8:15 AM		8:00 – 9:00 AM	

Notes: Bold and underline font indicates average speed less than 35 miles per hour. The average volume and speed for the peak hour are reported as vehicles per hour and miles per hour, respectively. The bus/carpool lane is included in the calculation of average volume and speed.

Source: Fehr & Peers, 2009

Table 2-12.5 Traffic Data (Existing SB PM Peak Volume and Speed)

EXISTING SOUTHBOUND PM PEAK-HOUR VOLUME AND SPEED								
Freeway Segment	**Alt. 4, No Build**		**Alt. 2, Mixed Flow Addition**		**Alt. 1, Bus/Carpool Addition**		**Alt. 3, Bus/Carpool Conversion**	
	Volume	**Speed**	**Volume**	**Speed**	**Volume**	**Speed**	**Volume**	**Speed**
Richards Blvd to I/J/L St	7,466	**<u>21</u>**	7,304	50	6,792	**<u>33</u>**	8,500	**<u>36</u>**
I/J/L St to US-50/P St/Q St	7,145	**<u>20</u>**	7,531	**<u>25</u>**	7,044	**<u>17</u>**	7,835	**<u>34</u>**
US-50/P St/Q St to Sutterville Rd	7,422	**<u>23</u>**	8,912	57	8,717	55	6,208	**<u>33</u>**
Sutterville Rd to Seamas Ave	7,568	**<u>31</u>**	9,053	64	8,966	63	6,475	64
Seamas Ave to 43rd Ave	7,625	**<u>32</u>**	9,060	62	9,018	61	6,660	61
43rd Ave to Florin Rd	6,626	**<u>28</u>**	8,632	59	7,913	61	5,843	52
Florin Rd to Pocket Rd	5,590	37	6,884	62	6,778	58	4,901	51
Pocket Rd to Cosumnes River Blvd	5,347	62	6,400	63	6,239	62	4,696	52
Cosumnes River Blvd to Laguna Blvd	5,254	62	6,204	63	6,071	61	4,541	49
Laguna Blvd to Elk Grove Blvd	3,507	59	3,329	63	4,111	63	3,091	62
Elk Grove Blvd to Hood Franklin Rd	2,413	63	2,974	64	2,860	62	2,191	63
Peak Hour	5:30 – 6:30 PM		4:30 – 5:30 PM		4:45 – 5:45 PM		5:30 – 6:30 PM	

Notes: Bold and underline font indicates average speed less than 35 miles per hour. The average volume and speed for the peak hour are reported as vehicles per hour and miles per hour, respectively. The bus/carpool lane is included in the calculation of average volume and speed.

Source: Fehr & Peers, 2009

Table 2-12.6 Traffic Data (2023 NB AM Peak Volume and Speed)

2023 NORTHBOUND AM PEAK-HOUR VOLUME AND SPEED								
- **Freeway Segment**	**Alt. 4, No Build**		**Alt. 2, Mixed Flow Addition**		**Alt. 1, Bus/Carpool Addition**		**Alt. 3, Bus/Carpool Conversion**	
	Volume	**Speed**	**Volume**	**Speed**	**Volume**	**Speed**	**Volume**	**Speed**
Hood Franklin Rd to Elk Grove Blvd	2,735	**<u>25</u>**	3,003	57	2,732	35	1,726	**<u>18</u>**
Elk Grove Blvd to Laguna Blvd	3,108	**<u>20</u>**	4,220	58	3,732	**<u>17</u>**	1,983	**<u>14</u>**
Laguna Blvd to Cosumnes River Blvd	3,648	**<u>22</u>**	5,801	**<u>31</u>**	4,368	**<u>26</u>**	2,453	**<u>28</u>**
Cosumnes River Blvd to Pocket Rd	3,979	**<u>21</u>**	5,692	**<u>23</u>**	4,595	**<u>23</u>**	2,705	**<u>21</u>**
Pocket Rd to Florin Rd	4,637	**<u>17</u>**	6,535	**<u>14</u>**	5,630	**<u>19</u>**	3,251	**<u>16</u>**
Florin Rd to 43rd Ave	5,518	**<u>22</u>**	7,237	**<u>23</u>**	6,449	**<u>24</u>**	4,212	**<u>19</u>**
43rd Ave to Seamas Ave	5,517	**<u>18</u>**	7,223	**<u>20</u>**	6,474	**<u>24</u>**	4,868	**<u>17</u>**
Seamas Ave to Sutterville Rd	7,394	**<u>30</u>**	8,958	**<u>29</u>**	8,311	**<u>32</u>**	5,362	**<u>28</u>**
Sutterville Rd to US-50/P St/Q St	7,517	60	8,917	61	8,409	60	5,702	39
US-50/P St/Q St to I/J/L St	6,914	56	7,138	54	7,083	53	6,478	**<u>26</u>**
I/J/L St to Richards Blvd	6,110	59	6,230	60	6,275	59	7,023	60
Peak Hour	7:00 – 8:00 AM		7:15 – 8:15 AM		7:15 – 8:15 AM		7:45 – 8:45 AM	

Notes: Bold and underline font indicates average speed less than 35 miles per hour. The average volume and speed for the peak hour are reported as vehicles per hour and miles per hour, respectively. The bus/carpool lane is included in the calculation of average volume and speed.

Source: Fehr & Peers, 2009

Table 2-12.7 Traffic Data (2023 SB PM Peak Volume and Speed)

2023 SOUTHBOUND PM PEAK-HOUR VOLUME AND SPEED

Freeway Segment	Alt. 4, No Build		Alt. 2, Mixed Flow Addition		Alt. 1, Bus/Carpool Addition		Alt. 3, Bus/Carpool Conversion	
	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed
Richards Blvd to I/J/L St	7,704	**25**	10,579	35	9,369	**31**	9,122	**28**
I/J/L St to US-50/P St/Q St	8,053	**26**	9,795	43	8,981	35	8,116	**29**
US-50/P St/Q St to Sutterville Rd	6,645	**19**	9,796	53	9,161	51	5,796	**26**
Sutterville Rd to Seamas Ave	6,588	**25**	9,888	63	9,135	44	5,795	**33**
Seamas Ave to 43rd Ave	6,787	**24**	10,001	62	9,070	39	5,976	**31**
43rd Ave to Florin Rd	6,025	**24**	9,520	57	7,987	**31**	5,267	**29**
Florin Rd to Pocket Rd	5,423	**29**	7,557	62	6,880	**28**	4,563	**40**
Pocket Rd to Cosumnes River Blvd	5,648	62	7,331	62	6,728	60	4,633	61
Cosumnes River Blvd to Laguna Blvd	5,667	58	7,061	**31**	6,449	45	4,540	54
Laguna Blvd to Elk Grove Blvd	3,898	53	3,740	64	4,382	63	3,104	62
Elk Grove Blvd to Hood Franklin Rd	2,824	63	3,379	63	3,103	61	2,263	63
Peak Hour	5:00 – 6:00 PM		5:15 – 6:15 PM		5:30 – 6:30 PM		5:30 – 6:30 PM	

Notes: Bold and underline font indicates average speed less than 35 miles per hour. The average volume and speed for the peak hour are reported as vehicles per hour and miles per hour, respectively. The bus/carpool lane is included in the calculation of average volume and speed.

Source: Fehr & Peers, 2009

Table 2-12.8 Traffic Data (2035 NB AM Peak Volume and Speed)

2035 NORTHBOUND AM PEAK-HOUR VOLUME AND SPEED

Freeway Segment	Alt. 4, No Build		Alt. 2, Mixed Flow Addition		Alt. 1, Bus/Carpool Addition		Alt. 3, Bus/Carpool Conversion	
	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed
Hood Franklin Rd to Elk Grove Blvd	2,871	**27**	3,607	56	2,756	**27**	1,697	**18**
Elk Grove Blvd to Laguna Blvd	3,278	**21**	4,779	**17**	3,992	**17**	2,018	**15**
Laguna Blvd to Cosumnes River Blvd	3,932	**24**	5,757	**26**	4,853	**29**	2,413	**28**
Cosumnes River Blvd to Pocket Rd	4,034	**22**	5,837	**24**	5,172	**25**	2,557	**20**
Pocket Rd to Florin Rd	4,838	**18**	6,671	**15**	6,202	**21**	3,423	**22**
Florin Rd to 43rd Ave	5,459	**22**	7,139	**22**	6,717	**25**	4,488	**25**
43rd Ave to Seamas Ave	5,457	**17**	7,144	**19**	6,733	**26**	5,366	**24**
Seamas Ave to Sutterville Rd	7,379	**30**	8,956	**29**	8,576	**32**	5,812	**29**
Sutterville Rd to US-50/P St/Q St	7,686	61	9,105	61	8,822	61	6,226	43

US-50/P St/Q St to I/J/L St	7,186	54	7,201	48	7,259	50	6,536	**26**
I/J/L St to Richards Blvd	6,638	59	6,598	59	6,665	58	7,318	60
Peak Hour	7:15 – 8:15 AM		7:15 – 8:15 AM		7:00 – 8:00 AM		7:30 – 8:30 AM	

Notes: Bold and underline font indicates average speed less than 35 miles per hour. The average volume and speed for the peak hour are reported as vehicles per hour and miles per hour, respectively. The bus/carpool lane is included in the calculation of average volume and speed.

Source: Fehr & Peers, 2009

Table 2-12.9 Traffic Data (2035 SB PM Peak Volume and Speed)

2035 SOUTHBOUND PM PEAK-HOUR VOLUME AND SPEED

Freeway Segment	Alt. 4, No Build		Alt. 2, Mixed Flow Addition		Alt. 1, Bus/Carpool Addition		Alt. 3, Bus/Carpool Conversion	
	Volume	Speed	Volume	Speed	Volume	Speed	Volume	Speed
Richards Blvd to I/J/L St	7,734	**27**	10,313	**35**	10,300	36	8,159	**26**
I/J/L St to US-50/P St/Q St	7,965	**29**	9,698	39	9,630	38	7,667	**25**
US-50/P St/Q St to Sutterville Rd	6,193	**18**	9,873	53	8,613	43	5,347	**24**
Sutterville Rd to Seamas Ave	6,140	**22**	10,045	63	8,499	**35**	5,270	**34**
Seamas Ave to 43rd Ave	6,412	**22**	10,188	62	8,519	**33**	5,512	**29**
43rd Ave to Florin Rd	5,784	**23**	9,666	57	7,658	**29**	4,908	**29**
Florin Rd to Pocket Rd	5,272	**26**	7,843	42	6,741	**27**	4,383	42
Pocket Rd to Cosumnes River Blvd	5,583	62	7,704	61	6,788	61	4,576	61
Cosumnes River Blvd to Laguna Blvd	5,409	62	7,069	60	6,333	61	4,480	61
Laguna Blvd to Elk Grove Blvd	3,786	56	3,844	64	4,458	63	3,106	62
Elk Grove Blvd to Hood Franklin Rd	2,802	63	3,633	63	3,270	63	2,348	63
Peak Hour	5:00 – 6:00 PM		5:15 – 6:15 PM		5:15 – 6:15 PM		5:15 – 6:15 PM	

Notes: Bold and underline font indicates average speed less than 35 miles per hour. The average volume and speed for the peak hour are reported as vehicles per hour and miles per hour, respectively. The bus/carpool lane is included in the calculation of average volume and speed.

Source: Fehr & Peers, 2009

Climate & Meterology

Assumed meteorological conditions are important factors in estimating CO concentrations. The meteorological conditions assumed for this air quality report are from the Transportation Project-Level Carbon Monoxide Protocol. The following meteorological assumptions were used:

Wind speed (U) =	0.5 m/sec
Wind Direction =	Worst
Atmospheric Stability Class =	7(G)
• Mixing Height =	1000
• Sigma Theta =	5 degrees

- Surface Roughness = 100
- Temperature = centimeter
- Altitude = 1.5 meters

Receptor Locations

The CALINE4 model estimates CO concentrations at specific locations. These locations are referred to as "receptors", and represent specific locations in the study area. For this air quality report, receptors were located according to guidelines presented in the *Transportation Project-Level Carbon Monoxide Protocol*. Thirty receptors (R1 through R30) were analyzed. For exact locations of these receptors, see Figures 2-12.1 to 4.

A summary of the results of the CALINE4 CO analysis for existing, 2017, 2023, and 2035, "No Build" and "Build" conditions are depicted in Tables 2-12.10, 11, 12, and 13. The results of all Build alternatives are below both federal and state air quality standards; the impact is considered less-than significant. The CALINE4 output files are included in Appendix B of the Air Quality Report, available from Caltrans.

Table 2-12.10 CO Concentrations. Alt. 4

CARBON MONOXIDE CONCENTRATIONS ON INTERSTATE-5 IN SACRAMENTO COUNTY FROM SOUTH OF ELK GROVE BOULEVARD US 50 (PM 9.7 to 22.5) (NO BUILD ALTERNATIVE)								
Receptor Number	"Existing"		20173		2023		2035	
	1 Hour Average	8 Hour Average	1 Hour Average	8 Hour Average	1 Hour Average	8 Hour Average	1 Hour Average	8 Hour Average
R 1	6.4	4.5	6.0	4.2	5.8	4.1	5.8	4.1
R 2	6.3	4.4	6.0	4.2	5.8	4.1	5.8	4.1
R 3	6.2	4.3	5.9	4.1	5.8	4.1	5.7	4.0
R 4	6.4	4.5	6.0	4.2	5.9	4.1	5.8	4.1
R 5	6.3	4.4	6.0	4.2	5.8	4.1	5.8	4.1
R 6	6.8	4.8	6.1	4.3	5.9	4.1	5.8	4.1
R 7	7.6	5.3	6.6	4.6	6.1	4.3	6.6	4.6
R 8	8.0	5.6	7.1	5.0	6.3	4.4	6.1	4.3
R 9	6.8	4.8	6.4	4.5	6.0	4.2	5.9	4.1
R 10	7.5	5.3	6.7	4.7	6.1	4.3	6.0	4.2
R 11	6.9	4.8	6.4	4.5	6.0	4.2	5.9	4.1
R 12	6.9	4.8	6.4	4.5	6.0	4.2	5.9	4.1
R 13	8.1	5.7	7.1	5.0	6.3	4.4	6.1	4.3
R 14	8.3	5.8	7.2	5.0	6.3	4.4	6.1	4.3
R 15	8.5	6.0	7.4	5.2	6.4	4.5	6.2	4.3
R 16	9.3	6.5	8.0	5.6	6.7	4.7	6.5	4.6
R 17	7.4	5.2	6.8	4.8	6.2	4.3	6.0	4.2
R 18	9.4	6.6	8.0	5.6	6.7	4.7	6.4	4.5
R 19	7.6	5.3	7.0	4.9	6.3	4.4	6.1	4.3
R 20	8.4	5.9	7.4	5.2	6.5	4.6	6.2	4.3
R 21	7.6	5.3	7.1	5.0	6.3	4.4	6.1	4.3
R 22	9.5	6.7	7.8	5.5	6.3	4.4	6.3	4.4
R 23	7.2	5.0	6.6	4.6	6.7	4.7	5.9	4.1
R 24	8.8	6.2	7.4	5.2	6.1	4.3	6.2	4.3
R 25	9.1	6.4	7.6	5.3	6.5	4.6	6.3	4.4
R 26	7.7	5.4	6.8	4.8	6.6	4.6	6.0	4.2
R 27	7.9	5.5	7.5	5.3	6.3	4.4	6.1	4.3
R 28	8.7	6.1	7.6	5.3	6.5	4.6	6.3	4.4
R 29	8.2	5.7	7.4	5.2	6.4	4.5	6.2	4.3
R 30	7.3	5.1	6.8	4.8	6.1	4.3	6.0	4.2

Note: All values are in parts per million (ppm)
State 1-hour standard for carbon monoxide is 20 ppm State 8-hour standard for carbon monoxide is 9 ppm For exact locations of receptors, see Figures 2-5
Source: CALINE4 microscale air quality dispersion model

Table 2-12.11 CO Concentrations, Alt. 1

CARBON MONOXIDE CONCENTRATIONS ON INTERSTATE-5 IN SACRAMENTO COUNTY FROM SOUTH OF ELK GROVE BOULEVARD US 50 (PM 9.7 TO 22.5) (BUS/CARPOOL [HOV] ALTERNATIVE)								
Receptor Number	**"Existing"**		**2017**		**2023**		**2035**	
	1 Hour Average	**8 Hour Average**	**1 Hour Average**	**8 Hour Average**	**1 Hour Average**	**8 Hour Average**	**1 Hour Average**	**8 Hour Average**
R 1	6.4	4.5	6.1	4.3	5.8	4.1	5.8	4.1
R 2	6.3	4.4	6.0	4.2	5.8	4.1	5.8	4.1
R 3	6.2	4.3	6.0	4.2	5.8	4.1	5.8	4.1
R 4	6.4	4.5	6.1	4.3	5.9	4.1	5.8	4.1
R 5	6.3	4.4	6.0	4.2	5.8	4.1	5.8	4.1
R 6	6.8	4.8	6.3	4.4	5.9	4.1	5.9	4.1
R 7	7.6	5.3	6.8	4.8	6.2	4.3	6.1	4.3
R 8	8.0	5.6	7.2	5.0	6.4	4.5	6.2	4.3
R 9	6.8	4.8	6.4	4.5	6.0	4.2	5.9	4.1
R 10	7.5	5.3	6.9	4.8	6.2	4.3	6.1	4.3
R 11	6.9	4.8	6.5	4.6	6.0	4.2	5.9	4.1
R 12	6.9	4.8	6.4	4.5	6.0	4.2	5.9	4.1
R 13	8.1	5.7	7.3	5.1	6.4	4.5	6.2	4.3
R 14	8.3	5.8	7.4	5.2	6.5	4.6	6.3	4.4
R 15	8.5	6.0	7.5	5.3	6.5	4.6	6.3	4.4
R 16	9.3	6.5	8.3	5.8	6.8	4.8	6.5	4.6
R 17	7.4	5.2	6.9	4.8	6.2	4.3	6.0	4.2
R 18	9.4	6.6	8.3	5.8	6.8	4.8	6.5	4.6
R 19	7.6	5.3	7.1	5.0	6.3	4.4	6.1	4.3
R 20	8.4	5.9	7.6	5.3	6.5	4.6	6.3	4.4
R 21	7.6	5.3	7.2	5.0	6.3	4.4	6.1	4.3
R 22	9.5	6.7	8.1	5.7	6.7	4.7	6.4	4.5
R 23	7.2	5.0	6.7	4.7	6.1	4.3	6.0	4.2
R 24	8.8	6.2	7.7	5.4	6.5	4.6	6.3	4.4
R 25	9.1	6.4	7.9	5.5	6.6	4.6	64	4.5
R 26	7.7	5.4	7.0	4.9	6.2	4.3	6.1	4.3
R 27	7.9	5.5	7.1	5.0	6.3	4.4	6.1	4.3
R 28	8.7	6.1	7.8	5.5	6.6	4.6	6.4	4.5
R 29	8.2	5.7	7.4	5.2	6.4	4.5	6.2	4.3
R 30	7.3	5.1	6.8	4.8	6.2	4.3	6.0	4.2

Note: All values are in parts per million (ppm)
State 1-hour standard for carbon monoxide is 20 ppm State 8-hour standard for carbon monoxide is 9 ppm For exact locations of receptors, see Figures 2-5
Source: CALINE4 microscale air quality dispersion model

Table 2-12.11 CO Concentrations, Alt. 2

CARBON MONOXIDE CONCENTRATIONS ON INTERSTATE-5 IN SACRAMENTO COUNTY FROM SOUTH OF ELVE BOULEVARD US 50 (PM 9.7 TO 22.5)
(MIXED-FLOW ALTERNATIVE)

Receptor Number	"Existing"		2017		2023		2035	
	1 Hour Average	8 Hour Average	1 Hour Average	8 Hour Average	1 Hour Average	8 Hour Average	1 Hour Average	8 Hour Average
R 1	6.4	4.5	6.1	4.3	5.8	4.1	5.8	4.1
R 2	6.3	4.4	6.1	4.3	5.8	4.1	5.8	4.1
R 3	6.2	4.3	6.0	4.2	5.8	4.1	5.8	4.1
R 4	6.4	4.5	6.2	4.3	5.9	4.1	5.8	4.1
R 5	6.3	4.4	6.0	4.2	5.8	4.1	5.8	4.1
R 6	6.8	4.8	6.4	4.5	6.0	4.2	5.9	4.1
R 7	7.6	5.3	6.9	4.8	6.3	4.4	6.1	4.3
R 8	8.0	5.6	7.2	5.0	6.5	4.6	6.3	4.4
R 9	6.8	4.8	6.4	4.5	6.0	4.2	5.9	4.1
R 10	7.5	5.3	6.9	4.8	6.3	4.4	6.1	4.3
R 11	6.9	4.8	6.5	4.6	6.1	4.3	6.0	4.2
R 12	6.9	4.8	6.4	4.5	6.1	4.3	5.9	4.1
R 13	8.1	5.7	7.3	5.1	6.5	4.6	6.3	4.4
R 14	8.3	5.8	7.4	5.2	6.5	4.6	6.3	4.4
R 15	8.5	6.0	7.4	5.2	6.6	4.6	6.4	4.5
R 16	9.3	6.5	8.3	5.8	7.0	4.9	6.7	4.7
R 17	7.4	5.2	6.9	4.8	6.3	4.4	6.1	4.3
R 18	9.4	6.6	8.2	5.7	7.0	4.9	6.7	4.7
R 19	7.6	5.3	7.1	5.0	6.4	4.5	6.2	4.3
R 20	8.4	5.9	7.6	5.3	6.7	4.7	6.4	4.5
R 21	7.6	5.3	7.1	5.0	6.5	4.6	6.2	4.3
R 22	9.5	6.7	8.3	5.8	6.9	4.8	6.6	4.6
R 23	7.2	5.0	6.8	4.8	6.2	4.3	6.0	4.2
R 24	8.8	6.2	7.8	5.5	6.7	4.7	6.5	4.5
R 25	9.1	6.4	8.1	5.7	6.8	4.8	6.5	4.5
R 26	7.7	5.4	7.1	5.0	6.3	4.4	6.2	4.3
R 27	7.9	5.5	7.3	5.1	6.4	4.5	6.2	4.3
R 28	8.7	6.1	7.9	5.5	6.7	4.7	6.4	4.5
R 29	8.2	5.7	7.5	5.3	6.5	4.6	6.3	4.4
R 30	7.3	5.1	6.8	4.8	6.2	4.3	6.1	4.3

Note: All values are in parts per million (ppm)
State 1-hour standard for carbon monoxide is 20 ppm State 8-hour standard for carbon monoxide is 9 ppm For exact locations of receptors, see Figures 2-5
Source: CALINE4 microscale air quality dispersion model

Table 2-12.13 CO Concentrations, Alt. 3

CARBON MONOXIDE CONCENTRATIONS ON INTERSTATE-5 IN SACRAMENTO COUNTY FROM SOUTH OF ELK GROVE BOULEVARD US 50 (PM 9.7 TO 22.5) (BUS/CARPOOL CONVERSION ALT)								
Receptor Number	"Existing"		2017		2023		2035	
	1 Hour Average	8 Hour Average	1 Hour Average	8 Hour Average	1 Hour Average	8 Hour Average	1 Hour Average	8 Hour Average
R 1	6.4	4.5	6.0	4.2	5.8	4.1	5.8	4.1
R 2	6.3	4.4	5.9	4.1	5.8	4.1	5.7	4.0
R 3	6.2	4.3	5.9	4.1	5.8	4.1	5.7	4.0
R 4	6.4	4.5	6.0	4.2	5.8	4.1	5.8	4.1
R 5	6.3	4.4	5.9	4.1	5.8	4.1	5.8	4.1
R 6	6.8	4.8	6.1	4.3	5.8	4.1	5.8	4.1
R 7	7.6	5.3	6.4	4.5	6.0	4.2	5.9	4.1
R 8	8.0	5.6	6.7	4.7	6.2	4.3	6.0	4.2
R 9	6.8	4.8	6.2	4.3	5.9	4.1	5.8	4.1
R 10	7.5	5.3	6.5	4.6	6.0	4.2	5.9	4.1
R 11	6.9	4.8	6.2	4.3	5.9	4.1	5.8	4.1
R 12	6.9	4.8	6.2	4.3	5.9	4.1	5.8	4.1
R 13	8.1	5.7	6.8	4.8	6.2	4.3	6.0	4.2
R 14	8.3	5.8	6.8	4.8	6.2	4.3	6.0	4.2
R 15	8.5	6.0	7.0	4.9	6.3	4.4	6.1	4.3
R 16	9.3	6.5	7.6	5.3	6.6	4.6	6.2	4.3
R 17	7.4	5.2	6.6	4.6	6.1	4.3	5.9	4.1
R 18	9.4	6.6	7.6	5.3	6.6	4.6	6.2	4.3
R 19	7.6	5.3	6.7	4.7	6.2	4.3	6.0	4.2
R 20	8.4	5.9	7.1	5.0	6.3	4.4	6.1	4.3
R 21	7.6	5.3	6.8	4.8	6.2	4.3	6.0	4.2
R 22	9.5	6.7	7.4	5.2	6.4	4.5	6.2	4.3
R 23	7.2	5.0	6.4	4.5	5.9	4.1	5.8	4.1
R 24	8.8	6.2	7.1	5.0	6.2	4.3	6.1	4.3
R 25	9.1	6.4	7.2	5.0	6.3	4.4	6.1	4.3
R 26	7.7	5.4	6.6	4.6	6.0	4.2	5.9	4.1
R 27	7.9	5.5	6.7	4.7	6.1	4.3	6.0	4.2
R 28	8.7	6.1	6.9	4.8	6.3	4.4	6.1	4.3
R 29	8.2	5.7	6.8	4.8	6.2	4.3	6.0	4.2
R 30	7.3	5.1	6.4	4.5	6.0	4.2	5.9	4.1

Note: All values are in parts per million (ppm)
State 1-hour standard for carbon monoxide is 20 ppm State 8-hour standard for carbon monoxide is 9 ppm For exact locations of receptors, see Figures 2-5
Source: CALINE4 microscale air quality dispersion model

VMT Analysis

Fehr & Peers conducted a vehicle miles travelled (VMT) analysis, which provides information about larger travel patterns and the efficiency of traffic operations. The results of the VMT analysis are also used to calculate air pollution and greenhouse gas emissions. Based on the research from Cervero, (*Cervero, R. (August 2002), Induced Travel Demand: Research Design, Empirical Evidence, and Normative Policies*), much of the change in VMT is anticipated to occur within a four-mile buffer on either side of the project area. This influence area is shown on the Fehr & Peers VMT Study Area Map in the figure section of the VMT analysis and includes SR 99, but is limited on the western edge by the boundary of the Sacramento River, given the limited number of river crossings.

The VMT results are sorted according to five mile-per hour "speed bins." In general, freeway facilities operate more efficiently and with fewer emissions at higher speeds. However for most pollutants and greenhouse gas emissions, the "sweet spot" of maximum efficiency occurs between 45 and 55 miles per hour. The results of the VMT analysis indicate that the alternatives with the greatest capacity (Alternatives 1 and 2) have the highest levels of VMT. The VMT results also indicate that the alternatives with the greatest capacity have the highest (and therefore more efficient) speeds.

Particulate Matter (PM)

Particulate matter (PM), a criteria air pollutant, consists of very small liquid and solid particles with an aerodynamic diameter less than or equal to a nominal 10 microns (about 1/7 the diameter of a single human hair) floating in the air that can include smoke, soot, dust, salts, acids, and metals. Particulate matter also forms when gases emitted from motor vehicles and industry undergoes chemical reactions in the atmosphere. Of greatest concern to public health are the particles small enough to be inhaled into the deepest parts of the lung. This includes fine particulate matter known as $PM_{2.5}$. In the western United States, there are sources of PM_{10} in both urban and rural areas. Major sources include motor vehicles, wood burning stoves and fireplaces, dust from construction, landfills, and agriculture, wildfires and brush/waste burning, industrial sources, and windblown dust from open lands. Based on PM_{10} monitoring records of the SMAQMD near the project area at 1309 T Street Air Quality Monitoring Station (Table 2-12.19), there is no PM_{10} exceedance of the primary federal 24-hour standard of 150 $\mu g/m^3$; therefore, there is no PM_{10}

violation to the NAAQS. The project is not located in a climate zone that requires heavy wintertime sanding operation for snow control nor does it have unpaved shoulder in loose material. Alternative 1 is designed to facilitate carpooling to move more passengers and reduce amount of passenger carrying vehicles on the highway, therefore relieve future traffic congestion and improve the level of service. Interagency consultation process was conducted through the Sacramento Area Council of Governments Regional Planning Partnership, concluding in March 2011 that this project is not a “Project of Air Quality Concern” for particulate matter (40 CFR 93.123(b)(1)(i) and (ii)). As such, there is no reason to believe that this project will contribute to a PM hot spot that will cause or contribute to violation of the PM NAAQS.

Tables 2-12.15 and 2-12.16 below depict the daily emissions between Build and No Build Alternatives for both PM_{10} and $PM_{2.5}$.

The total daily PM_{10} emission percentage differences between the Build and No Build alternatives showed changes range from -0.17% to 1.45%, and are much lower than existing emissions.

Table 2-12.15 Total PM_{10} Emissions (US Tons)

Alternatives	Existing	2023	2035
Alt. 4, No Build	0.2795	0.2374	0.2547
Alt. 2, Mixed-Flow Lanes		0.2370	0.2536
Alt. 1, HOV Lanes		0.2368	0.2534
Alt. 3, Lane Conversion		0.2397	0.2584

Table 2-12.16 PM_{10} Percentage Differences Between Build and No Build Alternatives

Alternatives	2023	2035
Alt. 2, Mixed Flow	-0.17%	-0.43%
Alt. 1, HOV Lanes	-0.25%	-0.51%
Alt. 3, Lane Conversion	0.97%	1.45%

Tables 2-12.17 and 2-12.18 show that the total daily $PM_{2.5}$ emission percentage differences between the Build and No Build alternatives showed changes range from -0.27% to 1.53%, and are much lower than existing emissions.

Table 2-12.17 Total $PM_{2.5}$ Emissions (US Tons)

Alternatives	Existing	202	2035
Alt. 4, No Build	0.2569	0.2195	0.2350
Alt. 2, Mixed-Flow Lanes		0.2189	0.2340
Alt. 1, HOV Lanes		0.2189	0.2340
Alt. 3, Lane Conversion		0.2216	0.2386

Table 2-12.18 $PM_{2.5}$ Percentage Differences Between Build and No Build Alternatives

Alternatives	2023	2035
Alt. 2, Mixed-Flow Lanes	-0.27%	-0.43%
Alt. 1, HOV Lanes	-0.27%	-0.43%
Alt. 3, Lane Conversion	0.96%	1.53%

Table 2-12.19 Ambient Air Quality Monitoring Data Measured at 1390 T Street Monitoring Station

POLLUTANT STANDARDS	2007	2008	2009
1-Hour Ozone			
Maximum 1-hour concentration (ppm)	0.109	0.107	0.102
1-hour California designation value	0.11	0.11	0.11
1-hour expected peak day concentration	0.105	0.105	0.103
Number of days standard exceeded[a]			
CAAQS 1-hour (>0.09 ppm)	2	7	3
8-Hour Ozone			
National maximum 8-hour concentration (ppm)	0.090	0.92	0.089
State maximum 8-hour concentration (ppm)	0.090	0.092	0.089
8-hour national designation value	0.078	0.079	0.077
8-hour California designation value	0.091	0.092	0.092
8-hour expected peak day concentration	0.091	0.094	0.092
Number of days standard exceeded[a]			
NAAQS 8-hour (>0.075 ppm)	2	9	4
CAAQS 8-hour (>0.070 ppm)	7	18	13
Particulate Matter (PM10)[d]			
National[b] maximum 24-hour concentration (µg/m3)	53.4	73.7	47.8
State[c] maximum 24-hour concentration (µg/m3)	57.4	70.9	50.7
State annual average concentration (µg/m3)[e]	20.4	25.1	19.9
National annual average concentration (µg/m3)	19.9	24.9	--
Number of days standard exceededa			
NAAQS 24-hour (>150 µg/m3)[f]	0	0	0
CAAQS 24-hour (>50 µg/m3)[f]	5	3	1

Particulate Matter (PM2.5)			
National[b] maximum 24-hour concentration (μg/m^3)	58.0	66.1	37.7
State[c] maximum 24-hour concentration (μg/m^3)	58.0	78.9	50.1
National annual designation value (μg/m^3)	--	--	10.8
National annual average concentration (μg/m^3)	11.9	10.9	9.5
State annual designation value (μg/m^3)	13	13	10
State annual average concentration (μg/m^3) [e]	--	--	9.5
Number of days standard exceeded[a]			
NAAQS 24-hour (>35 μg/m3)	19	5	1

Notes: CAAQS = California ambient air quality standards.
NAAQS = national ambient air quality standards.
--- = insufficient data available to determine the value.

[a] An exceedance not necessarily a violation.

[b] National statistics are based on standard conditions data. In addition, national statistics are based on samplers using federal reference or equivalent methods.

[c] State statistics are based on local conditions data, except in the South Coast Air Basin, for which statistics are based on standard conditions data. In addition, State statistics are based on California approved samplers.

[d] Measurements usually are collected every 6 days.

[e] State criteria for ensuring that data are sufficiently complete for calculating valid annual averages are more stringent than the national criteria.

[f] Mathematical estimate of how many days concentrations would have been measured as higher than the level of the standard had each day been monitored. *Sources:* California Air Resources Board 2009b

Carbon Dioxide (CO_2)

CT-EMFAC, a California-specific project-level analysis computer modeling tool designed to model criteria pollutants, developed by the joint efforts of the Caltrans and the Department of Civil and Environmental Engineering, University of California, was used to calculate the CO_2 emissions of this project for the purpose of comparing the build and no build alternatives. CO_2 emissions were also calculated using the EMFAC2011. However, Caltrans decided to use the more conservative numbers produced by the CT-EMFAC.

CO_2 is the most important anthropogenic green house gas and accounts for more than 75 percent of all anthropogenic green house gas emissions. Its long atmospheric lifetime (on the order of decades to centuries) ensures that atmospheric concentrations of CO_2 will remain elevated for decades after GHG mitigation efforts to reduce green house gas concentrations are promulgated (Intergovernmental Panel on Climate Change 2007).

Increasing concentrations of CO_2 in the atmosphere are primarily a result of emissions from the burning of fossil fuels, gas flaring, cement production, and land use changes. Three quarters of anthropogenic CO_2 emissions are the result of fossil fuel burning (and to a very small extent, cement production), and approximately one quarter of emissions are the result of land use change (Intergovernmental Panel on Climate Change 2007). Anthropogenic emissions of CO_2 have increased concentrations in the atmosphere most notably since the industrial revolution; the concentration of CO_2 has increased from about 280 ppm to 379 ppm over the last 250 years (Intergovernmental Panel on Climate Change 2001). The Intergovernmental Panel on Climate Change estimates that the present atmospheric concentration of CO_2 has not been exceeded in the last 650,000 years and is likely to be the highest ambient concentration in the last 20 million years (Intergovernmental Panel on Climate Change 2007; Intergovernmental Panel on Climate Change 2001).

The CT-EMFAC analysis results of estimated daily CO_2 for the project alternatives are listed in the following tables.

Table 2-12.20 Total CO_2 Emissions (US Tons)

Alternatives	Existing	2023	2035
Alt. 4, No Build	4,831.63	5,489.47	6,118.53
Alt. 2, Mixed-Flow Lanes		5,493.16	6,122.73
Alt. 1, HOV Lanes		5,490.01	6,119.85
Alt. 3, Lane Conversion		5,516.50	6,163.10

Table 2-12.21 CO_2 Percentage Differences between Build and No Build Alternatives

Alternatives	2023	2035
Alt. 2, Mixed-Flow Lanes	+0.067%	+0.069%
Alt. 1, HOV Lanes	+0.010%	+0.022%
Alt. 3, Lane Conversion	+0.492%	+0.728%

Tables 2-12.20 and 2-12.22 show the total daily CO2 emission percentage differences between the Build and No Build alternatives range from 0.010% to 0.728.

Nitrogen Oxides (NO_X) and Nitrogen Dioxide (NO_2)

Nitrogen dioxide (NO_2) is one of a group of highly reactive gasses known as "oxides of nitrogen," or "nitrogen oxides (NO_x)." Other nitrogen oxides include nitrous acid and nitric acid. While USEPA’s National Ambient Air Quality Standard covers this entire group of NO_x, NO_2 is the component of greatest interest and the indicator for the larger group of nitrogen oxides. NO_2 forms quickly from emissions from cars, trucks and buses, power plants, and off-road equipment. In addition to contributing to the formation of ground-level ozone, and fine particle pollution, NO_2 is linked with a number of adverse effects on the respiratory system.

On February 9, 2010, the Federal Register included the USEPA final rule which set a one-hour NO_2 standard at 100 parts per billion (ppb), effective on April 12, 2010. The agency is also keeping the existing annual average standard of 53 ppb. Sources of NO_2 include vehicles, power plants and other industrial emissions. NO_2 also contributes to formation of ozone and particulates. As part of its announcement, USEPA established new monitoring requirements in urban areas to measure NO_2 levels around major roads and within communities. USEPA plans to monitor near road NO_2 in 102 urban areas and community-wide concentrations in 53 urban areas. Designations were scheduled to occur in January 2012 based on the existing monitoring network. The new monitors will begin collecting data not later than January 1, 2013. Once the new monitors have collected three years of air quality data, USEPA intends to re-designate areas based on the data from the new monitoring network in 2016 or 2017.

The CT-EMFAC analysis results of estimated daily NO_x for this project are listed in the following table.

Table 2-12.22 Total NO_x Emissions (US Tons)

Alternatives	Existing	2023	2035
Alt. 4, No Build	7.1613	3.1402	2.0769
Alt. 2, Mixed-Flow		3.1527	2.0821
Alt. 1, HOV Lanes		3.1480	2.0828
Alt. 3, Lane Conversion		3.1455	2.0823

Table 2-12.23 NO_X Percentage Differences between Build and No Build Alternatives

Alternatives	2	2035
Alt. 2, Mixed-Flow Lanes	+0.398%	+0.250%
Alt. 1, HOV Lanes	+0.248%	+0.284%
Alt. 3, Lane Conversion	+0.169%	+0.260%

Tables 2-12.22 and 2-12.23 show the total daily NO_X emission percentage differences between the Build and No Build alternatives range from 0.169% to 0.398%, and are much lower than the existing emissions.

Reactive Organic Gas (ROG)

Reactive organic gases (ROG), also known as volatile organic compounds (VOC), are photochemically reactive hydrocarbons that are important for ozone formation. Ozone (O_3), a secondary pollutant, is a gas composed of three oxygen atoms. It is not usually emitted directly into the air, but at ground-level it is created by a chemical reaction between NO_x and ROG in the presence of sunlight. Sunlight and hot weather cause ground-level ozone to form in harmful concentrations in the air. As a result, it is known as a summertime air pollutant. The primary sources of ROG are petroleum transfer and storage, oil and gas production, mobile sources, organic solvent use, farming operations, and miscellaneous processes. No separate health standards exist for ROG as a group. California Air Resource Board (CARB) defines ROG as a photochemically reactive chemical gas, composed of non-methane hydrocarbons that may contribute to the formation of smog. The CT-EMFAC analysis results of estimated daily ROG emission for this project are listed in the following table.

Table 2-12.24 Total ROG Emissions (US Tons)

Alternatives	Existing	2023	2035
Alt. 4, No Build	1.68570	1.03459	0.89373
Alt. 2, Mixed-Flow Lanes		1.03008	0.88867
Alt. 1, HOV Lanes		1.03005	0.88891
Alt. 3, Lane Conversion		1.04326	0.90409

Table 2-12.25 ROG Percentage Differences between Build and No Build Alternatives

Alternatives	2023	2035
Alt. 2, Mixed-Flow Lanes	-0.44%	-0.57%
Alt. 1, HOV Lanes	0.44%	0.54%
Alt. 3, Lane Conversion	0.84%	1.16%

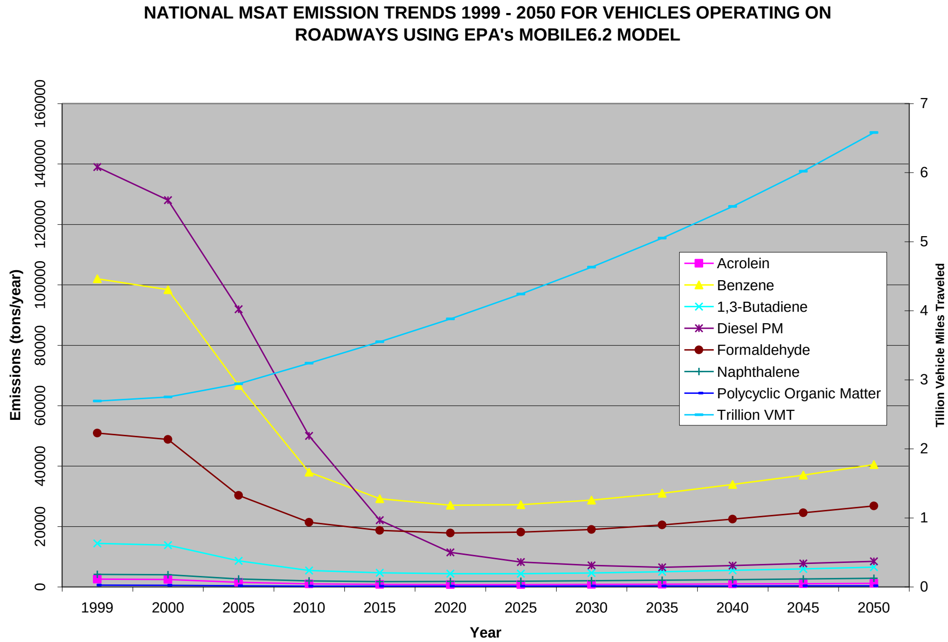
LONG TERM AIR QUALITY EFFECTS

Mobile Source Air Toxics

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the USEPA regulate 188 air toxics, also known as hazardous air pollutants. The USEPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/ncea/iris/index.html). In addition, USEPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA rule requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using USEPA's MOBILE6.2 model, even if vehicle activity (vehicle miles travelled, or VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in Figure 2-12.5.

Figure 2-12.5 National MSAT Emission Trends 199 – 2050 for Vehicles Operating on Roadways Using USEPA's Mobile 6.2 Model



Note:
(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors.

Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of the NEPA.

Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, Caltrans is expected by the public and other agencies to address MSAT impacts in environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

For each alternative in this analysis, the amount of MSAT emitted would be proportional to VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for each of the build alternatives is slightly higher than that for the no build alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network.

Table 2-12.26 Comparison of Change in Lane-Miles and Vehicle Miles Traveled (VMT) for the Build Alternatives

Add Mixed Flow Lane Alternative			**Add Bus/Carpool Lane Alternative**			**Convert Bus/Carpool Lane Alternative**		
% Change in Lane-Miles	% Change in VMT[1]	Elasticity of Travel Demand[2]	% Change in Lane-Miles	% Change in VMT[1]	Elasticity of Travel Demand[2]	% Change in Lane-Miles	% Change in VMT[1]	Elasticity of Travel Demand[2]
21.6%	4.4%	0.2	21.6%	3.1%	0.1	0.0%	-4.3%	N/A

Notes:

[1] VMT = vehicle-miles traveled

[2] Elasticity of travel demand defined as change in vehicle-miles traveled over change in lane-miles

Source: Fehr & Peers, 2009

This increase in VMT would lead to higher MSAT emissions for Alternative 1 along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to USEPA's MOBILE6.2 model, emissions of all of the priority MSAT except for diesel particulate matter decrease as speed increases. Because the estimated VMT under each of the alternatives are nearly the same, varying by less than five percent, it is expected there would be no appreciable difference in overall MSAT emissions among the various alternatives. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the USEPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

For each alternative in this analysis, the amount of MSAT emitted would be proportional to the VMT assuming that other variables such as fleet mix are the same for each alternative. The VMT for both Alternative 2 (+ 4.4%) and Alternative 1 (+ 3.1%) is slightly higher than that for Alternative 4 and Alternative 3 (- 4.3%), because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network.

Caltrans performed an analysis following the procedure specified in the FHWA's September 2009 "Interim Guidance Update on Mobile Source Air Toxic (MSAT) Analysis in NEPA". FHWA developed a tiered approach for analyzing MSAT in NEPA documents, depending on specific project circumstances. The FHWA has identified three levels of qualitative MSAT analysis:

1. **Exempt Projects or Projects with No Meaningful MSAT Impacts:** Exempt projects typically include those with no effects on traffic volume or vehicle mix. Projects qualifying as categorical exclusions under 23 CFR 771.117I or that are exempt from CAA conformity under 40 CFR 93.126 are also considered projects with no meaningful MSAT impacts.
2. **Projects with Low Potential MSAT Effects:** These projects have average annual daily trips less than 140,000 per day and for which the project does not add substantially to the number of trips. In California, the corresponding average annual daily traffic (AADT) thresholds are 100,000 on urban nonfreeways and 50,000 on rural nonfreeways. In addition, California has a third criterion, which states that if freeway modifications are to be completed more than 500 to 1,000 ft from a sensitive land use (e.g., residences, schools, day care centers, playgrounds, and medical facilities), the project will result in low potential MSAT effects (Brady pers. comm.; California ARB 2005). These projects are usually evaluated qualitatively.
3. **Projects with Higher Potential MSAT Effects:** These projects typically are those that have average annual daily trips exceeding 140,000 per day and that have the potential to significantly increase diesel particulate matter exhaust. In California, the corresponding AADT thresholds are 100,000 on urban nonfreeways and 50,000 on rural nonfreeways. In addition, California considers a project to have a higher potential MSAT effect if modifications to freeways are proposed to take place within 500 to 1,000 ft of sensitive land uses (Brady pers. comm.; California ARB 2005). These projects require a quantitative evaluation.

This project qualifies under Level 2, "Qualitative analysis for projects with low potential MSAT effects---The types of projects included in this category are those that serve to improve operations of highway…." Therefore, this analysis is following such guideline.

MSAT Analysis Methodology. The basic procedure for analyzing emissions for on-road MSATs is to calculate emission factors using EMFAC2011 and apply the emission factors to speed and VMT data specific to the project. EMFAC2011 is the emission inventory model developed by the CARB that calculates emission inventories for motor vehicles operating on roads in California. The emission factors information used in this analysis is from EMFAC2011 and is specific to the Sacramento Valley Basin.

This analysis focuses on seven MSAT pollutants identified by the USEPA as being the highest-priority MSATs. The seven pollutants are: acrolein, benzene, 1,3-butadiene, diesel PM, formaldehyde, naphthalene, and polycyclic organic matter. EMFAC2011 provides emission factor information for diesel PM, but does not provide emissions factors for the remaining six MSATs. Each of the remaining six MSATs, however, is a constituent of motor vehicle total organic gas emissions, and EMFAC2011 provides emission factors for total organic gas. The ARB has supplied Caltrans with "speciation factors" for each of the remaining six MSATs not directly estimated by EMFAC2011.[10] Each speciation factor represents the portion of total organic gas emissions estimated to be a given MSAT. For example, if a speciation factor of 0.03 is provided for benzene, its emissions level is estimated to be 3 percent of total organic gas emissions, utilizing the speciation factor as a multiplier once total organic gas emissions are known. This analysis used the ARB-supplied speciation factors to estimate emissions of the aforementioned six MSATs as a function of total organic gas emissions.

The University of California, Davis, in cooperation with Caltrans, developed a spreadsheet tool that incorporates EMFAC2011 emission factors, ARB speciation factors, and project-specific traffic activity data such as peak- and off-peak-hour VMT, speed, travel times, and traffic volumes. The spreadsheet tool applies the traffic activity data to the emission factors and estimates MSAT emissions for base-case (with "No Build" Alternative) and Build Alternative scenarios. Results were

[10] As of June 2011, speciation factors are not available for naphthalene and polycyclic organic matter.

produced for the opening year (2017) and the horizon year (2035). The 2017 and 2035 analyses compared "No Build" conditions to expected conditions resulting from implementation of the project. The spreadsheet used in this analysis is based on FHWA's 2006 MSAT guidance. Once speciation factors for naphthalene and polycyclic organic matter have been established, a new spreadsheet will be developed that is capable of calculating a project's emissions for all seven MSATs.
The analysis uses the MSATs tool, CT-EMFAC, developed by the University of California, Davis. The method utilizes the California Air Resources Board's (CARB's) EMFAC2007 on-road emissions model, related MSATs data provided by CARB, and activity data provided by the project analyst. The results of the analysis are detailed in the following table.

Table 2-12.27 MSATs Total Emissions (Tons per day)

Pollutant Name	Diesel_PM	FORMALDEHYDE	BUTADIENE	BENZENE	ACROLEIN	ACETALDEHYDE
existing	0.14010	0.05665	0.00696	0.04013	0.00151	0.02311
2023 No Build	0.06902	0.03111	0.00373	0.02319	0.00080	0.01273
2023 Mixed Flow	0.06918	0.03101	0.00374	0.02316	0.00081	0.01267
2023 HOV	0.06908	0.03100	0.00373	0.02314	0.00080	0.01267
2023 Conversion	0.06932	0.03135	0.00375	0.02337	0.00081	0.01283
2035 No Build	0.05620	0.02654	0.00335	0.02057	0.00072	0.01076
2035 Mixed-Flow	0.05624	0.02642	0.00335	0.02052	0.00073	0.01070
2035 HOV	0.05625	0.02641	0.00336	0.02055	0.00073	0.01069
2035 Conversion	0.05651	0.02681	0.00338	0.02078	0.00073	0.01088

Table 2-12.28 MSATs Percentage Differences between Build and No Build Alternatives

Pollutant Name	Diesel_PM	FORMALDEHYDE	BUTADIENE	BENZENE	ACROLEIN	ACETALDEHYDE
2023 Mixed Flow	0.232%	-0.321%	0.268%	-0.129%	1.250%	-0.471%
2023 HOV	0.087%	-0.354%	0.000%	-0.216%	0.000%	-0.471%
2023 Conversion	0.435%	0.771%	0.536%	0.776%	1.250%	0.786%
2035 Mixed-Flow	0.071%	-0.452%	0.000%	-0.243%	1.389%	-0.558%
2035 HOV	0.089%	-0.490%	0.299%	-0.097%	1.389%	-0.651%
2035 Conversion	0.552%	1.017%	0.896%	1.021%	1.389%	1.115%

As shown in Table 2-12.28, implementation of the proposed project alternatives would result in the release of MSAT emissions within the project vicinity. However, the proposed project's increase in MSAT emissions would be negligible.

In summary, Alternative 1 would result in a small increase in localized MSAT emissions. However, the USEPA's vehicle and fuel regulations, coupled with fleet turnover, will cause substantial reductions over time that will cause region-wide MSAT levels to be substantially lower than they are today.

2.12.5 Avoidance and Minimization Measures

The contractor is required to comply with all pertinent and legally enforceable rules and regulations of the Sacramento Metropolitan Air Quality Management District (SMAQMD). The Contractor is required to comply with Caltrans' *Standard Specifications* Sections 14-9.01 ("Air Pollution Control" and 14-9.02 ("Dust Control"). Section 7, "Legal Relations and Responsibility," addresses the Contractor's responsibility on many items of concern, such as: air pollution; protection of lakes, streams, reservoirs, and other water bodies; use of pesticides; safety; sanitation; convenience of the public; and damage or injury to any person or property as a result of any construction operation.

2.12.6 Mitigation Measures

Construction Mitigation

Caltrans Standard Specifications for construction (Sections 10 and 18 for dust control and Section 39-3.06 for asphalt concrete plants) will be adhered to in order to reduce emissions generated by construction equipment.

The best available control measures shall be incorporated into the project commitments. With implementation of standard construction measures (providing 50 percent effectiveness) such as frequent watering (e.g., minimum twice per day), fugitive dust and exhaust emissions from construction activities would not result in any adverse air quality impacts with implementation of the project.

Implementation of the following measures would help to reduce construction impacts:

- **Measure AIR-1:** The contractor shall obtain all necessary Sacramento County permits and approvals and shall follow all required County laws and procedures and respect to BMPs, grading and excavation for the proposed project and all construction related and emission generating activities.

- **Measure AIR-2:** Construction of the project shall comply with all applicable Sacramento County APCD codes for Best Management Practices, Grading Standards, and Air Quality Control.

- **<u>Mitigation Measure AIR-3:</u>** The contractor and all of the general contractor's subcontractors and suppliers to comply with all the terms and conditions of all project permits, approvals and conditions of the Sacramento County.

Wet suppression and wind speed reduction are the two most common methods used to control open dust sources at construction sites because a source of water and material for wind barriers tend to be readily available on a construction site.

2.13 Noise

This noise analysis evaluates the effects of the proposed project on the noise environment and discusses noise abatement measures for affected areas. Caltrans completed the Noise Study Report for this project in April 2008. This report reflects the existing conditions today, since nothing has changed to change the noise levels in the project area.

2.13.1 Regulatory Setting

NEPA 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.

2.13.1.1 CEQA

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 such measures are not feasible.

2.13.1.2 NEPA and 23 CFR 772

For highway transportation projects with FHWA (and Caltrans, as assigned) involvement, the Federal-Aid Highway Act of 1970 and the associated 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 contain 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 dBA) is lower than the NAC for commercial areas (72 dBA). The following table lists the noise abatement criteria for use in the NEPA-23 CFR 772 analysis.

Figure 2.13-1 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.

Table 2-13.1 Noise Abatement Criteria

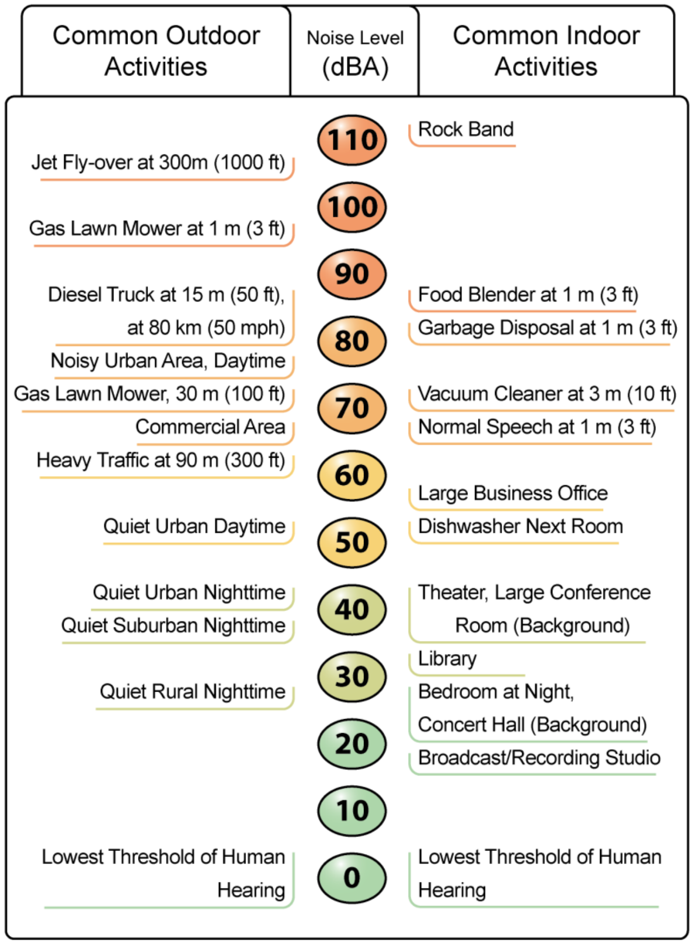
Activity Category	NAC, Hourly A-Weighted Noise Level, dBA L_{eq}(h)	Description of Activities
A	57 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Exterior	Picnic areas, recreation areas, playgrounds, active sport areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	72 Exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	–	Undeveloped lands.
E	52 Interior	Residence, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

In accordance with Caltrans' *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects (Noise Protocol)* (Caltrans, 2006d), a noise impact occurs when the future noise level with the project results in a substantial increase in 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. A copy of the noise protocol can be obtained at www.dot.ca.gov/ser/vol1/sec3/physical/ch12noise/chap12noise.htm.

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.

Caltrans' *Noise Protocol* sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 5 dBA reduction in the future noise level must be achieved for an abatement measure to be considered feasible. Other considerations include topography, access requirements, other noise sources, and safety considerations. The reasonableness determination is basically a cost-benefit analysis. Factors used in determining whether a proposed noise abatement measure is reasonable include: residents' acceptance, the absolute noise level, build versus existing noise, environmental impacts of abatement, public and local agencies input, newly constructed development versus development pre-dating 1978, and the cost per benefited residence.

Figure 2-13.1 Noise Levels of Common Activities



2.13.2 Affected Environment

The existing noise environment throughout the project corridor varies by location, proximity to I-5, other noise sources, the relative highway and local elevations and terrain, and any intervening structures or barriers. There is a mix of single-family and multi-family residential, commercial, industrial, and open space land uses throughout the project area.

2.13.3 Methodology

Study methods and procedures used in the noise analysis are consistent with requirements and guidance provided in 23 CFR 772 and the *Noise Protocol*. Below is a summary of the steps taken to determine if implementation of the proposed project would result in traffic noise impacts. FHWA's Traffic Noise Model Version 2.5 (TNM 2.5) was used for this analysis. According to the model, the predicted increase in traffic noise due to the proposed project would be from 1 to 2 dBA. This increase in noise not perceptible. An increase of 5 dBA is readily perceptible.

2.13.3.1 Identification of Sensitive Receiver Locations

Noise sensitive receivers that could be exposed to traffic noise impacts from the project were identified from aerial photographs and field visits to the project site. Due to the length and complexity of this project, the traffic noise analysis was divided into seven areas (See Figures 2-13.2 through 2-13.8). Category B land uses, in the form of single-family homes, apartment complexes, a youth sporting complex, a hotel, and a church were identified. There are no Category C land uses in the project area that would be considered to benefit from a lower noise level.

2.13.3.2 Measurement of Existing Sound Levels

The existing noise environment in the project area was characterized by conducting short-term noise measurements. The majority of the noise measurements were taken between March and November 2007. Three additional measurements were taken in June 2008. Short-term noise measurements were taken at 79 locations for a duration of 10 minutes each. A table of each receiver by address and measurement results can be found in Appendix E. Every effort was made to ensure that sound level data included in the short-term measurements were limited to traffic noise. The sound meters were stopped if a significant non-traffic source of noise, such as an aircraft flyover, occurred during the measurement period. Long-term measurements were also taken in select locations to quantify the existing worst-hour noise levels.

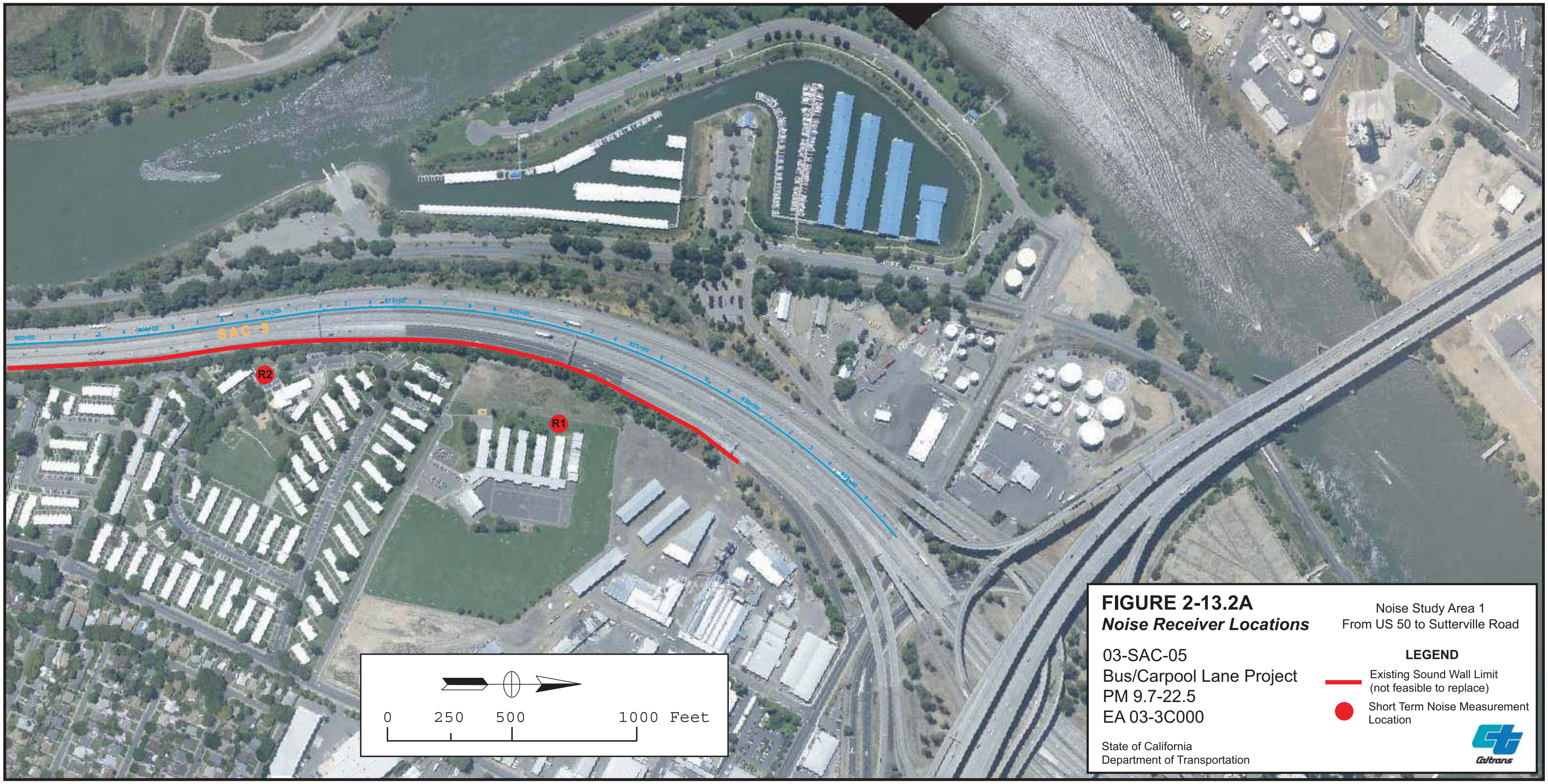


FIGURE 2-13.2A
Noise Receiver Locations

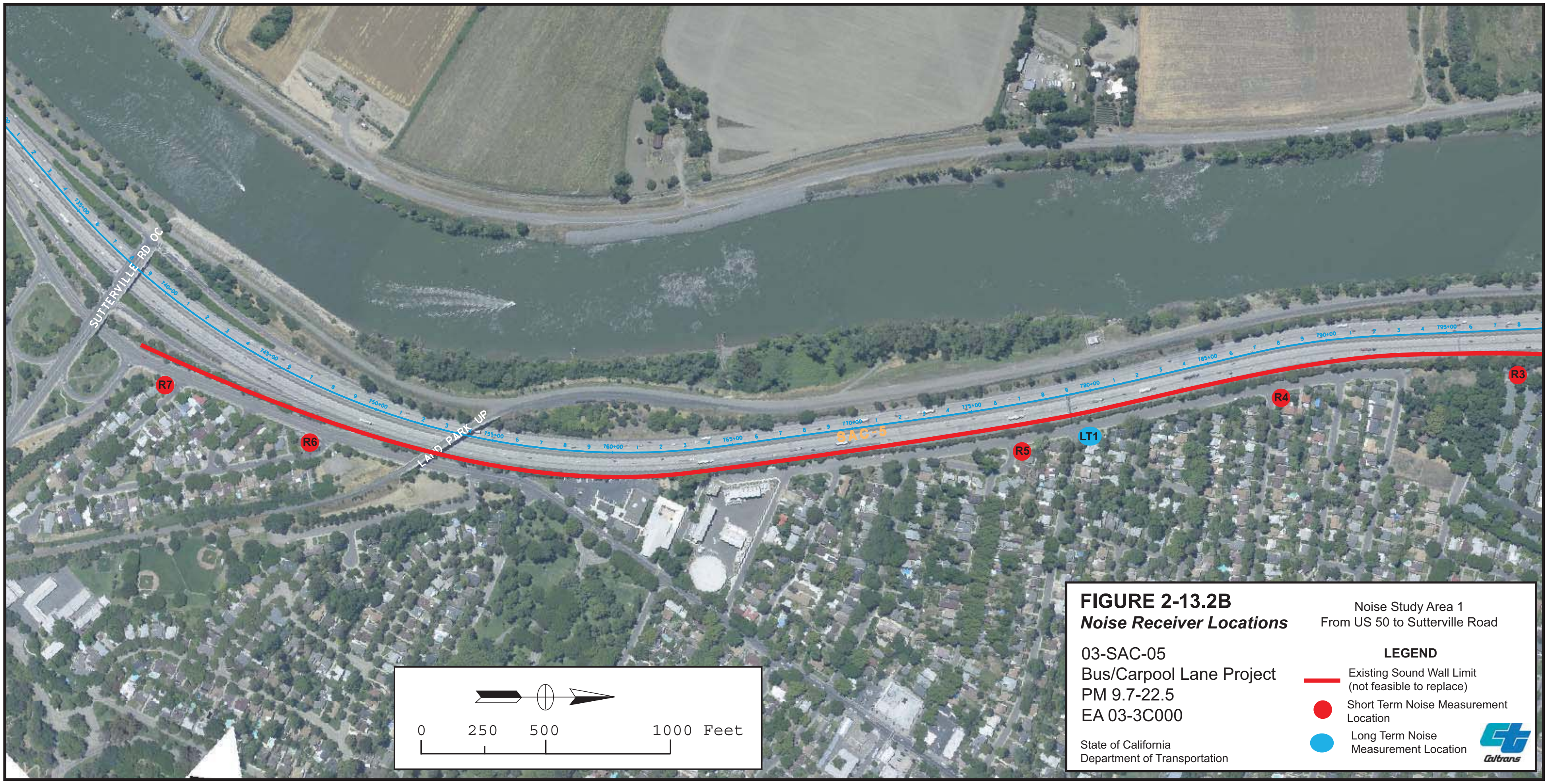


FIGURE 2-13.2B
Noise Receiver Locations

03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000

State of California
Department of Transportation

Noise Study Area 1
From US 50 to Sutterville Road

LEGEND

Existing Sound Wall Limit (not feasible to replace)

Short Term Noise Measurement Location

Long Term Noise Measurement Location

Caltrans

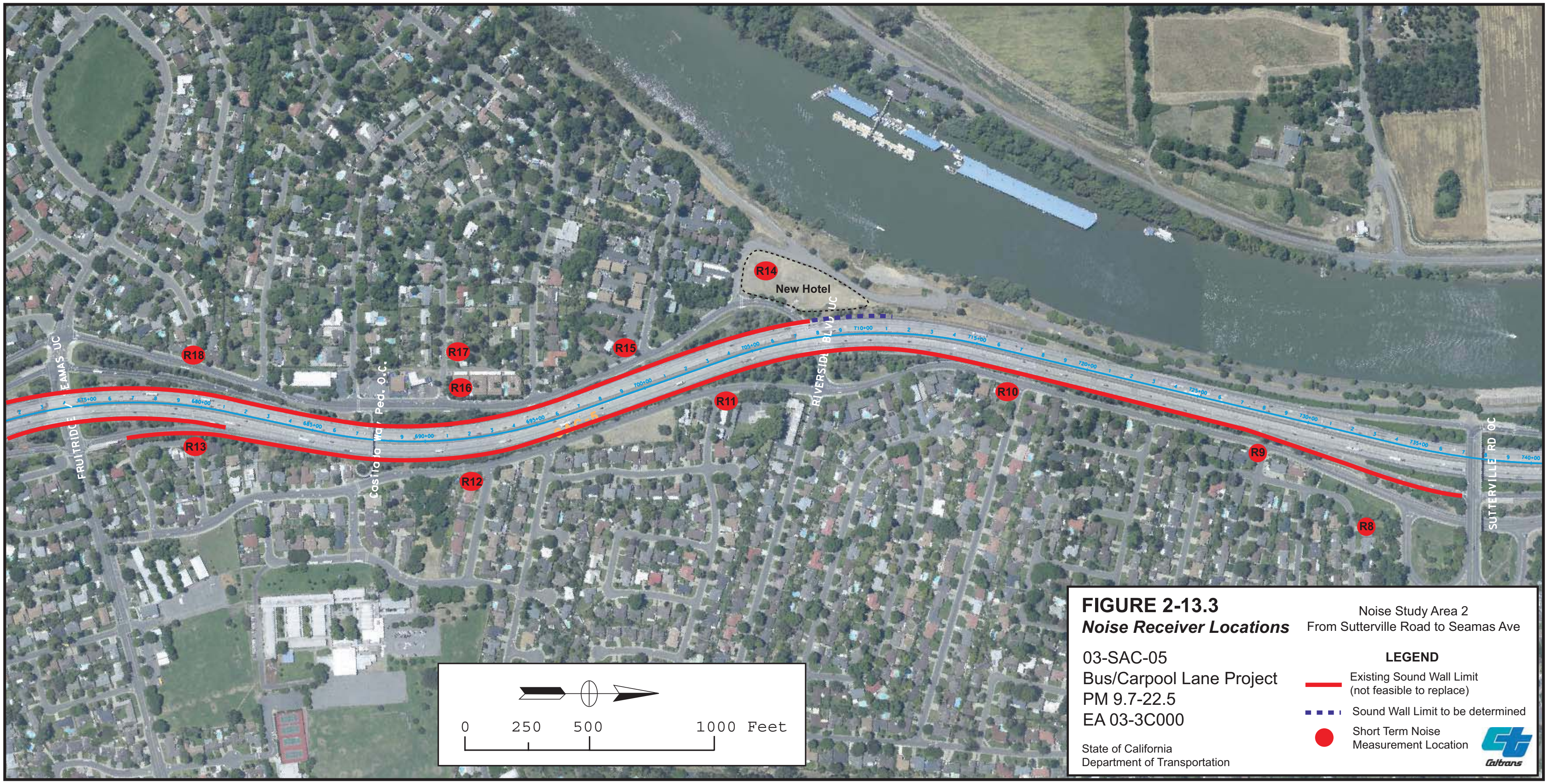


FIGURE 2-13.3
Noise Receiver Locations

03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000

State of California
Department of Transportation

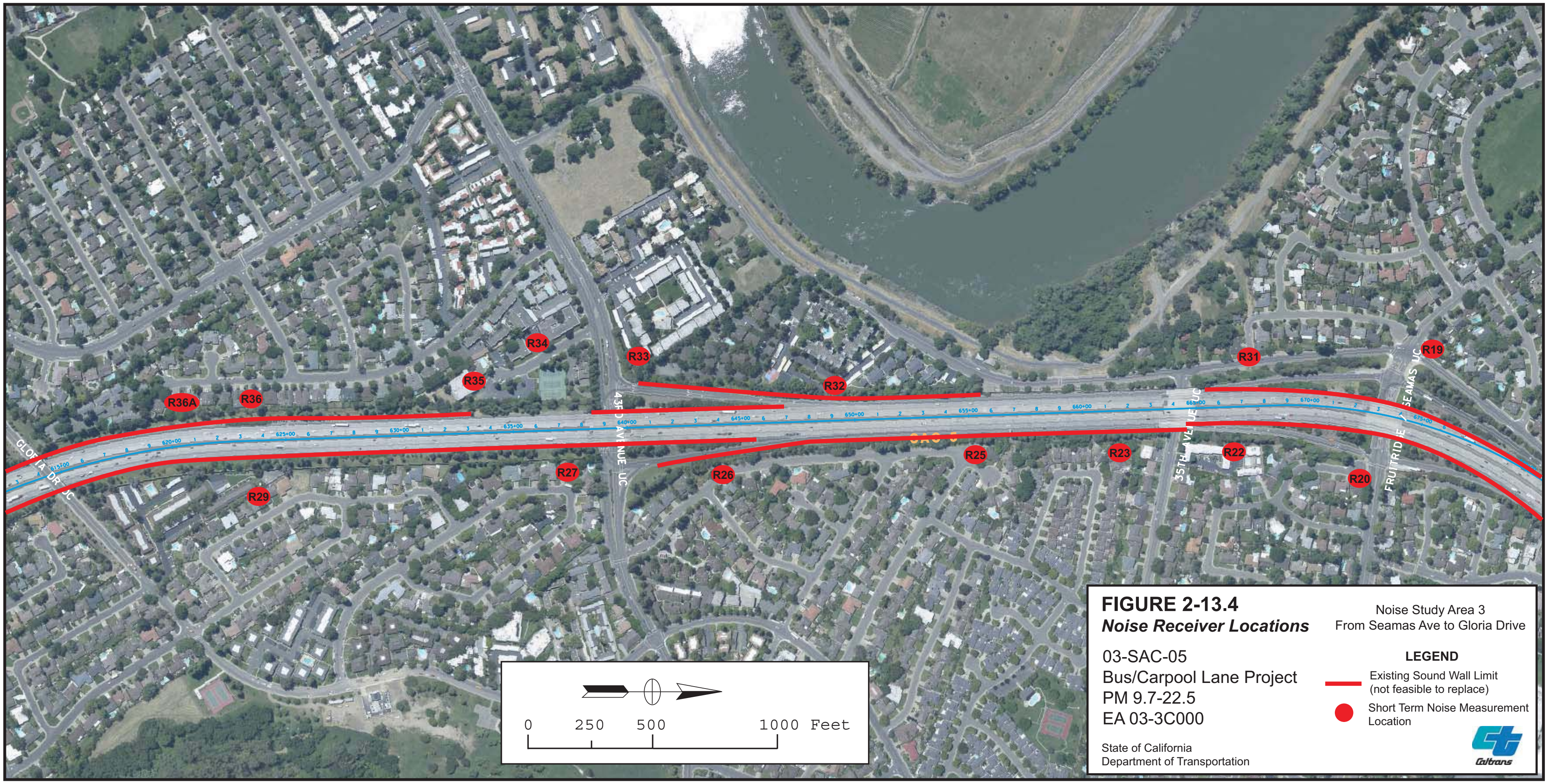
Noise Study Area 2
From Sutterville Road to Seamas Ave

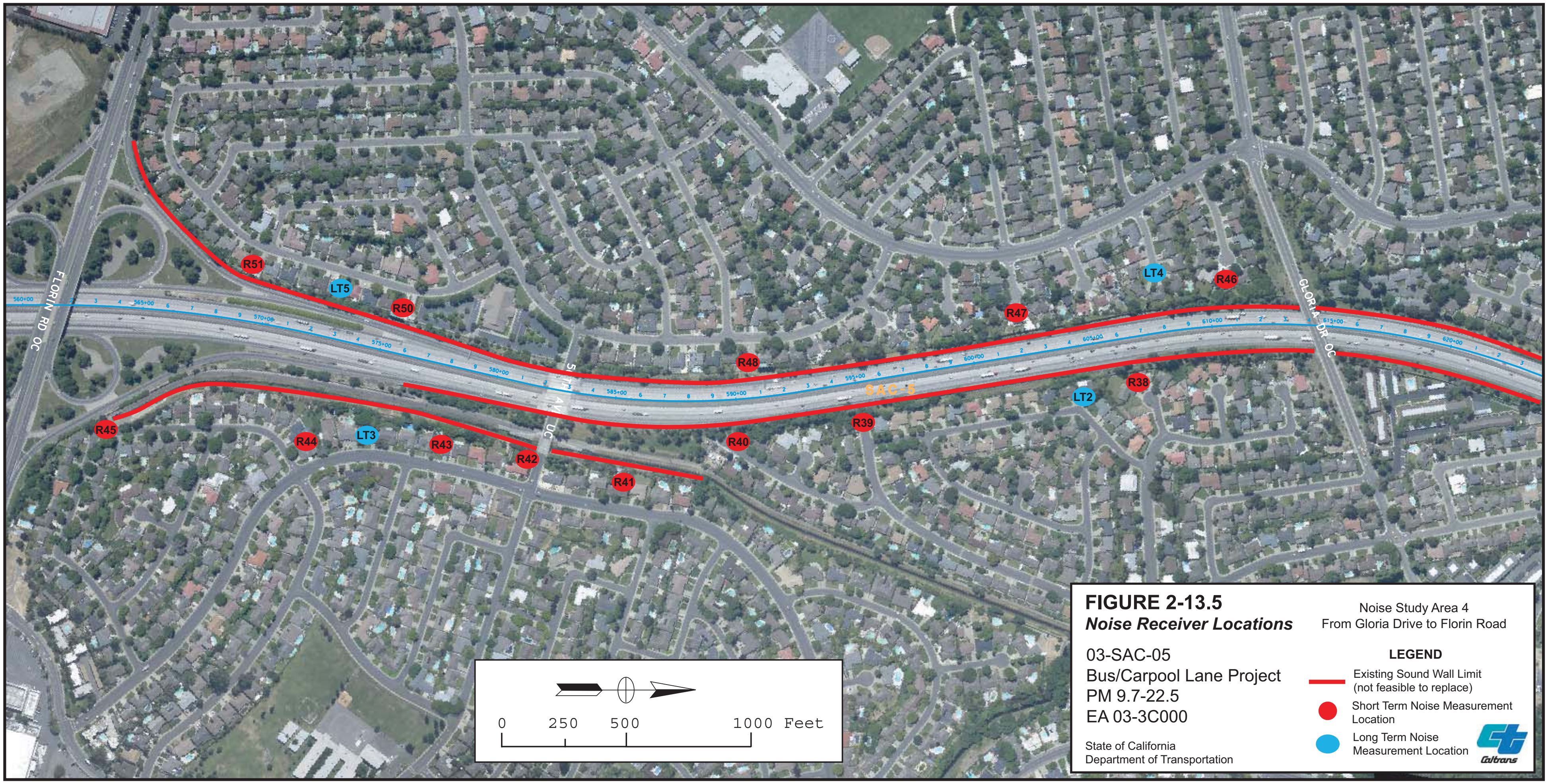
LEGEND

Existing Sound Wall Limit (not feasible to replace)

Sound Wall Limit to be determined

Short Term Noise Measurement Location


R36A
R36
R35
R34
R33
R32
R31
R19
R29
R27
R26
R25
R23
R22
R20
GLORIA DR UC
43RD AVENUE UC
35TH AVENUE UC
FRUITRIDGE
SEAMAS UC
0 250 500 1000 Feet
FIGURE 2-13.4
Noise Receiver Locations
Noise Study Area 3
From Seamas Ave to Gloria Drive
03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000
LEGEND
Existing Sound Wall Limit
(not feasible to replace)
Short Term Noise Measurement
Location
State of California
Department of Transportation
Caltrans


FLORIN RD OC
GLORIA DR OC
SAC-5
R38
R39
R40
R41
R42
R43
R44
R45
R46
R47
R48
R50
R51
LT2
LT3
LT4
LT5
0 250 500 1000 Feet
FIGURE 2-13.5
Noise Receiver Locations
03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000
State of California
Department of Transportation
Noise Study Area 4
From Gloria Drive to Florin Road
LEGEND
Existing Sound Wall Limit
(not feasible to replace)
Short Term Noise Measurement Location
Long Term Noise Measurement Location
Caltrans

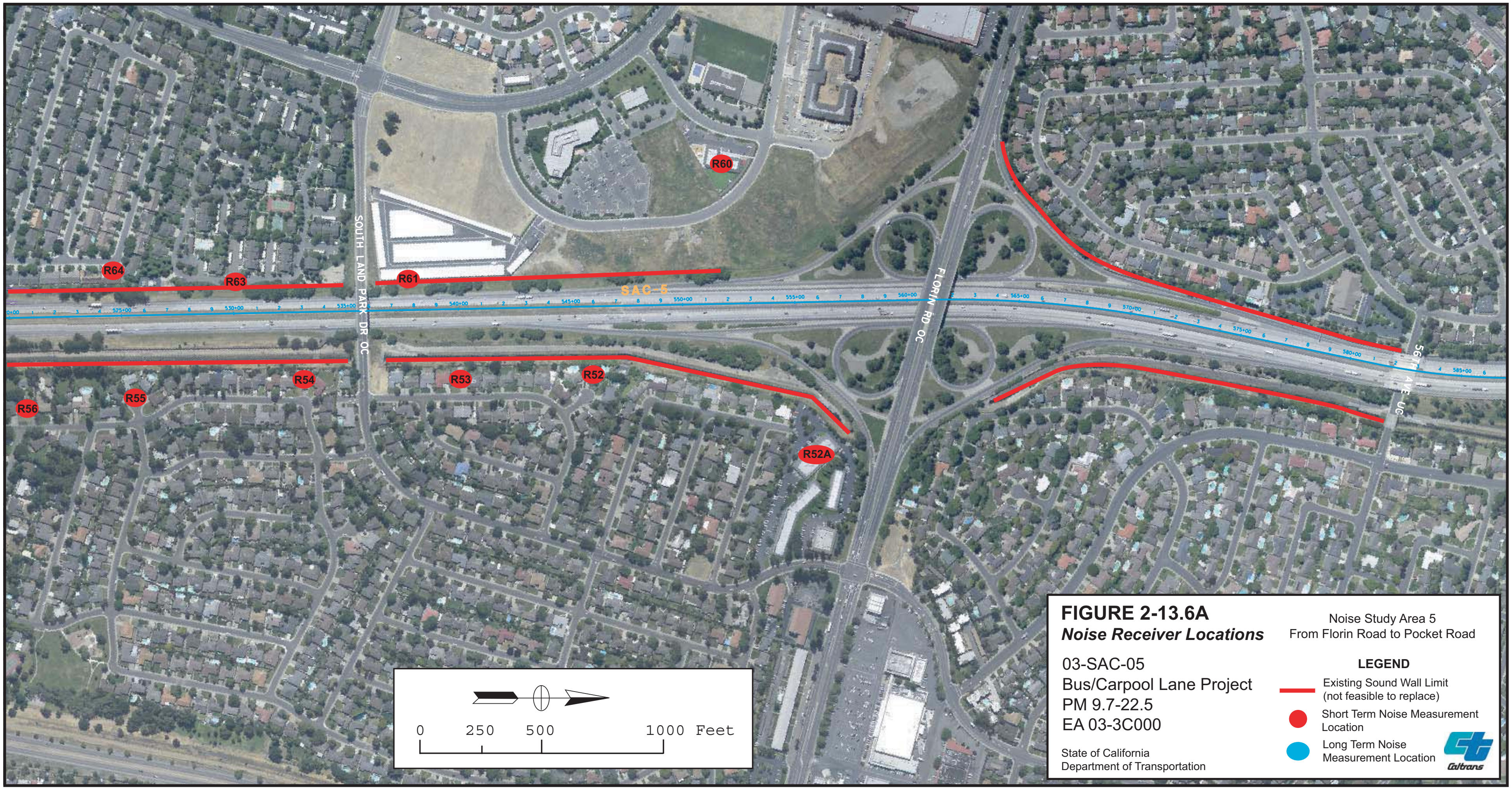
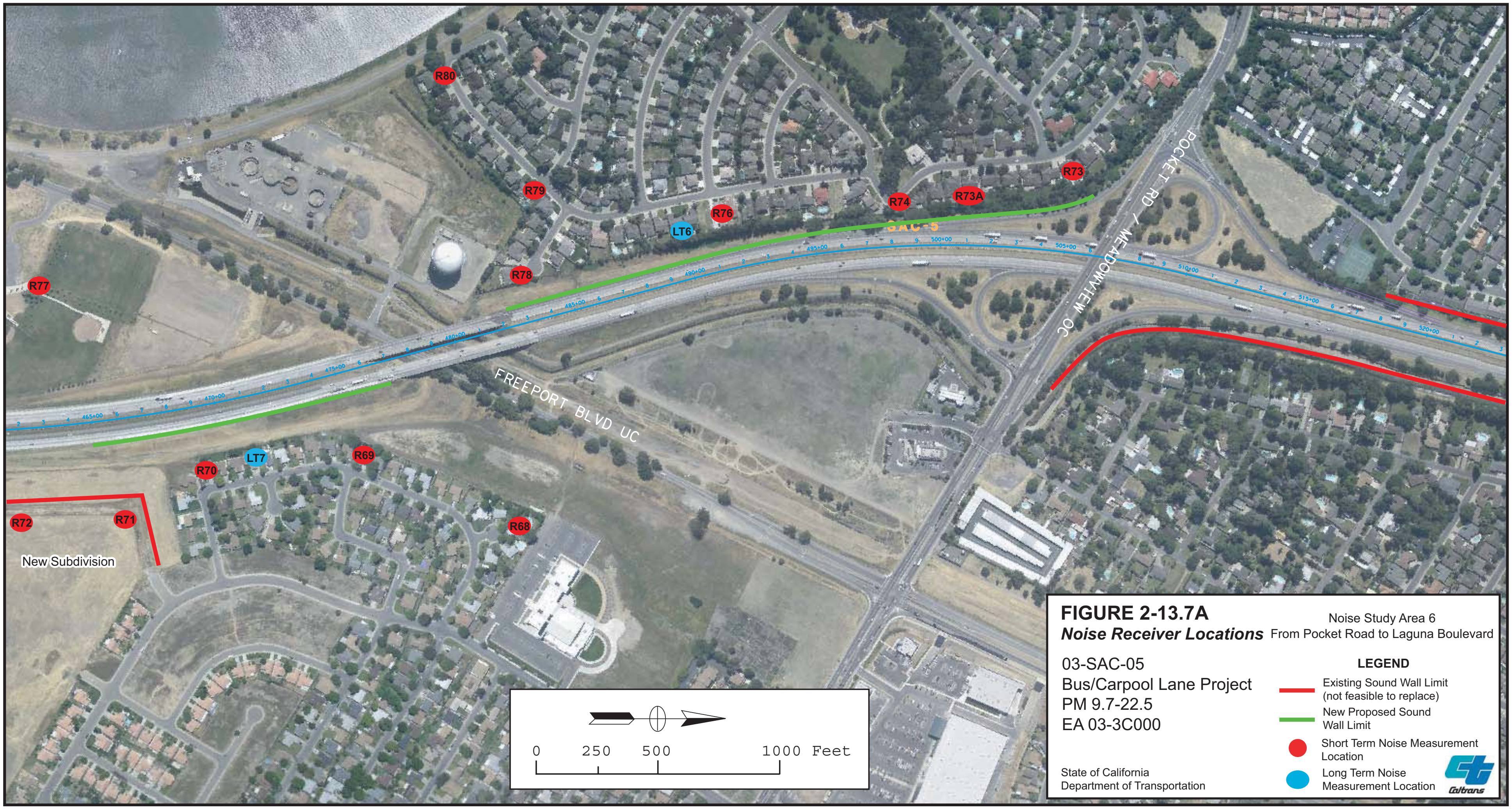


FIGURE 2-13.6A
Noise Receiver Locations


New Subdivision
FREEPORT BLVD UC
POCKET RD / MEADOWVIEW OC
SAC-5
R67
R66
R58
R56
0 250 500 1000 Feet
FIGURE 2-13.6B
Noise Receiver Locations
03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000
Noise Study Area 5
From Florin Road to Pocket Road
LEGEND
Existing Sound Wall Limit (not feasible to replace)
New Proposed Sound Wall Limit
Short Term Noise Measurement Location
Long Term Noise Measurement Location
State of California
Department of Transportation
Caltrans


R80
R79
R76
LT6
R74
R73A
R73
R78
R77
SAC-5
POCKET RD / MEADOWVIEW OC
FREEPORT BLVD UC
R69
LT7
R70
R72
R71
R68
New Subdivision
0 250 500 1000 Feet
FIGURE 2-13.7A
Noise Receiver Locations
Noise Study Area 6
From Pocket Road to Laguna Boulevard
03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000
LEGEND
Existing Sound Wall Limit (not feasible to replace)
New Proposed Sound Wall Limit
Short Term Noise Measurement Location
Long Term Noise Measurement Location
State of California
Department of Transportation
Caltrans

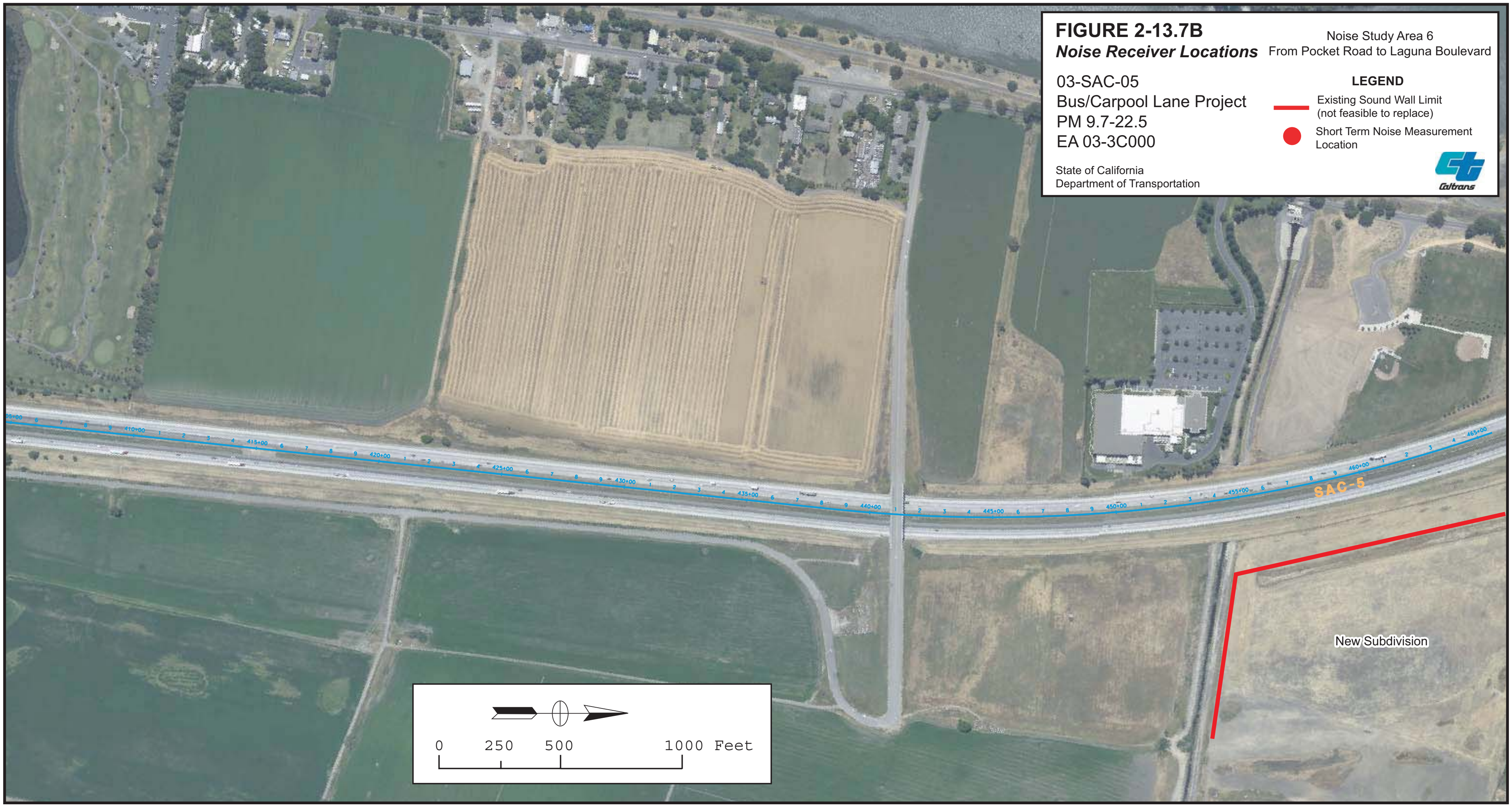


FIGURE 2-13.7B
Noise Receiver Locations
Noise Study Area 6
From Pocket Road to Laguna Boulevard
03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000
State of California
Department of Transportation
LEGEND
Existing Sound Wall Limit
(not feasible to replace)
Short Term Noise Measurement
Location
Caltrans
SAC-5
New Subdivision
0
250
500
1000 Feet

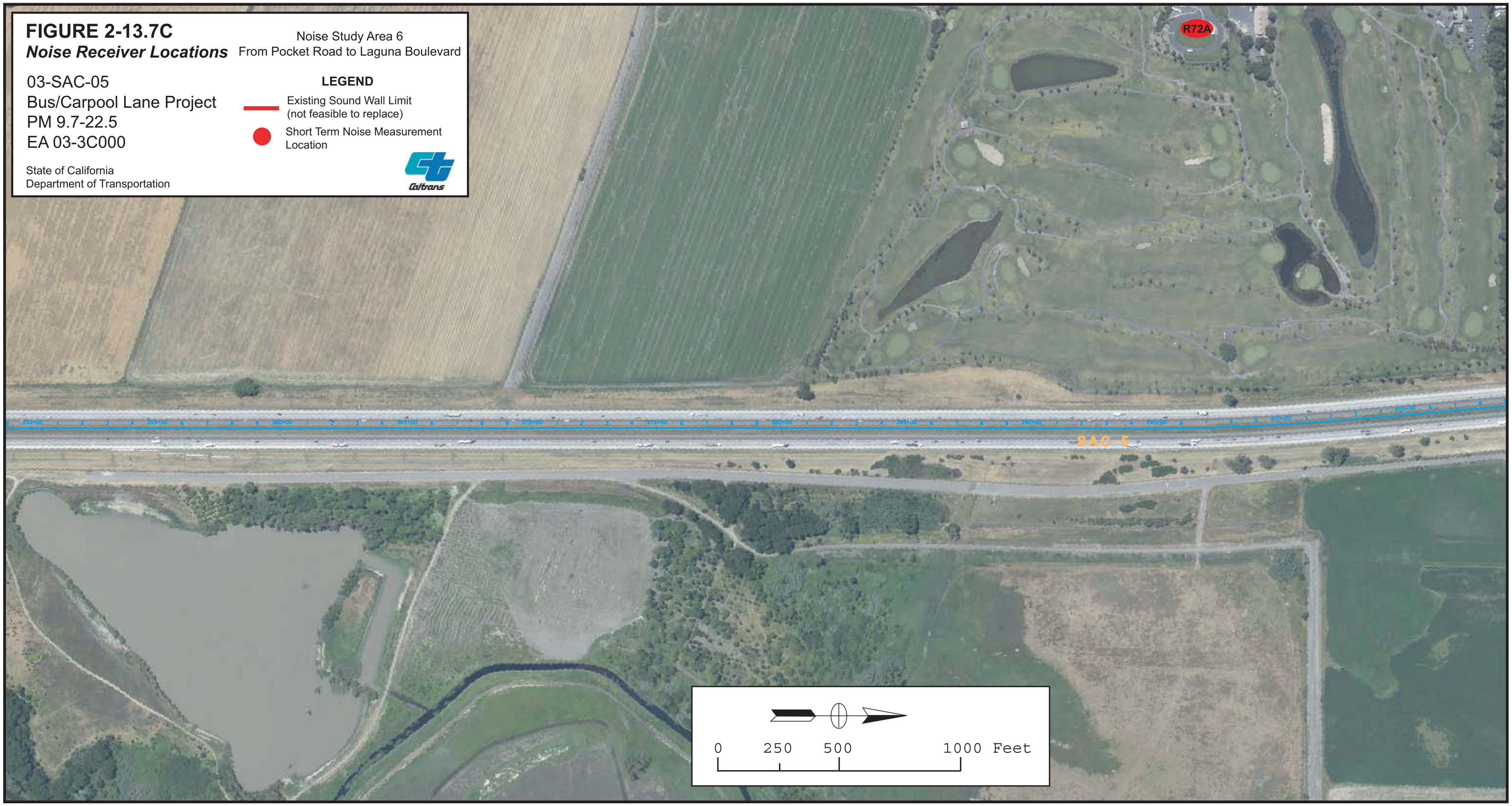


FIGURE 2-13.7C
Noise Receiver Locations
Noise Study Area 6
From Pocket Road to Laguna Boulevard
03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000
State of California
Department of Transportation
LEGEND
Existing Sound Wall Limit
(not feasible to replace)
Short Term Noise Measurement
Location
Caltrans
R72A
SAC-5
0
250
500
1000 Feet

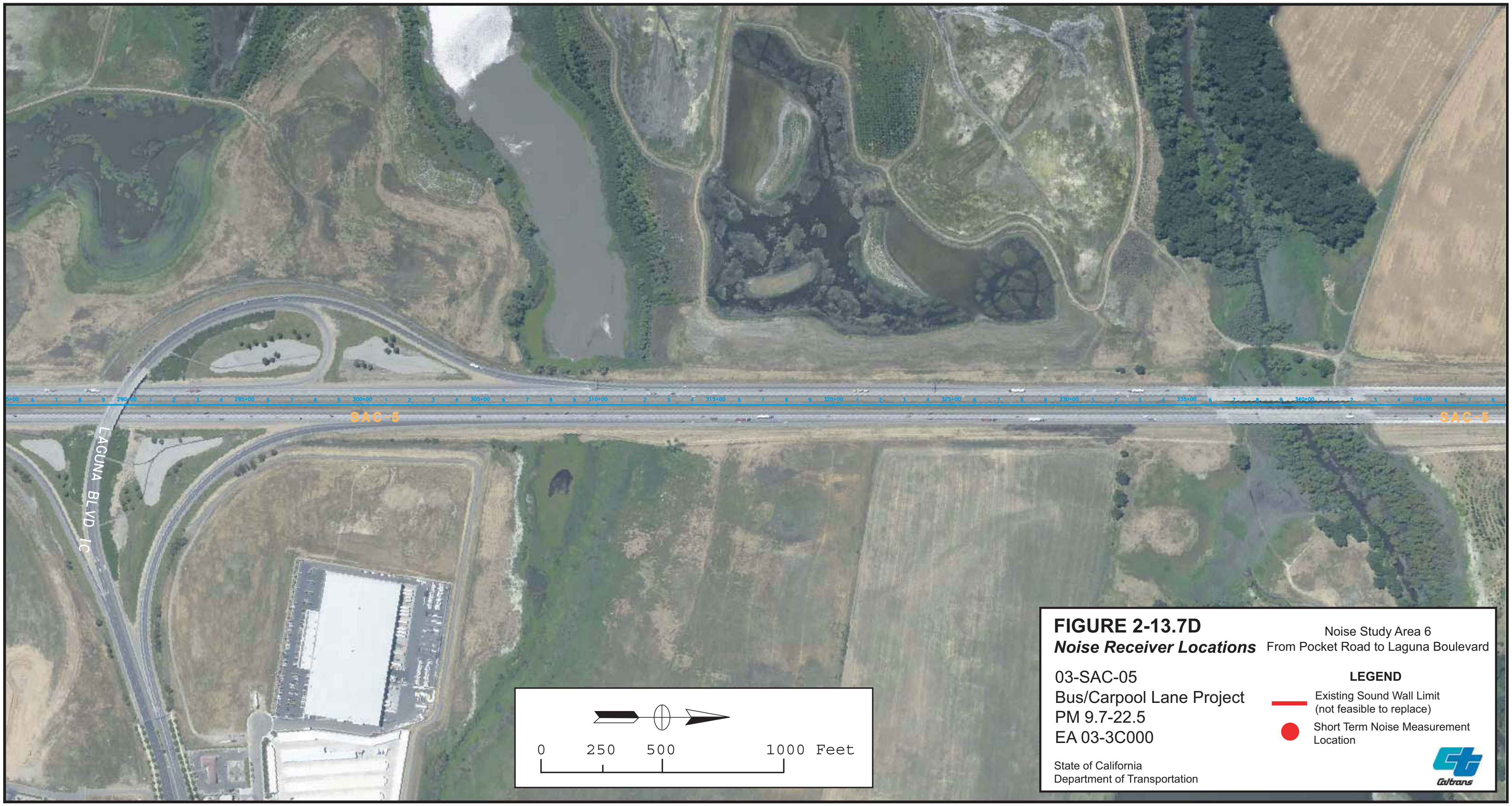


FIGURE 2-13.7D
Noise Receiver Locations

Noise Study Area 6
From Pocket Road to Laguna Boulevard

03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000

State of California
Department of Transportation

FIGURE 2-13.8A
Noise Receiver Locations

03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000

State of California
Department of Transportation

Noise Study Area 7
From Laguna Boulevard to
South Elk Grove Boulevard

LEGEND

Existing Sound Wall Limit (not feasible to replace)

Short Term Noise Measurement Location

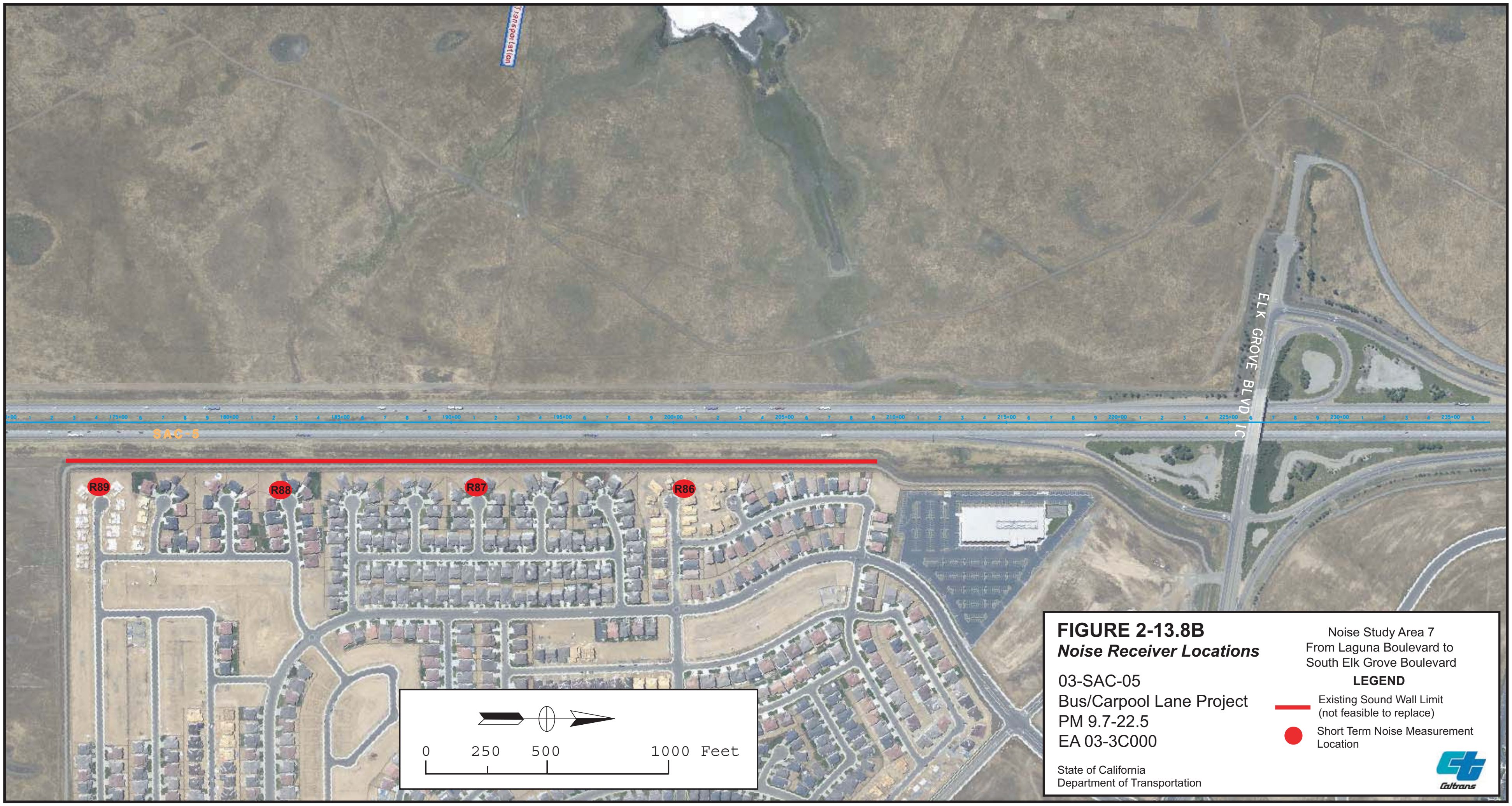


FIGURE 2-13.8B
Noise Receiver Locations

03-SAC-05
Bus/Carpool Lane Project
PM 9.7-22.5
EA 03-3C000

State of California
Department of Transportation

Noise Study Area 7
From Laguna Boulevard to
South Elk Grove Boulevard

LEGEND

Existing Sound Wall Limit (not feasible to replace)

Short Term Noise Measurement Location

Traffic flow on I-5 was videotaped while noise measurements were taken. Traffic was counted and classified by viewing the videotape. Vehicles were classified as automobiles, medium-duty trucks, or heavy-duty trucks. An automobile is defined as a vehicle with two axles and four tires that is designed primarily to carry passengers. Small vans and trucks are included in this category. Medium-duty trucks include all cargo vehicles with two axles and six tires. Heavy-duty trucks include vehicles with three or more axles.

2.13.3.3 Inputs to the Traffic Noise Model

Key inputs to the traffic noise model are the locations of roadways, topographic features, and receivers. The freeway lanes were digitized in each direction. Barriers and receptors located adjacent to the roadways were also digitized. The Caltrans North Region Division of Engineering provided drawings and three-dimensional representations of these key inputs (roadways, topographic features, and receivers) were produced.

2.13.3.4 Noise Model Calibration

Modeled noise levels were then compared to the measured or actual traffic noise levels in order to calibrate the noise model. The project area was modeled in seven independent sections to accommodate for the complexity of the model. The modeled segments are listed as follows:

- AREA 1: US 50 to Sutterville Rd.
- AREA 2: Sutterville Rd. to Seamas Ave.
- AREA 3: Seamas Ave. to Gloria Dr.
- AREA 4: Gloria Dr. to Florin Rd.
- AREA 5: Florin Rd. to Pocket Rd.
- AREA 6: Pocket Rd. to Laguna Blvd.
- AREA 7: Laguna Blvd. to south of Elk Grove Blvd.

Differences between the modeled and measured (actual) noise levels were then compared and model adjustments were made, as needed, to bring the model closer to actual conditions. In general, modeled and measured results are considered to be in reasonable agreement when they are within 2 to 3 dB of each other. Therefore, where the modeled results were within 3 dB of the actual level, no adjustment was made. Where the modeled result was more than 3 dBA of the actual condition, then an adjustment was made.

2.13.3.5 Design Year Traffic Noise Level Prediction

Design year traffic noise levels were generated using the model. TNM 2.5 calculates traffic noise levels based on the geometry of the site, which includes the positioning of lanes, receivers, and barriers. The noise source is the traffic flow, which is entered into the program in terms of hourly volumes and speeds of automobiles, medium trucks, and heavy trucks. The peak hour traffic volumes, classification percentage, and speeds were used to model traffic noise level under existing (Year 2007) and design-year (Year 2033) conditions. Fehr & Peers provided the design-year (Year 2033) data for modeling. Medium and heavy truck percentages on the freeway were estimated based on Caltrans' 2004 truck counts. Please refer to Section 2.5.2.1 for the methodology used to traffic data.

2.13.3.6 Identification of Traffic Noise Impacts and Consideration of Noise Abatement

As noted above, a noise impact occurs when the future noise level with the project results in a substantial increase in 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. Where traffic noise impacts are identified, noise abatement must be considered for reasonableness and feasibility as required by 23 CFR 772 and the *Noise Protocol*. According to the *Noise Protocol*, a minimum of 5 dBA of noise reduction must be achieved at affected receivers for the proposed abatement to be considered feasible. Other factors that also restrict feasibility include:

- Topography;
- Access requirements for driveways, ramps, etc.;
- Presence of local cross streets;
- Other noise sources in the area; and
- Safety considerations.

The overall reasonableness of noise abatement is also determined by considering a number of factors such as:

- Cost;
- Absolute noise levels;
- Change in noise levels;
- Noise abatement benefits;

- Date of developments along the highway;
- Environmental impacts of abatement construction;
- Opinions of affected residents;
- Input from the public and local agencies; and
- Social, legal, and technological factors.

Although various noise abatement measures are available (traffic management measures, alteration of horizontal and vertical alignments, acquisition of property to create a buffer zone adjacent to the highway, noise insulation), due to the topography and location of the project, sound walls were deemed the best and most cost effective measure. The *Noise Protocol* defines a procedure for assessing the reasonableness of sound walls from a cost perspective. A cost-per-residence allowance is first calculated using a base allowance of $32,000 per benefited residence (i.e., residences that receive at least 5 dB of noise reduction from the wall). Additional allowance dollars are added based on the following factors:

- The change in noise levels;
- Achievable noise reduction; and
- The date of construction.

The total allowance is then calculated based on the allowance per benefited residence times the number of benefited residences. If the total allowance is more than 50% of the estimated construction cost, the allowance per residence is modified to a reduced value.

2.13.4 Existing Noise Conditions

The existing noise environment throughout the project corridor varies by location, proximity to I-5, other noise sources, the relative highway and local elevations and terrain, and any intervening structures or barriers. There is a mix of single-family homes, elementary schools, apartment complexes, a hotel, a church, and industrial land uses throughout the project area. Although all developed land uses are evaluated in this analysis, the focus is on locations of frequent human use that would benefit from a lowered noise level. Accordingly, this impact analysis focuses on locations with defined outdoor activity areas, such as residential backyards and common-use areas at multi-family residences.

Areas of potential noise impact resulting from the proposed project are located east and west of I-5 throughout the majority of the project area. Regions within the study area where the proposed project could cause noise levels to approach or exceed the NAC under design year (2033) under the Bus/Carpool Addition Alternative have been identified. Table 2-13.2 identifies the applicable receiver category associated with each of the noise measurement locations.

Table 2-13.2 Summary of Noise Measurement Receiver IDs and Activity Category for Each Project Segment

Area number and Location	Applicable Activity Category	Receiver ID[11]
(1) US 50 to Sutterville Rd.	**B** (residential)	R1, R2, R3, R4, R5, R6, R7
(2) Sutterville Rd. to Seamas Ave.	**B** (residential)	R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, R18
(3) Seamas Ave. to Gloria Dr.	**B** (residential)	R19, R20, R22, R23, R25, R26, R27, R29, R31, R32, R33, R34, R36A, R36
(3) Seamas Ave. to Gloria Dr.	**C** (commercial)	R35
(4) Gloria Dr. to Florin Rd.	**B** (residential)	R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R50, R51
(5) Florin Rd. to Pocket Rd.	**B** (residential)	R52, R53, R54, R55, R56, R58, R63, R64, R66, R67,
(5) Florin Rd. to Pocket Rd.	**C** (commercial)	R52A, R60, and R61
(6) Pocket Rd. to Laguna Blvd.	**B** (residential)	R68, R69, R70, R71, R72A, R72, R73A, R73, R74, R76, R77, R78, R79, R80
(7) Laguna Blvd. to south of Elk Grove Blvd.	**B** (residential)	R81, R82, R84, R86, R87, R88, R89

[11] Receiver identification numbers are not consecutive.

2.13.5 Environmental Consequences

Alternative 1

During the construction phases of Alternative 1 (Bus/Carpool Addition), noise from construction activities may intermittently dominate the noise environment in the immediate area of construction.

Table 2-13.3 summarizes noise levels produced by construction equipment that is commonly used on roadway construction projects. As indicated, equipment involved in construction is expected to generate noise levels ranging from 70 dB to 90 dB at a distance of 50 ft. Noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance. No substantial noise impacts from construction are anticipated because construction activity would be conducted in accordance with Caltrans' standard specifications Section 14-8.02, "Noise Control" and would be short-term, intermittent, limited in physical extent, and in most cases dominated by local traffic noise.

Table 2-13.3 Construction Equipment Noise

Type of Equipment	Maximum Level, dBA at 50 ft
Scrapers	89
Bulldozers	85
Heavy trucks	88
Backhoe	80
Pneumatic tools	85
Concrete pump	82
Source: FHWA 1995.	

Caltrans standard specifications Section 14-8.02, "Sound Control Requirements" state that noise levels generated during construction shall comply with applicable local, state, and federal regulations, and that all equipment shall be fitted with adequate mufflers according to the manufacturers' specifications. Construction activities are planned during the night hours for the duration of the project. Because nighttime construction activity would be conducted in accordance with Caltrans' standard specifications and would be short term, intermittent, and limited in physical extent, no substantial noise impacts from nighttime construction are anticipated.

Tables 2-13.4 through 2-13.10 list the results of noise modeling for existing levels (2007) and future (2033) noise levels under the Bus/Carpool Addition Alternative for each project segment (divided into 7 areas). The modeling results indicate that the predicted traffic noise levels for some receivers approach or exceed the Activity Category B Noise Abatement Criteria of 67 dBA Leq (h). No receivers for this project will experience an increase of 12 dB or more.

Area 1: US 50 to Sutterville Rd.—Impacts

There is an existing 10-ft noise barrier in this segment of the project. Seven short-term measurements (R1, R2, R3, R4, R5, R6, and R7) were taken in this segment of the project. The loudest-hour Leq (h) for the year 2007 ranges from 65 to 71 dBA Leq (h) and for the design year (2033) ranges from 66 to 72 dBA as shown in the Table 2-13.4. The results indicate that the increase in noise between existing conditions and the design year is predicted to be 1 dB and in all instances approaches or exceeds the Activity Category B Noise Abatement Criteria (NAC) of 67 dBA Leq (h).

Table 2-13.4 Area 1 Existing and Predicted Traffic Noise Impact

Receiver ID	Existing Noise Level Leq (h), dBA	Design-Year With Project, Traffic Noise Level, Leq (h), dBA	Noise Abatement Category Leq (h), dBA	Traffic Noise Impact*	Existing Shielding
R1	65	66	67	**A/E**	10’ sound wall
R2	66	67	67	**A/E**	10’ sound wall
R3	67	68	67	**A/E**	10’ sound wall
R4	71	72	67	**A/E**	10’ sound wall
R5	71	72	67	**A/E**	10’ sound wall
R6	70	71	67	**A/E**	10’ sound wall
R7	65	66	67	**A/E**	10’ sound wall

* Traffic Noise Impact: A/E - Noise Abatement Criteria Approached or Exceeded

Area 2: Sutterville Rd. to Seamas Ave.—Impacts

The existing sound walls in this area range from 8 to 14 ft high. A section of existing sound wall in this segment will be demolished in order to upgrade the POC at Casilada Way to current standards. When the work on the POC has been completed, the section of sound wall that was disturbed will be replaced to its existing height of 12 ft.

Eleven short-term measurements (R8, R9, R10, R11, R12, R13, R14, R15, R16, R17, and R18) were taken that ranged from 49 to 69 dBA. The predicted loudest-hour Leq (h) for the design year (2033) ranges from 50 to 70 dBA. The results indicate that the increase in noise between existing conditions and the design year is predicted to be 1 dB, and that the predicted noise levels at the majority of the receivers approach or exceed the Activity Category B NAC of 67 dBA Leq (h). R14 is the Le Rivage Hotel, which was constructed in 2007. The Activity Category E (Interior) NAC of 52 will not be approached or exceeded.

Table 2-13.5 Area 2 Existing and Predicted Traffic Noise Impact

Receiver ID	Existing Noise Level (dBA)	Design-Year With Project Traffic Noise Level (dBA)	Noise Abatement Category Leq (h)	Traffic Noise Impact*	Existing Shielding
R8	60	61	67	None	12’ sound wall
R9	65	66	67	**A/E**	8’ sound wall
R10	66	67	67	**A/E**	12’ sound wall
R11	68	69	67	**A/E**	14’ sound wall
R12	65	66	67	**A/E**	14’ sound wall
R13	66	67	67	**A/E**	10’ sound wall
R14	49	50	52	None	None
R15	69	70	67	**A/E**	12’ sound wall
R16	69	70	67	**A/E**	12’ sound wall
R17	63	64	67	None	12’ sound wall
R18	68	69	67	**A/E**	10’ sound wall

* Traffic Noise Impact: A/E - Noise Abatement Criteria Approached or Exceeded

Area 3: Seamas Ave. to Gloria Dr.—Impacts

The existing sound walls in this segment range from 8 to 16 ft high. 15 short-term noise measurements (R19, R20, R22, R23, R25, R26, R27, R29, R31, R32, R33, R34, R35, R36A, and R36) were taken. The loudest-hour Leq (h) for the year 2007 ranges from 63 to 68 dBA and for the design year (2033) ranges from 64 to 69 dBA as shown in Table 2-13.6. The results indicate that the increase in noise between existing conditions and the design year is predicted to be 1 dB and in most instances, approaches or exceeds the Activity Category B NAC of 67 dBA Leq (h).

Table 2-13.6 Area 3 Existing and Predicted Traffic Noise Impact

Receiver ID	Existing Noise Level (dBA)	Design-Year With Project Traffic Noise Level (dBA)	Noise Abatement Category Leq (h)	Traffic Noise Impact*	Existing Shielding

Receiver ID	Existing Noise Level (dBA)	Design-Year With Project Traffic Noise Level (dBA)	Noise Abatement Category Leq (h)	Traffic Noise Impact*	Existing Shielding
R19	63	64	67	None	10’ sound wall
R20	63	64	67	None	10’ sound wall
R22	68	69	67	**A/E**	10’ sound wall
R23	65	66	67	**A/E**	8’ sound wall
R25	66	67	67	**A/E**	8’ sound wall
R26	66	67	67	**A/E**	8’ sound wall
R27	67	68	67	**A/E**	14’ sound wall
R29	67	68	67	**A/E**	16’ sound wall
R31	65	66	67	**A/E**	12’ sound wall
R32	66	67	67	**A/E**	12’ sound wall
R33	64	65	67	None	12’ sound wall
R34	63	64	67	None	None
R35	66	67	72	None	None
R36A	67	68	67	**A/E**	14’ sound wall
R36	66	67	67	**A/E**	14’ sound wall

* Traffic Noise Impact: A/E - Noise Abatement Criteria Approached or Exceeded

AREA 4: Gloria Dr. to Florin Rd.—Impacts

The existing sound walls in this segment range from 8 to 14 ft high. 13 short-term noise measurements (R38, R39, R40, R41, R42, R43, R44, R45, R46, R47, R48, R50, and R51) were taken. The loudest-hour Leq (h) for the year 2007 ranges from 61 to 66 dBA and for the design year (2033) ranges from 62 to 67 dBA as shown in Table 2-13.7.   The results indicate that the increase in noise between existing conditions and the design year is predicted to be 1 dB and in three instances approaches or exceeds the Activity Category B NAC of 67 dBA Leq (h).

Table 2-13.7 Area 4 Existing and Predicted Traffic Noise Impact

Receiver ID	Existing Noise Level Leq (h)(dBA)	Design-Year With Project Traffic Noise Level Leq (h) (dBA)	Noise Abatement Category Leq (h) dBA	Traffic Noise Impact*	Existing Shielding
R38	66	67	67	**A/E**	12’ sound wall

R39	64	65	67	None	12’ sound wall
R40	61	62	67	None	14’ sound wall
R41	62	63	67	None	8’ sound wall
R42	64	65	67	None	10’ sound wall
R43	64	65	67	None	8’ sound wall
R44	64	65	67	None	8’ sound wall
R45	63	64	67	None	10’ sound wall
R46	66	67	67	**A/E**	14’ sound wall
R47	65	66	67	**A/E**	14’ sound wall
R48	61	62	67	None	10’ sound wall
R50	62	63	67	None	11’ sound wall
R51	63	64	67	None	11’ sound wall

* Traffic Noise Impact: A/E - Noise Abatement Criteria Approached or Exceeded

AREA 5: Florin Rd. to Pocket Rd.—Impacts

Existing sound walls in this segment range from 6 to 10 ft high. Thirteen short-term noise measurements (R52, R52A, R53, R54, R55, R56, R58, R60, R61, R63, R64, R66, and R67) were taken in this area of project. As shown in Table 2-13.8, the loudest-hour Leq (h) for the existing year (2007) ranges from 62 to 69 dBA and for the design year (2033) ranges from 64 to 71. The results indicate that the increase in noise between existing conditions and the design year is predicted to be between 1 and 2 dB, and in six instances approaches or exceeds the Activity Category B NAC of 67 dBA Leq (h).

Table 2-13.8 Area 5 Existing and Predicted Traffic Noise Impact

Receiver ID	Existing Noise Level (dBA)	Design-Year With Project Traffic Noise Level (dBA)	Noise Abatement Category Leq (h)	Traffic Noise Impact*	Existing Shielding
R52	63	65	67	None	6’ sound wall
R52A	63	65	72	None	None
R53	68	69	67	**A/E**	6’ sound wall
R54	67	69	67	**A/E**	6’ sound wall
R55	67	69	67	**A/E**	6’ sound wall
R56	62	64	67	None	6’ sound wall
R58	63	65	67	None	6’ sound wall

R60	64	66	72	None	10’ sound wall
R61	69	71	72	None**	10’ sound wall
R63	68	70	67	**A/E**	10’ sound wall
R64	68	70	67	**A/E**	10’ sound wall
R66	67	69	67	**A/E**	10’ sound wall
R67	63	65	67	None	10’ sound wall

*Traffic Noise Impact: A/E - Noise Abatement Criteria Approached or Exceeded

**Although the noise levels at this location approach or exceed the Noise Abatement Criteria for Activity Category C, this location would not benefit from a lower noise level. This noise measurement was taken in the parking lot of a commercial business, some distance from the building. As stated in the Noise Protocol, noise abatement is only considered for areas of frequent human usage that would benefit from a lowered noise level. As a matter of practice, exterior locations are considered areas of frequent human use if people visit them for at least one hour on regular basis, therefore; impacts are only assessed in detail at locations of frequent human use.

AREA 6: Pocket Rd. to Laguna Blvd.—Impacts

There are no existing sound barriers in this segment. Fourteen short-term (R68, R69, R70, R71, R72A, R72, R73A, R73, R74, R76, R77, R78, R79, and R80) noise measurements were taken. As shown in Table 2-13.9, the loudest-hour Leq (h) for the existing year (2007) ranges from 53 to 72 dBA and for the design year (2033) ranges from 54 to 73 dBA. The results indicate that the increase in noise between existing conditions and the design year is predicted to be between 1 and 2 dB and in most instances, approaches or exceeds the Activity Category B NAC of 67 dBA Leq (h).

Table 2-13.9 Area 6 Existing and Predicted Traffic Noise Impact

Receiver ID	Existing Noise Level (dBA)	Design-Year With Project Traffic Noise Level (dBA)	Noise Abatement Category Leq (h)	Traffic Noise Impact*	Existing Shielding
R68	62	63	67	None	None
R69	65	66	67	**A/E**	None
R70	72	73	67	**A/E**	None
R71	67	68	67	**A/E**	12’ sound wall
R72A	53	54	67	None	None
R72	67	68	67	**A/E**	12’ sound wall
R73A	67	68	67	**A/E**	None
R73	66	67	67	**A/E**	None
R74	68	69	67	**A/E**	None

R76	68	69	67	**A/E**	None
R77	60	62	67	None	None
R78	71	72	67	**A/E**	None
R79	56	57	67	None	None
R80	55	56	67	None	None

* Traffic Noise Impact: A/E - Noise Abatement Criteria Approached or Exceeded

AREA 7: Laguna Blvd. to South of Elk Grove Blvd.—Impacts

Existing sound walls in this segment range from 8 to 10 ft high. Seven short-term noise measurements (R81, R82, R84, R86, R87, R88, and R89) were taken. As shown in Table 2-13.10, the loudest-hour Leq (h) for the existing year (2007) ranges from 66 to 69 dBA and for the design year (2033) ranges from 67 to 70 dBA. The results indicate that the increase in noise between existing conditions and the design year is predicted to be 1 dB and in all instances, approaches or exceeds the Activity Category B NAC of 67 dBA Leq (h).

Table 2-13.10 Area 7 Existing and Predicted Traffic Noise Impact

Receiver ID	Existing Noise Level (dBA)	Design-Year With Project Traffic Noise Level (dBA)	Noise Abatement Category Leq (h)	Traffic Noise Impact*	Existing Shielding
R81	67	68	67	**A/E**	10’ sound wall
R82	69	70	67	**A/E**	10’ sound wall
R84	68	69	67	**A/E**	10’ sound wall
R86	68	69	67	**A/E**	8’ sound wall
R87	66	67	67	**A/E**	8’ sound wall
R88	68	69	67	**A/E**	8’ sound wall
R89	67	68	67	**A/E**	8’ sound wall

* Traffic Noise Impact: A/E - Noise Abatement Criteria Approached or Exceeded

Alternative 2

Because the footprint and project features of Alternative 2 (Mixed Flow) are the same as Alternative 1, the impact of noise from Alternative 2 would be the same.

Alternative 3

The traffic noise impact will occur with Alternative 3 (Mixed Flow to Bus/Carpool Conversion). The magnitude of impact will be similar to Alternatives 1 and 2. As with all other built alternatives, none of the existing soundwalls qualify for replacement due to failing the feasibility test. The noise abatement recommendation for Alternative 3 will be same as Alternative 1 and 2: new soundwalls proposed at two locations within the project limits.

Alternative 4

The No Build Alternative would not modify I-5; therefore, no new noise impacts would occur.

2.13.6 Preliminary Noise Abatement Analysis—Feasibility

Noise abatement must be considered when traffic noise impacts are predicted to occur at Activity Category B land uses. A feasibility analysis must also be performed to determine if new or replacement noise barriers would provide the additional 5 dB reduction in noise levels. There are no Activity Category C land uses in the project area that are considered to have outdoor activity areas with frequent human usages that would benefit from a lower noise level.

As stated in the *Noise Protocol*, noise abatement is only considered for areas of frequent human use that would benefit from a lowered noise level. As a matter of practice, exterior locations are considered areas of frequent human use if people visit them for at least 1 hour on a regular basis. Potential noise abatement measures may include:

- Avoiding the project impact by using design alternatives such as altering the horizontal and vertical alignment of the project.
- Constructing noise barriers.
- Acquiring property to serve as a buffer zone.
- Using traffic management measures to regulate types of vehicles and speeds.
- Acoustically insulating public use or nonprofit institutional structures.

Due to the topography and location of the project, sound walls were deemed the best and most cost effective measure. Each noise barrier has been evaluated for feasibility based on achievable noise reduction. For each barrier found to be feasible, reasonable cost allowances were calculated. Table 2-13.18 at the end of this section summarizes the reasonable cost calculations, based on the allowance calculation procedure identified in the *Noise Protocol*. For any noise barrier to be considered reasonable from a cost perspective, the estimated cost of constructing the noise barrier should be equal to or less than total allowance calculated for that barrier.

As noted above, noise abatement must reduce the noise level by at least 5 dBA at the impacted receivers in order for the proposed noise abatement to be considered feasible. Greater noise reductions are encouraged as long as they meet the reasonableness guidelines. Feasibility can be restricted by various factors, including topography, access requirements for driveways, underground utilities, safety considerations and other noise sources in the area. TNM 2.5 was used to evaluate wall heights ranging from 8 ft to 16 ft, in 2-ft increments (refer to Section 2.13.3 regarding TNM 2.5). In addition, TNM 2.5 was used to make sure that the proposed barrier height would break the line of sight between an 11.5 ft high truck stack and a 5 ft high receiver. Existing Caltrans sound walls are typically constructed to meet the criteria in Chapter 1100 of the *Highway Design Manual* (HDM) (Caltrans 2006c). The HDM states that sound walls should not be higher than 14 ft above the pavement when located within 15 ft of the edge of travel way and 16 ft above ground when located more than 15 ft from the edge of travel way. Where I-5 is elevated above the receivers, the most acoustically effective location for a barrier is near the edge of shoulder.

The feasibility of sound walls was considered for all locations where traffic noise impacts were identified. In many locations, noise levels at receivers located behind existing barriers and sound walls exceeded the Noise Abatement Criteria. Replacement barriers were assessed using the feasibility and reasonability analysis. Once a noise barrier met feasibility criteria at a given receiver, the reasonableness was determined. Tables 2-13.11 through 2-13.17 show the predicted Year 2033 loudest-hour noise levels and insertion loss[12] for each barrier at various design heights.

[12] Insertion loss is the difference between the sound level with no sound wall and with the sound wall.

Area 1: US 50 to Sutterville Rd.—Feasibility Analysis

There is an existing 10-ft noise barrier located in this segment of the project. Seven measurements were taken behind this wall and noise levels at all receivers approach or exceed the NAC of 67 dBA. Table 2-13.11 shows the result of feasibility analysis. The analysis reveal that raising the existing sound wall to the maximum allowed height of 16 ft would not provide an additional 5 dBA reduction in noise levels; therefore this barrier is not considered to be feasible and new abatement measures are not recommended. A reasonability analysis was not performed because feasibility was not achieved.

Table 2-13.11 Area 1 Predicted Insertion Loss (I.L) For Sound Wall

Receiver ID*	Design (2033) Noise Level Leq (h)	Wall Height 8-Feet		Wall Height 10-Feet		Wall Height 12-Feet		Wall Height 14-Feet		Wall Height 16-Feet	
		Leq(h)	I.L	Leq(h)	I.L	Leq(h)	I.L	Leq(h)	I.L	Leq(h)	I.L
R1	66	N/A	N/A	N/A	N/A	64	2	64	2	64	2
R2	67	N/A	N/A	N/A	N/A	65	2	64	3	64	3
R3	68	N/A	N/A	N/A	N/A	67	1	66	2	65	3
R4	72	N/A	N/A	N/A	N/A	70	2	69	3	68	4
R5	72	N/A	N/A	N/A	N/A	70	2	69	3	68	4
R6	71	N/A	N/A	N/A	N/A	69	2	68	3	68	3
R7	66	N/A	N/A	N/A	N/A	65	1	65	2	65	2

* Note: Only receivers for which noise levels approach or exceed the NAC are included in this table.

Area 2: Sutterville Rd. to Seamas Ave.

Existing noise barriers in this segment of the project range from 8 to 14 ft high. Eleven short-term noise measurements were taken behind this wall and noise levels at 8 of the receivers approach or exceed the NAC of 67 dBA. Table 2-13.12 shows the result of the feasibility analysis. The analysis reveal that raising the existing sound wall to the maximum allowed height of 16 ft would not provide an additional 5 dBA reduction in noise levels; therefore this barrier is not considered to be feasible and new abatement measures are not recommended. A reasonability analysis was not performed because feasibility was not achieved.

Table 2-13.12 Area 2 Predicted Insertion Loss (I.L) For Sound Wall

Receiver ID*	Design (2033) Noise	Wall Height 8-Feet	Wall Height 10-Feet	Wall Height 12-Feet	Wall Height 14-Feet	Wall Height 16-Feet

	Level Leq (h)	Leq(h)	I.L	Leq(h)	I.L	Leq(h)	I.L	Leq(h)	I.L	Leq(h)	I.L
R9	66	N/A	N/A	65	1	65	1	64	2	64	2
R10	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	67	1
R11	69	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	68	1
R12	66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	65	1
R13	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	66	1
R15	70	N/A	N/A	N/A	N/A	N/A	N/A	69	1	68	2
R16	70	N/A	N/A	N/A	N/A	N/A	N/A	69	1	68	2
R18	69	N/A	N/A	N/A	N/A	68	1	68	1	67	2

* Note: Only receivers for which noise levels approach or exceed the NAC are included in this table.

Area 3: Seamas Ave. to Gloria Dr.

Existing noise barriers in this segment of the project range from 8 to 16 ft high. Fifteen short-term noise measurements were taken behind this wall and noise levels at ten of the receivers approach or exceed the NAC of 67 dBA. Table 2-13.13 shows the result of the feasibility analysis. The analysis reveal that raising the existing sound wall to the maximum allowed height of 16 ft would not provide an additional 5 dBA reduction in noise levels; therefore this barrier is not considered to be feasible and new abatement measures are not recommended. A reasonability analysis was not performed because feasibility was not achieved.

Table 2-13.13 Area 3 Predicted Insertion Loss (I.L) For Sound Wall

Receiver ID	Design (2033) Noise Level Leq (h)	Wall Height 8-Feet		Wall Height 10-Feet		Wall Height 12-Feet		Wall Height 14-Feet		Wall Height 16-Feet	
		Leq(h)	I.L	Leq(h)	I.L	Leq(h)	I.L	Leq(h)	I.L	Leq(h)	I.L
R22	69	N/A	N/A	N/A	N/A	68	1	67	2	67	2
R23	66	N/A	N/A	65	1	65	1	64	2	64	2
R25	67	N/A	N/A	67	1	65	2	65	2	64	3
R26	68	N/A	N/A	67	1	67	1	66	2	64	3
R27	68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	67	1
R29	68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
R32	67	N/A	N/A	N/A	N/A	N/A	N/A	66	1	65	2
R31	66	N/A	N/A	N/A	N/A	N/A	N/A	65	1	65	1
R32	67	N/A	N/A	N/A	N/A	N/A	N/A	66	1	65	2
R36A	68	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	67	1
R36	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	66	1

* Note: Only receivers for which noise levels approach or exceed the NAC are included in this table.

AREA 4: Gloria Dr. to Florin Rd.

Existing noise barriers in this segment of the project range from 8 to 14 ft high. Thirteen short-term noise measurements were taken behind this wall and noise levels at 3 of the receivers approach or exceed the NAC of 67 dBA. Table 2-13.14 shows the result of the feasibility analysis. The analysis reveal that raising the existing sound wall to the maximum allowed height of 16 ft would not provide an additional 5 dBA reduction in noise levels; therefore this barrier is not considered to be feasible and new abatement measures are not recommended. A reasonability analysis was not performed because feasibility was not achieved.

Table 2-13.14 Area 4 Predicted Insertion Loss (I.L) For Sound Wall

Receiver ID	Design (2033) Noise Level Leq (h)	Wall Height 8-Feet		Wall Height 10-Feet		Wall Height 12-Feet		Wall Height 14-Feet		Wall Height 16-Feet	
		Leq (h)	I.L	Leq (h)	I.L	Leq (h)	I.L	Leq (h)	I.L	Leq (h)	I.L
R38	67	N/A	N/A	N/A	N/A	N/A	N/A	66	1	65	2
R46	67	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	66	1
R47	66	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	65	1

* Note: Only receivers for which noise levels approach or exceed the NAC are included in this table.

AREA 5: Florin Rd. to Pocket Rd.

Existing noise barriers in this segment of the project range from 6 to 10 ft high. Thirteen short-term noise measurements were taken behind this wall and noise levels at 6 of the receivers exceed the NAC of 67 dBA. Table 2-13.15 shows the result of the feasibility analysis. The analysis reveal that raising the existing sound wall to the maximum allowed height of 16 ft would not provide an additional 5 dBA reduction in noise levels; therefore this barrier is not considered to be feasible and new abatement measures are not recommended. A reasonability analysis was not performed because feasibility was not achieved.

Table 2-13.15 Area 5 Predicted Insertion Loss (I.L) For Sound Wall

Receiver ID	Design (2033) Noise	Wall Height 8-Feet	Wall Height 10-Feet	Wall Height 12-Feet	Wall Height 14-Feet	Wall Height 16-Feet

	Level Leq (h)	Leq (h)	I.L	Leq (h)	I.L	Leq (h)	I.L	Leq (h)	I.L	Leq (h)	I.L
R53	69	68	1	67	2	66	3	65	4	65	4
R54	69	68	1	67	2	66	3	65	4	65	4
R55	69	68	1	67	2	66	3	65	4	65	4
R63	70	N/A	N/A	N/A	N/A	69	1	68	2	67	3
R64	70	N/A	N/A	N/A	N/A	69	1	68	2	67	3
R66	69	N/A	N/A	N/A	N/A	68	1	67	2	66	3

* Note: Only receivers for which noise levels approach or exceed the NAC are included in this table.

AREA 6: Pocket Rd. to Laguna Blvd.

There are no existing sound barriers in this segment. Fourteen short-term noise measurements were taken and noise levels at 9 of the receivers approach or exceed the Activity Category B NAC of 67 dBA. Table 2-13.16 shows the result of the feasibility analysis. Sound walls were found to be feasible in this location. Table 2-13.18 shows the allowed reasonableness associated with each barrier. Because the noise-sensitive receptors are located below the level of I-5, the most acoustically effective location for the proposed barrier is on the edge of the outside shoulder.

Table 2-13.16 Area 6 Predicted Insertion Loss (I.L) For Sound Wall

Receiver ID	Design (2033) Noise Level Leq (h)	Wall Height 8-Feet		Wall Height 10-Feet		Wall Height 12-Feet		Wall Height 14-Feet		Wall Height 16-Feet	
		Leq (h)	I.L	Leq (h)	I.L	Leq (h)	I.L	Leq (h)	I.L	Leq (h)	I.L
R69	66	63	3	61	5	60	6	59	7	59	7
R70	73	69	4	67	6	66	7	65	8	65	8
R71	68	NA	NA	NA	NA	NA	NA	66	2	66	2
R72	68	NA	NA	NA	NA	NA	NA	66	2	66	2
R73A	68	65	3	64	4	63	5	63	5	63	5
R73	67	62	5	61	6	60	7	60	7	60	7
R74	69	66	3	64	5	62	7	62	7	61	8
R76	69	65	4	63	6	62	7	62	7	61	8
R78	72	69	3	68	4	68	4	67	5	67	5

* Note: Only receivers for which noise levels approach or exceed the NAC are included in this table.

AREA 7: Laguna Blvd. to South of Elk Grove Blvd.

Existing noise barriers in this segment of the project range from 8 to 10 ft high. Seven short-term noise measurements were taken behind this wall and noise levels at each of the receivers exceed the NAC of 67 dBA. Table 2-13.17 shows the result of the feasibility analysis. The analysis reveal that raising the existing sound wall to the maximum allowed height of 16 ft would not provide an additional 5 dBA reduction in noise levels; therefore this barrier is not considered to be feasible and new abatement measures are not recommended. A reasonability analysis was not performed because feasibility was not achieved.

Table 2-13.17 Area 7 Predicted Insertion Loss (I.L) For Sound Wall

Receiver ID	Design (2033) Noise Level Leq (h)	Wall Height 8-Feet		Wall Height 10-Feet		Wall Height 12-Feet		Wall Height 14-Feet		Wall Height 16-Feet	
		Leq(h)	I.L	Leq(h)	I.L	Leq(h)		Leq(h)		Leq(h)	
R81	68	NA	NA	NA	NA	67	1	66	2	66	2
R82	70	NA	NA	NA	NA	69	1	68	2	68	2
R84	69	NA	NA	NA	NA	68	1	67	2	67	2
R86	67	NA	NA	66	1	65	2	64	3	64	3
R87	68	NA	NA	67	1	66	2	65	3	65	3
R88	69	NA	NA	68	1	67	2	66	3	66	3
R89	68	NA	NA	67	1	66	2	65	3	65	3

* Note: Only receivers for which noise levels approach or exceed the NAC are included in this table.

2.13.7 Preliminary Noise Abatement Analysis—Reasonableness

Sound walls that are found to be feasible must be evaluated for reasonableness. The preliminary reasonableness determination for providing exterior noise abatement for residential areas in Activity Category B begins with a $32,000 base allowance per benefited residence. The base cost per benefited residence is then adjusted by the five following reasonableness factors to determine a Total Reasonable Allowance for each sound wall:

- Absolute noise levels
- Build vs. existing noise levels
- Achievable noise reduction
- New construction or predates 1978
- Total noise abatement allowance versus project cost

Table 2-13.18 summarizes the maximum noise reduction, number of benefited receivers, and reasonable allowances for each assessed barrier in Area 6.

Table 2-13.18 Reasonable Allowance for Area 6 Barriers

Sound Wall ID	Direction	Location Of Sound wall	Barrier Height	Maximum Predicted Noise Reduction, dBA	Number of Benefited Receivers	Total Reasonableness Allowance ($)
SW1	Northbound	R/W Line	8 ft	4	20	920,000
			10 ft*	6	37	1,776,000
			12 ft	7	73	3,504,000
			14 ft	8	73	3,504,000
			16 ft	8	73	3,504,000
SW2	Southbound	R/W Line	8 ft	5	32	1,472,000
			10 ft*	6	56	2,688,000
			12 ft	7	116	5,568,000
			14 ft	8	116	5,568,000
			16 ft	8	116	5,568,000

* Barrier Height that is feasible and breaks the line of sight.

2.13.8 Avoidance and Minimization Measures

- Construction noise is regulated by Caltrans' *Standard Specifications* Section 14-8.02, "Noise Control.":

  14-8.02 NOISE CONTROL

  Do not exceed 86 dBA LMax at 50 feet from the job site activities from 9 p.m. to 6 a.m. Equip an internal combustion engine with the manufacturer-recommended muffler. Do not operate an internal combustion engine on the job site without the appropriate muffler.

2.13.9 Abatement Measures

Based on the studies conducted to date, Caltrans intends to incorporate noise abatement measures for the three build alternatives in the form of barriers (sound walls) at the following 2 locations: SW1 and SW2 (see Figures 2-13.6B and 2-13.7A for the locations of proposed sound walls). SW1 is expected to be 2100 ft long and 12 ft high. SW2 is expected to be 1050 ft long and 12 ft high. The proposed sound walls are expected to result in a noise reduction of 5 to 7 dBA and benefit a total of

189 residences. If conditions substantially change during final project design, noise barriers may not be required. The final decision regarding noise abatement will be made upon completion of the project design and the public involvement processes.

As a result of a resident's inquiry, Caltrans conducted a field review in August 2011 to determine if proposed sound wall SW1 can be extended further south over the SR 160 bridge. Caltrans concluded that the sound wall could not be extended on the bridge because the weight of the sound wall could exceed the load tolerance of the bridge. The extension also was not justified after conducting the reasonability test (see Section 2.13.7).

2.13.10 CEQA Noise Analysis and Determination

When determining whether a noise impact is significant under CEQA, comparison is made between the baseline noise level and the build noise level. The CEQA noise analysis is completely independent of the NEPA-23 CFR 772 analysis discussed in Chapter 2, which is centered on noise abatement criteria. Under CEQA, the assessment entails looking at the setting of the noise impact and then how large or perceptible any noise increase would be in the given area. Key considerations include: the uniqueness of the setting, the sensitive nature of the noise receptors, the magnitude of the noise increase, the number of residences affected and the absolute noise level.

Design year (2033) noise levels are predicted to be between 1 and 2 dBA higher than existing noise levels for all receivers. This 1-2 dBA increase between existing noise levels and predicted noise levels under proposed project would be barely perceptible to the human ear and is therefore less than significant under CEQA.

2.14 Energy

2.14.1 Regulatory Setting

NEPA (42 USC Part 4332) requires the identification of all potentially significant impacts to the environment, including energy impacts.

The CEQA Guidelines, Appendix F, Energy Conservation, state 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.

2.14.2 Affected Environment

As noted in Chapter 1, I-5 is designated as part of the "National Network" for trucks and as the primary north-south route in the state serves both interregional and interstate travel. I-5 plays a critical role in California's economy by supporting a high volume of commuter and interregional traffic as well as trucks moving goods to destinations in and outside the state.

Overall mobility and traffic flow are declining in this portion of the corridor due to increasing traffic congestion. Traffic volumes have steadily grown due to increasing development along this portion of the I-5 corridor, and monitoring of traffic conditions during the peak commute periods has shown a steady increase in both the duration and the length of congestion. Traffic volumes in many portions of the route are near capacity or exceed capacity during the morning and afternoon peak periods. With a projected regional population increase of over 50 percent by 2030, the level of traffic congestion will increase substantially without improvements to the corridor.

2.14.3 Environmental Consequences

Alternative 1

Alternative 1 would result in a temporary increase in energy consumption during construction of the project, including fuel necessary for the movement of equipment, materials, and personnel to the project site, fuel for the operation of equipment, and lighting for night work.

Alternative 1 would reduce energy demand by easing congestion and improving traffic flow along 1-5. This would increase fuel efficiency and reduce energy demand. The proposed project would also encourage ridesharing, further reducing energy demand. Therefore, the project will not have any direct, indirect, short-term, long-term, or unavoidable impacts on energy demand or resources. When balancing energy used during construction and operation against energy saved by relieving congestion and other transportation inefficiencies, Alternative 1 would not result in substantial energy impacts.

Alternative 2

Alternative 2 would result in a temporary increase in energy consumption during construction of the project, including fuel necessary for the movement of equipment, materials, and personnel to the project site, fuel for the operation of equipment, and lighting for night work.

Alternative 2 would reduce energy demand by easing congestion and improving traffic flow along 1-5, but at a lesser extent than Alternative 1 since Alternative 2 does not include an HOV lane and would thus have fewer HOV users.

Alternative 3

As noted in Section 2.5.3, Alternative 3 would move fewer persons at a lower overall average speed than the other alternatives. Alternative 3 doesn't ease congestion or improve traffic flow. Alternative 3 would not encourage ridesharing, increase fuel efficiency, or reduce energy demand.

Alternative 4

The No Build Alternative would not encourage ridesharing, increase fuel efficiency, or reduce energy demand.

2.14.4 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures are required.

2.14.5 CEQA Considerations

Less than significant impacts resulting from energy use are anticipated.

Biological Environment

Caltrans prepared a Natural Environment Study (NES) report for the proposed project in June 2008. A copy of the NES is available on the project website at www.dot.ca.gov/dist3/Projects/00165/prjindex.htm. All information presented in this chapter is derived from this study.

A list of species and habitats potentially occurring within the project vicinity was developed based on information compiled from the US Fish and Wildlife Service (USFWS), California Department of Fish and Game's Natural Diversity Data Base (CNDDB), and the California Native Plant Society (CNPS) (see Tables 2-15.1 and Appendix F).

Caltrans biologists conducted field surveys of the project site between April 2006 and May 2008 to assess existing natural resources and potential impacts. Emphasis was placed on the special status species that may occur. The project site was field reviewed to 1) identify habitat types; 2) identify potential wetlands; 3) identify factors indicating the potential for rare species; 4) identify rare species present; and 5) identify potential problems for the study.

Please note that the avoidance and minimization measures for many biological resources are the same. Each section below therefore contains only a summary of applicable avoidance and minimization measures. These measures are then described in full in Section 2.21 of this document.

2.15 Biological Setting and Natural Communities

This section of the document discusses natural communities. The focus of this section is on biological communities, not individual plant or animal species. This section also includes information on wildlife corridors and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value.

Habitat areas that have been designated as critical habitat under the Federal Endangered Species Act are discussed in Section 2.19. Wetlands and other waters are also discussed in Section 2.16.

2.15.1 Vegetation Communities

Preliminary classification of vegetation communities within the Environmental Study Limits (ESL) was based on plant community descriptions provided in "Preliminary Descriptions of the Terrestrial Natural Communities of California" (Holland 1986), as appropriate. Vegetation communities and land uses mapped in the ESL are described below.

Great Valley Mixed Riparian Forest

Great Valley mixed riparian forest occurs in the ESL along Morrison Creek. This is a tall, dense, winter-deciduous, broad-leaved riparian forest. The tree canopy is comprised of several species including Fremont cottonwood (*Populus fremontii*), valley oak (*Quercus lobata*), box elder (*Acer negundo* var. *californicum*), Goodding's black willow (*Salix gooddingii*), and arroyo willow (*Salix lasiolepis*). Understory shrubs include California button willow (*Cephalanthus occidentalis* var. *californicus*), blue elderberry (*Sambucus mexicana*), narrow-leaved willow (*Salix exigua*), and California wild grape (*Vitis californica*). Herbaceous cover includes willow weed (*Polygonum lapathifolium*), sticktight (*Bidens frondosa*), western poison oak (*Toxicodendron diversilobum*), cocklebur (*Xanthium strumarium*), and broad-leaved peppergrass (*Lepidium latifolium*).

Aquatic/Riverine

Aquatic/riverine habitats can occur in association with many terrestrial habitats, including urban and ruderal areas, annual grasslands, and woodlands. Aquatic/riverine habitats in the ESL include Morrison Creek, the Sacramento Drainage Canal, and an unnamed channel crossing under I-5 south of Laguna Blvd.

Perennial Freshwater Wetlands

Perennial freshwater wetlands have soils permanently flooded or saturated by freshwater (rather than brackish or saline water) and are dominated by perennial emergent hydrophytes such as broad-leaved cattail (*Typha latifolia*) and tule (*Scirpus acutus*). Perennial freshwater wetland vegetation may occur in association with terrestrial or aquatic habitats. Perennial freshwater wetland vegetation occurs in several areas within the southern portion of the ESL in association with the sloughs and creeks that flow through the area.

Seasonal Wetland

Seasonal freshwater wetlands occur in areas that are marshy with standing water or saturated soils following winter rains, but which may be nearly or completely dry by summer. Seasonal wetland areas are not necessarily alkaline, but may become more alkaline late in the season. Seasonal freshwater wetlands in the ESL occur adjacent to Morrison Creek within the riparian area, along Parker Slough, and at the Stone Lake Wildlife Refuge.

Seasonal wetland features also occur in seasonally wet depressions, such as highway drainage ditches or isolated depressions along the highway. Seasonal freshwater wetland areas support mostly low-growing annual hydrophytic herbs, including Baltic rush (*Juncus balticus*), umbrella sedge (*Cyperus eragrostis*), curly dock (*Rumex crispus*), rayless goldfields (*Lasthenia glaberrima*), perennial ryegrass (*Lolium perenne*), hyssop loosestrife (*Lythrum hyssopifolia*), birdfoot trefoil (*Lotus corniculatus*), annual hairgrass (*Deschampsia danthonoides*), broad-leaved peppergrass, willow weed, and common lippia (*Phyla nodiflora*).

Nonnative Grassland

Nonnative grassland occurs along the shoulder of I-5 in the southern portion of the ESL south of Pocket Road to the southern limits of the ESL. This plant community is dominated by nonnative grasses such as wild oat (*Avena fatua*), Italian ryegrass (*Lolium multiflorum*), barley (*Hordeum murinum* ssp. *leporinum*), and soft chess (*Bromus hordeaceus*). Other species found in this community include radish (*Raphanus sativus*), vinegarweed (*Trichostema lanceolatum*), cutleaf geranium (*Geranium dissectum*), and willowherb (*Epilobium brachycarpum*).

Ruderal

A ruderal species is a plant species that is first to colonize disturbed lands. The disturbance may be natural (e.g., wildfires or landslides) or man-made (e.g., construction or agriculture). Ruderal communities occur in areas of disturbances, such as along roadsides, trails, parking lots, etc. These communities are subjected to ongoing or past disturbances (e.g., vehicle activities, grazing, mowing, etc.). Ruderal communities are often successional in nature; however, in highly disturbed areas, ruderal assemblages of native and introduced weedy species can become established and maintain a position in the community as succession is prevented by repeated disturbance. The components of the ruderal community vary from place to place and with the nature of the disturbance. Most of the species that occur in these disturbed areas are various annual grasses and forbs of Eurasian origin, many of which also occur in grasslands. Areas mapped as ruderal vegetation within the ESL are dominated by annual grasses including soft chess, ripgut brome (*Bromus diandrus*), wild oat, and Johnsongrass, as well as annual forbs including black mustard (*Brassica* *nigra*), yellow star-thistle (*Centaurea solstitialis*), chicory (*Cichorium intybus*), bindweed (*Convolvulus arvensis*), prickly lettuce (*Lactuca serriola*), and mayweed (*Anthemis cotula*). Within the ESL, ruderal areas occur adjacent to the highway, including the unpaved road shoulders, and the unpaved median in the southern portion of the ESL. Many of the ruderal areas within the ESL are regularly maintained or mowed.

Agricultural

Typically, agricultural fields are monotypic. Because of their high degree of disturbance, agricultural areas generally have a low habitat value for wildlife, although a number of species adapted for disturbed conditions can be found. Agricultural areas are present within the ESL in the temporary construction easement (TCE) near Morrison Creek.

Ornamental

Ornamental plants and trees are distinguished from native vegetation and from utilitarian and crop plants, such as those used for agriculture and vegetable crops, for forestry, or as fruit trees. Areas mapped as ornamentals include areas landscaped in non-native vegetation, such as urban landscape vegetation along the shoulders of I-5 and within the freeway interchanges.

Developed/Urban

Developed areas consist of all artificial structures within the project area including roads, buildings, etc. Developed areas within the ESL consist of I-5 and its associated off ramps and on ramps, city streets, overcrossings, bridges, and paved road shoulders.

2.15.2 Hydrology

The ESL is located within the Sacramento River hydrologic region. The Sacramento River is the pivotal hydrologic feature in the landscape of Sacramento County, and is a principal source of irrigation water for Sacramento and San Joaquin Valley farmers and freshwater flow to the San Francisco Bay. Streams, creeks, and sloughs in the ESL and its vicinity will eventually drain into the Sacramento River, which eventually empties into the Sacramento-San Joaquin Delta. Watercourses in the ESL drain generally from northeast to southwest.

Hydrology in this watershed has been substantially altered from historical conditions by urban development and agricultural practices. Urbanization has had many effects on watercourses in the ESL and its vicinity. Covering natural soil with impervious surfaces (i.e., pavement, structures) eliminates soil absorption of storm water, resulting in increased amounts of surface water to be disposed. Many creek beds have been channelized to protect structures that were built in floodplains, and some are lined with concrete. Floodplains are discussed in detail in Chapter 2.7.

In the northern portion of the ESL, the Sacramento Drainage Canal is located within the ESL near the SR 160/Freeport Blvd undercrossing under Interstate 5. This is a concrete-lined channel that is part of the City of Sacramento's existing drainage system.

The southern portion of the ESL lies within the Beach-Stone Lakes Basin in the northeast portion of the Sacramento-San Joaquin Delta. This Basin is within the lower watershed of the Morrison Creek drainage, with the Sacramento River to the west and the Mokelumne and Cosumnes Rivers nearby to the southeast. The lower Morrison Creek watershed governs the surface water flow over the Stone Lakes National Wildlife Refuge, which is west of the ESL. This 180-mile system of streams and floodplain originates in eastern Sacramento County and includes portions of the City of Sacramento, and Morrison, Unionhouse, Laguna, Elk Grove, and Elder creeks. Stream flows in these channels are affected by storm runoff, springs, urban drainage, groundwater pumping for irrigation, water supply and diversions, and surface storage ponds located throughout the watershed. Waters on the Stone Lakes National Wildlife Refuge are also influenced by the Cosumnes and Mokelumne Rivers, especially during floods when water from the two rivers backs up the Southern Pacific Railroad borrow canal.

The Morrison Creek stream group drains a large urban and agricultural watershed that includes Laguna and Morrison Creeks and Beach Lake. Many industrial and commercial sources contribute runoff to Morrison Creek. Most streams are intermittent and historically dry during the summer. Urbanization and agricultural practices in this watershed have resulted in low summer flows consisting of runoff from irrigation, wastewater flows, and agricultural return flows.

Elevations in the Morrison Creek watershed range from 300 feet above mean sea level in the northeast and slope gently down to sea level in the Beach-Stone Lakes Basin in the southwest. The Beach Lake dike, a reclamation district levee, divides Upper Beach Lake from Lower Beach Lake. The Beach Lake dike directs water draining down Morrison Creek from Upper Beach Lake to an electric pump (City

Sump 90) that discharges it directly into the Sacramento River near the town of Freeport.

During winter high-flow periods when Upper Beach Lake rises above 3.5 feet mean sea level, water overtops the dike dividing Upper and Lower Beach Lake and spills into Lower Beach Lake and the Southern Pacific Railroad borrow canal. Water then continues south to North Stone Lake, Hood-Franklin Road, and South Stone Lake; passes through the Lambert Road Bridge flood control structure; and then enters Snodgrass Slough. Snodgrass Slough provides a surface hydrologic connection for the Basin and the Sacramento-San Joaquin Delta near the Town of Locke. South of Morrison Creek, Parker Slough flows through the ESL. Parker Slough is hydrologically connected to Lower Beach Lake through two large culverts. Thus, any consistent flows above 3.5 feet mean sea level will cause a breach across the Beach Lake dike, connecting Morrison Creek with Parker Slough.

Nearly all of the lands within the Stone Lakes National Wildlife Refuge are within the 100-year floodplain (see Chapter 2.7).

2.15.3 Regional Species and Habitats

Table 2-15.1 provides a listing of special status species that could potentially occur in the project area.

Table 2-15.1 Special Status Species Potentially Occuring in the Project Area

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
Accipiter cooperi	Cooper's hawk	CNDDB	Nests in dense stands of live oak, riparian deciduous, or other forest habitats near water. Hunts in broken woodlands and habitat edges.	**Low**. Suitable nesting and foraging habitat present in the ESL.
Acipenser medirostris	Green sturgeon	FT, FSC, SSC	Spawns in the Sacramento and Klamath Rivers. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	**None**. No suitable habitat present in the ESL.
Actinemys marmorata marmorata	Northwestern pond turtle	SSC	Occurs in permanent or nearly permanent water sources, ponds, marshes, rivers, streams and irrigation ditches with emergent vegetation and basking sites. Lay eggs in upland habitat consisting of sandy banks or grassy, open fields.	**Moderate**. Suitable habitat present in the ESL.
Agelaius tricolor	Tricolored blackbird	SSC	Highly colonial species. Nests near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, and tall herbs. Forages in croplands and grasslands.	**Low**. Marginal nesting habitat present, but suitable foraging habitat is present in the ESL.
Ambystoma californiense	California tiger salamander	FT, SSC	Most commonly found in annual grassland habitat, but also occurs in grassy understory of valley-foothill hardwood habitats, and uncommonly along stream courses in valley-foothill riparian habitats. Requires vernal pools or other seasonal water bodies for breeding. Utilizes underground refuges, especially ground squirrel burrows.	**None**. No suitable habitat will be impacted by the proposed project. This species is not known to occur in or near the ESL. The closest reported occurrence is 13.0 miles southeast of the ESL (CNDDB 2008).
N/A	California tiger salamander (central population) critical habitat	N/A	N/A	**None**. The ESL is not located within critical habitat of the California tiger salamander
Archoplites interruptus	Sacramento perch	SSC	Formerly inhabited sloughs, slow-moving rivers, and lakes of the Central Valley, but are now mostly found in reservoirs and ponds. They are often associated with beds of rooted, submerged, and emergent vegetation and other submerged objects.	**None**. The ESL is outside of the current range for this species.

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
Ardea alba	Great egret (rookery site)	CNDDB	Colonial nester in large trees near marshes, tide-flats, irrigated pastures, and margins of rivers and lakes. Nesting colony must be isolated from human activities. Feeds in shallow water and along shores of estuaries, lakes, ditches, and slow-moving streams, in salt ponds and mudflats, and in irrigated croplands and pastures.	**Low**. Suitable foraging habitat present, but no rookery sites are present in the ESL. A rookery site is located along Morrison Creek approximately 0.3 mile upstream of the ESL.
Ardea herodias	Great blue heron (rookery site)	CNDDB	Colonial nester in large trees, cliffsides, and sequestered spots on marshes. Foraging habitat includes marshes, lake margins, tide-flats, rivers, streams and wet meadows. Rookery sites are located in close proximity to foraging areas.	**Low**. Suitable foraging habitat present, but no rookery sites are present in the ESL. A rookery site is located along Morrison Creek approximately 0.3 mile upstream of the ESL.
Athene cunicularia	Burrowing owl	SSC	Burrow sites in open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, California ground squirrel.	**Low**. Suitable habitat is present in the ESL, but no burrowing owls were observed during field surveys.
Branchinecta conservatio	Conservancy fairy shrimp	FE	Found in large, turbid pools in grasslands in the northern two-thirds of the Central Valley.	**Low**. No suitable habitat will be impacted by the proposed project. Vernal pools complexes are located near the ESL, but the project will not alter the hydrology of these complexes.
Branchinecta lynchi	Vernal pool fairy shrimp	FT	Endemic to the grasslands of the Central Valley, Central Coast Mountains and South Coast Mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swales, earthen slumps, or basalt-flow depression pools.	**Low**. No suitable habitat will be impacted by the proposed project. Vernal pools are located near the ESL, but the project will not alter the hydrology of these complexes.
N/A	Vernal pool fairy shrimp critical habitat	N/A	N/A	**None**. The ESL is not located within vernal pool fairy shrimp critical habitat.
Branchinecta mesovallensis	Midvalley fairy shrimp	CNDDB	Occurs in seasonal vernal pools or other topographic depressions throughout the Central Valley.	**Low**. No suitable habitat will be impacted by the proposed project. Vernal pools are located near the ESL, but the project will not alter the hydrology of these complexes.

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
Buteo swainsoni	Swainson's hawk	ST	Breeds in stands with few trees in juniper-sage flats, riparian areas and oak savannahs. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**Moderate**. Suitable nesting and foraging habitat present in the ESL, and Swainson's hawks were observed foraging near the ESL.
Carex comosa	Bristly sedge	CNPS 2	Lake margins, marshes and swamps (0 – 2,050 ft). Blooms May – September.	**None**. Potential habitat located within the ESL, but species was not observed during 2007 plant surveys. No suitable habitat will be impacted by the proposed project.
N/A	Coastal and Valley Freshwater Marsh	CNDDB	Dominated by perennial, emergent monocots, such as tules and cattails, to approximately 15 ft tall. Often forming completely closed canopies.	**None**. This habitat type will not be impacted by the proposed project.
Coccyzus americanus occidentalis	Western yellow-billed cuckoo	FC, SE	Riparian forest with dense vegetation, along the broad, lower flood-bottoms of larger river systems. Nests in riparian jungles of willow, often mixed with cottonwoods, with understory of blackberry, nettles, or wild grape.	**None**. No suitable habitat present in the ESL.
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	FT	Occurs only in the Central Valley of California, in association with blue elderberry (Sambucus mexicana). Preferable to branches greater than one inch in diameter.	**Low**. Several elderberry shrubs are located within the ESL.
N/A	Valley elderberry longhorn beetle critical habitat	N/A	N/A	**None**. No valley elderberry longhorn beetle critical habitat is present in the ESL.
Downingia pusilla	Dwarf downingia	CNPS 2	Vernal lake and pool margins (3 – 1460 ft). Blooms March – May.	**None**. No suitable habitat will be impacted by the proposed project.
Egretta thula	Snowy egret (rookery site)	CNDDB	Locally common in the Central Valley all year. Feeds in shallow water or along shores of wetlands or aquatic habitats. Nests in protected beds of dense tules.	**Low**. Suitable foraging habitat present, but no rookery sites are present in or adjacent to the ESL. Closest reported rookery site is approximately 11 miles north of the ESL near the Sacramento Metropolitan Airport.
Elanus leucurus	White-tailed kite	SFP	Nesting habitat includes rolling foothills/valley margins with scattered oaks, and river bottomlands or marshes next to deciduous woodlands. Forages in open grasslands, meadows, or marshes.	**Low**. Suitable nesting and foraging habitat is present in the ESL.

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
Elaphrus viridis	Delta green ground beetle	FT	Restricted to the margins of vernal pools in the grassland area between Jepson Prairie and Travis Air Force Base.	**None**. No suitable habitat present in the ESL, and the ESL is not within the range of this species.
N/A	Elderberry Savanna	CNDDB	Characterized by single plants or aggregations of elderberry shrubs in grassland habitat.	**None**. This habitat type is not located in the ESL.
Gratiola heterosepala	Bogg's Lake hedge-hyssop	SE; CNPS 1B	Usually occurs in vernal pools, sometimes found on lake margins. Grows in clay soils (15 – 7,800 ft). Blooms April – August.	**None**. No suitable habitat will be impacted by the proposed project.
N/A	Great Valley Cottonwood Riparian Forest	CNDDB	Dense, broad-leaved, winter-deciduous forest dominated by Fremont cottonwood and Goodding's black willow. Understory includes California wild grape, and seedlings of box elder and Oregon ash.	**None**. No great valley cottonwood riparian forest is present in the ESL.
N/A	Great Valley Mixed Riparian Forest	CNDDB	Tall, dense, winter deciduous, broad-leaved riparian forest. Tree canopy includes Fremont cottonwood, valley oak, boxelder, sycamore, California black walnut, Goodding's black willow, and red willow. Understory includes button bush, Oregon ash, and California wild grape.	**Moderate**. Great Valley Mixed Riparian Forest is present along Morrison Creek and will be impacted by the proposed project.
N/A	Great Valley Valley Oak Riparian Forest	CNDDB	Medium to tall, winter-deciduous, closed-canopy, broad-leaved riparian forest dominated by valley oak. Understory includes Oregon ash, sycamore, and valley oak seedlings.	**None**. No Great Valley Valley oak riparian forest is present in the ESL.
Haliaeetus leucocephalus	Bald eagle	FD; SE, SFP	Nests in large, old growth, or dominant live tree with open branches near ocean shore, lake margins, and rivers. Usually nests within one mile of water.	**None**. No suitable habitat present in the ESL.
Hibiscus lasiocarpus	Woolly rose-mallow	CNPS 2	Freshwater marshes and swamps. Moist, freshwater-soaked riverbanks and low peat islands in sloughs. In California, known from the Delta watershed (3 – 400 ft). Blooms June – September.	**None**. Suitable habitat present in the ESL along Morrison Creek, but this species was not observed during plant surveys and is presumed absent from the ESL.
Hypomesus transpacificus	Delta smelt	FT, ST	Sacramento-San Joaquin Delta. Seasonally in Suisun bay, Carquinez Strait, and San Pablo Bay. Seldom found at salinities greater than 10 ppt. Most often in salinities less than 2 ppt.	**None**. No suitable habitat present in the ESL.

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
	Delta smelt critical habitat	N/A		**None**. The ESL is not located within critical habitat for Delta smelt.
Juglans hindsii	Northern California black walnut	CNPS 1B	Riparian forest and riparian woodland. Few extant native stands remain (0 – 1296 ft). Blooms April – May.	**None**. No black walnut trees were observed in the ESL.
Juncus leiospermus var. ahartii	Ahart's dwarf rush	CNPS 1B	Restricted to the edges of vernal pools.	**None**. No suitable habitat present in the ESL.
Lasiurus cinereus	Hoary bat	CNDDB	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees.	**Low**. Suitable foraging and roosting habitat present in the ESL.
Lathyrus jepsonii var. jepsonii	Delta tule pea	CNPS 1B	Freshwater and brackish marshes (0 – 13 ft). Blooms May – July, sometimes until September.	**None**. No suitable habitat will be impacted by the proposed project.
Legenere limosa	Legenere	CNPS 1B	Beds of vernal pools (3 – 2,900 ft). Blooms April – June.	**None**. No suitable habitat will be impacted by the proposed project.
Lepidurus packardi	Vernal pool tadpole shrimp	FE	Occurs in the Sacramento Valley in a variety of natural and artificial seasonally ponded habitat types including: vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, ditches, backhoe pits, and ruts caused by vehicular activities.	**Low**. No suitable habitat present in the ESL. Vernal pools are located near the ESL, but the project will not change the hydrology of these complexes.
N/A	Vernal pool tadpole shrimp critical habitat	N/A	N/A	**None**. The ESL is not within critical habitat for the vernal pool tadpole shrimp.
Lilaeopsis masonii	Mason's lilaeopsis	SR, CNPS 1B	Freshwater and brackish marshes, and riparian scrub. Occurs in tidal zones in muddy or silty soil formed through river deposition or riverbank erosion (0 – 33 ft). Blooms April – November.	**None**. No suitable habitat present in the ESL.
Limosella subulata	Delta mudwort	CNPS 2	Marshes and swamps, muddy or sandy intertidal flats (0 – 10 ft). Blooms May – August.	**None**. No suitable habitat present in the ESL.
Linderiella occidentalis	California linderiella	CNDDB	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan, or in sandstone depressions.	**Low**. No suitable habitat present in the ESL. Vernal pools are located near the ESL, but the project will not change the hydrology of these complexes.
N/A	Northern Claypan Vernal Pool	CNDDB	Areas of grassland where winter rainfall perches on the claypan, forming pools in the depressions. Evaporation empties the pools in the spring, leaving concentric bands of vegetation.	**None**. No northern claypan vernal pools are located in or near the ESL.

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
N/A	Northern Hardpan Vernal Pool	CNDDB	Areas of grassland where winter rainfall perches on the hardpan, forming pools in the depressions. Evaporation empties the pools in the spring, leaving concentric bands of vegetation.	**Low.** No northern hardpan vernal pools are present in the ESL. Northern hardpan vernal pools are located near the ESL, but the project will not change the hydrology of these complexes.
Nycticorax nycticorax	Black-crowned night heron (rookery site)	CNDDB	Feeds along the margins of lacustrine, large riverine, and fresh and saline emergent habitats and, rarely, on kelp beds in marine subtidal habitats. Nests and roosts in dense-foliaged trees and dense emergent wetlands.	**Low**. Suitable foraging habitat present, but no rookery sites are present in or adjacent to the ESL. Closest reported rookery site is at Nicholas Pond, approximately 0.4 mile east of the ESL and 0.3 mile north of Laguna Blvd.
Oenothera deltoides ssp. howellii	Antioch Dunes evening-primrose	FE, SE, CNPS 1B	Interior dunes. Remnant river bluffs and sand dunes east of Antioch (0-100 ft). Blooms March – September.	**None**. No suitable habitat present in the ESL.
Oncorhynchus mykiss irideus	Central Valley steelhead	FT	Populations occur and spawn in the Sacramento and San Joaquin rivers and their tributaries.	**Low**. No spawning habitat present in the ESL. Indirect effects resulting from construction in Morrison Creek could occur downstream of the project.
N/A	Central Valley steelhead critical habitat	N/A	N/A	**None**. No critical habitat for Central Valley steelhead is present in the ESL.
Oncorhynchus tshawytscha	Central Valley fall/late fall-run Chinook salmon	FSC, SSC	Found mainly in the Sacramento River and its tributaries, and most spawning and rearing of juveniles takes place in the reach between Red Bluff and Redding (Keswick Dam). Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel.	**Low**. No spawning habitat present in the ESL. Indirect effects resulting from construction in Morrison Creek could occur downstream of the project.
Oncorhynchus tshawytscha	Central Valley spring-run Chinook salmon	FT, ST	Sacramento and San Joaquin Rivers and tributaries. Primarily found in Butte, Big Chico, Deer, and Mill creeks. Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel.	**Low**. No spawning habitat present in the ESL. Indirect effects resulting from construction in Morrison Creek could occur downstream of the project.
N/A	Central Valley spring-run Chinook salmon critical habitat	N/A	N/A	**None**. No critical habitat for Central Valley spring-run Chinook salmon is present in the ESL.
Oncorhynchus tshawytscha	Sacramento River winter-run Chinook salmon	FE, SE	Sacramento River below Keswick Dam. Spawns in the Sacramento River but not in tributary streams.	**Low**. No spawning habitat present in the ESL. Construction in Morrison Creek could result in indirect effects to fish downstream of the work area.
N/A	Winter-run Chinook salmon critical habitat	N/A	N/A	**None**. No critical habitat for winter-run Chinook salmon is present in the ESL.

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
Orcuttia tenuis	Slender Orcutt grass	FT, SE, CNPS 1B	Vernal Pools (115 – 5800 ft). Blooms May – October.	**None**. No suitable habitat present in the ESL.
N/A	Slender Orcutt grass critical habitat	N/A	N/A	**None**. The ESL is not located within critical habitat for slender orcutt grass.
Orcuttia viscida	Sacramento Orcutt grass	FE, SE, CNPS 1B	Vernal pools (100 – 300 ft). Blooms April – July).	**None**. No suitable habitat present in the ESL.
	Sacramento Orcutt grass critical habitat	N/A	N/A	**None**. The ESL is not located within critical habitat for Sacramento orcutt grass.
Phalacrocorax auritus	Double-crested cormorant (rookery site)	CNDDB	Colonial nester in trees, on ground, or on cliffs near ponds, lakes, rivers, lagoons, estuaries, and along open coastlines.	**Low**. Suitable foraging habitat present, but no rookery sites are present in the ESL. Closest rookery site is located at North Stone Lake, approximately 0.3 miles east of the ESL.
Pogonichthys macrolepidotus	Sacramento splittail	SSC	Endemic to the lakes and rivers of the Central Valley, but now confined to the Delta, Suisun Bay, Suisun Marsh, Napa River, Petaluma River, and other parts of the Sacramento-San Joaquin estuary.	**None**. ESL is outside of the current range of this species.
Progne subis	Purple martin	SSC	Open agricultural areas, towns and marsh edges. Nests in cavities in oak woodland and low-elevation coniferous forest habitats. Frequently nests in old woodpecker cavities and human-made structures.	**None**. Suitable habitat present in the ESL, but this species does not nest within the ESL.
Rana aurora draytonii	California red-legged frog	FT, SSC	Lowlands and foothills in or near permanent sources of water with dense, shrubby or emergent riparian vegetation.	**None**. No suitable habitat present in the ESL.
Riparia riparia	Bank swallow	ST	Open and partly open situations, frequently near flowing water. Colonial nester in steep sand, dirt, or gravel banks, in burrows dug near the top of the bank, along the edge of inland water or along the coast, or in gravel pits, road embankments, etc.	**None**. No suitable habitat present in the ESL.
Sagittaria sanfordii	Sanford's arrowhead	CNPS 1B	In standing or slow-moving freshwater ponds, marshes and ditches. Marshes and swamps (0 – 2000 ft). Blooms May – October.	**Moderate**. Species detected at Morrison Creek.
Scutellaria lateriflora	Blue skullcap	CNPS List 2	Meadows and seeps, marshes and swamps (-10 – 1650 ft). Blooms July – September.	**None**. No suitable habitat present in the ESL.
N/A	Succulent (=fleshy) owl's clover critical habitat	N/A	N/A	**None**. The ESL is not within critical habitat for succulent owl's clover.

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
Taxidea taxus	American badger	SSC	Occurs throughout California and the United States. Primary habitat requirements seem to be sufficient food and friable soils in relatively open uncultivated ground in grasslands, woodlands, and desert.	**None**. No suitable habitat present in the ESL.
Thamnophis gigas	Giant garter snake	FT, ST	Streams and sloughs, usually with mud bottom. One of the most aquatic of garter snakes; usually in areas of freshwater marsh and low-gradient streams with emergent vegetation, also drainage canals and irrigation ditches and ponds and small lakes.	**Moderate**. Suitable habitat present in Morrison Creek and surrounding upland area.
N/A	Valley Oak Woodland	CNDDB	Canopies dominated almost exclusively by valley oak. Associated species in the Central Valley include sycamore, northern California black walnut, interior live oak, box elder, and blue oak. Understory consists of poison oak, blue elderberry, California wild grape, toyon, California coffeeberry, and California blackberry.	**None**. No valley oak woodland is present in the ESL.
Xanthocephalus xanthocephalus	Yellow-headed blackbird	SSC	Nests in freshwater emergent wetlands with dense vegetation and deep water, often along borders of lakes or ponds. Nests only where large insects are abundant.	**None**. No suitable habitat present in the ESL.

FE: Federal Endangered
FT: Federal Threatened
FC: Federal Candidate for Endangered Species Act listing
FPE: Federal Proposed Endangered
FPT: Federal Proposed threatened
FSC: Federal Species of Concern - list established by NOAA Fisheries
CNPS 1B: California Native Plant Society list of plants rare, threatened or endangered in California
CNPS List 2: California native Plant Society list of plants rare, threatened or endangered in California, but more common elsewhere
CNPS List 3: California Native Plant Society list of plants about which there is a need for more information - a review list
CNPS List 4: California native Plant Society list of plants of limited distribution- a watch list
CNDDB: Species that have no formal listing or protection status, but appear in the CNDDB due to their conservation status ranking

SE: CA Endangered
ST: CA Threatened
SR: CA Rare
SSC: California Species of Special Concern
SFP: State Fully Protected

2.16 Wetlands and Other Waters

2.16.1 Regulatory Setting

Wetlands and other waters are protected under a number of laws and regulations. At the federal level, the Clean Water Act (33 USC Section 1344) is the primary law regulating wetlands and surface waters. The Clean Water Act regulates the discharge of dredged or fill material into waters of the United States, including wetlands. Waters of the United States include navigable waters, interstate waters, territorial seas and other waters that may be used in interstate or foreign commerce. To classify wetlands for the purposes of the Clean Water Act, a three-parameter approach is used that includes the presence of hydrophytic (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 Clean Water Act.

Section 404 of the Clean Water Act establishes a regulatory program that provides that no discharge of dredged or fill material can 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.

USACE issues two types of 404 permits: Standard and General permits. Nationwide permits, a type of General permit, are issued to authorize a variety of minor project activities with no more than minimal effects. Ordinarily, projects that do not meet the criteria for a Nationwide Permit may be permitted under one of USACE's Standard permits. For Standard permits, the USACE decision to approve is based on compliance with USEPA's Section 404(b)(1) Guidelines (USEPA 40 CFR Part 230), and whether permit approval is in the public interest.

The 404 (b)(I) Guidelines were developed by the U.S. EPA in conjunction with 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 USACE may not issue a permit ifthere is a least environmentally damaging practicable alternative (LEDP A) to the proposed discharge that would have lesser effects on waters of the U.S., and not have any other significant adverse environmental consequences.

Executive Order 11990 (*Protection of Wetlands*) also regulates the activities of federal agencies with regard to wetlands. Essentially, this executive order states that a federal agency, such as FHWA, 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.

At the state level, wetlands and waters are regulated primarily by CDFG, the SWRCB, and the RWQCBs. In certain circumstances, the California Coastal Commission (or Bay Conservation and Development Commission or the Tahoe Regional Planning Agency) may also be involved. CDFG Code Section 1600 et seq. requires that any agency that proposes a project that will substantially divert or obstruct the natural flow of or substantially change the bed, channel, or bank of a river, stream, or lake must first notify CDFG before beginning construction. If CDFG determines that the project may substantially and adversely affect fish or wildlife resources, a Lake or Streambed Alteration Agreement will be required. CDFG 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 USACE may or may not be included in the area covered by a Streambed Alteration Agreement obtained from CDFG.

The Regional Water Quality Control Boards were established under the Porter-Cologne Water Quality Control Act to oversee water quality. The RWQCB also issues water quality certifications in compliance with Section 401 of the Clean Water Act (see Section 2.8 of this document for additional details).

2.16.2 Affected Environment

A delineation of wetlands and other waters potentially subject to regulation by the USACE and/or the CDFG was conducted between June 2007 and May 2008. Locations of drainages or other surface water bodies within the project area were noted on field maps. All water bodies found were evaluated to determine if they qualified as waters of the United States. General characteristics were noted, including the position of the ordinary high water mark (OHWM), and the presence or lack of bed and bank, hydrophytic or riparian vegetation, or hydric soils.

The CDFG regulates wetland areas only to the extent that those wetlands are part of a river, stream, or lake as defined by the CDFG. Morrison Creek and the wetlands and riparian habitat directly associated with the creek are under CDFG jurisdiction and will require a Streambed Alteration Agreement from the CDFG. Riparian habitat includes willows, cottonwoods, and other vegetation typically associated with the banks of a stream or lake shoreline. In most situations, wetlands associated with a stream or lake would fall within the limits of riparian habitat. Seasonal wetlands and marsh habitats that are not associated with Morrison Creek and that do not fall within the CDFG's definition of a river, stream, or lake are not within CDFG jurisdiction.

Vegetation communities within the ESL that fall under the potential jurisdiction of the USACE and/or the CDFG include Great Valley mixed riparian forest, seasonal freshwater wetlands, perennial freshwater wetlands, and aquatic/riverine habitats.

2.16.3 Environmental Consequences

Alternative 1

Alternative 1 would result in temporary impacts to 4.18 acres of Great Valley Mixed Riparian Forest habitat, under the jurisdiction of the CDFG. Approximately 1.95 acres of this riparian habitat is also considered seasonal wetland and is under the potential jurisdiction of the USACE. These temporary impacts are expected to occur due to equipment access and staging during the widening of the Beach Lake Bridge over Morrison Creek.

Alternative 1 would also result in temporary impacts to an additional 0.18 acre of potentially USACE jurisdictional seasonal freshwater wetland that is located outside the riparian area (and is therefore not under the jurisdiction of CDFG).

Alternative 1 would permanently impact 0.004 acre of Great Valley Mixed Riparian Forest (CDFG jurisdictional), which includes 0.002 acre of seasonal wetland within the riparian area that is also under the potential jurisdiction of the USACE.

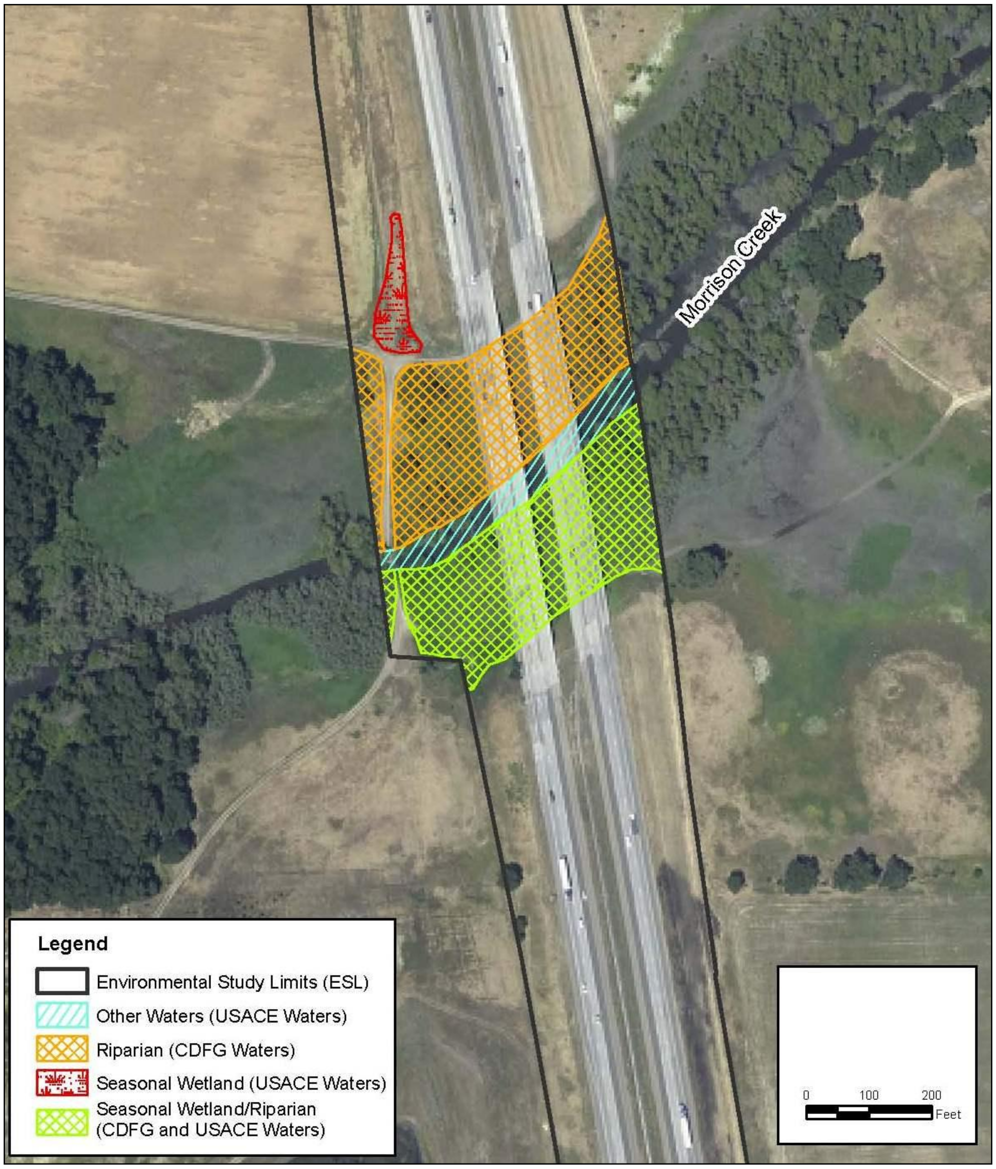
No impacts to perennial freshwater wetlands would occur with the implementation of the avoidance and minimization measures listed in Section 2.16.4.1.

Other waters of the US (potentially USACE jurisdictional) that would be affected consist of aquatic/riverine habitat in Morrison Creek. Alternative 1 would result in permanent impacts to approximately 0.0004 acre of other waters of the US. Permanent impacts would result from placement of the piers for the widening of the bridge over Morrison Creek.

Alternative 1 would also result in temporary impacts to approximately 0.57 acre of other waters of the US during dewatering and construction of the bridge piers.

Indirect effects are those effects that are caused by or would result from the proposed action and are later in time, but are still reasonably certain to occur. These impacts are caused by: alteration of hydrology; human intrusion resulting from increased development; and the introduction or increase of pesticides, predators, and weedy nonnative vegetation.

Figure 2-16.1 Wetland Impacts at Morrison Creek



Indirect impacts to potentially jurisdictional areas throughout the project area are also possible due to the introduction of weedy plant species from construction equipment or the spread of known noxious weeds within the project area. Caltrans will implement minimization and avoidance measures that will limit the introduction or spread of noxious weeds, as outlined in Section 2.20.4.1 of this document.

Alternative 2

Alternative 2 footprint and features are the same as Alternative 1. Its potential impacts to wetlands and other waters will be the same as well. Please refer to the impact discussion under Alternative 1.

Alternative 3

Alternative 3 does not involve widening any structures or bridges and thus will not affect wetlands or other waters.

Alternative 4

This alternative would not involve construction and therefore would not result in any impacts to CDFG or potentially USACE jurisdictional wetlands or waters.

2.16.4 Avoidance and Minimization Measures

The following avoidance and minimization measures will be implemented throughout the ESL to minimize impacts to wetlands, other waters of the US, and CDFG waters:

01 – Establish Environmentally Sensitive Areas
02 – Limit Vegetation Removal
03 – Containment Measures/Construction Site Best Management Practices
04 – Minimize Disturbance to Creek Channel and Adjacent Areas
05 – Restore Wetland, Riparian, and Stream Habitat Disturbed by Construction
06 – Dewatering Activities
07 – Restrict Timing of In-Stream Activities

2.16.5 Mitigation Measures

Alternatives 1 and 2 will result in permanent impacts to wetlands and other waters under the potential jurisdiction of the USACE and CDFG. Alternatives 1 and 2 will require a Clean Water Act Section 404 permit from the USACE, a Section 401 Water Quality Certification from the RWQCB, and a Streambed Alteration Agreement from CDFG (pursuant to Section 1600 et seq. of the California Fish and Game Code). Conditions of these permits will include requirements for compensation for impacts to wetlands and other waters.

Areas of temporary impacts, including the 4.18 acres of temporary impacts to CDFG jurisdictional Great Valley Mixed Riparian Forest habitat (which includes 1.95 acres of potentially USACE jurisdictional seasonal wetlands) and the additional 0.18 acre of potentially USACE jurisdictional seasonal freshwater wetland that is located outside the riparian area will be restored to pre-project conditions as described in the avoidance and minimization measures listed above.

Compensation for permanent impacts to the 0.004 acre of Great Valley Mixed Riparian Forest (CDFG jurisdictional) will be accomplished at a ratio of 3:1; approximately 0.012 acre of compensation will be required. Riparian impacts will likely be compensated through the purchase of credits at an approved mitigation bank, if available, or through the use of existing credits that are available to Caltrans at the Beach Lake Mitigation Bank.

Compensation for impacts to 0.002 acre of seasonal wetland will be covered by the compensation required for Great Valley Mixed Riparian Forest, and no additional compensation will be needed.

Permanent impacts to 0.0004 acre of other waters of the US will be likely compensated at a 1:1 ratio through the creation of vegetated buffers in the riparian area of Morrison Creek

Compensation measures for impacts to wetlands and other waters will be developed in coordination with the applicable resource agencies and will include all necessary measures to offset project effects.

2.16.6 CEQA Considerations

Less than significant impacts to wetlands and other waters are anticipated. As these impacts are less than significant, no mitigation measures are required under CEQA. However, mitigation will be required by the USACE to compensate for the loss of wetlands and other waters of the U.S. and will be required by CDFG to compensate for the loss of CDFG jurisdictional waters.

2.17 Plant Species

2.17.1 Regulatory Setting

The USFWS and the CDFG share regulatory responsibility for the protection of special-status plant species. “Special-status” species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are afforded varying levels of regulatory protection. The highest level of protection is given to threatened and endangered species; these are species that are formally listed or proposed for listing as endangered or threatened under the Federal Endangered Species Act (FESA) and/or the California Endangered

Species Act (CESA). Please see the Threatened and Endangered Species Section 2.19 in this document for detailed information regarding these species.

This section of the document discusses all the other special-status plant species, including CDFG fully protected species and species of special concern, USFWS candidate species, and non-listed 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 Fish and Game Code, Section 1900-1913, and CEQA, Public Resources Code, Sections 21000-21177.

2.17.2 Affected Environment

Only one special-status plant species, Sanford's arrowhead (*Sagittaria sanfordii*), was located within the ESL of the proposed project.

Sanford's Arrowhead

Sanford's arrowhead is a CNPS List 1B species, but has no federal or state status. This rhizomatous, emergent herb grows in assorted shallow freshwater habitats, such as standing or slow-moving freshwater ponds, marshes, and ditches. Sanford's arrowhead has been extirpated from southern California, and mostly extirpated from the Central Valley (CNPS 2010). Sanford's arrowhead grows at elevations from sea level to approximately 2,100 ft elevation, and blooms from May to October. This species is threatened by grazing, development, recreational activities, competition from non-native plants, road widening, and channel alteration.

Suitable habitat for this species is present in the ESL at Morrison Creek, and this species was identified growing within the ESL, approximately 50 ft east of the existing bridge. Approximately 25 plants were observed growing in a wetted area next to the edge of the creek.

2.17.3 Environmental Consequences

Alternative 1

No impacts to Sanford's arrowhead are anticipated with the implementation of the avoidance and minimization measures listed below. If it is determined that complete avoidance of this species is not feasible, then CDFG will be contacted to determine the proper course of action to minimize or offset impacts to this species.

Alternative 2

Alternative 2 footprint and features are the same as Alternative 1. Its potential impacts to plants will be the same as well. Please refer to the impact discussion under Alternative 1.

Alternative 3

Alternative 3 does not involve widening any structures or bridges and thus will not affect plants.

Alternative 4

Alternative 4 would not involve construction and therefore would not result in any impacts to Sanford's arrowhead.

2.17.4 Avoidance and Minimization Measures

The following measures will be implemented to reduce impacts to Sanford's arrowhead.

01 – Establish Environmentally Sensitive Areas
02 – Limit Vegetation Removal
03 – Containment Measures/Construction Site Best Management Practices
04 – Minimize Disturbance to Creek Channel and Adjacent Areas
08 – Pre-construction Plant Surveys

2.17.5 Mitigation Measures

With the implementation of the avoidance and minimization measures above, no mitigation will be required.

2.17.6 CEQA Considerations

Less than significant impacts to special-status plant species are anticipated.

2.18 Animal Species

2.18.1 Regulatory Setting

Many state and federal laws regulate impacts to wildlife. The USFWS, the National Oceanic and Atmospheric Administration (NOAA) Fisheries and the CDFG are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with wildlife not listed or proposed for listing under the state or federal Endangered Species Act. Species listed or proposed for listing as threatened or endangered are discussed in Section 2.19. All other special-status animal species are discussed here, including CDFG fully protected species and species of special concern, and USFWS or NOAA Fisheries candidate species.

Federal laws and regulations pertaining to wildlife include the following:

- National Environmental Policy Act
- Migratory Bird Treaty Act
- Fish and Wildlife Coordination Act

State laws and regulations pertaining to wildlife include the following:

- California Environmental Quality Act
- Sections 1600 – 1603 of the Fish and Game Code
- Section 4150 and 4152 of the Fish and Game Code

2.18.2 Affected Environment

Due to the relatively undeveloped and open nature of the southern portion of the ESL, many wildlife species are likely to move through the area. Wildlife expected to occur in and around the ESL include primarily birds and small mammals, but it is expected that frogs and turtles also use the aquatic resources in Morrison Creek. The majority of the habitats are upland, although some aquatic habitat occurs in Morrison Creek and perennial wetland areas along the freeway.

Potential nesting habitat for migratory birds includes the riparian vegetation communities that occur at Morrison Creek, and other large trees and shrubs throughout the ESL.

The special-status animal species listed in Table 2-18.1 are those known to occur, or are considered likely to occur, in the ESL. Threatened and endangered species are listed in Table 2-19.1.

Table 2-18.1 Special Status Animal Species Potentially Occuring Within the ESL

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
Vernal Pool Invertebrates				
Branchinecta mesovallensis	Midvalley fairy shrimp	CNDDB	Occurs in seasonal vernal pools or other topographic depressions throughout the Central Valley.	**Low**. No suitable habitat will be directly impacted by the proposed project. Vernal pools are located near the ESL, but the project will not alter the hydrology of these complexes.
Linderiella occidentalis	California linderiella	CNDDB	Seasonal pools in unplowed grasslands with old alluvial soils underlain by hardpan, or in sandstone depressions.	**Low**. No suitable habitat present in the ESL. Vernal pools are located near the ESL, but the project will not change the hydrology of these complexes.
Other Invertebrates				
Amphibians and Reptiles				
Actinemys marmorata marmorata	Northwestern pond turtle	SSC	Occurs in permanent or nearly permanent water sources, ponds, marshes, rivers, streams and irrigation ditches with emergent vegetation and basking sites. Lay eggs in upland habitat consisting of sandy banks or grassy, open fields.	**Moderate**. Suitable habitat present in the ESL.
Anadromous Fish Species				
Oncorhynchus tshawytscha	Central Valley fall/late fall-run Chinook salmon	FSC, SSC	Found mainly in the Sacramento River and its tributaries, and most spawning and rearing of juveniles takes place in the reach between Red Bluff and Redding (Keswick Dam). Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel.	**Low**. No spawning habitat present in the ESL. Indirect effects resulting from construction in Morrison Creek could occur downstream of the project.
Birds				
Agelaius tricolor	Tricolored blackbird	SSC	Highly colonial species. Nests near fresh water, preferably in emergent wetland with tall, dense cattails or tules, but also in thickets of willow, blackberry, wild rose, and tall herbs. Forages in croplands and grasslands.	**Low**. Marginal nesting habitat present, but suitable foraging habitat is present in the ESL.
Athene cunicularia	Burrowing owl	SSC	Burrow sites in open, dry annual or perennial grasslands, deserts, and scrublands characterized by low-growing vegetation. Subterranean nester, dependent upon burrowing mammals, most notably, California ground squirrel.	**Low**. Suitable habitat is present in the ESL, but no burrowing owls were observed during field surveys.

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
Elanus leucurus	White-tailed kite	SFP	Nesting habitat includes rolling foothills/valley margins with scattered oaks, and river bottomlands or marshes next to deciduous woodlands. Forages in open grasslands, meadows, or marshes.	**Low**. Suitable nesting and foraging habitat is present in the ESL.
Accipiter cooperi	Cooper's hawk	CNDDB	Nests in dense stands of live oak, riparian deciduous, or other forest habitats near water. Hunts in broken woodlands and habitat edges.	**Low**. Suitable nesting and foraging habitat present in the ESL.
Bats				
Lasiurus cinereus	Hoary bat	CNDDB	Prefers open habitats or habitat mosaics, with access to trees for cover and open areas or habitat edges for feeding. Roosts in dense foliage of medium to large trees.	**Low**. Suitable foraging and roosting habitat present in the ESL.
SSC: California Species of Special Concern				
SFP: State Fully Protected				
CNDDB: Species that have no formal listing or protection status, but appear in the CNDDB due to their conservation status ranking				

Vernal Pool Invertebrates

Special-status vernal pool invertebrates that occur in vernal pools, swales, and other seasonal wetlands in the Sacramento Valley include midvalley fairy shrimp (*Branchinecta mesovallensis*) and California fairy shrimp (*Linderiella occidentalis*). Endangered or threatened vernal pool invertebrate species are discussed in Section 2.19.2 of this document.

No vernal pools are located within the ESL, but vernal pool complexes are located on properties adjacent to the Caltrans' right-of-way in the southern portion of the ESL. Elliot Ranch, a vernal pool preserve, is located on the east side of I-5 approximately one mile south of Elk Grove Blvd. In addition, aerial photos of the ESL and vicinity indicate potential vernal pools on the west side of I-5 south of the Beach Lake Mitigation Bank. Because these parcels are private property, Caltrans could not perform ground surveys to verify locations of vernal pools and proximity of vernal pools to I-5. In addition, Caltrans could not sample the vernal pools for invertebrate species, but midvalley fairy shrimp and California fairy shrimp, as well as the vernal pool fairy shrimp and vernal pool tadpole shrimp are known to occur in vernal pools on the Elliot Ranch property (CNDDB 2008).

Vernal pool invertebrates inhabit seasonal vernal pools and other depressions in the Central Valley. They are aquatic species that feed on algae, bacteria, protozoa, and other organic debris.

Female fairy shrimp carry their eggs in a ventral brood sac. The eggs are either dropped to the pool bottom or remain in the brood sac until the female dies and sinks to the bottom. The eggs dry out when the pool does, and remain in the dry pool beds until rains and other environmental stimuli hatch them (USFWS 2007a). Resting fairy shrimp eggs are called cysts, and are capable of withstanding heat, cold, and prolonged extreme dryness. The cyst bank in the soil may contain cysts from several years of breeding (USFWS 2007a).

Midvalley Fairy Shrimp

The midvalley fairy shrimp has no federal or state status, but is listed in the CNDDB as a sensitive species. This species of fairy shrimp is found in vernal pools, vernal swales, and various artificial ephemeral wetland habitats in Sacramento, Contra Costa, San Joaquin, Madera, Merced and Fresno Counties. They have also been found in various roadside puddles, scrapes, and ditches, and in several railroad toe-drain pools (USFWS 2004).

California Linderiella

The California fairy shrimp has no federal or state status, but is listed in the CNDDB as a sensitive species. This species is one of two species of *Linderiella* described in North America. The California fairy shrimp can be differentiated from other fairy shrimp (*Branchinecta* sp.) by its red eyes and smaller size. This species is the most widely distributed fairy shrimp in California. The California fairy shrimp is currently known to occur in a wide range of vernal pool habitats in the Central Valley of California; however, the California fairy shrimp tends to be in deeper pools. The current distribution of the California fairy shrimp in the Central Valley may be similar to its historical distribution in extent, but remaining populations are now considerably more fragmented and isolated than during pre-agricultural times.

Northwestern Pond Turtle

The northwestern pond turtle (*Clemmys marmorata marmorata*) is a state species of special concern, but has no federal status. This species occurs in permanent or nearly permanent bodies of water from near sea level to approximately 4,700 ft elevation. Northwestern pond turtles require some slack- or slow-water aquatic habitat and are found in a variety of habitats including ponds, marshes, rivers, and irrigation ditches.

Suitable habitat must include basking sites such as partially submerged logs, rocks, floating mats of vegetation, or open mud banks. Western pond turtles also require suitable nesting sites in the vicinity of their aquatic habitat.

Nests are typically dug in a substrate with high clay or silt content, and are typically located on an unshaded slope that may be at least partly south facing. The nesting site can be up to 1,320 ft from the aquatic site, but nest sites are typically located within 650 ft (CDFG 1994).

Suitable habitat is present for this species in the ESL at Morrison Creek. No surveys for northwestern pond turtles were conducted, but this species has been recorded less than a half mile downstream from the ESL at Beach Lake and Stone Lake Preserves. Northwestern pond turtle is likely to occur in the ESL.

Anadromous Fish Species: Central Valley Chinook Salmon (Fall/Late Fall Run)

The Magnuson-Stevens Act (MSA) calls for direct action to stop or reverse the continued loss of fish habitats. Toward this end, Congress mandated the identification of habitats essential to managed species and measures to conserve and enhance this habitat. The MSA requires cooperation among the NOAA Fisheries, the Fishery Management Councils, and Federal agencies to protect, conserve, and enhance "essential fish habitat (EFH)". Congress defined EFH for federally managed fish species as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity."

The MSA requires Federal agencies to consult with NOAA Fisheries on actions that may adversely affect EFH. Generally, EFH consultation consists of a Federal agency notifying NOAA Fisheries regarding an action that may adversely affect EFH and providing NOAA Fisheries with an EFH Assessment, NOAA Fisheries providing EFH Conservation Recommendations to avoid and/or minimize adverse effects to EFH, and the Federal agency responding to NOAA Fisheries' EFH Conservation Recommendations.

Caltrans received a letter from NOAA fisheries dated December 13, 2007, providing recommended conservation measures to be included in the project plans, and suggesting Best Management Practices (BMPs) for erosion control and water quality during construction. This letter was responding to the Notice of Preparation for the proposed project that was sent out to various agencies for comment.

In May 2008, Caltrans biologist Cherilyn Meigs contacted Doug Hampton at NOAA Fisheries to discuss the NOAA letter and the likelihood of the project impacting anadromous fish. Mr. Hampton indicated that the project might indirectly affect anadromous fish due to construction in Morrison Creek that could affect water quality downstream. He also indicated that the project contains Essential Fish Habitat (EFH) for chinook salmon, even though salmon do not currently utilize the creek within the ESL.

Salmon are anadromous fish that spend part of their life cycle in freshwater and part in salt water. This species spawns in small, freshwater streams where the young remain from one to several years before migrating to the ocean to feed and grow. Adults return to their natal streams to spawn and complete their life cycle.

The Central Valley fall/late fall-run Chinook salmon (*Oncorhnchys tshawytscha*) Evolutionarily Significant Unit (ESU) is a federal and state species of concern. This ESU of Chinook salmon is found mainly in the Sacramento River and its tributaries, and most spawning and rearing of juveniles takes place in the reach between Red Bluff and Redding (Keswick Dam). Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel.

Surveys for anadromous fish were not conducted as a part of this project. Previous surveys conducted on the Bufferlands property captured several fish species in Morrison Creek. These species include hardhead minnow (*Mylopharodon conocephalus*), California roach (*Hesperoleucus symmetricus*), common carp (*Cyprinus carpio*), black bullhead (*Ameiurus melas*), mosquitofish (*Gambusia affinis*), inland silverside (*Menidia beryllina*), white crappie (*Pomoxis annularis*), black crappie (*Pomoxis nigromaculatus*), and bigscale logperch (*Percina macrolepida*). One Chinook salmon was found dead in December 1994 in the upper reaches of Parker Slough, which is an arm of Lower Beach Lake and is downstream of the ESL. Lower Beach Lake is connected to the Delta system via Snodgrass Slough. It is possible that this individual Chinook salmon took a misguided route during high water and was stranded when the water receded.

Morrison Creek within the ESL does not provide suitable spawning habitat for anadromous fish. In addition, the Beach Lake dyke downstream of the construction area provides a barrier for anadromous fish species. During high flows, the Beach Lake dyke may overtop, providing connectivity between Morrison Creek and downstream areas. It is possible that during these conditions anadromous fish could move into the ESL. However, Morrison Creek does not provide suitable habitat for spawning runs, since no suitable spawning habitat is present in the reach of Morrison Creek in the ESL or in upstream reaches of this creek.

Tricolored Blackbird

The tricolored blackbird (*Agelaius tricolor*) is a state species of concern, but has no federal status. Tricolored blackbirds are common locally throughout the Central Valley and in coastal areas from Sonoma County south. This bird species is highly gregarious and nests near fresh water, usually in emergent wetlands with tall, dense cattails and tules. Tricolored blackbirds also nest in willow thickets, blackberry, wild rose or tall herbs, and forage in grassland and cropland habitats. Nesting areas must be large enough to support a colony of at least 50 pairs of nesting birds.

No formal surveys for this species were conducted; however, if nesting tricolored blackbirds were present in the ESL, they would have been easily detected due to the highly gregarious nature of this species. Although this species was not detected in the ESL during surveys, potential nesting and foraging habitat is present and this species could occur here.

Burrowing Owl

The burrowing owl (*Athene cunicularia*) is a state species of concern, but has no federal status. Burrowing owls occur in the warmer valleys, open, dry grasslands, deserts, and scrublands associated with agriculture and urban areas that support populations of California ground squirrels. Burrowing owls nest below ground, utilizing abandoned burrows of other species, most commonly ground squirrel burrows. They may dig their own burrows in soft soil. Pipes, culverts, and nest boxes are used where burrows are scarce. Individuals in the northern part of the range may winter to the south, as far as Central America. Burrowing owls in California are mostly residents.

Breeding occurs from March through August, with the peak in April and May.

No burrowing owls or signs (i.e., pellets, whitewash) of burrowing owls were detected during field surveys. The CNDDB contains several records of nesting burrowing owls in the vicinity of the ESL, including one record approximately 30 ft east of the I-5 right-of-way fence along a drainage canal south of Meadowview Rd. Caltrans Biologist C. Meigs and Caltrans Environmental Coordinator J. Heichel, visited this location on April 30, 2008, but no owls or their sign were observed.

Burrowing owls have also been reported on the Bufferlands property, east of I-5. Although this species was not observed in the ESL, suitable habitat occurs here. Since this species is migratory and current records are known from the immediate vicinity, burrowing owls could migrate into the ESL prior to construction. Caltrans biological staff will conduct a burrowing owl survey prior to construction.

White-Tailed Kite

The white-tailed kite (*Elanus leucurus*) is a California fully protected species, but has no federal status. This species is a common to uncommon, yearlong resident in coastal and valley lowlands, and is rarely found away from agricultural areas. White-tailed kites inhabit herbaceous and open stages of most habitats, mostly in cismontane California.

White-tailed kites typically are found in open grasslands or savannahs, often near marshes or river bottomlands. This species usually nests in isolated trees or groves of dense trees, near open foraging areas. Their nests consist of loosely piled sticks and twigs and are lined with grass, straw, or roots. Nests are placed near the top of dense stands of oak, willow or other tree species, usually 20 to 100 ft above ground. Nesting occurs from February to October, with a peak from May to August.

White-tailed kites forage in open grasslands, meadows, farmlands, and emergent wetlands. They forage from a central perch over areas as large as approximately two square miles. White-tailed kites seldom hunt more than 0.5 mile from their nest when they are breeding. They prey mostly on voles and other small, diurnal mammals. Occasionally they prey on birds, insects, reptiles and amphibians.

No formal surveys for white-tailed kite were conducted, but suitable nesting and foraging habitat is present throughout the ESL. This species has been reported in adjacent areas (i.e., Bufferlands, Beach Lake) and likely occurs in the ESL.

Cooper's Hawk

The Cooper's hawk (*Accipiter cooperi*) is a state species of concern but has no federal status. The Cooper's hawk is a breeding resident throughout most of the wooded portion of California, ranging from sea level to 9,000 ft elevation. This species frequents landscapes where wooded areas occur in patches and groves, and often uses patchy woodlands and edges with snags for perching. Cooper's hawks usually nest in second-growth conifer stands, or in deciduous riparian areas, usually near streams. This species breeds from March through August, with peak activity from May through July.

Suitable Cooper's hawk nesting and foraging habitat occurs in the ESL at Morrison Creek. No formal surveys within the ESL were conducted for this species. The closest reported nest is approximately 2.3 miles east of the ESL at the edge of the Bufferlands property. Due to the presence of suitable habitat, and occurrences of this species in the vicinity, Cooper's hawks could nest and forage in the ESL.

Migratory Birds

In addition to the bird species listed as sensitive included in Tables 2.15.1 and 2.18.1, migratory bird species are protected by the Federal Migratory Bird Treaty Act (MBTA) of 1918 (16 USC 703-711).

Cliff swallows (*Petrochelidon pyrrhonota*), Northern rough-winged swallows (*Stelgidopteryx serripennis*), barn swallows (*Hirundo rustica*), and white-throated swifts (*Aeronautes saxatalis*) were observed nesting on several of the overcrossings and undercrossings throughout the ESL. Northern rough-winged swallows and white-throated swifts were observed nesting in weep holes on many of these structures.

Other nesting habitat is present in riparian vegetation at Morrison Creek, and in other woody vegetation throughout the ESL, and other migratory bird species are likely to nest within the ESL.

Bat Species

In addition to the bat species listed as sensitive included in Tables 2.15.1 and 2.18.1, state laws protect bats and their occupied roosts from harassment and destruction. Protection under California Law is found in the Fish and Game Code Sections 2000, 2002, 2014 and 4150, and in the California Code of Regulations Section 251.1.

Several species of bats require trees as daytime roosts, and several other species day roost in trees occasionally or use trees as important night roosts. Several species of bats are known to use man-made structures such as bridges or buildings as daytime roosts, and several other species day roost in structures occasionally or use structures as important night roosts (CDFG 2005). The following bat species may be expected to occur in the ESL: hoary bat (*Lasiurus cinereus*), western red bat (*Lasiurus blossevillii*), pallid bat (*Antrozous pallidus*), big brown bat (*Eptesicus fuscus*), Yuma myotis (*Myotis yumanensis*), California myotis (*Myotis californicus*), western pipistrelle (*Pipistrellus hesperus*), and Mexican free-tailed bat (*Tadarida brasiliensis*).

Potential roost sites in the ESL were surveyed for presence of bats. Surveys consisted of visually inspecting potential roost sites (i.e., bridge joints) for roosting bats, staining, and guano. A high-powered spotlight was utilized to visually inspect potential roost sites.

Bat call surveys were conducted at the I-5 bridge over Morrison Creek using the ANABAT© detection software/system. Surveys began in the evening after dusk and continued for several hours depending on the amount of bat activity detected. Bat calls were recorded in the field, and were analyzed at a later time. Surveys began in April and continued through September 2006.

Several species of bats were detected with the ANABAT© detection software/system during surveys. Species detected include: western red bat, big brown bat, western pipistrelle, and Mexican free-tailed bat.

Bats likely forage over much of the ESL. Morrison Creek provides suitable foraging habitat for many bat species. All of the bridges were surveyed for bats and their sign (i.e., staining, guano, etc.). No bats or evidence of day or maternity roosts were observed on any of the bridges in the ESL.

Bats could potentially roost in the trees in the ESL. In addition, bats could migrate into potential roosting habitat in the ESL prior to project implementation.

2.18.3 Environmental Consequences

Alternative 1

Vernal Pool Invertebrate Species

Alternative 1 will not directly impact vernal pools or vernal pool species, because no vernal pools are located within the ESL. Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects to vernal pool species can be caused by changes in hydrology, construction of roads, human intrusion (induced by development), pesticides/herbicides, and introduced predators. The USFWS asserts that all vernal pool habitat within 250 ft of proposed development may be considered to be indirectly affected by the development based on the above factors (USFWS 1996).

Although the Alternative 1 footprint may be within 250 ft from vernal pools, the project is not expected to indirectly impact vernal pools or vernal pool invertebrates. Alternative 1 will modify the median of I-5, which has an existing storm water runoff system. The runoff in this area is conveyed in a series of drainage channels, where the majority is eliminated through infiltration. A small portion of the flow is directed to the City of Sacramento's Sump 90, located west of I-5 and Morrison Creek, where it is pumped through the levee and into the Sacramento River. Although Alternative 1 will increase the amount of impervious surface area on the freeway, the existing self-contained drainage system will not change; therefore, Alternative 1 will not contribute additional runoff to the vernal pool complexes, or intercept existing runoff from reaching the vernal pool complexes adjacent to the right-of-way.

Since Alternative 1 consists of improving an existing freeway, no new grading will occur within vernal pool complexes; thus, the water regime of vernal pool habitat will not be affected. In addition, Alternative 1 will not increase access by humans to the surrounding areas, increase pesticides or herbicides used in the project area, or introduce new predators to the project area.

Northwestern Pond Turtle

Alternative 1 will result in temporary impacts to 0.57 acre of aquatic habitat in Morrison Creek, and 4.18 acres of riparian habitat (CDFG riparian/waters) adjacent to the creek. Alternative 1 will also result in permanent impacts to 0.0004 acre of aquatic habitat in Morrison Creek, and 0.004 acre of riparian habitat associated with the creek. Alternative 1 may result in direct impacts to individual western pond turtles if relocation efforts are necessary. No other impacts to western pond turtles are expected with implementation of the avoidance and minimization measures in Section 2.18.4.1.

Anadromous Fish Species: Central Valley Chinook Salmon (Fall/Late Fall Run)

The Morrison Creek bridge will be widened toward the inside—combining each pair of structures into its own single span to accommodate the additional lanes proposed by this project. The new bridge will require 6 new piers per bent, along 12 bents for a total of 72 new piers (Appendix B: Beach Lake Bridge Widening X-Section). Each pier will permanently occupy approximately 2.5 square feet. Due to placement of the new piers to expand the bridge over Morrison Creek, Alternative 1 will permanently impact 0.004 acre of adjacent wetland habitat, and 0.0004 acre aquatic habitat in Morrison Creek, for a total of 0.0044 acre of permanent impacts. Alternative 1 will temporarily impact 0.57 acre of aquatic habitat, and 4.5 acres of adjacent wetland, riparian, and upland habitat due to dewatering, access, staging, and the construction and removal of temporary false-work to construct the bridge over Morrison Creek, for a total of 5.07 acres of temporary impacts.

Caltrans received a letter from NOAA fisheries dated December 13, 2007, providing recommended conservation measures to be included in the project plans, and suggesting Best Management Practices (BMPs) for erosion control and water quality during construction. The recommendations included in this letter have been incorporated into the avoidance, minimization and compensation measures. Due to the limited nature of this project and the implementation of appropriate avoidance and minimization measures, Caltrans concludes there will be only minor adverse impacts to EFH. In July 2011, NOAA fisheries concurred that the project may affect, but not likely to adversely affect CV spring-run Chinook salmon. No compensatory mitigation is proposed.

Alternative 1 is not expected to directly impact individual anadromous fish species, since they are not expected to occur in the ESL during construction. Alternative 1 could indirectly affect anadromous fish species downstream of the ESL due to impacts to water quality. Implementation of the measures in Section 2.18.4.1 will minimize potential impacts to anadromous fish species.

Tricolored Blackbird

No impacts to this species are expected since they were not detected in the ESL; however, tricolored blackbirds could nest in potential habitat in the ESL, and they are opportunistic in selecting nesting colonies in any given year. Implementation of the avoidance and minimization measures in Section 2.18.4.1, which include pre-construction nest surveys, will minimize potential impacts to this species.

Burrowing Owl

No impacts to burrowing owls are expected since they were not detected within the ESL; however, burrowing owls could migrate into the ESL prior to construction. Implementation of the avoidance and minimization measures in Section 2.18.4.1, which include pre-construction nest surveys, will minimize potential impacts to this species.

White-Tailed Kite

Alternative 1 could temporarily disturb kites if they are foraging in the area during construction. Alternative 1 will also widen the outside, southbound lane of I-5 approaching the Elk Grove Blvd. off-ramp. This sliver of habitat, which extends 12 ft from the edge of pavement and totals 0.85 acre, could be considered foraging habitat for white-tailed kites. In addition, Alternative 1 will eliminate the unpaved median in the southern portion of the ESL. Although white-tailed kites may use this area for foraging, this habitat is highly disturbed and is subject to mowing, and is unlikely to support substantial rodent populations. Impacts to white-tailed kite foraging habitat will be minimal.

No other impacts to white-tailed kite are expected with implementation of the avoidance and minimization measures listed in Section 2.18.4.1.

Cooper's Hawk

Alternative 1 will permanently impact 0.004 acre of riparian habitat (CDFG riparian/waters) due to placement of additional piers required to widen the bridge over Morrison Creek. Although these impacts are located within the riparian zone, the area that will be impacted is located under the existing I-5 bridge over Morrison Creek, and no nesting or foraging habitat for this species is located in this area.

Alternative 1 will temporarily impact approximately 4.18 acres of potential habitat for Cooper's hawk due to equipment access and construction activities necessary to widen the I-5 bridge over Morrison Creek. No further impacts to this species are anticipated with the implementation of the avoidance and minimization measures listed in Section 2.18.4.1.

Migratory Birds

Alternative 1 will not result in permanent impacts to migratory birds with the implementation of the avoidance and minimization measures outlined in Section 2.18.4.1. Alternative 1 will result in temporary impacts to structure nesting birds by excluding them from suitable nesting sites for at least two seasons.

Bat Species

Project construction activities could temporarily disturb bats that forage in the ESL. No impacts to bat roosts are anticipated with implementation of the avoidance and minimization measures listed in Section 2.18.4.1.

Alternative 2

Alternative 2 footprint and features are the same as Alternative 1. Its potential impacts to special-status animal species will be the same as well. Please refer to the impact discussion under Alternative 1.

Alternative 3

Alternative 3 does not involve widening any structures or bridges and thus will not affect special-status animal species (no migratory birds or bats were seen at the Casilada POC).

Alternative 4

The No Build Alternative would not involve construction and therefore would not result in any impacts to special-status animal species.

2.18.4 Avoidance and Minimization Measures

The following avoidance and minimization measures will be implemented to minimize potential effects to special-status animal species:

01 – Establish Environmentally Sensitive Areas
02 – Limit Vegetation Removal
03 – Containment Measures/Construction Site Best Management Practices
04 – Minimize Disturbance to Creek Channel and Adjacent Areas
05 – Restore Wetland, Riparian, and Stream Habitat Disturbed by Construction
06 – Dewatering Activities
07 – Restrict Timing of In-Stream Activities
09 – Restrict Timing of Woody Vegetation Removal
10 – Nesting Bird Surveys
11 – Pre-construction Pond Turtle Surveys
12 – Pre-construction Burrowing Owl Surveys
15 – Pre-construction Roosting Bat Surveys
16 – Bird and Bat Exclusion Measures

2.18.5 Mitigation Measures

With the implementation of the above avoidance and minimization measures, no mitigation will be required for special-status animal species.

2.18.6 CEQA Considerations

Less than significant impacts to special-status animal species are anticipated.

2.19 Threatened and Endangered Species

2.19.1 Regulatory Setting

The primary federal law protecting threatened and endangered species is the Federal Endangered Species Act (FESA): 16 USC Section 1531, et seq. See also 50 CFR Part

402. This act and subsequent amendments provide for the conservation of endangered and threatened species and the ecosystems upon which they depend. Under Section 7 of this act, federal agencies, such as FHWA, 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 is a Biological Opinion or an incidental take permit. 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 California Endangered Species Act (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. CDFG is the agency responsible for implementing CESA. Section 2081 of the Fish and Game Code prohibits "take" of any species determined to be an endangered species or a threatened species. Take is defined in Section 86 of the Fish and Game Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by CDFG. For projects requiring a Biological Opinion under Section 7 of the FESA, CDFG may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the 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.

2.19.2 Affected Environment

A list of threatened and endangered species was requested and received from USFWS on September 25, 2006 and was updated July 26, 2012. The complete list is included in Appendix F. Table 2-19.1 lists threatened and endangered species with a real potential to occur within the ESL based on specific habitat requirements. Further information can be found on the USFWS Sacramento Office Endangered Species Program website at http://www.fws.gov/sacramento/es/default.htm and the CDFG Threatened and Endangered Species website at http://www.dfg.ca.gov/wildlife/species/t_e_spp/index.html.

The proposed project will require consultation with the USFWS under Section 7 of the FESA for potential effects to giant garter snake, vernal pool invertebrate species, and valley elderberry longhorn beetle. When it was determined that species listed under the FESA could be present within the vicinity of the proposed project, informal consultation with the USFWS was initiated with the request of a threatened and endangered species list (received 9/25/2006, updated on 7/26/2012). Because federally listed species could be impacted by the proposed projects, a Biological Assessment will be prepared in accordance with legal requirements set forth under Section 7 of the Endangered Species Act (19 U.S.C. 1536c), and will be submitted to the USFWS upon completion. When a species is listed, the USFWS, in most cases, must officially designate specific areas as critical habitat for the species. Consultation with USFWS is required for projects that include a federal action or federal funding if the project will modify designated critical habitat.

Caltrans will also consult with NOAA Fisheries under Section 7 of the FESA for potential effects to federally listed anadromous fish species and potential effects to Essential Fish Habitat (EFH) pursuant to the Magnuson-Stevens Fishery Conservation and Management Act. When it was determined that species listed under FESA could be present within the vicinity of the proposed project, informal consultation with NOAA Fisheries was initiated with the request of a threatened and endangered species list (received 9/25/2006, updated on 7/29/2011). Because federally listed species could be impacted by the proposed project, a Biological Assessment will be prepared in accordance with legal requirements set forth under section 7 of the Endangered Species Act and will be submitted to NOAA Fisheries upon completion.

NOAA Fisheries maintains a list of Species of Concern (FSC), which are those species about which NOAA Fisheries has some concerns regarding status and threats, but for which insufficient information is available to indicate a need to list the species under the FESA. "Species of concern" status does not carry any procedural or substantive protections under the FESA, but fosters voluntary efforts to conserve the species before listing becomes warranted.

The ESL is not located within a designated area of critical habitat for any species.

Table 2.19-1 Threatened and Endangered Species Potentially Occurring Within the ESL

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
Vernal Pool Invertebrates				
Branchinecta conservatio	Conservancy fairy shrimp	FE	Found in large, turbid pools in grasslands in the northern two-thirds of the Central Valley.	**Low**. No suitable habitat will be impacted by the proposed project. Vernal pools complexes are located near the ESL, but the project will not alter the hydrology of these complexes.
Branchinecta lynchi	Vernal pool fairy shrimp	FT	Endemic to the grasslands of the Central Valley, Central Coast Mountains and South Coast Mountains, in astatic rain-filled pools. Inhabit small, clear-water sandstone-depression pools and grassed swales, earthen slumps, or basalt-flow depression pools.	**Low**. No suitable habitat will be impacted by the proposed project. Vernal pools are located near the ESL, but the project will not alter the hydrology of these complexes.
Elaphrus viridis	Delta green ground beetle	FT	Restricted to the margins of vernal pools in the grassland area between Jepson Prairie and Travis Air Force Base.	None. No suitable habitat present in the ESL, and the ESL is not within the range of this species.
Lepidurus packardi	Vernal pool tadpole shrimp	FE	Occurs in the Sacramento Valley in a variety of natural and artificial seasonally ponded habitat types including: vernal pools, swales, ephemeral drainages, stock ponds, reservoirs, ditches, backhoe pits, and ruts caused by vehicular activities.	**Low**. No suitable habitat present in the ESL. Vernal pools are located near the ESL, but the project will not change the hydrology of these complexes.
Other Invertebrates				
Desmocerus californicus dimorphus	Valley elderberry longhorn beetle	FT	Occurs only in the Central Valley of California, in association with blue elderberry (Sambucus mexicana). Preferable to branches greater than one inch in diameter.	**Low**. Several elderberry shrubs are located within the ESL.
Amphibians and Reptiles				

Scientific Name	**Common Name**	**Status**	**Habitat Requirements**	**Potential to be Adversely Affected by the Proposed Project**
Ambystoma californiense	California tiger salamander	FT	Most commonly found in annual grassland habitat, but also occurs in grassy understory of valley-foothill hardwood habitats, and uncommonly along stream courses in valley-foothill riparian habitats. Requires vernal pools or other seasonal water bodies for breeding. Utilizes underground refuges, especially ground squirrel burrows.	None. No suitable habitat will be impacted by the proposed project. This species is not known to occur in or near the ESL. The closest reported occurrence is 13.0 miles southeast of the ESL (CNDDB 2008).
Rana draytonii	California red-legged frog	FT	Lowlands and foothills in or near permanent sources of water with dense, shrubby or emergent riparian vegetation.	None. No suitable habitat present in the ESL, and the ESL is outside of the current range of this species.
Thamnophis gigas	Giant garter snake	FT, ST	Streams and sloughs, usually with mud bottom. One of the most aquatic of garter snakes; usually in areas of freshwater marsh and low-gradient streams with emergent vegetation, also drainage canals and irrigation ditches and ponds and small lakes.	**Moderate**. Suitable habitat present in Morrison Creek and surrounding upland area.
Anadromous Fish Species				
Acipenser medirostris	Green sturgeon	FT	Spawns in the Sacramento and Klamath Rivers. Preferred spawning substrate is large cobble, but can range from clean sand to bedrock.	None. No suitable habitat present in the ESL.
Hypomesus transpacificus	Delta smelt	FT	Sacramento-San Joaquin Delta. Seasonally in Suisun bay, Carquinez Strait, and San Pablo Bay. Seldom found at salinities greater than 10 ppt. Most often in salinities less than 2 ppt.	None. No suitable habitat present in the ESL.
Oncorhynchus mykiss irideus	Central Valley steelhead	FT	Populations occur and spawn in the Sacramento and San Joaquin rivers and their tributaries.	**Low**. No spawning habitat present in the ESL. Indirect effects resulting from construction in Morrison Creek could occur downstream of the project.
Oncorhynchus tshawytscha	Central Valley spring-run Chinook salmon	FT, ST	Sacramento and San Joaquin Rivers and tributaries. Primarily found in Butte, Big Chico, Deer, and Mill creeks. Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel.	**Low**. No spawning habitat present in the ESL. Indirect effects resulting from construction in Morrison Creek could occur downstream of the project.
Oncorhynchus tshawytscha	Sacramento River winter-run Chinook salmon	FE, SE	Sacramento River below Keswick Dam. Spawns in the Sacramento River but not in tributary streams.	**Low**. No spawning habitat present in the ESL. Construction in Morrison Creek could result in indirect effects to fish downstream of the work area.
Birds				

Scientific Name	Common Name	Status	Habitat Requirements	Potential to be Adversely Affected by the Proposed Project
Buteo swainsoni	Swainson's hawk	ST	Breeds in stands with few trees in juniper-sage flats, riparian areas and oak savannahs. Requires adjacent suitable foraging areas such as grasslands, or alfalfa or grain fields supporting rodent populations.	**Moderate**. Suitable nesting and foraging habitat present in the ESL, and Swainson's hawks were observed foraging near the ESL.

FE: Federal Endangered
FT: Federal Threatened
FSC: Federal Species of Concern - list established by NOAA Fisheries
SE: CA Endangered
ST: CA Threatened

Vernal Pool Invertebrates

Conservancy Fairy Shrimp

The Conservancy fairy shrimp is a federal endangered species, but has no state status. This crustacean ranges in size from ½ inch to one inch long. Conservancy fairy shrimp inhabit rather large, cool-water vernal pools with moderately turbid water. The pools generally last until June, but the shrimp have been observed from early November to early April.

Vernal Pool Fairy Shrimp

The vernal pool fairy shrimp is a federal threatened species, but has no state status. This species occurs in a wide variety of vernal pool habitats, from small, clear, sandstone rock pools to large, turbid, alkaline, grassland valley floor pools. Although the species has been collected from large vernal pools, it tends to occur in smaller pools. It is most frequently found in pools measuring less than 0.05 acre. These are most commonly in grass or mud bottomed swales, or basalt flow depression pools in unplowed grasslands. Vernal pool fairy shrimp have been observed from early December to early May (USFWS 2007b).

Vernal Pool Tadpole Shrimp

The vernal pool tadpole shrimp (*Lepidurus packardi*) is a federal endangered species, but has no state status. This species differs from fairy shrimp in appearance because it has a large, shield-like carapace (shell) that covers most of the body, and a pair of long cercopods (appendages) at the end of the last abdominal segment. Vernal pool tadpole shrimp adults reach two inches in length. This species is aquatic and inhabits vernal pools containing clear to highly turbid water, and ranging in size from 54 square feet (sq ft) in the former Mather Air Force Base area of Sacramento County, to the 89-acre Olcott Lake at Jepson Prairie (USFWS 2007c). Tadpole shrimp feed on organic debris and living organisms, such as fairy shrimp and other invertebrates. Like fairy shrimp, the life cycle of the vernal pool tadpole shrimp is linked to the seasonal cycle of the vernal pool. Some cysts hatch immediately, and others remain dormant in the soil to hatch during later rainy seasons. The vernal pool tadpole shrimp has a patchy distribution across the Central Valley of California, from Shasta County southward to northwestern Tulare County, with isolated occurrences in Alameda and Contra Costa Counties.

The proposed project will not directly impact vernal pools or vernal pool species, because no vernal pools are located within the ESL. Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects to vernal pool species can be caused by changes in hydrology, construction of roads, human intrusion (induced by development), pesticides/herbicides, and introduced predators. Although the proposed project footprint may be within 250 feet from vernal pools, the project is not expected to indirectly impact vernal pools or vernal pool invertebrates.

Valley Elderberry Longhorn Beetle

The valley elderberry longhorn beetle (VELB; *Desmocerus californicus dimorphus*) is a federally threatened species, but has no state status. The beetle is dependent on its host plant, blue elderberry (*Sambucus mexicana*), which is a common component of Central Valley riparian forests. VELB larva feed and mature within elderberry stems one inch in diameter or greater, and then exit prior to metamorphosing to the pupal stage. Exit holes created by the larvae are generally the only evidence of beetle use. Because the larval beetles cannot be detected within the stems until the adults emerge, the presence of VELB is inferred within stems of sufficient size (i.e., have stems one inch in diameter or greater at ground level) anywhere within the beetle's known range. Further information on the life history, ecology, behavior, and distribution of the beetle can be found in the *Distribution, Habitat, and Status of the Valley Elderberry Longhorn Beetle* (Barr 1991) and the *Recovery Plan for the Valley Longhorn Elderberry Beetle* (USFWS 1984).

Several elderberry shrubs with stems greater than one inch in diameter at ground level are located within the ESL; therefore, presence of VELB is inferred. One elderberry shrub is located near Morrison Creek in the temporary construction easement. No exit holes were found in this shrub. The other shrubs in the ESL were not surveyed for exit holes during field surveys due to access and safety constraints.

Giant Garter Snake

The giant garter snake (*Thamnophis gigas*) is a federal and state threatened species. Giant garter snakes inhabit marshes, sloughs, ponds, small lakes, low gradient streams, and other waterways. This species also frequents agricultural wetlands such as irrigation and drainage canals and rice fields, and the adjacent uplands. Essential habitat components consist of the following components: 1) adequate water during the snake's active period (i.e., early spring through mid-fall) to provide a prey base and cover; 2) emergent, herbaceous wetland vegetation, such as cattails and bulrushes, for escape cover and foraging habitat; 3) upland habitat for basking, cover, and retreat sites; and 4) higher elevation uplands for cover and refuge from flood waters.

Giant garter snakes inhabit small mammal burrows and other soil crevices above prevailing flood elevations throughout its winter dormancy period. Giant garter snakes typically select burrows with sunny exposure along south and west facing slopes. The breeding season extends through March and April, and females give birth to live young from late July through early September. Young immediately scatter into dense cover and absorb their yolk sacs, after which they begin feeding on their own. Giant garter snakes feed primarily on small fishes, tadpoles, and frogs.

Suitable aquatic and upland habitat is present for this species at Morrison Creek.

Anadromous Fish Species: Central Valley Steelhead and Central Valley Chinook Salmon (Spring and Winter Runs)

As noted in Section 2.18, salmon, along with steelhead, are anadromous fish that spend part of their life cycle in freshwater and part in salt water.

The Central Valley steelhead (*Oncorhynchus mykiss irideus*) is a federally threatened species, but it has no state status. Populations occur and spawn in the Sacramento and San Joaquin rivers and their tributaries.

The Central Valley spring-run Chinook salmon Evolutionarily Significant Unit (ESU) is federally and state listed as threatened. This ESU occurs in the Sacramento and San Joaquin Rivers and their tributaries, and is primarily found in Butte, Big Chico, Deer, and Mill creeks. Adult numbers depend on pool depth and volume, amount of cover, and proximity to gravel.

The Sacramento winter-run Chinook salmon ESU is federally and state endangered. This ESU occurs in the Sacramento River below Keswick Dam, and spawns in the Sacramento River but not in tributary streams.

Surveys for anadromous fish were not conducted as a part of this project, as Morrison Creek within the ESL does not provide suitable spawning habitat for anadromous fish.

Swainson's Hawk

The Swainson's hawk (*Buteo swainsoni*) is a state threatened species, but has no federal status. Swainson's hawks were once found throughout lowland California and were absent only from the Sierra Nevada, north Coast Ranges and Klamath Mountains, and portions of the desert regions of the state. Today, Swainson's hawks are restricted to portions of the Central Valley and Great Basin regions where suitable nesting and foraging habitat is still available. Central Valley populations are centered in Sacramento, San Joaquin, and Yolo counties.

Swainson's hawks require large, open grasslands with abundant prey in association with suitable nest trees. The diet of the Swainson's hawk is varied with the California vole (*Microtus californicus*) being the staple in the Central Valley. A variety of bird and insect species are also taken. Suitable foraging areas include native grasslands or lightly grazed pastures, alfalfa and other hay crops, and certain grain and row croplands. Unsuitable foraging habitat includes any crop where prey are not available due to the high density of vegetation, or where there is a low abundance of prey such as vineyards, orchards, certain row crops, rice, corn, and cotton crops. Under natural conditions, Swainson's hawks likely foraged in upland and seasonally flooded perennial grasslands. These habitats are largely extirpated from the Central Valley today, replaced by annual grasslands with low prey populations and agricultural crops. These changes have resulted in Swainson's hawks being dependent on landscape elements almost entirely controlled by human activities, with frequent shifts in agricultural practices and habitat quality.

Over 85 percent of Swainson's hawk territories in the Central Valley are in riparian systems adjacent to suitable foraging habitats. Swainson's hawks often nest peripherally to riparian systems of the valley as well as utilizing lone trees or groves of trees in agricultural fields and mature roadside trees. Valley oak, Fremont cottonwood, walnut, and large willow with an average height of about 58 feet, and ranging from 41 to 82 feet, are the most commonly used nest trees in the Central

Valley. Nesting Swainson's hawks are somewhat tolerant of human activity, particularly in areas where activity is regular and individual pairs are able to habituate to it. Nest sites are sometimes located near roads and houses, and frequently near field edges where crop cultivation activities regularly occur. However, changes in activity regime (e.g., construction in previously open areas, human intrusion at nest site) frequently cause nest abandonment, particularly during the pre-nesting, egg-laying, and incubation stages of the reproductive cycle.

Swainson's hawks that breed in California may spend the winter in Mexico and South America. Central Valley birds appear to winter in Mexico and Columbia and hawks from northeastern California have been satellite-transmitter tracked to Argentina. The southern migration of Swainson's hawks begins in August and lasts through October. In the spring, they begin returning north to California in March. The populations that nest within the Central Valley arrive and depart earlier than those populations in northern California. The intensity of the summer heat in the Valley is thought to be the trigger for these earlier dates (Brown 2006).

The loss of agricultural lands to various residential and commercial developments is a serious threat to Swainson's hawks throughout California. Additional threats are habitat loss due to riverbank protection projects, conversion from agricultural crops that provide abundant foraging opportunities to crops such as vineyards and orchards which provide fewer foraging opportunities, shooting, pesticide poisoning of prey animals and hawks on wintering grounds, competition from other raptors, and human disturbance at nest sites (CDFG 1990). The populations of Swainson's hawks have declined by 90% since the 1940s due to the loss of nesting habitat. In the 1980s there was an estimated 375 pairs within California, but not all pairs nested. Although it is not an evident threat within California, pesticides and insecticides are a severe threat to the wintering birds in Argentina, killing over 10,000 birds in 1995 alone (Brown 2006).

The CNDDB contains several records of Swainson’s hawk nests within 0.25 mile of the ESL (CNDDB 2008), and Swainson’s hawks were observed during several site visits. Morrison Creek provides high quality suitable nesting habitat, and this species is known to nest in the area. During a field visit on May 29, 2008, Caltrans biologists observed one Swainson’s hawk entering a cottonwood tree along Morrison Creek less than 0.1 mile from the edge of the ESL while another Swainson’s hawk soared nearby. At least one other individual Swainson’s hawk was observed soaring over the Morrison Creek area during the same field visit.

2.19.3 Environmental Consequences

Alternative 1

Vernal Pool Invertebrates

As noted in Section 2.18.3 of this document, Alternative 1 will not directly impact vernal pools or vernal pool species, because no vernal pools are located within the ESL. Indirect effects are caused by or result from the proposed action, are later in time, and are reasonably certain to occur. Indirect effects to vernal pool species can be caused by changes in hydrology, construction of roads, human intrusion (induced by development), pesticides/herbicides, and introduced predators. The USFWS asserts that all vernal pool habitat within 250 ft of proposed development may be considered to be indirectly affected by the development based on the above factors (USFWS 1996).

Although the proposed project footprint may be within 250 ft from vernal pools, Alternative 1 is not expected to indirectly impact vernal pools or vernal pool invertebrates. The proposed project will modify the median of I-5, which has an existing storm water runoff system. The runoff in this area is conveyed in a series of drainage channels, where the majority is eliminated through infiltration. A small portion of the flow is directed to the City of Sacramento's Sump 90, located west of I-5 and Morrison Creek, where it is pumped through the levee and into the Sacramento River. Although the proposed project will increase the amount of impervious area on the freeway, the existing self-contained drainage system will not change; therefore, Alternative 1 will not contribute additional runoff to the vernal pool complexes, or intercept existing runoff from reaching the vernal pool complexes adjacent to the right-of-way. Alternative 1 is unlikely to adversely affect federally listed vernal pool branchipods (Conservancy fairy shrimp, vernal pool fairy shrimp, and vernal pool tadpole shrimp).

Since Alternative 1 consists of improving an existing road, no new grading will occur within vernal pool complexes; thus, the water regime of vernal pool habitat will not be affected. In addition, Alternative 1 will not increase access by humans to the surrounding areas, increase pesticides or herbicides used in the project area, or introduce new predators to the project area.

Valley Elderberry Longhorn Beetle

No elderberry shrubs will be removed or trimmed as a result of the proposed project; therefore, no direct impacts to VELB will occur. Alternative 1 is unlikely to adversely affect the VELB, a federally threatened species.

Construction may take place within the "core avoidance area" (20 ft from the dripline) of some of the elderberry shrubs in the ESL. These shrubs are located along the shoulder of I-5 in areas that are currently disturbed, and no additional areas outside of the existing shoulder in this portion of the ESL will be paved. Indirect impacts to VELB in these areas are unlikely for the following reasons: 1) the area is currently highly developed/disturbed; 2) Alternative 1 will not result in changes to soil compaction, hydrology, lighting, or pedestrian traffic/access near these elderberry shrubs; and 3) Alternative 1 will not result in additional habitat fragmentation.

Giant Garter Snake

Alternative 1 will permanently impact 0.004 acre of giant garter snake upland habitat, and 0.0004 acre of giant garter snake aquatic habitat due to placement of the new piers to expand the bridge over Morrison Creek, for a total of 0.0044 acre of permanent impacts. Alternative 1 will temporarily impact 0.57 acre of aquatic habitat, and 4.5 acres of upland habitat for this species due to dewatering, access, and staging to construct the bridge over Morrison Creek, for a total of 5.07 acres of temporary impacts. Alternative 1 may adversely affect the giant garter snake, a federally threatened species.

The permanent impacts are considered Level 3 based on the "*Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat*." Based on these same guidelines, because the work in and around Morrison Creek is expected to last for two seasons, the temporary impacts to giant garter snake are considered Level 2. Please refer to Table 2-21.1 for a summary of giant garter snake conservation measures.

No other impacts to giant garter snake or its habitat are expected with implementation of the avoidance and minimization measures listed in Section 2.19.5.1.

Anadromous Fish Species: Central Valley Steelhead and Central Valley Chinook Salmon (Spring and Winter Runs)

Alternative 1 is not expected to directly impact individual anadromous fish species, since they are not expected to occur in the ESL during construction. Alternative 1 could indirectly affect anadromous fish species downstream of the ESL due to impacts to water quality. Implementation of the measures in Section 2.19.5.1 will minimize potential impacts to anadromous fish species. Alternative 1 may affect, but is unlikely to adversely affect, federally listed salmonid fishes including Central Valley spring-run chinook salmon (*Oncorhynchus tshawytscha,* federally threatened), winter-run chinook salmon, Sacramento River (*Oncorhynchus tshawytscha,* federally endangered), and Central Valley steelhead (*Oncorhynchus mykiss* federally threatened).

Swainson's Hawk

Alternative 1 may temporarily disturb Swainson's hawks if they are foraging in the project vicinity during construction activities. Swainson's hawks may nest within 0.25 mile of the construction area, and disturbance within this distance from an active nest may cause nest abandonment. Under CDFG's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawk (Buteo swainsoni) in the Central Valley of California* (CDFG 1994) impacts to nesting Swainson's hawks must be avoided. CDFG may require a no disturbance zone of 0.25-mile around an active Swainson's hawk nest site between March 1 and September 15. Implementation of the measures in Section 2.19.5.1 will minimize potential for nest abandonment.

Alternative 1 will widen into the median of I-5 in the southern portion of the project area. Alternative 1 will also widen the outside, southbound lane of I-5 approaching the Elk Grove Blvd. off-ramp. Caltrans does not consider the land occurring in the median or along the shoulders as an important component of foraging habitat for Swainson's hawk in the area for the following reasons:

- The constant, high volume of traffic throughout the day and night along this multi-lane major interstate freeway limits the potential for the recruitment and dispersal of small rodents into and out of the median.
- The close proximity of the freeway traffic lanes on both sides of the narrow median and near the road shoulders renders these areas unfavorable and hazardous as foraging habitat. Note that the median between Laguna Blvd. and Florin Road was paved in 2012.
- The vegetation in the median and shoulders is actively managed in order to decrease fire hazards. This management involves frequent mowing and the use of pre-emergent herbicides in the fall to reduce vegetation growth—eliminating cover for rodents.
- The soil is compacted as a result of the original freeway construction. Compaction limits rodent burrowing abilities.
- Much of the adjoining properties along both sides of I-5 through the northern portion of the project limits are either developed, under development, or approved for future urban type development.

2.19.4 Preliminary Effect Determinations

It is Caltrans' determination that the proposed project will have "no effect" on the following federally listed threatened or endangered, candidate, or proposed species or their critical habitat:

California tiger salamander, western yellow-billed cuckoo, delta green ground beetle, bald eagle, delta smelt, Antioch Dunes evening-primrose, slender Orcutt grass, Sacramento Orcutt grass, and California red-legged frog, and green sturgeon.

It is Caltrans' determination that the proposed project "may affect but is not likely to adversely affect" the following federally listed threatened or endangered, candidate, or proposed species or their critical habitat.

Conservancy fairy shrimp, vernal pool fairy shrimp, valley elderberry longhorn beetle, vernal pool tadpole shrimp, Central Valley steelhead, Central Valley spring-run chinook salmon, and Sacramento River winter-run chinook salmon.

Caltrans will seek concurrence with our effect determinations from the USFWS and the NOAA Fisheries through informal consultation under Section 7 of the Federal Endangered Species Act (FESA).

The proposed activities may result in harassment or harm to individuals, which constitutes "take" under the FESA. Consequently, the proposed project is "likely to adversely affect" the following federally listed threatened or endangered, candidate, or proposed species or their critical habitat, and Caltrans will formally consult with the USFWS under Section 7 of the FESA:

Giant garter snake.

It is Caltrans' determination that the proposed project will not result in "take" of the following California State listed or proposed listed rare, threatened, or endangered species:

Western yellow-billed cuckoo, Bogg's Lake hedge-hyssop, bald eagle, delta smelt, Mason's lilaeopsis, Antioch Dunes evening-primrose, Central Valley spring-run chinook salmon, Sacramento winter-run chinook salmon, slender Orcutt grass, Sacramento Orcutt grass, and bank swallow.

The proposed project may result in disturbance of Swainson's hawk nests, which has the potential to cause "take" of Swainson's hawks under the California Endangered Species Act (CESA). The project may also cause take of giant garter snakes under CESA. Caltrans will consult with the California Department of Fish and Game (CDFG). The proposed project may result in "take" of the following California State listed or proposed listed rare, threatened, or endangered species:

Swainson's hawk, and giant garter snake.

Due to the project area being outside the range of the species, the lack of suitable habitat or habitat components in the project area, the lack of detection during recent Caltrans surveys, or because the project would not harm individuals or alter the species' habitat, it is Caltrans' determination that the proposed project will have not affect the following California species of special concern:

Green sturgeon, California tiger salamander, Sacramento perch, Sacramento splittail, purple martin, California red-legged frog, American badger, and yellow-headed blackbird.

It is Caltrans' determination that the proposed project is not likely to cause any impact to the following California species of special concern:

Northwestern pond turtle, tricolored blackbird, burrowing owl, and Central Valley fall/late fall-run chinook salmon.

Alternative 2

Alternative 2 footprint and features are the same as Alternative 1. Its potential impacts to threatened and endangered species will be the same as well. Please refer to the impact discussion under Alternative 1.

Alternative 3

Alternative 3 does not involve widening any structures or bridges and thus will not affect threatened and endangered species.

Alternative 4

The No Build Alternative would not involve construction and therefore would not result in any impacts to threatened or endangered species.

2.19.5 Avoidance and Minimization Measures

The following avoidance and minimization measures will be implemented to minimize potential effects to threatened and endangered animal species:

01 – Establish Environmentally Sensitive Areas
02 – Limit Vegetation Removal
03 – Containment Measures/Construction Site Best Management Practices
04 – Minimize Disturbance to Creek Channel and Adjacent Areas
05 – Restore Wetland, Riparian, and Stream Habitat Disturbed by Construction
06 – Dewatering Activities
07 – Restrict Timing of In-Stream Activities
09 – Restrict Timing of Woody Vegetation Removal
10 – Nesting Bird Surveys
13 – Pre-construction Surveys and Construction Monitoring for Swainson's Hawks
14 – Protection of Elderberry Shrubs
17 – Giant Garter Snake Minimization Measures
18 – Giant Garter Snake Habitat Restoration

2.19.6 Mitigation Measures

Vernal Pool Invertebrates

With the implementation of the above avoidance and minimization measures, no mitigation will be required.

Valley Elderberry Longhorn Beetle

With the implementation of the above avoidance and minimization measures, no mitigation will be required.

Giant Garter Snake

Permanent impacts will be compensated at a 3:1 replacement ratio. Based on this ratio, 0.0132 acres will be required for mitigation. Following project completion, temporary impacts will be mitigated by on-site restoration plus 1:1 replacement of giant garter snake habitat. Approximately 5.07 acres of replacement habitat will be required to mitigate for Level 2 temporary impacts.

Impacts to giant garter snake habitat will likely be mitigated through the purchase of credits at a USFWS approved mitigation bank.

Anadromous Fish Species: Central Valley Steelhead and Central Valley Chinook (Spring, Fall/Late Fall/Winter Runs)

With the implementation of the above avoidance and minimization measures, no mitigation will be required.

Swainson's hawk

With the implementation of the above avoidance and minimization measures, no mitigation will be required.

2.19.7 CEQA Considerations

Less than significant impacts to vernal pool vertebrates, valley elderberry longhorn beetle, Central Valley Steelhead and Central Valley Chinook (Spring, Fall/Late Fall/Winter Runs), and Swainson's hawk are anticipated. With mitigation, less than significant impacts to giant garter snake are anticipated.

2.20 Invasive Species

2.20.1 Regulatory Setting

On February 3, 1999, President Clinton signed Executive Order 13112 requiring federal agencies to combat the introduction or spread of invasive species in the United States. The order defines invasive species as "any species, including its seeds, eggs, spores, or other biological material capable of propagating that species, that is not native to that ecosystem whose introduction does or is likely to cause economic or environmental harm or harm to human health." Federal Highway Administration guidance issued August 10, 1999 directs the use of the State's invasive species list, currently maintained by the California Invasive Species Council to define the invasive species that must be considered as part of the NEPA analysis for a proposed project.

2.20.2 Affected Area

The freeway and roadway system represents a permanent disturbance zone and dispersal corridor; these areas experience reduced shade and vegetation cover, conditions favored by many invasive plant species. Areas of disturbed soil along roadway shoulders and cut/fill slopes provide an optimal location for invasive plant species introduction, establishment, and subsequent invasion. Invasive plant seeds may be disbursed via the roadway system by motor vehicles at any time, and are often carried along roadways in the undercarriage of vehicles. The I-5 corridor is especially prone to noxious weed infestations because it represents a principal arterial for the movement of goods and people through California.

The California Invasive Plant Council list of “Exotic Pest Plants of Greatest Ecological Concern in California”, Invasive Species Council of California, and the US Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) lists were consulted for a list of target invasive plant species. Many invasive plant species are common and widespread throughout the ESL. Invasive plant species occurring throughout the ESL include, but are not limited to, yellow star thistle (*Centaurea solstitialis*), wild oat (*Avena fatua*), broad-leaved pepperweed, field bindweed (*Convolvulus arvensis*), Bermuda grass (*Cynodon dactylon*), black mustard (*Brassica nigra*), bristly oxtongue (*Picris echioides*), curly dock (*Rumex crispus*), Himalayan blackberry (*Rubus discolor*), and johnsongrass (*Sorghum halepense*). Invasive plant species in the ESL and surrounding areas are primarily concentrated in close vicinity to highways, county and private roads, urban areas, agricultural areas, annual grasslands, and seasonal wetland areas. Infestations of invasive plant species in the ESL were considered too widespread to map individual infestations.

2.20.3 Environmental Consequences

Alternative 1

None of the species on the California list of invasive species is currently used by Caltrans for erosion control or landscaping. All equipment and materials will be inspected for the presence of invasive species. In compliance with Executive Order 13112 (*Invasive Species*), and subsequent guidance from FHWA, the landscaping and erosion control included in the project will not use species listed as noxious weeds. No effects resulting from the introduction or spread of nonnative or invasive species are expected with the implementation of the measures in Section 2.20.4.1.

Alternative 2

Alternative 2 footprint and features are the same as Alternative 1. Its potential invasive species impacts will be the same as well. Please refer to the impact discussion under Alternative 1.

Alternative 3

Alternative 3 will not have invasive species impacts.

Alternative 4

The No Build Alternative would not involve construction and therefore would not contribute the introduction or spread of nonnative or invasive species in the project area.

2.20.4 Avoidance and Minimization Measures

In compliance with the Executive Order on Invasive Species, EO 13112, and subsequent guidance from the Federal Highway Administration, the landscaping and erosion control included in the project will not use species listed as invasive. In areas of particular sensitivity, extra precautions will be taken if invasive species are found in or adjacent to the construction areas. These include the inspection and cleaning of construction equipment and eradication strategies to be implemented should an invasion occur.

The following avoidance and minimization measures will be implemented to minimize the potential introduction or spread of invasive or noxious species:

19 – Weed Free Construction Equipment
20 – Proper Disposal of Soil and Plant Material
21 – Weed Free Erosion Control Treatments

With the implementation of the above avoidance and minimization measures, no mitigation will be required.

2.20.5 CEQA Considerations

Less than significant impacts resulting from invasive species are anticipated.

2.21 Avoidance and Minimization Measures for Biological Resources

01 – Establish Environmentally Sensitive Areas

Additional direct and indirect impacts to sensitive biological resources, including wetland and riparian areas, throughout the project area will be avoided or minimized by designating these features outside of the construction impact area as "environmentally sensitive areas" (ESAs) on project plans and in project specifications. ESA provisions may include, but are not limited to, the use of temporary orange fencing to delineate the proposed limit of work in areas adjacent to sensitive resources, or to delineate and exclude sensitive resources from potential construction impacts. Contractor encroachment into ESAs will be prohibited (including the staging/operation of heavy equipment or casting of excavation materials). ESA provisions shall be implemented as a first order of work, and remain in place until all construction activities are complete.

02 – Limit Vegetation Removal

Vegetation removal will be limited to the absolute minimum area required for construction. Trimming vegetation to ground level is preferred over removal.

03 – Containment Measures/Construction Site Best Management Practices

Measures will be employed to prevent any construction material or debris from entering surface waters or their channels. Best Management Practices (BMPs) for erosion control will be implemented and in place prior to, during, and after construction in order to ensure that no silt or sediment enters surface waters.

Any additional measures included in the 401 certification, 1602 Agreement, or 404 permit will be complied with. BMPs include but are not limited to:

- Where working areas encroach on live or dry streams, lakes, or 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. During construction of the barriers, discharge of sediment into streams shall be held to a minimum. Discharge will be contained through the use of RWQCB-approved measures that will keep sediment from entering protected waters.
- Oily or greasy substances originating from the Contractor's operations will not be allowed to enter or be placed where they will later enter a live or dry stream, pond, or wetland.
- Asphalt concrete will not be allowed to enter a live or dry stream, pond, or wetland.

04 – Minimize Disturbance to Creek Channel and Adjacent Areas

Disruption of the streambeds and adjacent riparian and wetland areas will be minimized. All stream, riparian, and wetland habitat areas outside of the construction limits will be designated as ESAs as detailed in Measure 01.

05 – Restore Wetland, Riparian, and Stream Habitat Disturbed by Construction

Upon completion of the construction project, stream banks will be permanently stabilized and the wetland and riparian areas temporarily impacted will be replanted with appropriate native species. Species that will be used for the restoration will include willow species (*Salix* sp.), California button willow, and other native wetland

and riparian species occurring in these areas. Stream channels will be regraded to pre-construction conditions.

A restoration and monitoring plan will be prepared by the Caltrans Landscape Architecture Branch and will be submitted for approval by the appropriate agencies prior to project permitting. The restoration plan will outline and detail all planting and erosion control activities, and all associated proposed monitoring activities (including length and timing of monitoring, success criteria, remedial actions, and documentation).

06 – Dewatering Activities

Dewatering of the creek bed and/or a temporary stream diversion may be necessary where bridge expansion is proposed in accordance with any Section 401 certification or any other permit. All dewatering activities will observe measure 03. Any intakes that may be required for water pumps associated with wetting/ irrigation/ de-watering of sites shall be screened to RWQCB specifications to avoid the intake of fish.

If dewatering of a site is deemed necessary, a temporary sediment-settling basin will be constructed downstream of the activity. All discharge waters associated with the dewatering activities will be pumped into the constructed basin before being allowed to re-enter project area drainages.

07 – Restrict Timing of In-Stream Activities

Project construction activities within aquatic features will not take place until there is a low-flow condition. It is predicted that in most years, the seasonal low-flow or dry period occurs between June 15th and October 15th; however, work within the drainages (i.e. Morrison Creek) will be subject to stream conditions and permit restrictions.

08 – Pre-construction Plant Surveys

Prior to construction, surveys will be conducted to verify the extent of the Sanford’s arrowhead population at Morrison Creek, and this population will be designated as an ESA as described in Measure 01 above.

If it is determined that complete avoidance of this species is not feasible, then CDFG will be contacted to determine the proper course of action to minimize or offset impacts to this species.

09 – Restrict Timing of Woody Vegetation Removal

If possible, the removal of any woody vegetation (trees and shrubs) required for the project will be completed between September 1 and February 15, prior to project construction, outside of the predicted nesting season for raptors and migratory birds in this area. Vegetation removal outside this time period may not proceed until a survey by a qualified biologist determines no nests are present or in use.

10 – Nesting Bird Surveys

If woody vegetation removal, construction, grading, or other project-related improvements are scheduled during the nesting season of protected raptors and migratory birds (February 16th to August 31st), a focused survey for active bird nests will be conducted by a qualified biologist no more than 10 days prior to the beginning of project-related activities. If active nests are found, Caltrans shall consult with USFWS regarding appropriate action to comply with the Migratory Bird Treaty Act of 1918 and with CDFG to comply with provisions of the Fish and Game Code of California. If a lapse in project related work of ten days or longer occurs, another survey and, if required, consultation with USFWS and CDFG will be required before the work can be reinitiated.

11 – Pre-construction Pond Turtle Surveys

Prior to the start of construction activities, suitable habitat within the ESL (Morrison Creek) will be surveyed by a qualified biologist for the presence of northwestern pond turtles. If pond turtles are observed in the project area, they will be relocated outside of the work area.

Upon completion of the turtle relocation effort, temporary screen fencing (i.e., silt fencing) should be placed around the work area at strategic locations to minimize the possibility of turtles reentering construction areas. Installation of fencing should occur under the supervision of a qualified biologist.

12 – Pre-construction Burrowing Owl Surveys

A qualified biologist will survey suitable habitat in the ESL and adjacent areas for burrowing owls no more than 30 days prior to the start of construction. If burrowing owls or their sign is identified, CDFG shall be contacted to determine the best course of action.

13 – Pre-construction Surveys for Swainson's Hawks

Pre-construction surveys will be performed by a qualified biologist according to CDFG guidelines to determine if Swainson's hawks are nesting within 0.25 mile of the proposed project area. Caltrans will consult with CDFG regarding the need for further action if no Swainson's hawks are recorded nesting within 0.25 mile of the proposed project site during the said construction season.

During construction, a qualified avian biologist will be present daily, on site, monitoring the behavior of any Swainson's hawks nesting within 0.25-mile of the proposed project area. All construction activities will stop if the birds exhibit erratic behavior and construction will not resume until the avian biologist confirms that the bird's behavior has normalized.

14 – Protection of Elderberry Shrubs

Prior to construction, ESAs will be designated 20 feet from the drip line of all elderberry shrubs in the ESL, as detailed in measure 01, above. A drip line is the outer edge of a tree or shrub, the point where water would drip to the ground from the outer leaves of a plant. If construction will take place within 20 feet of an elderberry shrub, the ESA will be designated as far from the drip line as feasible to allow construction to take place.

15 – Pre-Construction Roosting Bat Surveys

All suitable roosting habitat that will be impacted (i.e., bridges, trees ≥12 in. diameter at breast height) will be surveyed prior to construction. If active bat day or maternity roosts are found, Caltrans shall consult with CDFG regarding appropriate action to comply with provisions of the Fish and Game Code of California.

16 – Bat and Bird Exclusion Measures

If bat day or maternity roosts are identified in the ESL within the project footprint, roosting prevention measures will be implemented. Roosting prevention measures may include scheduling activities outside of the anticipated roosting dates, installing exclusionary devices, and other measures approved by a qualified biologist and CDFG.

Because work will occur during the migratory bird nesting season (February 16 – August 31) structure nesting birds will be excluded, if necessary, by a qualified company, prior to onset of the breeding season. Where necessary, exclusion structures (e.g., netting and weep hole plugs) will be left in place and maintained through August 31 of each breeding season, or until the work is complete.

17 – Giant Garter Snake Avoidance and Minimization Measures

Following project completion, all areas temporarily disturbed during construction shall be restored following the "Standard Avoidance and Minimization Measures During Construction Activities in Giant Garter Snake (*Thamnophis gigas*) Habitat" (Appendix C of the *Programmatic Biological Opinion on the Effects of Small Highway Projects on the Threatened Giant Garter Snake in Butte, Colusa, Glenn, Sacramento, San Joaquin, Solano, Sutter, Yolo, and Yuba Counties, California*) (hereafter, Programmatic BO) (USFWS No. 1-1-03-F-0154, dated January 24, 2005) outlined below.

- When feasible, avoid construction activities within 200 feet from the banks of giant garter snake aquatic habitat. Confine movement of heavy equipment to existing roadways to minimize habitat disturbance.
- Construction activity within habitat should be conducted between May 1 and October 1. This is the active period for giant garter snakes and direct mortality is lessened, because snakes are expected to actively move and avoid danger. Between October 2 and April 30 contact USFWS's Sacramento Fish and Wildlife Office to determine if additional measures are necessary to minimize and avoid take.
- Confine clearing to the minimal area necessary to facilitate construction activities. Flag and designate avoided giant garter snake habitat within or adjacent to the project area as ESAs, as outlined in Measure 01. These areas should be avoided by all construction personnel.
- Construction personnel should receive USFWS-approved worker environmental awareness training. This training instructs workers to recognize giant garter snakes and their habitat(s).
- 24-hours prior to construction activities, the ESL will be surveyed for giant garter snakes. Surveys of the ESL will be repeated if a lapse in construction activity of two weeks or greater has occurred. If a snake is encountered during construction, activities shall cease until appropriate corrective measures have been completed or it has been determined that the snake will not be harmed. Report any sightings and any incidental take to the USFWS immediately by telephone at (916) 414-6600.
- Any dewatered habitat should remain dry for at least 15 consecutive days after April 15 and prior to excavating or filling of the dewatered habitat.
- After completion of construction activities, remove any temporary fill and construction debris and, wherever feasible, restore disturbed areas to pre-

project conditions. Restoration work may include such activities as replanting species removed from banks or replanting emergent vegetation in the active channel.

- Follow the conservation measures in the Table 2-21.1 to minimize the effects of loss and disturbance of habitat on giant garter snakes. Replacement ratios (levels) are based on the acreage and on the duration of disturbance.

Table 2-21.1 Summary of Giant Garter Snake Conservation Measures

	Effects: Duration	Effects: Acres	Conservation Measure: Compensation
Level 1	1 season	Will not exceed 20 and temporary	Restoration
Level 2	2 seasons	Will not exceed 20 and temporary	Restoration plus 1:1 replacement
Level 3	More than 2 seasons and temporary	Will not exceed 20 and temporary	3:1 Replacement (or restoration plus 2:1 replacement)
	Permanent loss	Will not exceed 3 acres total giant garter snake habitat AND Less than 1 acre aquatic habitat;	3:1 Replacement

Notes:
Giant garter snake habitat includes 2.0 acres of surrounding upland habitat for every 1.0 acre of aquatic habitat. The 2.0 acres of upland habitat also may be defined as 218 linear ft of bankside habitat that incorporates adjacent uplands to a width of 200 ft from the edge of each bank. Each acre of created aquatic habitat should be supported by two acres of surrounding upland habitat. Compensation may include creating upland refuges and hibernacula for the giant garter snake that are above the 100-year floodplain. A season is defined as the calendar year period between May 1 and October 1, the active period for giant garter snake when mortality is less likely to occur.

18 – Giant Garter Snake Habitat Restoration

Following project completion, all areas temporarily disturbed during construction will be restored following the "Guidelines for Restoration and/or Replacement of Giant Garter Snake Habitat" as outlined below:

- Regrade the area to preexisting contour, or a contour that would improve restoration potential of the site.
- Replant and hydroseed the restoration area. Recommended plantings consist of: a) wetland emergents; b) low-growing cover on or adjacent to banks; and c) upland plantings/hydroseeding mix to encourage use by other wildlife. Riparian plantings are not appropriate because shading may result in lack of basking sites. Native plantings are encouraged except where non-natives will provide additional values to wildlife habitat and will not become invasive in native communities. The applicant should obtain cuttings, plantings, plugs, or seeds from local sources wherever possible. The applicant should attempt to restore conditions similar to that of adjacent or nearby habitats.

- Emergent wetland plants recommended for giant garter snake habitat are California bulrush (*Scirpus californicus*), cattail (*Typha* spp.), and water primrose (*Ludwigia peploides*). Additional wetland plantings may include common tule (*Scirpus acutus*), Baltic rush (*Juncus balticus*), or duckweed (*Lemna* spp.).
- Cover species on or adjacent to the bank may include California blackberry (*Rubus ursinus*) or California wild grape (*Vitis californica*), along with the hydroseeding mix recommended below.
- Upland plantings/hydroseeding mix: Disturbed soil surfaces such as levee slopes should be hydroseeded to prevent erosion. The USFWS recommends a mix of at least 20-40 percent native grass seeds [such as annual fescue (*Vulpia* spp.), California brome (*Bromus carinatus*), blue wildrye (*Elymus glaucus*), and needle grass (*Nassella* spp.)], 2-10 percent native forb seeds, five percent rose clover (*Trifolium hirtum*), and five percent alfalfa (*Medicago sativa*). Approximately 40-68 percent of the mixture may be non-aggressive European annual grasses [such as wild oats (*Avena sativa*), wheat (*Triticum* ssp.), and barley (*Hordeum vulgare*)]. Aggressive non-native grasses, such as perennial ryegrass (*Lolium perenne*), cheatgrass (*Bromus tectorum*), fescue (*Festuca* spp.), giant reed (*Arundo donax*), medusa-head (*Taeniatherum caput-medusae*), or Pampas grass (*Cortaderia selloana*) will not be included in the hydroseed mix. Endophyte-infected grasses will not be included in the mix. Mixes of one hundred percent native grasses and forbs may also be used, and are encouraged.

19 – Weed Free Construction Equipment

All off-road construction equipment will be cleaned of potential invasive plant species sources (i.e., mud, vegetation) before entry into the project area to help ensure additional invasive plant species are not introduced into the project area. The Contractor shall employ whatever cleaning methods (typically with the use of a high-pressure water hose) necessary to ensure that equipment is free of invasive plant species. Equipment will 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, and that do not drain into sensitive (riparian, wetlands, etc.) areas or any surface waters.

20 – Proper Disposal of Soil and Plant Material

Caltrans will not allow disposal of soil and plant material from any areas that support invasive plant species onto areas that support stands dominated by native plant species.

21 – Weed Free Erosion Control Treatments

To further minimize the risk of introducing additional non-native species into the area, only native plant species appropriate for the project area will be used in any erosion control or revegetation seed mix or stock. No dry-farmed straw will be used, and certified weed-free straw shall be required where erosion control straw is to be used. In addition, any hydro-seed mulch used for revegetation activities must also be certified weed-free.

2.22 Cumulative Impacts

2.22.1 Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this project. A cumulative effects assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive types of agricultural cultivation. These land use activities can degrade habitat and species diversity through consequences such as displacement and fragmentation of habitats and populations, alteration of hydrology, contamination, erosion, sedimentation, 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. A copy of the project's community impact assessment is available on the project website at www.dot.ca.gov/dist3/Projects/00165/prjindex.htm.

CEQA Guidelines, Section 15130, describes when a cumulative impact analysis is warranted and what elements are necessary for an adequate discussion of cumulative impacts. The definition of cumulative impacts, under CEQA, can be found in Section 15355 of the CEQA Guidelines. A definition of cumulative impacts, under NEPA, can be found in 40 CFR, Section 1508.7 of the CEQ Regulations.

2.22.2 Methodology

The cumulative impacts analysis was prepared using the procedures outlined in the Caltrans' *Guidance for Preparers of Cumulative Impact Analysis (Cumulative Impacts Guidance)*. This guidance was prepared to address cumulative impact analysis for transportation projects in California and was developed by an interagency workgroup consisting of staff from the FHWA California Division, Caltrans, and USEPA Region IX.

For a cumulative impacts analysis to be effective, it must be limited to the effects that can be evaluated meaningfully. While there is no universally accepted approach to preparing a cumulative impacts analysis, the *Cumulative Impacts Guidance* states that a cumulative impact analysis should focus only on 1) those resources significantly impacted by the project and 2) those resources in *poor or declining health or at risk*, even if project impacts are relatively small (Caltrans 2005).

This analysis considers the overall cumulative effects of the proposed project when taken together with past, present, and reasonably foreseeable projects within the resource study area defined for each resource. For resources unaffected by the proposed project, no cumulative impact analysis was performed, as the project could not contribute to a cumulative impact. Of the resources evaluated in this document, the following resources are not included in this cumulative impacts analysis, because no substantial impacts resulting from the proposed project were identified:

- Land Use and Planning
- Growth-Related Impacts
- Community Impacts
- Utilities, Emergency Services, and Community Facilities
- Hydrology and Floodplains
- Geology/Soils/Seismic/Topography
- Energy

In order to consider the combined effects of the proposed project when taken together with past, present, and reasonably foreseeable projects, an RSA was defined for each resource that will be impacted by the proposed project. The RSA differs for each resource, in order to view the health of a given resource in its appropriate geographical context. For the most part, the RSAs that were defined for the project are located within and adjacent to the project limits or along the I-5 corridor. For resources such as air quality, the RSA is, by necessity, much larger.

It is important to note that impacts (such as a change in the visual environment) cannot contribute to a cumulative effect if that impact occurs outside the RSA defined for the proposed project. For example, a visual change in one location cannot contribute to a cumulative impact when combined with a visual change in another location, as the viewsheds and viewer groups are different. Likewise, an increase in operational freeway noise in one location cannot contribute to a cumulative impact when combined with operational freeway noise in another distant location, as the receivers differ. The RSAs for each resource, as well as the current health and historical context of each effected resource are described in detail in the Cumulative Impacts Analysis prepared for the project.

2.22.3 Other Transportation Projects and Anticipated Environmental Consequences

This section includes a summary of transportation projects (and each project's expected environmental consequences *in common with* and, as applicable, within the same RSA for the resource of concern as the proposed project) that are most relevant to an analysis of potential cumulative impacts. Although a great many more transportation projects are planned for the region, the projects included here are those that are either located within or adjacent to the proposed project limits, or could be considered "related" projects—including those projects which together form the existing and planned regional network of high occupancy vehicle lanes for the Sacramento region.

Table 2-22.1 at the end of this chapter provides a more thorough list of planned transportation projects.

2.22.3.1 Interstate 5—Widen Northbound Onramp from Elk Grove Blvd.

Caltrans and the FWHA propose to widen and reconfigure the northbound on-ramp to I-5 from westbound Elk Grove Blvd. The ramp will be widened to three lanes and the mid-ramp access lane from eastbound Elk Grove Blvd. will be closed. In addition, the positions of the existing mixed flow (one) and HOV lane (one) will be reversed, so that the HOV lane becomes the outside lane. A Project Study Report/Project Report was prepared for this project in March 2006. In August 2007, a Supplemental Project Report was approved. This project is expected to have the following environmental effects *in common* with the proposed project:

- Temporary impacts to traffic during construction
- Temporary construction-related impacts to water quality
- Temporary visual changes during construction
- Temporary construction-related impacts to air quality including the emission of ozone precursors and particulate matter
- Temporary construction-related noise impacts

2.22.3.2 Interstate 5—Interstate 5/Cosumnes River Blvd. Interchange

The City of Sacramento, Caltrans, and FHWA propose to construct a new Cosumnes River Blvd. interchange on I-5 in south Sacramento. In addition to the interchange, the project would extend Cosumnes Blvd. from its current western terminus at Franklin Blvd. to Freeport Blvd. with a newly constructed interchange at I-5. The project is intended to provide an east-west connector between I-5 and SR 99 and improve mobility within the southerly limits of the City of Sacramento. The final Environmental Impact Statement/Environmental Impact Report (EIS/EIR) was released in April 2007 and the Notice of Determination signed on Oct. 29, 2009.

This project is expected to have the following environmental consequences *in common* with the proposed project:

- Temporary impacts to traffic during construction
- Temporary visual changes during construction
- Permanent changes to the *proposed project's* southern landscape assessment unit (LAU)
- Temporary construction-related impacts to water quality
- Potential impacts to paleontological resources
- Potential for exposure to known and unknown hazardous materials during construction including lead and asbestos
- Temporary construction-related impacts to air quality including the emission of ozone precursors and particulate matter
- Temporary construction-related noise impacts
- Permanent exposure to operational traffic noise
- Impacts to wetlands and other waters
- Potential for temporary construction-related disturbance of northwestern pond turtles
- Temporary construction-related disturbance of nesting or foraging migratory birds including Swainson's hawk and other raptors
- Loss of habitat for Giant Garter Snake

2.22.3.3 Interstate 5—Auxiliary Lane Project

Caltrans and the FHWA propose to add auxiliary lanes between Florin and Pocket/Meadowview Roads in Sacramento, California. This project was originally included with the I-5 bus/carpool lane project. However, the construction of the auxiliary lanes was split into a separate project and the 2009/12 MTIP has been updated to reflect this change (Administrative Modification #30 to the 2009/12 MTIP and Amendment #31 to the 2009/12 MTIP).

The northbound auxiliary lane will start at the Pocket/Meadowview Road on-ramp and end at the Florin Road off-ramp. A bottleneck exists in this segment during the morning commute period, due to the high ramp demand volumes. The southbound auxiliary lanes started at the number 4 mainline lane drop and ended at the Pocket Road off-ramp. A bottleneck exists during the PM commute period, due to the lane drop and high mainline volumes approaching the Florin Road Interchange.

This project is intended to improve traffic operation for the southbound direction of Interstate 5 from Florin Road interchange to Pocket Road interchange.

2.22.3.4 I-5 Reconnection Project

The City of Sacramento proposed the I-5 Riverfront Reconnection Project, which includes pedestrian and bicycle improvements to Capitol Mall, N Street, and O Street; a new roadway bridge across I-5 at N Street; the reconfiguration of Front Street, Neasham Circle, and 2nd Street west of I-5; and the construction of a new 2nd Street/Capitol Mall/Front Street intersection. Project improvements would be constructed within existing City of Sacramento or State (Caltrans) rights-of-way.

The City of Sacramento approved a Mitigated Negative Declaration for the project on July 19, 2011.

2.22.3.5 Capitol Southeast Connector Project

The proposed Capitol Southeast Connector is an approximately 35-mile-long proposed parkway that would link communities in Sacramento and El Dorado Counties, including Elk Grove, Rancho Cordova, Folsom, and El Dorado Hills. The project limits extend from the I-5/Hood Franklin Road interchange in southwest Sacramento County to US 50 in the vicinity of Silva Valley Parkway, approximately 3 miles east of the Sacramento County/El Dorado County line.

A Draft Program Environmental Impact Report (DPEIR) has been released (March 2011) for the Connector Project. The Revised Final Program EIR was certified by the Capital Southeast Connector Authority Board of Directors in March 2012. At that time, the Board also adopted Findings of Fact and a Statement of Overriding Considerations, and a Mitigation Monitoring and Reporting Plan under CEQA.

Although the Connector Project would have many impacts in common with the proposed project, most of which would be temporary in nature and related to construction, none of these impacts would change the conclusions presented in the Draft EIR/EA for the proposed project. Resources evaluated in the DEIR/EA for potential cumulative impacts included:

- Traffic and Transportation
- Visual/Aesthetics
- Water Quality/Stormwater Runoff
- Paleontology
- Air Quality
- Noise
- Hazardous Waste
- Special-Status Animal Species
- Threatened and Endangered Species

The proposed project's impacts to Giant Garter Snake habitat, when combined with the other transportation and development projects included in the DEIR/EA and the "Connector Project" will be cumulatively significant under CEQA. However, the proposed project's incremental contribution to these cumulative effects will be rendered *less than cumulatively considerable* through the implementation of the mitigation measures outline in Section 2.19 of the DEIR/EA and will therefore be less than significant under CEQA.

While the DEIR/EA concluded that the proposed project's effects to the visual environment, particularly those in the Southern Landscape Assessment Unit, when combined with the other transportation and development projects included in the DEIR/EA, would be cumulatively significant before mitigation, the Connector Project is outside the viewshed of the proposed project, which terminates 1.1 miles south of Elk Grove Blvd. The Connector Project will connect with I-5 using the existing

Hood-Franklin Road Interchange, and any other visual effects of the Connector Project will be located well to east of the proposed project.

2.22.3.6 14th Avenue Extension Project

The City of Sacramento proposed the 14th Avenue Extension Project. The project is located on 14th Avenue, between Power Inn Road and Florin Perkins Road. The project would improve 2,800 linear feet of 14th Avenue between Power Inn Road and the current end of the road, just east of 82nd Street, and extend the road 2,250 linear feet from the current end to Florin Perkins Road.

The City of Sacramento approved a Mitigated Negative Declaration for the project on April 26, 2011.

2.22.4 Planning Environment and Other Projects in the Greater Sacramento Area

This section includes a summary of the regional planning environment and development projects (along with each project's expected environmental consequences) that are most relevant to an analysis of potential cumulative impacts. Table 2-22.2 at the end of this chapter provides a more thorough list of planned development projects.

2.22.4.1 Sacramento Area Council of Government's Sacramento Region Blueprint

In December 2004, SACOG's Board of Directors adopted the Preferred Blueprint Scenario for 2050. The Preferred Blueprint Scenario depicts a way for the region to grow in a manner consistent with the Blueprint planning principles, which promote transportation choices, mixed land uses, compact development, housing choices, the use of existing assets (such as infill development in urban areas), quality design, and natural resources conservation. Through higher density development and greater transit choices it also seeks to shorten commute times, reduce traffic congestion, lessen dependence on automobiles, and provide for housing choices that more closely align with the needs of the population (SACOG 2004). In 2008, the SACOG Board adopted the Metropolitan Transportation Plan (MTP) for 2035, using the Preferred Blueprint Scenario as the basis for the land use on which transportation investments will be made. The I-5 Bus/Carpool Lane Project is included in the 2035 MTP.

Although the Blueprint is only advisory, many jurisdictions have modeled their planning policies on the Blueprint's planning principles, including the City of Sacramento, Sacramento County, and the City of Elk Grove.

2.22.4.2 Sacramento Area Council of Government's Metropolitan Transportation Plan

The Sacramento Area Council of Governments' Metropolitan Transportation Plan (MTP) is the long-range transportation plan for the region. The MTP is required to cover at least a 20-year planning horizon and must be updated every 4 years. In 2008, the SACOG Board adopted the Metropolitan Transportation Plan (MTP) for 2035. The I-5 Bus/Carpool Lane Project is included in the 2035 MTP. In April 2012, the SACOG Board adopted the MTP/SCS Metropolitan Transportation Plan/Sustainable Communities Strategy in April 2012. The project is included in the MTP/SCS.

2.22.4.3 City of Sacramento General Plan and General Plan Update

The current City of Sacramento General Plan was adopted on March 3, 2009. The previous General Plan was dated 1988, and the update process began in 2004. The General Plan update process included town hall meetings and community forums, aimed at ensuring that the updated General Plan would reflect residents' views and concerns. The city gathered input from more than 4,600 residents, which helped shape the policy direction of the 2030 General Plan.

2.22.4.4 County of Sacramento General Plan and General Plan Update

Sacramento County adopted its General Plan in December 1993. A Notice of Preparation was released on August 13, 2007 and a Draft Environmental Impact Report was released on May 1, 2009. The Sacramento County General Plan of 2005 - 2030 was amended and adopted by the County Board of Supervisors in November 2011. The Land Use Element in the 2005-2030 general plan states that "this Land Use Element supports the land use principles espoused by SACOG's adopted Blueprint Vision [and] emphasizes their implementation."

2.22.4.5 City of Elk Grove General Plan

The current General Plan for the City of Elk Grove was adopted in 2003 and contains amendments through July 22, 2009.

2.22.4.6 Delta Shores

The Delta Shores project is located along I-5 in southern Sacramento County and includes the development of a 782-acre master planned community. Situated east of Freeport Blvd., south of the existing Meadowview neighborhood, north of the Sacramento Regional County Sanitation District (SRCSD) Wastewater Treatment Plant, and east of the Morrison Creek levee, the Delta Shores area is one of the last major undeveloped areas in the City of Sacramento.

The proposed project is envisioned as a compact residential community of approximately 5,092 residences with two mixed-use retail centers—a Regional Village Center (Village Center) and a neighborhood-serving residential mixed-use retail area (Residential/Mixed-Use area). The proposed project also includes open space, recreation, and pedestrian and bicycle friendly aspects. The project applicant, M&H (Merlone Geier Partners, LLC) would develop the commercial areas including the Village Center and Residential/Mixed-Use area. The Village Center is anticipated to include up to approximately 1.3 million square feet of retail and commercial uses while the Residential/Mixed-Use area would include a maximum of approximately 161,600 square feet of retail and incorporated office uses.

The proposed project proposes to subdivide approximately 315 acres into residential lots and approximately 118 acres into parks, trails, open space, and wetland preserve. A total of approximately 147 acres would be designated for commercial development (including the 19.9 acres of mixed-use) with the remaining area set aside for schools, utilities, a private community center, and roadways, including development of internal residential collector streets.
A Draft Environmental Impact Report was circulated to the public between September 9 and October 23, 2008. A Final Draft Environmental Impact Report (EIR) was completed in December 2008. The Sacramento City Council certified the EIR in January 2009. In February 2009, litigants filed a writ of mandate alleging that the EIR and findings failed to comply with CEQA. In February 2010, the court issued its ruling that determined that the city's significance analysis and findings relating to exposure to, and health risks from, freeway mobile source Toxic Air Contaminants ("TACS") was invalid. In all other respects, the Petition for Writ of Mandate was denied. In August 2010, an agreement between the parties was reached in which the city agreed to:

- Prepare a new health risk assessment.

- Implement measures to mitigate future Delta Shore residents' exposure to TACs, including tree plantings, relocation of building air intakes, installation of air filters in buildings within 500 feet of I-5, and installation of non-operable windows facing I-5.
- Amend the Delta Shores development agreement to include these measures.

The following environmental impacts *in common* with the proposed project are anticipated at this time:

- Temporary impacts to traffic during construction
- Temporary visual changes during construction
- Permanent changes to the *proposed project's* southern landscape assessment unit (LAU)
- Temporary construction-related impacts to water quality
- Potential to impact paleontological resources
- Temporary construction-related impacts to air quality including the emission of ozone precursors and particulate matter
- Temporary construction-related noise impacts
- Permanent exposure to operational traffic noise
- Impacts to wetlands and other waters
- Temporary construction-related disturbance of nesting or foraging migratory birds including Swainson's hawk and other raptors
- Loss of habitat for Giant Garter Snake

2.22.4.7 Sacramento Regional Transit District South Line Extension

The Sacramento Regional Transit District (RT) is proposing Phase II of its South Corridor Extension, located between I-5 and SR 99. Phase I, from downtown Sacramento to Meadowview, opened to the public in September 2003. Phase II consists of a 4-mile light rail extension from Meadowview to Cosumnes River College and includes four new stations. A Supplemental Draft Environmental Impact Statement/Subsequent Draft Environmental Impact Report for this project was released in January 2007, and a Supplemental Final Environmental Impact Statement/Subsequent Final Environmental Impact Report for this project was completed in September 2008.

The Locally Preferred Alternative Phase 2 (LPAP2) is expected to result in the following environmental impacts *in common* with the proposed project:

- Temporary impacts to traffic during construction
- Potential for exposure to known and unknown hazardous materials during construction, including lead and asbestos
- Temporary construction-related impacts to water quality
- Temporary construction-related impacts to air quality including the emission of ozone precursors and particulate matter
- Impacts to wetlands and other waters
- Potential for temporary construction-related disturbance of northwestern pond turtles
- Temporary construction-related disturbance of nesting or foraging migratory birds including Swainson's hawk and other raptors
- Loss of habitat for Giant Garter Snake

2.22.4.8 Sacramento Railyards Specific Plan

The Sacramento Railyards project is a 240-acre master-planned, mixed-use development proposed for the former site of the Union Pacific Railyards in downtown Sacramento. A draft Environmental Impact Report for the adoption and implementation of the proposed Railyards Specific Plan was released for this project in August 2007. The Plan will establish a framework of development policies to create mixed-use neighborhoods consisting of high-density housing complemented by cultural opportunities, office development, hotels, entertainment and commercial uses, and parks and urban plazas. The Railyards will include between 10,000 and 12,500 residential housing units, 1,384,800 sq ft of retail space, 491,000 sq ft of mixed-use space, 1,100 hotel rooms, 2,337,200 sq ft of office space, 485,390 sq ft of historic/cultural space (including the proposed California State Railroad Technology Museum), and 41.16 acres of open space. Approximately 32 acres have been designated for the development of the proposed Sacramento Intermodal Transportation Facility (see below), which would provide multiple modes of public transit service. A Draft Environmental Impact Report for the Railyards Specific Plan was released in August 2007 and a Final Environmental Impact Report was completed in November 2007.

This project has the potential to affect the following environmental resources *in common* with the proposed project:

- Temporary impacts to traffic during construction
- Temporary construction-related impacts to water quality

- Potential to impact paleontological resources
- Potential for exposure to known and unknown hazardous materials during construction including lead and asbestos
- Temporary construction-related impacts to air quality including the emission of ozone precursors and particulate matter
- Impacts to wetlands and other waters
- Temporary construction-related disturbance of nesting or foraging migratory birds including Swainson's hawk and other raptors

2.22.4.9 Sacramento Intermodal Transportation Facility

The City of Sacramento plans to expand the existing Sacramento Valley Station to meet current needs and to establish a state-of-the-art regional transportation center to meet the future needs of rail and bus transit passengers and service operators in the Sacramento region through the year 2025 and beyond. The project site is located within the Central Business District of the downtown area of the City of Sacramento and within the Railyards Specific Plan area, just south of the historic Southern Pacific Railroad Sacramento Shops complex. The project site consists of approximately 33 acres and is generally bounded by I St. on the south, 2nd St. and the Sacramento River riverfront on the west, 7th St. on the east, and the Central Shops buildings on the north.

Developed in three phases, the Sacramento Intermodal Transportation Facility would encompass a realignment of existing mainline rail tracks (Phase 1), improvements to the existing Sacramento Valley Station, which includes the current Southern Pacific Railroad Depot (Phase 2), and eventual transformation of the Station into a multimodal transportation center (future Phase 3).

A Finding of No Significant Impact for the project was made on August 31, 2009. This project has the potential to affect the following environmental resources *in common* with the proposed project (for Phases 1 and 2 of the project):

- Temporary impacts to traffic during construction
- Temporary construction-related impacts to water quality
- Potential to impact paleontological resources
- Potential for exposure to known and unknown hazardous materials during construction
- Temporary construction-related impacts to air quality including the emission of ozone precursors and particulate matter

- Impacts to wetlands and other waters
- Temporary construction-related disturbance of nesting or foraging migratory birds including Swainson's hawk and other raptors

2.22.4.10 Township 9

On August 28, 2007, the Sacramento City Council unanimously approved the Township 9 development project, located on 65 acres in the city's River District. The Township 9 project is a mixed-use development project bounded roughly by Richards Blvd. to the south, the American River to the north, North 5th St. to the west, and North 7th St. to the east. The project will include approximately 2,700 homes along with office and retail space. A Draft Environmental Impact Report for this project was prepared in February 2007 and a Notice of Determination for this project was filed with the California State Clearinghouse on August 29, 2007.

At the time of the Draft EIR, this project was expected to result in the following environmental consequences *in common* with the proposed project:

- Temporary impacts to traffic during construction
- Temporary visual changes during construction
- Temporary construction-related impacts to water quality
- Potential to impact paleontological resources
- Potential for exposure to known and unknown hazardous materials during construction, including lead and asbestos
- Temporary construction-related impacts to air quality, including the emission of ozone precursors and particulate matter
- Impacts to wetlands and other waters
- Potential for temporary construction-related disturbance of northwestern pond turtles
- Temporary construction-related disturbance of nesting or foraging migratory birds, including Swainson's hawk and other raptors

2.22.4.11 The Docks Area Specific Plan

This project is located on the Sacramento River, and is roughly bound by the R St. overpass and proposed Docks Promenade/Parkway on the north, Front St. and I-5 to the east, and the Pioneer Bridge (on US 50/I-80 over the Sacramento River). The project site is approximately 29 acres in size. The Docks Area Specific Plan would provide for a range of mixed-use development densities, including: 1,000 to 1,155 dwelling units; 200,000 to 500,000 sq ft of office space; 40,500 to 43,300 sq ft of retail space; and 1,870 to 2,920 off-street parking spaces. A Draft Environmental Impact Report for the Docks Area Specific Plan was released in August 2008 and a Final Environmental Impact Report for the Docks Area Specific Plan was completed in October 2009.

At the time of the Draft EIR, this project was expected to result in the following environmental consequences *in common* with the proposed project:

- Temporary impacts to traffic during construction
- Temporary visual changes during construction
- Temporary construction-related impacts to water quality
- Potential to impact paleontological resources
- Potential for exposure to known and unknown hazardous materials during construction, including lead and asbestos
- Temporary construction-related impacts to air quality including the emission of ozone precursors and particulate matter
- Temporary construction-related disturbance of nesting or foraging migratory birds, including Swainson's hawk and other raptors

2.22.4.12 The Creamery

This proposed project is located on 8.2 acres in downtown Sacramento (10th and D Streets) with a total of 217 high density residential dwelling units (townhouses or loft-style "workforce housing") and approximately 90,000 square feet of office and 20,000 square feet of neighborhood-serving retail. The project is currently on hold.

2.22.4.13 River District Specific Plan

The River District Specific Plan is approximately 773 acres of mostly developed land located within the River District Redevelopment Project Area. It is defined on the north by American River, on the west by the Sacramento River, on the south by the recently adopted Sacramento Railyards Specific Plan Area and on the east by the 16th Street corridor. The target growth for the 773 acre planning area is approximately 5,600 residential dwelling units, 780,000 square feet of commercial, 3.9 million square feet of office, 1.4 million square feet of light industrial and 3,000 hotel rooms, phased in over a period of 20 years or more.

According to the City of Sacramento, the vision for the River District is that of an eclectic mix of uses that will evolve from a primarily light-industrial, low-intensity commercial district, to that of a series of distinctive walkable neighborhoods within a district that is contiguous to the American River and serves as the northern gateway into the Central City. The land is divided into approximately 422 separate parcels held by over 200 property owners. The District is currently home to 386 residential units, approximately 5.07 million square feet of industrial uses, 384,000 square feet of retail/wholesalers and 1.312 million square feet of office.

Note the River District Specific Plan includes the Township 9 development; therefore, the number of dwelling units has been deducted from the River District Specific Plan because Township 9 is listed separately in this table.

The City of Sacramento prepared a Draft EIR in July 2010. The Final EIR was completed in December 2010. The City Council adopted Ordinance No. 2011-010 on February 15, 2011, adding Chapter 17.210 River District Special Plan Area to the City's zoning code.

This project has the potential to affect the following environmental resources *in common* with the proposed project:

- Temporary impacts to traffic during construction
- Potential for exposure to known and unknown hazardous materials during construction, including lead and asbestos
- Temporary construction-related impacts to air quality, including the emission of ozone precursors and particulate matter
- Temporary construction-related disturbance of nesting or foraging migratory birds, including Swainson's hawk and other raptors
- Temporary construction-related disturbance of nesting bats

2.22.4.14 Northwest Land Park Project

The Northwest Land Park Project would develop a residential/mixed-use community on approximately 31.7 acres within the Land Park Community Plan Area of the City of Sacramento. The project site is bounded by Broadway on the north, 5th Street on the east, McClatchy Way on the south, and an elevated section of I-5 on the west. The project would replace existing light industrial and commercial uses on the project site with up to 898 medium-density multi-family residences on approximately 19.2 acres, up to 70 high-density multi-family residences, and 15,000 square feet of commercial-retail uses on approximately 1.2 acres, approximately 4.3 acres of park and public open space, approximately 1.1 acres of private open space, and approximately 5.9 acres of public rights-of-way. A four-phase project buildout is anticipated.

The Draft EIR was completed in December 2010. The Final EIR was released in July 2011.

The DEIR/EA for the proposed project evaluated the following resources for potential cumulative effects:

- Traffic and Transportation
- Visual/Aesthetics
- Water Quality/Stormwater Runoff
- Paleontology
- Air Quality
- Noise
- Hazardous Waste
- Special-Status Animal Species
- Threatened and Endangered Species

With the exception of impacts to visual and aesthetic resources, the proposed project's impacts, when combined with the other transportation and development projects included in the DEIR/EA, the Northwest Land Park Project will not be cumulatively significant under CEQA.

As noted in the DEIR/EA prepared for the proposed project, visual impacts in the Northern Landscape Assessment Unit consist largely of tree and vegetation removal due to the construction of a new pedestrian overcrossing, areas of minor outside widening, structure widening, and soundwall construction. The Northern Landscape Assessment Unit would include those areas that received new land use designations in the Northwest Land Park Project. However, the inclusion of the Northwest Land Park Project in the cumulative impact analysis does not change the conclusions presented in the DEIR/EA for the proposed project.

The proposed project's impacts to the visual environment, when combined with the other transportation and development projects included in the DEIR/EA (although most particularly those located in the Southern Landscape Assessment Unit) were already determined to be cumulatively significant under CEQA. The addition of any visual or aesthetic impacts resulting from the Northwest Land Park project does not alter this conclusion.

Further, with the exception of impacts resulting from glare, the EIR prepared for the Northwest Land Park required mitigation for visual impacts, at least in part due to the low visual quality of portions of the *existing* environment in the area proposed for new development, most notably those currently zoned for industrial uses.

As noted in the DEIR/EA, the proposed project's incremental contribution to cumulative effects on the visual and/or aesthetic environment will be rendered *less than cumulatively considerable* through the implementation of the mitigation measures outlined in Section 2.19 of the DEIR/EA and will therefore be less than significant under CEQA. Caltrans is only responsible for mitigating those cumulative impacts arising from the proposed project, not any impacts that result from the Northwest Land Park Project.

2.22.4.15 800 K & L Street Project

In February 2010, the City of Sacramento received four project concepts to develop a transformative mixed-use project aimed to further revitalize the JKL Street Corridor. Four development teams submitted their concepts for the redevelopment of three opportunity sites along the 700 and 800 blocks of K and L Street. According to the City of Sacramento, the 800 K & L Street Project currently consists of 210 unit condos and 25,000 square feet of retail.

The City released a Categorical Exemption for the project in May 2011.

2.22.4.16 CADA East End Gateway, Site 1

The proposed project, located at 16th and O Streets in downtown Sacramento, includes 117 market-rate one and two bedroom condominium units, 5,200 square feet of ground floor retail and 136 parking spaces. Construction of the nine-story building is scheduled to begin in 2013.

2.22.4.17 7th & H Mixed Use Housing

The project is located on the northwest corner of 7th & H streets in downtown Sacramento. Mercy Housing, a nonprofit housing organization, is proposing an affordable housing community that will include 150 studio and one bedroom apartments, community space, resident services, a health clinic, and ground floor retail in an eight-story building located in close proximity to public transit and a number of neighborhood amenities. Seventy five of the units at 7th & H will be reserved for formerly homeless residents. The other half will be reserved for residents earning between 40%-50% of the Sacramento median income.

2.22.4.18 700 Block of K Street Project

The project site is composed of 11 parcels on the southeast corner of 7th Street and K Street, which make up the entire half-block between K Street and the K/L alley. The site is currently built out. The project proposes redevelopment of the existing structures along K Street (the north half of the block), rehabilitation of the historic facades, and keeping ground-floor retail, but conversion of the upper floors to residential/office uses. The south half of the block is proposed for demolition and construction of an approximately five-story apartment building over a two-story parking garage. The proposed mixed-use project would include approximately 153 dwelling units, 63,780 square feet of commercial area, and a 91-space parking garage for the residents.

The City released the Draft EIR in February 2011 and the Final EIR in April 2011.

This project does not have the potential to affect the environmental resources *in common* with the proposed project.

2.22.5 Environmental Consequences

Alternative 1

Traffic and Transportation

TEMPORARY AND CONSTRUCTION-RELATED

Alternative 1 may contribute to temporary, construction-related cumulative impacts to traffic and transportation. While project construction is not anticipated to have any substantial adverse impacts to traffic, it is scheduled at the same time as several other road and highway improvement projects. Table 2-22.1 lists some of the proposed highway projects in the greater Sacramento area, some of which may be constructed within three years of the proposed project. There are many other local road projects that will be constructed during the same time period. Many of the development projects listed in Table 2-22.2 will be under construction during this period as well.

Cumulative impacts related to the construction of these projects could include temporary road and lane closures, which could lead to traffic delays and impaired access to local businesses, commercial and tourist destinations, public recreational areas, and private residences. Impacts may occur throughout the Sacramento region, including the project corridor and downtown Sacramento. These impacts could adversely impact the provision of emergency services, public transportation, school buses, and other services dependent on the road and highway network.

A series of Transportation Management Plans (TMPs) will be developed to address potential cumulative impacts due to construction of these projects. Caltrans requires TMPs for all major construction activities that are expected to impact traffic on the state highway system. When several consecutive or linked projects within a region create a cumulative need for a TMP, Caltrans can coordinate individual TMPs. TMPs result in minimized project-related traffic delay and accidents by the effective combination of public and motorist information, demand management, incident management, system management, alternate route strategies, construction strategies, and other strategies. Other strategies may become available, such as a construction season map published to inform the public, local businesses, and local agencies of project locations and activities.

TMPs are designed to reduce the amount of substantial delay time due to lane closures and construction-related activity. According to Caltrans' guidelines, a substantial delay time is 30 minutes above normal recurring traffic delay on the existing facility or the delay threshold set by the District Traffic Manager, whichever is less. The Caltrans Office of Traffic Management may determine that a cumulative delay time of less than 30 minutes is necessary for the I-5 corridor. The Office of Traffic Management will determine thresholds for delays during the development of a TMP before the contract specifications and provisions are finalized.

A TMP will be prepared for the proposed project. Typical measures that may be included in a TMP are discussed in Section 2.5.4 of this document.

A copy of the traffic report is available from on the project website at www.dot.ca.gov/dist3/Projects/00165/prjindex.htm.

PERMANENT

Alternative 1 would provide greater connectivity and accessibility to the existing and planned bus/carpool lane system in the Sacramento region. The project would conform to Caltrans' effort to encourage the use of transit and multi-passenger occupied vehicles. Overall, the cumulative impact of this project, as well as the development and transportation projects listed in Table 2-22.1, would be beneficial to circulation and access in the Sacramento region. There are several projects that would lead to greater connectivity of the road and highway network and increase road capacity. These projects would reduce congestion and decrease travel times for vehicular traffic and emergency services.

Alternative 1 would construct an essential portion of the regional network of existing and planned high occupancy vehicle lane projects in El Dorado, Placer, and Sacramento counties. These projects are included in the regional plans. Cumulatively, these bus/carpool projects would have a positive effect upon the vehicle occupancy rate. The projects will encourage bus and carpool usage. Traffic studies by Caltrans on other bus/carpool lane projects have shown that vehicle occupancy rates can be raised from the state average of 1.3 occupants per vehicle to as much as 2.8 occupants per vehicle with the implementation of a bus/carpool lane. There are several projects listed in Table 2-22.1 that would lead to greater connectivity of the road and highway network and increase road capacity. Many of these projects are expected to reduce congestion and decrease travel times for vehicular traffic and emergency services.

Visual/Aesthetics

TEMPORARY AND CONSTRUCTION-RELATED

Construction is expected to occur over a 24-month period. Viewers would see materials, equipment, workers, and the operations of construction during the construction process. Impacts of construction are unavoidable but would be temporary. Motorists would be exposed briefly to construction activities while passing through the construction zone but residents of adjacent homes would be exposed to these activities on a more continuous basis.

Cumulative effects to the visual environment due to the construction of the proposed project along with the other projects listed in Tables 2-22.1 and 2-22.2 are not expected to be substantial as these visual effects are temporary in nature.

PERMANENT

Alternative 1 is expected to result in adverse changes to the visual environment, particularly in the northern half of the project limits. Shoulder reconstruction, minor roadway widening in some area areas, sound wall construction, and the replacement of the Casilada Way pedestrian overcrossing (POC) will result in the loss of visual resources such as mature trees, shrubs, vines, and other vegetation and will introduce new elements (sound walls, replaced POC) into the visual landscape. Other projects planned within the I-5 corridor have the potential to substantially impact the visual character of the project corridor, including the I-5 Reconstruction project, the Delta Shores development, and the construction of the Cosumnes River Blvd. interchange. In particular, both the Delta Shores development and the Cosumnes River Blvd. interchange project will result in permanent changes to Alternative 1's southern landscape assessment unit (LAU). As described in Section 2.6 of this document, however, Alternative 1 will incorporate a number of avoidance, minimization, and mitigation measures that will minimize the project's potential contribution to a cumulative impact. These will include erosion control measures, aesthetic treatments for sound walls, barriers, the POC, and replacement plantings.

Less than significant impacts to visual resources are anticipated.

Water Quality

Temporary and Construction-Related

Alternative 1 may contribute to temporary, construction-related impacts to water quality. Each of the projects included in Tables 2-22.1 and 2-22.2 has the potential to result in at least minor construction-related impacts to water quality.

Sediment is the main pollutant of concern during Caltrans construction projects. During construction, there is the potential for increased erosion. Storm water runoff carrying sediments or other pollutants could potentially enter Morrison Creek or other drainages. The potential for increased erosion may persist until completion of construction activities and implementation of landscaping and other long-term erosion control measures.

Accidental spills of petroleum hydrocarbons, such as fuels and lubricating oils, concrete wastewater or other potentially toxic materials, are also a concern during construction activities. The magnitude of the impact from an accidental release would depend on the amount and type of material spilled.

The avoidance and minimization measures included in Section 2.8. of this document will minimize the project's potential contribution to a cumulative impact. Additionally, each of the projects included in Tables 2-22.1 and 2-22.2 will be subject to permit conditions and other regulatory controls to minimize impacts to water quality both during and after construction. Also, these potential impacts are temporary.

PERMANENT

Alternative 1 is expected to add 38 acres of impervious surface, which is an increase of approximately 15 percent from existing conditions. The increased volume of storm water runoff from the added impervious surface to the entire Hydrologic Sub-Area (HAS) is very small. Therefore, the pollutant loads from the project's traveled way will be negligible and will not have a substantial impact on the overall water quality of the receiving waters.The increased volume of storm water runoff from the added impervious surface to the hydrologic sub areas will be negligible and should not have a substantial impact on the overall water quality of the receiving waters. Rather, the implementation of permanent storm water treatment measures as applicable, such as biofiltration strips and/or swales, will slow down the flow of runoff and allow sediments and other pollutants to settle out and be removed prior to reaching receiving waters. The Delta Shores project is expected to convert 782 acres of currently undeveloped land to urban land use, which will result in a substantial increase in stormwater runoff compared to existing conditions. The Cosumnes River Blvd. interchange is also expected to result in increased stormwater runoff, although no amounts have been quantified. The Sacramento RT South Line Extension project is expected to add a maximum of 35.9 acres of impervious surface.

The avoidance and minimization measures included in Section 2.8 of this document will minimize Alternative 1's potential contribution to a cumulative impact. Additionally, each of the transportation projects included in Table 2-22.1 and development projects listed in Table 2-22.2 will be subject to permit conditions and other regulatory controls to minimize impacts to water quality both during and after construction. As a result, cumulative effects to water quality due to the construction of the proposed project along with the other projects listed in Tables 2-22.1 and 2-22.2 are not expected to be substantial.

Paleontology

TEMPORARY AND CONSTRUCTION-RELATED/PERMANENT

Potential impacts to paleontological resource would occur only during construction but would be permanent in nature. Although no fossils are known to directly underlie the proposed project, the Riverbank Formation is known to contain vertebrate and other fossil remains, suggesting that there is a high potential for additional similar fossil remains to be uncovered by excavations in these formations during project construction. Under both Caltrans criteria and the Society of Vertebrate Paleontology (SVP) criteria, this formation has a high sensitivity for producing additional paleontological resources, as does the Modesto Formation. Identifiable fossil remains recovered from these formations during project construction could be scientifically important.

Potential impacts to paleontological resources resulting from construction of Alternative 1 would primarily result from ground disturbance during deep excavation. The potential for impact would be greatest in the southern portion of the alignments, where the highly sensitive Riverbank formation is exposed at ground surface; and in any parts of the northern alignment where project excavation or drilling would be deep enough to impact buried Pleistocene strata (Modesto or Riverbank) underlying the Holocene veneer. Most of the project will be within the existing fill of I-5 (ranging from 3-40 ft), excluding the foundations required for the replacement of the Casilada Way Pedestrian Overcrossing (POC) and the widening of the Beach Lake Bridge. Impacts to previously undisturbed sediments will be small and less than significant. The implementation of the mitigation plan would reduce impacts.

Those projects described in Section 2.22.4 that may affect paleontological resources are expected to include a paleontological mitigation plan with features similar to the plan included in Appendix I (monitoring, collection, etc.). As a result, cumulative effects to paleontological resources are not expected to be substantial.

Hazardous Waste

Temporary and Construction-Related

Alternative 1 is not expected to result in construction-related cumulative effects to the environment due to hazardous waste or materials. It is anticipated that ADL, lead-based paint, asbestos-containing materials, and yellow traffic stripe containing lead and other heavy metals such as chromium may be encountered during construction of the project. Additionally, a number of materials will be used during construction including gasoline, diesel fuel, oil, and lubricants for operation of construction equipment. These materials are typically used, handled, and stored by contractors on all roadway construction projects. No acutely hazardous materials would be used or stored on-site during construction. Construction of the proposed build alternatives could potentially result in small fuel spills from construction or vehicles.

However, as discussed in Section 2.11.4.1 of this document, Alternative 1 will implement a number of avoidance and minimization measures to ensure that the project has no environmental effects due to hazardous waste/materials. Other transportation projects would likely have similar measures, and all projects are subject to laws and regulations that govern the handling, storage, and disposal of these materials. Thus, there is little to no potential for cumulative impacts to occur.

PERMANENT

No permanent impacts are anticipated.

Air Quality

TEMPORARY AND CONSTRUCTION-RELATED

During construction, short-term degradation of air quality may occur due to the release of particulate emissions (airborne dust) generated by excavation, grading, hauling, and various other activities. Emissions from construction equipment also are anticipated and would include CO, nitrogen oxides (NO_X), volatile organic compounds (VOCs), directly-emitted particulate matter (PM_{10} and $PM_{2.5}$), and toxic air contaminants such as diesel exhaust particulate matter. Ozone is a regional pollutant that is derived from NO_X and VOCs in the presence of sunlight and heat.

Site preparation and roadway construction could involve clearing, cut-and-fill activities, grading, removing or improving existing roadways, and paving roadway surfaces. Construction-related effects on air quality from most highway projects would be greatest during the site preparation phase because most engine emissions are associated with the excavation, handling, and transport of soils to and from the site. If not properly controlled, these activities would temporarily generate PM_{10}, $PM_{2.5}$, and small amounts of CO, SO_2, NO_X, and VOCs. Sources of fugitive dust would include disturbed soils at the construction site and trucks carrying uncovered loads of soils. Unless properly controlled, vehicles leaving the site would deposit mud on local streets, which could be an additional source of airborne dust after it dries. PM_{10} emissions would vary from day to day, depending on the nature and magnitude of construction activity and local weather conditions. PM_{10} emissions would depend on soil moisture, silt content of soil, wind speed, and the amount of equipment operating. Larger dust particles would settle near the source, while fine particles would be dispersed over greater distances from the construction site.

Other projects within the corridor that could result in localized construction-related impacts to air quality include the Cosumnes River Blvd. Interchange project and the Delta Shores development.

Construction-related impacts to air quality are expected to be minimal with the implementation of the avoidance and minimization measures included in Section 2.12

of this document and would therefore not substantially contribute a cumulatively significant impact. Each of the transportation projects included in Table 2-22.1 would implement similar measures, as applicable.

PERMANENT

Under the National Ambient Air Quality Standard (NAAQS), Sacramento County is designated as “attainment-maintenance” for CO, “non-attainment” for $PM_{2.5}$ and PM_{10}, and “severe non-attainment” for Ozone.

Under the California Ambient Air Quality Standards (CAAQS), Sacramento County is currently designated as in “attainment” for CO, “non-attainment” for $PM_{2.5}$, PM_{10}, and Ozone.

Regional level conformity in California is concerned with how well the region is meeting the standards set for carbon monoxide (CO), nitrogen dioxide (NO_2), ozone (O_3), and particulate matter (PM). California is in attainment for the other criteria pollutants. At the regional level, Regional Transportation Plans (RTPs), also titled Metropolitan Transportation Plans (MTPs) in metropolitan planning areas, are developed that include all of the transportation projects planned for a region over a period of years, usually at least 20. Based on the projects included in the RTP, an air quality model is run to determine whether or not the implementation of those projects would conform to emission budgets or other tests showing that attainment requirements of the Clean Air Act are met. If the conformity analysis is successful, the regional planning organization (such as SACOG) and the appropriate federal agency (such as FHWA) make the determination that the MTP is in conformity with the State Implementation Plan (SIP) for achieving the goals of the Clean Air Act. Otherwise, the projects in the MTP must be modified until conformity is attained. If the design and scope of the proposed transportation project are the same as described in the MTP, then the proposed project is deemed to meet regional conformity requirements for purposes of project-level analysis.

The transportation projects listed in Table 2-22.1, including the proposed project, are included in the SACOG MTP and Metropolitan Transportation Improvement Plan (MTIP), both of which conform to the SIP. SACOG adopted Amendment #1 to the MTP/SCS 2035 in August 2012, and the Final 2013/16 MTIP received federal approval in December 2012. The project is included in the approved MTIP. Before adopting the MTP and MTIP, SACOG performed a quantitative analysis to determine if implementation of the set of projects included in these documents would result in violations of the ozone and PM_{10} air quality standard. Based on this analysis, SACOG has concluded that the set of projects included in the MTP and MTIP would not result in a violation of the ozone standard and would result in reduction of PM_{10} emission.

As the SACOG analysis considered all planned and programmed transportation projects included in the MTP and MTIP, the transportation projects listed in Table 2-22.1 (which includes the proposed project) have been analyzed and found not to contribute to a substantial impact to air quality.
In addition, the development projects in Table 2-22.2 are also subject to air quality permitting requirements. Projects that are in conformance with the regional air quality plan and that meet regional air pollutant budgets (based on air quality models and analyses) would not be expected to have a negative cumulative impact.

Alternative 1's contribution to carbon monoxide levels would not result in an adverse cumulative impact. High concentrations of CO are typically a localized occurrence and are associated with high traffic volumes and heavily congested roadway facilities. Although the highest 1-hour and 8-hour values for each of the build alternatives are marginally higher than the No Build Alternative at some receptors—these results are below both federal and state air quality standards and are projected to be lower than existing levels.

Likewise, Alternative 1's marginal contributions to mobile source air toxics, particulate matter, ROG, and NO_X would not contribute to a cumulative impact, as future levels of each pollutant are projected to be lower than existing levels as newer, cleaner vehicles become a larger portion of the vehicle fleet, despite expected increases in VMT.

Under Alternative 1, vehicles using the carpool/bus lanes and the mixed flow lanes will be moving instead of being gridlocked, which improves air quality. Please refer to Section 2.12, Air Quality.

Noise

TEMPORARY AND CONSTRUCTION-RELATED

During the construction phases of the proposed project, noise from construction activities may intermittently dominate the noise environment in the immediate area of construction.

Equipment involved in construction is expected to generate noise levels ranging from 70 dB to 90 dB at a distance of 50 ft. Noise produced by construction equipment would be reduced over distance at a rate of about 6 dB per doubling of distance. No substantial noise impacts from construction are anticipated because construction activity would be conducted in accordance with Caltrans' standard specifications Section 14-8.02 and would be short-term, intermittent, limited in physical extent, and in most cases dominated by local traffic noise.

Caltrans standard specifications Section 14-8.02, "Sound Control Requirements" state that noise levels generated during construction shall comply with applicable local, state, and federal regulations, and that all equipment shall be fitted with adequate mufflers according to the manufacturers' specifications.

PERMANENT

In the southern half of the project area, traffic on I-5 is the predominant source of noise in the surrounding landscape. In the northern end of the project, which is more urbanized, noise sources are more varied and may include traffic from other freeways and highways, traffic from local roads, power tools including lawnmowers and leaf blowers, car alarms, rooftop heating and cooling equipment, construction tools and activities, trains (including light rail) and their associated crossing signals, emergency vehicles, and flights from both Sacramento Metropolitan Airport and Executive Airport.

Under Alternative 1, design year (2033) noise levels are predicted to be between 1 and 2 dBA higher than existing noise levels for all receivers. This 1-2 dBA increase between existing noise levels and predicted noise levels would be barely perceptible to the human ear and would not be substantial. Sound walls may be constructed in two locations where the predicted noise levels exceed the federal noise abatement criteria and where the addition of a sound wall has been deemed reasonable and feasible.

Although the Cosumnes River Blvd. Interchange project is expected to result in operational traffic noise, the noise study areas (and sensitive receivers) for these two projects do not overlap, and no cumulative impact is expected.

Biological Environment

TEMPORARY AND CONSTRUCTION-RELATED

Alternative 1 will temporarily impact approximately 4.18 acres of Great Valley Mixed Riparian Forest habitat (CDFG riparian/waters), including 1.95 acres of potentially USACE jurisdictional seasonal wetlands, due to equipment access and construction activities necessary to widen the Beach Lake Bridge over Morrison Creek. Temporary impacts to another 0.18 acres of potentially USACE jurisdictional seasonal wetland that is located outside of the riparian area (and is therefore not under the jurisdiction of CDFG) is also expected. Alternative 1 will result in temporary impacts to approximately 0.57 acre of other waters of the US during construction of the bridge piers.

Alternative 1 may result in direct impacts to northwestern pond turtles if relocation efforts are necessary during construction.

Alternative 1 may temporarily disturb Swainson's hawks if they are foraging in the project vicinity during construction activities. Swainson's hawks may nest within 0.25 mile of the construction area, and disturbance within this distance from an active nest may cause nest abandonment. Under CDFG's *Staff Report Regarding Mitigation for Impacts to Swainson's Hawk (Buteo swainsoni) in the Central Valley of California* (CDFG 1994), impacts to nesting Swainson's hawks must be avoided. CDFG requires a no disturbance zone of 0.25-mile around an active Swainson's hawk nest site between March 1 and September 15.

Alternative 1 will temporarily impact 0.57 acre of aquatic giant garter snake habitat, and 4.5 acres of upland habitat due to dewatering, access, and staging to construct the bridge over Morrison Creek, for a total of 5.07 acres of temporary impacts.

The avoidance and minimization measures described in Section 2.21 of this document will minimize potential temporary and construction-related impacts to biological resources. Further, all areas of temporary disturbance will be restored to pre-project conditions; therefore, no adverse cumulative construction-related effects are anticipated.

PERMANENT

Alternative 1 will permanently impact 0.004 acre of Great Valley Mixed Riparian Forest habitat (CDFG riparian/waters), which includes 0.002 acre of potentially USACE jurisdictional seasonal wetland within the riparian area. Permanent impacts will occur due to placement of additional piers required to widen the bridge over Morrison Creek. Alternative 1 will also result in permanent impacts to approximately 0.0004 acre of other waters of the US in Morrison Creek. Compensation for permanent impacts to the 0.004 acre of Great Valley Mixed Riparian Forest (CDFG jurisdictional) will be accomplished at a ratio of 3:1; approximately 0.012 acre of compensation will be required. Riparian impacts will likely be compensated through the purchase of credits at an approved mitigation bank. Compensation for impacts to 0.002 acre of seasonal wetland will be covered by the compensation required for Great Valley Mixed Riparian Forest, and no additional compensation will be needed.

Alternative 1 may result in permanent effects to northwestern pond turtle due to the permanent loss of 0.0004 acre of aquatic habitat (Morrison Creek) and 0.004 acres of riparian habitat associated with the creek. Permanent impacts to 0.0004 acre of other waters of the US will be likely compensated at a 1:1 ratio through the creation of vegetated buffers in the riparian area of Morrison Creek

Alternative 1 will permanently impact 0.004 acre of giant garter snake upland habitat, and 0.0004 acre of giant garter snake aquatic habitat due to placement of the new piers to expand the bridge over Morrison Creek, for a total of 0.0044 acre of permanent impacts. Permanent impacts will be compensated at a 3:1 replacement ratio. Based on this ratio, 0.0132 acres will be required for mitigation. Impacts to giant garter snake habitat will likely be mitigated through the purchase of credits at a USFWS approved mitigation bank.

Avoidance, minimization and mitigation policies, construction BMPs, and requirements of federal, state, and local natural resource agencies such as the California Department of Fish and Game are expected to minimize and/or eliminate any cumulatively significant adverse impacts from this project to natural resources. In addition, environmental reviews, comprehensive plans, and other public processes are in place to ensure that the impacts of new development to natural resources would be minimized.

Alternative 2

Alternative 2 footprint and features are the same as Alternative 1. Potential cumulative impacts will be the same as well.

Alternative 3

Alternative 3's temporary and construction related cumulative impacts are similar to, but at less than, the temporary and construction-related impacts of Alternative 1 for traffic/transportation, visual resources, water quality, hazardous materials, air quality, and noise. Temporary and construction-related cumulative impacts to paleontological and biological resources are not anticipated.

Alternative 4

The No Build Alternative would not involve construction; therefore, this alternative would not result in any temporary, construction-related, or permanent cumulative impacts.

Table 2-22.1 Partial List of Proposed Highway Projects in the Greater Sacramento Area[13]

Project	SACOG ID	Lead Agency	County
Interstate 5 Projects			
I-5 Bus/Carpool Lanes (the proposed project)	CAL17840	Caltrans District 3	Sacramento
I-5/I-80 HOV Connectors and Lanes to Downtown	CAL18410	Caltrans District 3	Sacramento
I-5/US 50 Riverfront Interchange	CAL18801	Caltrans District 3	Sacramento
I-5 Downtown Sac Rehab	CAL18738	Caltrans District 3	Sacramento
I-5 Reconnection	SAC22530	City of Sacramento	Sacramento
I-5/Cosumnes River Blvd. Interchange	SAC18380	City of Sacramento	Sacramento
I-5/Richards Blvd. Interchange	SAC18170	City of Sacramento	Sacramento
I-5/Metro Air Parkway Interchange	SAC18150	Sacramento County	Sacramento
I-5/SR 113 Connector	CAL15881	Caltrans District 3	Yolo
I-5/County Rd. 102 Interchange	YOL17300	City of Woodland	Yolo
Interstate 80 Projects			
I-80 HOV Lanes and Auxiliary Lanes – Phase 3A	CAL18797	Caltrans District 3	Placer
I-80 HOV Lanes and Auxiliary Lanes – Phase 3B	CAL18840	Caltrans District 3	Placer
I-80 HOV Lanes	CAL18450	Caltrans District 3	Sacramento
I-80 Pedestrian Bicycle Crossing	SAC22290	Sacramento County	Sacramento
I-80/Richards Interchange	YOL17140	City of Davis	Yolo
I-80/Enterprise Blvd.	YOL15891	City of West Sacramento	Yolo
I-80/Reed Ave. Interchange	YOL15670	City of West Sacramento	Yolo
US 50 Projects			
US 50 HOV Lanes Phase I	CAL19211	Caltrans District 3	El Dorado
US 50 HOV Lanes Phase 2	CAL18818	Caltrans District 3	El Dorado
US 50 HOV Lanes Phase 3	CAL19213	Caltrans District 3	El Dorado
US 50/Western Placerville Interchanges	ELD16060	City of Placerville	El Dorado
US 50 El Dorado Hills Pedestrian OC	ELD19173	El Dorado County DOT	El Dorado
US 50 Widening at El Dorado Hills	ELD19215	El Dorado County DOT	El Dorado
US 50 WB Auxiliary Lane	ELD19273	El Dorado County DOT	El Dorado
US 50/Bass Lake Rd. Interchange – Phase I	ELD19182	El Dorado County DOT	El Dorado
US 50/Cambridge Rd. Interchange – Phase I	ELD19181	El Dorado County DOT	El Dorado
US 50/Cameron Park Dr. Interchange – Phase I	ELD19177	El Dorado County DOT	El Dorado
US 50/Cameron Park Dr. Interchange – Phase II	ELD19219	El Dorado County DOT	El Dorado
US 50 Projects Continued			

[13] For a complete list of projects, please see the project list in the Final 2013-2016 MTIP available at: http://www.sacog.org/mtip/2013-2016/adoption/pdf/2013%20MTIP%20Transmittal%209-26-12.pdf

Project	SACOG ID	Lead Agency	County
US 50/El Dorado Hills Blvd. Interchange	ELD15630	El Dorado County DOT	El Dorado
US 50/El Dorado Hills Blvd. Interchange – Phase I	ELD19178	El Dorado County DOT	El Dorado
US 50/El Dorado Hills Blvd. Interchange – Phase II	ELD19272	El Dorado County DOT	El Dorado
US 50/Missouri Flat Rd. Interchange – Phase 1A	ELD15690	El Dorado County DOT	El Dorado
US 50/Missouri Flat Rd. Interchange – Phase 1B	ELD19193	El Dorado County DOT	El Dorado
US 50/Ponderosa Rd. Interchange – Phase I	ELD19170	El Dorado County DOT	El Dorado
US 50/Ponderosa Rd. Interchange – Phase II	ELD19244	El Dorado County DOT	El Dorado
US 50/Ponderosa Rd. Interchange – Phase III	ELD19180	El Dorado County DOT	El Dorado
US 50/Silva Valley Parkway Interchange – Phase I	ELD19216	El Dorado County DOT	El Dorado
US 50/Silva Valley Parkway Interchange – Phase II	ELD15610	El Dorado County DOT	El Dorado
US 50 Auxiliary Lanes	CAL18817	Caltrans District 3	Sacramento
US 50 EB Auxiliary Lanes	CAL18814	Caltrans District 3	Sacramento
US 50/Empire Ranch Rd. Interchange	SAC19890	City of Folsom	Sacramento
US 50/Rancho Cordova Parkway Interchange	SAC24220	City of Rancho Cordova	Sacramento
US 50/Watt Ave. Interchange	SAC19350	Sacramento County DOT	Sacramento
US 50/Jefferson Blvd. Interchange	YOL15900	City of West Sacramento	Yolo
Sacramento River Crossing	SAC24420 YOL19222	City of Sacramento DOT	Various
State Route 99 Projects			
SR 99 Operational Improvements	CAL18816	Caltrans District 3	Sacramento
SR 99/Elk Grove Blvd. Interchange	SAC24116	City of Elk Grove	Sacramento
SR 99/Elkhorn Blvd. Interchange	SAC18690	City of Sacramento	Sacramento
SR 99/Grant Line Rd. Interchange - Completed	SAC20520	City of Elk Grove	Sacramento
SR 99/Sheldon Rd. Interchange	SAC19830	City of Elk Grove	Sacramento
SR 99/Elverta Rd. Interchange	CAL15510	Sacramento County	Sacramento
State Route 65 Projects			
SR 65 Signal Coordination Project	PLA20532	City of Lincoln	Placer
Galleria Blvd./SR 65 Interchange Phase II	PLA25209	City of Roseville	Placer
SR 65/Sunset Blvd. Interchange	PLA19510	Placer County	Placer
SR 65 Lincoln Bypass	CAL17240	Caltrans District 3	Placer

Table 2-22.2 Other Development Projects

Project	Description
City and County of Sacramento	
Delta Shores	926 acres; *5,092* residences, 1.3 million square feet of retail and commercial uses, and 161,600 square feet of retail and incorporated office uses
Sacramento RT South Line Extension	Phase II of the South Line Extension consists of a 4-mile light rail extension from Meadowview to Cosumnes River College and includes four new stations
Railyards Specific Plan	240 acre urban infill mixed use development; between 10,000 and 12,500 residential housing units, 1,384,800 sq ft of retail space, 491,000 sq ft of mixed-use space, 1,100 hotel rooms, 2,337,200 sq ft of office space, 485,390 sq ft of historic/cultural space and 41.16 acres of open space.
Sacramento Intermodal Transportation Facility	Included in the Railyards Specific Plan
Township 9	65 acres of mixed use development with approximately 2,700 homes in the city's River District; mixed-use development project bounded roughly by Richards Blvd. to the south, the American River to the north, North 5th St. to the west, and North 7th St. to the east
Docks Area Specific Plan	29 acres roughly bound by the R St. overpass and proposed Docks Promenade/Parkway on the north, Front St. and I-5 to the east, and the Pioneer Bridge; 1,000 to 1,155 dwelling units, 200,000 to 500,000 sq ft of office space, 40,500 to 43,300 sq ft of retail space, and 1,870 to 2,920 off-street parking spaces.
The Creamery	This project is located on 8.2 acres with a total of 217 high density residential dwelling units, 90,000 square feet of office, and 20,000 square feet of retail.
River District Specific Plan	The River District Specific Plan is approximately 773 acres. The project proposes approximately 5,600 residential dwelling units, 780,000 square feet of commercial, 3.9 million square feet of office, 1.4 million square feet of light industrial and 3,000 hotel rooms, phased in over a period of 20 years or more. Note: the River District Specific Plan includes the Township 9 development. Therefore the number of dwelling units has been deducted from the River District Specific Plan because Township 9 is listed separately in this table.
Northwest Land Park	Residential/mixed use community on approximately 31.7 acres. The project would include up to 898 medium density multi-family residences, up to 70 high density multi-family residences, 15,000 square feet of commercial retail uses, approximately 4.3 acres of park approximately 1.1 acres of private open space, and approximately 5.9 acres of public right-of-way.
800 K & L Street Project	In February 2010, the City of Sacramento

Project	Description
	received four project concepts to develop a transformative mixed-use project aimed to further revitalize the JKL Street Corridor. Four development teams submitted their concepts for the redevelopment of three opportunity sites along the 700 and 800 blocks of K and L Street. According to the City of Sacramento, the 800 K & L Street Project currently consists of 210 unit condos and 25,000 square feet of retail.
CADA East End Gateway Site 1	The proposed project, located at 16th and O Streets in downtown Sacramento, includes 117 market-rate one and two bedroom condominium units, 5,200 square feet of ground floor retail and 136 parking spaces. Construction of the nine-story building is scheduled for 2013.
7th & H Mixed Use Housing	The project is located on the northwest corner of 7th & H streets in downtown Sacramento. Mercy Housing, a nonprofit housing organization, is proposing an affordable housing community that will include 150 studio and one bedroom apartments, community space, resident services, a health clinic, and ground floor retail in an eight-story building located in close proximity to public transit and a number of neighborhood amenities. Seventy five of the units at 7th & H will be reserved for formerly homeless residents. The other half will be reserved for residents earning between 40%-50% of the Sacramento median income.
700 Block of K Street Project	The proposed mixed-use project would include approximately 153 dwelling units, 63,780 square feet of commercial area, and a 91-space parking garage for the residents
Capitol Southeast Connector Project	The project is an approximately 35-mile-long roadway that would link communities in Sacramento and El Dorado Counties, including Elk Grove, Rancho Cordova, Folsom, and El Dorado Hills. The project limits extend from the I-5/Hood Franklin Road interchange in southwest Sacramento County to US 50 in the vicinity of Silva Valley Parkway, approximately 3 miles east of the Sacramento County/El Dorado County line.
14th Avenue Extension Project	The project would improve 2,800 linear feet of 14th Avenue between Power Inn Road and the current end of the road, just east of 82nd Street, and extend the road 2,250 linear feet from the current end to Florin Perkins Road.

2.22.6 Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, and/or mitigation measures for cumulative impacts are required.

Chapter 3 California Environmental Quality Act (CEQA) Evaluation

3.1 Determining Significance Under CEQA

The proposed project is a joint project by the California Department of Transportation (Caltrans) and the Federal Highway Administration (FHWA) and is subject to state and federal environmental review requirements. Project documentation, therefore, has been prepared in compliance with both the California Environmental Quality Act (CEQA) and the National Environmental Policy Act (NEPA). FHWA's responsibility for environmental review, consultation, and any other action required in accordance with NEPA and other applicable federal laws for this project is being, or has been, carried out by Caltrans under its assumption of responsibility pursuant to 23 USC 327. 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 some 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 under CEQA. This chapter discusses the effects of this project and CEQA significance.

3.2 CEQA Environmental Checklist

Supporting documentation of all CEQA checklist determinations is provided in Chapter 2 of this environmental document. Documentation of "No Impact" determinations is provided at the beginning of Chapter 2. Discussion of all impacts, avoidance, minimization, and/or compensation measures is under the appropriate topic headings in Chapter 2. 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 indicate no impacts. A NO IMPACT answer in the last column reflects this determination. Where there is a need for clarifying discussion, the discussion is included either following the applicable section of the checklist or is within the body of the environmental document itself. 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.

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
1. AESTHETICS: Would the project:				
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?	☐	☐	☐	☒
2. AGRICULTURE AND FOREST RESOURCES: In determining whether impacts to agricultural resources are significant environmental effects, lead agencies may refer to the California Agricultural Land Evaluation and Site Assessment Model (1997) prepared by the California Dept. of Conservation as an optional model to use in assessing impacts on agriculture and farmland. In determining whether impacts to forest resources, including timberland, are significant environmental effects, lead agencies may refer to information compiled by the California Department of Forestry and Fire Protection regarding the state's inventory of forest land, including the Forest and Range Assessment Project and the Forest Legacy Assessment Project; and the forest carbon measurement methodology provided in Forest Protocols adopted by the California Air Resources Board. Would the project:				
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?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
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?	☐	☐	☐	☒
3. AIR QUALITY: Where available, the significance criteria established by the applicable air quality management or air pollution control district may be relied upon to make the following determinations. Would the project:				
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?	☐	☐	☐	☒
4. BIOLOGICAL RESOURCES: Would the project:				
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 Game 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 Game 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?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
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?	☐	☐	☐	☒
5. CULTURAL RESOURCES: Would the project:				
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 formal cemeteries?	☐	☐	☐	☒
6. GEOLOGY AND SOILS: Would the project:				
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?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
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?	☐	☐	☐	☒
7. GREENHOUSE GAS EMISSIONS: Would the project:				
a) Generate greenhouse gas emissions, either directly or indirectly, that may have a significant impact on the environment? b) Conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases?	*An assessment of the greenhouse gas emissions and climate change is included in the body of environmental document. While Caltrans has included this good faith effort in order to provide the public and decision-makers as much information as possible about the project, 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 significance determination regarding the project's direct and indirect impact with respect to climate change. Caltrans does remain firmly committed to implementing measures to help reduce the potential effects of the project. These measures are outlined in the body of the environmental document.*			
8. HAZARDS AND HAZARDOUS MATERIALS: Would the project:				
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?	☐	☐	☐	☒

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?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
9. HYDROLOGY AND WATER QUALITY: Would the project:				
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	☐	☐	☐	☒
10. LAND USE AND PLANNING: Would the project:				
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?	☐	☐	☐	☒
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?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
11. MINERAL RESOURCES: Would the project:				
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?	☐	☐	☐	☒
12. NOISE: Would the project result in:				
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?	☐	☐	☐	☒
) 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?	☐	☐	☐	☒
13. POPULATION AND HOUSING: Would the project:				
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?	☐	☐	☐	☒

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?	☐	☐	☒	☐

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
14. 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:				
Fire protection?	☐	☐	☒	☐
Police protection?	☐	☐	☒	☐
Schools?	☐	☐	☒	☐
Parks?	☐	☐	☒	☐
Other public facilities?	☐	☐	☒	☐
15. RECREATION:				
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?	☐	☐	☒	☐
16. TRANSPORTATION/TRAFFIC: Would the project:				
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?	☐	☐	☐	☒

	Potentially Significant Impact	Less Than Significant with Mitigation	Less Than Significant Impact	No Impact
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?	☐	☐	☒	☐
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?	☐	☐	☐	☒
17. UTILITIES AND SERVICE SYSTEMS: Would the project:				
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?	☐	☐	☐	☒
18. MANDATORY FINDINGS OF SIGNIFICANCE				
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?	☐	☐	☒	☐

3.3 Discussion of Significant Impacts

3.3.1 Significant Environmental Effects of the Proposed Project

The proposed project would have potentially significant impacts to biological resources. Accordingly, for the categories listed under the Mandatory Findings of Significance, the proposed project would have potentially significant impacts to the natural environment. However, these impacts would be reduced to less than significant with the implementation of mitigation measures.

3.3.1.1 Impacts Mitigated to a Less Than Significant Level

Biological Resources – Less than Significant Impact with Mitigation

Would the project 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 Game or U.S. Fish and Wildlife Service?

Alternative 1 and Alternative 2 would result in permanent impacts to .0044 acres of Giant Garter Snake (GGS) habitat and temporary impacts to 5.07 of GGS habitat.

Permanent impacts to GGS habitat will be compensated at a 3:1 replacement ratio. Based on this ratio, 0.0132 acres will be required for mitigation. Following project completion, temporary impacts will be mitigated by on-site restoration plus 1:1 replacement of giant garter snake habitat. Approximately 5.07 acres of replacement habitat will be required to mitigate for Level 2 temporary impacts (as defined in Table 2-21.1 of this document).

Impacts to giant garter snake habitat will likely be mitigated through the purchase of credits at a USFWS approved mitigation bank.

Please refer to Chapter 2.19.

3.3.1.2 Unavoidable Significant Environmental Effects

The proposed project would not result in any unavoidable significant environmental impacts.

3.4 Climate Change

3.4.1 Introduction

Climate change refers to long-term changes in temperature, precipitation, wind patterns, and other elements of the earth's climate system. An ever-increasing body of scientific research attributes these climatological changes to greenhouse gas (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. In California, however, transportation sources (including passenger cars, light duty trucks, other trucks, buses, and motorcycles make up the largest source (second to electricity generation) of GHG emitting sources. The dominant GHG emitted is CO_2, mostly from fossil fuel combustion.

There are typically two terms used when discussing the impacts of climate change. "Greenhouse Gas Mitigation" is a term for reducing GHG emissions in order to reduce or "mitigate" the impacts of climate change. “Adaptation," refers to the effort of planning for and adapting to impacts resulting from climate change (such as adjusting transportation design standards to withstand more intense storms and higher sea levels)[14].

There are four primary strategies for reducing GHG emissions from transportation sources: 1) improving the transportation system and operational efficiencies, 2) reducing the growth of vehicle miles traveled (VMT), 3) transitioning to lower GHG emitting fuels, and 4) improving vehicle technologies. To be most effective all four strategies should be pursued cooperatively. The following Regulatory Setting section outlines state and federal efforts to comprehensively reduce GHG emissions from transportation sources.

Regulatory Setting

State

With the passage of several pieces of legislation including State Senate and Assembly bills and Executive Orders, California launched an innovative and pro-active approach to dealing with GHG emissions and climate change.

[14] http://climatechange.transportation.org/ghg_mitigation/

Assembly Bill 1493 (AB 1493), Pavley. Vehicular Emissions: Greenhouse Gases, 2002: requires the California Air Resources Board (ARB) 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. In June 2009, the United States Environmental Protection Agency (U.S. EPA) Administrator granted a Clean Air Act waiver of preemption to California. This waiver allowed California to implement its own GHG emission standards for motor vehicles beginning with model year 2009. California agencies will be working with federal agencies to conduct joint rulemaking to reduce GHG emissions for passenger cars model years 2017-2025.

Executive Order S-3-05 (EO): (signed on June 1, 2005, by former Governor Arnold Schwarzenegger) the goal of this EO is to reduce California's GHG emissions to: 1) year 2000 levels by 2010, 2) year 1990 levels by the 2020, and 3) 80 percent below the year 1990 levels by the year 2050. In 2006, this goal was further reinforced with the passage of Assembly Bill 32.

AB 32, the Global Warming Solutions Act of 2006 Núñez and Pavley: AB 32 sets the same overall GHG emissions reduction goals as outlined in EO S-3-05, while further mandating that ARB create a scoping plan, (which includes market mechanisms) and implement rules to achieve "real, quantifiable, cost-effective reductions of greenhouse gases."

Executive Order S-20-06 (signed on October 18, 2006 by former Governor Arnold Schwarzenegger) further directs state agencies to begin implementing AB 32, including the recommendations made by California's Climate Action Team.

Executive Order S-01-07: (signed on January 18, 2007 by former Arnold Governor Schwarzenegger) set forth the low carbon fuel standard for California. Under this EO, the carbon intensity of California's transportation fuels is to be reduced by at least ten percent by the year 2020.

Senate Bill 97 (SB 97) Chapter 185, 2007: required the Governor's Office of Planning and Research (OPR) to develop recommended amendments to the California Environmental Quality Act (CEQA) Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010

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Caltrans Director's Policy 30 (DP-30) Climate Change (approved June 22, 2012): is intended to establish a Department policy that will ensure coordinated efforts to incorporate climate change into Departmental decisions and activities. This policy contributes to the Department's stewardship goal to preserve and enhance California's resources and assets.

Federal

Although climate change and GHG reduction is a concern at the federal level; currently there are , no regulations or legislation that have been enacted specifically addressing GHG emissions reductions and climate change at the project level. Neither the United States Environmental

Protection Agency (U.S. EPA) nor the Federal Highway Administration (FHWA) has promulgated explicit guidance or methodology to conduct project-level GHG analysis. As stated on FHWA's climate change website (http://www.fhwa.dot.gov/hep/climate/index.htm), climate change considerations should be integrated throughout the transportation decision-making process–from planning through project development and delivery. Addressing climate change mitigation and adaptation up front in the planning process will facilitate decision-making and improve efficiency at the program level, and will inform the analysis and stewardship needs of project level decision-making. Climate change considerations can easily be integrated into many planning factors, such as supporting economic vitality and global efficiency, increasing safety and mobility, enhancing the environment, promoting energy conservation, and improving the quality of life.

The four strategies set forth by FHWA to lessen climate change impacts do correlate with efforts that the state has undertaken and is undertaking to deal with transportation and climate change; the strategies include improved transportation system efficiency, cleaner fuels, cleaner vehicles, and a reduction in the growth of vehicle hours travelled.
Climate change and its associated effects are being addressed through various efforts at the federal level to improve fuel economy and energy efficiency, such as the "National Clean Car Program" and EO 13514 - *Federal Leadership in Environmental, Energy and Economic Performance*.

Executive Order 13514 is focused on reducing greenhouse gases internally in federal agency missions, programs and operations, but also direct federal agencies to participate in the Interagency Climate Change Adaptation Task Force, which is engaged in developing a national strategy for adaptation to climate change.

On April 2, 2007, in *Massachusetts v. EPA*, 549 U.S. 497 (2007), the Supreme Court found that greenhouse gases are air pollutants covered by the Clean Air Act and that the U.S. EPA has the authority to regulate GHG. The Court held that the U.S. EPA Administrator must determine whether or not emissions of greenhouse gases from new motor vehicles cause or contribute to air pollution which may reasonably be anticipated to endanger public health or welfare, or whether the science is too uncertain to make a reasoned decision.

On December 7, 2009, the U.S. EPA Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act:

- **Endangerment Finding:** The Administrator found that the current and projected concentrations of the six key well-mixed greenhouse gases—carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6)—in the atmosphere threaten the public health and welfare of current and future generations.

- **Cause or Contribute Finding:** The Administrator found that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the GHG pollution which threatens public health and welfare.

Although these findings did not themselves impose any requirements on industry or other entities, this action was a prerequisite to finalizing the U.S. EPA's *Proposed Greenhouse Gas Emission Standards for Light-Duty Vehicles*, which was published on September 15, 2009[15]. On May 7, 2010 the final *Light-Duty Vehicle Greenhouse Gas Emissions Standards and Corporate Average Fuel Economy Standards* was published in the Federal Register.
U.S. EPA and the National Highway Traffic Safety Administration (NHTSA) are taking coordinated steps to enable the production of a new generation of clean vehicles with reduced GHG emissions and improved fuel efficiency from on-road vehicles and engines. These next steps include developing the first-ever GHG regulations for heavy-duty engines and vehicles, as well as additional light-duty vehicle GHG regulations. These steps were outlined by President Obama in a Presidential Memorandum on May 21, 2010.[16]

The final combined USEPA and NHTSA standards that make up the first phase of this national program apply to passenger cars, light-duty trucks, and medium-duty passenger vehicles, covering model years 2012 through 2016. The standards require these vehicles to meet an estimated combined average emissions level of 250 grams of carbon dioxide per mile (the equivalent to 35.5 miles per gallon [MPG)] if the automobile industry were to meet this CO_2 level solely through fuel economy improvements). Together, these standards will cut GHG emissions by an estimated 960 million metric tons and 1.8 billion barrels of oil over the lifetime of the vehicles sold under the program (model years 2012-2016).

On November 16, 2011, U.S. EPA and NHTSA issued their joint proposal to extend this national program of coordinated greenhouse gas and fuel economy standards to model years 2017 through 2025 passenger vehicles.

3.4.2 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

[15] http://www.epa.gov/oms/climate/regulations.htm#1-1
[16] http://epa.gov/otaq/climate/regulations.htm

with the contributions of all other sources of GHG.[17] 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 in order to make this determination is a difficult, if not impossible, task.

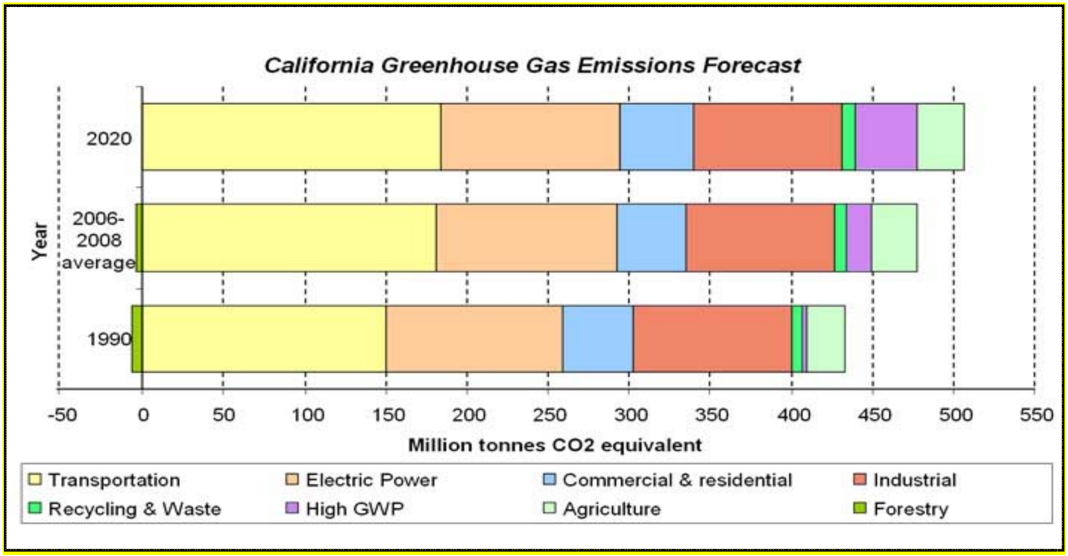
The AB 32 Scoping Plan mandated by AB 32 contains the main strategies California will use to reduce GHG emissions. As part of its supporting documentation for the Draft Scoping Plan, ARB released the GHG inventory for California (forecast last updated: October 28, 2010). The forecast is an estimate of the emissions expected to occur in the year 2020 if none of the foreseeable measures included in the Scoping Plan were implemented. The base year used for forecasting emissions is the average of statewide emissions in the GHG inventory for 2006, 2007, and 2008.

The Department and its parent agency, the Business, Transportation, and Housing Agency, have taken an active role in addressing GHG emission reduction and climate change. Recognizing that 98 percent of California's GHG emissions are from the burning of fossil fuels and 40 percent of all human made GHG emissions are from transportation, the Department has created and is implementing the Climate Action Program at Caltrans that was published in December 2006.[18]

[17] This approach is supported by the AEP: *Recommendations by the Association of Environmental Professionals on How to Analyze GHG Emissions and Global Climate Change in CEQA Documents* (March 5, 2007), as well as the South Coast Air Quality Management District (Chapter 6: The CEQA Guide, April 2011) and the US Forest Service (Climate Change Considerations in Project Level NEPA Analysis, July 13, 2009).

[18] Caltrans Climate Action Program is located at the following web address: http://www.dot.ca.gov/hq/tpp/offices/ogm/key_reports_files/State_Wide_Strategy/Caltrans_Climate_Action_Program.pdf

Figure 3-4.1 California Greenhouse Gas Inventory



Source: http://www.arb.ca.gov/cc/inventory/data/forecast.htm

Construction-Related Impacts

Greenhouse gas emissions for transportation projects can be divided into those produced during construction and those produced during operations. Construction GHG emissions include emissions produced as a result of material processing, emissions produced by onsite construction equipment, and emissions arising from traffic delays due to construction. These emissions will be produced at different levels throughout the construction phase; their frequency and occurrence can be reduced through innovations in plans and specifications and by implementing better traffic management during construction phases. In addition, with innovations such as longer pavement lives, improved traffic management plans, and changes in materials, the GHG emissions produced during construction can be mitigated to some degree by longer intervals between maintenance and rehabilitation events.

Operational Impacts

One of the main strategies in the Caltrans' Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide from mobile sources, such as automobiles, occur at stop-and-go speeds (0-25 miles per hour) and speeds over 55 mph; the most severe emissions occur from 0-25 miles per hour (see Figure 3-4.2 below). 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 purpose of this project is to provide congestion relief, improve traffic flow and mobility by carrying more people in fewer vehicles during peak periods, and promote ride sharing and the use of high occupancy vehicles, such as carpools, vanpools, and express bus services.

Figure 3-4.2 Possible Effect of traffic operation strategies in reducing on-road CO_2 emission[19]

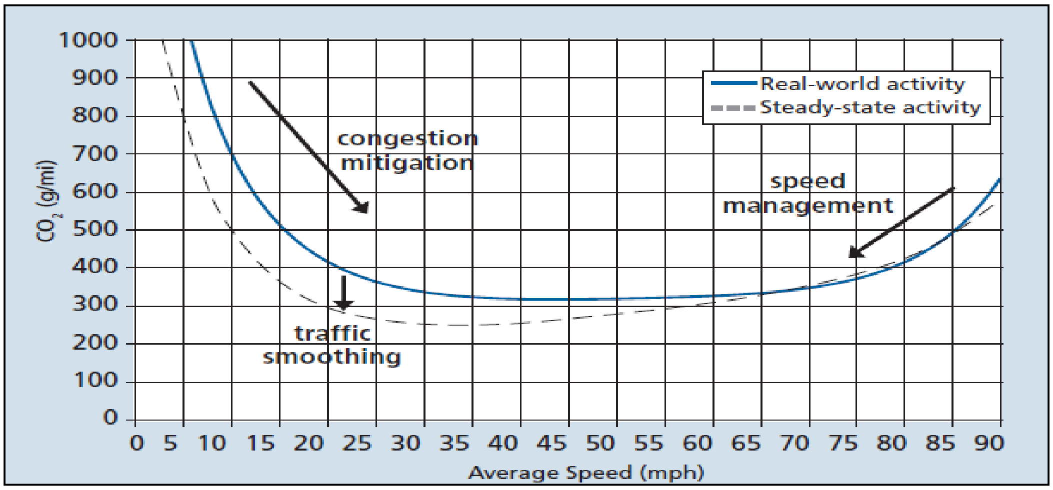


Table 3-4.1 Peak-Period Network Summary for 2035 Conditions

Direction & Peak Period	Alternative	Vehicles Served	Persons Served[1]	Average Speed (All)[2]	Average Speed (HOV)[2]
Northbound AM Peak	Existing	49,300	58,900	29.2	28.7
	Alternative 1	64,900	91,300	17.3	23.3
	Alternative 2	65,100	84,300	18.5	21.7
	Alternative 3	41,500	59,800	8.7	11.5
	Alternative 4	60,000	78,700	14.7	18.1
Southbound PM Peak	Existing	56,000	69,000	38.6	37.9
	Alternative 1	76,000	103,400	32.2	41.1
	Alternative 2	78,700	99,000	39.0	41.2
	Alternative 3	59,200	77,900	22.1	29.6
	Alternative 4	65,000	86,900	23.4	25.9

Notes: 1. Based on traffic counts, HOVs, trucks, and other vehicles are assumed to have vehicle occupancies of 2.35, 1.2, and 1.0 persons per vehicle, respectively.
2. Speed is reported in miles per hour for all vehicles and for HOVs.

Source: Fehr & Peers, 2009

Although the average increase in speeds for all vehicles during the peak period in 2035 is, in some instances, marginal over Alternative 4, there are a number of factors which must be considered. First, as shown by Table 3-4.1, for the northbound (morning) direction, Alternative 1 would provide higher speeds for all travelers than either Alternative 4 or Alternative 3. Although Alternative 2 would provide a slightly higher average speed, this alternative would serve 7,000 fewer people than Alternative 1. Most significantly, Alternative 1 would provide

[19] **Traffic Congestion and Greenhouse Gases:** Matthew Barth and Kanok Boriboonsomsin(TR News 268 May-June 2010)<http://onlinepubs.trb.org/onlinepubs/trnews/trnews268.pdf>

higher speeds for HOV users than any of the other alternatives, thus providing incentive for travelers to choose this mode of travel.

The results are similar for the southbound (afternoon) direction, although the travel speeds during the peak period show more improvement. In the southbound direction, Alternative 1 would again provide higher speeds for all travelers than either Alternative 4 or Alternative 3. Again, although Alternative 2 would provide a slightly higher average speed, this alternative would serve 4,400 fewer people than Alternative 1. Finally, Alternative 1 would provide higher speeds for HOV users than either Alternative 4 or Alternative 3 (although Alternative 2 would operate at about the same speed). The higher speeds for HOV users under Alternative 1 when compared to Alternative 4 or Alternative 3 would provide incentive for travelers to choose this mode of travel.

Alternative 1 provides the lowest average speeds of all alternatives in both directions and in most cases would result in speeds lower than Alternative 4. As noted above, the most severe emissions from automobiles occur at stop-and-go speeds (0-25 miles per hour). Although none of the alternatives has an average speed of more than 25 miles per hour in the northbound direction, Alternative 1 does serve the highest number of persons. In the southbound direction, average speeds do improve from 25.9 miles per hour under Alternative 4 to 41.1 miles per hour with Alternative 1 and again, this alternative serves the highest number of persons.

The higher speeds during peak periods, particularly for HOV users, are expected to promote ride sharing.

Although the proposed project may result in minor increases in VMT, it is important to look at the overall transportation network.

As noted in the *Climate Action Program at Caltrans:*

> Operational improvements and ITS strategies [discussed in Section 3.4.3] are applied across the modes and intermodally (state highways, local streets and roads, bus and rail transit) and are intended to smooth out traffic flow, restore speed, and improve travel time on the congested roadway system. These measures along with demand management strategies could significantly contribute to reducing fuel consumption and CO2 from transportation.

Additionally, the proposed project is fully funded and is included in the Metropolitan Transportation Plan (MTP) 2035, which was found to conform and adopted by SACOG on March 20, 2008. FHWA and the Federal Transit Administration (FTA) adopted the air quality conformity finding on May 16, 2008. The project is also included in the financially constrained 2012/2016 MTIP. Projects in the 2012/2016 MTIP were found to conform as part of the previous regional emissions analysis approved by FHWA in December 2012. The design concept and scope of the proposed project is consistent with the project description in the MTP 2035, the 2012/2016 MTIP, and the assumptions in SACOG's regional emissions analysis.

CARBON DIOXIDE (CO_2) QUANTITATIVE ANALYSIS

CT-EMFAC, a California-specific project-level analysis computer modeling tool designed to model criteria pollutants, developed by the joint efforts of Caltrans and the Department of Civil and Environmental Engineering, University of California, was used to calculate the CO_2 emissions of this project for the purpose of comparing the build and no build alternatives.

The CT-EMFAC analysis results of CO_2 for this project are listed in the following table.

Table 3-4.2 Estimated Daily CO_2 Emissions (US Tons)

Alternatives	Existing	2023	2035
Alternative 1 (Bus/Carpool)		5,490.01	6,119.85
Alternative 2 (Mixed Flow)		5,493.16	6,122.73
Alternative 3 (Conversion)		5,516.50	6,163.10
Alternative 4 (No-Build)	4,831.63	5,489.47	6,118.53

The CO_2 emissions numbers are only useful for a comparison between alternatives. The numbers are not necessarily an accurate reflection of what the true CO_2 emissions will be because CO_2 emissions are dependent on other factors that are not part of the model such as the fuel mix (EMFAC model emission rates are only for direct engine-out CO_2 emissions not full fuel cycle; fuel cycle emission rates can vary dramatically depending on the amount of additives like ethanol and the source of the fuel components), rate of acceleration, and the aerodynamics and efficiency of the vehicles.

LIMITATIONS AND UNCERTAINTIES WITH MODELING

Although EMFAC can calculate CO_2 emissions from mobile sources, the model does have limitations when it comes to accurately reflecting CO_2 emissions. According to the National Cooperative Highway Research Program report, *Development of a Comprehensive Modal Emission Model* (April 2008), studies have revealed that brief but rapid accelerations can contribute significantly to a vehicle's carbon monoxide and hydrocarbon emissions during a typical urban trip. Current emission-factor models are insensitive to the distribution of such modal events (i.e., cruise, acceleration, deceleration, and idle) in the operation of a vehicle and instead estimate emissions by average trip speed. This limitation creates an uncertainty in the model's results when compared to the estimated emissions of the various alternatives with baseline in an attempt to determine impacts. Although work by USEPA and the CARB is underway on modal-emission models, neither agency has yet approved a modal emissions model that can be used to conduct this more accurate modeling. In addition, EMFAC does not include speed corrections for most vehicle classes for CO_2—for most vehicle classes emission factors are held constant which means that EMFAC is not sensitive to the decreased emissions associated with improved traffic flows for most vehicle classes. Therefore, unless a project involves a large number of heavy-duty vehicles, the difference in modeled CO_2 emissions due to speed change will be slight.

It is interesting to note that CARB is currently not using EMFAC to create its inventory of greenhouse gas emissions. It is unclear why the CARB has made this decision. Their website (available at: http://www.arb.ca.gov/msei/msei.htm) only states:

> **Model Clarification:** Both EMFAC and OFFROAD Models develop CO_2 and CH_4 emissions estimates; however, they are not currently used as the basis for ARB's official GHG inventory which is based on fuel usage information See the ARB's official GHG inventory **(**http://www.arb.ca.gov/cc/inventory/inventory.htm**)**. However, ARB is working towards reconciling the emission estimates from the fuel usage approach and the models.

OTHER VARIABLES

With the current science, project-level analysis of greenhouse gas emissions is limited. Although a greenhouse gas analysis is included for this project, there are numerous key greenhouse gas variables that are likely to change dramatically during the design life of the proposed project and would thus dramatically change the projected CO_2 emissions.

First, vehicle fuel economy is increasing. The USEPA's annual report, "Light-Duty Automotive Technology and Fuel Economy Trends: 1975 through 2008" (http://www.epa.gov/oms/fetrends.htm), which provides data on the fuel economy and technology characteristics of new light-duty vehicles including cars, minivans, sport utility vehicles, and pickup trucks, confirms that average fuel economy has improved each year beginning in 2005, and is now the highest since 1993. Most of the increase since 2004 is due to higher fuel economy for light trucks, following a long-term trend of slightly declining overall fuel economy that peaked in 1987. These vehicles also have a slightly lower market share, peaking at 52 percent in 2004 with projections at 48 percent in 2008. Table 3-4.4 shows the alternatives for vehicle fuel economy increases currently being studied by the National Highway Traffic Safety Administration in its Draft EIS for New Corporate Average Fuel Economy (CAFE) Standards (June 2008).

Table 3-4.4 Vehicle Fuel Economy

Model Year 2015 Required Miles Per Gallon (mpg) by Alternative								
No Action		25% Below Optimized	Optimized (Preferred)	25% Above Optimized	50% Above Optimized	Total Costs Equal Total Benefits	Technology Exhaustion
Cars	27.5	33.9	35.7	37.5	39.5	43.3	52.6
Trucks	23.5	27.5	28.6	29.8	30.9	33.1	34.7

Second, near zero carbon vehicles will come into the market during the design life of this project. According to a March 2008 report released by University of California Davis (UC Davis), Institute of Transportation Studies:

> Large advancements have occurred in fuel cell vehicle and hydrogen infrastructure technology over the past 15 years. Fuel cell technology has progressed substantially resulting in power density, efficiency, range, cost, and durability all improving each year. In another sign of progress, automotive developers are now demonstrating over 100 fuel cell vehicles (FCVs) in California – several in the hands of the general public – with configurations designed to be attractive to buyers. Cold-weather operation and vehicle range challenges are close to being solved, although vehicle cost and durability improvements are required before a commercial vehicle can be successful without incentives. The pace of development is on track to approach pre-commercialization within the next decade.

A number of the US Department of Energy (USDOE) 2010 milestones for FCV development and commercialization are expected to be met in the near future. Accounting for a five to six year production development cycle, the scenarios developed by the USDOE suggest that 10,000s of vehicles per year from 2015 to 2017 would be possible in a federal demonstration program, assuming large cost share grants by the government and industry are available to reduce the cost of production vehicles.

Third, as previously stated, California has recently adopted a low-carbon transportation fuel standard. CARB is scheduled to come out with draft regulations for low carbon fuels in late 2008 with implementation of the standard to begin in 2011.

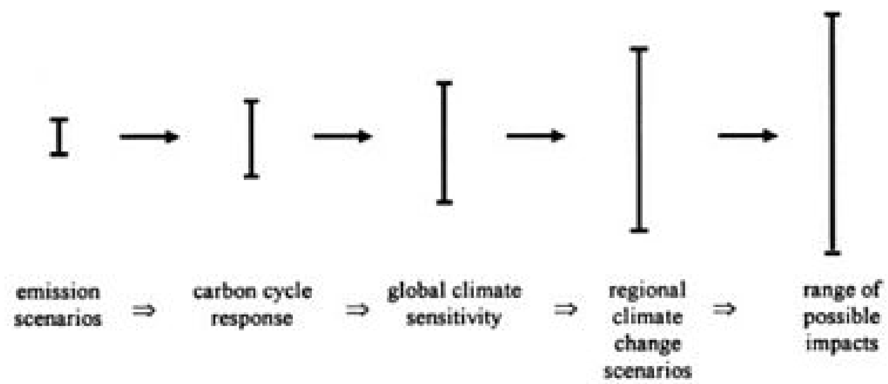
Fourth, driver behavior has been changing as the US economy and oil prices have changed. In its January 2008 report, "Effects of Gasoline Prices on Driving Behavior and Vehicle Market," (http://www.cbo.gov/ftpdocs/88xx/doc8893/01-14-GasolinePrices.pdf) the Congressional Budget Office found the following results based on data collected from California: 1) freeway motorists have adjusted to higher gas prices by making fewer trips and driving more slowly; 2) the market share of sports utility vehicles is declining; and 3) the average prices for larger, less fuel-efficient models have declined over the past five years as average prices for the most-fuel efficient automobiles have risen, showing an increase in demand for the more fuel efficient vehicles.

LIMITATIONS AND UNCERTAINTIES WITH IMPACT ASSESSMENT

Taken from pp. 3-48 and 3-49 of the National Highway Traffic Safety Administration Draft EIS for New CAFE Standards (June 2008), Figure 3- 3 illustrates how the range of uncertainties in assessing greenhouse gas impacts grows with each step of the analysis:

> Cascade of uncertainties typical in impact assessments showing the "uncertainty explosion" as these ranges are multiplied to encompass a comprehensive range of future consequences, including physical, economic, social, and political impacts and policy responses.

Figure 3-4.3 Cascade of Uncertainties



Much of the uncertainty in assessing an individual project's impact on climate change surrounds the global nature of the climate change. Even assuming that the target of meeting the 1990 levels of emissions is met, there is no regulatory or other framework in place that would allow for a ready project-level assessment of what the modeled 2035 Bus/Carpool Addition Alternative 1736.89 ton increase in CO_2 emissions over existing conditions (2006)—an increase of just 0.022 percent—would mean for climate change given the overall California greenhouse gas emissions inventory of approximately 430 million tons of CO_2 equivalent. This uncertainty only increases when viewed globally. The IPCC has created multiple scenarios to project potential future global greenhouse gas emissions as well as to evaluate potential changes in global temperature, other climate changes, and their effect on human and natural systems. These scenarios vary in terms of the type of economic development, the amount of overall growth, and the steps taken to reduce greenhouse gas emissions. Non-mitigation IPCC scenarios project an increase in global greenhouse gas emissions by 9.7 up to 36.7 billion metric tons CO_2 from 2000 to 2030, which represents an increase of between 25 and 90%[20].

The assessment is further complicated by the fact that changes in greenhouse gas emissions can be difficult to attribute to a particular project because the projects often cause shifts in the locale for some type of greenhouse gas emissions, rather than causing "new" greenhouse gas emissions.

Although some of the emission increases might be new, the extent to which the modeled 1.64 to 3.64 ton increase in CO_2 emissions represents a net global increase, reduction, or no change, is uncertain and there are no models approved by regulatory agencies that operate at the global or even statewide scale.

The complexities and uncertainties associated with project level impact analysis are further borne out in the June 2008 Draft EIS completed by the National Highway Traffic Safety Administration Corporate Average Fuel Economy (CAFE) Standards (the final EIS was released in February 2010). As the text quoted below shows, even when dealing with greenhouse gas emission scenarios on a national scale for the entire passenger car and light truck fleet, the numerical differences among alternatives is very small and well within the error sensitivity of the model.

> In analyzing across the CAFE 30 alternatives, the mean change in the global mean surface temperature, as a ratio of the increase in warming between the B1 (low) to A1B (medium) scenarios, ranges from 0.5 percent to 1.1 percent. The resulting change in

[20] Intergovernmental Panel on Climate Change (IPCC). February 2007. Climate Change 2007: The Physical Science Basis: Summary for Policy Makers. Available at: http://www.ipcc.ch/publications_and_data/publications_ipcc_fourth_assessment_report_wg1_report_the_physical_science_basis.htm

sea level rise (compared to the No Action Alternative) ranges, across the alternatives, from 0.04 centimeter to 0.07 centimeter. In summary, the impacts of the model year 2011-2015 CAFE alternatives on global mean surface temperature, sea level rise, and precipitation are relatively small in the context of the expected changes associated with the emission trajectories. This is due primarily to the global and multi-sectoral nature of the climate problem.

Emissions of CO_2, the primary gas driving the climate effects, from the United States automobile and light truck fleet represented about 2.5 percent of total global emissions of all greenhouse gases in the year 2000 (USEPA, 2008; CAIT, 2008). While a significant source, this is a still small percentage of global emissions, and the relative contribution of CO_2 emissions from the United States light vehicle fleet is expected to decline in the future, due primarily to rapid growth of emissions from developing economies (which are due in part to growth in global transportation sector emissions). [NHTSA Draft EIS for New CAFÉ Standards, June 2008, pp.3-77 to 3-78].

<u>CEQA Conclusion</u>
As discussed above, both the future with project and future no build show increases in CO2 emissions over the existing levels; the future build CO2 emissions are higher than the future no build emissions. In addition, as discussed above, there are limitations with EMFAC and with assessing what a given CO2 emissions increase means for climate change. Therefore, it is Caltrans determination that in the absence of further regulatory or scientific information related to greenhouse gas 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.

AB 32 Compliance
The Department continues to be actively involved on the Governor's Climate Action Team as ARB works to implement Executive Orders S-3-05 and S-01-07 and help achieve the targets set forth in AB 32. Many of the strategies the Department is using to help meet the targets in AB 32 come from the California Strategic Growth Plan, which is updated each year. Former Governor Arnold Schwarzenegger's Strategic Growth Plan calls for a $222 billion infrastructure improvement program to fortify the state's transportation system, education, housing, and waterways, including $100.7 billion in transportation funding during the next decade. The Strategic Growth Plan targets a significant decrease in traffic congestion below today's level and

Figure ##: Mobility Pyramid

a corresponding reduction in GHG emissions. The Strategic Growth Plan proposes to do this while accommodating growth in population and the economy. A suite of investment options has been created that combined together are expected to reduce congestion. The Strategic Growth Plan relies on a complete systems approach to attain CO_2 reduction goals: system monitoring and evaluation, maintenance and preservation, smart land use and demand management, and operational improvements as depicted in Figure ##: The Mobility Pyramid.

The Department is supporting efforts to reduce vehicle miles traveled by planning and implementing smart land use strategies: job/housing proximity, developing transit-oriented communities, and high density housing along transit corridors. The Department works closely with local jurisdictions on planning activities but does not have local land use planning authority. The Department also assists efforts to improve the energy efficiency of the transportation sector by increasing vehicle fuel economy in new cars, light and heavy-duty trucks; the Department is doing this by supporting on-going research efforts at universities, by supporting legislative efforts to increase fuel economy, and by its participation on the Climate Action Team. It is important to note, however, that the control of the fuel economy standards is held by U.S. EPA and ARB.

Table 3-4.5 summarizes the Departmental and statewide efforts that the Department is implementing in order to reduce GHG emissions. More detailed information about each strategy is included in the Climate Action Program at Caltrans (December 2006).

Table 3-4.5 Climate Change/CO2 Reduction Strategies

Strategy	Program	Partnership		Method/Process	Estimated CO_2 Savings (MMT)	
		Lead	Agency		2010	2020
Smart Land Use	Intergovernmental Review (IGR)	Caltrans	Local Governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Caltrans	Local and regional agencies & other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Caltrans	Regional plans and application process	.975	7.8
Operational Improvements & Intelligent Trans. System (ITS) Deployment	Strategic Growth Plan	Caltrans	Regions	State ITS; Congestion Management Plan	.07	2.17
Mainstream Energy & GHG into Plans and Projects	Office of Policy Analysis & Research; Division of Environmental Analysis	Interdepartmental effort		Policy establishment, guidelines, technical assistance	Not Estimated	Not Estimated
Educational & Information Program	Office of Policy Analysis & Research	Interdepartmental, CalEPA, CARB, CEC		Analytical report, data collection, publication, workshops, outreach	Not Estimated	Not Estimated
Fleet Greening & Fuel Diversification	Division of Equipment	Department of General Services		Fleet Replacement B20 B100	.0045	.0065 .045 .0225
Non-vehicular Conservation Measures	Energy Conservation Program	Green Action Team		Energy Conservation Opportunities	.117	.34
Portland Cement	Office of Rigid Pavement	Cement and Construction Industries		2.5 % limestone cement mix 25% fly ash cement mix > 50% fly ash/slag mix	1.2 .36	4.2 3.6
Goods Movement	Office of Goods Movement	Cal EPA, CARB, BT&H, MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					2.72	18.18

To the extent that it is applicable or feasible for the project and through coordination with the project development team, the following measures will also be included in the project to reduce the 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. Intelligent transportation systems are commonly referred to as electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system. Caltrans planning documents (Ramp Meter Development Report, etc.) call for the installation of traffic operations system (TOS) elements along I-5 in the study area. These elements, which provide control and monitoring of traffic conditions, include ramp meters, traffic monitoring stations (TMS), closed-circuit television cameras (CCTV), changeable message signs (CMS), highway advisory radio (HAR), and real-time weather information system (RWIS). Table 3-4.6 lists the proposed TOS elements to be constructed as part of the proposed project and a separate project that will construct TOS elements throughout the Sacramento region.

Table 3-4.6 Traffic Operations System Elements

Element	Project	Location	Post Mile
CCTV	I-5Bus/Carpool Lanes (EA 3C9000)	Elk Grove Blvd.	10.8
		Laguna Blvd.	12.2
TMS	Sacramento TOS Elements (EA 4C0301)	South of Elk Grove Blvd.	10.0
		South of Laguna Blvd.	11.7
		Beach Lake Bridge	12.7
		North of Beach Lake Bridge	13.2
		South of River Bend Overcrossing	14.5
		Route 160 Overhead	15.5

Source: I-5 Bus/Carpool Lanes Project Study Report, Caltrans District 3, 2007 and Caltrans District 3, 2008

- According to Caltrans' *Standard Specifications*, idling time for lane closure during construction is restricted to ten minutes in each direction; in addition, the Contractor must comply with Caltrans' *Standard Specifications* Sections 14-9.01 ("Air Pollution Control") and 14-9.02 ("Dust Control").

- Replacement plantings will be required for all trees, shrubs, vines, and groundcovers to be removed within the northern LAU (north of Pocket Rd.), including those removed for the replacement of the Casilada POC. Replacement plantings will ensure that the benefits of planted trees in offsetting CO_2 emissions will not be diminished. Based on a formula from the Canadian Tree Foundation[21], it is anticipated that the planted trees will offset between 7-10 tons of $C0_2$ per year.

3.4.3 Adaption Strategies

"Adaptation strategies" refer to how the Department and others can plan for the effects of climate change on the state's transportation infrastructure and strengthen or protect the facilities from damage. Climate change is expected to produce increased variability in precipitation, rising temperatures, rising sea levels, 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. There may also be economic and strategic ramifications as a result of these types of impacts to the transportation infrastructure.

At the federal level, the Climate Change Adaptation Task Force, co-chaired by the Council on Environmental Quality (CEQ), the Office of Science and Technology Policy (OSTP), and the National Oceanic and Atmospheric Administration (NOAA), released its interagency report on October 14, 2010 outlining recommendations to President Obama for how federal agency policies and programs can better prepare the U.S. to respond to the impacts of climate change. The Progress Report of the Interagency Climate Change Adaptation Task Force recommends that the federal government implement actions to expand and strengthen the nation's capacity to better understand, prepare for, and respond to climate change.

Climate change adaption must also involve the natural environment as well. Efforts are underway on a statewide-level to develop strategies to cope with impacts to habitat and biodiversity through planning and conservation. The results of these

[21] Canadian Tree Foundation at http://www.tcf-fca.ca/publications/pdf/english_reduceco2.pdf. For rural areas the formula is: # of trees/360 x survival rate = tons of carbon/year removed for each of 80 years.

efforts will help California agencies plan and implement mitigation strategies for programs and projects.

On November 14, 2008, former 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.

The California Natural Resources Agency (Resources Agency) was directed to coordinate with local, regional, state, and federal public and private entities to develop. The California Climate Adaptation Strategy (Dec 2009)[22], which summarizes the best known science on climate change impacts to California, assesses California's vulnerability to the identified impacts, and then outlines solutions that can be implemented within and across state agencies to promote resiliency.

The strategy outline is in direct response to EO S-13-08 that specifically asked the Resources Agency to identify how state agencies can respond to rising temperatures, changing precipitation patterns, sea level rise, and extreme natural events. Numerous other state agencies were involved in the creation of the Adaptation Strategy document, including the California Environmental Protection Agency; Business, Transportation and Housing; Health and Human Services; and the Department of Agriculture. The document is broken down into strategies for different sectors that include: Public Health; Biodiversity and Habitat; Ocean and Coastal Resources; Water Management; Agriculture; Forestry; and Transportation and Energy Infrastructure. As data continues to be developed and collected, the state's adaptation strategy will be updated to reflect current findings.

The Resources Agency was also directed to request the National Academy of Science to prepare a Sea Level Rise Assessment Report by December 2010[23] to advise how California should plan for future sea level rise. The report is to include:

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[22] http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF

[23] Pre-publication copies of the report, *Sea Level Rise for the Coasts of California, Oregon, and Washington: Past, Present, and Future*, were made available from the National Academies Press on June 22, 2012. For more information, please see http://www.nap.edu/catalog.php?record_id=13389.

- Relative sea level rise projections for California, Oregon and Washington taking into account coastal erosion rates, tidal impacts, El Niño and La Niña events, storm surge and land subsidence rates.
- The range of uncertainty in selected sea level rise projections.
- A synthesis of existing information on projected sea level rise impacts to state infrastructure (such as roads, public facilities and beaches), natural areas, and coastal and marine ecosystems.
- A discussion of future research needs regarding sea level rise.

Prior to the release of the final Sea Level Rise Assessment Report, all state agencies that are planning to construct projects in areas vulnerable to future sea level rise were directed to consider a range of sea level rise scenarios for the years 2050 and 2100 in order to assess project vulnerability and, to the extent feasible, reduce expected risks and increase resiliency to sea level rise. Sea level rise estimates should also be used in conjunction with information regarding local uplift and subsidence, coastal erosion rates, predicted higher high water levels, storm surge and storm wave data

Interim guidance has been released by The Coastal Ocean Climate Action Team (CO-CAT) as well as Caltrans as a method to initiate action and discussion of potential risks to the states infrastructure due to projected sea level rise.

All projects that have filed a Notice of Preparation (NOP) as of the date of the EO S-13-08, and/or are programmed for construction funding through 2013, or are routine maintenance projects may, but are not required to, consider these planning guidelines. A Notice of Preparation was filed for the proposed project on October 11, 2007.

Executive Order S-13-08 also directed the Business, Transportation, and Housing Agency to prepare a report to assess vulnerability of transportation systems to sea level rise affecting safety, maintenance and operational improvements of the system, and economy of the state. The Department continues to work on assessing the transportation system vulnerability to climate change, including the effect of sea level rise.

Currently, the Department is working to assess which transportation facilities are at greatest risk from climate change effects. However, without statewide planning scenarios for relative sea level rise and other climate change effects, the Department has not been able to determine what change, if any, may be made to its design standards for its transportation facilities. Once statewide planning scenarios become available, the Department will be able review its current design standards to determine what changes, if any, may be warranted in order to protect the transportation system from sea level rise.

Climate change adaptation for transportation infrastructure involves long-term planning and risk management to address vulnerabilities in the transportation system from increased precipitation and flooding; the increased frequency and intensity of storms and wildfires; rising temperatures; and rising sea levels. The Department is an active participant in the efforts being conducted in response to EO S-13-08 and is mobilizing to be able to respond to the National Academy of Science Sea Level Rise Assessment Report.

Chapter 4 Comments and Coordination

Early and continuing coordination with the general public and appropriate public agencies is an essential part of the environmental process to determine the scope of environmental documentation, the level of analysis, potential impacts and mitigation measures, and related environmental requirements. Agency consultation and public participation for this project have been accomplished through a variety of formal and informal methods, including project development team (PDT) meetings, interagency coordination meetings, the development of a project website, and a public open house. This chapter summarizes the results of Caltrans efforts to fully identify, address, and resolve project-related issues through early and continuing coordination.

4.1 Responsible Agencies Under CEQA

Because of their jurisdiction by law, the following state agencies or officers will issue permits or approval for the project:

- California Department of Fish and Game (CDFG)
- Central Valley Regional Water Quality Control Board (RWQCB)

4.2 Trustee Agencies under CEQA

The California Department of Parks and Recreation (DPR) and CDFG are also considered Trustee Agencies (California Environmental Quality Act [CEQA] Guidelines Section 15386) because both departments have jurisdiction by law over resources that could be affected by the project that are held in trust for the people of the State of California.

4.3 Other Jurisdictional Agencies

Although not Responsible or Trustee agencies under CEQA, the following federal agencies are considered jurisdictional agencies because they will issue permits or approvals for the project:

- National Oceanic and Atmospheric Administration-National Marine Fisheries Service (NOAA Fisheries)
- US Army Corps of Engineers (USACE)
- US Environmental Protection Agency (USEPA)
- United States Fish and Wildlife Service (USFWS)

4.4 Notice of Preparation

A Notice of Preparation (NOP) was sent to the State Clearinghouse on October 11, 2007. The NOP was published in the Sacramento Bee on October 15, 2007. The

NOP was also distributed directly to approximately 130 local, state, and federal agencies and elected officials; tribal representatives; neighborhood and community groups; and other organizations. The NOP contained information regarding the planned open house/scoping meetings. Additionally, notices of availability of the NOP and invitations to the open house/scoping meetings were also sent to all businesses and residences (approximately 30,500) within one-half mile of the project corridor. The North/City and Elk Grove/Laguna regional sections of the *Sacramento Bee*, the *Elk Grove Citizen*, and the *Laguna Citizen* advertised the open houses.

The following agencies responded in writing to the NOP. Their letters are included in Appendix H.

Table 4-4.1 Comments Received on the Notice of Preparation

Agency	Date	Issues/Concerns
California Department of Water Resources, Floodplain Protection Section	October 18, 2007	Noted that project may be an encroachment on the State Adopted Plan of Flood Control and provided information on process for obtaining an encroachment permit.
Sacramento Regional County Sanitation District (SRCSD)	October 25, 2007	Advised that SRCSD has many facilities located in the proposed project area and that close coordination would be required.
Sacramento Metropolitan Air Quality Management District (SMAQD)	November 5, 2007	Provided recommendations regarding the air quality analysis to be conducted for the project, specifically the identification of any sensitive receptors effected by roadway widening, an air quality analysis of operational and construction emissions, and consideration of climate change and green house gases. Noted that the project is subject to all applicable SMAQD rules and regulations in effect at the time of construction.
City of Sacramento	November 20, 2007	Noted concerns regarding increased freeway noise to adjacent neighborhoods and requested that specific locations be included in the noise studies and considered for possible sound wall locations.
United States Department of Commerce – National Oceanic and Atmospheric Administration–National Marine Fisheries Service	December 13, 2007	Noted that the following listed species and/or critical habitat may occur in or downstream of the project area: Sacramento River Chinook salmon (spring run, fall/late fall-run, and winter run) and Central Valley steelhead. Provided list of Best Management Practices for erosion control and water quality during construction.

Public Outreach

Two Open House/Scoping Meetings were held following the publication of the NOP. The first meeting was held October 24, 2007 at Joseph Sims Elementary School, located at 3033 Buckminster Dr. in Elk Grove. The second meeting was held October 25, 2007 at the Belle Cooledge Branch of the Sacramento Public Library, located at 5600 South Land Park Dr. in Sacramento.

The purpose of the open house/scoping meetings was to inform the public, local officials, and all interested parties of the current status of the project. In addition to including notice of the open house/scoping meetings in the NOP and the notices of availability of the NOP, the open houses were advertised in the North/City and Elk Grove/Laguna regional sections of the *Sacramento Bee,* and the *Elk Grove Citizen*. A press release was also issued by the Caltrans District 3 Office of Public Affairs and the project website was posted to the Internet on October 15, 2007.

The format of the public open houses was informal, and this format was chosen to facilitate communications between the public and Caltrans. Maps, exhibits, and graphic displays were set up around the room, with Caltrans representatives available to answer questions. Attendees were encouraged to submit written comments on cards that were provided for this purpose.

Approximately 11 people attended the first open house held in Elk Grove. Four people returned comment cards. All four comments expressed concern about the northbound on-ramp from Elk Grove Blvd. to I-5.[24]

Approximately 73 people attended the open house held on October 25, 2007. Thirty people returned the comment cards that were provided. The majority of the comments related to concerns over noise and potential sound wall locations, as well as concern over the possible reduction in lane width. At this meeting, five people asked Caltrans staff for further information on the noise studies (four of which also submitted comment cards repeating this request). Contact information was obtained from each of these people and the noise specialist contacted each of them to learn more about their concerns.

Following the open houses, twelve additional comments were received via mail or e-mail.

Caltrans also maintains a Sac 5 Bus/Carpool Lane Project website at: www.dot.ca.gov/dist3/Projects/00165/prjindex.htm.

4.5 Additional Presentations

An early meeting to present the proposed project to local agency partners was held on October 18, 2006. Representatives from Sacramento County, the City of Sacramento, and the City of Elk Grove attended this meeting.

[24] As noted in Section 2.22.3.1 of this document, a separate project is planned that will widen the ramp to three lanes and close the mid-ramp access lane from eastbound Elk Grove Blvd.

Caltrans District 3 Director Jody Jones and Project Manager Carlos Portillo held four meetings (listed below) in January of 2008 to present the proposed projects to members of the Sacramento City Council:

- January 3, 2008 – Meeting with Councilmember Bonnie Pannell, Sacramento Department of Transportation Director Jerry Way, and Sacramento Department of Transportation Operations Manager Fran Halbakken.

- January 3, 2008 – Meeting with Councilmember Robert Fong, Sacramento Department of Transportation Director Jerry Way, and Sacramento Department of Transportation Operations Manager Fran Halbakken.

- January 15, 2008 – Meeting with Councilmember Ray Tretheway, Sacramento Department of Transportation Director Jerry Way, and Sacramento Department of Transportation Operations Manager Fran Halbakken.

- January 15, 2008 – Meeting with Councilmember Robbie Waters, Sacramento Department of Transportation Director Jerry Way, and Sacramento Department of Transportation Operations Manager Fran Halbakken.

Beginning in early 2009, additional meetings were held with environmental advocacy groups as well as local cities, counties, and transit agencies. These meetings are summarized as follows:

- March 3, 2009 – Meeting with Eric W. Davis, Richard Seyman, and Rick Bettis of the Environmental Council of Sacramento.

- March 26, 2009 – Meeting with SACOG and Sacramento Regional Transit

- April 14, 2009 – Meeting with e-tran.

- May 1, 2009 – Meeting with City of Elk Grove, City of Sacramento, Sacramento County Department of Transportation and SACOG.

- May 12, 2009 – Meeting with Sacramento City/Sacramento County Bicycle Advisory Committee (SacBAC).

- May 18, 2009 – Meeting with Elk Grove Trails Committee.

- August 5, 2009 – Meeting with e-tran and City of Elk Grove.

- April 23, 2010 – Meeting with Jon Ellison of ECOS and Rick Bettis of the Sierra Club.

Caltrans Staff

- Jess Avila, Project Manager
- Mike Auslam, Traffic Operations
- Gagandeep Bains, Traffic
- Alyssa Begley, Office Chief, Planning
- Roy Bibbens, Geotechnical Design
- Eric Burgeson, Structures Design
- Maria Alicia Beyer-Salinas, Hazardous Waste Coordinator
- Jim Calkins, Traffic Senior
- Shalanda Christian, Air Quality Specialist
- Joe Downing, Structures Design
- Joan Fine, Architectural Historian
- Brian Fox, Surveys
- Kathleen Grady, Landscape Architecture
- Timothy Hart, Travel Forecasting/Planning
- Qiang Huang, Geotechnical Design
- Ken Lastufka, Project Environmental Coordinator
- Loren Newell, Traffic
- Cesley Nixon, Right-of-way Utilities
- Kim Noonan, Construction
- Meshack Okpala, Construction
- Jan Rutenbergs, HQ Design
- Mohammad U. Sadiq, Design Senior
- Erik Schwab, Biologist
- Kendall Schinke, Environmental Senior
- Ricky Siebert, Right-of-way Engineering
- Manny Tamayo, Traffic
- Sharon Tang, Air Quality Specialist
- Clark Townsend, Hydraulics Engineer
- Benjamin Tam, Noise Specialist
- Scott Williams, Archaeologist
- James Williamson, Landscape Architect
- Bruce Wilson, Right-of-way Senior
- Saeid Zandian, Noise Specialist

External Partners/Stakeholders

- Sacramento Transportation Authority
- Sacramento Area Council of Governments
- Federal Highway Administration
- City of Elk Grove and City of Elk Grove e-tran
- City of Sacramento
- Sacramento County
- Sacramento Metropolitan Air Quality Management District
- Central Valley Regional Water Quality Control Board
- Sacramento Regional Transit
- California Highway Patrol
- Sacramento Regional County Sanitation District, Bufferlands

4.6 Public Workshops Conducted During the 2011 Circulation of the DEIR/EA

On April 8, 2011, Caltrans and FHWA released a Draft Environmental Impact Report/Environmental Assessment (DEIR/EA) for the I-5 Bus/Carpool Lanes Project. The public review period extended for 60 days, from April 8 to June 10, 2011. Caltrans sent a notice of availability of the DEIR/EA to nearly 26,000 adjacent property owners within one mile from the project. The notice also appeared in the Sacramento Bee on April 18, 2011. A copy of the DEIR/EA was sent to approximately 130 agencies and organizations, as well as 8 public libraries.

There were two public open house workshops, one on May 4, 2011 at Belle Cooledge Library and the other on May 4, 2011 at Joseph Sims Elementary School. Approximately 40 members of the public attended the workshops.

Overall, Caltrans received separate comments from 3 comment cards from the workshops, 8 letters, and 7 emails.

Chapter 5 List of Preparers

The following Caltrans staff and consultants contributed to the preparation of this EIR/EA.

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Chapter 6 Distribution List

The following agencies, organizations, and individuals will be sent a copy of this Draft EIR/EA. A notice of availability of this document has been sent to a much broader list that includes all owners and occupants of property within one mile from the project.

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Chapter 7 References

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