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

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

Air Quality – The proposed project would not conflict with or obstruct implementation of any applicable air quality plan, but rather conforms to both the 2035 Regional Transportation Plan (RTP) and 2011 Transportation Improvement Program (TIP). The project would not violate any air-quality standard or contribute substantially to an existing or projected air quality violation, and would not 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. The project would not expose sensitive receptors to substantial pollutant concentrations.

The project does not require a regional emissions analysis and is considered not capacity increasing but rather an operational improvement. The Construction Impacts section of Chapter 2 includes a discussion of avoidance and minimization measures related to temporary air quality effects during construction.

Community Character and Cohesion – The proposed project will not alter the character or cohesiveness of existing neighborhoods or communities.

Farmlands and Timberlands – There are no farmlands or timberlands within the project vicinity.

Growth – The project is not considered capacity increasing, but is an operational improvement to reduce congestion. The proposed improvements are limited to the replaced overcrossing and ramp locations. The replaced interchange would not provide new access to any area that it does not already serve. The proposed project would respond to existing and foreseeable demands of the community, rather than trigger further development beyond the project itself.

Mineral Resources – There are no mining resources within the project vicinity.

Parks and Recreation – There are no park or recreational facilities affected by the project.

Wetlands and other waters – There are no streams or wetlands within or adjacent to the project vicinity.

Human Environment

2.1 EXISTING AND FUTURE LAND USE

Affected Environment

The US 101/Willow Road interchange is located in a highly developed area of San Mateo County within the cities of Menlo Park and East Palo Alto. The surrounding area consists primarily of light-commercial and low-density residential development, with limited vegetation along sections of the freeway and within the current interchange configuration. A facility of the US Department of Veterans Affairs is within the project vicinity.

Environmental Consequences

The potential for major future development in the project vicinity is low. The project will require minimal acquisition of private properties and local streets within the project vicinity, which is further discussed in the Relocations and Real Property Acquisition section of this chapter.

Avoidance, Minimization, and/or Mitigation Measures

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

2.2 CONSISTENCY WITH STATE, REGIONAL AND LOCAL PLANS AND PROGRAMS

Affected Environment

The consistency of various state, regional and local plans and programs has been analyzed for the project including the San Francisco Bay Conservation and Development Commission (BCDC), Department of Transportation: *Deputy Directive-64-R1 Complete Streets—Integrating the Transportation System (DD-64-R1),* Metropolitan Transportation Commission's current Regional Transportation Plan: *Transportation 2035 Plan for the San Francisco Bay Area*, *San Mateo County Comprehensive Bicycle and Pedestrian Transportation Plan* (2011), the *General Plan* of the City of Menlo Park (1994), the *Menlo Park Comprehensive Bicycle Development Plan* (2005) and the *East Palo Alto Bicycle Transportation Plan.*

Environmental Consequences

San Francisco Bay Conservation and Development Commission (BCDC)

It has been determined that the project does not lie within the jurisdictional limits of the San Francisco Bay Conservation and Development Commission (BCDC).

Department of Transportation: Complete Streets - Integrating the Transportation System (DD-64-R1)

The Department has complied with Deputy Directive-64-R1 with the following ongoing efforts:

- Ensuring bicycle, pedestrian and transit-user needs are identified and addressed during system and corridor planning, project initiation, scoping, and programming.

- Collaborating with local and regional partners to plan, develop and maintain effective bicycle, pedestrian and transit networks.

- Consulting locally adopted bicycle, pedestrian and transit plans to ensure that State highway system plans are compatible with these.

- Ensuring the project is planned, designed, constructed, operated and maintained to provide for the safety and mobility needs of all users who have a legal right to access a transportation facility. The Department has been working with the San Mateo County Transportation Authority (SMCTA) and the cities of Menlo Park and East Palo Alto on the purpose and need, scope and design features of the project.

- Implement current design standards that meet the needs of bicyclists, pedestrians and transit users in design, construction and maintenance work zones, encroachment permit work and in system operations.

Regional Transportation Plans/Programs

As explained in the beginning of Chapter 1, the proposed project is included in the Metropolitan Transportation Commission's current Regional Transportation Plan (RTP), the *Transportation 2035 Plan for the San Francisco Bay Area*.

Local Plans/Programs

Existing Class II bike lanes on Willow Road currently terminate at Durham Street to the west and Newbridge Street to the east of the overcrossing. The proposed Class I and Class II bike lanes, as described in the Build Alternative section of Chapter 1, will run between the southbound on-ramps and northbound on-ramps in each direction of the reconstructed Willow Road overcrossing. The gaps between the existing Class II bike lanes and the reconstructed overcrossing will remain undesignated, unless further action is taken in cooperation between the Department and cities of Menlo Park and East Palo Alto.

The project is consistent with the objectives of local plans and programs, including the *San Mateo County Comprehensive Bicycle and Pedestrian Transportation Plan* (2011), the *General Plan* of the City of Menlo Park (1994), the *Menlo Park Comprehensive Bicycle Development Plan* (2005) and the *East Palo Alto Bicycle Transportation Plan* (2011) by providing Class I and Class II bike facilities on the reconstructed overcrossing.

Avoidance, Minimization, and/or Mitigation Measures

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

2.3 RELOCATIONS AND REAL PROPERTY ACQUISITION

Regulatory Setting

The Department's Relocation Assistance Program (RAP) is based on the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970 (as amended) and Title 49 Code of Federal Regulations (CFR) Part 24. The purpose of RAP is to ensure that

persons displaced as a result of a transportation project are treated fairly, consistently, and equitably so that such persons will not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole.

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

Affected Environment

The existing right-of-way for the project vicinity consists of property owned in fee by the State with no easements. This property includes the existing roadway within the interchange, including that on the Willow Road overcrossing structure, areas under the overcrossing structure including the US 101 mainline, and on-/off-ramps and shoulder areas required for the current roadway alignment and overcrossing to function and be maintained.

Environmental Consequences

The proposed project, as explained in Chapter 1, will consist of reconstructing the interchange by reconfiguring the on- and off-ramps as well as reconstructing sound walls. Therefore, acquisition of right-of-way will be necessary to accommodate the proposed project as well as to maintain all of the surrounding local streets in both directions for traffic.

Right-of-way requirements for the project are listed in Table 6 and are subject to change and the sizes and types of each requirement will be finalized by the design/right-of-way phase of the project. No owners, tenants, businesses or persons would be displaced by the project. None of the structural improvements (i.e., dwelling units) to the affected properties will be impacted by the project.

Table 6 - Proposed Right-of-Way Requirements

San Mateo County Assessor's Parcel Number	Address (Type of property)	Anticipated Type of Right-of-Way Required
062-221-100	227 Holland Street, East Palo Alto (single-family residential)	Partial Acquisition
062-221-290	229 Holland Street, East Palo Alto (single-family residential)	Partial Acquisition
062-120-010	No address, East Palo Alto (vacant property)	Partial Acquisition
062-121-160	1153 Saratoga Avenue, East Palo Alto (single-family residential)	Temporary Construction Easement
062-121-120	1149 Saratoga Avenue, East Palo Alto (single-family residential)	Temporary Construction Easement
062-121-140	1143 Saratoga Avenue, East Palo Alto (single-family residential)	Temporary Construction Easement
062-093-440	1105 Willow Road, Menlo Park (multi-family residential)	Partial Acquisition
062-470-050	795 Willow Road, Menlo Park (business/non-profit)	Partial Acquisition

San Mateo County Assessor's Parcel Number	Address (Type of property)	Anticipated Type of Right-of-Way Required
062-241-330	999 Bayshore Road, East Palo Alto (business/non-profit)	Partial Acquisition
062-221-340	807 Bayshore Road, East Palo Alto (business/non-profit)	Partial Acquisition

Upon the appraisal and inspection of the proposed right-of-way acquisition by the Department at future meetings between the affected property owner(s) and/or tenant(s) and Department right-of-way representatives, the owner(s)/tenant(s) may qualify for relocation assistance benefits for the possible relocation of any personal property within required right-of-way areas encountered during inspection. No other RAP benefits or entitlements are anticipated.

In addition, portions of existing right-of-way on adjacent streets including Pierce Road, Van Buren Road and Bay Road in Menlo Park, and East Bayshore Road in East Palo Alto, will be required for the project. This right-of-way will be acquired by the State pursuant to Section 83 of the California Streets and Highways Code.

Avoidance, Minimization, and/or Mitigation Measures

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

2.4 UTILITIES/EMERGENCY SERVICES

Affected Environment

Several utilities that exist within the project limits will require relocation. These include gas, electric, sewer, cable and water lines.

Environmental Consequences

Underground utilities that are within or near the project vicinity will be investigated through potholing during the design phase of the project and will be modified as required during construction.

No law-enforcement, fire or other emergency services would be affected by the project. A detailed Transportation Management Plan (TMP) will be prepared for the project and is discussed in the Avoidance, Minimization, and/or Mitigation Measures of the Traffic and Transportation/Pedestrian and Bicycle Facilities section of this chapter.

Avoidance, Minimization, and/or Mitigation Measures

No avoidance, minimization, or mitigation measures are proposed.

2.5 TRAFFIC AND TRANSPORTATION/PEDESTRIAN AND BICYCLE FACILITIES

Affected Environment

The *Route 101/Willow Road Interchange Improvements Traffic Operations Analysis Report* was prepared for the project and completed in May 2012. This report is available upon request.

Existing Bicycle and Pedestrian Facilities

As explained in Chapter 1, there is 10.4-foot wide sidewalk in the westbound direction and a 6.1-foot wide sidewalk on the eastbound direction of the Willow Road overcrossing. The existing Class II bicycle lanes on Willow Road end at Durham Street on the west and Newbridge Street on the east.

Existing Public Transit

Transit service is provided by the San Mateo County Transit District, known as SamTrans, in the cities of Menlo Park and East Palo Alto. SamTrans operates bus routes on Willow Road and US 101 in the project vicinity, including Routes 296, 297, 397 and Line U. The Dumbarton Express bus service and the City of Menlo Park shuttle service also operate within the project vicinity.

Existing Traffic Conditions

Local street performance is measured using the "level of service" (LOS) concept, whereby traffic demand is evaluated in the context of capacity. Since intersections are a key factor in determining the capacity of local streets, the adopted procedures of most jurisdictions focus on peak-hour operations at intersections. The methodology computes a level of service taking into account factors such as the demand for each traffic movement (i.e., left turns, straight, right turns), the number of lanes, and, where applicable, signal timing. As summarized in Table 7 below, level of service can range from "LOS A," representing free-flow conditions, to "LOS F," representing jammed/over-saturated conditions.

Table 7 – Signalized Intersection Level of Service Definitions

Level of Service	Description	Average Control Delay * Per Vehicle (Seconds)
A	Progression is extremely favorable and most vehicles arrive during the green phase. Short cycle lengths may contribute to this low delay.	Up to 10.0
B	Good progression, short cycle lengths, or both. More vehicles stop than LOS A, causing higher level of delay	10.1 to 20.0
C	Fair progression, longer cycle lengths, or both. Individual cycle failures may begin to appear at this level. The number of vehicles stopping is significant.	20.1 to 35.0
D	Influence of congestion becomes noticeable. Unfavorable progression, long cycle lengths, and high volume/capacity (v/c) ratios. Many vehicles stop, and the proportion of vehicles not stopping declines. Individual cycle failures are noticeable.	35.1 to 55.0
E	Poor progression, long cycle lengths, and high v/c ratios. Individual cycle failures are frequent.	55.1 to 80.0
F	Arrival flow rates exceed the capacity of the lane groups and the intersection is oversaturated. High v/c ratios with many individual cycle failures. Poor progression, long cycle lengths may also contribute significantly to high delay levels. This level, considered unacceptable to most drivers.	Greater than 80.0

Source: Transportation Research Board, *2000 Highway Capacity Manual*, (Washington D.C. 2000)
*Average Control Delay includes the time for initial deceleration delay, queue move-up time, stopped delay, and final acceleration.

Additionally, the level of service concept can be applied to freeways as described in Table 8 below ranging from "LOS A," representing free-flow speeds, to "LOS F," representing a breakdown in flow.

Table 8 – Freeway Level of Service Definitions

Level of Service	Description	Density (passenger cars/mile/lane)
A	Free-flow speeds prevail. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream.	Up to 11.0
B	Free-flow speeds are maintained. The ability to maneuver with the traffic stream is only slightly restricted.	11.1 to 18.0
C	Flow with speeds at or near free-flow speeds. Freedom to maneuver within the traffic stream is noticeably restricted, and lane changes require more care and vigilance on the part of the driver.	18.1 to 26.0
D	Speeds decline slightly with increasing flows. Freedom to maneuver with the traffic stream is more noticeably limited, and the driver experiences reduced physical and psychological comfort.	26.1 to 35.0
E	Operation at capacity. There are virtually no usable gaps within the traffic stream, leaving little room to maneuver. Any disruption can be expected to produce a breakdown with queuing.	35.1 to 45.0
F	Represents a breakdown in flow.	Greater than 45.0

Source: Transportation Research Board, *2000 Highway Capacity Manual*, (Washington D.C. 2000)

The analysis area encompasses the segment of US 101 from south of the Embarcadero Road/Oregon Expressway Interchange to just north of the Woodside Road interchange, including all on- and off-ramps within these limits. The study area also includes the segment of Willow Road between Durham Street to O'Brien Drive. This segment of Willow Road includes four signalized intersections: Durham Street, Bay Road, Newbridge Street and O'Brien Drive. The analysis encompassed the weekday AM and PM peak periods that were defined as 6:00 AM to 10:00 AM and 3:00 PM to 7:00 PM, respectively. The analysis conducted for this study examined two horizon year scenarios: 2020 "Opening Year" and 2040 "Design Year".

Freeway Congestion and Queuing Observations - Weekday AM Peak Period

During the AM peak period, varying levels of congestion were observed on southbound US 101 in the southern portion of the analysis area. No congestion was observed on northbound US 101. A more detailed description of the weekday AM peak period operating and queuing conditions by facility and direction is provided in the following paragraphs.

Southbound US 101

A bottleneck between the University Avenue on-ramp and Oregon Expressway/Embarcadero Road off-ramp was observed during the AM peak period. The queue extended as far as the Woodside Road interchange. A minor bottleneck was also

observed between the Oregon Expressway/Embarcadero Road on-ramp and the San Antonio Road off-ramp, and that the queue from this bottleneck can spill back into the Oregon Expressway/Embarcadero Road interchange.

Northbound US 101

No freeway mainline bottlenecks or congestion within the study area were observed during the AM peak period.

Ramps/Connectors

Some queuing on the northbound off-ramp to westbound Willow Road was observed due to congestion on Willow Road resulting from the lane-drop west of Bay Road. However, the ramp queues were observed to be of short duration and did not impact mainline operations. No other congestion was observed on the ramps during the AM peak period.

Intersections

In the westbound direction on Willow Road queuing was observed at the lane-drop west of Bay Road, beginning late in the second hour and dissipating in the last hour of the peak period. At the peak, the queue extends just west of Newbridge Street.

Freeway Congestion and Queuing Observations - Weekday PM Peak Period

During the PM peak period, significant levels of congestion were observed in the southbound direction of US 101. No congestion was observed on northbound US 101. A more detailed description of the weekday PM peak period congestion and queuing conditions, broken down by facility and direction, is provided in the paragraphs below.

Southbound US 101

A bottleneck was observed between the Oregon Expressway/Embarcadero Road on-ramp and the San Antonio Road off-ramp. The queue was observed to extend as far as the Woodside Road interchange. There was also a bottleneck downstream of the study area in the segment between the Rengstorff Avenue on-ramp and the Old Middlefield Road on-ramp. The queue from this bottleneck was observed to extend beyond the Oregon Expressway/Embarcadero Road interchange.

Northbound US 101

No freeway mainline bottleneck was observed; however, traffic slows down in the vicinity of the on-ramp from Oregon Expressway/Embarcadero Road. Traffic flows on the freeway mainline are controlled by bottlenecks upstream of the study segment.

Ramps/Connectors

Southbound US 101 on-ramp from Oregon Expressway/Embarcadero Road: Queues were observed due to a combination of the congestion on the Route 101 mainline and the high demands at this on-ramp during most of the PM peak period. Queues began to dissipate toward the end of the PM peak period.

Northbound US 101 on-ramp from Oregon Expressway/Embarcadero Road: Queues were observed due to a combination of the high volumes on the US 101 mainline and the high demands at this on-ramp during most of the PM peak period.

Northbound US 101 off-ramp to eastbound Willow Road: Queues were observed to extend from the Newbridge Street intersection onto the off-ramp. The queue, however, was not observed to spill back to the freeway mainline.

Intersection Observations

Queues were observed in the eastbound direction at Newbridge Street beginning around 5:30 PM and dissipating around 6:45 PM. At the peak, the queue on Willow Road extended just beyond the merge with the northbound US 101 off-ramp.

Traffic Demand

Year 2020 (opening year) and Year 2040 (design year) traffic demand forecasts were used as the basis for the project alternatives traffic operational analysis. For each horizon year, the base or No Build forecasts were developed. Because the project is considered an operational improvement project, it was assumed that these modifications would not cause a change in the overall travel demands or origin-destination patterns with the study area, and would only result in the re-distribution of traffic between ramps at the Willow Road interchange. As part of this, the demand volumes at the other adjacent interchanges and at the four existing intersections along the study segment of Willow Road would not change from the No Build Alternative. The interchange modifications would only result in the re-distribution of traffic between the Willow Road interchange ramps and at the new intersections.

Project Alternatives

The project proposed involves reconstructing the existing four-quadrant cloverleaf interchange as a partial cloverleaf under the Build Alternative, known as *Alternative 1B - Condensed Partial Cloverleaf* in project documents, including the *Route 101/Willow Road Interchange Improvements Traffic Operations Analysis Report* prepared for the project.

The No Build Alternative assumes no change to the existing four quadrant cloverleaf interchange at Willow Road. However, this Alternative, as well as the Build Alternative, include the following baseline improvements:

- Northbound auxiliary lanes between:
    - San Antonio Road diagonal on-ramp and Oregon Expressway/Embarcadero Road off-ramp,
    - Oregon Expressway/Embarcadero Road on-ramp and University Avenue off-ramp,
    - University Avenue on-ramp and Willow Road diagonal off- ramp, and
    - Willow Road diagonal on-ramp and Marsh Road off-ramp.

- Southbound auxiliary lanes between:
    - Marsh Road diagonal on-ramp and Willow Road diagonal off-ramp,
    - Willow Road diagonal on-ramp and University Avenue off-ramp,
    - University Avenue on-ramp and Oregon Expressway/Embarcadero Road off-ramp, and

- Oregon Expressway/Embarcadero Road on-ramp and San Antonio Road diagonal off-ramp.

- Metering of all Willow Road on-ramps.

No Build Future Traffic Conditions

No Build - Opening Year (2020) Analysis Results - AM Peak Period Conditions

Under the No Build Alternative, the assumed baseline improvements described above would eliminate most congestion on southbound US 101 within the study area. Most notably, the southbound auxiliary lane between University Avenue and Embarcadero Road is expected to eliminate the existing bottleneck in this segment.

However, minor congestion on the freeway is expected to occur within the weaving section between the westbound Willow Road on-ramp and the eastbound Willow Road off-ramp in the southbound direction. Additionally, the ramp meters on both the westbound Willow loop on-ramp and the eastbound Willow diagonal on-ramp to southbound US 101 would become bottlenecks with associated congestion that would affect operations both on the freeway and on Willow Road. The queue from the westbound Willow Road loop on-ramp meter is projected to extend onto westbound Willow Road beyond O'Brien Drive. In turn, this would constrain flows on the northbound US 101 loop off-ramp and eventually the northbound freeway mainline. The queue from the eastbound Willow diagonal on-ramp meter is projected to extend back onto eastbound Willow Road beyond Durham Street.

Network performance measures, freeway travel times and intersection levels of service (LOS) for the No Build Alternative in opening year 2020, AM Peak Period Conditions, are discussed in detail in the *Opening Year (2020) Analysis Results - AM Peak Period Conditions* of the Environmental Consequences-Future Traffic Conditions portion of this section for comparative purposes.

No Build - Opening Year (2020) Analysis Results - PM Peak Period Conditions

As with the AM peak period, the baseline auxiliary lanes improvements in the study area are expected to relieve the existing major bottleneck on the freeway during the PM peak period, leaving only minor congestion at various points along the freeway. Under the No Build Alternative, minor congestion on the freeway is expected to occur within the weaving sections in both directions at the Willow interchange. Similar to the AM peak period, minor queuing is also expected on the approaches to several of the intersections along Willow Road during the PM peak period.

Network performance measures, freeway travel times and intersection levels of service (LOS) for the No Build Alternative in opening year 2020, PM Peak Period Conditions, are discussed in detail in the *Opening Year (2020) Analysis Results - PM Peak Period Conditions* of the Environmental Consequences-Future Traffic Conditions portion of this section for comparative purposes.

No Build - Design Year (2040) Analysis Results - AM Peak Period Conditions

Under the No Build Alternative, the primary southbound bottleneck is within the segment between the Oregon Expressway/Embarcadero Road off-ramp and on-ramp. The queue from this bottleneck is expected to extend through the study area to just north of the

Woodside Road interchange. This congestion, in turn, greatly affects operations on westbound Willow Road and northbound US 101. Due to the heavy congestion on southbound US101 at the merge, the loop on-ramp from westbound Willow Road backs up. The queue from this loop on-ramp is projected to extend onto westbound Willow Road beyond O'Brien Drive. The congestion on westbound Willow Road then constrains flow from the northbound US 101 loop off-ramp causing it to back up onto the northbound freeway mainline with the queue expected to extend well south of the Oregon Expressway/Embarcadero Road interchange beyond the limits of the study area. A second major bottleneck is projected to occur on northbound US 101 within the segment between the Woodside Road off-ramp and loop on-ramp.

Considerable congestion is also projected for eastbound Willow Road due to the constraint at the ramp meter on the on-ramp to southbound US 101. The queue from this meter spills back onto eastbound Willow Road affecting the Bay Road and Durham Street intersections.

Network performance measures, freeway travel times and intersection levels of service (LOS) for the No Build Alternative in design year 2040, AM Peak Period Conditions, are discussed in detail in the *Design Year (2040) Analysis Results - AM Peak Period Conditions* of the Environmental Consequences-Future Traffic Conditions portion of this section for comparative purposes.

No Build - Design Year (2040) Analysis Results - PM Peak Period Conditions

Under the No Build Alternative, a major northbound bottleneck is projected to occur within the weaving section between the eastbound Willow Road loop on-ramp and the westbound Willow Road loop off-ramp. The queue from the bottleneck is expected to extend well south of the Oregon/Embarcadero interchange beyond the limits of the study area. In the southbound direction, bottleneck segments include those between the Marsh Road loop on-ramp and diagonal on-ramp, the weaving section between the westbound Willow Road loop on-ramp and the eastbound Willow Road loop off-ramp, and between the Oregon Expressway/Embarcadero Road on-ramp and the San Antonio Road off-ramp. The queue from the Marsh Road bottleneck is expected to extend north of the Woodside Road interchange outside the study area.

On Willow Road, only minor queuing/congestion is projected in the westbound direction. In the eastbound direction, significant congestion is projected due to the constraint at the ramp meter on the on-ramp to southbound US 101. The queue from this meter spills back onto eastbound Willow Road affecting the Bay Road and Durham Street intersections.

Network performance measures, freeway travel times and intersection levels of service (LOS) for the No Build Alternative in design year 2040, PM Peak Period Conditions, are discussed in detail in the *Design Year (2040) Analysis Results - PM Peak Period Conditions* of the Environmental Consequences-Future Traffic Conditions portion of this section for comparative purposes.

Environmental Consequences

Bicycle and Pedestrian Facilities

As explained in Chapter 1, the project proposes to improve bicycle and pedestrian facilities on the Willow Road interchange. The Build Alternative proposes to construct 6.0-foot wide Class II bike lanes and 8.0-foot wide Class I bike paths on the Willow Road overcrossing

structure in each direction for a total of four bike facilities. The project will improve pedestrian access by constructing 10-foot-wide sidewalks on both sides of the new overcrossing. Additionally, compliance with the Americans with Disabilities Act (ADA) will be provided throughout the project.

On the overcrossing, the Class I facility will be between the 4.0-foot-wide shoulder and 10-foot-wide sidewalk with a barrier separating between the shoulder and Class I facility. The Class II facility will be between the third lane (the right through lane) and the fourth lane (the right turn lane) in both directions. The Class I facility will be only on the overcrossing. The Class II facility will conform to the existing Willow Road facility at both ends of the overcrossing in a manner to be determined during the design phase of the project.

Existing bicycle and pedestrian access will be maintained through the construction period, except during critical short-term construction activities requiring closure to perform construction or for safety reasons.

Public Transit

SamTrans Routes 296, 297, 397 and Line U, the Dumbarton Express bus service and the City of Menlo Park shuttle service should not be affected by the construction of the project. Each construction stage will attempt to maintain the existing lanes of traffic on the overcrossing in each direction. Potential lane closures for this project will be made during non-peak travel periods.

Future Traffic Conditions

Opening Year (2020) Analysis Results - AM Peak Period Conditions

Under the Build Alternative, the widening of the on-ramps from Willow Road to southbound US 101 to accommodate one general purpose and one HOV lane at the ramp meter would reduce the queuing and congestion associated with these meters. In the case of the westbound Willow Road loop on-ramp to southbound Route 101, the queue from the ramp meter would no longer back onto Willow Road thus eliminating the associated congestion on westbound Willow Road and on northbound US 101. However, other minor bottlenecks on the freeway appear in the northbound direction. With respect to the eastbound Willow Road on-ramp to southbound US 101 on-ramp, the widening of the on-ramp to add the HOV priority lane at the meter would greatly reduce the queue at the ramp meter such that it would no longer spill back onto Willow Road under the Build Alternative. Minor queuing, defined as vehicles waiting more than one cycle to clear an intersection, is projected for most intersection approaches along Willow Road under these alternatives.

- Network Performance Measures

The 2020 AM peak period network measures of effectiveness for the Build and No Build Alternatives are presented in Table 9, below. As indicated, the Build Alternative shows an increase in vehicle miles of travel (VMT) and average speed, along with a corresponding decrease in vehicle hours of travel (VHT) and vehicle hours of delay (VHD) compared to the No Build Alternative. These changes reflect the improved mobility and operation gained through the modification of the on-ramps to southbound Route 101, notably the elimination of the bottleneck on the westbound Willow Road loop on-ramp to southbound Route 101 and the associated congestion on westbound Willow Road and on northbound Route 101.

Table 9 - Network Performance Measures – 2020 AM Peak Period

Performance Measure	Build Alternative	No Build Alternative
VMT	519,302	490,810
VHT	9,892	12,192
VHD	1,596	4,407
Speed (miles per hour)	52	40

- Freeway Travel Times

The AM freeway travel times for the Build and No Build Alternatives in year 2020 are presented in Table 10, below. As shown, the Build Alternative shows a decrease in average travel time for northbound US 101 compared to the No Build Alternative. Again, this improvement is the result of elimination of the bottleneck on the westbound Willow Road loop on-ramp to southbound US 101 and the associated congestion on northbound US 101. In the southbound direction, the Build Alternative shows a small increase in average travel time compared to the No Build Alternative. In this case, the ramp improvements at the Willow Road interchange allow for more traffic to enter the freeway in the southbound direction resulting in the slightly higher freeway travel times.

Table 10 - Freeway Travel Times – 2020 AM Peak Period

Hour	Build Alternative	No Build Alternative
Northbound US 101 travel time (minutes)		
6 to 7	5.5	5.5
7 to 8	5.8	5.9
8 to 9	6.1	8.9
9 to 10	5.6	13.9
Average	5.8	8.5
Southbound US 101 travel time (minutes)		
6 to 7	5.5	5.4
7 to 8	6.4	5.9
8 to 9	5.8	5.7
9 to 10	5.5	5.4
Average	5.8	5.6

- Intersection Level of Service (LOS)

The AM Peak Hour intersection LOS for the Build and No Build Alternatives in year 2020 are presented in Table 11, below. Under the No Build Alternative, the Bay Road and Newbridge Street intersections are expected to operate at LOS D or worse during the 2020 AM peak hour due to the spillback of the queues from the on-ramps to southbound Route 101. The westbound weave section on Willow Road is expected to operate at LOS F for the same reason. The remaining study intersections and the eastbound weave section are projected to operate at LOS C or better.

Under the Build Alternative, elimination of the bottleneck on the westbound Willow loop on-ramp and the associated congestion on westbound Willow Road is expected to improve operations along Willow Road. The existing intersections are expected to operate at LOS C or better. The two new ramp terminus intersections are expected to operate at LOS C or better.

Table 11 - Intersection Level of Service – 2020 AM Peak Hour

Intersection	Build Alternative		No Build Alternative	
	Delay (seconds)	LOS	Delay (seconds)	LOS
Willow Road at Durham Street	13	B	33	C
Willow Road at Bay Road	21	C	57	E
Willow Road at Newbridge Street	24	C	43	D
Willow Road at O'Brien Drive	18	B	25	C
Willow Road at Northbound US 101 Ramps	14	B	Not Applicable (N/A)	N/A
Willow Road a Southbound US 101 Ramps	13	B	N/A	N/A
Weaving LOS at US 101/Willow Road Interchange				
Eastbound Willow Road Weaving Segment		N/A		A
Westbound Willow Road Weaving Segment		N/A		F

Opening Year (2020) Analysis Results - PM Peak Period Conditions

The Build Alternative would eliminate the weave sections and associated bottlenecks at the Willow Road interchange, but other minor bottlenecks appear. As with the No Build Alternative, minor queuing is also projected along Willow Road. Off-ramp queues are not expected to back onto the freeway mainline, and on-ramp queues are not expected to back onto Willow Road.

- Network Performance Measures

The 2020 PM peak period network measures of effectiveness for the Build and No Build Alternative are presented in Table 12, below. As indicated, the Build Alternative shows a slight improvement in all network performance measures compared to the No Build Alternative despite the addition of the two new signals along Willow Road. This improvement may be the result of the widening of the on-ramps at the Willow Road interchange.

Table 12 - Network Performance Measures – 2020 PM Peak Period

Performance Measure	Build Alternative	No Build Alternative
VMT	568,446	566,714
VHT	11,038	11,254
VHD	2,052	2,225
Speed (miles per hour)	51	50

- Freeway Travel Times

The PM peak period freeway travel times for the Build and No Build Alternatives are presented in Table 13, below. As shown, the Build Alternative shows a decrease in average freeway travel time compared to the No Build Alternative, most notably in the northbound direction due to elimination of the weave section at the Willow Road interchange.

Table 13 - Freeway Travel Times – 2020 PM Peak Period

Hour	Build Alternative	No Build Alternative
Northbound US 101 travel time (minutes)		
6 to 7	5.7	5.6
7 to 8	5.8	5.6
8 to 9	6.0	6.1
9 to 10	6.0	8.4
Average	5.9	6.4
Southbound US 101 travel time (minutes)		
6 to 7	5.7	5.7
7 to 8	5.9	6.1
8 to 9	5.7	6.0
9 to 10	5.5	5.5
Average	5.7	5.8

- Intersection Level of Service (LOS)

The 2020 PM peak hour intersection LOS for all alternatives are presented in Table 14 below. Under the No Build Alternative, all intersections are expected to operate at LOS C or better. Additionally, the eastbound and westbound weave sections on Willow Road are expected to operate at LOS A in the PM peak hour. In the Build Alternative, the existing intersections, as well as the two new ramp terminus intersections, are also expected to operate at LOS C or better.

Table 14 - Intersection Level of Service – 2020 PM Peak Hour

	Build Alternative		**No Build Alternative**	
Intersection	Delay (seconds)	LOS	Delay (seconds)	LOS
Willow Road at Durham Street	24	C	25	C
Willow Road at Bay Road	22	C	30	C
Willow Road at Newbridge Street	30	C	31	C
Willow Road at O'Brien Drive	12	B	14	B
Willow Road at Northbound US 101 Ramps	24	C	Not Applicable (N/A)	N/A
Willow Road a Southbound US 101 Ramps	19	B	N/A	N/A
Weaving LOS at US 101/Willow Road Interchange				
Eastbound Willow Road Weaving Segment		N/A		A

Westbound Willow Road Weaving Segment		N/A		A

Design Year (2040) Analysis Results - AM Peak Period Conditions

Under the Build Alternative, the northbound bottleneck on US 101 at the loop off-ramp to westbound Willow Road would be eliminated as this ramp would be closed. This reveals a less severe bottleneck in the section from University Avenue to Willow Road. Unlike the queue in the No Build Alternative, the queue from this bottleneck would not extend beyond the study boundary. There is essentially no change in southbound condition with the proposed project.

On Willow Road, considerable congestion similar to No Build Alternative is expected in the westbound direction under the Build Alternative due to the spillback of the queue from the loop on-ramp to southbound US 101.

In the eastbound direction, the widening of the eastbound Willow Road on-ramp to southbound US 101 on-ramp would greatly reduce the queue spillback from the ramp meter onto eastbound Willow Road under the Build Alternative.

- Network Performance Measures

The 2040 AM peak period network measures of effectiveness for the Build and No Build Alternatives are presented in Table 15, below. As suggested by these network performance measure results, the level of mobility and operation improves under the Build Alternative compared to the No Build Alternative. The increases in vehicle miles of travel (VMT) and average speed, combined with the reduction in vehicle hours of travel (VHT) and vehicle hours of delay (VHD), indicate a reduced level of congestion that allows vehicles to better move within and through the study network.

Table 15 - Network Performance Measures – 2040 AM Peak Period

Performance Measure	Build Alternative	No Build Alternative
VMT	1,169,800	1,120,977
VHT	33,426	36,824
VHD	15,552	19,631
Speed (miles per hour)	35	30

- Freeway Travel Times

The AM freeway travel times for all 2040 alternatives are presented in Table 16 below. As shown, the Build Alternative shows a considerable decrease in freeway travel time compared to the No Build Alternative for both directions.

Table 16 - Freeway Travel Times – 2040 AM Peak Period

Hour	Build Alternative	No Build Alternative
Northbound US 101 travel time (minutes)		
6 to 7	5.6	5.6
7 to 8	9.7	10.7
8 to 9	14.7	18.4
9 to 10	10.2	18.3
Average	10.1	13.2
Southbound US 101 travel time (minutes)		
6 to 7	5.4	5.5
7 to 8	6.4	6.4
8 to 9	8.5	16.4
9 to 10	17.4	19.7
Average	9.4	12.0

- Intersection Level of Service (LOS)

Levels of service during the AM Peak Hour for the Build and No Build Alternatives are presented in Table 17, below. For the No Build Alternative, the LOS for the weave sections on Willow Road is also presented in this Table. Under the No Build Alternative, the four existing intersections are expected to operate at LOS D or E during the 2040 AM peak hour. Additionally, the eastbound weave section on Willow Road is expected to operate at LOS A, while the westbound weave section is projected to operate at LOS F.

Under the Build Alternative, the existing intersections are also expected to operate at LOS D/E. The new northbound off-ramp terminus intersection is expected to operate at LOS E, while the intersection at the southbound off-ramp terminus is expected to operate at LOS C.

Table 17 - Intersection Level of Service – 2040 AM Peak Hour

	Build Alternative		**No Build Alternative**	
Intersection	Delay (seconds)	LOS	Delay (seconds)	LOS
Willow Road at Durham Street	41	D	56	E
Willow Road at Bay Road	65	E	74	E
Willow Road at Newbridge Street	78	E	58	E
Willow Road at O'Brien Drive	58	E	36	D
Willow Road at Northbound US 101 Ramps	56	E	Not Applicable (N/A)	N/A
Willow Road a Southbound US 101 Ramps	35	C	N/A	N/A
Weaving LOS at US 101/Willow Road Interchange				
Eastbound Willow Road Weaving Segment		N/A		A

Westbound Willow Road Weaving Segment		N/A		F

Design Year (2040) Analysis Results - PM Peak Period Conditions

Under the Build Alternative, the northbound Route 101 bottleneck at the Willow Road interchange weave section would be eliminated, thus revealing a bottleneck in the section from University Avenue to Willow Road. While this bottleneck would be less severe, the queue is still expected to extend beyond study boundary. In the southbound direction, the proposed project would eliminate the minor bottleneck at the Willow Road interchange weave section, but would reveal a minor bottleneck at the University Avenue on-ramp merge. The southbound bottlenecks between the Marsh Road loop on-ramp and diagonal on-ramp, and between the Oregon Expressway/Embarcadero Road on-ramp and San Antonio Road off-ramp would remain.

On Willow Road, conditions under the Build Alternative would generally be better than those under the No Build Alternative. Notably, the widening of the eastbound Willow Road to southbound US 101 on-ramp would eliminate the queue spillback onto eastbound Willow Road during the PM peak period.

- Network Performance Measures

The 2040 PM peak period network measures of effectiveness for the Build and No Build Alternatives are presented in Table 18, below. As suggested by these network performance measure results, the level of mobility and operation improves under the Build Alternative compared to the No Build Alternative. The increases in vehicle miles of travel (VMT) and average speed, combined with the reduction in vehicle hours of travel (VHT) and vehicle hours of delay (VHD), indicate a reduced level of congestion that allows vehicles to better move within and through the study network. Much of this benefit may be due to the elimination of the northbound Route 101 bottleneck at the Willow Road interchange weave section and the widening of the on-ramps at the ramp meters.

Table 18 - Network Performance Measures – 2040 PM Peak Period

Performance Measure	Build Alternative	No Build Alternative
VMT	1,369,539	1,288,870
VHT	37,936	46,618
VHD	16,836	26,684
Speed (miles per hour)	36	28

- Freeway Travel Times

The PM freeway travel times for the Build and No Build Alternatives are presented in Table 19, below. As shown, the Build Alternative shows a significant decrease in both northbound and southbound freeway travel times compared to the No Build Alternative.

Table 19 - Freeway Travel Times – 2040 PM Peak Period

Hour	Build Alternative	No Build Alternative
Northbound US 101 travel time (minutes)		
6 to 7	6.6	6.2
7 to 8	7.3	10.1
8 to 9	8.2	11.7
9 to 10	8.1	15.0
Average	7.5	10.7
Southbound US 101 travel time (minutes)		
6 to 7	6.5	7.3
7 to 8	8.4	12.3
8 to 9	14.0	16.5
9 to 10	10.6	9.5
Average	9.9	11.4

- Intersection Level of Service (LOS)

Intersection levels of service during the PM peak hour for the Build and No Build Alternatives are presented in Table 20, below.

Under the No Build Alternative, the Bay Road and Durham Street intersections are expected to operate at LOS D or worse during the 2040 PM peak hour due to the spillback of the queue from the eastbound Willow Road on-ramp to southbound US 101. The Newbridge Street intersection is also expected to operate at LOS D, due largely to high eastbound demand including that from the northbound US 101 off-ramp. The O'Brien Drive intersection is expected to operate at LOS B during the 2040 PM peak hour. The eastbound and westbound weave sections on Willow Road are expected to operate at LOS A.

Under the Build Alternative, the existing intersections, as well as the two new ramp terminus intersections, are also expected to operate at LOS D or better.

Table 20 - Intersection Level of Service – 2040 PM Peak Hour

Intersection	Build Alternative		No Build Alternative	
	Delay (seconds)	LOS	Delay (seconds)	LOS
Willow Road at Durham Street	23	C	45	D
Willow Road at Bay Road	22	C	61	E
Willow Road at Newbridge Street	44	D	40	D
Willow Road at O'Brien Drive	14	B	13	B
Willow Road at Northbound US 101 Ramps	28	C	Not Applicable (N/A)	N/A
Willow Road a Southbound US 101 Ramps	25	C	N/A	N/A
Weaving LOS at US 101/Willow Road Interchange				
Eastbound Willow Road Weaving Segment		N/A		A
Westbound Willow Road Weaving Segment		N/A		A

Comparison to Existing Conditions

Measures of effectiveness in VMT and average speeds for existing AM and PM peak periods, along with opening and design year AM and PM peak periods, is presented in Table 21, below.

Table 21 – Network Performance in Existing Condition compared to Project

Condition	VMT	Speed (miles per hour)
Existing AM Peak Period	456,173	30
Existing PM Peak Period	420,753	30
2020 AM Peak Period (Build)	519,302	52
2020 AM Peak Period (No Build)	490,810	40
2020 PM Peak Period (Build)	568,446	51
2020 PM Peak Period (No Build)	566,714	50
2040 AM Peak Period (Build)	1,169,800	35
2040 AM Peak Period (No Build)	1,120,977	30
2040 PM Peak Period (Build)	1,369,539	36
2040 PM Peak Period (No Build)	1,288,870	28

All future conditions in show an increase in VMT when compared to corresponding existing conditions. Average speeds increase in both opening (2020) and design (2040) years under the Build Alternative compared to corresponding existing conditions. Under the No Build Alternative, average speeds increase initially between existing conditions and the opening year, but then decrease in the design year. The average speed during the PM peak period of the 2040 design year is slightly lower (28 MPH) than it is during the existing PM peak period at 30 MPH.

Existing VMT in Table 21 was calculated by expanding the peak hour data to obtain the four-hour peak-period VMT, whereas the model data obtained for the forecast data provided in the previous paragraphs calculates the peak period VMT based on data obtained from each hour of the peak period model.

Furthermore, it should be noted that comparisons in performance measures between existing conditions and future conditions (both the opening year of 2020 and the design year of 2040 in this case) are generally inappropriate to make because data analyzed for existing conditions is actual data collected in the field whereas any future year data is based on forecast model data. This future forecast model data includes projects that are to be built by the forecast year. For example, the existing data analysis employed for the study did not include the auxiliary lanes that were recently completed on US 101 as a separate project in vicinity of this project; however, the future forecast model data analysis employed for the study assumed that these lanes are in place.

Avoidance, Minimization, and/or Mitigation Measures

Each construction stage will attempt to maintain the existing lanes of traffic on the overcrossing in each direction and on all on- and off-ramps. Potential lane closures for this project will be made during non-peak travel periods. It is anticipated that a Transportation Management Plan (TMP) will be competed for the project which may consist of, but is not limited to, public awareness campaigns and portable changeable-message signs to detour vehicle, bicycle and pedestrian traffic for potential temporary street closures. The Construction Impacts section of this chapter details the stage construction for the project.

Bicycle advocacy groups provided input during the scoping process of this project.

No other avoidance, minimization and/or mitigation measures are proposed.

2.6 VISUAL/AESTHETICS

Regulatory Setting

The California Environmental Quality Act (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 [PRC] Section 21001[b]).

Affected Environment

A *Visual Impact Assessment* was prepared for the project and completed in October 2013. The landscape is characterized as urban, with mature trees planted over 30 years ago, planted along a generally flat geography, except in areas graded with 3:1 (horizontal:vertical) slopes along the freeway as well as at the interchange. The land use within the corridor or project corridor is primarily urban, with a mixture of commercial and residential development. The project corridor is defined as the area of land that is visible from, adjacent to, and outside the highway right-of-way, and is determined by topography, vegetation, and viewing distance. There are no scenic resources along the corridor, nor is the project within a designated State Scenic Highway.

Environmental Consequences

As a result of this project, approximately 148 trees consisting primarily of coast redwood (*Sequoia sempervirens)* and coast live oak (*Quercus agrifolia)* will be removed. It is estimated that 35 trees will be removed in the northeast quadrant of the interchange, 33 trees in the southeast quadrant, 50 trees in the northwest quadrant, and 30 trees in the southwest quadrant. The new southbound off-ramp to Willow Road will be reconfigured and the majority of existing vegetation currently on the freeway side of Bay Road will be removed and in its place will be a sound wall. The townhomes adjacent to this off-ramp will lose the current tree screening and the second stories of these townhomes will be exposed to the freeway. In the southeast quadrant, existing trees and vegetation will be removed to accommodate a new on-ramp and off-ramp. In the northeast quadrant, an existing stand of mature eucalyptus trees will be removed along Willow Road to allow for the realignment of the northbound on-ramp. There will be no opportunity to replant with trees in these areas.

The process used in the analysis below generally follows the guidelines outlined in the publication "Visual Impact Assessment for Highway Projects", Federal Highway Administration (FHWA), Publication No. FHWA-HI-88-054.

Visual Resources and Resource Change

Visual resources of the project setting are defined and identified below by assessing *visual character* and *visual quality* in the project corridor. *Resource change* is assessed by evaluating the visual character and the visual quality of the visual resources that comprise the project corridor before and after the construction of the proposed project.

The visual character of the proposed project will be compatible with the existing visual character of the corridor. In terms of form, line, color, and texture, the current elements are very urban, comprising of paved roads, ramps, sidewalks, traffic signage, and mature trees and landscape. The proposed elements will continue with the same form, line, color and texture and can be enhanced by the addition of color and/or texture to the widened bridge, re-aligned sound walls, railings, barriers, pedestrian fencing etc., to soften and blend them into adjacent areas.

Based on the concepts of vividness, intactness and unity, the visual quality of the existing corridor will be altered somewhat by the proposed project. Vividness, described as the visual power or memorability of landscape components as they combine in distinctive visual patterns, will be slightly altered by the loss of mature trees within the center of the interchange, which singularly create the dominant vertical scale within the project limits.

The intactness, described as the visual integrity of the natural and man-made landscape and its freedom from encroaching elements, will also be slightly affected due to the loss of mature trees and vegetation along the frontage roads which face residential properties. In place of these mature trees and landscape, realigned sound walls and/or retaining walls will be placed closer to the properties.

Unity, defined as the visual coherence and compositional harmony of the landscape, frequently attesting to the careful design of individual man-made components in the landscape, will not change in terms of the project as a whole.

The Resource Change, defined as changes to visual resources as measures by changes in visual character and visual quality, will be moderately low. The average visual resource

change will be the loss of a number of mature trees within the interior of the project. A majority of these trees cannot be replaced due to setback guidelines.

Viewers and Viewer Response

Neighbors' views to the road and highway users' views from the road will be changed under the Build Alternative. Neighbors with views towards the road will lose screening from trees and vegetation; however, their views of the road will be blocked by the newly relocated sound walls and the addition of retaining walls. Some neighbors, especially the residents on Pierce Road and Bay Road, will encounter widened on-ramps and off ramps with sound walls and/or retaining walls, which will be closer in proximity to them. The sound walls and retaining walls will limit their exposure and sensitivity to the roadway; however, residents in multi-story housing units will be exposed to the highway from their upper floors. Highway users on the bridge and reconfigured on-ramps and off-ramps will encounter a wider roadway, and signalized intersections.

Overall, the level of visual change from neighbor's views will be moderate and the level from highway users will be low. Undesirable views that are opened up to the freeway by the loss of mature trees will be somewhat minimized by the sound walls and retaining walls. As a whole, it is anticipated that the average response of all viewer groups will be moderate to low.

Visual Impact

Visual impacts are determined by assessing changes to the visual resources and predicting viewer response to those changes. The most notable visual impact as a direct result of construction of this project will be the wider traffic areas, resulting in increased areas of hardscape, most notably at the two new signalized intersections on Willow Road adjacent to the bridge. Additionally, the loss of mature trees fronting residential properties will reduce the visual quality of the neighborhood.

The project contains no scenic vistas or scenic resources.

The following Figures depict Willow Road looking west toward the overcrossing structure in its existing setting (Figure 4) and a simulation upon completion of the project (Figure 5).

Figure 4 – Willow Road Existing Setting

Figure 5 – Willow Road Simulation at Project Completion

Avoidance, Minimization, and/or Mitigation Measures

The loss of mature trees within view of highway users can be minimized by preserving as many trees as possible, and by replanting with appropriately sized trees, shrubs and groundcover based upon current Department setback requirements. Any retaining walls and sound walls to be constructed or reconstructed, especially along the frontage roads, will minimize light and glare from oncoming traffic that would otherwise be increased as a result of the loss of vegetation.

The following is a summary of measures to avoid or minimize visual impacts that will be incorporated into the project. These will be designed and implemented with concurrence of the Department's District Landscape Architect, and consulted and coordinated with the cities of Menlo Park and East Palo Alto.

1. Include architectural treatment on the widened bridge structure, sound walls, retaining walls, barriers and bridge fencing to improve the visual quality of the built vertical and horizontal elements. Both sides of sound walls shall receive architectural treatments on both sides of each wall that are consistent with the corridor. The starkness of the sound walls can be softened by using colors and textures that will minimize the impact.

2. Preserve as much existing vegetation, especially the mature trees, as possible, and by replanting with large trees where current setback requirements allow, and by replanting with small trees in tighter areas. In most cases, to help offset the loss of trees and vegetation along the frontage roads, the sound walls and retaining walls will be softened by planting vines on them since there will be little opportunity to replant trees due to the lack of plantable area.

3. Utilize street lighting and street signalization consistent with those adjacent to the project on Willow Road.

4. Cut and fill slopes should be contour graded and rounded in order to reflect the contours of adjacent, undisturbed topography to the maximum extent feasible.

5. Provide follow-up highway planting immediately upon completion of the bridge widening project. Replacement planting should be funded by this interchange project and completed as a separate highway planting project with a three year plant establishment period.

The project can minimize the visual effects with a successful replanting project with as many trees and associated vegetation where possible that can soften the rigid lines of the expanded roadway and bridge. The visual remediation will not be fully realized until the replacement trees can attain a certain size, approximately 10+ years from planting, and 5+ years for shrub and groundcover.

2.7 CULTURAL RESOURCES

Regulatory Setting

"Cultural resources" as used in this document refers to all "built environment" resources (structures, bridges, railroads, water conveyance systems, etc.), culturally important

resources, and archaeological resources (both prehistoric and historic), regardless of significance. Laws and regulations dealing with cultural resources include:

Historical resources are considered under the California Environmental Quality Act (CEQA), as well as CA Public Resources Code (PRC) Section 5024.1, which established the California Register of Historical Resources. PRC Section 5024 requires state agencies to identify and protect state-owned resources that meet National Register of Historic Places listing criteria. It further specifically requires the Department to inventory state-owned structures in its right-of-way. Sections 5024(f) and 5024.5 require state agencies to provide notice to and consult with the State Historic Preservation Officer (SHPO) before altering, transferring, relocating, or demolishing state-owned historical resources that are listed on or are eligible for inclusion in the National Register or are registered or eligible for registration as California Historical Landmarks.

Affected Environment

The Department's Office of Cultural Resource Studies completed a Historic Property Survey Report (HPSR) in May 2013 which included an Archaeological Survey Report (ASR) and Historic Resource Evaluation Report (HRER) in accordance with the January 2004 PA described above.

Architectural History Studies

The HRER was completed for the project in February 2013. The Area of Potential Effect (APE) for architectural-history studies includes all properties adjacent to Highway 101 or Willow Road within the project limits. Where properties are separated from the state right-of-way by a frontage road, the properties are included in the APE where there may be alterations to the frontage road or where new sound walls may block existing views from the properties.

Research for these studies was conducted using Department cultural-resource files and library, historic maps at the Earth Sciences (Map) Library at the University of California at Berkeley, and local history materials from the Menlo Park and East Palo Alto public libraries. In addition, online real-estate data was used for San Mateo County Assessor's parcel numbers and for construction dates for the evaluated properties.

Department architectural historians conducted field work for this project on August 7, 2012. The APE for this project includes 34 properties with buildings. 21 of these properties, constructed in 1966 or earlier, were recorded during field work and are evaluated in the HRER. The properties consist of 15 single-family residences, five multi-unit residential buildings, and one religious building.

The only bridge in the APE is the Willow Road overcrossing structure, #35-0084, that will be reconstructed as part of this project. The structure was built in 1956 and was determined ineligible for National Register listing in the statewide historic bridge survey of 2003-2006.

The City of Menlo Park has a heritage tree ordinance that defines a heritage tree as any tree that meets a certain size criteria, and any tree specifically designated by the City Council as a heritage tree. According to the City of Menlo Park website, there are currently no trees specifically designated by the City Council as heritage trees. The stated purpose of the ordinance is to "preserve the scenic beauty and natural environment of the city, prevent erosion of topsoil and sedimentation in waterways, encourage quality development, and

provide shade and wildlife habitat." The City's ordinance treats heritage trees primarily as natural amenities rather than historical resources. There may be some trees in the project area that qualify as heritage trees based on their size. However, there are no trees or groups of trees within the APE that warrant evaluation as possible historic properties. In addition, there are no historic properties for which associated trees or other landscaping would be a contributing feature.

The twenty evaluated residential properties are located in three separate residential subdivisions. The potential for these subdivisions or portions of these subdivisions to meet the National Register criteria was considered, although no district evaluations were prepared. All three of the subdivisions were platted between 1909 and 1927, although most of the houses within these three subdivisions were constructed after World War II. The three subdivisions have linear street patterns typical of prewar subdivisions, rather than the curvilinear streets commonly seen in postwar developments. In all three of the subdivisions, houses built at various times from the late 1940s to the early 1960s are mixed together on each block, indicating that several different builders were probably involved, with each builder constructing a small number of houses on scattered lots. This contrasts with the more typical method of postwar housing construction, whereby a single builder constructs an entire subdivision in a short period of time. None of the three subdivisions are sufficiently cohesive architecturally or possess sufficient integrity to convey a sense of their time, and therefore they do not appear to have the potential to meet the National Register criteria.

Archaeology Studies

The ASR was completed for the project in May 2013. The APE for archaeology studies is the state right-of-way boundary, including the known or reasonably anticipated boundaries of archaeological sites and any locations where construction activities will take place. The proposed construction and construction-related activities along US 101 from Post Mile 1.6 to Post Mile 2.2 will be within State right-of-way, except for four areas of new partial right-of-way acquisition. The proposed project will have maximum depths of 40 feet to accommodate the sound wall piling installation in various locations within the project area. The proximity to the seismically active faults (discussed in the Geology/Soils/Seismic/Topography section of this chapter) and the deep soft mud soils in this region of San Mateo County require that sound wall pilings go to depths of up to 40 feet in order to withstand potential soil liquefaction and ground trembling in the event of an earthquake.

Department staff reviewed Department Cultural Resource Studies Office files, maps and aerial photographs as well as archaeological base maps and site record forms to identify records and locations of any previously identified archaeological or historical sites in the vicinity of the project area. Department staff also conducted a record search at the Northwest Information Center (NWIC) in Rohnert Park, California on October 8. 2012. A 0.5-mile search radius around the project area was used. Two recorded structures (P-41-002286 and P-41-002292) were the only documented resources within the search radius. These resources were located outside the current undertaking's APE. No archaeological resources had been previously recorded and submitted to the NWIC at the time of the record search.

In addition, the following local, state and federal cultural resource inventories were reviewed: National Register of Historic Places (Online database, 02/2013), the California Inventory of Historic Resources (California Department of Parks and Recreation 1976 and updates), California Historical Landmarks (California Department of Parks and Recreation 1990 and

updates), California Points of Historic Interest listing (California Department of Parks and Recreation 1992 and updates).

Archival research of the project area indicated that only one archaeological survey had been conducted within the APE. This survey was conducted within the southwestern quadrant of the current interchange and resulted in negative findings. A geo-archaeological sensitivity study was conducted along Willow Road throughout the project area and a letter report discussing a literature search along US 101 within the APE was documented. The geo-archaeological sensitivity report was conducted by LSA Associates, Inc. for a Department project in 2009.

The Department contacted the Native American Heritage Commission (NAHC) on August 15, 2012, requesting that they conduct a search of their Sacred Lands file to determine if there were known historically significant sites within or near the APE for the proposed project. No Native American cultural resources were reported from the Sacred Lands file records search. The NAHC list of interested Native American groups and individuals was used to send letters inviting participation in our efforts to identify archaeological and Native American resources. All individuals and organizations listed were sent letters requesting input on December 17, 2012. No individuals responded to the initial consultation letters; however, follow-up phone calls or emails were conducted between January 16 and January 17, 2013. During these follow-up contacts, all individuals responded. A few respondents indicated that they recommend Native American monitoring during ground disturbing activities. The Department did not deem it necessary to have tribal monitors during ground disturbing activities due to there being no previously recorded archaeological sites within the project footprint. In order to address concerns, however, a copy of the ASR will be supplied to tribal representatives contacted for this project.

Discovery of Cultural Materials During Construction

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

If human remains are discovered, State Health and Safety Code Section 7050.5 states that further disturbances and activities shall cease in any area or nearby area suspected to overlie remains, and the County Coroner contacted. Pursuant to CA Public Resources Code (PRC) Section 5097.98, if the remains are thought to be Native American, the coroner will notify the Native American Heritage Commission (NAHC) who will then notify the Most Likely Descendent (MLD). At this time, the person who discovered the remains will contact Elizabeth McKee, Chief, Office of Cultural Resource Studies, Department of Transportation, District 4, so that they may work with the MLD on the respectful treatment and disposition of the remains. Further provisions of PRC 5097.98 are to be followed as applicable.

Environmental Consequences

The HRER concludes that none of the twenty-one properties evaluated are eligible for listing on the National Register of Historic Places. In addition, none of these properties are considered historical resources for the purpose of compliance with CEQA. The ASR concludes that no archaeological properties were identified within the Area of Potential Effect for this undertaking.

The Department requested concurrence that none of the properties evaluated in the HRER are eligible for National Register listing from the State Historic Preservation Officer (SHPO) on April 26, 2013. The SHPO concurred with a Finding of No Historic Properties Affected on May 23, 2013.

Avoidance, Minimization, and/or Mitigation Measures

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

Physical Environment

2.8 HYDROLOGY AND FLOODPLAIN

Affected Environment

A *Location Hydraulic Study*, including a Floodplain Evaluation Report Summary, has been prepared for the project and is available upon request.

Floodplain Description

The San Francisquito Creek (SFC) Watershed encompasses an area of approximately 45 square miles. This drainage area encompasses the area from the ridge of the Santa Cruz Mountains, on the crest of the San Andreas Fault, to San Francisco Bay, with approximately 80 percent in San Mateo County and approximately 20 percent in Santa Clara County. The channel length of San Francisquito Creek is approximately 14 miles and begins at the north end of Searsville Lake and ends at San Francisco Bay. The San Francisquito Creek and its 24 tributaries, which includes three main tributaries (Los Trancos Creek, Corte Madera Creek and Bear Creek), drain a funnel-shaped area on the eastern San Francisco Peninsula. The SFC Watershed's local jurisdictions are the incorporated cities and towns of Portola Valley, parts of Woodside, Menlo Park, East Palo Alto and Palo Alto, as well as Stanford University and other unincorporated lands in the counties of San Mateo and Santa Clara.

Elevations within the watershed range from sea level to 2,200 feet above sea level at the ridge of the Santa Cruz Mountains. From the ridge, the terrain slopes from steep to gently until it reaches the center of the watershed where San Francisquito Creek begins at approximately 300 feet above sea level. The creek exists in the foothills above Stanford University for only a few miles before it flattens to a gentler slope as it crosses the valley floor. The upper portion of the watershed consists of low-density residential development, while the lower portion on the relatively flat valley floor has been extensively developed. This lower region includes a wide variety of land uses and natural habitats including residential, university, commercial shopping centers, open space preserves, grazing land, and a biological preserve. Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps (FIRM) show that the majority of residential development and the majority of properties are within the boundary of the base floodplain.

The fact that the SFC Watershed begins in the high altitude of the Santa Cruz Mountains, combined with the soil types and the presence of a dam in the center of the watershed, has considerably altered the sediment regime and therefore the creek's capacity for handling floodwaters. As a result, more than three quarters of the reservoir is filled with sediment. Residential areas on the upstream of the reservoir have begun to experience flooding. Severe bank erosion in the highly urbanized area below the reservoir threatens schools, public roads, homes and businesses. The watershed has been listed as an "impaired water body" by the State Water Resources Control Board due to sediment.

Historic Flooding

Three state and federal highway routes, State Route 84, US 101 and Interstate 280, as well as CalTrain, a commuter rail service, run through the SFC Watershed and are potentially affected by flooding. San Francisquito Creek begins at the Searsville Lake Dam and flows through Stanford University and the cities of Palo Alto, Menlo Park, and East Palo Alto. The

creek then discharges to San Francisco Bay in the vicinity of the Palo Alto Airport. This entire lower region of the SFC Watershed is subject to flooding according to the latest FIRM from FEMA. US 101 has been closed several times due to flooding over the decades, affecting Bay Area motorists that utilize this major commute corridor.

According to FEMA Study (dated August 23, 1999) and SFC Watershed Study (prepared by the Santa Clara Valley Water District in 2007), San Francisquito Creek has overflowed eleven times since 1910. Three peak floods took place in 1982, 1998 and 2005.

The 1998 event, a 70-year flood event that was subject to El Nino storm effects and high tides, record flows occurred which produce a flood discharge of 7,100 cubic feet per second (cfs). Water overtopped at 15 locations, flooded over 11,000 acres and 1,100 homes, caused the evacuation of 500 residents, closed the Palo Alto Airport, closed southbound US 101 for nearly 20 hours, and resulted in more than $28 million in damages.

In December 1955, the previous flood of record with a maximum discharge of 5,560 cfs, floodwaters overtopped San Francisquito Creek at two locations west of East Palo Alto in Menlo Park. The floodwaters passed through East Palo Alto and Menlo Park, and US 101 at Laurel Avenue before flowing to the northeast toward San Francisco Bay, inundating a portion of East Palo Alto from US 101 northward near Alberni Street. Large areas of Palo Alto were flooded, inundating about 1,200 acres of commercial and residential property and about 70 acres of agricultural land.

In April 1958, storms caused a levee failure downstream of US 101, flooding the Palo Alto Airport, the city landfill, and golf course to a depth of nearly four feet. In 1982, San Francisquito Creek overflowed near Alpine Road at University Avenue and downstream of US 101, causing extensive damage to private and public property.

Floodplain Assessment

The proposed project area lies within the 100-year floodplain designated on the latest FEMA Flood Insurance Rate Map (FIRM), which is shown in Figure 6. The project area north of the Willow Road interchange falls within Zone X and Zone A; and south of the interchange falls within Zone X and Zone AH. According to FEMA definitions, Zone X (unshaded on FIRMs) consists of areas of moderate flood hazard, usually the area between the limits of the 100-year and 500-year floods. Zone A consists of areas with a 1 percent annual chance of flooding and a 26 percent chance of flooding over the life of a 30-year mortgage. Zone AH consists of areas with a 1 percent annual chance of shallow flooding, usually in the form of a pond, with an average depth ranging from 1 to 3 feet.

During the flood event in 1955, the floodwater overtopped San Francisquito Creek traveling along Laurel Avenue, then passing through US 101 to flood both the upper part in Menlo Park and the lower part in East Palo Alto. In the early 1990s, the Department initiated a sound-wall and median-barrier project to allow floodwaters to pass through the State right-of-way during a flood event for this section of US 101. The staggered sound wall opening at Laurel Avenue near the Willow Road southbound US 101 on-ramp was installed in 1995. The median thrie beam barriers, which replaced concrete barriers, were installed during the same project for the purpose of passing floodwater. A thrie beam barrier is a type of corrugated barrier with three ridges. No similar 1955 flooding has been documented since that time. Near the sound wall opening, there is an open area with considerable storage for floodwater between the roadway pavement and sound walls. Studies conducted by the Department indicate that with the water spread encroaching shoulders, the southbound on-

/off-ramps and lanes 3 and 4 of the travel way would handle the peak flow of approximately 140 cfs. Based on the roadway profile and pavement elevations as shown on the base map, excessive flow would spill through the southbound roadway shoulder and lanes #3 and #4 of the travel way northward about 6,000 feet from the US 101/Willow Road interchange before passing the median to flood northbound US 101.

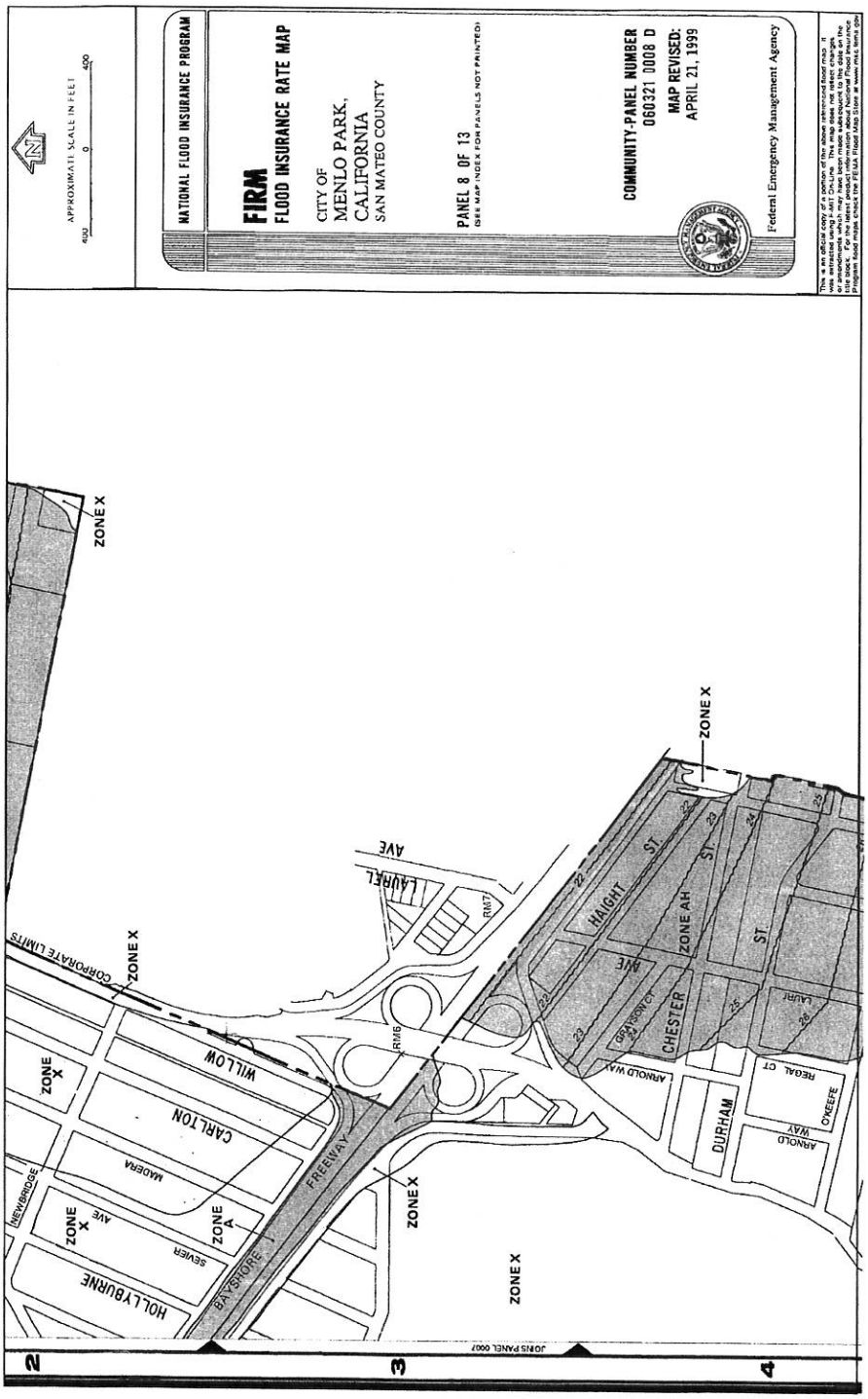
Environmental Consequences

The proposed project consists of reconstructing the existing US 101/Willow Road (State Route 114) interchange to a partial cloverleaf. The project is not expected to have any significant impacts on the floodplain provided the proposed sound wall configurations and drainage patterns remain the same as existing on both northbound and southbound of the US 101 mainline. No significant impacts are expected because the majority of the proposed work is on the bridge and ramp structure.

Avoidance, Minimization, and/or Mitigation Measures

Any temporary construction platforms built to provide access for the proposed project have to be built so as not to impede the flow of the existing drainage. No other avoidance, minimization and/or mitigation measures are proposed.

Figure 6 – Flood Insurance Rate Map (FIRM)



2.9 WATER QUALITY AND STORM WATER RUNOFF

Regulatory Setting

Federal Requirements: Clean Water Act

In 1972 Congress amended the Federal Water Pollution Control Act, making the addition of pollutants to the waters of the United States (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 comply with the NPDES permit scheme. Important CWA sections are:

- Sections 303 and 304 require states to promulgate water quality standards, criteria, and guidelines.

- Section 401 requires an applicant for a federal license or permit to conduct any activity, which may result in a discharge to waters of the U.S. to obtain certification from the state that the discharge will comply with other provisions of the act. This is most frequently required in tandem with a Section 404 permit request (see below).

- Section 402 establishes the NPDES, a permitting system for the discharges (except for dredge or fill material) of any pollutant into waters of the U.S. Regional Water Quality Control Boards (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 the U.S. Army Corps of Engineers (USACE).

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 Section 404 (b)(1) Guidelines (U.S. EPA Code of Federal Regulations [CFR] 40 Part 230), and whether permit approval is in the public interest. The Section 404(b)(1) 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 if there is a least environmentally damaging practicable alternative (LEDPA), to the proposed discharge that would have lesser effects on waters of the U.S., and not have any

other significant adverse environmental consequences. According to the Guidelines, documentation is needed that a sequence of avoidance, minimization, and compensation measures has been followed, in that order. The Guidelines also restrict permitting activities that violate water quality or toxic effluent 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.

State Requirements: Porter-Cologne Water Quality Control Act

California's Porter-Cologne Act, enacted in 1969, provides the legal basis for water quality regulation within California. This Act requires a "Report of Waste Discharge" for any discharge of waste (liquid, solid, or gaseous) to land or surface waters that may impair beneficial uses for surface and/or groundwater of the state. It predates the CWA and regulates discharges to waters of the state. Waters of the state include more than just waters of the U.S., like groundwater and surface waters not considered waters of the U.S. Additionally, it prohibits discharges of "waste" as defined and this definition is broader than the CWA definition of "pollutant". Discharges under the Porter-Cologne Act are permitted by Waste Discharge Requirements (WDRs) and may be required even when the discharge is already permitted or exempt under the CWA.

The State Water Resources Control Board (SWRCB) and RWQCBs are responsible for establishing the water quality standards (objectives and beneficial uses) required by the CWA, and regulating discharges to ensure compliance with the water quality standards. Details regarding water quality standards in a project area are contained in the applicable RWQCB Basin Plan. In California, Regional Boards designate beneficial uses for all water body segments in their jurisdictions, and then set criteria necessary to protect these uses. Consequently, the water quality standards developed for particular water segments are based on the designated use and vary depending on such use. In addition, the SWRCB 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 or non-point source controls (NPDES permits or WDRs), the CWA requires the establishment of Total Maximum Daily Loads (TMDLs). TMDLs specify allowable pollutant loads from all sources (point, non-point, and natural) for a given watershed.

State Water Resources Control Board and Regional Water Quality Control Boards

The SWRCB administers water rights, sets water pollution control policy, and issues water board orders on matters of statewide application, and oversees water quality functions throughout the state by approving Basin Plans, TMDLs, and NPDES permits. RWCQBs are responsible for protecting beneficial uses of water resources within their regional jurisdiction using planning, permitting, and enforcement authorities to meet this responsibility.

- **National Pollution Discharge Elimination System (NPDES) Program**

  Municipal Separate Storm Sewer Systems (MS4)

  Section 402(p) of the CWA requires the issuance of NPDES permits for five categories of storm water discharges, including Municipal Separate Storm Sewer Systems (MS4s). The U.S. EPA 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 the Department as an owner/operator of an MS4 pursuant to federal regulations. The Department's MS4 permit covers all Department 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 Department's MS4 Permit, under revision at the time of this update, contains three basic requirements:

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

2. The Department must implement a year-round program in all parts of the State to effectively control storm water and non-storm water discharges; and

3. The Department storm water discharges must meet water quality standards through implementation of permanent and temporary (construction) Best Management Practices (BMPs), to the Maximum Extent Practicable, and other measures as the SWRCB determines to be necessary to meet the water quality standards.

To comply with the permit, the Department 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 the Department 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 the Department 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 Best Management Practices (BMPs). The proposed project will be programmed to follow the guidelines and procedures outlined in the latest SWMP to address storm water runoff.

Construction General Permit

Construction General Permit (Order No. 2009-009-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 are smaller sites that are part of a larger common plan of development. By law, all storm water discharges associated with construction activity where clearing, grading, and excavation results in soil disturbance of at least one acre must comply with the provisions of the General Construction Permit. Construction activity that results in soil disturbances of less than one acre is subject to this Construction General Permit if there is potential for significant water quality impairment resulting from the activity as determined by the RWQCB. Operators of regulated construction sites are required to develop storm water pollution prevention plans; to implement sediment, erosion, and pollution prevention control measures; and to obtain coverage under the Construction General Permit.

The 2009 Construction General Permit separates projects into Risk Levels 1, 2, or 3. Risk levels are determined during the planning and design phases, and 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 the Department's 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 CWA, any project requiring a federal license or permit that may result in a discharge to a water of the United States must obtain a 401 Certification, which certifies that the project will be in compliance with state water quality standards. The most common federal permits triggering 401 Certification are CWA Section 404 permits issued by USACE. The 401 permit certifications are obtained from the appropriate RWQCB, dependent on the project location, and are required before USACE issues a 404 permit.

In some cases the RWQCB may have specific concerns with discharges associated with a project. As a result, the RWQCB may issue a set of requirements known as Waste Discharge Requirements (WDRs) under the State Water Code (Porter-Cologne Act) that define activities, such as the inclusion of specific features, effluent limitations, monitoring, and plan submittals that are to be implemented for protecting or benefiting water quality. WDRs can be issued to address both permanent and temporary discharges of a project.

Affected Environment

The Department completed a Water Quality Report for the project in April 2013 and is available upon request. The project is located within the San Francisco (SF) Bay RWQCB jurisdiction (Region 2), which is responsible for implementation of State and Federal laws and regulations for water quality protection.

The project site is within the California Interagency Watershed Mapping Committee (CalWater) planning watershed of 2204400304 as well as a Hydrologic Sub-Area (HSA) of 204.40 in San Mateo Bayside Hydrologic Area of South Bay Hydrologic Unit. The project will indirectly discharge to the Upper Crystal Springs Reservoir, which is located about 1/4 mile southwest, via a tributary stream. The project is also located within high-risk watershed (i.e., San Mateo Creek Frontal Watershed). Since the reservoir is designated as a drinking water reservoir for spill response enhancement, the San Francisco Public Utilities Commission (SFPUC) who utilizes and manage the reservoir for domestic use will be notified immediately upon any spills that can be potentially discharge to the reservoir.

The Basin Plan establishes beneficial uses for waterways and water bodies within the region. Beneficial uses for the Temescal Creek include cold freshwater habitat (COLD), water freshwater habitat (WARM), wildlife habitat (WILD), water contact recreation (REC-1), and non-contact water recreation (REC-2).

Under Section 303(d) of the CWA, states, territories and authorized tribes are required to develop a list of water quality limited segments. These waters on the list do not meet water quality standards, even after point sources of pollution have installed the minimum required levels of pollution control technology. The Upper Crystal Springs Reservoir is not listed on the EPA's 303(d) List of Water Quality Limited Segments.

Environmental Consequences

The Department has performed many studies to monitor and characterize highway storm water runoff throughout the State. Pollutants of Concern in runoff found from the "Final Report of the Department BMP (Best Management Practices) Retrofit Pilot Program" were phosphorus, nitrogen, copper, lead, zinc, sediments, general metals (unspecified metals), and litter. Some sources of these pollutants are natural erosion, phosphorus from tree leaves, combustion products from fossil fuels, trash and falling debris from motorists, and the wearing of brake pads.

The project will create disturbed soil area (DSA) of about 2 acres. In addition, the project will create new impervious area of about 7.5 acres and reworked area of about 1.5 acres.

No waters of the State or waters of the U.S. are located within the project limits. Therefore, since no impacts to waters of the State or waters of the U.S. are anticipated, the project is unlikely to require an 404 permit from the U.S. Army Corps of Engineers as well as a 401 Water Quality Certification from the San Francisco Bay RWQCB.

Avoidance, Minimization, and/or Mitigation Measures

According to the Department Permit and the Construction General Permit (CGP), best management practices (BMPs) will be incorporated into this project to reduce the discharge of pollutants during and after construction Since the project has more than one acre of DSA, this project is subject to the CGP, and will require a SWPPP.

In general, BMPs fall into three main categories: (i) Design Pollution Prevention BMPs, (ii) Temporary Construction Site BMPs, and (iii) Permanent Treatment BMPs.

a) Design Pollution Prevention BMPs are permanent measures to improve storm water quality by reducing erosion, stabilize disturbed soil areas, and maximize vegetated surfaces. Design Pollution Prevention BMPs is expected to be required for this project. Erosion control measures will be provided on all disturbed areas.

b) Temporary Construction Site BMPs: These BMPs are applied during construction activities to reduce the pollutants in the storm water discharges throughout construction. This project will require Construction Site BMPs including, but not limited to:

- Soil Stabilization: scheduling, preservation of existing vegetation, slope protection, slope interrupter devices, and channelized flow;
- Sediment Control: run-on or run-off control, storm drain inlets, sediment or desilting basins, and sediment trap;
- Tracking Controls: stabilized construction entrance and exit, tire or wheel wash, stabilized construction roadway, and street sweeping and vacuuming;

- Wind Erosion Controls; hydraulic mulch, hydroseeding, and temporary covers;

- Non-Storm Water Management: temporary stream crossing, clear water diversion, water conservation practices, dewatering operations, paving and grinding operations, potable water/irrigation, vehicle and equipment operations (fueling, cleaning and maintenance), pile driving operations, concrete curing and finishing, and material and equipment use, structure demolition or removal over water; and

- Waste Management and Materials Pollution Control: material delivery and storage, material use, stockpile management, spill prevention and control, solid and concrete waste management, hazardous waste and contaminated soil management, and sanitary or septic and liquid waste management.

- Permanent Treatment BMPs: These BMPs are permanent water quality controls used to remove pollutants from storm water runoff prior to being discharged from State right-of-way. Treatment BMPs will be incorporated into the project. Some existing features may be considered as Treatment BMPs even if they were not originally designed with that intent, provided that the existing features meet the guidelines. If an existing feature is determined to be the functional equivalent of an approved Treatment BMP and classification as a Treatment BMP is accepted, this feature qualifies as an existing Treatment BMP and claim credit on the appropriate Treatment BMP Summary Spreadsheet. Since this project is considered a major reconstruction project, it is not exempt from incorporating Treatment BMPs. Treatment BMPs are permanent devices and facilities treating storm water runoff. Typical Treatment BMPs are biofiltration strips or swales with or without soil amendment, infiltration basins and detention basins. In general, biofiltration strips or swales are the most cost-effective alternative.

Based on the sediment risk and the receiving water risk, the project is classified as "Risk Level 2" under the CGP. The requirements for Risk Level 2 projects are presented in Attachment D of the CGP. In summary, Risk Level 2 projects are required:

a) To prepare a SWPPP that has to be developed and certified by a Qualified SWPPP Developer (QSD);

b) To develop a Construction Site Monitoring Program (CSMP) by the QSD, which includes the procedures and methods related to the visual monitoring and the sampling and analysis for non-visible pollutants, sediment and turbidity, and pH;

c) To prepare a Rain Event Action Plan (REAP) that will include the current construction activity and strategy or actions to be taken for the implementation of BMPs; and

d) To submit a Storm Water Annual Report, annually, that includes a summary and evaluation of sampling and analysis results as well as any violations or exceedance and corrective actions.

2.10 GEOLOGY/SOILS/SEISMIC/TOPOGRAPHY

Regulatory Setting

For geologic and topographic features, the key federal law is the Historic Sites Act of 1935, which establishes a national registry of natural landmarks and protects "outstanding examples of major geological features." Topographic and geologic features are also protected under the California Environmental Quality Act (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 Department's Office of Earthquake Engineering is responsible for assessing the seismic hazard for Department projects. Structures are designed using the Department's Seismic Design Criteria (SDC). The SDC provides the minimum seismic requirements for highway bridges designed in California. A bridge's category and classification will determine its seismic performance level and which methods are used for estimating the seismic demands and structural capabilities. For more information, please see the Department's Division of Engineering Services, Office of Earthquake Engineering, Seismic Design Criteria.

Affected Environment

A *Preliminary Geotechnical Report* was prepared for the project and completed in September 2012. This report is available upon request.

Climate

The climate in the project area is representative of the northern coast of California. Winters are mild and wet, and summers are cool and nearly rainless. The average annual rainfall is 19.95 inches. Temperatures are rather mild with an average January temperature of 39.6 degrees Fahrenheit (F) and an average July temperature of 82.5 degrees F.

Topography and Drainage

The project is located on the nearly flat floodplain on the southwest side of San Francisco Bay. The project area is located less than one mile (approximately 0.93 miles) southwest of salt evaporation ponds constructed on bay mud deposits. The project area slopes gently toward the north and the elevation ranges from approximately 23 feet at the south side to 14 feet on the north side. The San Francisco Bay is considered the main drainage of the project site.

Regional Geology

The project site is located at the southeastern margin of the San Francisco Peninsula, which is part of northwest-trending California Coast Ranges. The eastern margin of the peninsula is influenced by the tidal action of San Francisco Bay, and underlain predominately by Holocene and Pleistocene deposits of unconsolidated basin and alluvial deposits, and Bay Mud overlay older rocks the lower Cretaceous/Jurassic Franciscan Complex.

Site Geology

The project area is entirely covered by Holocene floodplain deposits. The floodplain deposits contain very medium to dark-grey, dense, sandy to silty clay. Lenses of coarser material (silt, sand and pebbles) may be locally present. Flood basin deposits to the north, natural Levee deposits to the east and alluvial fan deposits to the south surround the project site. Flood basin deposits consist of clay to silty clay and contain carbonate nodules and iron stained spots. The natural levee deposits contain loose, moderate-to well-sorted sandy or clayey silt grading to sandy or silty clay. The alluvial fan deposits are brown or tan and contain medium dense to dense gravelly sand or sandy gravel that grades upward to sandy or silty clay.

Two boreholes drilled in May 1953 at the same project location show that the project area is covered by interchangeable layers of stiff to very stiff silty to sandy clay followed by soft silty clay and medium dense silty sand with gravel to a depth of approximately 50 feet and are underlain by Bay Mud to the depth of the investigation (80 feet). In some locations, the Bay Mud is intercalated by silt layer (lens) of approximately 10 feet thick.

The Franciscan Complex forms the basement rock and underlies the entire area east of the Pilarcitos Fault. The Franciscan Complex is composed of weakly to strongly metamorphosed greywacke, argillite, limestone, basalt, serpentinite, chert and other rocks. The Franciscan rocks in this area overlain by Upper Jurrasic to Upper Cretaceous turbidites.

Soils

According to the United States Department of Agriculture, Soil Survey San Mateo Area County, Eastern Part and San Francisco County, California Report, 1991, the project area is entirely covered by Botella – Urban land complex, 0 to 5 percent slopes soil. This soil is on alluvial fans, old flood plains and stream terraces. It formed in alluvium derived from various kinds of rocks. This soil contains 45 percent Botella clay loam and 30 percent Urban land.

The Botella soil is very deep and well drained. Typically, the surface layer is dark grayish brown clay loam about 6 inches thick. The upper 11 inches of the subsoil is dark grayish brown clay loam, and the lower part to a depth of 60 inches or more is brown clay loam. Urban land consists of areas covered by asphalt, concrete, buildings and other structures. The material covered by these structures consists of soils that are similar to the Botella soil. Included in Botella is urban land complex soil, which consists of small areas of Orthents, cut and fill, and soils that have slopes of more than 5 percent or are loam or gravelly loam throughout. Permeability is moderately slow in the Botella soil. Runoff is slow, shrink-well potential is moderate, and the hazard of water erosion is slight with K-factor ranging between 0.32 and 0.37.

Seismicity

The project area is located in a seismically active region of northern California. It lies to the east of the San Andreas Fault and to the west of the Silver Creek Fault and Hayward Faults.

The seismicity of the southern San Francisco Bay Area is dominated by the interaction of the San Andreas Fault on one side, and the Hayward Faults on the other side, with the Santa Clara Valley located between these two systems. These and other lesser faults are responding to stress produced by relative motions of the Pacific and North American tectonic plates. The stress is relieved by right-lateral strike-slip, vertical or reverse slip

faulting along the San Andreas, Hayward and Silver Creek Faults and other associated faults.

The San Andreas Fault, the Silver Creek Fault and the Hayward Fault zones are active right lateral, strike-slip fault zones. All of these faults are a part of the San Andreas Fault system and have produced major earthquakes in historic time. The San Andreas Fault system is a complex belt of major fault zones extending roughly northwestward from northern Mexico through western California.

Table 22, below, lists the distance from the project to nearby active faults, the Maximum Magnitude of these faults, estimated Deterministic Peak Bed Rock Acceleration (PBA), and probabilistic United States Geological Survey (USGS) 5% in 50 years hazard anticipated within the project area using the Department Acceleration Response Spectrum (ARS) online (shake program).

Table 22 – Nearby Active Faults

Fault	Site to Source Distance (Mile)	Maximum Magnitude (M_{max})	Peak Bed Rock Acceleration	USGS 5% in 50 years Probability Exceedance
San Andreas	6.9 (west)	6.9	0.32	0.52
Silver Creek	6.8 (east)	6.8	0.34	
Hayward	3.6 (east)	11.5	Not Applicable	

San Andreas Fault

The active San Andreas Fault lies to the west of the project area. It extends from the Gulf of California in the south to the Mendocino Tripple Junction near Eureka in the north. In most places, the San Andreas Fault appears to consist of fairly narrow, single active trace, marked by sag ponds, linear troughs, deflected drainage, and other topographic features indicative of Holocene fault movement. During the earthquake of 1906, displacement occurred along two parallel faults in some places and offset of more than 3 feet occurred along each of two sub parallel faults.

Four historic earthquakes greater than magnitude 6.0 have been recorded for the San Andreas Fault in the Bay Area: 1838, 1865, 1906 and 1989. The 1838 event was estimated as magnitude 7.0 on the Richter scale and reported to have had surface rupture for 35 miles from Santa Clara to San Francisco. The 1865 earthquake was estimated as magnitude 6.5 on the Richter scale. The 1906 event was the greatest historic earthquake to have occurred along the northern portion of the fault. It was estimated to have a magnitude 8.2 on the Richter scale and produced 270 miles of surface rupture. The most recent earthquake, the Loma Prieta, occurred on October 17, 1989 and measured 7.1 on the Richter scale. It was located in the southern portion of the Santa Cruz Mountains. There was no surface rupture associated with this earthquake. The San Andreas Fault has a probability of 21% of at least one magnitude of 6.7 or greater earthquake before 2030.

Silver Creek Fault

The Silver Creek Fault lies to the east of the project area. This fault is generally well-defined along most of its trace because of the strong lithologic contrast between weak beds of the Santa Clara Formation and relatively resistant serpentine. Geomorphic evidence for

Holocene offset along the Silver Creek Fault is vague in detail. Possible historic fault creep along the Silver Creek Fault is suggested by the apparent right-lateral displacement of fence line, but the age of the fence was uncertain, and additional monitoring was abandoned.

The Silver Creek Fault was originally part of the state of California's Alquist-Priolo Fault Rupture Hazard Zone Maps. The Special Studies Zone for the Silver Creek Fault was recommended for removal after fault studies found no evidence of obvious surface rupture along its surface trace in southern San Jose. On its own initiative, the City of San Jose maintains a surface rupture study zone along the Silver Creek Fault, and a number of other faults where State mandated hazard zones have been withdrawn. The Department considered the Silver Creek Fault potentially active, based on the late Quaternary age.

Hayward Fault

The Hayward Fault lies to the east of the project area. The fault is a major, active, right-lateral, strike-slip fault which extends along the western front of the hills bordering the east side of San Francisco Bay from Milpitas northward to the south shoreline of San Pablo Bay. Movement along this system has caused two major historic earthquakes with accompanying surface ruptures, one in 1836 and one in 1868. A surface rupture extended from near Warm Springs in the south, to the vicinity of Mills College in Oakland. Maximum displacement in Hayward was 3 feet. Tectonic creep has been observed from San Pablo to Fremont. It has offset curbs, streets, fences, railroad tracks, pipelines and buildings. The current rate of movement appears to be approximately 0.2 inches per year. No movement has been documented south of the Alameda-Santa Clara County line.

The 30-year probability of a greater than magnitude 7.0 earthquake on the Hayward Fault is very high. Probabilities for the northern segment are estimated to be 28% and the probabilities for the southern segment are estimated to be 23%. The most recent report has rated the Hayward-Rodgers Creek Fault as to the highest offs of a 6.7 or larger earthquake by the year 2030.

Groundwater

The groundwater depth ranges between 11.4 feet below the ground surface at borehole B-3 and 13.1 feet at borehole B-1 below the ground surface, measured in March 1952. The groundwater elevation ranges between 3.9 feet at borehole B-9 and 8.3 feet at borehole B-5, measured in 1987.

Mineral Resources

Except for salt evaporators, there are no known mineral resources of commercial value within the project area.

Environmental Consequences

Seismic Hazard

The site may be affected by activity along any of active faults discussed above. Earthquake induced hazards can be divided into primary and secondary seismic effects.

Primary seismic effects such as ground rupture or surface deformation resulting from differential movement along a fault trace are not expected to occur on the site. The project area is not intersected by any known faults.

Secondary seismic effects result from various soil responses to ground acceleration. These effects may result from activity on any of the nearby active faults.

- Liquefaction of natural ground – Loose saturated sand may liquefy during strong ground motions. Borehole No. B-4, that was drilled just east of the project site through the foundation investigation of sound wall #5 in 1987, shows wet medium dense sand at shallow depth under the groundwater elevation. The most serious effect will be if liquefaction occurs immediately adjacent to an embankment or some structure not supported by piles, particularly if there is moderately sloping original ground surface and the liquefaction occurs at shallow to moderate depth.

  In addition, the USGS Bay Area Liquefaction Map shows the site to have a moderate susceptibility for liquefaction.

- Cracking – Lurch cracks may develop in the silty and clayey soil overlying the site. The potential for lurch cracking will be higher in the rainy periods when the soil is saturated. The hazard from cracking is considered minimal.

- Ground shaking – The site is expected to undergo varying intensities of ground shaking in response to local earthquake events depending on the composition, consistency and thickness of the soils overlying rock-like material at the site. According to the Association of Bay Area Governments (ABAG), it is classified as "Strong" (Plate 5). The ground at the site is considered unstable and therefore, structures built to the requirements of the latest Uniform Building Code would be expected to withstand the ground shaking induced by an earthquake.

Geologic Hazards

Filling on deep bay mud may create mud waves and cause embankment failures. The likelihood of embankment failure can be reduced by proper design, and controlled construction methods. Mud also presents problems of differential settlement.

Embankment & Cuts

Maximum heights of embankments have not yet been determined. Embankment fills where appreciable mud deposits exist may require strutting. In general, localized shallow soft clay deposits can be stripped prior to fill replacement. Mud of considerable depth can be pre-consolidated to minimize ground settlement and strengthen the foundation by placing an embankment surcharge for the waiting period.

There are no considerable cuts in the native soil included in the project.

Erosion

The erosion potential in the project area is low.

Settlement

Some differential and areal settlement can be anticipated due to the presence of soft clay and bay mud in different sites.

In May 1979, at southbound US 101, Post Mile 1.7, an area of pavement settlement occurred involving seven voids and cracking, and extended from the middle of the #1 lane (far left lane), across to the #3 lane for a distance of approximately 24 feet. The maximum amount of settlement was between 0.5 and 0.75 inches. The investigation indicated that the deepest two voids were underlain by thick imported sub-base material and the cause of subsidence may have been due to settlement.

Slope Stability

Depending on the depth and consistency of the muds, low embankments of 2 to 5 feet with relatively flat slopes can be constructed over reinforcing fabrics to increase stability. Higher embankments can be constructed by placing lower embankments (struts) adjacent to higher embankments for increased stability.

Avoidance, Minimization, and/or Mitigation Measures

Additional geotechnical subsurface and design investigations will be performed during the Design phase of the project. The investigations will include site-specific evaluations of subsurface conditions at the locations of proposed foundation features during final design of the project. Project elements will be designed and constructed to meet seismic design requirements for ground shaking and ground motions, as determined for the project location and site conditions (i.e., liquefaction, settlement). No further avoidance, minimization and/or mitigation measures are proposed. Best Management Practices (BMPs) for erosion and sediment control are noted in the Water Quality section of this chapter.

2.11 PALEONTOLOGY

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 projects. 16 United States Code (USC) 431-433 prohibits appropriating, excavating, injuring, or destroying any object of antiquity situated on federal land without the permission of the Secretary of the Department of Government having jurisdiction over the land. 23 United States Code (USC) 305 authorizes funds be appropriated and used for archeological and paleontological salvage as necessary by the highway department of any state, in compliance with 16 USC 431-433 above. 16 United States Code (USC) 470(aaa) prohibits the excavation, removal or damage of any paleontological resources located on Federal land. 23 Code of Federal Regulations (CFR) 1.9(a) states that the use of federal funds must be in conformity with federal and state law. Under California law, paleontological resources are protected by the California Environmental Quality Act (CEQA).

Affected Environment

A Paleontological Identification Report (PIR) for this project was completed in November 2012 and is available upon request. The paleontological study area (PSA) includes Willow

Road (State Route 114) and US 101. The field survey was conducted along the PSA on August 2, 2012.

Review of the data sources show the project site is located on artificial fill, which during construction of the overpass was deposited on the top of Quaternary Flood plain deposits. Artificial fill (Historic) is loose to very well consolidated gravel, sand, silt, clay, rock fragments, organic matter, and man-made debris in various combinations of Flood-plain deposits (Holocene), medium- to dark-gray, dense sandy to silty clay. Lenses of coarser material (silt, sand and pebbles) may be locally present. Flood-plain deposits usually occur between levee deposits (Qhl) and basin deposits (Qhb). Department Log of Test Borings for the Willow Separation show the strata at the project site being unconsolidated clays, silts and sands to a depth of approximately 90 feet.

Listed for San Mateo County, the Berkeley Natural History Museum (BNHM) has over 8,607 exhibits and they are categorized by biological classification. The exhibits are from the Museum of Vertebrate Zoology, Museum of Paleontology, University and Jepson Herbaria, Phoebe Hearst Museum of Anthropology, Essig Museum of Entomology and the University of California Botanical Garden. Some of these do not fall into the category of fossil; i.e., Anthropology and modern plants from the Botanical Garden. Since these fossils are not listed by their epoch, it is more useful to use the University of California Museum of Paleontology (UCMP) Database, which has 392 fossils found within San Mateo County. These fossils are listed by their epoch, and of the over 392 fossils found, the majority are not within close proximity of the project and were from the Holocene epoch. Ten of the fossils listed are from the Pleistocene. Since the geologic units in the project location are from the Holocene, these fossils will not be found. The UCMP findings can be supplied upon request.

Environmental Consequences

The "windshield survey" was completed on August 2, 2012 by Department staff. During the survey, no paleontological resources were observed.

The project should be considered to have a paleontological sensitivity of "No Potential", since the Holocene deposits are not considered old enough to be of significance. The man-made artificial fill should also be considered to have no potential to yield fossils.

Construction activities can impact paleontologically geologic units when vehicles or other work equipment impact previously undisturbed sediments by excavating, grading or crushing bedrock exposed in or underlying a project. This can result in impacts to fossils by destroying them or otherwise altering them in such as way that their scientific value is lost. Since the deposits at the project site are either man-made or from the Holocene epoch, fossil findings are not expected.

Avoidance, Minimization, and/or Mitigation Measures

In general, avoidance and minimization are not feasible with regard to addressing effects on paleontological resources. Since the project vicinity is considered to have no potential for yielding fossils, no measures are recommended.

2.12 HAZARDOUS WASTE/MATERIALS

Regulatory Setting

Hazardous materials, including hazardous substances and wastes are regulated by many state and federal laws. Statutes govern the generation, treatment, storage and disposal of hazardous materials, substances, and waste, and also the investigation and mitigation of waste releases, air and water quality, human health and land use.

California regulates hazardous materials, waste, and substances under the authority of the CA Health and Safety Code California Health and Safety Code and is also authorized by the federal government to implement RCRA in the state. California law also addresses specific handling, storage, transportation, disposal, treatment, reduction, cleanup and emergency planning of hazardous waste. The Porter-Cologne Water Quality Control Act also restricts disposal of wastes and requires clean-up of wastes that are below hazardous waste concentrations but could impact ground and surface water quality. California regulations that address waste management and prevention and clean up contamination include Title 22 Division 4.5 Environmental Health Standards for the Management of Hazardous Waste, Title 23 Waters, and Title 27 Environmental Protection.

Worker and public health and safety are key issues when addressing hazardous materials that may affect human health and the environment. Proper management and disposal of hazardous material is vital if it is encountered, disturbed during, or generated during project construction.

Affected Environment

An initial site assessment (ISA) was prepared for this project in December 2002. The summary of findings section of the ISA report noted that petroleum hydrocarbon-impacted groundwater exists within the area of the project improvements near the Willow Road overcrossing, on the south side of US 101. An ISA update, which was conducted in August 2012 in order to re-evaluate the project for potential contamination issues, concluded that the findings and recommendations documented in the 2002 ISA remain valid.

Ongoing soil testing by the Department has indicated that elevated levels of aerially deposited lead (ADL) exist in soils that are adjacent to major freeway routes due to past leaded fuel emissions from vehicles. ADL is typically found within the upper 2 feet of soil in the unpaved shoulder and median areas of the freeways.

There is potential that asbestos-containing material and lead-containing paint are present in the existing Willow Road overcrossing to be demolished.

Environmental Consequences

The project will involve roadway excavation and structure demolition activities. Construction workers could potentially be exposed to ADL-impacted soil, petroleum hydrocarbon-impacted soil and groundwater, asbestos-containing material and lead-containing paint during the project's construction.

Avoidance, Minimization, and/or Mitigation Measures

During the project's design phase, a site investigation will be conducted in the proposed improvement area in order to determine the presence and concentrations of total petroleum hydrocarbons and heavy metals, including lead. The conclusions in the report will examine viable soil management options. Additionally, an asbestos and lead-containing paint survey will be conducted to determine the minimization measures necessary prior to the demolition of the existing Willow Road overcrossing.

No other avoidance, minimization and/or mitigation measures are proposed.

2.13 NOISE

Noise is defined as unwanted sound. A number of factors affect sound perceived by the human ear, including the level of sound, the frequencies involved, the period of exposure, and changes or fluctuations in the noise levels during exposure. Levels of sound are measured in terms of decibels (dB). Since the human ear cannot perceive all frequencies equally well, measured sound levels are often adjusted, or weighted, to correspond to human hearing. This adjusted unit is known as the A-weighted decibel, or dBA.

Sound in our daily environment fluctuates over time. One way of describing fluctuating sound over a specific time period is to present the changing levels of sound as if it had been at a steady unchanging level for the time period. A descriptor called the equivalent sound level, Leq, is used to represent a constant level of sound that contains the same amount of acoustical energy as a fluctuating sound would generate in a given time period. Since highway traffic noise impacts are evaluated by using the average noise levels at sensitive receivers during the worst, or the noisiest, one hour period of the day, the sound level equivalents of the acoustical energy received in one hour is the descriptor used for this purpose, which is represented as Leq(h).

Decibels are logarithmic units. A doubling of the number of noise sources, such as cars on a roadway, increases the noise levels by 3 dBA. A ten-fold increase in the number of noise sources adds 10 dBA to the noise levels. For every doubling of distance between the noise source and the receptor, traffic noise would decrease by 3 dBA over hard ground (paved surface) or 4.5 dBA over soft ground (vegetated or plowed soil). Furthermore, with normal human hearing, an increase of 10 dBA in sound levels is perceived as twice as loud, while a change of 3 dBA is barely perceivable.

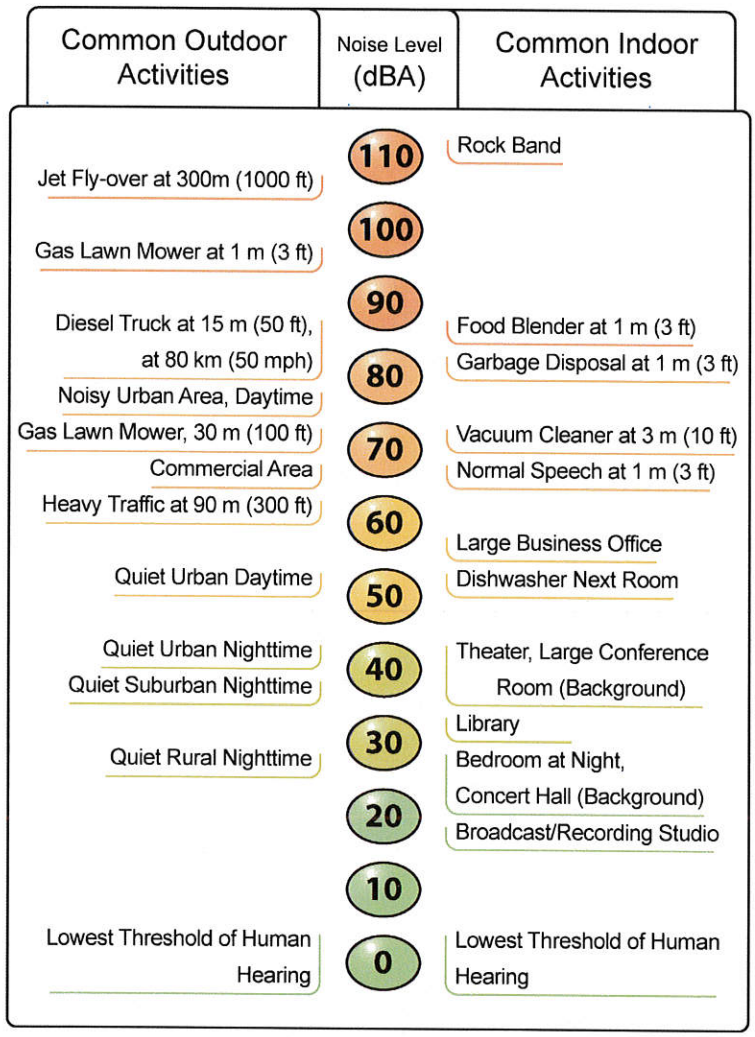
CEQA requires a strictly baseline versus build analysis to assess whether a proposed project will have a noise impact. If a proposed project is determined to have a significant noise impact under CEQA, then CEQA dictates that mitigation measures must be incorporated into the project unless such measures are not feasible.

The regulations of the Federal Highway Administration (FHWA) and the Department 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). Table 23 lists the noise abatement criteria for use in the analysis.

Table 23 - Noise Abatement Criteria		
Activity Category	**NAC, Hourly A- Weighted Noise Level, Leq(h)**	**Description of activity category**
A	57 (Exterior)	Lands on which serenity and quiet are of extraordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B[1]	67 (Exterior)	Residential.
C[1]	67 (Exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings.
D	52 (Interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (Exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A–D or F.
F	No NAC— reporting only	Agriculture, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical, etc.), and warehousing.
G	No NAC— reporting only	Undeveloped lands that are not permitted.
[1] Includes undeveloped lands permitted for this activity category.		

Figure 7, below, lists the noise levels of common activities in order to enable readers to compare the actual and predicted highway noise levels discussed in this section with common activities.

Figure 7 - Noise Levels of Common Activities



In accordance with the Department's *Traffic Noise Analysis Protocol for New Highway Construction and Reconstruction Projects, May 2011*, 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.

If it is determined that the project will have noise impacts, then potential abatement measures must be considered. Noise abatement measures that are determined to be reasonable and feasible at the time of final design are incorporated into the project plans and specifications. This document discusses noise abatement measures that would likely be incorporated in the project.

The Department's *Traffic Noise Analysis Protocol* sets forth the criteria for determining when an abatement measure is reasonable and feasible. Feasibility of noise abatement is basically an engineering concern. A minimum 7 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 and the cost per benefited residence.

Affected Environment

Methodology

The Department prepared a Noise Study Report in July 2013. State policy requires that projects started after January 15, 2005 use the FHWA computer model TNM, Version 2.5. The inputs for the TNM are traffic speeds and volumes and vehicle mix, along with the 3-dimensional coordinates of the roadway, ground lines, existing noise barriers, and receptors.

Under the FHWA and Department policies and rules, noise barriers will be considered for this type of project if the following criteria are met:

1. Predicted worst hourly noise will *approach or exceed* federal Noise Abatement Criteria (NAC).

2. At least a 5 dBA reduction can be achieved.

State policy also requires the calculation of a reasonable allowance for determination of each barrier's cost effectiveness as outlined in the Traffic Noise Analysis Protocol.
In determining the existing noise environment, representative noise levels were measured throughout the study area. These noise measurements were generally chosen from the first row of homes closest to the freeway. These measured locations and locations where noise levels were not measured were then used to model the future worst-case noise.

The Federal-Aid Highway Program Manual (FHPM 7-7-3) suggests that the future worst-case noise levels generated from highway traffic would occur when traffic is in operation under Level of Service C conditions. For Level of Service C conditions, it is assumed that 1500 vehicles per lane per hour are traveling at 65 miles per hour on the freeway. The traffic inputs consist of 5.0% medium trucks and 5.0% heavy trucks that based upon field traffic counts and the TNM computer model analysis.

Existing Noise Environment

Existing noise levels ranging from 58.2 to 65.7 dBA Leq(h) were measured at various locations within the project limits at the Route 101IWillow Road interchange. These sites were chosen from the first row of residences closest to the freeway and were also used to predict future worst-case noise. The locations of the residences, also known as receptors, are shown on Figure 8.

The existing noise environment in the project area varies by location, depending on site characteristics such as proximity to other noise sources, the relative elevation of roadways and receivers, and any intervening structures or barriers. The results of the long-term (24 hour) and short-term (10 minutes) field measurements are summarized in Table 24 and Table 25. The estimated worst-hour noise levels at short-term locations were based on daytime measurement data, peak-hour traffic data, and the trends in hourly noise levels measured at nearby representative long-term measurement sites. A comparison of the data collected at the long-term and short-term noise measurement sites was made to estimate worst-hour noise levels at short-term measurement locations. These data were then compared to the worst-hour noise levels predicted for existing conditions to confirm that the

model accurately reflects the measured noise data. The TNM computer model was found to be accurate to reflect the measured noise data.

Figure 8 – Receptor and Noise Barrier Location Map

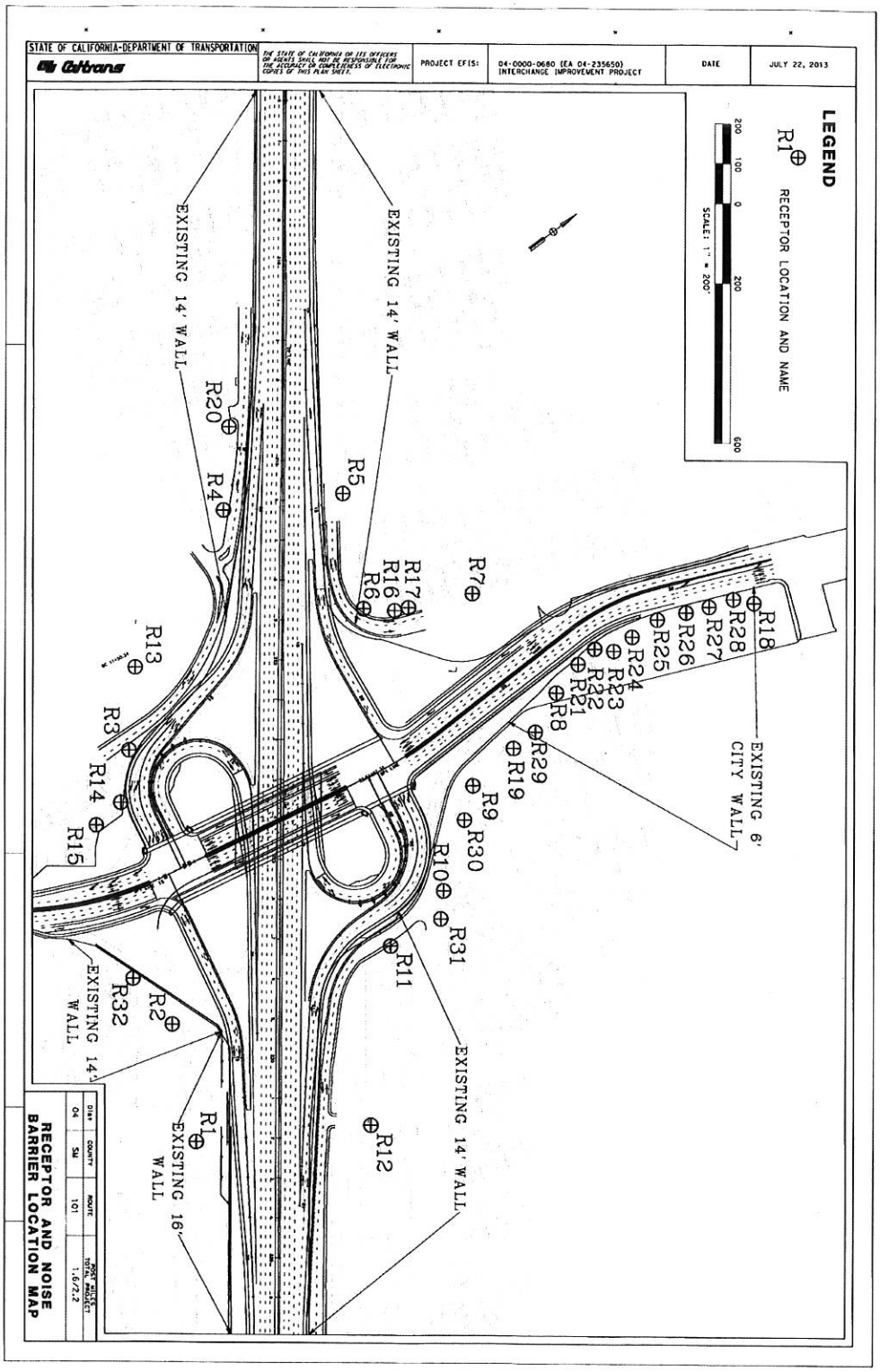


Table 24 – Summary of Long-Term Noise Measurements

Receiver ID	Location	Date	Time	Worst Hour leq(h), dBA
R6	Front yard of 1105 Willow Road	3/28/2013	7:00 AM	60
R9	Front yard of 939 Bay Road	3/27/2013	4:00 PM	65
R15	Rear yard of 9 Heritage Place	3/27/2013	2:00 PM	63

Table 25 – Summary of Short-Term Noise Measurements

Receiver ID	Location	Date	Time	10-min Leq, dBA	Est. Worst Hour Leq(h), dBA
R1	Front yard of 936 Laurel Avenue	9/25/2012	11:15 AM	60	62
R2	Front yard of 320 Haight Street	9/25/2012	11:15 AM	58	60
R3	Rear yard of 7 Heritage Place	9/25/2012	11:55 AM	66	67
R4	Front yard of 815 Bay Road	9/25/2012	11:55 AM	64	66
R5	Front yard of 835 Pierce Street	9/25/2012	12:50 AM	64	66
R6	Front yard of 1105 Willow Road	9/25/2012	12:50 AM	64	66
R7	Front yard of 220 Holland Street	9/25/2012	12:25 AM	64	64

Environmental Consequences

This project is classified a Type I project under the Department Traffic Noise Analysis Protocol (TNAP, 2011).

No Build Alternative

Since the freeway is currently operating at its peak noise generating level (Level of Service C), with the No Build Alternative, future noise levels for residents along freeway would not significantly increase.

Build Alternative

The predicted future noise levels at the project area range from 59.0 to 66.0 dBA Leq(h). Four of the receptors are at or above the Federal/State Noise Abatement Criteria (NAC) of 67 dBA Leq(h). Therefore, noise abatement measures must be considered for this project.

Table 26 shows the changes in noise levels between the existing peak noise and the Build Alternative.

Where there is an existing barrier the predicted insertion loss is the additional abatement that would be expected if the barrier were raised from 14 feet to the maximum allowable

height of 16 feet. Table 27 shows the predicted insertion losses for the entire project. There are existing 14-foot to 16-foot barriers within the project limits. For those locations the barriers were assumed to be either untouched or, where necessary, replaced in-kind. Increasing the height of an existing noise barrier is considered not feasible if the additional abatement is less than 5 dBA.

There is also an existing 6-foot community sound wall in the northeast quadrant of the project. The sound wall is located along the east side of Willow Road, ending about 100 feet from Newbridge Street, in the northbound direction and mostly protects the houses along Saratoga Avenue. The future noise levels of these houses are all below the Federal/State Noise Abatement Criteria (NAC) of 67 dBA Leq(h). It is assumed the construction will not affect the wall. If the construction interferes with the wall it should be replaced in-kind. Further noise abatement measures are not recommended for this area.

There is a Veteran's Administration Hospital in the southwest quadrant of the project. The open area adjacent to it has an outdoor area of human use (R-13) which was predicted to have a noise level of 65 dBA in the build condition. This is less than the Noise Abatement Criteria (NAC) of 67 dBA Leq(h), so consideration of abatement is not warranted. It should be noted that even if a 16 foot barrier were considered, the predicted insertion loss would be 5 dBA, which meets the criteria for feasibility, but not the criteria for reasonableness.

The Build noise levels of the three receptors on Heritage Place, R3 (7 Heritage Place), R14 (8 Heritage Place), and R15 (9 Heritage Place) are predicted to be 64, 62, & 62 dBA respectively. These levels do not approach the NAC, therefore they do not meet the criteria for a traffic noise impact. Consideration of abatement is not warranted.

Table 26 - Changes in Noise Levels with Build Alternative (dBA)

Location	Existing Peak Noise Level	# of Units	Build Condition	Change in Noise Level after Build Alternative (dBA)
R-936 Laurel*	64	1	64	0
R2-320 Haight**	62	1	62	0
R3-7 Heritage	67	1	64	-3
R4-815 Bay**	66	1	66	0
R5-835 Pierce**	67	1	66	-1
R6-1105 Willow**	66	1	66	0
R7-1129 Willow	63	1	63	0
R8-1143 Saratoga***	63	1	64	1
R9-939 Bay	66	1	64	-2
R10-906 Bay	65	1	61	-4
R11-229 Holland**	65	1	61	-4
R12-1008 Laurel**	64	1	63	-1
R13-VA Hospital	65	1	65	0
R14-8 Heritage	68	1	62	-6
R15-9 Heritage	65	1	62	-3
R16-1115 Willow	66	1	65	-1
R17-1121 Willow	65	1	64	-1
R18-1195 Saratoga***	58	1	59	1
R19-825 Bay	65	1	64	-1
R20-1014 Madera**	66	1	66	0
R21-1149 Saratoga***	64	1	64	0
R22-1153 Saratoga***	63	1	63	0
R23-1157 Saratoga***	62	1	62	0
R24-1161 Saratoga***	61	1	62	1
R25-1173 Saratoga***	61	1	62	1
R26-1175 Saratoga***	61	1	62	1
R27-1183 Saratoga***	61	1	62	1
R28-1189 Saratoga***	62	1	63	1
R29-1136 Saratoga***	64	1	64	0
R30-1101 Westminster	65	1	63	-2
R31-220 Holland	64	1	61	-3
R32-327 Haight**	60	1	60	0

Notes: *Existing 16' sound wall ** Existing 14' sound wall ***Existing 6' sound wall

Table 27 Potential Noise Barriers-Insertion Losses (IL)

Location	Build Condition	Future with Potential Barriers Leq.(h.)											
		6'	IL	8'	IL	10	IL	12'	IL	14'	IL	16'	IL
R-936 Laurel*	64	--	--	--	--	--	--	--	--	--	--	64	0
R2-320 Haight**	62	--	--	--	--	--	--	--	--	62	0	62	0
R3-7 Heritage	64	--	--	58	6	58	6	58	6	58	6	57	7
R4-815 Bay**	66	--	--	--	--	--	--	--	--	66	0	65	1
R5-835 Pierce**	66	--	--	--	--	--	--	--	--	66	0	65	1
R6-1105 Willow**	66	--	--	--	--	--	--	--	--	66	0	65	1
R7-1129 Willow	63	--	--	--	--	--	--	--	--	--	--	--	--
R8-1143 Saratoga***	64	64	0	--	--	--	--	--	--	--	--	--	--
R9-939 Bay	64	--	--	--	--	--	--	--	--	--	--	--	--
R10-906 Bay	61	--	--	--	--	--	--	--	--	--	--	--	--
R11-229 Holland**	61	--	--	--	--	--	--	--	--	61	0	61	0
R12-1008 Laurel**	63	--	--	--	--	--	--	--	--	63	0	62	1
R13-VA Hospital	65	--	--	61	4	60	5	60	5	60	5	60	5
R14-8 Heritage	62	--	--	58	4	58	4	58	4	58	4	58	4
R15-9 Heritage	62	--	--	60	2	60	2	60	2	60	2	60	2
R16-1115 Willow	65	--	--	--	--	--	--	--	--	--	--	--	--
R17-1121 Willow	64	--	--	--	--	--	--	--	--	--	--	--	--
R18-1195 Saratoga***	59	59	0	--	--	--	--	--	--	--	--	--	--
R19-825 Bay	64	--	--	--	--	--	--	--	--	--	--	--	--
R20-1014 Madera**	66	--	--	--	--	--	--	--	--	66	0	66	0
R21-1149 Saratoga***	64	64	0	--	--	--	--	--	--	--	--	--	--
R22-1153 Saratoga***	63	63	0	--	--	--	--	--	--	--	--	--	--
R23-1157 Saratoga***	62	62	0	--	--	--	--	--	--	--	--	--	--
R24-1161 Saratoga***	62	62	0	--	--	--	--	--	--	--	--	--	--
R25-1173 Saratoga***	62	62	0	--	--	--	--	--	--	--	--	--	--
R26-1175 Saratoga***	62	62	0	--	--	--	--	--	--	--	--	--	--
R27-1183 Saratoga***	62	62	0	--	--	--	--	--	--	--	--	--	--
R28-1189 Saratoga***	63	63	0	--	--	--	--	--	--	--	--	--	--
R29-1136 Saratoga***	64	64	0	--	--	--	--	--	--	--	--	--	--
R30-1101 Westminster	63	--	--	--	--	--	--	--	--	--	--	--	--
R31-220 Holland	61	--	--	--	--	--	--	--	--	--	--	--	--
R32-327 Haight**	60	--	--	--	--	--	--	--	--	60	0	60	0

Notes: *Existing 16' wall **Existing 14' wall ***Existing 6' wall

The predicted noise levels at most locations did not reach the level defined as a traffic noise impact under the Department Traffic Noise Analysis Protocol. Furthermore, locations which reached the criteria level of 66 dBA were behind existing 14-foot sound walls. If these walls were raised to the maximum allowable height of 16 feet they could not provide the additional required minimum 5 dBA of noise reduction. Therefore, no new sound walls or sound wall modifications are proposed or recommended for this project. No Noise Abatement Decision Report is required for this project.

The proposed project will realign ramps in the interchange without adding capacity. Therefore it is not expected that noise levels will increase significantly and is therefore not a significant noise impact under CEQA. The maximum noise levels at sensitive receptors will increase by no more than 1 dBA. At some locations noise levels will decrease by as much as 6 dBA. A change in noise level of less the 3 dBA is not detectable to the human ear.

Avoidance, Minimization, and/or Abatement Measures

Efforts to minimize construction noise are noted in the Construction Impacts section of this document.

Biological Environment

2.14 NATURAL COMMUNITIES

This section of the document discusses natural communities of concern. The focus of this section is on biological communities, not individual plant or animal species. This section also includes information on wildlife corridors and habitat fragmentation. Wildlife corridors are areas of habitat used by wildlife for seasonal or daily migration. Habitat fragmentation involves the potential for dividing sensitive habitat and thereby lessening its biological value.

Habitat areas that have been designated as critical habitat under the Federal Endangered Species Act are discussed below in the Threatened and Endangered Species section.

Affected Environment

A Natural Environment Study (Minimal Impacts) was completed for all biological resources for the project in May 2013. A Biological Study Area (BSA) was created for the purpose of describing the existing biological conditions and potential biological effects of the proposed project. The project footprint for the Build Alternative contains all areas within the Department right-of-way that encompass the US-101/Willow Road interchange. The BSA encompasses the same area as the project footprint and includes both the existing and proposed roadways within the project area. It is located in the U.S Geological Survey (USGS) Palo Alto 7.5-minute quadrangle and extends approximately 0.6 miles from east to west. A buffer of 5 miles around the project footprint was used to describe the potential biological resources within the vicinity of the BSA.

During the ground-level surveys, Department biologists searched for natural habitats such as streams and drainages outside the BSA but within the project vicinity to determine the potential for wildlife movement through the BSA. No connecting wildlife travel corridors were observed.

Ruderal (weedy) grasslands and urban forest mix are the dominant vegetation types present within the BSA. The tree layer is dominated by large-diameter coast live oak (*Quercus agrifolia*), coast redwood (*Sequoia sempervirens*), black acacia (*Acacia decurrens*), sweetgum (*Liquidambar styraciflua*), Monterey pine (*Pinus radiata*), and landscape varieties of locust (*Robinia* spp.).

The shrub layer is dominated by landscape varieties of privet (*Ligustrum* spp.), Christmas berry (*Heteromeles* spp.), shrub-sized regeneration of the tree species, and climbing woody vines such as Ivy (*Hedera* spp.), cotoneaster (*Cotoneaster* spp.), pyracantha (*Pyracantha* spp.), melaluca (*Melaleuca* spp.), and Himalayan blackberry (*Rubus armeniacus*).

The herbaceous layer is a mixture of the following native and non-native grasses and herbaceous flowering plants: goosegrass (*Eleusine indica*), bitter dock (*Rumex obtusifolius*), oats (*Avena barbata*), wild lettuce (*Lactuca canadensis*), bottlebrush (*Callistemon* spp.), milk thistle (*Silybum marianum*), Italian thistle (*Carduus pycnocephalus*), carrot weed (*Cupaniopsis anacardioides*), wild mustard (*Synapis arvensis*), salsify (*Tragopogon* spp.), common groundsel (*Senecio vulgaris*), grevillea (*Grevillea* spp.), photinia (*Photinia* spp.), sow thistle (*Sonchus oleraceus*), and black medic (*Medicago lupulina*).

The California Natural Diversity Database (CNDDB) shows Northern coastal salt marsh habitats and serpentine bunchgrass habitats as present within five miles of the project site to

the northeast and southwest, respectively, but these habitats are not present within one mile of the project vicinity. The CNDDB shows valley oak (*Quercus lobata*) woodlands as present within one mile of the project vicinity, but these habitats are not present within the project site and will therefore not be affected by the project.

Environmental Consequences

The proposed project will not affect any sensitive vegetation communities or habitat types because these resources have been determined to be absent within the BSA.

Landscape Planting

The proposed project will result in the removal of approximately 148 medium-sized trees (4- to 12-inch-diameter at breast height) that were planted for landscaping purposes along the interchange. There are several well-established redwood, black acacia, sweetgum, and Monterey pine trees distributed among the vegetated areas within the interchange that may be affected by the proposed project through removal or pruning. The number of removed or pruned trees is not expected to have a substantial biological effect on the area's urban forest or on the populations of animal species that use the trees because of the low habitat quality provided by sparsely scattered trees in this heavily urbanized area.

Avoidance, Minimization, and/or Mitigation Measures

Adherence to the following standard Department Best Management Practices (BMPs) will be required and will be sufficient to protect the limited biological resources that occur or may occur in the vicinity of the project site:

- All pavement rehabilitations and improvements will be constructed from existing paved surfaces.
- If vegetation removal occurs during the winter wet season, all trees and shrubs will be cut above the ground and their stumps left in place to prevent soil disturbance, erosion, and discharge into any creeks.
- Any clearing and grubbing will occur in the summer dry season.
- Any waste materials or products (e.g., pavement grindings) will be disposed of at an approved facility or certified landfill.
- All staging will occur within existing paved or gravel turnout areas. Any staging in vegetated areas (grass and low-growing vegetation) or off-pavement will require additional assessments by a Department biologist.
- Standard BMP material will be in place under any construction equipment being stored, refueled, or maintained at staging areas.

Landscape Planting

Avoidance/minimization and/or mitigation measures related to landscape planting are located in the Visual/Aesthetics section of this Chapter.

2.15 PLANT SPECIES

Regulatory Setting

The U.S. Fish and Wildlife Service (USFWS) and California Department of Fish and Wildlife (CDFW) have regulatory responsibility for the protection of special-status plant species. "Special-status" species are selected for protection because they are rare and/or subject to population and habitat declines. Special status is a general term for species that are 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 in this document for detailed information regarding these species.

This section of the document discusses all the other special-status plant species, including CDFW species of special concern, USFWS candidate species, and California Native Plant Society (CNPS) rare and endangered plants.

The regulatory requirements for FESA can be found at United States Code 16 (USC), Section 1531, et seq. See also 50 Code of Federal Regulations (CFR) Part 402. The regulatory requirements for CESA can be found at California Fish and Wildlife Code, Section 2050, et seq. Department projects are also subject to the Native Plant Protection Act, found at California Fish and Wildlife Code, Section 1900-1913, and the California Environmental Quality Act (CEQA), CA Public Resources Code, Sections 2100-21177.

Affected Environment

Department biologists considered a combined list of special-status plant species that occur within five miles of the Biological Study Area (BSA) from the CNPS lists (CNPS 2013) and CNDDB records (CDFW 2013). The CNPS identifies twelve special-status plant species as potentially occurring in the BSA. These species include: Franciscan onion (*Allium peninsulare* var. *franciscanum*), Kings Mountain manzanita (*Arctostaphylos regismontana*), Congdon's tarplant (*Centromadia parryi* ssp. *congdonii*), San Francisco collinsia (*Collinsia multicolor*), western leatherwood (*Dirca occidentalis*), Hoover's button-celery (*Eryngium aristulatum* var. *hooveri*), fragrant fritillary (*Fritillaria liliacea*), arcuate bush-mallow (*Malacothamnus arcuatus*), Davidson's bush-mallow (*Malacothamnus davidsonii*), woodland woollythreads (*Monolopia gracilens*), slender-leaved pondweed (*Stuckenia filiformis*), and caper-fruited tropidocarpum (*Tropidocarpum capparideum*).

Environmental Consequences

The assessment of the potential of the BSA to support any of the plants identified as special-status and/or their habitat was based on factors such as the species' preferred habitat characteristics, proximity to existing populations, and ecological condition of the habitats on the current project site. It was determined that the project site does not represent potential habitat for any special-status plants. All of the species were considered highly unlikely to occur in the BSA for one or more of the following reasons: (1) requirements such as serpentine or alkaline soils are absent; (2) the elevation range of the species is outside the range within the BSA; (3) habitats such as low, wet swales, and riparian areas are not present in the BSA.

Department biologists surveyed the BSA on February 27, 2013 and concluded that no federally or state-listed plant species or special-status plant species were identified within the BSA.

Avoidance, Minimization, and/or Mitigation Measures

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

2.16 ANIMAL SPECIES

Regulatory Setting

Many state and federal laws regulate impacts to wildlife. The US Fish and Wildlife Service (USFWS), the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries Service) and the California Department of Fish and Wildlife (CDFW) are responsible for implementing these laws. This section discusses potential impacts and permit requirements associated with animals not listed or proposed for listing under the federal or state Endangered Species Act. Species listed or proposed for listing as threatened or endangered are discussed in the Threatened and Endangered Species section below. All other special-status animal species are discussed here, including CDFW fully protected species and species of special concern, and USFWS or NOAA Fisheries Service candidate species.

Federal laws and regulations pertaining to wildlife include the following:

- National Environmental Policy Act
- Migratory Bird Treaty Act
- Fish and Wildlife Coordination Act

State laws and regulations pertaining to wildlife include the following:

- California Environmental Quality Act
- Sections 1600 – 1603 of the California Fish and Wildlife Code
- Section 4150 and 4152 of the California Fish and Wildlife Code

Affected Environment

Department biologists evaluated the special-status wildlife species occurring in the region based on the USFWS species list and CNDDB records. CNDDB occurrence records, species habitat requirements, and an evaluation of habitat connectivity were used to determine the potential for each state and federal threatened or endangered animal species within the BSA to occur in the project site vicinity.

There are fourteen wildlife species of concern that have the potential to occur within five miles of the project vicinity as follows:

- The state species of concern western pond turtle (*Actinemys marmorata*) is generally found in or near permanent bodies of water, although females can migrate up to 325 feet

to find a nesting site. Because there are no water bodies within approximately 5,000 feet of the BSA, there is no potential for individuals of this species to be present within the BSA before or during construction.

- Small, partially collapsed burrows of California ground squirrels (*Spermophilus beecheyi*) are present in the ruderal habitat in the BSA near the northeastern off-ramp from US-101 to Willow Road. However, these burrows are too small and disturbed to provide suitable nesting or roosting habitat for burrowing owls (*Athene cunicularia*). In addition, the small, highly disturbed ruderal habitat within the BSA does not provide suitable foraging habitat for burrowing owls, and the species is not expected to occur as an occasional forager within the BSA.

- The highly disturbed isolated woodland and ruderal habitat mix within the BSA do not provide suitable nesting or foraging habitat for other special-status raptors, including the short-eared owl (*Asio flammeus*), northern harrier (*Circus cyaneus*), and white-tailed kite (*Elanus leucurus*).

- The BSA does not provide suitable habitat for other special-status bird species, including the California black rail (*Laterallus jamaiciensis coturniculus*), snowy egret (*Egretta thula*), Alameda song sparrow (*Melospiza melodia pusillula*), or salt-marsh common yellowthroat (*Geothlypis trichas sinuosa*), all of which, along with the salt-marsh wandering shrew (*Sorex vagrans halicoetes*), exhibit strong preference for coastal marsh habitats.

- The isolated and small, disturbed ruderal habitat within the BSA is unlikely to support the American badger (*Taxidea taxus*), which prefers open grasslands with available prey and sandy loam soils, or the Santa Cruz kangaroo rat (*Dipodomys venustus venustus*), which prefers open chaparral habitat occurring on sandy soils.

- The pallid bat (*Antrozous pallidus*) and hoary bat (*Lasiurus cinereus*) are California species of special concern and may forage in small numbers in or near the BSA, but are not expected to roost or breed on the site. During the ground-level surveys, biologists looked for suitable roosting habitat for bat species under the US-101 overpass and in trees within the BSA but found no evidence of active or recent bat roosts and no suitable crevices to support bats. Therefore, the project will not affect populations of protected bat species in the vicinity of the BSA.

Ruderal grasslands and urban forest mix are not preferred habitats for any of these fourteen animal species that are listed as federally threatened or endangered, or species of concern that have the potential to occur within five miles of the project site.

Because the project site consists of an interchange between a busy, eight-lane divided US highway and a (currently) four-lane state highway and is in a highly urbanized area, terrestrial animals that are incapable of flight are continually discouraged from seeking forage, cover or other habitat requirements within the project area. There are no surface water features present within the project area, making the site unsuitable for aquatic species, species that have aquatic stages, and terrestrial species seeking to ingest water.

Most of the regionally occurring special-status species were rejected for potential occurrence in the BSA because the project area lacks suitable habitat and/or is outside the

range of the species. Many of the special-status animals that occur in the project vicinity are associated with aquatic or wetland habitats.

Environmental Consequences

Because the project will not affect aquatic or wetland habitats, these special-status animals are absent from the BSA and will not be affected by the project. Similarly, most other special-status animals occurring in the region have habitat requirements that are absent from the BSA, and these species are absent.

No federally or state-listed special-status species were observed during the ground-level surveys conducted on February 27, 2013 by Department biologists. The recorded occurrences of the previously described fourteen federal and state-listed special-status species within five miles of the project site have limited potential to be present in the BSA before or during construction, and impacts to these species are avoidable.

The potential exists for migratory birds to nest in trees or shrubs or on the Willow Road overpass within the BSA. Project implementation could result in the destruction of active nests if present in vegetation when clearing or tree removal occurs. The project could also result in the abandonment of eggs or young if project activities occur near active nests, disturbing adult birds to the point of nest abandonment. Although some bird species may be expected to use the site, the high level of continual disturbance from motor vehicles is likely to cause the number of birds nesting within the project site to be low. No nesting activity was observed in the vicinity of the project site during the ground-level surveys on February 27, 2013, but this observation does not preclude potential nesting activity prior to or during construction.

Avoidance, Minimization, and/or Mitigation Measures

If construction occurs between February 15 and September 1, a qualified biologist will install bird exclusion materials and conduct nesting bird surveys to comply with the California Fish and Wildlife Code and Migratory Bird Treaty Act. The biologist will receive a two-week notice prior to project implementation to schedule nesting bird surveys. The surveys will be conducted within 48 hours before any ground-disturbing activities occur, including vegetation removal, and will be valid for 3 days, after which new surveys will be conducted. This survey schedule will allow the biologist to remove nests that are started between surveys, well prior to the start of egg-laying. Ground-disturbing activities will not begin until the Department biological monitor has given clearance.

2.17 THREATENED AND ENDANGERED SPECIES

Regulatory Setting

The primary federal law protecting threatened and endangered species is the Federal Endangered Species Act (FESA): 16 United States Code (USC) Section 1531, et seq. See also 50 Code of Federal Regulations (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 the Federal Highway Administration (FHWA), are required to consult with the U.S. Fish and Wildlife Service (USFWS) and the National Oceanic and Atmospheric Administration's National Marine Fisheries Service (NOAA Fisheries Service) to ensure that they are not undertaking, funding, permitting or authorizing actions likely to jeopardize the continued existence of listed species or destroy or adversely modify designated critical habitat. Critical habitat is defined as geographic locations critical to the existence of a threatened or endangered species. The outcome of consultation under Section 7 may include a Biological Opinion with an Incidental Take statement, a Letter of Concurrence and/or documentation of a no effect finding. Section 3 of 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 Wildlife Code Section 2050, et seq. CESA emphasizes early consultation to avoid potential impacts to rare, endangered, and threatened species and to develop appropriate planning to offset project caused losses of listed species populations and their essential habitats. The California Department of Fish and Wildlife (CDFW) is the agency responsible for implementing CESA. Section 2081 of the Fish and Wildlife 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 Wildlife Code as "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." CESA allows for take incidental to otherwise lawful development projects; for these actions an incidental take permit is issued by CDFW. For species listed under both FESA and CESA requiring a Biological Opinion under Section 7 of the FESA, CDFW may also authorize impacts to CESA species by issuing a Consistency Determination under Section 2080.1 of the California Fish and Wildlife Code.

Affected Environment

Department biologists considered a combined list of special-status plant species that occur in the region from the CNPS lists (CNPS 2013) and CNDDB records (CDFW 2013), which include USFWS-listed federally endangered and threatened species. The CNDDB species list for the USGS Palo Alto 7.5-minute quadrangle is located in Appendix B, and the USFWS species list for this quadrangle is located in Appendix C.

Plant Species

The following animal species are identified on the USFWS list as potentially occurring in the BSA:

- San Mateo thornmint (*Acanthomontha duttonii*) – The CNDDB shows one occurrence of San Mateo thornmint, a federally and state endangered species, within five miles of the project vicinity, but this species occurs on grassy slopes on

serpentine soils, a habitat type that is not present near the project vicinity. The CNPS shows this species as extirpated from the project vicinity.

- Fountain thistle (*Cirsium fontinale var. fontinale*) – The CNDDB shows no occurrence of fountain thistle, a federally and state endangered species, within five miles of the project vicinity, and this species is restricted to serpentine seeps, a habitat type not present near the project vicinity.

- Marin dwarf-flax (= western flax) (*Hesperolinon congestum*) – The CNDDB shows no occurrence of Marin dwarf-flax, a federally and state threatened species, within five miles of the project site, and this species occurs in serpentine chaparral or bunchgrass, habitat types that are not present near the project vicinity.

- Showy rancheria clover (*Trifolium amoenum*) – The CNDDB shows no occurrence of showy rancheria clover, a federally endangered species, within five miles of the project vicinity. The USFWS five-year review (USFWS 2012) states that this species has been extirpated from all of the known locations except one at Dillon Beach, the only site that has not been invaded by aggressive exotic ruderal species with which showy rancheria clover cannot compete.

Animal Species

The following animal species are identified on the USFWS list as potentially occurring in the BSA:

- Bay checkerspot butterfly (*Euphydryas editha bayensis*) and its critical habitat - The Bay checkerspot butterfly, a federally threatened species, requires specific host plants (*Plantago erecta*, *Castilleja densiflorus,* or *C. exserta*) in the larval stage, and these plants require serpentine soils. Serpentine soils are not present in or near the project area, and the site assessment indicated that these plants are not present in the project site.

- Delta smelt (*Hypomesus transpacificus*) - Delta smelt, a federally threatened and state endangered species, inhabit primarily the freshwater-saltwater mixing estuary zone and are not present in the project site.

- Coho salmon, Central California coast (*Oncorhynchus kisutch*) - There are no streams near the project area that support Central California Coastal Coho salmon, a federally and state endangered species.

- Central California coastal steelhead and its critical habitat/Central Valley steelhead (*Oncorhynchus mykiss*) - There are no streams in or near the project area that support the Central California coastal steelhead/Central Valley steelhead, a federally threatened species.

- Central Valley spring-run Chinook salmon/Winter-run Chinook salmon (*Oncorhynchus tshawytscha*) – There are no streams in or near the project area that support Central Valley spring salmon, a federally and state threatened species, or winter-run salmon, a federally and state endangered species.

- California tiger salamander (*Ambystoma californiense*) – The CNDDB shows four historical records of California tiger salamander, a federally and state threatened species, within five miles of the project vicinity, but these records are from the late 1800s and the species is considered extirpated from the area.

- California red-legged frog (*Rana draytonii*) – The CNDDB shows three occurrences of the California red-legged frog between four and five miles from the project vicinity, but no habitat connectivity to the project is apparent based on aerial photos of the area.

- San Francisco garter snake (*Thamnophis sirtalis tetrataenia*) – The CNDDB does not show occurrence of the San Francisco garter snake, a federally and state endangered, California fully protected species, within five miles of the project vicinity, and the preferred habitat of densely vegetated ponds, marshes, and wetlands near open hillsides is not present near the project area.

- Marbled murrelet (*Brachyramphus marmoratus*) – The CNDDB does not show occurrence of the Marbled murrelet, a federally threatened and state endangered species, within five miles of the project vicinity, and their preferred nesting habitat of old-growth coastal redwood and Douglas-fir forests with large trees, multiple canopy layers, and moderate-to-high canopy closure is not present near the project vicinity.

- Western snowy plover (*Charadrius alexandrinus nivosus*) – The CNDDB shows five occurrences of the western snowy plover, a federally threatened species, within five miles of the project vicinity, but the preferred nesting habitat of beaches, sand spits, dune-backed beaches, sparsely vegetated dunes, beaches at creek and river mouths, and salt pans at lagoons and estuaries is not present closer than one mile from the project site.

- California brown pelican (*Pelecanus occidentalis californicus*) – The California brown pelican, a federally endangered species, nests on offshore islands, a habitat not present near the project site.

- California clapper rail (*Rallus longirostris obsoletus*) – The California clapper rail, a federally endangered, state endangered and California fully protected species, typically inhabits salt marshes dominated by pickleweed (*Salicornia virginica*) and cordgrass (*Spartina* spp.), which are habitats that are not present near the project vicinity.

- California least tern (*Sternula antillarum (=Sterna, =albifrons) browni*) – The CNNDB shows three occurrences of the California least tern, a federally and state endangered species, within five miles of the project vicinity, but the species requires expansive stretches of shoreline near abundant supplies of prey. This habitat is not present closer than one mile from the project vicinity.

- Salt-marsh harvest mouse (*Reithrodontomys raviventris*) – The CNDDB shows 12 occurrences of salt-marsh harvest mouse, a federally endangered, state endangered and California fully protected species within 5 miles of the project vicinity, but their preferred habitat of salt and brackish marshes with dense pickleweed (*Salicornia*) cover is not present closer than 1.5 miles from the project vicinity.

Environmental Consequences

The potential for each state and federal threatened or endangered plant and animal species described previously to be encountered in the project area is considered highly unlikely and will therefore not be affected by the proposed project. Consequently, Section 7 consultation with the USFWS or NOAA Fisheries Service is not necessary.

Avoidance, Minimization, and/or Mitigation Measures

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

2.18 CONSTRUCTION IMPACTS

Stage Construction

It is anticipated that construction of the new overcrossing, ramp and road realignments will require multiple stages of construction. Construction for this project will take approximately two years to complete. Lane closures for this project will be made during non-peak travel periods.

During each construction stage, the Department will attempt to maintain the existing lanes of traffic on the overcrossing in each direction and on all on- and off-ramps. Existing pedestrian access will be maintained through the construction period, except during critical short-term construction activities requiring closure for construction or safety reasons.

It is expected that Stage 1 will construct the portion of the bridge on the north and southbound side of the overcrossing and a portion of the on-/off-ramps. Retaining walls and sound walls will be constructed within the adjacent ramps. Stage 2 will construct the remaining portion of the on- and off-ramps, while Willow Road through traffic is open. Stage 3 will construct Willow Road partially for the off-ramps making a left turn to Willow Road. Stage 4 will construct the remaining middle portion of the bridge.

Weekend and nighttime work may be required to permit temporary closures for tasks that could interfere with mainline traffic or create safety hazards such as mainline restriping, and falsework erection and removal. Some short-term night closures of existing interchange ramps may be necessary during some construction activities such as constructing portions that are at grade with existing ramps or at over/under the existing ramps, constructing conforms between existing and new roadways, paving operation, and lane striping. Advance notice will be provided of ramp closures and traffic will be detoured to the adjacent interchanges for these periods.

Transportation Management Plan for Use During Construction

The department will coordinate with local agencies to develop a Transportation Management Plan (TMP). A TMP is a plan that will be implemented during construction to minimize and prevent delay and inconvenience to the traveling public.

The proposed construction and improvements will require lane closures or detours. Lane closure scheduling requirements will be outlined within contract specifications for maintaining and handling traffic during construction. The TMP for the project will be developed and refined during the PS&E and final design phases, supported by detailed traffic and operation studies. The TMP includes press releases to notify and inform

motorists, business, community groups, local agencies, government officials and emergencies services of upcoming closures or detours. Various TMP elements such as portable Changeable Message Signs, CHP Construction Zone Enhanced Enforcement Program (COZEEP), and K-Rails will be utilized to alleviate and minimize delay to the traveling public.

Air Quality

Trucks and construction equipment emit hydrocarbons, nitrogen oxides, carbon monoxide and particulates. Most pollution would consist of wind-blown dust generated by excavation, grading, hauling and various other activities. The effects from these activities would vary from day to day as construction progresses. The Special Provisions and Standard Specifications would include requirements to minimize or eliminate dust during construction through the application of water or dust palliatives.

Noise

It is possible that the high levels of noise generated by construction equipment may annoy residents, but it will likely be short-lived at each location. Construction equipment should be required to conform to the provisions in Section 14-8.02 Noise Control, of the latest Standard Specifications. These requirements are meant to minimize the effect from short duration construction noise.

In addition to the aforementioned Standard Specifications, construction noise impacts can be minimized by implementing some or all of the following measures:

- Avoiding construction activities during the nighttime and on weekends.
- Constructing noise barriers as the first order of work.
- Using stockpiled dirt as earth berms where possible.
- Keeping noisy equipment and haul roads away from sensitive receptors.
- Keeping the community informed of upcoming especially noisy construction activities and establishing a field office to handle noise complaints.

2.19 CUMULATIVE IMPACTS

Regulatory Setting

Cumulative impacts are those that result from past, present, and reasonably foreseeable future actions, combined with the potential impacts of this proposed project. A cumulative effect assessment looks at the collective impacts posed by individual land use plans and projects. Cumulative impacts can result from individually minor, but collectively substantial impacts taking place over a period of time.

Cumulative impacts to resources in the project area may result from residential, commercial, industrial, and highway development, as well as from agricultural development and the conversion to more intensive 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.

California Environmental Quality Act (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.

The following resource areas were determined to have no direct or indirect impacts under The Build Alternative, and were not discussed within chapter two of the document: air quality, community character and cohesion, farmlands and timberlands, growth, mineral resources, parks and recreation, and wetlands and other waters. It is for this reason that these resources are not discussed in this section.

Similarly, the following topics were discussed within Chapter 2, but as they have no potentially significant direct or indirect impacts on a resource, will not contribute to a cumulative impact on a resource for the Build Alternative and need not be further evaluated: existing and future land use, consistency with state, regional and local plans and programs, relocations and real property acquisition, utilities/emergency services, traffic and transportation/pedestrian and bicycle facilities, visual/aesthetics, cultural resources, hydrology and floodplain, water quality and storm water runoff, geology/soils/seismic/topography, paleontology, hazardous waste/materials, noise, natural communities, and special status plant and animal species.

2.20 CLIMATE CHANGE

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)[1].

There are four primary strategies for reducing GHG emissions from transportation sources: 1) improving the transportation system and operational efficiencies, 2) reducing 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 collectively. 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.

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 U.S. 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 (EO) S-3-05: (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 the California's Climate Action Team.

Executive Order S-01-07: (signed on January 18, 2007 by former Governor Arnold 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

[1] http://climatechange.transportation.org/ghg_mitigation/

Quality Act (CEQA) Guidelines for addressing GHG emissions. The amendments became effective on March 18, 2010.

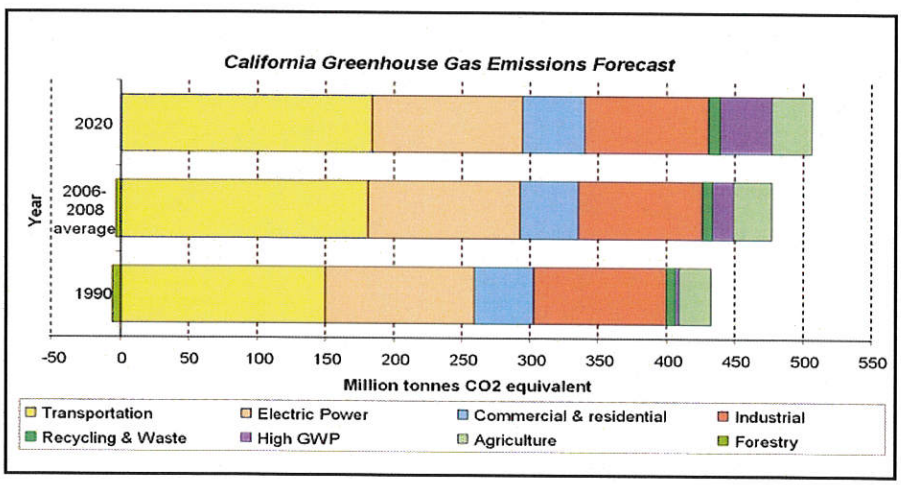
Department Director's Policy 30 (DP-30) Climate Change (approved June 22, 2012): is intended to establish a Department policy that will ensure coordinated efforts to incorporate climate change into Departmental decisions and activities. This policy contributes to the Department's stewardship goal to preserve and enhance California's resources and assets.

Project Analysis

An individual project does not generate enough GHG emissions to significantly influence global climate change. Rather, global climate change is a cumulative impact. This means that a project may contribute to a potential impact through its *incremental* change in emissions when combined with the contributions of all other sources of GHG.[2] 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.

Figure 9 – California Greenhouse Gas Forecast



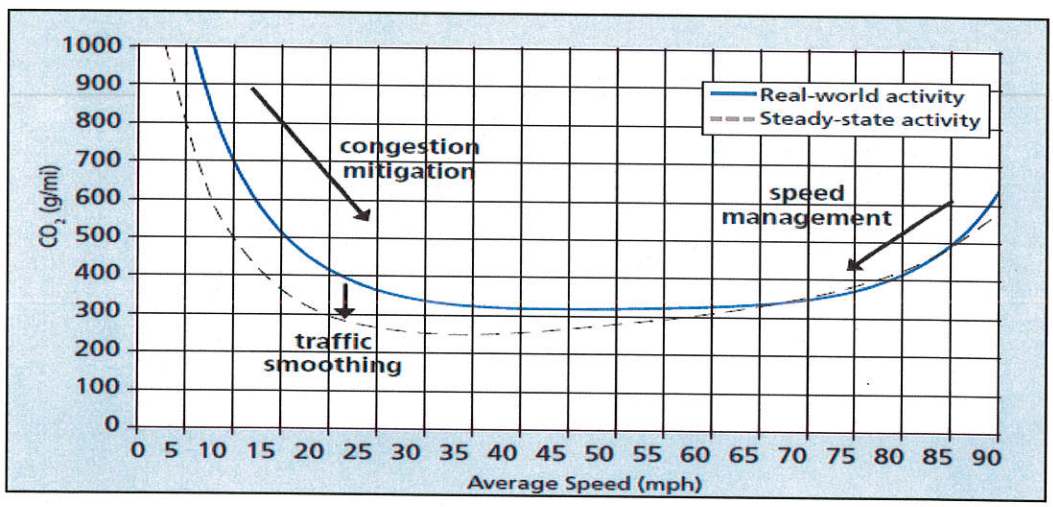
Source: http://www.arb.ca.gov/cc/inventory/data/forecast.htm

[2] 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).

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.[3]

One of the main strategies in the Department's Climate Action Program to reduce GHG emissions is to make California's transportation system more efficient. The highest levels of carbon dioxide (CO_2) 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 10 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.

Figure 10 - Possible Effects of Traffic Operation Strategies in Reducing On-Road CO_2 Emission[4]



[3] 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

[4] **Traffic Congestion and Greenhouse Gases:** Matthew Barth and Kanok Boriboonsomsin (TR News 268 May-June 2010)<http://onlinepubs.trb.org/onlinepubs/trnews/trnews268.pdf>

Table 28 Projected CO_2 Emissions

NO-Build VMT CO_2 per year			
Peak Period	2011	2020	2040
AM	152	187	477
PM	140	216	549
Speeds (AM/PM)	fleet avg speed	40/50	30/30

Build VMT CO_2 per year			
Peak Period	2011	2020	2040
AM	n/a	198	478
PM	n/a	217	559
Speeds (AM/PM)	n/a	50/50	35/35

Existing VMT was calculated by expanding the peak hour data to get the four hour peak period VMT whereas the traffic operations model calculates the peak period VMT based on data from each hour of the peak period model.

The proposed project is expected to improve traffic operations at the US 101/Willow Road interchange, including adjacent ramps and intersections, and will help to reduce or avoid traffic queues that currently affect US 101 operations between Marsh Road to the north and University Avenue to the south. A rough estimate of projected CO_2 emissions was calculated using the EMFAC 2011 model. Although the proposed project is expected to improve operations, it is estimated CO_2 emissions will increase when compared to the existing conditions. When comparing the future build to the future no-build emissions are projected to increase slightly.

The project is included in the current Regional Transportation Plan (RTP) and Transportation Improvement Program (TIP), which contain adopted strategies for greenhouse gas emissions from transportation sources. Specifically, RTP reference number 230550, "Transportation Climate Action Campaign," is an adopted 5-year program for the Bay Area region involving outreach and education, promotion of safe routes to school and transit, and funding for transit priorities. The adopted TIP also demonstrated that the region will remain below all approved "vehicle emission budgets" through the 2035 study year. The project design incorporates facilities that will improve access to alternative modes of transportation. As explained in Chapter 1, the Build Alternative proposes to construct a 6-feet wide Class II bike lane and an 8-foot wide Class I bike path on the Willow Road overcrossing structure. The project will therefore connect the existing Class II bike lanes on Willow Road that currently terminate at Durham Street to the west and Newbridge Street to the east of the overcrossing. The project will also improve pedestrian access via 10 foot-wide sidewalks placed in both directions on the new overcrossing. The project will not add capacity to US 101, and will not affect traffic flow at the regional level compared to the No Build Alternative. The project will therefore not result in substantial direct or indirect emissions of greenhouse gases.

Construction Emissions

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. Measures to reduce construction emissions are listed in the avoidance, minimization and/or mitigation measures of the Air Quality section of this chapter, and include maintenance of construction equipment and vehicles, limiting construction vehicle idling time, and scheduling and routing of construction traffic to reduce engine emissions.

Limitations and Uncertainties with Modeling

EMFAC

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 EPA 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.

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 only states:

> REVISION: Both the EMFAC and OFFROAD Models develop CO_2 and CH_4 [methane] emission estimates; however, they are not currently used as the basis for [CARB's] official [greenhouse gas] inventory which is based on fuel usage information. . . 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 EPA'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 29 shows the alternatives for vehicle fuel economy increases studied by the National Highway Traffic Safety Administration in its Final EIS for New Corporate Average Fuel Economy (CAFE) Standards (October 2008).

Table 29 - 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 U.S. DOE 2010 milestones for FCV development and commercialization are expected to be met by 2010. Accounting for a five to six year production development cycle, the scenarios developed by the U.S. DOE 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."[6]

Third and as previously stated, California has recently adopted a low-carbon transportation fuel standard. Third and as previously stated, California adopted a low-carbon fuel standard in 2009 to reduce the carbon intensity of transportation fuels by 10 percent by 2020. The regulation became effective on January 12, 2010 (codified in title 17, California Code of Regulations, Sections 95480-95490). Beginning January 1, 2011, transportation fuel producers and importers must meet specified average carbon intensity requirements for fuel in each calendar year.

Fourth, driver behavior has been changing as the U.S. 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 p. 3-70 of the National Highway Traffic Safety Administration Final EIS for New CAFE Standards (October 2008), Figure 11 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."

[6] Cunningham, Joshua, Sig Cronich, Michael A. Nicholas. March 2008. Why Hydrogen and Fuel Cells are Needed to Support California Climate Policy, UC Davis, Institute of Transportation Studies, pp. 9-10.

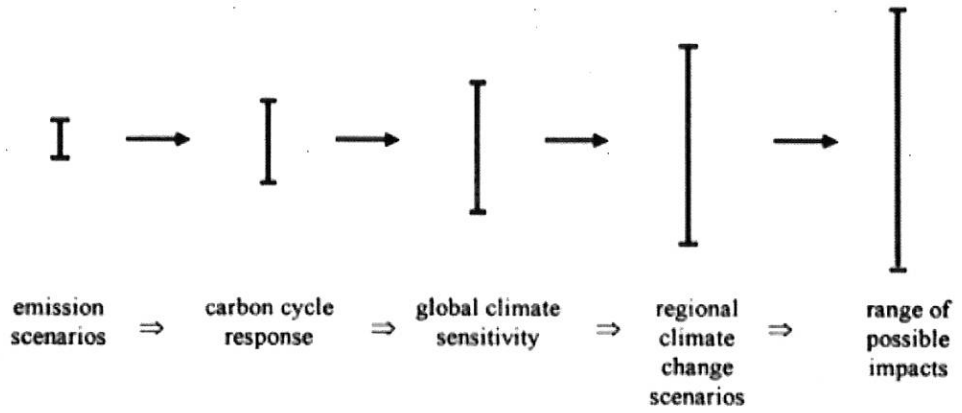


Figure 11 - Cascade of Uncertainties

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 assessment of what any modeled increase in CO_2 emissions 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%.[7]

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. It is difficult to assess the extent to which any project level increase in CO_2 emissions represents a net global increase, reduction, or no change; 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 recently released Final EIS completed by the National Highway Traffic Safety Administration CAFE standards, October 2008. 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 sea level rise (compared to the No Action Alternative)

[7] Intergovernmental Panel on Climate Change (IPCC). February 2007. Climate Change 2007: The Physical Science Basis: Summary for Policy Makers. http://www.ipcc.ch/SPM2feb07.pdf.

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 (EPA, 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 CAFE Standards, June 2008, pp.3-77 to 3-78]

CEQA Conclusion

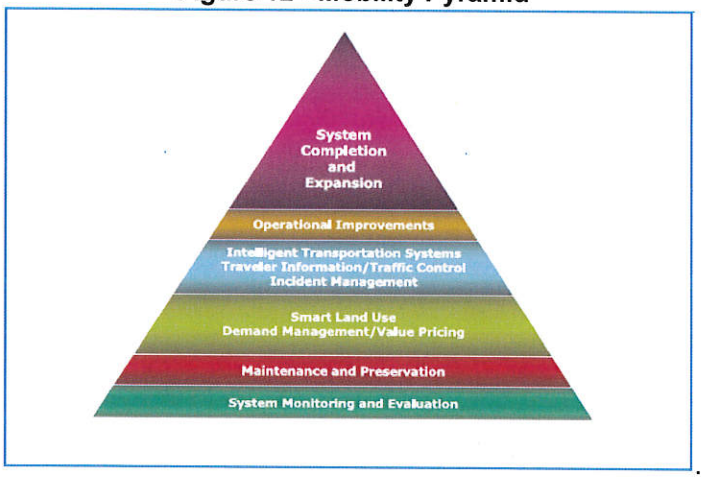
As discussed above, both the future with project and future no build show increases in CO_2 emissions over the existing levels; the future build CO_2 emissions are higher than the future no build emissions. In addition, as discussed above, there are also limitations with EMFAC and with assessing what a given CO_2 emissions increase means for climate change. Therefore, it is the Department's 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, the Department is firmly committed to implementing measures to help reduce the potential effects of the project. These measures are outlined in the following section.

Greenhouse Gas Reduction Strategies

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 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 12: The Mobility Pyramid.

Figure 12 - 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 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 30 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 30 Climate Change/CO_2 Reduction Strategies

Strategy	Program	Partnership		Method/Process	Estimated CO_2 Savings (MMT)	
		Lead	Agency		2010	2020
Smart Land Use	Intergovernmental Review (IGR)	Department	Local governments	Review and seek to mitigate development proposals	Not Estimated	Not Estimated
	Planning Grants	Department	Local and regional agencies & other stakeholders	Competitive selection process	Not Estimated	Not Estimated
	Regional Plans and Blueprint Planning	Regional Agencies	Department	Regional plans and application process	.975	7.8
Operational Improvements & Intelligent Transportation System (ITS) Deployment	Strategic Growth Plan	Department	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, ARB, 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, ARB, BT&H, MPOs		Goods Movement Action Plan	Not Estimated	Not Estimated
Total					2.72	18.18

The following measures will also be included in the project to reduce the GHG emissions and potential climate change impacts from the project:

1. The Department and the California Highway Patrol are working with regional agencies to implement intelligent transportation systems (ITS) to help manage the efficiency of the existing highway system. ITS is commonly referred to as electronics, communications, or information processing used singly or in combination to improve the efficiency or safety of a surface transportation system.

2. US 101 is part of the Bay Area high occupancy vehicle lane network, and the Metropolitan Transportation Commission (MTC) and other agencies actively encourage ridesharing (e.g., the "511.org" ridesharing information link provides resources for ride sharing and trip planning). Ridesharing, or carpooling, reduces vehicle trips and their associated emissions.

3. The project will utilize energy efficient lighting, which will be defined during final design.

Adaptation 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.

Climate change adaption must also involve the natural environment as well. Efforts are underway on a statewide-level to develop strategies to cope with impacts to habitat and biodiversity through planning and conservation. The results of these efforts will help California agencies plan and implement mitigation strategies for programs and projects.

On November 14, 2008, former Governor Arnold Schwarzenegger signed 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)[8], 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,

[8] http://www.energy.ca.gov/2009publications/CNRA-1000-2009-027/CNRA-1000-2009-027-F.PDF

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[9] to advise how California should plan for future sea level rise. The report is to include:

- 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 the Department 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 as of the date of EO S-13-08, and/or are programmed for construction funding from 2008 through 2013, or are routine maintenance projects may, but are not required to, consider these planning guidelines. The project was programmed for construction prior to 2013. Furthermore, the project is located outside the Coastal Zone and direct impacts to transportation facilities due to projected sea level rise are not expected.

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.

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[9] 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.

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.